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PhD student:

Giammarco Alderotti

Coordinator:

Prof. Elisabetta Barbi

Supervisor:

Prof. Daniele Vignoli

Prof. Alessandra De Rose

Prof. Anna Matysiak

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*“Uncertainty is the natural habitat of human life,
though the hope of escaping uncertainty
is the engine of human life pursuits”*

Zygmunt Bauman, “The Art of Life”

INTRODUCTION

The purpose of this thesis is to gain insights into the relationship between employment uncertainty and fertility in Europe. The topic is a prominent one in contemporary demographic research, but the complexity of uncertainty as a concept and the multitude of disconnected empirical studies have hampered deeper understanding, preventing any generalisation of findings. At the same time, a continuous and rapid evolution of demographic dynamics (e.g., migration and union formation) has characterised the second half of the last century until the present days, creating need for a more thorough investigation of some case studies which have been, so far, underexplored or not explored at all. Based on the current state of art, this thesis aims to provide new evidence in order to improve the knowledge about the relationship between employment uncertainty and fertility, encouraging, at the same time, further research on the topic.

The concept of uncertainty is vague and not uniquely defined. In general, it reflects uncertainty in people's minds about possible futures, or, in other words, the lack of predictability of future events (Johnson Hanks 2004; Bloom 2014). The modern definition of uncertainty dates back to almost one hundred years ago, when Knight (1921) theorised the difference between risk and uncertainty. The American economist defined 'risk' as a situation in which an individual knows the probability of a set of future events, while 'uncertainty' is referred to as individuals' inability to predict the likeliness of events happening.

Irrespective of its exact definition, uncertainty represents an immanent feature of contemporary societies. Globalisation, through the deregulation and internationalisation of labour markets, harder competition and accelerated spread of networks, generated an unprecedented level of uncertainty about economic and social developments (Blossfeld et al. 2006). The spread of uncertainty was not limited to the working class and the most vulnerable subgroups of the population; in fact, it contaminated most households, including the high-income ones (Ranci et al. 2017). What is more,

uncertainty peaks in parallel with unexpected shocks that generate instability (e.g., economic crises, natural catastrophes, conflicts). Recently, this has happened during the Great Recession which started in 2008, renewing the interest of social research into uncertainty and its consequences.

Uncertainty, and in particular economic uncertainty, is of particular concern to demographic research because of its effects on family dynamics. The notion of economic uncertainty generally refers to clarity, or the lack thereof, about future economic activities (Bloom, 2014; Moore, 2017); however, it was defined in many different ways depending on the context in which it was applied, and its operationalisation changed accordingly. To begin with, economic uncertainty might be seen as an individual risk factor, mainly related to the labour market (e.g., time-limited contracts, unemployment, atypical jobs; Kreyenfeld et al. 2012), but it could also be interpreted as a macro-level phenomenon that reflects general uncertainty felt by people in times of economic turmoil (e.g., Sobotka et al. 2011). Furthermore, economic uncertainty can be operationalised through objective and subjective indicators. Objective indicators of uncertainty, such as the type of contract or unemployment rates, are the most commonly used; nevertheless, subjective perception of economic uncertainty has also been proved recently to be related to family dynamics (e.g., Hofmann and Hohmeyer 2013). Indeed, individuals differ in the way they feel, tolerate and react to uncertainty (Bernardi et al. 2009; Kreyenfeld et al. 2010).

Increasing economic uncertainty impacts individuals' decision-making processes, jeopardising, among other aspects of life, family formation (Mills and Blossfeld 2013). Experiencing uncertainty during young adulthood may generate insecurity and conflicts at a time when people take long-term decisions that change their life deeply. Under conditions of uncertainty, it becomes more difficult to compare and choose between the various options for educational, professional or family careers, as not enough information is available about future alternatives (Mills and Blossfeld 2005). This is particularly the case for fertility decisions, since childbearing is an irreversible event; accordingly, conditions of uncertainty are nowadays viewed as primary forces behind the postponement of childbearing in contemporary Europe (Ranjan 1999; Kreyenfeld et al. 2012).

This thesis focuses on economic uncertainty intended as a micro-level factor primarily driven by labour market conditions over the life course; for this reason, it is operationalised through employment uncertainty. Unlike economic uncertainty, employment uncertainty can be directly observed, and it translates immediately into perception of economic uncertainty, because most necessary information to evaluate uncertainty depends on employment status and job characteristics (Scherer 2009; Kreyenfeld 2016). For instance, a time-limited contract implies higher insecurity about future economic conditions compared to a permanent one; or, more generally, precarious work is often accompanied by economic and career penalties.

Despite the relationship between employment conditions and family dynamics being a major topic of public interest, the employment uncertainty/fertility nexus is not at all clear. The prevailing conviction is that employment uncertainty discourages people from having children; nevertheless, premises are weak, and empirical findings produce contrasting evidence. On the one hand, as will be discussed in the following paragraphs, many relevant theories explaining why fertility behaviours have changed over the last decades did not take into consideration economic uncertainty in the analysis of the drivers of fertility change; on the other hand, evidence at the micro-level about the relationship between employment uncertainty and fertility remains ambiguous. An extensive literature on the micro-level link between employment uncertainty and fertility is available, but each article focuses on a specific study-case (e.g., a given country, in a certain period, on a selected group of individuals, etc.), producing a wealth of research outputs that are highly context-dependant, and thus hard to generalise. In addition, some sub-topics (such as the relationship between employment uncertainty and fertility among vulnerable groups – e.g., migrants – and the interrelationship between union formation and transition to parenthood) are hardly explored, leaving gaps in the literature that prevent a deeper understanding of the employment uncertainty/fertility link.

The idea that economic conditions are related to family formation is very old and can be found already in the work of Malthus. In the “Essay on Population” (1798), he listed the mechanisms that

balance the relationship between food supply and population growth, mentioning for the first time the fact that economic hardship may induce people to postpone marriage and childbearing (Kreyenfeld 2016). The assumption that people need a stable economic situation in order to start a family was maintained over time, and historical demographers still consider economic hardship as a driving factor in explaining reduced marriage and fertility rates in the past (e.g., Bengtsson and Saito, 2003). Moving back to the recent times, the importance of economic and employment conditions as determinants of fertility behaviours has increased and changed over time, in parallel with the deep transformations of the labour market that took place during the second half of the twentieth century (e.g., the increase in female labour force participation, technological changes). Researchers' interest in the relationship between labour market and fertility change produced an extensive literature aimed to explain the adaptation of childbearing behaviours to the new labour market dynamics.

Among the most influential theories, the New Home Economics (NHE) theory (Becker, 1991; Becker, 1993) considers fertility decisions as a function of individual preferences and the cost of children, under income constraints. With this economic approach, children are 'treated as goods', so that both their quality and quantity increase parents' utility, and they have a cost. The cost of children includes *opportunity cost* (namely the earning loss from reduced labour supply), childcare cost and time costs of raising a child. These costs are somehow offset by other household members' income as well as welfare benefits and taxes. The NHE theory focuses on the role of female wages (representing the opportunity cost of childbearing) as determinants of fertility. Female wages have both (positive) income and (negative) substitution effects on fertility, with opposite effects on female labour force participation. The income effect refers to the fact that when income increases, the demand for children also increases, resulting in an increase in fertility; the substitution effect implies that when income increases, the opportunity cost for having more children increases, which has a detrimental effect on fertility; hence, the overall effect of an increase in women's wage on fertility remains ambiguous (see Hotz et al. 1997 for a review). Unemployment is not explicitly considered in the models of NHE; however, understood as a zero wage, unemployment might induce a strong

income effect for families in which the husband is employed, while it should yield both income and substitution effects if a working wife loses her job (Ahn and Mira, 2002).

Another hypothesis in sociological literature is that societal level responses have raised incompatibility issues between childrearing and (female) employment (Rindfuss and Brewster 1996; Engelhardt et al. 2004, Matysiak 2011). This approach shifts the focus from women's wages to their ability to combine childbirth and labour as well as the economic sustainability of interruptions or reductions of labour supply in conjunction with childbearing and childrearing. In pre-industrial societies, non-mechanised agricultural work could be combined with child supervision without danger to the child and without loss of economic productivity (Degler 1980, Roos 1985). As industrialisation proceeded, childcare and economically productive work became gradually incompatible. Today, the workplace is usually far from home, and work schedules, set by employers, lack the flexibility required for childrearing. Thus, individuals (women especially) who wish to participate in the labour force must either limit their fertility or make alternative arrangements for childcare. Social and economic institutions play a pivotal role in this case, since they determine how easily a woman can combine work and family. Formerly, it seemed natural to associate fertility decline with the parallel increase in women's labour force participation, providing thus support for the *role incompatibility* hypothesis. Since the mid-1980s, however, the validity of the *role incompatibility* hypothesis was challenged by a number of studies showing that the correlation between female labour force participation (FLFP) and total fertility rate (TFR) has changed over time, turning from a negative to positive (Ahn and Mira, 2002; Brewster and Rindfuss, 2000; Esping-Andersen, 1999; Pampel, 2010; Rindfuss et al., 2003). This result was often explained through different reasons, such as policies that reduce incompatibilities between childrearing and female employment and the increased availability of childcare (Rindfuss et al. 2003; Brewster and Rindfuss 2000), or the increase of the income effect of female wages (Ahn and Mira 2002). Nonetheless, other authors posited that the reversal in the cross-country correlation is probably due to the presence of unmeasured country-specific factors, and to country-level heterogeneity in the magnitude of the

negative time-series association between TFR and FLFP (Engelhardt et al. 2004; Kögel 2004). Moving from the macro to the micro level, a meta-analysis of micro level studies indicates that the relationship between female labour-force participation and fertility remains negative, but the strength of the association is stronger where the male breadwinner model prevails (e.g., Southern Europe), and weaker in the Nordic countries (Matysiak and Vignoli 2008).

Macunovich (1996) analysed the US study case and suggested another possible perspective on the parallel shifts in fertility and women's participation to the labour market. In her view, the decline of men's (relative) income and the weakening of men's economic stability induced young adults to change the traditional patterns, increasing the number of two-earners households and delaying family formation. Accordingly, relative to the predominant male-breadwinner family model of the mid-20th century, women increasingly entered the labour market, and female wage reached a high level that could offset the instability of men's income. This effect was strong enough to prevent US fertility from falling to the low levels of some European countries. Such explanation relates back to the NHE theory: when women started to enter the labour market, this change resulted in a higher opportunity cost of childbearing, which deteriorated fertility – at least initially. However, as men's economic and employment uncertainty increased during the following years (together with the diffusion of alternative purchased methods of childcare), the income effect from women's work might have started to gain importance, promoting higher fertility.

A very influential theory on fertility of the last century is the Second Demographic Transition (SDT, Van de Kaa 1987; Lesthaeghe 1995). The SDT is a framework which addresses a series of massive demographic changes that took place starting from the 1950s. As the authors pointed out, *“the SDT started with a multifaceted revolution, and all aspects of it affected fertility”* (Lesthaeghe 2010, p. 6). To begin with, the invention and diffusion of the pill drove the contraceptive revolution, which permitted postponement of childbearing as a goal in its own right. Then, the sexual revolution challenged the idea that sex is confined to marriage and mainly for procreation. Finally, the gender revolution freed women from being subservient to men and husbands, asserting the right to regulate

their fertility. At the same time, a multitude of living arrangements other than marriage (e.g., premarital cohabitation) started to spread, and procreation became less connected to marriage. Taken together, these fundamental changes reoriented ideas and values of contemporary societies, bringing a rise of high order needs, such as individual autonomy and self-actualisation, which entailed a reprioritisation of careers and self-actualisation over family in post-modern societies. As a result, the pattern of fertility associated with the SDT is a marked degree of postponement: the mean age at childbearing peaked to unprecedented levels in many countries, and fertility dropped to (and in some cases remained at) below-replacement levels.

Despite the fact that these theories deal with the roles that economy and the new labour market play in relation to fertility change, none of them explicitly considers economic uncertainty as a key factor in explaining fertility transformations in high income countries. There is, however, mounting evidence of the importance of uncertainty factors in the empirical fertility literature, especially during the last two decades of the last century, namely when uncertainty in the labour market started to spread. In those years, the crisis of the Fordist model had led to a lack of job creation and a dramatic increase in unemployment rates in the West of Europe, particularly among the young. Persistently high youth unemployment was often attributed to the rigidity of European labour markets, i.e. excessive protection for permanent jobs (Cutuli and Guetto 2013). Consequently, starting from the 1980s, most Western European labour markets experienced strong deregulation, which, as some authors pointed out, mostly involved non-standard employment relations among marginal groups in the labour market, leaving standard employment and existing working contracts almost unchanged (Barbieri 2009). For this reason, the process of flexibilization hit people at the margins of the labour market stronger than anyone else and contributed to splitting the labour market into two parts: on the one hand, highly protected workers (e.g., permanent contracts holders, public employee), on the other hand highly flexible jobs (unstable and with low levels of protection, e.g., internships, temporary contracts) widespread among the youth, women, migrants and unskilled workers. This ‘partial and targeted’ deregulation (Esping-Andersen and Regini 2000) increased employment uncertainty in

many European countries, especially among the young (Bentolila et al. 2012; Rubery and Piasna 2016). Indeed, the share of temporary jobs increased everywhere, and it accounted for the most part of total employment growth in countries such as Germany, Austria and Italy. At the same time, the collapse of communism in Eastern Europe and economic restructuring led to a massive increase in unemployment in the region and to an increase in the instability of work contracts (Lehmann and Muravyev 2011). The ongoing integration of the global economy and progressive privatization and liberalization have further intensified labour market volatility and have led to an unprecedented level of structural uncertainty in Europe (Mills et al. 2005; Standing 2014). Finally, the recent Great Recession, which started in the late 2007 in the US and eventually affected all European countries, has contributed to a further spread of uncertainty in the labour markets, mainly through increasing unemployment rates. and putting downward pressure on wages. The cuts in government spending further worsened the situation of most vulnerable groups, and the proportion of individuals who experienced long-term unemployment (i.e., for more than 12 months) grew strongly in many European countries. The economic downturn hit hardest in Southern Europe and some CEE countries, where unemployment growth and downward pressure on wages were particularly intense, especially among the young (Matysiak et al. 2018).

The process of spreading uncertainty was analysed by some authors, who brought uncertainty directly into the debate about low fertility. Oppenheimer's works (1988, 1994, 2003) pioneered the literature on the relationship between growing economic uncertainty and changing demographic behaviours. Studying the remarkable changes in fertility and marriage behaviours in the US during the 1970s-1980s, she argued that women's increasing participation in the labour market was not the only important factor to look at, and that men's deteriorating economic positions could play an equally important role. In Oppenheimer's view, given the dominant male-breadwinner family model of the mid-20th century in the US, men (especially the young ones) who are not able to fulfil the role of breadwinner, lose their attractiveness as partners and fathers, because building a family and running a household cost money. More precisely, Oppenheimer's *uncertainty hypothesis* (1988) assesses that

unstable employment conditions (such as nonemployment, temporary employment, but also low-status jobs) cause uncertainty, and such uncertainty threatens men's breadwinning capability. Because lifestyle is structured by work, it is hard to predict whether men who are not (yet) settled in their careers will be able to provide in the future. The Oppenheimer's view is reflected in empirical evidence both in the US and, with some heterogeneity, in several European countries (see Kalmijn 2011). In the same period, Priya Ranjan (1999) observed that a part of countries in which fertility dropped down were experiencing a sharp increase in economic uncertainty, with inflation running high, growing unemployment rates, and vanishing job security due to processes such as the privatisation of public companies. Thus, he developed a theoretical model, following Dixit and Pindyck (1994) and the financial option literature, in which uncertainty about future income leads people to postpone childbearing to less uncertain times. Given the irreversible nature of the childbearing decision itself, individuals with an income under a certain threshold will wait to have a child until they can be more certain about income levels. On the other hand, the work by Debra Friedman and colleagues (1994) suggested that uncertainty may have a positive effect on fertility: when a woman has limited possibilities in the labour market, she might choose the "alternative career" of becoming a mother. This is even more likely if a mother has an alternative income source, for instance if her partner is established in the labour market (Vignoli et al. 2012) or if she receives reasonable support from the welfare state (Blossfeld and Mills 2005). However, this kind of behaviour is less typical of men, in particular in countries with a traditional division of household labour (Schmitt 2008). Such 'uncertainty narrative' focuses on biographical uncertainty rather than economic insecurity per se as the major consequence of job instability. The 'un-structuring' of the life course" (Hurrelmann 2003), which is a consequence of the growing demands for flexibility in the educational and vocational spheres, generates increasing biographical uncertainty in terms of which choices need to be faced and in terms of their timing. Following this narrative, life course choices that reduce the level of uncertainty can be potentially attractive. In this sense, parenthood is a way of producing biographical certainty (Kohler and Kohler 2002), and it can thus be thought of as

a force that works against the biographical uncertainty produced by precarious job situations (Bernardi et al. 2008).

Finally, some authors pointed out that the increasing speed and volatility of the outcomes of globalisation, and the new wave of technological change, made it increasingly difficult for individuals to predict their future and choose between alternatives and strategies. According to this ‘globalisation perspective’, deregulation, internationalisation and delocalisation generated unprecedented levels of uncertainty, which affected many workers and was shown to have an impact on family life as well, including fertility (Blossfeld et al. 2005; Blossfeld and Hofmeister 2006; Blossfeld et al. 2006; Kreyenfeld et al. 2012; Mills and Blossfeld 2013). Uncertainty mainly derives from precarious employment forms (e.g., fixed-time contract, part-time work) concentrated among specific groups seeking access to the labour market (youth, unemployed), and their economic insecurity. Accordingly, the sequence of events that comprise individual biographies in contemporary societies has become less stable, more complex and less collectively determined. These conditions hamper transition to adulthood, because youth require some minimum level of stability before entering a binding relationship or before having a child.

Informed on the current state of the literature, we structured this thesis according to two main goals. The first one is to systematise the current empirical evidence on the relationship between employment uncertainty and fertility in Europe (Chapter 1). This objective is met by performing a meta-analysis (namely, a quantitative literature review), which synthesizes, combines and compares all the empirical evidence available in the literature, looking at the role played by potential moderators of the relationship between employment uncertainty and fertility (e.g., gender, time, welfare system). With respect to the classic meta-analysis, already employed in social sciences (e.g., Matysiak et al. 2014), we added a methodological advancement, implementing for the first time in demographic research a Network Meta-Analysis (hereafter, NMA). The NMA allows comparisons between multiple indicators of employment uncertainty (e.g., time-limited employment, unemployment)

within a single interconnected network, producing relative rankings of the effects of each condition of employment uncertainty on fertility.

The second main goal is to provide new micro-level evidence on the relation between employment uncertainty and fertility regarding two research lines that have not (or not sufficiently) been investigated yet. First, we analysed fertility behaviours before and in the aftermath years of the Great Recession, specifically among natives and migrants, in two remarkably interesting country contexts: Italy and Sweden (Chapter 2). Migrants' fertility is a relevant topic in demographic research (see Kulu and González-Ferrer 2014; Andersson 2004), but the way in which they might react to economic shocks in terms of childbearing behaviour is largely unknown. Looking at the probability of having a(nother) child before the onset of the crisis and while it was underway among natives, recently arrived and long-term migrants, we address the lack of knowledge on migrants' fertility in times of economic uncertainty, providing evidence for two opposing case-studies. Studying migrants' fertility is not an isolated area of research, nor is it relevant only if migrants significantly shape a country's fertility. Investigating childbearing patterns of international migrants is essential in order to understand the effects of changing socio-economic, cultural, and institutional contexts on fertility behaviour, especially with a comparative perspective (Kulu and Milewski 2007). The second micro-level contribution of the thesis regards the interrelationship between union formation and fertility (Chapter 3). The large majority of studies investigate the relationship between employment uncertainty and either union formation or fertility; nevertheless, fertility does not occur in isolation, but within relationships, and employment uncertainty is likely to affect both these processes, but possibly in different ways and with different intensities. Adverse employment conditions may affect union formation by compromising assortative mating; as a consequence, individuals who struggle to enter a union are less likely to become parents. Previous studies addressing the employment uncertainty/fertility nexus suffer from selection bias, because they do not account for the fact that some men and women are selected into union, while others are not. In this way, most existing studies about the effects of employment uncertainty on partnered individuals' fertility disregard the fact that

employment uncertainty may have already entailed a selection of the analytical sample, with individuals particularly successful in the labour market being already selected into unions. By employing simultaneous hazard modelling (Lillard 1993), we analyse first union formation and transition to parenthood jointly, looking at the role played by employment uncertainty, which may lead to the postponement of marriage or uncertain relationships, not only to the postponement/avoidance of fertility. We do this for Italy, a quite unique case characterised by high youth unemployment, traditional values and low fertility rates.

The three empirical works offered by this thesis are united by a common micro-level demographic perspective, and are all anchored in the life course perspective. The life course perspective posits that individuals' lives develop across the life course, with prior events influencing later life course outcomes in a complex network of interactions between different life domains and decision-making processes (Elder 1985; Bengtson and Allen 2009; Mayer 2009; Perelli-Harris and Bernardi 2015). Both micro- and macro-level factors, as well as cultural, social and institutional dimensions structure individuals' life courses and demographic dynamics. The meta-analyses in Chapter 1 represent a synthesis of results from previous micro-level studies. The effects of individual-level variables and, when contemplated, contextual factors on fertility transitions are summarized to provide generalizable conclusions on the relationship between employment uncertainty and fertility. The meta-analysis includes studies on the impact of employment uncertainty not only on the progression to the first child, but also to higher order births. This approach recognizes fertility choices as a succession of transitions in one's life-course. Despite the second study (Chapter 2) not relying on longitudinal data, it emphasises the differences in fertility behaviour between migrants who have recently arrived to their destination country and migrants who have already lived there for a long time – and who therefore are at a later stage of their migration process. Finally, the third study (Chapter 3) addresses the interrelationship between union formation and childbearing, adopting a life course approach. Highly informative retrospective data are used to obtain complete individual life histories and to look at how (changing) employment status during the life course influences the probability of

both entering a union and having a child, net of the interrelation between the two processes. This approach explicitly acknowledges that employment uncertainty might affect several life domains in individual' family life courses, and that choices made in one life domain (fertility) might be taken simultaneously to choices made in another domain (partnership).

By making use of new methodological insights and addressing underexplored fields in the literature on the employment uncertainty/fertility nexus, this thesis aims to produce new knowledge and to provide substantive improvements to the literature, feeding further research on the topic. Each of the chapters 1, 2 and 3 presents one of the three studies included in the thesis, and they are titled, respectively, “The Relationship between Employment Uncertainty and Fertility: a Network Meta-analysis of European Research Findings” (co-authors: Daniele Vignoli and Michela Baccini, University of Florence; Anna Matysiak, University of Warsaw), “Natives and Migrants' Fertility in the Aftermath of the Great Recession: a Comparison between Italy and Sweden” (co-authors: Eleonora Mussino, University of Stockholm; Chiara Ludovica Comolli, University of Lausanne), and “The Interrelationship of Union Formation and Fertility in Italy: The Role of Employment Uncertainty”. Finally, the “Conclusions” section brings together the main findings from each study, drawing general conclusions and elaborating on the grand contribution of this thesis.

1. EMPLOYMENT UNCERTAINTY AND FERTILITY: A NETWORK META-ANALYSIS OF EUROPEAN RESEARCH FINDINGS

1.1 Introduction

The role of employment uncertainty as a key driver in fertility decision-making has long been on demographers and sociologists' research agenda. Generally speaking, the notion of employment uncertainty refers to clarity, or the lack thereof, about what will happen in the labour market and the likely availability of a stable job or, indeed, any job to cover household expenses (Scherer 2009; see also Bloom 2014; Moore 2016). Individuals who are uncertain about their future income and earning opportunities may shy away from long-term commitments and, thus, postpone leaving the parental home, setting up their own household and having children (Billari 2005). A persistent experience of uncertainty may even lead to the perpetual postponement of family formation and, as a result, to a smaller family size or even to no family at all (Busetta et al. 2019). On the other hand, individuals may use periods of employment uncertainty to have children, in particular if they have other income sources (Mills and Blossfeld 2005; Vignoli et al. 2012) or if they have little to lose in terms of future employment prospects (Friedman et al. 1994).

Empirical studies, likewise, provide no clear predictions about the relationship between employment uncertainty and fertility. Although much research has been published on the relationship between employment uncertainty and fertility, the results are heterogeneous and contradictory. What is more, micro-level studies are context-dependent, elucidating only one part of the nexus between employment uncertainty and fertility. For instance, different indicators were used to assess the effect of employment uncertainty on fertility; primarily unemployment and time-limited contracts. At the same time, researchers often focused on parity-specific transitions, on a particular time period or on specific cohorts; they also included different control variables in their model equations. All this has made for a crowded, but fragmented state-of-the-art about this topic.

This article aims to draw general conclusions from existing micro-level results about the size and the direction of the impact of employment uncertainty on fertility in Europe. We confine our analysis to European countries because they display an interesting variation in fertility and labour market patterns, while also sharing certain economic, social, and cultural similarities. By using meta-analysis techniques, we synthesized, compared and combined the empirical evidence available in the literature, taking advantage of the abundance of independent studies on this topic conducted on different data sets. Additionally, we inspected how the association between economic uncertainty and fertility changes across time and space (i.e. between different families and different labour market regimes).

Meta-analysis has been successfully employed in family demography research (Matysiak and Vignoli 2008; Matysiak et al. 2014), but with this paper we offer a step forward. In fact, we performed not only classic pairwise meta-analyses, separately comparing the effects on fertility of the two conditions of employment uncertainty – i.e., unemployment/time-limited employment vs. employment/unlimited-time employment, but also a Network Meta-analysis (hereafter NMA), which included unemployment, limited-time employment and unlimited time employment in a common network of evidence. This approach enabled us to offer general conclusions about the relative ranking of these three conditions on fertility. The NMA is widely used in medical research as a tool to combine information from clinical trials, in the presence of multiple competing treatments. Compared with pairwise meta-analyses, network meta-analysis allows for the combination of direct (informed by data) and indirect (indirectly derived from the observed) evidence. It also estimates the relative effectiveness of each treatment in respect to each other and ranks them according to their efficacy (Tonin et al. 2017). This is the first implementation of a network meta-analysis in population research.

1.2 Literature review

1.2.1 *Unemployment and fertility*

The main theoretical arguments described in the Introduction have been tested empirically at the micro-level, and all of them found supporting (and opposing) evidence in various case-studies. A major source of heterogeneity in findings is definitely the way in which employment uncertainty was operationalised. Among a variety of indicators, the ones that are most frequently used in demographic research – possibly because of data availability – are unemployment and time-limited employment.

Unemployment is a crucial indicator of employment uncertainty and it has often been used in demographic research (e.g., Özcan et al. 2010; Pailhé and Solaz 2012; Schmitt 2012b). Unemployment refers to the occupational status of individuals who are jobless, but actively seeking work. Opposing theoretical effects of unemployment on fertility can be anticipated. On the one hand, unemployment erodes household financial resources by reducing a man or a woman's income, inhibiting – in turn – the demand for children (income effect). In addition to the income effect, some authors also argue that (from the woman's perspective) unemployment may make a man appear to be less reliable as a potential father, or to be a less favourable candidate for family formation in general (Kravdal 2002). Being unemployed means uncertainties about the future, because potential parents do not know how long unemployment will last, total income loss, or the characteristics of a future job (Inanc 2015). On the other hand, unemployment might facilitate the decision to have a(nother) child by providing additional time for childbearing and childrearing (substitution effect). Substitution effects particularly applies to first births because there is a general social norm against remaining childless (Kravdal 2002; Konietzka and Kreyenfeld 2007). Given a continuing gendered household division of labour, this positive effect of unemployment on fertility is more likely to apply to women than to men. Indeed, male unemployment is more likely to signal a reduced breadwinner capability, favouring fertility postponement or even a reduction in family size (Schmitt 2008). Recently, Busetta and colleagues (2019) argued that using 'snapshot indicators' (i.e., the employment status at the time

of conception or childbirth) to operationalize employment uncertainty underestimates the complexity and variety of individuals' employment careers, and showed that persistent joblessness (namely repeated and close spells of joblessness) is closely related to low fertility intentions among women.

A substantial number of articles addressing the nexus between unemployment and fertility have meant a substantial literature on the topic. Conclusions vary though. A positive relationship between unemployment and fertility was the most frequent result among women (e.g., Liefbroer and Corijn 1999 for the Netherlands and Flanders; Andersson 2000 for Sweden; Adsera 2011b for many European countries; Gonzalez and Jurado 2006 for Spain, Italy, Germany and France; Schmitt 2008 and 2012 for, respectively, Germany and the UK; Sinyavskaya and Billingsley 2015). However, some studies also yielded a not statistically significant effect. (e.g., Gutiérrez-Domènech 2008; Özcan et al. 2010). Among the others, Kravdal (2002) examined the effect of individual and aggregate unemployment on parity-specific childbearing progressions in Norway, and, despite some negative effects of aggregate unemployment on fertility, he concluded that the effect of individual-level unemployment on fertility is negligible. By contrast, male unemployment is usually related to lower birth risks (Kreyenfeld and Andersson 2014; Neels et al. 2013; Pailhé and Solaz 2012; Schmitt 2012a). Nevertheless, in some cases unemployment was found to be positive for men's fertility: for example, Andersson and Scott (2007) found a positive relationship between men's unemployment and transition to third births in Sweden, and Kravdal (2002) found similar evidence for Norway. Finally, Inanc (2015) analysed data from the British Household Panel Study and found that unemployment is associated to an earlier entry into parenthood (both among men and women), with some differences according to the relationship status. Kreyenfeld and Andersson (2014) argue that one possible reason for such a high heterogeneity in empirical results could be that unemployment has a different meaning and significance according to the life-course stage and socio-economic position that one holds. Accordingly, using register data from Denmark and Germany, they explored how the relationship between unemployment and fertility changes adopting a life-course perspective,

and found that individual unemployment at higher reproductive ages (29-44) represents a more disturbing experience compared to younger ages in terms of fertility reactions.

1.2.2 Time-limited employment and fertility

Traditionally, employment uncertainty was operationalized through unemployment, but more recently, studies have taken contract duration into account (e.g., Sutela 2012; Pailhé and Solaz 2012). The availability of temporary employment may increase employment chances for individuals that would otherwise be cut out of the labor market (OECD 2002). In addition, some temporary jobs require lower engagement levels compared to unlimited-time employment, which, in association with reduced working hours, may facilitate work/family reconciliation among individuals who give priority to family life over career (Scherer 2009; Pirani and Salvini 2015). Some kinds of flexible contracts, even if unstable, can also increase job satisfaction, especially among highly-skilled workers (Guest et al. 2006), and entail higher wages (Kalleberg et al. 2000). Nevertheless, time-limited employment often reflects a low level of labor market integration and this is connected to low employment protection and to wage penalties (Schmitt, 2012b). In addition, individuals with time-limited employment tend to have physically stressful work, monotone and repetitive tasks, with little control over working hours. On average, they are less satisfied with their jobs and have worse physical and mental health (Benavides et al. 2000; Kalleberg 2009; Pirani 2017), with negative consequences for their private lives. Employment uncertainty generates fears and anxiety that might have negative consequences for individuals' quality of life and subjective well-being (D'Ambrosio 2012; Vignoli et al. 2018). Women are often overrepresented in fixed-term employment due, at least in part, to the greater family responsibilities they shoulder (Schmitt 2012b).

Because of the instability of temporary contracts and their low quality, one might expect that time-limited jobs would be detrimental for fertility, at least in the case of men. For women, the relationship may be more ambiguous for the same reasons that the relationship between

unemployment and family formation is ambiguous. Empirical findings are, however, not always consistent with the expectations. For instance, analyzing the transition to parenthood of European graduates, Wolbers (2007) did not find any significant difference between individuals with unlimited-time and time-limited occupations in terms of the probability that they would have a first child. Similarly, de Lange and colleagues (2014) found that time-limited employment (as opposed to permanent employment) did not affect the timing of the first childbirth in the Netherlands. On the other hand, a large number of studies support the hypothesis of a negative relationship between time-limited employment and fertility for both men and women (e.g., Dupray and Pailhé 2018 for France; Lundstrom and Andersson 2012 for Sweden; Baizan 2005 for Denmark, Spain and UK; Blossfeld et al. 2006 for Germany). Focusing on Spain, Adsera (2011a) found that the increase of temporality in employment hinders second births among women, regardless of their educational attainment. Conversely, Wood et al. (2016) showed that temporary employment reduces second birth hazards particularly among women with medium-low educational levels. When gender-differences in the relationship between time-limited employment and fertility are detected, it usually happens that this kind of employment uncertainty is more detrimental for fertility among women than among men (e.g., Pailhé and Solaz 2012).

Most of the studies cited so far concerning the relationship between both unemployment and temporary employment and fertility present results that change to different extents depending on a series of moderators. The role of such moderators in shaping the employment uncertainty/fertility nexus is discussed in the following paragraph.

1.2.3 The role of potential moderators: age, education, parity and the welfare state

Age

Young people generally live under higher uncertainty and face higher risks of unemployment and precarious employment (Sobotka et al. 2011). Accordingly, demographic literature that adopts a life course approach assumes that experiencing uncertainty in the early stages of adult life is most

detrimental for fertility decisions, because young men and women have higher margin to defer life plans such as union formation and transition to parenthood (Mills and Blossfeld, 2003). Facing repeated unemployment spells or highly precarious employment during young adulthood may indeed provoke feelings of uncertainty among people who fail into establishing themselves in the labour market. In line with the expectations, some studies show that younger women, experiencing uncertainty, are more likely to postpone childbearing than women who are reaching the end of their reproductive life (Kreyenfeld and Andersson 2014; Currie and Schwandt 2014). Another interesting age-specific result comes from Kreyenfeld (2015), who found strong differences in the uncertainty/fertility nexus by people's ages. Using panel data from Germany, the author found that perceived economic uncertainty accelerates first birth transitions at younger ages (17–26), but then, for the majority of women and men who had their first child after age 26, economic uncertainty has a strong negative impact on transition to higher parities.

Education

Following the demographic literature, experiencing employment uncertainty may have different consequences on fertility depending on the educational level. On the one hand, highly educated individuals enter the labour market at later ages, and they are likely to have jobs with long-term career tracks. Even if they experience uncertainty, they still have better opportunities in the labour market and generally higher wages. Some authors pointed out that this combination of factors makes it more complicated for highly educated ones to have a child in their early career (e.g. Liefbroer and Corijn 1999). Other studies suggest that highly-educated women are more prone to delay parenthood, as they usually have better chances for getting established in the labour market than low-educated women (Kreyenfeld 2009; Pailhé and Solaz 2012). They may also value a professional career more strongly than the lower educated and thus be more eager to search for a stable job rather than using a period of uncertainty to have a child. On the other hand, the least educated ones are usually more likely to

be employed in lower status occupation and with temporary contracts and have fewer resources because of that (OECD 2016).

Empirical evidence studying the employment uncertainty/fertility nexus education-specifically is quite limited. Among few others, Kreyenfeld (2009) and Kreyenfeld and Andersson (2014) found that women with higher education display lower first-birth rates during unemployment, while uncertainty accelerates fertility decisions among poorly educated women in Germany and Denmark. In another study, Adsera (2011a) shows that low educated Spanish women display slower transition to the second birth, while the impact of unemployment on highly educated women is relatively small. Conversely, in the same case of study, temporary employment is negatively related to second births across all educational groups.

Parity

The relationship between employment uncertainty and fertility may also depend on parity. Individuals who are uncertain about their economic prospects are usually likely to postpone family formation until when they can accumulate resources and until at least one of the partners is established in the labour market. After entering parenthood, they may, however, decide to proceed with their childbearing plans, no matter the employment circumstances. This might be because they have little time to postpone higher order births or it might be because they want to provide a companion for their first child (Kreyenfeld and Andersson 2014; Wood and Neels 2017). On the other hand, however, they may postpone or even give up the decision to enlarge the family if they (continue to) experience uncertainty after becoming parents. The negative effect of economic uncertainty on subsequent birth transitions can be even stronger than the effect on the first birth. Emotional reasons (the need for love) usually play a higher role in the decision to have the first child than they do with higher order children. Financial factors, meanwhile, typically weigh more on decisions about higher order parities (Bulatao 1981). At the same time, family enlargement may require substantial additional expenses, such as a car or a larger flat.

Welfare state

Differences between micro-level findings are also likely to be driven by the social context of a given country. Public policies play an important role in altering the effects of economic uncertainty on families (Blossfeld and Mills 2005). Welfare policies offer people some financial security and thus support them in realizing their fertility desires even in adverse economic conditions. Consequently, individuals living in countries with generous welfare support would be more likely to have a child despite a precarious labour market. Besides family policies, labour market policies (such as unemployment benefits, assistance in job searches or the level of employment protection) may also influence the relationship between economic uncertainty and fertility, by affecting unemployment duration, opportunities for entering employment and by providing financial support in the case of unemployment (Adserà 2004, 2005; OECD 2006; Caroleo and Pastore 2007). Finally, the incidence of women's labour force participation and the gender division of labour may also affect the magnitude of the relationship being studied, and in particular gender differences in that relationship. In countries where women are less present in the labour market and where the division of labour is more traditional, women may be more likely to use unemployment or temporary employment to have children. After all, it might be reasoned, by the family, that women's economic careers are less important than their male partners (Schmitt 2012b). At the same time, unemployed men and men in fixed-term contracts may be more likely to postpone childbearing in these countries.

Among European countries, Nordic countries are known for providing strong welfare support, and for implementing active labour market policies that facilitate entry into employment (Esping-Andersen 1999; Thévenon 2011). These countries are also characterized by high labour force participation among women and a more egalitarian division of household labour (Kan et al. 2011, Altintas and Sullivan 2016). Western Europe (Austria, Belgium, France, Germany, Luxembourg and the Netherlands) also provides strong financial support for the unemployed and has generous family policies (Gauthier 2002; Misra et al. 2007; Thévenon 2011), but this region (in particular Austria and Germany) still lags behind the Nordic countries when it comes to women's labour force participation

and gender equality in the household (Steiber et al. 2016). The support for families in the United Kingdom and Ireland is weaker and is only directed towards those that have the greatest need (Barbieri and Bozzon 2016). At the same time, these two countries are characterized by highly flexible labour markets with relatively short unemployment spells and low temporary employment (Adsera 2004; Caroleo and Pastore 2007). Women's participation in the labour force is moderate, and usually takes the form of part-time employment (Connolly et al. 2016) while men tend to work long hours and have limited time for their families (Adler and Lenz 2015). Finally, social assistance for families and the unemployed is least generous in Southern Europe and in the post-socialist countries of Central and Eastern Europe (CEE) (Esping-Andersen 1999; Caroleo and Pastore 2007; Javornik 2014). In addition, Southern Europe is known for high employment protection (particularly among more senior workers) and, as a result, high youth unemployment, high temporary employment and high involuntary self-employment (Barbieri and Scherer 2009; Venn 2009; Adserà 2011). The gender division of labour is heavily asymmetric, both in the east and the south, but women's employment plays a substantially greater role in the former countries, as it constitutes an important income source for families (Matysiak 2011).

1.3 Data and methods

1.3.1 Meta-sample

The premise of a meta-analysis is to cover all the articles ever published on the topic of interest. In order to accomplish this goal, a systematic procedure has been followed to retrieve articles and select them through the application of some inclusion/exclusion criteria.

We collected articles using the electronic database Scopus (www.scopus.com), the largest abstract and citation database of peer-reviewed literature with more than 60 million records. Scopus covers articles, articles-in-press, books, book chapters, and reviewed conference papers dating back to 1970. Book reviews and conference abstracts are not included. After a thorough Scopus search, we checked references within retrieved articles to find articles that had been missed or that were

published too early to be included in the database. Finally, we sent our article list to eleven experts on the topic, asking them to check whether any important contribution was missing.

The selection of the results to be included in the meta-analysis was done on the basis of several inclusion/exclusion criteria: (i) we restricted the search to studies conducted in European countries; (ii) we included only articles and book chapters, excluding conference and working papers; (iii) we excluded qualitative works that did not provide a quantitative measure of the effect of interest; (iv) we disregarded macro-level studies about employment uncertainty and fertility, as we are interested in the micro-level.

We only considered articles in English. From a very large initial number of articles retrieved in the literature, 52 papers were selected with our criteria for the meta-analysis. Out of these 52 articles, 23 deal with a comparison between time-limited employment and unlimited-time employment, and 44 with the comparison between unemployment and employment (some of them deal with both). Due to the fact that some articles reported specific analyses for subgroups (e.g., men and women, childless individuals and parents, different countries), each article might include more than one effect estimate. In fact, we obtained a final sample of 46 effect estimates regarding time-limited employment *versus* unlimited-time employment and 110 effect estimates about unemployment *versus* employment. Though, as noted in the previous section, the effects of economic uncertainty on birth risks may vary by education and by woman's age only a few studies investigated this relationship in any kind of detail. We were, thus, obliged to abstain from collecting effect sizes by woman's age and education, though this information would have been theoretically relevant.

The presence of publication bias was investigated by funnel plots, where the effect sizes from the studies in the meta-sample expressed as log odds ratios (X axis) are reported against their standard errors in descending order (Y axis) (see Figures 1A, 1C, 1E, 1G in the Appendix). An asymmetric distribution of studies indicates a relationship between the 'treatment' effect estimate and the study precision, which may derive from publication bias (e.g., only results showing significant results are published). In this case, the symmetry of the funnel plot in respect to the vertical line corresponding

to the meta-analytic overall effect is indicative of no relevant publication bias. We tested for funnel plots asymmetry using the Egger’s test (Egger et al. 1997) (see Table 1A in the Appendix).

1.3.2 Random effect meta-analysis with a Bayesian approach

From each article, we extracted one or more effect estimates (depending on whether more than two employment conditions were investigated), with the associated standard errors¹. The effect estimates consisted of relative risks (RR) or odds ratios (OR) of childbearing for individuals with a limited-versus unlimited time contract (LT/UT) and for unemployed individuals compared to the employed (UN/EM). First, for each pairwise comparison of interest, we specified random-effects meta-analysis models, which accounted not only for within-study sampling errors (measured by the estimated standard errors reported in the papers), but also for the heterogeneity of the effect size among studies. In this way, we relaxed the assumption that each estimate represented a measure of the same “true effect”, allowing for the fact that the effect size could vary according to study characteristics (Borenstein et al. 2010). When a study includes more than one effect-estimate (e.g., country-specific, gender-specific), we assume, for the sake of simplicity, independence between estimates. We performed all the meta-analyses within a Bayesian framework, which, with respect to the frequentist approach, provides a more appropriate quantification of between study heterogeneity (Sutton and Abrams 2001).

Let $(b_1, s_1), (b_2, s_2), \dots, (b_n, s_n)$ be the set of n point estimates of log RR or log OR with their estimated standard errors, the random effects meta-analysis models assume:

$$b_i | \beta_i, s_i^2 \sim N(\beta_i, s_i^2) \quad \beta_i | \beta, \tau^2 \sim N(\beta, \tau^2)$$

¹ Some studies did not report any statistics that would have allowed us to compute the standard error (e.g., t -statistics or p -value). In such cases, we followed the literature on meta-analysis and made the following assumptions. When the result was marked significant and no other details were available, we set the p -value equal to 0.05. When the result was not significant and when the upper limit was 0.05, we set the p -value at 0.55. When the significance was marked with stars only, we assumed the p -value was equal to the midpoint of its interval.

where β_i are study-specific effect estimates, β is the overall effect, expressing the average effect over the studies, and τ^2 is a term of variance expressing heterogeneity among studies.

Within the Bayesian framework, prior distributions on the model hyper-parameters must be specified, which are then combined with the likelihood of the observed data to obtain a joint posterior distribution. We specified non-informative priors on β and τ^2 (a Normal distribution with mean equal to 0 and variance equal to 10^6 for β ; an Inverse-Gamma distribution with both parameters equal to 10^{-4} for τ^2), in order to reflect our *a priori* ignorance about the value of the hyper-parameters. Then, a sample from the joint posterior distribution of the model parameters was obtained using the Gibbs sampling algorithm implemented in the WinBUGS software (Lunn et al. 2012). Three chains of 25,000 values were generated, and a 3000-run burn-in was applied. The marginal posterior distributions of the parameters of interest were obtained through the marginalisation of the joint posterior distribution. Finally, as a robustness check, we performed all the meta-analyses also with a frequentist approach, and results are remarkably similar to the ones obtained through the Bayesian paradigm. The results of the frequentist meta-analyses are reported and briefly commented in the Appendix (Tables 1B-1C-1D-1E).

1.3.3 *Uni-variate and multi-variate analyses*

The impact of employment uncertainty on fertility has been shown to present different connotations between genders. In addition, it is a well-established fact that these relationships may be further modified by social context. We thus clustered the countries covered by the original studies into country groups and considered gender and country group as possible moderators of the relationship between employment uncertainty and fertility.

We next investigated: whether the effects of economic uncertainty on fertility obtained from more recent data are stronger than those based on older data; whether they differed between a transition to first or to second and higher order birth; and whether they depended on controls for

income (any source of income, either individual or household) and partners' characteristics (educational attainment, labour market status, earnings). We performed this investigation within the meta-regression framework, controlling for gender and country group. The meta-regression model can be formalized as follow. Let x_1, x_2, \dots, x_K be K covariates to be included in the meta-regression model and $\gamma_1, \gamma_2, \dots, \gamma_k$ the associated parameters, we assumed:

$$b_i | \beta_i, s_i^2 \sim N(\beta_i, s_i^2) \quad \beta_i | \gamma_1, \dots, \gamma_K, \tau^2 \sim N\left(\sum_{k=1}^K \gamma_k x_{ki}, \tau^2\right)$$

As in the previous models, vague priors were specified for the hyper-parameters: $\gamma_k \sim N(0, 10^4)$; $\beta \sim N(0, 10^6)$; $\tau^2 \sim IG(0.001, 0.001)$. The meta-regression was estimated separately for the effect of unemployment *versus* employment and the effect of time-limited *versus* unlimited employment.

Controlling for gender and country group, we first added parity and period as explanatory variables. The variable “parity” was a dummy that was equal to 0 if the effect referred to the progression to first birth individuals and equal to 1 if the effect referred to the progression to second and higher-order births. The variable “period” was computed as the median year of the study period. For example, if the original model included births which happened between 1990 and 2000 the period was set equal to 1995. Furthermore, we added the variable “income”, which assumed the value 0 if the estimated effect was adjusted for individual or household income, and 1 otherwise; and the “couple”, which was 0 if the study did not control for partner's characteristics and 1 otherwise. Considering the small sample size, we preferred to use two separate models to investigate the “couple effect” and the “income effect”.

1.3.4 Network meta-analysis

The NMA allowed for a comparison between multiple conditions of employment uncertainty. We pooled together the collected evidence in a network of comparison between unlimited time employment, time-limited employment and unemployment. Figure 1.1 exemplifies the difference between a classical pairwise meta-analysis and a network meta-analysis. It should be noticed that the

NMA did not include the effect estimates that compared unemployed and employed individuals when the latter category included both time-limited and unlimited-time workers. This was because of the need to focus on mutually exclusive employment conditions. Consequently, while the number of effect-estimates involving time-limited employment did not change, the number of effect-estimates involving unemployment falls to 24 (see Table 1F in the Appendix for a complete list of studies and their inclusion in the meta-analyses and in the network meta-analysis).

Along with the within-trial variability and between-trial heterogeneity, network meta-analysis exhibits an additional source of variability that is termed “inconsistency”. Heterogeneity captures discrepancies between estimates of the same effect arising from studies with the same design (two study have same design when they compare exactly the same set of conditions). “Inconsistency” is a special kind of heterogeneity that captures divergences arising when the same effect is measured in studies with different designs (e.g., the effect of time-limited employment on childbearing may differ when it comes from studies that restrict comparisons of fertility behaviour of time-limited vs. unlimited-time employed individuals, with respect to studies of the whole population, which also include unemployed and inactive individuals), or when direct and indirect evidences provide different results (e.g., the effect of time-limited employment as opposed to unemployment on fertility is either directly observed or derived from other effect-estimates). Following Higgins et al. (2012), we specified a model which accounted for inconsistency through the inclusion of random terms w on specific comparisons. The model can be formalized as follows:

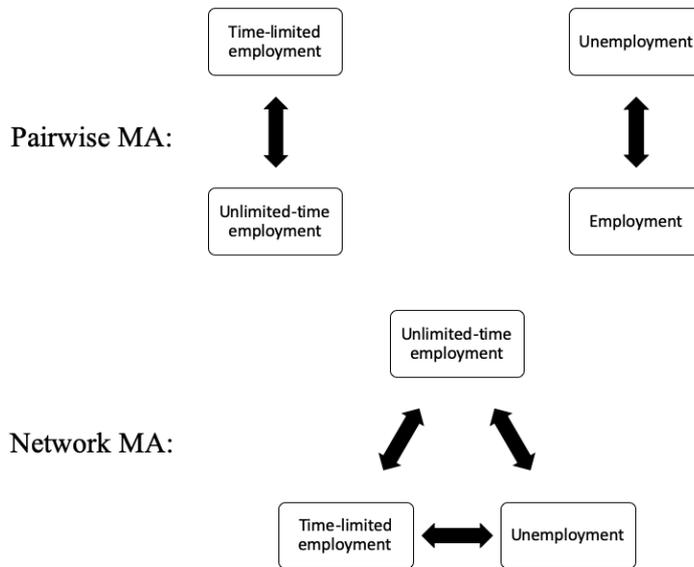
$$Y_{ibk} \sim N(d_{bk} + u_{ibk} + w_{bk}^{D_i}, \sigma_{ibk}^2)$$

$$u_{ibk} \sim N(0, \tau_{bk}^2) \quad w_{bk}^{D_i} \sim N(0, \tau_w^2)$$

where i indicates the study; k, b are the “treatments” that we are comparing (here, two of the three employment conditions of interest); Y_{ibk} is the estimate of the effect of the *treatment* k when compared with b in the i -th study; σ_{ibk} is the estimate of the standard error of Y_{ibk} ; d_{bk} is the average effect of the *treatment* k when compared with b ; u_{ibk} is a random term from a Normal distribution with mean equal to 0 and variance τ_{bk}^2 ; τ_{bk}^2 expresses the heterogeneity among studies for the comparison k versus b ;

$w_{bk}^{D_i}$ is a random term from a Normal distribution with mean equal to 0 and variance τ_w^2 which expresses the inconsistency for the comparison k versus b in the design of the i -th study (D_i); τ_w^2 captures the network incoherence. Following Higgins et al. (2012), some of the $w_{bk}^{D_i}$ terms were set to zero, in order to avoid over parametrization of the NMA model. We assumed random terms in the model to be mutually independent. Non-informative priors were defined on all the hyper-parameters in the model: Normal distributions with large variance $N(0, 10^5)$ for the effect measures d_{bk} , and Inverse Gamma distributions $IG(10^{-3}, 10^{-3})$ for τ^2 and τ_w^2 (Lumley 2002; Lu and Ades 2006).

Figure 1.1 – Scheme of the classic pairwise meta-analyses and network meta-analysis implemented in this chapter.



1.4 Results

1.4.1 Search outcome

Table 1.1 shows, separately for the employment condition investigated, how many effect estimates were available for each subgroup defined, according to gender, parity and country group.

The original studies more often investigated the relationship between economic uncertainty and fertility among women than men and they more often looked at the transition to parenthood than to higher order births. In fact, only eight studies investigate transition to higher-order parities among

individuals with time-limited employment. We would have liked to include Central and Eastern European countries in the analysis of time-limited employment, but we did not find enough articles compatible with our criteria.

Table 1.1 – Meta-samples for the two pairwise meta-analyses (time-limited employment vs. unlimited-time employment; unemployment vs. employment).

Meta-sample		No of estimates		No of estimates	
Time-limited employment vs. Unlimited-time employment	Women	32	Nordic countries	5	
	Men	13	Western countries	15	
	Childless	36	Southern countries	16	
	Parents	9	German-speaking countries	5	
Unemployment vs. Employment	Women	81	Nordic countries	28	
	Men	26	Western countries	27	
	Childless	64	Southern countries	16	
	Parents	43	German-speaking countries	27	
			CEE countries	10	

Note: Nordic countries (Denmark, Finland, Norway, Sweden), Western countries (Belgium, France, Ireland, Netherlands, the UK), Southern countries (Italy, Greece, Portugal, Spain), German-speaking countries (Austria, Germany, Switzerland) and Central and Eastern European – CEE – countries (Armenia, Bulgaria, Estonia, Georgia, Hungary, Latvia, Lithuania, Moldova, Slovenia, Slovakia, Poland, Russia, Romania, the Czech Republic).

Source: our elaboration on meta-sample

1.4.2 Unemployment and fertility

Pairwise meta-analyses

We performed meta-analyses on all the available effect estimates and, then, separately by gender and by gender and geographical area. For each meta-analysis, the following results are reported (Tables 1.2 and 1.3): posterior mean of the overall effect ($OR = \exp(\beta)$); probability p ; posterior median of the I^2 index and number of effect estimates covered by the meta-analysis. We call p the posterior probability for the effect to be larger than one (when the posterior mean was larger than one) or smaller than one (when the posterior mean was lower than one). In other words, p shows how much of the posterior distribution of the overall effect lies above or below 1: a value of p close to 1 refers to a reliable estimate. The I^2 index represents the percentage of total variability explained by between-study heterogeneity (Higgins and Thompson 2002): the higher the level of I^2 , the higher the

heterogeneity among studies (see Huedo-Medina et al. 2006 for guidelines on how to interpret I^2). The funnel plots are reported in Figures 1A and 1C, and the posterior distributions of the effects are plotted in Figures 1B and 1D (see Appendix). The funnel plots, reported in Figures 1A and 1C, are overall symmetric, except that one for the global meta-analysis on women. This is confirmed by the Egger's test for funnel plots' asymmetry (see Table 1A in the Appendix). As can be seen from the plot (Figure 1A), there are fewer effect-estimates in the lower left-hand corner; this means that a lower number of studies reporting a negative and uncertain (i.e., with large standard errors) effect of unemployment on women's fertility were retrieved. However, no significant publication bias is detected once the sample is further divided by country groups.

Although the findings for men were based on a much smaller number of effect sizes, our results suggest a substantial difference in the relationship between unemployment and birth risks between men and women (Table 1.2): while unemployed men were less likely to have a child than their employed counterparts (-9%), women exhibited higher odds of childbearing if unemployed (+9%). We also investigated how these findings by gender vary by country group (Table 1.3). Overall, we observed that unemployed women were consistently more likely to have a child than the employed ones in all country groups save in the Southern European countries, and that unemployed men were less likely to have a child in all country groups apart from Western countries (though the findings for men in Western European countries were rather uncertain, $p = 0.57$). Finally, our findings show that results concerning women are in general more heterogeneous than those about men, suggesting a higher uncertainty around results about women and, potentially, a larger role of context. It should also be noted that for CEE countries we located only one study on men's unemployment and fertility and for Southern Europe only two studies. We thus decided to show no estimates for these groups.

Table 1.2 – Random-effects meta-analyses about unemployment versus employment, gender-specific results. ORs are reported.

	Average effect	p	I ²	Number of effect-sizes
Women	1.09	0.99	32.7%	81
Men	0.91	0.93	16.4%	26

Note: “p” is the proportion of simulated OR that are smaller (or larger) than 1, if the average OR is smaller (or larger) than 1).

Source: our elaboration on meta-sample

Table 1.3 – Random-effects meta-analyses about unemployment versus employment, results by welfare states. ORs are reported.

Country group	Gender	Average effect	p	I ²	Number of effect-sizes
Nordic	Women	1.02	0.86	12.69%	20
	Men	0.92	0.93	3.11%	8
Western	Women	1.27	0.98	76.67%	20
	Men	1.04	0.57	34.03%	6
Southern	Women	0.95	0.75	28.51%	13
	Men	-	-	-	2
German-speaking	Women	1.17	0.99	14.48%	19
	Men	0.82	0.87	39.08%	8
CEE	Women	1.34	0.96	4.75%	6
	Men	-	-	-	1

Note: “p” is the proportion of simulated OR that are smaller (or larger) than 1, if the average OR is smaller (or larger) than 1).

Source: our elaboration on meta-sample

Meta-regression

As a second step, we studied the role of parity, period, and partner’s characteristics for the relationship between economic uncertainty and fertility by gender by performing meta-regressions. We did not include the indicator about income from work, because the unemployed do not have an income from work, and too few studies controlled for household income. In Table 1.4 we reported the posterior means of the meta-regressions and the posterior probabilities p . In this case, p is the posterior probability that the meta-regression coefficient is either positive (if the posterior mean is positive) or negative (if the posterior mean is negative).

Parity did not appear to be a relevant moderator of the effect of unemployment on fertility ($p=0.72$ among women, $p=0.54$ among men). Conversely, there was a negative effect of the period: more recent articles found a more strongly negative relationship between unemployment and fertility

among men. Finally, studies at the couple-level found, for men, a weaker negative effect of unemployment on fertility than individual-level studies, suggesting that studies that fail to account for partners' characteristics overestimated the effect of male employment uncertainty on fertility.

Table 1.4 – Meta-regression (dependent variable: effect-estimates about unemployment vs. employment). The model controls for welfare state.

	Women (n=78)		Men (n=25)	
	Coefficient	<i>P</i>	Coefficient	<i>p</i>
Second or higher order birth (<i>ref. first birth</i>)	0.036	0.72	-0.013	0.54
Period	-0.007	0.96	-0.016	0.91
Couple level (<i>ref. individual level</i>)	-0.017	0.60	0.177	0.92

Note: results are controlled for gender and welfare state grouping; “p” is the proportion of simulated coefficients that are smaller (or larger) than 0, if the average coefficient is smaller (or larger than 1).

Source: our elaboration on meta-sample

1.4.3 Time-limited employment and fertility

Pairwise meta-analyses

Results about the relationship between time-limited contracts and fertility show that working with a time-limited contract has a significant negative effect on fertility, for both men and women. This effect is particularly strong for women, who have a 14% lower risk of having a child if they work on a fixed-term contract (in comparison to women on time-unlimited contracts, see Table 1.5). This estimate is very reliable because the *p* is 1 and heterogeneity is low. The effect for men is weaker and less precise.

We also investigated how these effects vary by country group (Table 1.6). We decided to present only the findings for women by country group. We did so as we have few estimates for men. We also show the results for women and men combined, as the effect of time-limited employment on fertility seems to be negative for both of them. The OR of having a child for time-limited female workers compared to unlimited-time female workers goes from 0.88 in Western European countries to 0.81 in Southern Europe, while it is not significant in Germany. The relationship between time-limited employment and fertility is strongest in the Scandinavian countries where the OR for women

is 0.74 (and 0.81 for the whole sample), although based on a low number of original studies. In this analysis, the I^2 index (56.61%) is indicative of a moderate heterogeneity among Nordic studies.

The funnel plots (Figures 1E and 1G) are substantially symmetric and the Egger's tests not significant, suggesting the absence of publication bias. The posterior distributions of the overall effects are shown in Figures 1F and 1H (see Appendix).

Table 1.5 – Random-effects meta-analyses about time-limited employment versus unlimited-time employment, gender-specific results. ORs are reported.

	Average effect	p	I^2	Number of effect-sizes
Women	0.86	1.00	0.9%	32
Men	0.94	0.97	0.7%	13

Note: “p” is the proportion of simulated OR that are smaller (or larger) than 1, if the average OR is smaller (or larger than 1).

Source: our elaboration on meta-sample

Table 1.6 – Random-effects meta-analysis for time-limited employment *versus* unlimited-time employment, results by welfare states. ORs are reported.

Country group	Gender	Average effect	p	I^2	Number of effect-sizes
Nordic	Women	0.74	0.93	56.61%	3
	Total	0.81	0.98	32.9%	5
Western	Women	0.88	0.96	16.97%	9
	Total	0.89	0.99	4.93%	15
Southern	Women	0.81	0.99	0.43%	14
	Total	0.81	0.99	0.35%	16
German-speaking	Women	0.95	0.62	10.62%	3
	Total	0.99	0.54	4.91%	5
CEE	Women	-	-	-	-
	Total	-	-	-	-

Note: “p” is the proportion of simulated OR that are smaller (or larger) than 1, if the average OR is smaller (or larger than 1).

Source: our elaboration on meta-sample

Meta-regressions

Table 1.7 shows the result from meta-regression models in which we studied the role played by parity, period, partner's characteristics, and income. Due to the small size of the time-limited vs. unlimited time employment sample, it was impossible to run gender-specific meta-regressions. The

results of these were too imprecise, yielding unreliable estimates. Accordingly, Table 1.7 reports average effects across genders. We consider this approach to be appropriate given that our descriptive findings suggest no substantial differences between men and women in terms of the effects of time-limited employment on fertility.

Results show that time-limited employment is slightly more detrimental for parents' transition to higher-order parities than for the transition to parenthood. As regards the effects of the period of analysis, we detected a relatively small, but non-negligible negative effect: the effect of time-limited employment on fertility becomes stronger over time. The positive coefficient for the couple indicator indicates that studies that controlled for some of the partner's characteristics found, on average, a smaller effect of uncertainty on fertility. Finally, the income variable had a positive coefficient, which means that studies that measured the effect of time-limited employment on fertility controlling for individuals' income, found on average a weaker effect with respect to studies that did not control for income.

Table 1.7 – Meta-regressions (dependent variable: effect-estimates about time-limited employment vs. unlimited-time employment). All models are controlled for gender and welfare state, n=44.

	Model 1	p	Model 2	P
Second or higher order birth (ref. first birth)	-0.016	0.97	-0.018	0.98
Period	-0.004	0.90	-0.004	0.89
Couple level (ref. individual level)	0.087	0.95		
Control for income (ref. no control for income)			0.104	0.97

Note: results are controlled for gender welfare state grouping. "p" is the proportion of simulated coefficients that are smaller (or larger) than 0, if the average coefficient is smaller (or larger than 1).

Source: our elaboration on meta-sample

1.4.4 Findings from the network meta-analysis

Focusing on the subset of papers addressing the comparisons between time-limited *versus* unlimited-time employment and unemployment *versus* unlimited-time employment, we defined a network involving three conditions: unlimited-time employment, time-limited employment, and

unemployment. The NMA allowed us to estimate, at the same time, the ORs of time-limited employment and unemployment in respect to unlimited-time employment (taken as the reference), and so we were able to rank the three employment conditions according to their effect on fertility. Note that with the NMA we obtained a posterior distribution of the rank of each employment condition. Thus, we computed the median rank from each distribution, and rounded it to the closest integer for ease of reading. This produced the rank reported in Tables 1.8 and 1.9. First, we conducted a NMA on the whole subset of studies, and then we did so separately for men and women. Finally, we ran a gender-specific NMA for childless individuals and parents. Note that we could not run meta-analyses specific to welfare states (as in pairwise meta-analyses) due to the small sample size.

Our findings turned out – again – to be clearly gender-specific. We found that, among women, limited-time employment had a worse effect on fertility than being unemployed (with respect to unlimited-time employment). There was an OR of time-limited versus unlimited-time employment equal to 0.88, and an OR of unemployment versus unlimited-time employment equal to 0.97. For men the opposite was true. We found unemployment to be more detrimental for fertility than fixed-time employment (OR=0.87 vs OR=0.93) (Table 1.8). This is a novel result: the gender-specific ranking of unemployment and term-limited employment was possible because this study employed an NMA.

As regards the differences between childless individuals and individuals who already have at least one child, Table 1.9 shows that the relationship between employment uncertainty and the transition to parenthood is not different from that of the pooled sample. The same result is found for the transition to higher parities among women: having time-limited employment is the most detrimental employment condition for women who want to enlarge their family, with an OR of time-limited employed *versus* unlimited-time employment equal to 0.90. Unfortunately, the number of studies focusing on the transition to higher parities among men is not large enough to allow a specific NMA. For the sake of simplicity, results about heterogeneity and inconsistency are not reported in the tables. However, the heterogeneity index is always higher than the inconsistency index,

suggesting that the largest share of the total variability originates from the between studies variance, rather than from differences due to the study designs.

Table 1.8 – Network meta-analysis, results by gender. Odds ratios are reported.

women					men				
rounded rank	Effect	OR	p	n	rounded rank	effect	OR	p	n
#1	time-limited	0.88	0.99	52	#1	unemployment	0.87	0.97	22
#2	unemployment	0.97	0.74		#2	time-limited	0.93	0.92	

Note: “p” is the proportion of simulated OR that are smaller (or larger) than 1, if the average OR is smaller (or larger than 1).

Source: our elaboration on meta-sample

Table 1.9 – Network meta-analysis, results by parity and gender. Odds ratios are reported.

	transition to the 1 st child					transition to second or higher parity				
	rounded rank	Effect	OR	p	n	rounded rank	effect	OR	p	N
Women	#1	time-limited	0.89	0.97	40	#1	time-limited	0.90	0.87	12
	#2	unemployment	0.98	0.66		#2	unemployment	1.01	0.52	
Men	#1	unemployment	0.88	0.97	12	-				
	#2	time-limited	0.93	0.93						

Note: “p” is the proportion of simulated OR that are smaller (or larger) than 1, if the average OR is smaller (or larger than 1).

Source: our elaboration on meta-sample

1.5 Discussion

The relationship between employment uncertainty and fertility has proved of increasing interest to researchers. The evidence produced by these studies has been equivocal and inconsistent, however. Because micro-level studies have often focused on one country or a particular issue, they have been unable to offer generalisable findings. The meta-analysis reported in this paper was undertaken to remedy that problem: it was based on findings on the impact of employment uncertainty on fertility in European countries from the early 1970s to 2015.

Several conclusions can be drawn from the study. First, our findings revealed a clear gender-specific effect for both time-limited employment and unemployment on childbearing. From the pairwise meta-analyses, we found that having a time-limited job is strongly detrimental for women’s

fertility, while the effect on men is smaller and weaker. Conversely, being unemployed significantly reduces fertility among men, but it can increase fertility for women (in all areas but Southern Europe). Results from the NMA confirm and generalize this ranking: taking unlimited-time employment as a reference category, unemployment has the worst effect on men's fertility, and time-limited employment has the worst effect on women's fertility. We explain this result recalling the male breadwinner model: in a couple, the man is often the main earner, and being employed represents a prerequisite for childbearing and childrearing. Hence, having a time-limited job is always better than being unemployed for men. Temporary employment, which is especially diffuse among women, makes family-work reconciliation harder. Furthermore, the opportunity cost of childbearing is usually particularly high for women in non-permanent employment. This outcome is, in the end, very much in line with the traditional micro-economic interpretation that emphasizes the husband's breadwinner capacity. Couple's fertility is impacted by men's unemployment to a larger degree than by women's. Having a place in the labour market which restores men's social status and their role as income provider is a prerequisite for having children. But increasingly both partners search for employment before having children. The precariousness of contemporary labour markets – often gendered, with women more exposed to employment uncertainties than men – is central in European fertility dynamics.

Second, the welfare state proved to be a significant moderator of the relationship between employment uncertainty and fertility. Our findings show that the negative impact of time-limited employment on fertility is the strongest in Southern Europe countries, where social protection is lowest. There is, meanwhile, no effect in countries like Germany and Austria. Similarly, unemployment proved to be strongly detrimental for fertility especially in Southern Europe. Recently, Barbieri and Bozzon (2016) showed that the risk of entering poverty at childbirth in Southern Europe is elevated compared to other European Union welfare clusters. This was especially true for single-earner families and dual-earner families with precariously employed or unemployed members. The low protection of the Southern European family and social policies plays a crucial role here. Poor

labour market prospects and welfare state performance, characterized by familialism, low levels of state support for childcare, and difficulties in balancing work and family life particularly for women create, a family unfriendly environment (Barbieri and Scherer 2009; Barbieri et al. 2015).

In addition, results from the meta-regressions show that the relationship between employment uncertainty and fertility has not remained steady over time. During the decades covered by our meta-study, the effect of both unemployment and time-limited employment on fertility has become more negative. The oldest collected works include data from the late 1970s and 1980s. The collected works mostly covered, though, the 1990s and, especially, the 2000s, when the diffusion of time-limited jobs started to become an issue. There are also some very recent publications spanning the years of the Great Recession. Reflecting on the deep transformations in labour market dynamics over the last forty years (de-regulation and structural and individual insecurity levels), the nexus between employment uncertainty and childbearing gradually became more and more negative. A similar trend suggests that the persistence – or even the escalation – of employment uncertainty levels hampers fertility with growing intensity, at least in institutional contexts which failed to adapt to the abovementioned changes in economic and social conditions.

On average, the effect of employment uncertainty on fertility also changes depending on parity. Most studies we located addressed the relationship between employment uncertainty (mostly unemployment) and the transition to first birth. The results showed that employment uncertainty might also be important for the transition to higher-order births. Earlier, we formulated two competing hypotheses. The first one presupposed that employment uncertainty matters less for higher-order births, as individuals who made a transition to parenthood late usually face stronger time constraints and need to speed up their transition to the second child if they want to give a companion to their first child. The second hypothesis assumed that employment uncertainty may, in fact, discourage people from having a second or higher order child, as the decision to have a subsequent child may be less emotionally driven and more strongly determined by financial constraints than the decision to have a first child. While we did not find unemployment to have differential effect on fertility by parity, our

findings on the impact of time-limited employment are strongly in line with the second hypothesis. This finding suggests that having a stable source of income is crucial for enlarging the family, more so than for entering parenthood. Our results suggest that future research should concentrate on the impact of economic uncertainty not only on the progression to the first child – a standard practice in this literature – but also to higher order births.

Finally, this article also uncovered two potential mechanisms through which employment uncertainty affects fertility. Studies in which the authors did not control for at least one of the partner's characteristics (e.g., educational level, employment condition, income) report, on average, a stronger effect of employment uncertainty on fertility. The extent to which uncertainty due to precarious employment conditions affects individuals' fertility outcomes also depends on their partner's employment status. Since the decision to have a child is usually made within couples, partner's characteristics might compensate for his or her job uncertainty. In a similar vein, when studies did not control for the respondent's or household income, a stronger negative effect of employment uncertainty on fertility was detected. Such results are particularly supported by data for time-limited employment. Income is a pivotal factor in properly assessing the relationship between employment uncertainty and fertility. After all, having a time-limited job does not necessarily lead to poverty and, consequently, not all temporary jobs are "bad jobs". Some individuals may even decide voluntarily to work on time-limited contracts, in well-paid, high-level occupations. Such freedom of choice does not necessarily hinder fertility. We conclude that income and partner's characteristics are crucial mediators of the effects of employment uncertainty on fertility: failing to control for income and partner's characteristics leads to an overestimation of the negative effect of employment uncertainty on fertility.

Our study did not cover all possible sources of employment uncertainty. For instance, involuntary part-time contracts, on-call jobs and informal jobs are also important channels of employment uncertainty. We were not able to include studies which investigate fertility effects of these work arrangements in our analyses due to their limited number. Nonetheless, this paper

contributes to our knowledge about the relationship between employment uncertainty and fertility in Europe. It does so by integrating and systematizing the existing quantitative findings on the influence of unemployment and term-limited working conditions on fertility. Employment uncertainty has become an intrinsic feature of the globalizing world, and its effects on fertility are a major research topic for the years to come. With the meta-analysis presented in this article we helped translate the fragmented micro-level findings on the topic into general conclusions about the effects of employment uncertainty on fertility, which should also feed further research on the topic.

2. NATIVES AND MIGRANTS' CHILDBEARING IN THE AFTERMATH OF THE GREAT RECESSION: A COMPARISON BETWEEN ITALY AND SWEDEN

2.1 Introduction

The impact of economic crises on population dynamics has been on the demographers' agenda for a long time (Malthus, 1798; Easterlin, 1987; Livi Bacci, 2001). The overall outcome of such strand of research is that economic uncertainty influences negatively fertility decisions, at the very least in terms of timing, inducing a postponement of childbearing, but possibly also affecting the quantum of fertility (Sobotka et al., 2011, Comolli and Bernardi, 2015, Caltabiano et al. 2017). The evidence about the consequences of the Great Recession of 2008 in Europe is in line with such findings, with many studies reporting a strong correlation between, for instance, increasing unemployment rates and fertility decline (Sobotka et al., 2011; Goldstein et al., 2013; Testa and Basten, 2014; Bellido and Marcén, 2016; Comolli, 2017). Despite the rich and growing literature on the association between economic uncertainty and childbearing, however, the evidence regarding migrants' fertility behaviour during crisis is scarce. The aim of research on immigrant fertility is usually to understand fertility patterns after immigration and if (and how) immigration influences fertility levels. Nevertheless, migration is only one in a series of potential factors that may interact with each other and shape fertility behaviours in times of economic recession, such as the labour market attachment and the national context. Indeed, being generally more weakly attached to labour market and facing greater financial and employment uncertainty, migrants represent a relatively more vulnerable group in society than natives (Sobotka et al., 2011). Sobotka (2017) shows that in 11 out of the 15 European countries considered, in the period 2008-2013, Total Fertility Rate (TFR) fell much more pronouncedly among migrant than natives. It is certainly the case for Italy, where TFR dropped by about 2% among natives and 20% among migrants, while in other countries such as Sweden, the decline in natives' and migrants' fertility was similar (below 5%).

Starting from this macro-level evidence, the first contribution of this paper is to investigate how differently childbearing behaviour changed during the Great Recession at the individual level among migrants compared to natives. More specifically, we assume recent migrants to be more negatively affected by the crisis, i.e. more vulnerable, because of their weaker integration in the labour market. Consequently, following the existing evidence on the negative association between uncertainty and fertility, we assume them to postpone childbirth more than others. Conversely, long-term migrants are more likely to have achieved living and employment conditions similar to natives (Chiswick, 1978; Amuedo-Dorantes and de la Rica, 2006), thus being more protected vis-à-vis the crisis and postponing childbirth to a lesser degree than recently arrived migrants.

The second contribution of this study is the investigation of a more traditional dimension of vulnerability, i.e. career instability. Permanent and tenured job positions tend to be more secure during economic downturns compared to temporary contracts, non-standard employment or recently acquired jobs. A solid position in the labour market is usually considered a precondition to parenthood while unstable careers are typically linked to postponement or renunciation to parenthood (Vignoli et al., 2012). Additionally, as emerged from previous studies, also the type of occupation and fertility choices are interrelated, since different occupations generate specific working conditions and socio-economic settings that may protect and affect family dynamics differently, especially in times of economic uncertainty (Ohlsson-Wijk, 2015; Ekert-Jaffé et al., 2002).

Third, childbearing behaviours during economic recession and more in general the association between economic and labour market uncertainty and childbearing differs quite a lot not only across social groups but also across national contexts (Adsera, 2004, 2005). The heterogeneity in the degree of coverage of social and family policies mediates the effect of economic shocks on childbearing decisions. Similarly, the degree of protection of the insiders vs. outsiders (e.g., Barbieri and Cutuli 2016), the diffusion of precarious contracts, the rigidity of the salary scale, among other labour market features, also mediate the effect of employment insecurity on family decisions, so that having a stable or an unstable career might matter in some contexts more than in others. In addition, welfare and job

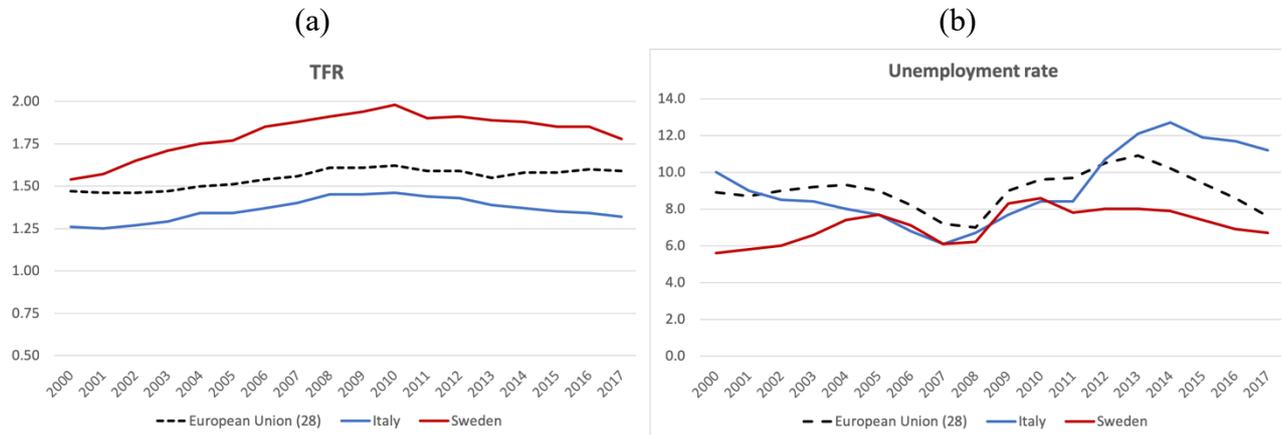
market dimensions can vary across our social groups of interest - migrants vs. natives - insofar as, for instance, a country grants access to social benefits based on citizenship. Putting together these three contributions, we consider economic uncertainty both at the micro-level (e.g., employment status) and at the macro-level (e.g., the different stages of the Great Recession and different national contexts), looking at uncertainty in a wider array of sources of socioeconomic vulnerabilities.

Matysiak and colleagues (2018) analyse the impact of the Great Recession on 258 regions in 29 European countries and find the greatest fertility decline in regions in which the crisis hit the hardest and where the welfare state provided lower support for the socioeconomically disadvantaged (Southern and Central-Eastern Europe). An exception to this pattern is represented by the Nordic countries in which the recession was milder and welfare support is generous, but, despite that, the TFR dropped substantially. Informed by this empirical puzzle, the present paper analyses two countries, Italy and Sweden, both characterised by a substantial and prolonged fertility decline after 2010 but that represent two opposite cases in the Matysiak et al (2018) framework. Italy represents a typical case of strong recession-poor welfare and Sweden a typical case of weak recession-generous welfare provisions². Figure 2.1 shows in fact that both countries registered a steady decline in total fertility rates after 2010 with Sweden moving from 1.98 to 1.85 in 2013, and Italy from 1.46 to 1.34 in the same years (Eurostat 2018). Moreover, the trend in one of the main indicators of the status of the economy, unemployment rate, has been remarkably similar during the years leading to the onset of the fertility decline. Figure 2.1 shows that between 2005 and 2010 unemployment in the two countries followed an identical trend of initial decline and subsequent increase. It seems that the macroeconomic conditions preceding the fertility decline were somehow similar in the two countries but started to diverge after 2011, when unemployment rates went on increasing in Italy while levelling

² It is important to acknowledge that, besides their welfare states and the extent to which they were hit by the Great Recession, the two countries differ substantially in a number of other dimensions: migration history, female employment participation and labour market features more generally. These differences are difficult to single out and assessing which contextual features explain the change in childbearing probability during the recession in Italy and Sweden goes beyond the scope of this paper.

off and then declining in Sweden. Our investigation contributes to shed light on this open empirical debate on the fertility rates' decline in Sweden despite the Great Recession being comparatively mild and short lived (Kulu and González-Ferrer, 2014).

Figure 2.1 - TFR (2000-2017) and unemployment rate (2000-2017) in Sweden and Italy.



Source: Eurostat (2018)

2.2 Background

The literature about labour market dynamics and fertility in general is discussed in the Introduction and in the previous chapter. In the following paragraphs we present evidence related to this specific study-case.

2.2.1 Employment uncertainty and fertility among migrants

The low fertility regime that characterized Europe over the last decades triggered the interest of demographic research towards migrants' fertility, which is often higher than among natives. However, findings show that not all migrant subgroups display higher fertility rates than their native counterparts, and that there are significant differences according to many factors (e.g., the country of origin and the one of destination, the level of integration and the duration of stay in the destination country), including their employment status (e.g., Ekert-Jaffé et al. 2002; Andersson and Scott 2007; Ohlsson-Wijk 2015).

Immigrants tend to be disadvantaged in the labor market compared to native workers in a number of dimensions. Migrants face comparatively more obstacles in accessing employment (Bevelander and Pendakur, 2012; Kesler, 2006; van Tubergen et al., 2004), they are more likely to occupy lower status occupations with time-consuming and low skilled jobs (Milewski, 2009; Constant and Massey, 2005; Ortensi, 2015) and they tend to have lower wages (Kreyenfeld and Konietzka, 2002). Female migrants' penalization in the labor market is usually even higher because they carry a double disadvantage in the labor market: the gender and the ethnic disadvantage (Boyd 1984, Mussino and Duvander, 2016; Ballarino and Panichella, 2018). According to theoretical premises, reconciling work and family for migrants might be harder than for natives, because migrants may try to enhance their social standing by actively improving their position in the labor market, which could depress fertility, because they have weaker access to social and family benefits and because they do not have a social network and family members to support them (Goldscheider and Uhlenberg 1969; Andersson and Scott 2007).

Evidence on the relationship between employment conditions and migrants' fertility is scarce and focus largely on the fertility consequences of migrants' participation to the labor market rather than on employment uncertainty specifically. At the macro level, Sobotka (2017) analyzed the trend of fertility rates in many European countries between 2008 and 2013 and found out that fertility decreased much more among migrants than among natives in most countries. Evidence at the micro-level is fragmented and limited to some study-cases (e.g., Andersson and Scott 2005; Lundström and Andersson 2012).

2.2.2 Type of occupation and fertility

Besides working or not, different types of jobs can also lead to quite different childbearing decisions. Because of the diverse working conditions and job characteristics that influence the reconciliation of work and family (Ohlsson-Wijk, 2015), previous research shows that there is an association between types of occupations and fertility choices (Begall and Mills, 2012; Martín García, 2010). On the one

hand, some occupations (usually tenured well-paid in private companies or public sectors jobs) provide an economically secure basis for family formation through earnings that alleviate the direct cost of childbearing and through employment security. On the other hand, some occupations (usually female dominated, caring or teaching oriented occupations) allow special conditions such as flexible work hours, reduced work hours or work arrangements, which decrease the indirect cost of childbearing (Låppegard et al., 2011). Some studies assimilate self-employment to this second case, documenting a positive influence on fertility of female self-employment because it offers flexible working conditions, although at the expenses of job security (Connelly, 1992; Wellington, 2006). Other studies, however, such as Noseleit (2014), find a positive impact only among older women.

2.2.3 *Migrant women's employment and fertility in Italy and Sweden*

Migrants are disadvantaged to different extents in Italy and Sweden, because of their different models of immigrants' integration in the labour market (Reyneri and Fullin, 2011). In Northern Europe, where the labour market is highly regulated and there is a low demand of low-skilled jobs, foreigners are strongly disadvantaged with respect to natives in terms of employment probability, but they are less strongly penalised as regards job quality. In contrast, in Southern European countries, where the demand for low-skilled job is high and the labour market is *de facto* poorly regulated in its lowest segments (Reyneri, 1998, 2004), migrants are not strongly penalised in terms of employment opportunity, but they face higher risks of remaining trapped in the secondary segments of the labour market than their native counterparts (Fellini and Guetto, 2018; Guetto, 2018). Accordingly, in Italy the share of foreign-born women in the labour force is systematically higher than the one of native women, while the opposite holds for Sweden (Eurostat 2018). The incentives to work for women in the two countries are clearly different across social groups. In Italy, a traditional familistic society, native Italian women face a normative cost of being working mothers, which seems to be less strong for migrant. At the same time, migrant women often have a stronger need of working in order to support themselves (Ballarino and Panichella, 2018). In Sweden, a frontrunner country in gender

equality, female participation in employment is the norm (80% of Swedish women worked in 2014, Eurostat 2018). Although it is less so for foreign-born women, in Sweden they still display a higher participation rate than foreign-born women in Italy (Eurostat 2018).

Italy and Sweden have two different migration histories, which lead to a different composition of ethnicities between the two countries. At the time of the analysis, in Italy, the largest communities came from Eastern Europe (mainly Romania and Ukraine), Albania, Morocco and China; conversely, in Sweden, most migrants were born in Finland, in Western Asia (mainly Iraq and Iran), Poland and Yugoslavia. The top-five migrant communities are completely different in Italy and Sweden; nonetheless, they chiefly include low-fertility countries (with the exceptions of Morocco and Iraq), which certainly improves their comparability. However, the relation between labour market conditions and fertility behaviour among migrants is also highly context dependent. Andersson and Scott (2005 and 2007) find a positive association between women's labour force participation and transition to motherhood for immigrants in Sweden. Lundström and Andersson (2012) find that being out of the labour force or having precarious employment have negative effects on the propensity to become a parent, for both immigrants and natives. At least in terms of family formation, it seems that the universalistic welfare state of Sweden makes immigrants behave more similarly to natives. The results for Italy are scarce. Fiori et al. (2018) show that overall in Italy between 2002 and 2012 the intention to have a(nother) child among mothers declined significantly and the proportion of women reporting economic constraints as a motivation increased substantially. They also find a convergence over the years of the Great Recession between native Italian and women of another nationality to a similar 20% chance of not wanting a second child due to economic reasons. The authors suggest that non-Italian women tend to work in the private care sector which was less affected by the crisis compared to other sectors where Italian native women work.

2.3 Research hypotheses

The first aim of the paper is to investigate whether and how, in comparison to natives', the fertility behaviour of migrants with different length of stay in the destination country changed around the years of the Great Recession (2007-2012). The length of stay is one of the main determinants of reproductive behaviour of foreign women (Toulemon and Mazuy, 2004; Milewski, 2010; Mussino and Duvander, 2016). The heterogeneity of findings on the relationship between labour market attachment and fertility among migrants might be partly due to the lack of inclusion of this variable.

We build on two main empirical findings to formulate hypotheses. The first is that economic and labour market uncertainty is generally associated to a postponement of childbearing (Adsera, 2005, 2011; Vignoli et al., 2012; Kreyenfeld et al., 2012; Busetta et al., 2019). Second, informed by the finding that recently arrived migrants tend to be less integrated and display a weaker attachment to the labour market (Barrett and Duffy, 2008; Rendall et al., 2010; Reyneri and Fullin, 2010), we assume that they are more vulnerable vis-a-vis the Great Recession. On the contrary, migrants who arrived earlier tend to be more integrated into the new society and its labour market (Chiswick, 1978; Blau et al., 2003; Rebhun, 2010); therefore, we argue that they should be less vulnerable to economic shocks compared to the recently arrived migrants. These assumptions together suggest that recently arrived migrants, compared to long-term migrants and natives, would display the strongest postponement of birth during the Great Recession. However, the length of stay in the host country is associated to childbearing probability also through other mechanisms, different from the economic and labour market vulnerability. Recent migrants' fertility behaviour, in fact, tends to be closer to that of their origin country (Socialisation hypothesis: Mussino and Strozza, 2012a; Milewski, 2010) and, if the migration and childbearing processes are connected, they display a higher fertility right after arrival (Interrelation hypothesis: Mulder and Wagner, 1993; Mussino and Strozza, 2012b). Long-term migrants instead tend to adapt to the fertility behaviour of the destination countries (Mussino and Van Raalte, 2013; Mussino et al., 2015), likely behaving more similarly to natives also in their fertility response to economic and labour market uncertainty (Adaptation hypothesis:

Andersson, 2004; Kulu and González-Ferrer, 2014). Overall, recent migrants are thus expected to display a higher probability of births (in levels) than long-term migrants and natives, but to be more negatively affected by the Great Recession due to their weaker financial and labour market stability. Conversely, we expect to find weaker postponement among older migrants and smaller differences between them and natives, since they are more integrated in the host society and the labour market.

The second aim of the study is to investigate how protective it is for childbearing chances during a recession, to have a stable employment instead of an intermittent career or non-employment. Following existing studies (Adsera, 2005, 2011; Vignoli et al., 2012; Kreyenfeld et al., 2012; Busetta et al., 2019), we expect that the probability of having a child decreases between the pre-crisis period 2007-09 and the crisis period 2010-12 more for women with unstable job trajectories and in long term unemployment, compared to women durably employed. We also argue that this type of employment vulnerability interacts with migration background in shaping the change in the probability of having a(nother) child before and after the Great Recession. Among migrants, we expect career instability to be even more detrimental for childbearing with respect to natives, because of the cumulative disadvantage in the labour market.

In addition, focusing the group of durably employed women we also test if there are differences in the childbearing behaviour during the years of the Great Recession, by occupational categories. One can argue that, while working hours' flexibility and job autonomy might be positively associated to childbearing during periods of economic growth and stability, during recessions the income effect prevails over the opportunity cost effect, and the job security offered by more standard dependent employment would be more positively associated to childbearing. We thus expect women working in elementary occupations (i.e., workers) to be more vulnerable to the economic downturn with respect to clerks and directors, because such jobs are insecure and low paid, leading to a lower probability of having a child. Conversely, women employed in higher-levels occupations might be more resilient to the economic crisis since their jobs provide good economic basis to bear the cost of childbearing. Following this argument, we also hypothesize that the lower financial insecurity of self-

employment, although coupled with higher job flexibility, would induce women to postpone childbearing more than women with a stable and financially more secure dependent employment.

Third, we test the previous hypotheses in relation to the country context by comparing Italy and Sweden, two countries with different welfare states (Esping-Andersen, 1990). Several studies find that in contexts where migrants have more limited social rights, immigrant and native fertility patterns tend to remain more heterogeneous (Parrado and Morgan, 2008). Andersson (2004) for actual fertility and Milewski and Mussino (2018) for fertility intention discuss how the process of adaptation depends on the strength of the country's welfare institutions. Being more traditional and familism-oriented welfare state as opposed to the universalism of Sweden, Italy is expected to display a milder association between job status and childbearing. What is more, even those migrants who in Italy obtain a work permit get very poor benefits from one of the least generous welfare states in Europe (Reyneri and Fullin, 2011). Among women with a stable employment in Sweden, instead, we expect less difference in the fertility behaviours across occupations, because everyone has similar access to social benefits. Finally, informed by the different models of incorporations of migrants into the labour market in the two countries outlined in section 2.3, we expect to see smaller differences among the employed across occupations in Sweden compared to Italy where it's easier for migrants to find a job but much more difficult to leave the trap of low-quality jobs. In addition, since self-employed are less protected in Italy, we expect to find, there more than in Sweden, a larger decrease in independent workers' probability of having a child during the Great Recession compared to the other workers. Overall, we expect migrant women to be more disadvantaged and behaving more differently from natives in Italy than in Sweden.

2.4 Data and methods

2.4.1 Data and analytic sample

We analyse the change in the fertility behaviour of natives and migrants over the years of the Great Recession using individual-level data for Italy and Sweden. We use the Italian Labour Force Survey

(LFS) and the Swedish population registers (Sweden over Time: Activities and Relations, STAR). The differences between the two datasets are numerous and they impose a series of restrictions regarding the selection of the analytic sample. First and foremost, the registers are longitudinal data covering the entire population, while the LFS is a cross-sectional survey of the population. Despite the limitations imposed by the very different sources, at the time of writing the two are the best data available in the respective countries. The Swedish population registers have an individual and longitudinal set up and they cover family-demographic histories and a large amount of socio-economic and background data for the entire population between 1968 and 2012. The LFS is the most reliable survey to use when the focus is on migrants in Italy due to the comparatively large immigrant population surveyed (Fullin and Reyneri, 2009). Moreover, the LFS offers the most recent data available for Italy, necessary to study the aftermath of the Great Recession.

Our selected population in both countries is composed of native and migrant women in reproductive age (15-45 years old) resident in the two countries in two specific years: 2009 (N=58,705 for Italy; N=1,148,394 for Sweden) and 2012 (N=52,903 for Italy; N=1,171,886 for Sweden). To overcome the problems posed by the cross-sectional character of the Italian LFS, we pool the samples from the two years but only use retrospective information on births and women's occupational careers during the three previous years: 2007-09 (pre-crisis) and 2010-12 (crisis). These two time-spans (2007-09 and 2010-12) clearly do not correspond to the pre-crisis and crisis years respectively, in fact the Great Recession was right underway during 2009, while Sweden was almost out of the crisis in 2010-2012. Nevertheless, children born in 2007-2009 were roughly conceived in 2006-2008, which is before the onset of the Great Recession in Europe. Similarly, considering that it takes a pregnancy and a short period of adjustment for fertility to react to a recession, we can surmise that 2010-2012 is a suitable time-span to see whether – and to what extent – fertility behaviours have changed in the

aftermath of the Great Recession³. Finally, women's fertility history in the Italian LFS is based on the information on the number and age of the co-resident children (Own-children method, Cho et al., 1986). This method is applied to many surveys in several European countries for the study of fertility (Bordone et al., 2009; Adserà and Ferrer, 2011). We weight the Italian data in order to report estimates to the relevant population of interest. We run separated but identical analyses for the two countries.

2.4.2 Variables and methods

The dependent variable, the probability of childbirth, is a dummy variable that records whether a woman had a child during 2007-2009 or 2010-2012. We exclude foreign-born women who arrived during those three years, because they could have had a child abroad in those years that would not be accounted for in our estimates. We use linear probability models (LPM) to study the probability of having a(nother) child⁴. The main explanatory variable is the period dummy 2009 vs 2012 which would represent the change in probability of having a(nother) child in the aftermath of the Great Recession. Our second explanatory covariate is a categorical variable for women's migration background distinguishing between natives, recent and long-term migrants. The latter distinction is based on the length of stay of migrant women in the destination country being lower or equal or greater than 10 years. We interact these two variables to measure the period effect on the three origin groups. Since parities are not identically linked to economic and labour market uncertainty and mothers (especially of young children) are less active on the job market than childless women (Boeckmann et al., 2015), we run this set of models separately for the probability of having a first child or a second or higher parity.

³ *The choice of the periods is also partially data-driven. We chose 2009 and not earlier years because it is the first LFS wave for which micro-data are fully available. Previous waves lack important information, e.g., about age and education at the start of observation period. We chose 2012 because it is the most recent available year for Swedish data. Robustness checks using earlier or later waves for Italy do not suggest major differences.*

⁴ *Logit models have been shown to suffer from estimation bias when interaction terms - the main focus in this paper - are used (Mood, 2010). Moreover, the LPM offers the advantage of simplicity of interpretation of interactions and predicted probabilities are shown to be identical to those provided by the Logit models.*

In a second set of analyses we add employment status. Complete individual working histories are not available for the Italian LFS data, but we only know the employment status at the time of the interview (employed, unemployed or inactive) and the duration of that status. To overcome this lack of information and still ensure that we backdate employment to childbirth, we group women in four categories based on their labour market status during the entire three years preceding the eventual childbirth. First, women who have been employed in the same place for at least three years; second, women who have been unemployed⁵ for at least three years and third, women who have been inactive for at least three years. The fourth and residual category includes all the other women, namely those who have changed either job or employment status at least once over the last three years. These women might have gone in and out of the labour market, changed occupations or simply workplace, during the last three years. This category of women with an unstable career is admittedly very heterogeneous. Nevertheless, what these women have in common is the experience of some kind of interruption in their recent career development, voluntarily or not, a situation of employment uncertainty and instability, characterised by alternations of (short-term) employment and non-employment. We introduce women's employment status preceding childbirth in the model first as a control and, second, as an interaction with the period dummy to test whether the effect of the crisis was concentrated in a particular social origin group *and* in a particular job status.

In the final set of analyses, we focus on women who had a stable employment in the three years preceding the observation in 2009 and 2012 to test whether the changes in childbearing probability over the years Great Recession varies by occupation. We use the type of work (dependent work vs. self-employment) and the International Standard Classification of Occupations (ISCO) to group women into four categories: self-employed, managers or directors, clerks and workers. Dependent workers were defined through the "Major Groups" classification of ISCO-08 as follows: "managers or directors" include major groups 1 and 2 (managers and professionals); "clerks" include major

⁵ As regards Swedish data, individuals are considered unemployed for at least three years if they received unemployment benefit during three consecutive years, regardless of the total amount of the benefit.

groups 3, 4 and 5 (technicians, associate professionals, clerical support workers, services and sales workers); finally, “workers” include major groups 7, 8 and 9 (craft and trades workers, plant and machine operators and assemblers, elementary occupations).

Finally, all models include the following control variables measured at the beginning of the observation period (2007 for women in the 2009 wave and 2010 for women in the 2012 wave): women’s age and age squared, education (primary, secondary, tertiary), civil status (unmarried, married, widowed or divorced) and the region of residence⁶ (NUTS1). In models in which we do not distinguish between first or higher order births, we control for previous parity (childless, having at least one child). Similarly, in models in which we do not distinguish between recent and long-term migrants, we control for their length of stay in the destination country. Results are illustrated graphically using predicted probabilities of having a(nother) child. Complete models are reported in the Appendix (Tables 2B to 2E).

2.5 Results

2.5.1 Descriptive results

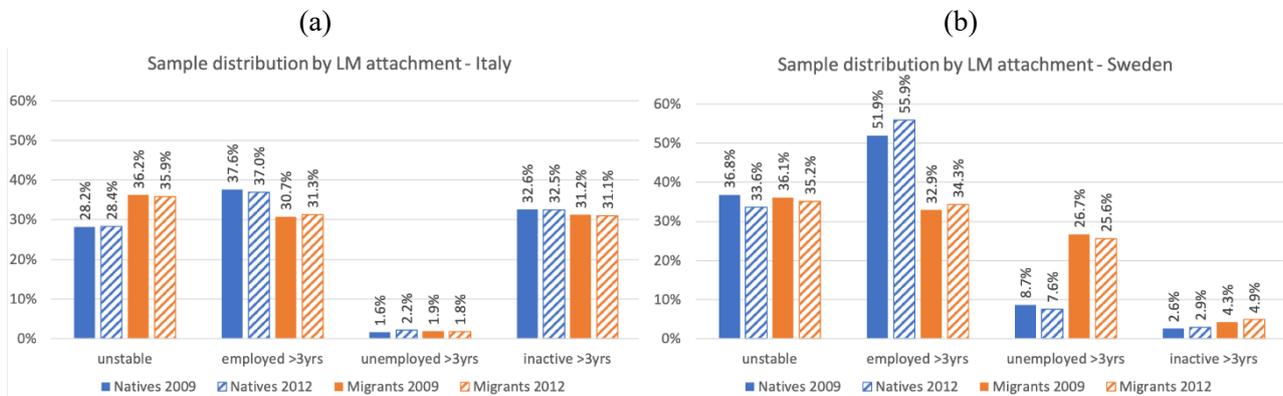
Figures 2.2-2.3 show the distribution of women according to their employment status and the distribution of occupations among durably employed natives and migrants in 2009 and 2012, in Italy and Sweden⁷. In Italy, the most remarkable change between the two periods is the increase in the share of long-term unemployed native women (from 1.6% in 2009 to 2.2% in 2012, see Figure 2.2), while the differences between natives and migrants are relatively small. However, if we look at the distribution by occupation, there are instead marked differences between natives and migrants durably employed. Natives are much more likely to be employed in top occupations (directors, managers) or as clerks, while about 1 out of 2 migrants work in elementary occupations (e.g., workers,

⁶ We did not show models by migrants’ country or region of origin. We had them in a previous version of the paper but, even aggregating by fertility regimes, due to the very small cell size results were difficult to interpret.

⁷ Descriptive statistics are provided in the Appendix (Table 2A).

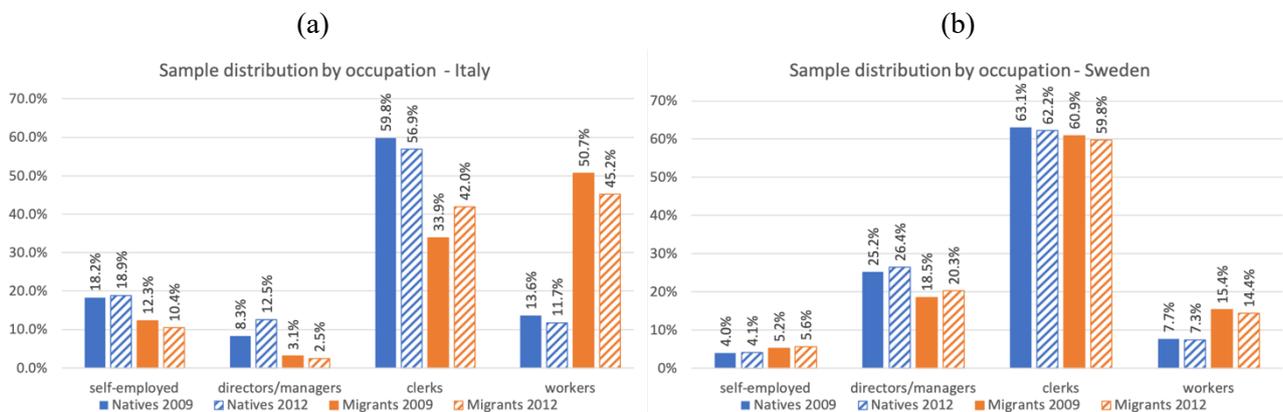
assemblers, cleaners). In Sweden the differences between natives and migrants are much more pronounced. Foreign-born are less likely to have a stable employment and they are overrepresented among long-term unemployed. Conversely, the distribution of occupations among stable workers is significantly more homogeneous than in Italy. These descriptive findings are in line with the theories of immigrants' integration in the labour market presented in par. 2.3, predicting large natives/migrants employment gap in Sweden but not in Italy, and high natives/migrants occupational gap in Italy but not in Sweden.

Figure 2.2 – Employment status among native and foreign-born women in 2009 and 2012, Italy (a) and Sweden (b).



Source: elaboration of the authors based on Italian LFS.

Figure 2.3 – Occupation among native and foreign-born women in 2009 and 2012, Italy (a) and Sweden (b).

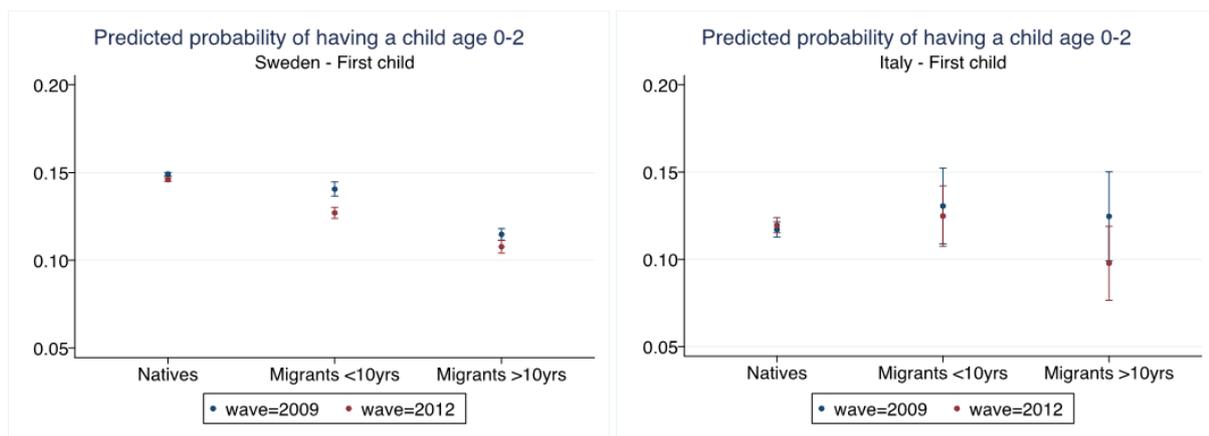


Source: elaboration of the authors based on Swedish Population Registers.

2.5.2 All women

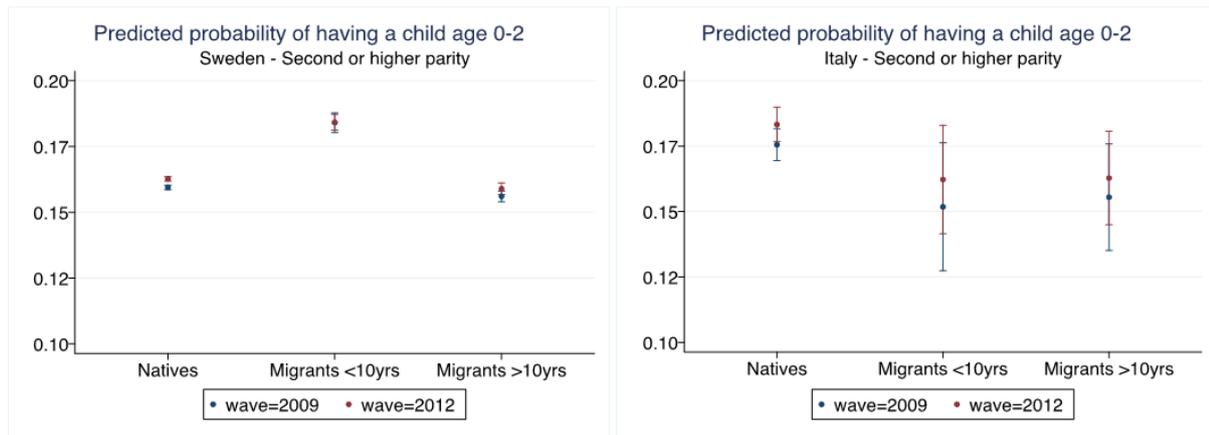
First, we are interested in whether and how the probability of having a child for women living in Sweden and in Italy changed in 2010-2012 with respect to 2007-2009, depending on their migration background and their employment status. Figures 2.4a-2.4b show the comparison between the predicted probabilities of having, respectively, a first or a higher parity child in 2009 and 2012 for native women, women who migrated during the previous ten years or longer than ten years before. Control variables are at their mean value (Tab. 2B reports complete results). The decline in the probability of birth in Sweden among recent migrants is concentrated on first births (from 14.1% to 12.6%). The probability of having a first child decreases between 2009 and 2012 also among Swedish native women and weakly also among long-term migrants. On the contrary, the probability of a second or higher birth slightly increases for both native and long-term migrants. In Italy, it seems that the probability first births declined during the crisis among long-term migrant women, although the confidence intervals are too large to identify a precise estimate. We do not find any significant change in the probability of second or higher order births between 2009 and 2012 in Italy.

Figure 2.4a – Predicted probability of a first child in the last three years (2009 vs. 2012).



Source: Elaboration of the authors based on Swedish Population Registers and Italian LFS.

Figure 2.4b – Predicted probability of an additional child in the last three years (2009 vs. 2012).

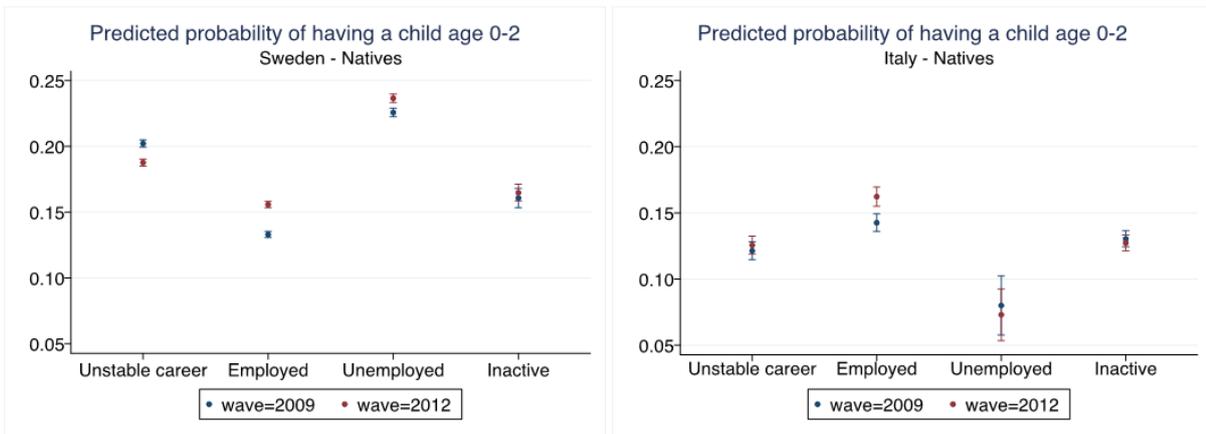


Source: Elaboration of the authors based on Swedish Population Registers and Italian LFS.

Figure 2.5a and 2.5b show the predicted probability of having a(nother) child for natives and migrants respectively, in the two periods across the four categories of employment status⁸ (full models in Tab. 2C). Among Swedish native women, the chances of having a child in the recent period increase significantly for those who are regularly employed during the previous three years, and it increased slightly also for unemployed native women. On the contrary, the probability of having a child decreases for Swedish women with unstable careers, moving from 20.2% to 18.7%. Similar differences arise among foreign-born women, with larger gaps: the probability of having a child for Swedish migrants with unstable careers drops from 19.4% to 15.2%. Among Italian women, we find an increase in the probability of having a child between 2009 and 2012 among native women who have been consistently employed during the previous three years. In all other categories, point estimates and confidence intervals for the probability of birth across the years of the crisis largely overlap. This seems to indicate that in Italy the probability of childbirth did not change during the crisis among inactive women or those with unstable careers or unemployed either native or migrants. While this might not be surprising regarding women out of the labour force, results on working women with unstable careers and experiencing long-term joblessness is unexpected.

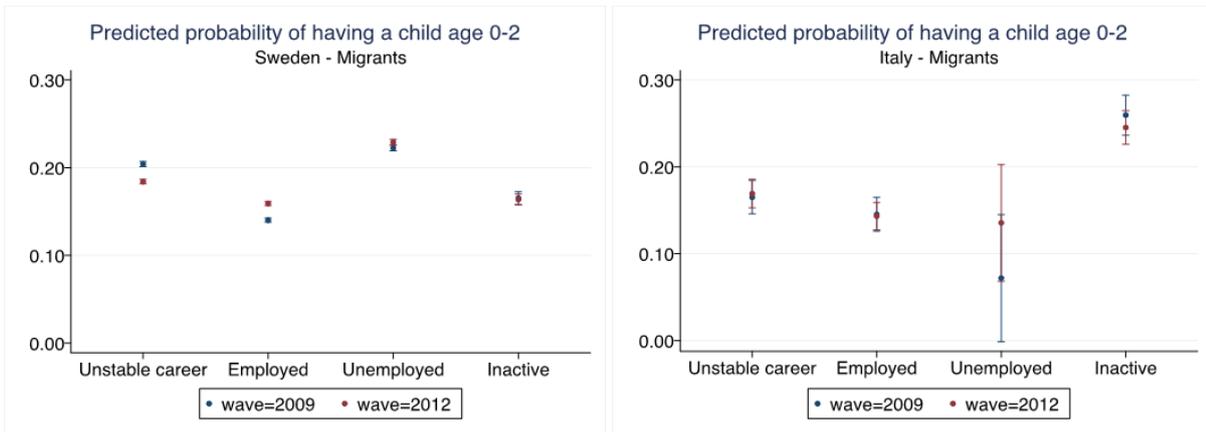
⁸ When we further distinguish by employment status and occupation substantial differences across parities do not emerge, therefore, for the sake of brevity we present models pooled by (but controlling for) parities (results by parities are available from the authors). Similarly, we present the results for overall migrants because we do not have enough observations in the Italian dataset to run specific models (i.e., recently arrived vs. long-term). We control for duration of stay.

Figure 2.5a – Predicted probability of having a(nother) child in the last three years (2009 vs. 2012). Natives.



Source: Elaboration of the authors based on Swedish Population Registers and Italian LFS.

Figure 2.5b – Predicted probability of having a(nother) child in the last three years (2009 vs. 2012). Migrants.



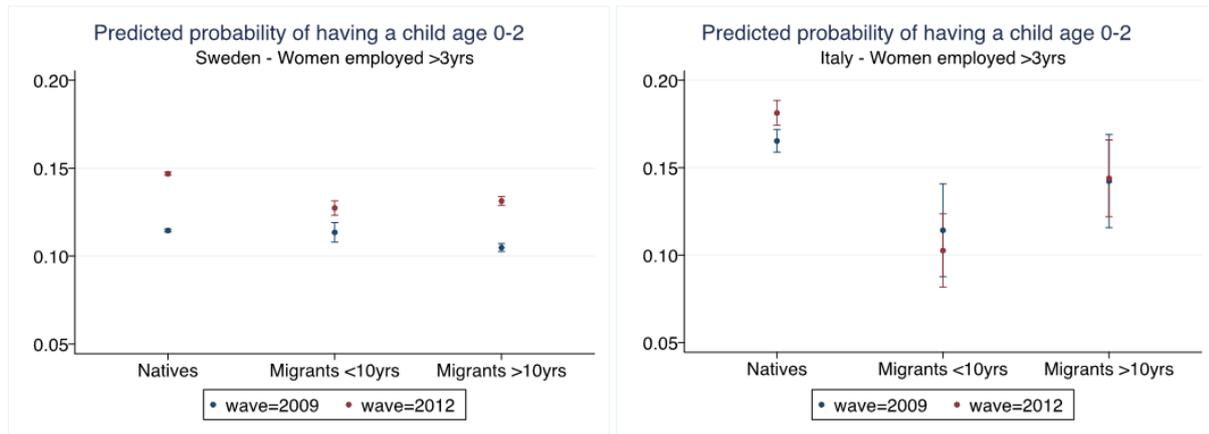
Source: Elaboration of the authors based on Swedish Population Registers and Italian LFS.

2.5.3 Working women

Focusing on the subsample of women who have worked in the same place during the previous three years, Figure 2.6 shows that in Sweden women with a stable employment the probability of having a(nother) child increases for both natives and migrants but with different intensities (+3.2% among natives, +1.4% among recent migrants, +2.6% among long-term migrants). In Italy childbearing probability increases only among native employed women, whose probability of having a child is 16.5% in 2009 and 18.1% in 2012, and no relevant variation in the probability of having a child is detected among long-term migrant women with a stable employment. For recently arrived

continuously employed migrant women, instead, the probability of having a(nother) child seems to decline during the crisis, however, the point estimates are too imprecise to draw definite conclusions.

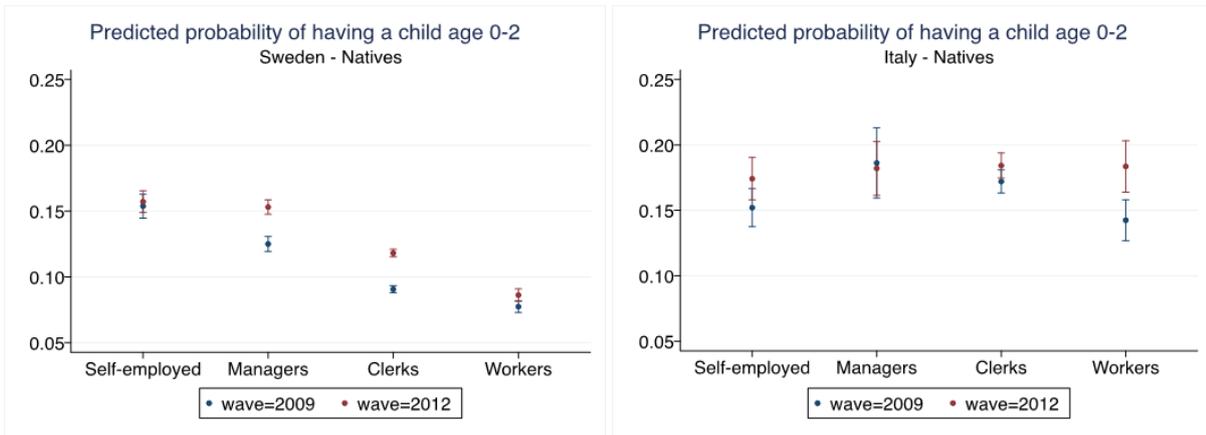
Figure 2.6 – Predicted probability of a(nother) child in the last three years (2009 vs. 2012). Women employed for at least 3 years.



Source: Elaboration of the authors based on Swedish Population Registers and Italian LFS.

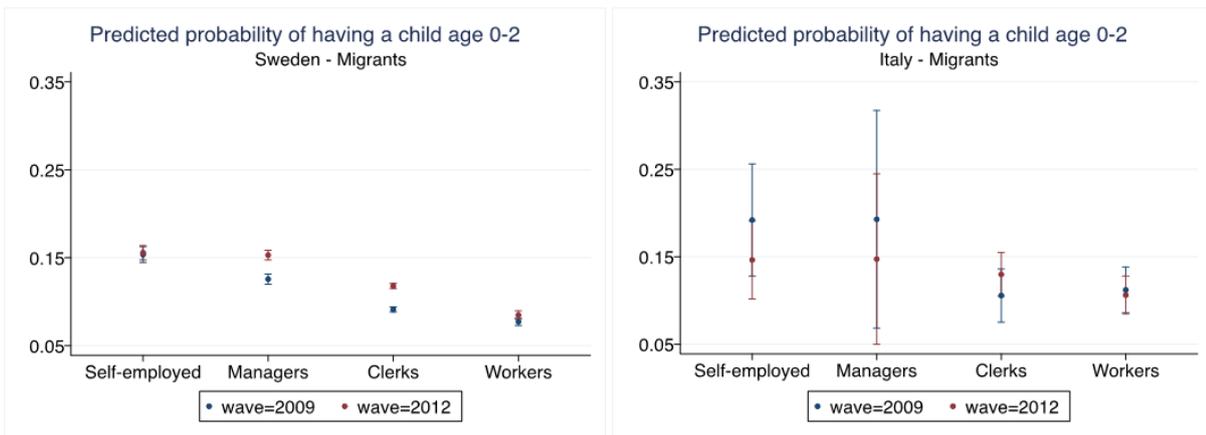
Figures 2.7a-2.7b plot the predicted probability of having a child for, respectively, employed natives and migrants across four types of occupations: self-employed, managers, clerks and workers. Full models are available in Tab. 2E. The probability of having a child in the last three years is higher in 2012 with respect to 2009 among all native Swedish with a dependent work while no variation is recorded among self-employed. Among native Italian women, workers are the only occupational class whose childbearing probability significantly increases in the aftermath of the Great Recession. Among working migrant women in Sweden, the pattern is almost identical to natives, with a positive period increase in the probability of having a child among migrant with a dependent work. Among working migrant women in Italy, the same advantage of dependent work does not emerge as it did for native Italian. Among migrant self-employed women, instead, we see a decline in the chances of childbirth over the years of the crisis. However, the confidence intervals are very large and estimates too imprecise (and close to those of migrants' managers) to conclude that self-employed foreign-born women postponed childbearing during the crisis substantially more than employed migrants.

Figure 2.7a – Predicted probability of a(nother) child in the last three years (2009 vs. 2012). Women employed for at least 3 years, natives.



Source: Elaboration of the authors based on Swedish Population Registers and Italian LFS.

Figure 2.7b – Predicted probability of a(nother) child in the last three years (2009 vs. 2012). Women employed for at least 3 years, migrants.



Source: Elaboration of the authors based on Swedish Population Registers and Italian LFS.

2.6 Summary and conclusions

Building on the literature showing that during economic downturns fertility declines (Sobotka et al., 2011; Goldstein et al. 2013; Comolli, 2017), we compare changes in childbearing probability over the initial years of the Great Recession in Italy and Sweden. Despite being two heterogeneous countries, they share a substantial drop in fertility rates after the onset of the crisis that opens up to interesting comparative questions. Using the Italian Labour Force Survey and the Swedish population registers we focus on the change in the probability of having recently had a child between the pre-crisis period (2007-09) and the aftermath of the crisis (2010-12). More specifically, this study investigates whether relatively more vulnerable groups in society display a stronger postponement during the Great Recession compared to less socioeconomically fragile groups. A first source of vulnerability is the migration background. We further consider the length of stay in the destination country as a proxy of the economic and labour market integration of migrants into the new society. Our hypothesis of a declining childbearing probability during the crisis among recently arrived, less integrated, migrants was confirmed only for first births in Sweden. In contrast, in Italy the probability of having a child in the considered period declines only for long-term migrants. The argument that the processes of migration and childbearing are interconnected is generally supported both in Sweden and in Italy. The probability of birth is always higher in levels for migrant women who arrived less than 10 years before compared to women who migrated before (Okun and Kagya, 2012; González-Ferrer et al., 2017). Unsurprisingly, this difference disappears when we look at continuously working women.

Second, we then investigate labour market vulnerabilities, which we assess both in terms of women's employment status and type of occupation. The theoretical assumption behind this is that not only labour market attachment but also occupational segregation in less protected jobs generate the type of uncertainty that can influence childbearing decisions. A decline in the probability of having a(nother) child is witnessed among unemployed or precarious native women in Sweden and not among the durably employed. The same pattern can be found among migrants, but with a steeper

drop in the birth probability among women with unstable careers. The stronger decline for women in unstable careers with respect to non-working women suggests that the prevailing mechanism in Sweden is the uncertainty effect, more than the income effect, especially for migrants. This might be linked to the generous social benefits in Sweden to which non-working women have access to. In Italy, on the one hand we do not find a significant decline in the probability of having a(nother) child among women with unstable careers or unemployed but, on the other hand, the only positive variation in childbearing probability during the years of the analysis is registered for native women with a stable employment. Findings for Italy are in line with theories about a protective income effect during economic downturns related to women's stable employment, although we cannot draw definite conclusions since we do not find precise estimates of the effects among non-working and unstable career women neither for natives nor migrants. Finally, on employed women our analysis on Swedish data confirmed results obtained in other studies (Andersson and Scott, 2005 and 2007): once employed, migrants tend to behave like natives. The probability of having a child increases between 2009 and 2012 in all occupational and time-since-migration categories. The same cannot be said about Italy: in all occupations native women display a higher childbearing probability than migrants and for them we even witness an increase in the chances of having a(nother) child. On the contrary, self-employed migrant women seem to postpone childbearing during the initial years of the Great Recession in Italy.

Before discussing the implications of our findings, it is important to acknowledge that the study suffers from a few limitations. First and foremost, due to the Italian LFS data, some restrictions had to be placed to the analytical sample and research design. Most notably, we cannot look at how changes in labour market variables influence childbearing. With this respect, panel data are always preferable when studying life course family decisions, however, longitudinal data on Italy covering the period of the crisis were not available at the time of writing. For this reason, we could not assess the causal effect of the crisis on childbearing but only period associations. In addition, the

measurement of career instability as a residual category might include women who did not really interrupt their career but simply changed job or workplace. This might include women who are actually promoted to a better job which is not exactly the type of employment insecurity we are pointing at in this study on the Great Recession, but more a problem of “role incompatibility”. In some cases, it could happen that such change of job or workplace has happened after the birth of the child, because we do not know at which point, during the three-years span, the career interruption and the childbirth took place. Despite this limitation regards only a portion of the part of women with unstable careers, it clearly constitutes a limitation of our study, which will be overcome in the final version of the paper by considering smaller timespans (i.e., 1 year). In addition, the selection of women with a stable employment for three years represents a deliberate choice of the authors. We made this choice picking the shortest interval for which we had childbearing information for the LFS (0-2 years old child in the household) to measure employment the year before the birth of the child but limiting as much as possible the selection on the length of employment. However, the pool of women with a stable employment changes in the two periods in relation to our main explanatory variable, the Great Recession. The crisis supposedly reduced the chances of keeping a stable working position, therefore in 2012 compared to 2009 the group of women who stays in the sample represents the strongest labour market candidates who manage to retain their jobs notwithstanding the crisis. The sample selection might possibly bias results on occupational differences if the selection is stronger in some types of jobs than others. Results on this part of the paper thus have to be interpreted with caution. Finally, due to the complexity of the study we could not address directly in the analyses the numerous differences between the Italian and Swedish context (e.g. migration history, female employment participation, welfare states and the extent to which they were hit by the Great Recession). This means that we cannot point to any specific contextual feature to explain the cross-country heterogeneity in our findings.

Bearing these limitations in mind, our paper shows that fertility behaviour did not change in the expected direction in all groups. First, in both contexts we confirm our hypothesis that, in the aftermath of the crisis, the migration background represents a vulnerable condition at least in terms of childbearing. However, only for Sweden we could confirm that the time since arrival is a good proxy of the labour market integration of migrants in the host society, as far as at least a lower integration is associated to a stronger postponement of childbearing compared to natives and long-term migrants. Second, for migrant women unemployment and career instability during the crisis seem to be more detrimental in Sweden than in Italy; while larger differences across migration background emerge in Italy among working women. In the aftermath of the Great Recession, self-employed migrant women tend to delay childbearing more than migrant women in other occupations in the Italian context. These results confirm previous findings that show that migrants are more disadvantaged in Sweden in terms of access to employment but less segregated into bad occupation once working. The opposite is true for Italy, in which case we show that migrant women suffer a larger childbearing penalty if self-employed, a far less protected job condition in Italy than in Sweden. In addition, we can add that, in Italy, atypical job contracts on average last longer than the three years window we consider here for being durably employed⁹. This means that in our reference group of durably employed women we might be including some precarious contracts. Although probably not being the most precarious, they still represent a trap into non-standard employment (Barbieri 2011). This means that the effect of career instability we are measuring here does not translates one-to-one into contract precariousness, or at least that the negative effect of career instability relative to stable employment in Italy might be here underestimated.

Finally, our results about Italy differ substantially from Sobotka's (2017) macro-level findings, according to which the Italian TFR decreased during the years of the Great Recession due to a drop in migrants' fertility. In our findings there is no precise evidence of a strong decrease in the

⁹ 40 months for women in atypical self-employment and 44 in atypical dependent employment; 50 months in the south of Italy, *ILFI data on births cohorts after 1970*.

probability of having a child in 2012 with respect to 2009 among migrants. Apart from the obvious difference between TFR and the probability of having a child during a three years-span, another explanation to justify such a clear divergence relates to over-coverage. Migrants residing in Italy might have left the country during the years of the Great Recession, because of the crisis, without cancelling themselves out of the municipal registers (Monti et al., 2018). Such lack in out-registration when migrants emigrate is common, since they might forget to register their exit or might have incentives to remain in host population registers (Weitof et al., 1999). Official statistics, on which the calculation of TFR is based, compute a lower fertility rate not because of the lower number of births, but due to the over-coverage of the migrant population resident in Italy (Statistical Report about Migration, IDOS 2017).

The novel focus of this paper on migrants, a largely overlooked group in studies of childbearing behaviour in relation to the business cycle, suggests that multiple sources of socioeconomic vulnerabilities interact in determining family decisions during economic downturns. More research is needed in the field addressing how these ascertained disadvantages in contemporary societies expands and cumulate during periods of economic turmoil and how in turn they affect key demographic processes and family dynamics such as childbearing.

3. THE INTERRELATIONSHIP OF UNION FORMATION AND FERTILITY IN ITALY: THE ROLE OF EMPLOYMENT UNCERTAINTY

3.1 Introduction

During the last years, the relationship between employment uncertainty and family formation has become an increasingly important issue in demographic research. Uncertainty is usually deemed to impact negatively family formation, with individuals in more precarious positions more likely to postpone or forego partnership and parenthood (Oppenheimer 1988; Blossfeld et al. 2006). Despite union formation and childbearing are two interrelated processes, most studies focus on the effect of employment uncertainty on either union formation or fertility. However, fertility does not occur in isolation, but within relationships. A limitation of most previous studies is that they suffer from selection bias: because only partnered individuals are considered, these studies disregard how some men and women are selected into union while others are not. Employment uncertainty, indeed, may lead to the postponement of marriage or uncertain relationships, not only to the postponement/avoidance of fertility.

A handful of studies faced this issue by analysing and modelling *jointly* the processes of union formation and transition to parenthood (Brien et al. 1999 for the US; Baizan et al. 2003 for Spain; Baizan et al., 2004 for Germany and Sweden; Aasve et al. 2006 for the UK; Trimarchi and Van Bavel 2017 for many European countries). Findings from these studies proved that the two processes are strongly interrelated and that are affected by unobserved common factors, such as value orientation, individual risk aversion and behavioural intentions and plans; accordingly, we posit that studying the effect of employment uncertainty on union formation and fertility without taking into consideration the interrelation between family formation processes may generate biased conclusions. Indeed, it is not clear through which channels employment uncertainty affects fertility: uncertainty could jeopardise both union formation and transition to parenthood, but it may also affect primarily union

formation, and then, as a result, childbearing might be lower due to a reduced likelihood of entering a union.

Informed by this strand of literature, our aim is to analyse simultaneously union formation and childbearing in Italy, which represents an intriguing case-study, because it is characterised by high youth unemployment, traditional values with a strong preference towards marriage (with respect to cohabitation) and low fertility rates. This analysis elucidates the role played by employment uncertainty in shaping family dynamics, unravelling whether its effects are stronger on either union formation or childbearing.

3.2 Literature Review

The literature about the relationship between employment uncertainty and fertility is already discussed in the previous chapters. In the following paragraphs, we present the study-specific literature concerning the relationship between employment uncertainty and union formation, and the interrelationship between union formation and fertility in the Italian context.

3.2.1 Employment uncertainty and union formation

Fertility is not the only family dynamic to be jeopardised by employment uncertainty. Adverse employment conditions may already undermine union formation by affecting an individual's probability of finding a partner, and thus operating a first selection of people who might have a child within a relationship. There is an extensive theoretical and empirical literature about the relationship between employment uncertainty and union formation, which, however, does not allow drawing clear and univocal conclusions.

In this regard, one of the seminal papers is that by Oppenheimer (1988). In her theory of marriage timing, she claims that uncertainty about future and current attributes may delay marriage. Among the exogenous factors that affect the degree of uncertainty, she gives particular emphasis to employment careers, since unstable job conditions and low socio-economic status might jeopardise

assortative mating. Especially in male breadwinner societies, men's uncertainty about future employment might be critical for the male breadwinner model, with couples postponing or foregoing marriage. This is also formalised in economic search model of marriage, according to which the probability of getting married depends on the quality of individuals in the labour market, that, in turn, is strongly driven by income (Keeley 1977; Aassve et al. 2002). In the same vein, following the globalisation and labour market deregulation perspective, marriage is likely to be postponed in times of employment uncertainty, because it is a long-term commitment (Blossfeld et al. 2005; Blossfeld et al. 2006; Mills and Blossfeld 2013). An opposing narrative was developed by Friedman et al. (1994). According to their *uncertainty reduction* theory, individuals always tend to reduce uncertainty, and thus they (women especially) may choose to marry in order to reduce biographical uncertainty, as a response to negative employment prospects.

However, marriage is not the only way to form a union. Over the last decades, cohabitation has become increasingly popular (e.g., Guetto et al. 2016; Baizan et al. 2003), but none of the aforementioned theories takes explicitly into consideration cohabitation as union type. Different and contrasting theories exist about the spreading of cohabitation and about the way in which individuals make their choices between cohabitation and marriage in time of uncertainty. On the one hand, the SDT argues that cohabitation emerged together with structural and cultural changes involving new family models (e.g., modernisation, the rise of higher education, secularisation and the rise of individualistic values). Given its reversibility, cohabitation might act as a viable alternative to marriage also in male breadwinner societies, because the deterioration of men's employment prospects is more tolerable in a precarious union (Oppenheimer et al. 1997; Oppenheimer 2003). Accordingly, individuals with higher educational levels are expected to be the forerunners in cohabitation, since they are more likely to embrace new values. Several authors found evidence in favour of this hypothesis (e.g., Lesthaeghe and Surkyn 2002). Nevertheless, some studies found evidence of a negative educational gradient in nonmarital childbearing (e.g., Rindfuss et al. 1996 for the U.S.; Perelli-Harris et al. 2010 for Europe). A possible explanation to this "reverse" gradient is

the Patterns of Disadvantage narrative (hereafter POD; Perelli-Harris and Gerber 2011): rather than being a lifestyle choice, cohabitation often involves unstable relationship, in which the long-term commitment of marriage is hindered by economic uncertainty. Instead of being a choice that reflects the spread of new values, cohabitation is practiced by the least educated and most socially disadvantaged individuals, while marriage remains a prerogative of highly educated individuals. To this regard, there is evidence from the US that women with poor career perspectives may decide to have a child while cohabiting to give meanings to their lives, but than they do not marry because of their male partner's unstable economic and employment situation (Edin and Kefalas 2011; Brown 2004).

In demographic literature, these theories were directly and indirectly tested on several study cases, providing mixed evidence (e.g., Kurz et al. 2005; Noguera et al. 2005; Kalmijn 2007). For instance, some studies addressed the nexus between education and union formation ignoring employment conditions (e.g., Oppenheimer and Lew 1995; Thornton et al. 1995; Koytcheva and Philipov 2008). Especially the POD hypothesis that uncertain lives may fall back on cohabitation was mainly operationalised through educational attainment (e.g., Kalmijn 2013; Guetto et al. 2016). However, the link between uncertainty and union formation cannot be simply disentangled by looking at the role played by education, especially when lower education does not necessarily mean more uncertain employment, as it is the case of Italy, where better educated ones are also the most affected by the rise in precarious forms of employment due to the targeted labour market deregulation (Barbieri and Scherer 2009). Finally, only few studies analysed the effect of employment on the probability of entry both cohabitation and marriage (e.g., Bukodi 2012).

Finally, evidence on the Italian case is quite scarce and ambiguous. It was found that women's employment is associated to a delay in marriage (Ongaro 2001), but also that worsening employment opportunities among the youngest lead to lower risks of entry into marriage (Bernardi and Nazio 2005). Vignoli and colleagues (2016) found that, among Italian women, employment uncertainty is associated with higher risk of cohabitation, while employment stability is connected to higher

marriage rates. These results were interpreted as “traces” suggesting the emergence of a POD as a driver of the spread of cohabitation. Conversely, they found that for men having (or not) a job is the main determinant of union formation practices.

Given that economic uncertainty may affect union formation, by discouraging individuals from forming marriages and perhaps encouraging them to enter more unstable union types, it may also have indirect repercussions on fertility. Nonetheless, previous studies rarely addressed the role of union formation in mediating the relationship between economic uncertainty and fertility.

3.2.2 Union formation and fertility: a neglected interrelation

As shown in the previous two paragraphs, there is a huge literature about each of these two processes in relation to employment uncertainty, while studies that take also into account the interconnection between family formation processes in analysing the uncertainty/fertility nexus are few. Many studies investigate the relationship between uncertainty and fertility, but the association that they observe could be either direct or indirect (i.e., driven by the effect of uncertainty on union formation), or both. To this regard, the pioneering papers about joint modelling of union formation and fertility were made by Lillard and colleagues (e.g., Lillard 1993; Lillard and Waite 1993), who first developed a simultaneous equations model for hazard, and then implemented it to analyse union formation and dissolution and fertility timing in the United States. Among the more recent studies about Europe, Baizan et al. (2003) investigated the mutual relationship between first union formation and first childbirth in Spain, searching for the existence of unmeasured determinants shared by the two processes. Their findings confirm the presence of a significant positive correlation between such heterogeneity components, suggesting that women who are more likely to have a child are also more likely to start a union. For this reason, disregarding the strong interrelationship between the events studied may lead to important distortions in the effect estimates. Among the possible factors that could explain the unobserved, the authors indicate value orientation, norms on the timing of events, and the individual’s network interactions. Similarly, Baizan et al. (2004) used the same methodology

adopting a comparative approach for Sweden and Germany. They concluded that the timing of first union and of first birth are, at least partially, determined by unobserved factors, and such factors are positively correlated. The authors suggest that possible unobserved factors affecting both union formation and fertility are value orientations, attitudes towards gender roles, behavioural intentions and plans, or the individual's network norms, and pressures concerning the timing of household formation. What is more, such factors may vary between the two countries (e.g., the social acceptance of cohabitation as a permanent union). Their study shows that union formation has a strong effect on the transition to parenthood, net of the presence of correlated unobserved factors, and that this impact is higher in the case of marriage than in the case of cohabitation. Moreover, they find that transition rates to parenthood within a union are higher in Sweden than in Germany, which is particularly the case for cohabiting couples. In Aassve et al. (2006), the authors address the issue of the interrelationship between family formation processes with special emphasis on the role of employment in Great Britain. Findings show that employment is strongly related to union formation and fertility among women especially. They also conclude stressing the importance of modelling such processes *jointly*, showing that unobserved heterogeneity is correlated across demographic processes.

After the great relevance given to the interrelation of family formation processes during the years of the aforementioned articles, the importance of joint determination faded into the background in demographic research until recently. The topic gained new relevance with the study by Trimarchi and Van Bavel (2017), who used simultaneous hazard models to study the effect of education on transition to fatherhood. Their findings generally confirm the hypothesis that educational attainment has a consistently positive effect on men's transition to fatherhood, but that this effect is mainly indirect, as it works through its positive effect on the rate of union formation. Few more studies used simultaneous hazard models to account for the interrelationship between family formation processes when studying fertility, but none of those which analyse Italy either focuses on the role of employment uncertainty.

3.2.3 *The Italian context: labour market and family dynamics*

The Italian case represents a unique case study because of the quick rise of uncertainty levels in the labour market and for the peculiarity of its family formation dynamics.

Starting from the 1980s, European labour markets went through a strong process of deregulation, including privatisations and liberalisations, which generated unprecedented levels of structural uncertainty (Mills and Blossfeld 2005). In Southern European countries, the deregulation of non-standard employment was *partial* and *targeted* (Esping-Andersen and Regini 2000), since it affected almost exclusively labour market entrants, while leaving mostly unchanged existing work contracts. Within this context, Italy was not an exception. Starting from the 1990s, a number of laws were promoted to give impulse to new flexible - but less protective than before - forms of employment, aimed to increase the employment rate by creating additional jobs (“Treu Law”, L.196/1997; “Biagi Law”, L.30/2003; Bernardi and Nazio 2005; Barbieri and Scherer 2009). Consequently, the already existing division between insiders and outsiders in the labour market was emphasized among young adults. The targeted labour market deregulation did not improve the statistics about employment; in fact, precarious and cheap employment increased, raising the general level of uncertainty (Cutuli and Guetto 2013; Barbieri et al. 2015). Between 2002 and 2009, the share of temporary contracts out of total employment increased by 31.9% in Italy (with respect to 7.5% in EU in the same years, in relative terms), and further increased by 14.7% after the Great Recession, between 2009 and 2016 (with respect to 5.2% in EU in the same years, in relative terms; Eurostat 2019).

From a demographic point of view, Italy is well-known for its latest-late transition to adulthood (Billari et al. 2002; Stranges 2007). With respect to their European counterparts, “young” Italians are among the oldest ones to complete their education, to enter the labour market, to leave the parental family, to start a union and to have a child (De Rose et al. 2008). Nowadays, Italy stands out from the other countries as far as age at leaving parental home is concerned, with an average age of 30.1

years, compared to the European average of 26.0 (only Malta and Croatia have higher mean ages; Eurostat 2017).

As regards the union formation process, there is a clear preference toward marriage, which has a strong central role both as a main reason to leave the parental home and as a type of first union (Billari and Rosina 2004). Cohabitation started to spread in the country during the second half of the 1990s, along with the rise of marital instability and nonmarital fertility (Guetto et al. 2016). Nevertheless, compared to other European countries, the diffusion of cohabitation was slow due to the familial and social pressure to marry, and to the prolonged absence of the legal recognition of civil unions (Dalla Zuanna et al. 2005; Vignoli and Salvini 2014). Furthermore, the general delay in marriage that characterised the Second Demographic Transition (van de Kaa 1987) has contributed to experiencing new forms of living in most Western countries, such as permanent celibacy and prevalence of long-term nonmarital cohabitations, while it coincided with a longer permanence in the parental home for young Italian adults (Rosina 2004, Billari and Rosina 2004). OECD estimates for the year 2011 show that in Italy only 8.8% of people living with a partner were actually cohabiting (compared to the European average of 14.1%). In the same year, Italian men had the highest mean age at first marriage in Europe excluding Scandinavian countries, namely 33.5 years (Eurostat). However, over the last years the popularity of marriage is decreasing in the country, together with an increase in the diversity of union patterns and a slow process of secularisation (Pirani and Vignoli 2016; Vignoli et al. 2016; Sansonetti 2009).

In parallel, fertility behaviours have changed significantly over the last decades in Italy. Fertility started to decrease in the country during the 1970s and reached lowest-low levels during the early 1990s (Kohler et al., 2002). This sharp fall in fertility levels was partly due to the postponement of first births (mean age at childbearing reached 31 in 2009), and partly to quantum effects, approximately in equal measure (Matysiak and Vignoli 2013; Sobotka et al. 2005). At the dawn of the new millennium, a moderate yet meaningful increase of fertility levels took place, driven by a recuperation of postponed births mainly in the central and northern regions of Italy (Caltabiano et al.

2009). Even if cohabitation became more and more popular in the country during the same years, at the time of our data (up to 2009) most children were born to married couples (80% of the total births, ISTAT 2009)¹⁰.

These patterns can be ascribed to a culturally rooted “postponement syndrome” (Livi Bacci 2001), but also the abovementioned adverse labour market-related circumstances were proved to play an important role in shaping family formation dynamics (e.g., Santarelli 2011; Bernardi and Nazio 2005). Furthermore, the relentless spread of uncertainty in the Italian labour market during the last decades was embedded in one of the least generous welfare states in Europe. The Italian welfare system provides poor support for young adults and scarce state support for childcare before age three (Ferrera 2000; Saraceno and Keck 2010) and failed to adapt timely to the social change (De Rose et al. 2008). In addition, the Italian welfare occupational model allows access to the (few) welfare rights almost exclusively to individuals with unlimited-time working contracts, generating an unfriendly environment for family formation in which the family itself is the most important provider of welfare (Aassve et al. 2002; Scherer 2009).

3.3 Data and Methods

3.3.1 Data and variables

We use data from the Household Multipurpose Survey Family and Social Subjects (FSS), released by the Italian Statistical Office. At the time of writing this thesis, the latest wave available is the one released in 2009, and it constitutes the most recent Italian survey with information detailed enough for the analysis we want to perform. This survey includes detailed retrospective information on men’s and women’s partnership, employment and fertility histories, on a monthly basis.

¹⁰ *The share of children born within the wedlock kept on decreasing; in 2017 it was less than 70% (ISTAT 2019).*

Individuals become at risk of entering a first union (i.e., first cohabitation or first marriage¹¹) and having a first child at age 15 and exit from the study at 49. We dropped individuals with missing information on the two outcome variables. The main explanatory variable is the employment condition together with the type of job contract. Information on employment histories in the dataset allows to distinguish between non-employment, temporary employment, permanent employment and self-employment. The ‘temporary employment’ category includes ‘atypical jobs’, which identify the most precarious forms of employment. Unfortunately, with the available data it is not possible to distinguish between unemployed and inactive individuals. Control variables include: macro-area of residence¹² (1 = ‘North’; 2 = ‘Centre’; 3 = ‘South’), time-varying educational level (1 = ‘primary or lower-secondary’; 2 = ‘upper secondary’; 3 = ‘tertiary’; 4 = ‘still in education’), and calendar year (1 = ‘before 1997’; 2 = ‘after 1997’). The calendar variable distinguishes between the years before and after the spread of precarious working contracts in the Italian labour market, started in 1997 with the ‘Treu Law’. Since we are dealing with simultaneous analysis of first union formation and first childbirth, it is important to account for potential pregnancies outside of union, because some marriages and consensual unions might be a consequence of conceptions. Accordingly, in order to minimise possible reversed causation, the timing is specified as a transition to first-child conception.

3.3.2 *Statistical models*

We apply multi-process models to analyse family formation processes simultaneously. More specifically, we use multi-process lognormal survival models to study the first union formation and the transition to parenthood among Italian men and women. The lognormal distribution is very flexible and allows a non-monotonic shape of risks, since the hazard increases initially, and then

¹¹ In this version of the study, cohabitations and marriages are analysed together. A discussion is provided in the conclusions.

¹² As noted in previous studies (e.g., Vignoli et al. 2016; Reynaud and Conti 2011), it is relatively safe to consider the macro-area of residence as a time-constant variable because Italian internal mobility has been low over the recent decades and mainly restricted to short distances.

decreases monotonically. The timing of transition to parenthood and the timing of first union formation are endogenous, since survival in one state may depend on the outcome of the other process. We implement two survival processes, one for the entry into the first union and the second one for the transition to parenthood, with process-specific residuals varying over time that may be correlated. With this model, the endogeneity issue is directly addressed by allowing unobserved heterogeneity to be correlated across the processes. Hence, it is possible to account for shared unmeasured factors that influence first birth and union formation simultaneously.

The two equations, one for each process, are:

$$\begin{cases} \ln T_u = \alpha_u X_{uj} + \beta_u Z_{uj}(t) + \varepsilon_{uj} \\ \ln T_p = \alpha_p X_{pj} + \beta_p Z_{pj}(t) + \varepsilon_{pj} \end{cases} \quad \varepsilon_{.j} \sim N\left(0, \begin{bmatrix} \sigma_u^2 & \sigma_{up} \\ \sigma_{up} & \sigma_p^2 \end{bmatrix}\right)$$

T_u represents time to first union, and T_p is time to transition to parenthood. The term X_j includes time-constant covariates, while $Z_j(t)$ represents time-varying variables; the observation periods are indexed by j . The ε_j are the correlated unobserved heterogeneity components, which may include individual risk aversion and home/work-oriented attitudes, and they are clustered at the individual level. Unobserved heterogeneity is specified as a random component that captures what is not picked up by the observed covariates, and it is assumed to follow a Normal distribution with a zero mean.

The lognormal model is implemented only in the form of Accelerated Failure Time metrics (AFT; e.g., see Blossfeld et al. 2007). Accordingly, coefficients represent the effect of independent variables on the survival time, and not on the hazard of the event. In other words, if the coefficient β_i of X_i has positive/negative sign, it means that a unit increase in X_i leads to an increase/decrease in the survival time by a factor equal to e^{β_i} (which translates into a postponement/acceleration effect on the outcome). Models are implemented in STATA.

We run gender-specific models in order to investigate the different relationship between employment uncertainty and union formation or fertility among men and women. First, we run models with independent equations (i.e., with $\sigma_{up} = 0$) and show the relationship between employment uncertainty and both first union formation and transition to parenthood without

accounting for the interrelation between processes. Then we run simultaneous models and focus on how the estimates change and on the correlations between processes. The sign and the significance of the correlation terms indicate whether there is a positive/negative selection in the processes. For example, a positive correlation, which implies a positive selection, would mean that individuals who are more likely to enter their first union, are also more likely to become parents.

3.4 Results

We present the main results of our analysis in Table 3.1 (for men) and in Table 3.2 (for women). In each table, we report the effect of the variable ‘employment conditions’ on the timing of both first union formation and first childbirth, first estimated through independent models and then estimated simultaneously. For the simultaneous model, the correlation between the two processes (the term *rho*) and its confidence interval are reported.

As aforementioned, results from AFT models are to be interpreted ‘counterintuitively’; thus, a positive (negative) coefficient translates into a delay (reduction) in the time to first union formation/first childbearing. Results from the independent models among men show that individuals with temporary contracts and individuals who do not work enter into first union significantly later than men with a permanent employment. As regards the transition to parenthood, men with temporary contracts on average have their first child 1.4 (i.e., $e^{0.34}$) times later than men with unlimited-time working contracts, while no significant differences arise between non-employed, self-employed and permanently employed. When the two processes are estimated jointly, results change. Non-employment still has a significant negative effect on the first union timing for men, while the effect of having a temporary employment is greatly reduced and loses its significance. The coefficient for self-employment becomes slightly significant and indicates a weak negative effect compared to permanent employment. The effect of temporary employment on the first childbirth is also dramatically reduced in the joint estimation. Finally, *rho* is almost null, indicating that, net of the set of control variables, the two processes are not significantly interrelated among men.

Among women (Table 3.2), our results obtained through independent models show that both temporary employment and self-employment lead to a postponement of the first union with respect to unlimited-time employment. Conversely, women who do not work start their first union slightly sooner, on average. Having a temporary employment is also associated to a postponement of the transition to motherhood, and not working has a strong positive effect of the timing of the first childbirth ($e^{-0.26} = 0.77$ times shorter). Moving to the joint estimate of family processes, we found a weaker effect of temporary employment on first union timing with respect to permanent employment, while the coefficient for the category ‘no work’ changes its sign from positive to negative – but it loses its significance – and self-employment is not significant. As regards the first childbirth timing, there is no significant effect of employment status. The *rho* term is 0.32 and indicates a relevant interrelation between first union formation and first childbirth among women (the confidence interval does not include zero), which translates into a positive selection of women into family formation processes.

Table 3.1 – The effect of employment condition on first union formation and first childbirth among men – independent and joint models.

Independent models			Joint models		
Entry into first union			Entry into first union		
	coef.			coef.	
<i>ref. permanent employed</i>			<i>ref. permanent employed</i>		
temporary employed	0.29	***	temporary employed	-0.05	
self-employed	0.05		self-employed	0.06	*
no work	0.42	***	no work	0.38	***
Transition to parenthood			Transition to parenthood		
	coef.			coef.	
<i>ref. permanent employed</i>			<i>ref. permanent employed</i>		
temporary employed	0.34	**	temporary employed	0.14	
self-employed	0.13		self-employed	0.17	
no work	0.11		no work	-0.05	
			<i>rho</i> = -0.04 [-0.18; 0.09]		

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Results from AFT models are to be interpreted ‘counterintuitively’; thus, a positive (negative) coefficient translates into a delay (reduction) in the time to first union formation/first childbearing.

Source: elaboration of the authors on FSS 2009 data

Table 3.2 – The effect of employment condition on first union formation and first childbirth among women – independent and joint models.

Independent models			Joint models		
Entry into first union			Entry into first union		
	coef.			coef.	
<i>ref. permanent employed</i>			<i>ref. permanent employed</i>		
temporary employed	0.52	***	temporary employed	0.13	**
self-employed	0.15	***	self-employed	0.08	
no work	-0.04	*	no work	0.06	*
Transition to parenthood			Transition to parenthood		
	coef.			coef.	
<i>ref. permanent employed</i>			<i>ref. permanent employed</i>		
temporary employed	0.35	**	temporary employed	0.18	
self-employed	-0.02		self-employed	-0.02	
no work	-0.26	***	no work	-0.27	***
			<i>rho = 0.31 [0.18; 0.42]</i>		

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Results from AFT models are to be interpreted 'counterintuitively'; thus, a positive (negative) coefficient translates into a delay (reduction) in the time to first union formation/first childbearing.

Source: elaboration of the authors on FSS 2009 data

3.5 Conclusions

In this study, we look at the effect of employment uncertainty on first union formation and on transition to parenthood accounting for the interrelationship between the two processes in Italy. Despite several authors have already addressed the topic of the employment uncertainty/family formation link, the large majority of studies disregard the interconnection between union formation and transition to parenthood, which – we posit – might produce biased conclusions, because employment uncertainty might influence either both first union formation and transition to parenthood or it might influence fertility only indirectly, through reducing union chances. As a solution, we applied multi-process lognormal survival models to analyse the first union formation and the transition to parenthood jointly among Italian men and women, with a focus on the role played by employment uncertainty.

Our results from the independent models (i.e., without accounting for the interrelationship between the two studied processes) are in line with the theoretical premises and with previous studies (e.g., Barbieri et al. 2015; Bernardi and Nazio 2005). Having a temporary job contract leads to a postponement of both first union formation and transition to parenthood, especially among women. On the other hand, not having a job has negative consequences on the timing of family formation only among men, while among women it is associated to a shorter time to the first union and childbirth. When the interrelation between the two processes is taken into consideration, namely in the joint models, the magnitude of coefficients is reduced remarkably, and only few effects are still significant. The strong negative (i.e., postponement) effect of temporary employment on transition to motherhood that results from the independent estimates loses its significance in the joint estimate, while it is still relevant for the entry into first union. Hence, having a temporary job contract may affect female fertility only indirectly, operating chiefly through delaying union formation. In the same vein, temporary employment does not lead to a significant postponement of fatherhood – once that model estimation is done jointly – but, unlike women, men still tend to postpone fatherhood firmly if they are out of the labour market. An explanation for these findings is easily given recalling the male breadwinner model, which was probably still predominant in Italy at the time of the analysis. Men's (stable) employment is a prerequisite for starting a family, while the uncertain nature of job contracts affects women's union formation and transition to motherhood relatively more intensely. These results suggest that if the interrelationship between the events studied is not taken into account, important distortions in the estimates may arise, including an overestimation of the effect of employment uncertainty on family formation. Indeed, joint models display weaker associations between employment status and both first union formation and fertility once unobserved heterogeneity is accounted for.

Our findings also confirm the existence of a positive and significant correlation between the heterogeneity components, as it was found in other countries (e.g., Baizan et al. 2003 for Spain), at least among women. Accordingly, women who are more likely to have a first birth are also more

likely to form a union. This finding indicates that union formation and transition to parenthood are part of the same process of family formation, and that low fertility and postponement of first unions are – at least partially – determined by common factors. In the case of Italy, such factors could include value orientation, attitudes towards family/career and risk aversion.

Before acknowledging the limitations of our study, it is important to specify that this work is not in its final form yet, or rather, we wish to make some data-related improvements before considering it for a submission to a scientific journal. More specifically, the final version of this work shall include data from the latest wave of the ‘Family and Social Subjects’ survey, which includes data retrieved in 2016, but that has not been released yet at the time of writing this thesis. By pooling the two datasets, it will be possible to increase the sample size and the number of events (which is, so far, critically low as regards cohabitations), and it will allow a deeper investigation of the role of employment uncertainty in shaping family formation dynamics, also in light of the considerable upheavals of the labour market triggered by the Great Recession starting from 2008-2009.

The study suffers from two main limitations. First, as aforementioned, we were not able to distinguish between cohabitations and marriages as types of first union. Expanding our model with a third equation specific for cohabitation would require more observations, since cohabitations hardly represent the 15% of first unions in our analytical sample. However, we acknowledge that treating cohabitation and marriage as competing events would have been an important added value for this work to the extent that, as discussed in the literature review, cohabitation and marriage represent two different union types, and there might be specific mechanisms driving individuals towards one or the other, as shown by previous studies which found distinct effects of employment uncertainty on cohabitation and marriage (e.g., Vignoli et al. 2016). We are confident that when the 2016 wave of the FSS survey will be available, the larger sample size will allow a more comprehensive analysis of the interrelationship between first union formation and transition to parenthood, in which cohabitation is considered as a separate process. The second limitation is also data-driven and is reflected in the

impossibility to distinguish between unemployment and inactivity. This may be an issue especially for women, for whom the distinction between being unemployed and being a homemaker is crucial.

Despite its limitations, this study is the first one to provide evidence about the effect of employment uncertainty on union formation and fertility accounting for the interrelationship between family formation processes. Our assumption that by accounting for such interrelationship we can learn more about the channels through which employment uncertainty affects fertility turned out to be true for the Italian case, though with significant gender differences. In order to carry on a proper investigation on the employment uncertainty/fertility nexus, future research should include union formation in the analysis and consider it as a part of the same family formation process.

CONCLUSIONS

The relationship between employment uncertainty and fertility has been on the top of demographic researchers' agenda for years; nevertheless, it is far from being clearly understood. The substantial amount of research on the topic generated a host of context-dependent results, which led to an incomplete and fragmented knowledge of the matter, still leaving some relevant gaps in the literature. This thesis addresses the relationship between employment uncertainty and fertility by systematising the existing evidence on the topic and providing new empirical evidence on underexplored research lines.

From the three works included in the thesis, a number of prominent conclusions can be drawn. First, the meta-analyses (Chapter 1) translated individual-level findings into generalisable conclusions about the relationship between employment uncertainty and fertility. Results show a crucial gender differentiation to the extent that time-limited employment has a worse effect on women's fertility than unemployment, while the opposite is true for men. We found that parity and welfare state play a key role in moderating such nexus, and that the negative effect of employment uncertainty on fertility has become more negative over time. In addition, multivariate modelling revealed that studies that do not control for individual income and for the partner's characteristics tend to overestimate the effect of employment uncertainty on fertility. The latter finding is a clear indication for future research on the topic: not all temporary jobs correspond to unfavourable or undesired employment conditions, and income is a key variable that must be taken into consideration whenever it is possible, in order to account for the heterogeneity in time-limited contracts. Similarly, controlling for partner's employment/economic status cannot be overlooked in research on the link between employment and fertility, because failing into accounting for it means missing a crucial dimension of the context in which fertility decision are taken, namely, the couple. The second study (Chapter 2) investigates how the employment uncertainty/fertility link changes between migrant and

native women in Italy and Sweden. We looked at how the childbearing probability changed during the years 2007-2012 among women with different migration backgrounds and with different degrees of attachment to the labour market. Findings suggest that being a migrant represents a vulnerable condition at least in terms of childbearing, and that, in period analysed, unemployment and career instability among migrant women are detrimental for fertility. Furthermore, we found that some occupations are less “protective” than others: for example, among Italian self-employed women the probability of having a child in the aftermath of the Great Recession decreased more than in other occupational categories. Apart from the case-specific findings, this study draws attention on the importance of analysing the link between labour market dynamics and fertility specifically among migrants, in light of the increasing importance of their labour market participation and contribution to European’s low fertility. Not only the study focuses on migrants’ vulnerability with respect to natives: the time spent in the destination country is confirmed to be the game-changing variable, since long-term migrants are on average similar to natives in terms of fertility behaviour during the period analysed, whereas vulnerability lies among recently arrived migrants. Finally, results from the last work (Chapter 3) confirm that employment uncertainty matters significantly for men’s and women’s union formation and fertility, but at the same time it emphasises the importance of considering such dynamics jointly, as parts of the same family formation process. As regards the Italian context, we found that there are unobserved factors influencing both first union formation and transition to parenthood, and that omitting this interrelationship in the analysis produces biased results, i.e., the overestimation of the effect of employment uncertainty on fertility, which nonetheless remains negative and significant. Value orientation, attitudes towards family/career and risk aversion are rarely accounted for in demographic research on the determinants of fertility, but this study shows that they play a prominent role, especially when analysing the whole process of family formation, providing clear guidance for future research.

Summing up the main findings of our work, it is worth restating that all the research outputs of the thesis are descriptive, and that no causal effect can be inferred. The meta-analyses summarise

studies that look at the association between employment uncertainty and fertility, without undertaking causal approach. Similarly, the focus on migrants in Italy and Sweden is purely descriptive, and our third contribution on the Italian case-study cannot be interpreted in terms of causality, because we only considered the endogeneity between entry into first union and transition to parenthood, while the endogeneity between employment status and fertility is not addressed. Despite their correlational nature, the findings of this work give significant contributions to the demographic literature, by providing generalisable results about the unclear link between unemployment uncertainty and fertility and producing new findings in research lines thus far hardly explored. Few studies managed to address causality in demographic research, and especially regarding the relationship between uncertainty and fertility. Among others, Matysiak (2009) performed a simultaneous estimation of transitions to childbirth and entry to and exit from employment to investigate whether women postpone childbearing until they find a job. More recently, Hofmann and colleagues (2017) exploited exogenous shocks (i.e., mass layoffs) to study the effect of the economic uncertainty induced by those shocks on fertility behaviours in Germany, and Vignoli et al. (2019) used the potential outcomes approach to analyse the causal impact of entry into employment under uncertain conditions on first-birth postponement in Italy.

This thesis gives important inputs to the existing gaps in demographic research about the relationship between employment uncertainty and fertility. Considered altogether, our results imply that employment uncertainty is a non-negligible force associated with declining fertility, and that the negative relationship between employment uncertainty and childbearing is, with few exceptions, consistent across genders, time, country contexts and migration backgrounds. Nevertheless, as discussed in the introduction, employment uncertainty is not only related to time-limited employment and unemployment. This work focuses on the two main and most frequently studied ‘sources’ of uncertainty, but other employment conditions and types of contract, such as jobs-on-call, involuntary part-time and informal work, affect individual fertility decisions, and thus need to be considered in the debate. Moreover, most of the existing literature addressing the link between employment and

fertility consider individuals' working conditions right before the event (may this be the birth or the conception), disregarding a crucial dimension of employment uncertainty, namely its persistence. Persistent uncertainty, more than the status itself, may seriously compromise individual fertility choices (e.g., Busetta et al. 2019; Ciganda 2015). Uncertainty is a multifaceted concept. Accordingly, the objective and measurable aspect of economic uncertainty strictly related to employment uncertainty is only one of the many existing dimensions, and it cannot explain the overall picture alone. The subjective dimension of economic uncertainty, for example, might play a pivotal role to expand the knowledge on the topic, because the person-specific perception of economic uncertainty is fundamental (Comolli and Vignoli 2019; Vignoli et al. 2020; Bellani et al. 2020). The type of contract reflects an individual's current labour market position, and not his/her real labour market options and career prospects. Considering certainty as an 'immanent value' – using a terminology *à la* Friedman et al. (1994) – disregards subjective heterogeneity in risk aversion (Heckhausen and Schulz 1995; Sverke and Hellgren 2002), since individuals differ in the way they tolerate uncertainty and react to it.

Moving beyond the objective/subjective dichotomy, economic uncertainty is not only directly linked to employment. Among the others, housing is another important dimension that needs to be taken in to account and brought into the debate about the relationship between economic uncertainty and fertility. Housing uncertainty regards the place and conditions in which an individual will live, and it was proved to influence transition to parenthood (e.g., Tocchioni et al. 2019; Vignoli et al. 2013; Kulu and Milewski 2007), mainly through increasing rental prices, the necessity to maintain a dual income in order to service a mortgage, or house affordability.

The European context is characterised, to different extents depending on the country, by low fertility regimes. Prolonged low-fertility irreversibly shapes the population structure, through increasing ageing and decreasing population size, and there is evidence that very low fertility is often counter to the preferences of individuals experiencing it (e.g., van Peer 2002). From the macroeconomic point of view, low fertility leads to serious future labour shortages (especially of

young skilled workers) at a time when populations are aging rapidly. In this framework, spreading employment uncertainty, being negatively related to fertility, should be either limited or managed in such a way as to allow work-family reconciliation. Government policies are generally considered an essential means to contrast low fertility and to regulate the mechanisms through which economic uncertainty shapes individuals' fertility outcomes – and the results of this thesis concerning different employment uncertainty/fertility connections in different country contexts confirm this view. An increasing number of countries are facing the causes of low fertility and adopt policies, programs and incentives to encourage couples to increase their childbearing – especially when the decision of not having children is related to employment-related inadequacies. Most measures aim to facilitate reconciliation between working and family life (e.g., maternity and paternity leave, childcare, after school programs, part-time employment, job security), and in some cases they were successful in raising up childbearing, at least temporarily, even if they were often implemented too late (see Kohler et al. 2006; McDonald 2006). Aware of the fact that the annual number of births in European countries will continue to decline because of the *negative momentum* even if fertility policies will be successful, this thesis provides new evidence supporting the idea that uncertainty is a structural component of our society, and that its connection with fertility is not negligible. Accordingly, our result support the importance of limiting the (mostly) negative consequences of employment uncertainty, as to restrict the repercussions of low fertility on contemporary (and future) societies. Temporary employment was introduced in the European labour market to pursue lower (youth) unemployment levels and increased 'adaptability' of the work situation to family/private needs due to higher flexibility of employment (OECD 2002), but unfortunately such expectations, in general, have not been met. The process of partial and targeted deregulation did not increase the (net) amount of occupation by creating additional jobs, but rather replaced secure labour with precarious and cheaper employment (Kahn, 2007; OECD, 2008). Instead, positive effects of flexible employment should be enhanced, for example by facilitating continuous work participation over the life-course and allowing to seek an equilibrium between work and family, exploiting the increasing attractiveness of non-permanent

employment in life courses that no longer follow a clear sequential order of life statuses (European Foundation 2008, Scherer 2009; Barbieri and Scherer 2009).

In light of the complexity of the concept of uncertainty and considering the heterogeneity of effects at play, it is not redundant to recall the need for further research about the relationship between economic uncertainty and fertility, addressing the (many) remaining gaps and keeping pace with the continuous dynamism that characterises contemporary societies. Uncertainty stems from various domains of life, and paid work is only one of those. In addition to housing, economic uncertainty may originate from contexts such as finance and politics, that have rarely been considered in demographic analysis, but which may all contribute to generate the atmosphere of uncertainty that permeates individuals' life courses.

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Appendix 1

Figure 1A – Funnel plots for meta-analyses about the relationship between unemployment (as opposed to employment) and fertility, gender-specific models.

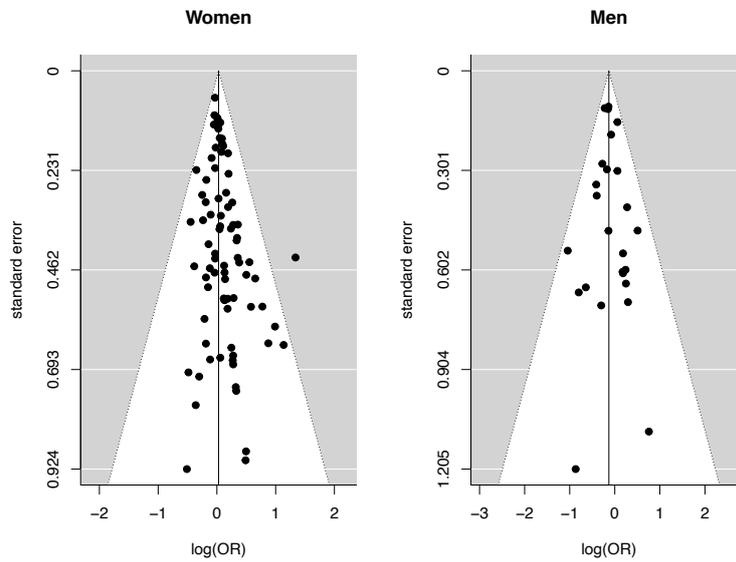


Figure 1B - Posterior distribution of effect-sizes from the meta-analyses about the relationship between unemployment (as opposed to employment) and fertility, gender-specific models.

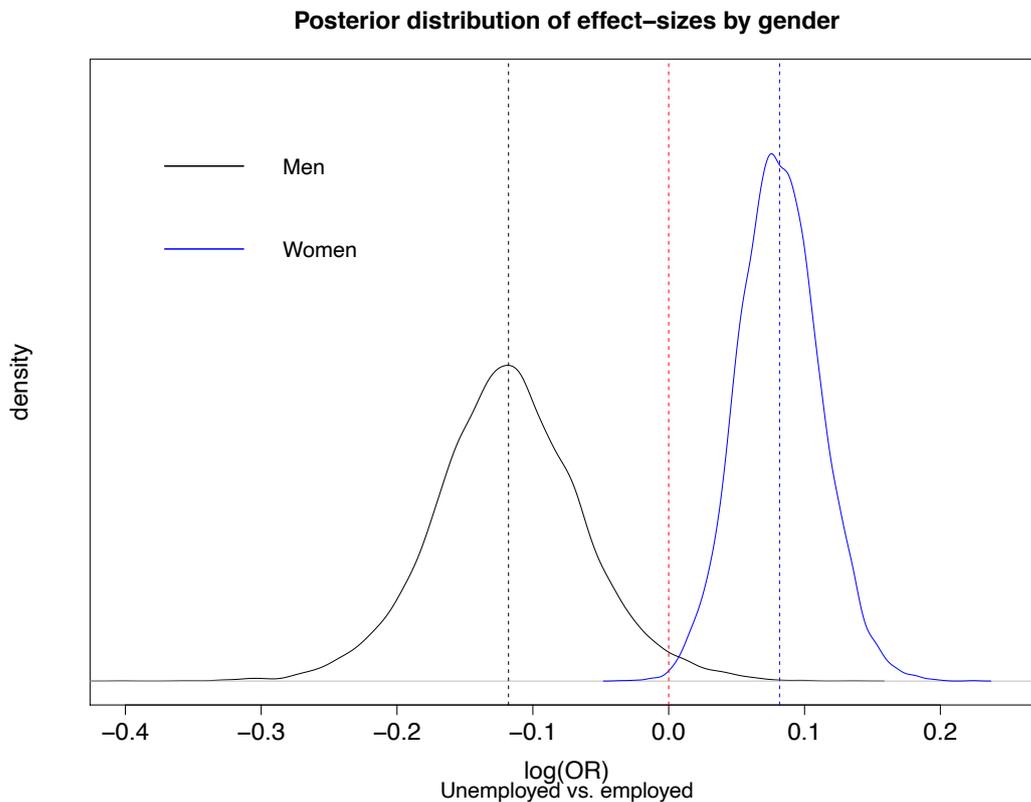


Figure 1C – Funnel plots for meta-analyses about the relationship between unemployment (as opposed to employment) and fertility, welfare and gender-specific models (w = women; m = men). Standard errors for each log(OR) are reported on the y-axis.

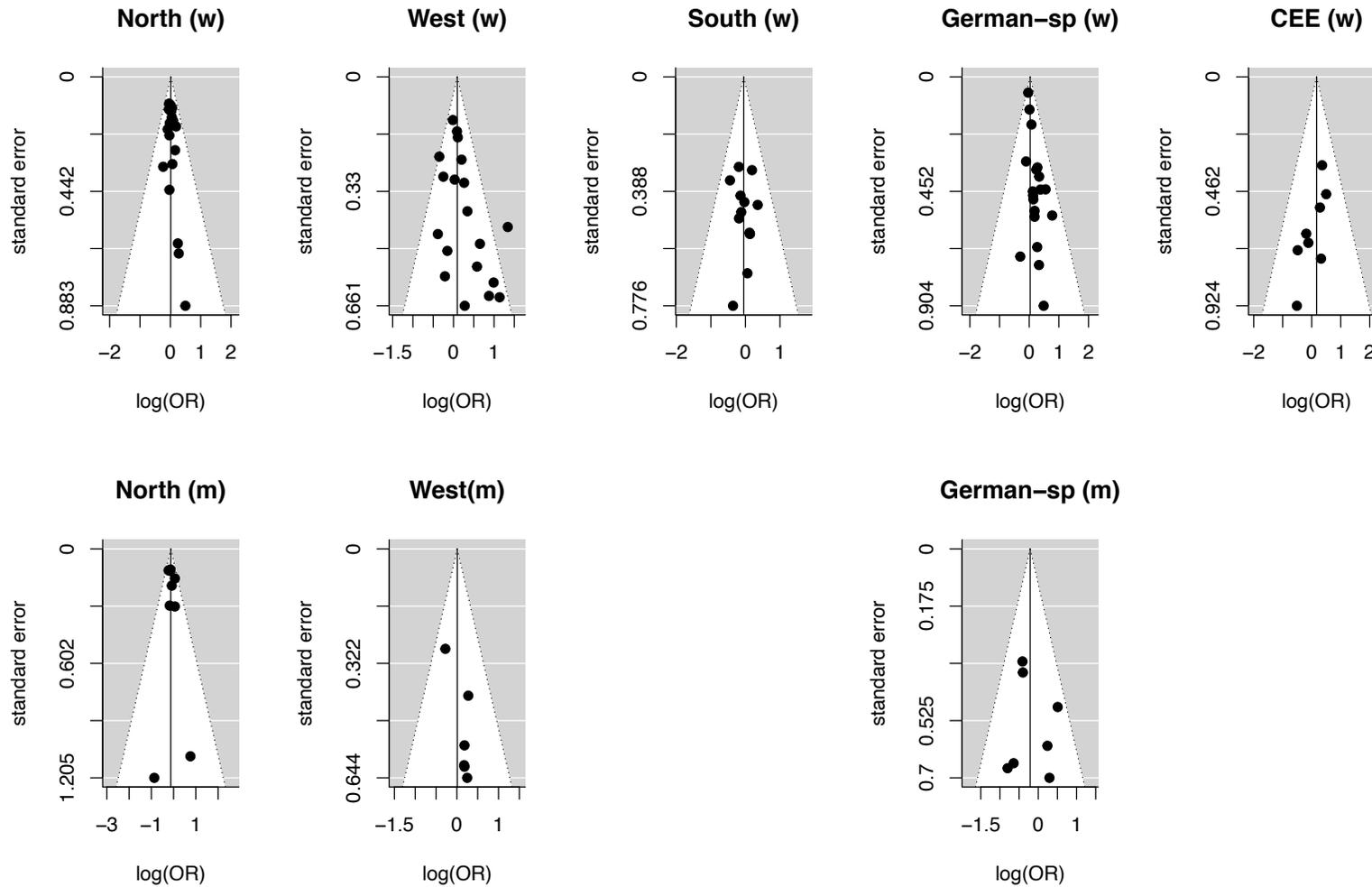


Figure 1D – Posterior distribution of effect-sizes from the meta-analyses about the relationship between unemployment (as opposed to employment) and fertility, welfare and gender-specific models.

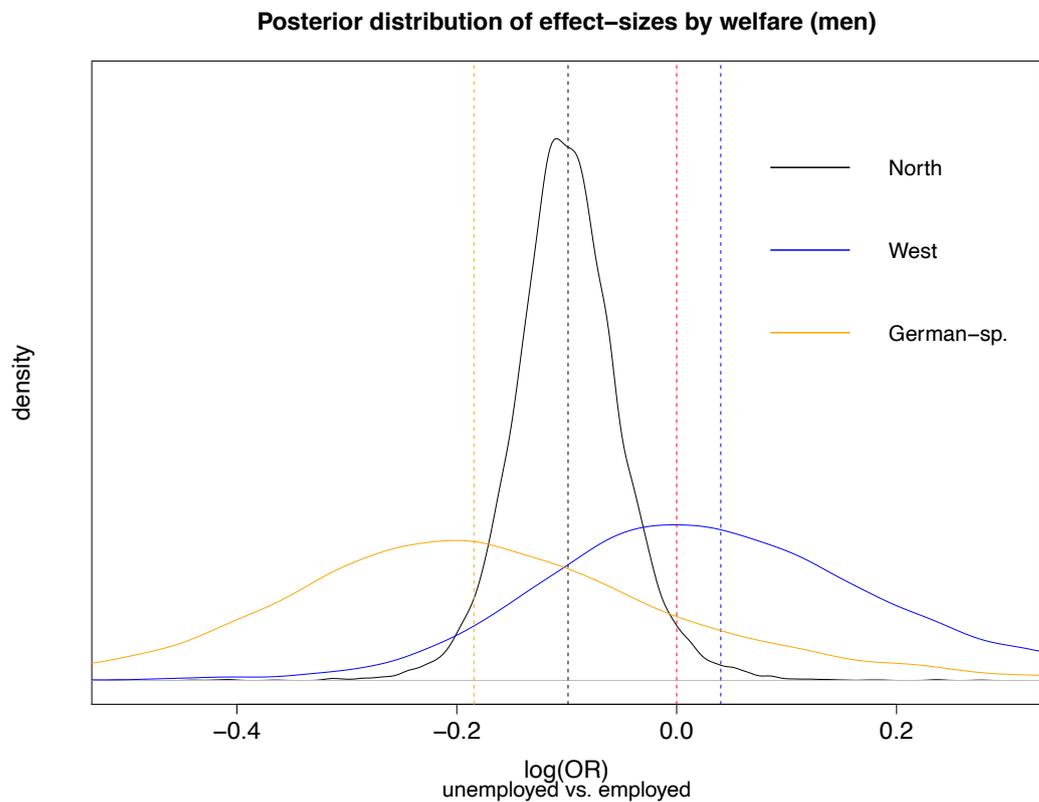
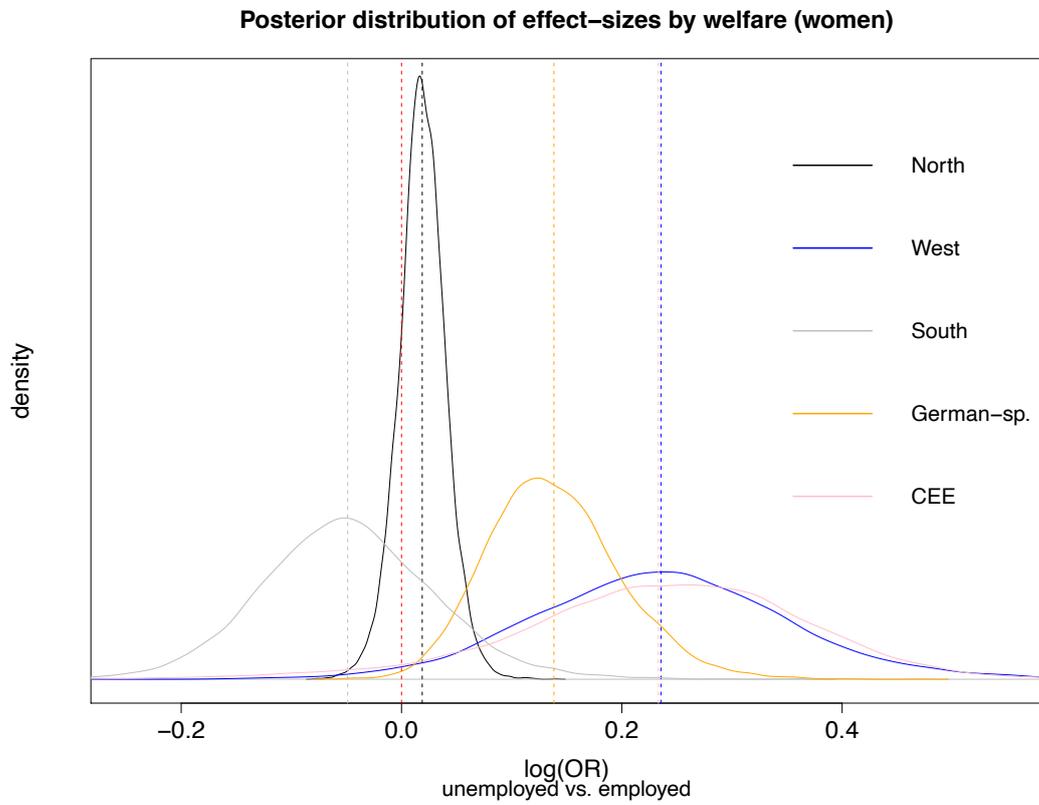


Figure 1E – Funnel plots for meta-analyses about the relationship between time-limited employment (as opposed to unlimited-time employment) and fertility, gender-specific models.

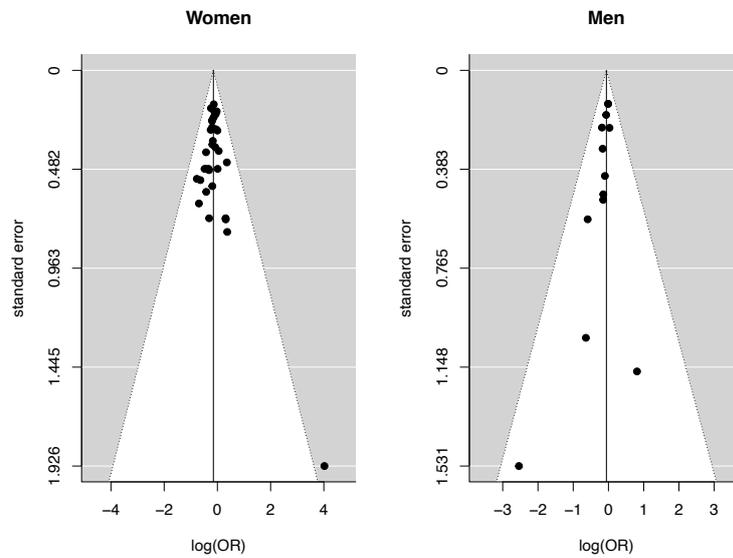


Figure 1F – Posterior distribution of effect-sizes from the meta-analyses about the relationship between time-limited employment (as opposed to unlimited-time employment) and fertility, gender-specific models.

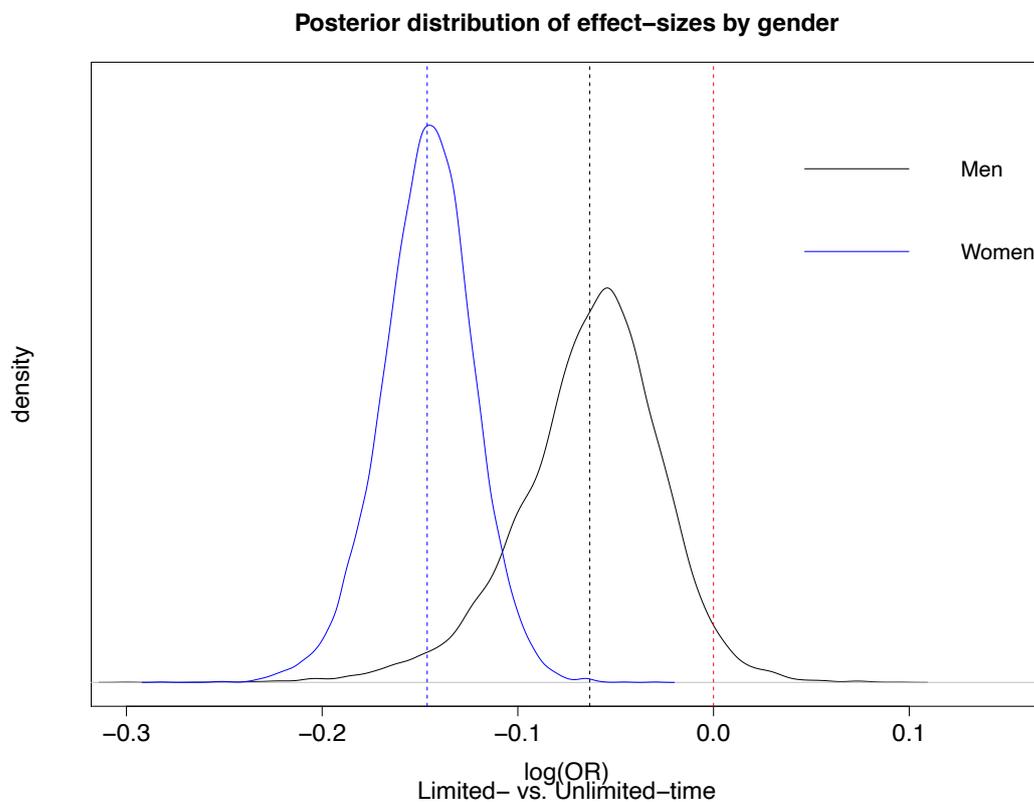


Figure 1G – Funnel plots for meta-analyses about the relationship between time-limited employment (as opposed to unlimited-time employment) and fertility, welfare and gender-specific models (w = women; tot = pooled dataset). Standard errors for each log(OR) are reported on the y-axis.

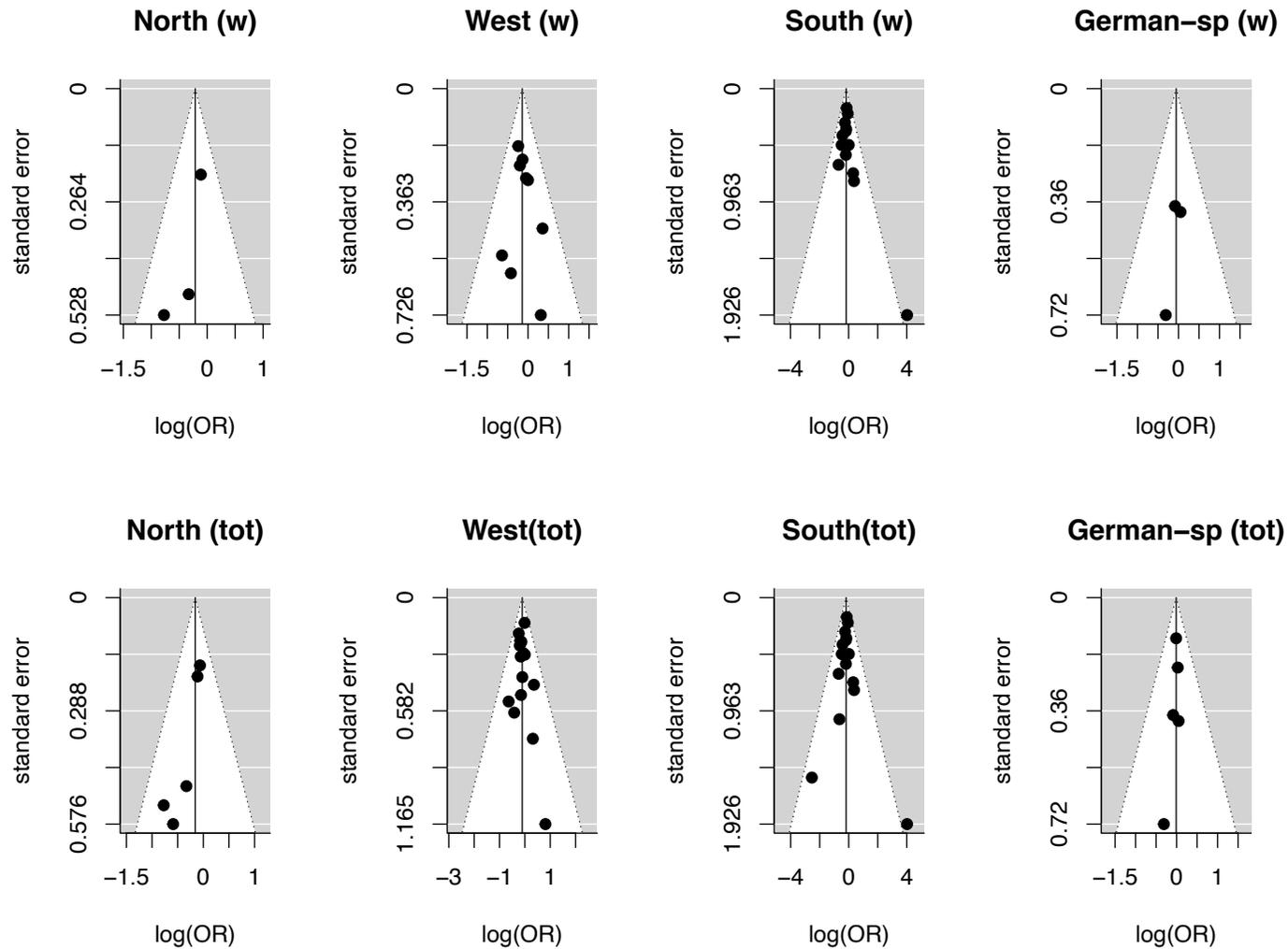


Figure 1H – Posterior distribution of effect-sizes from the meta-analyses about the relationship between time-limited employment (as opposed to unlimited-time employment) and fertility, welfare and gender-specific models.

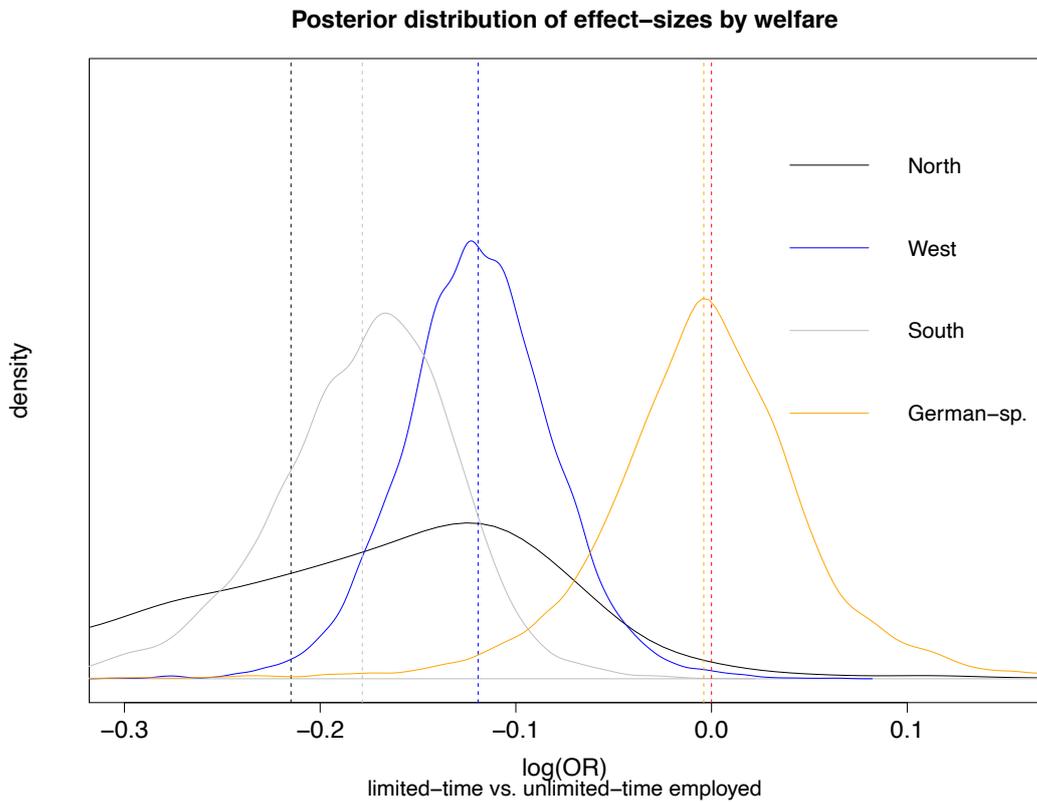
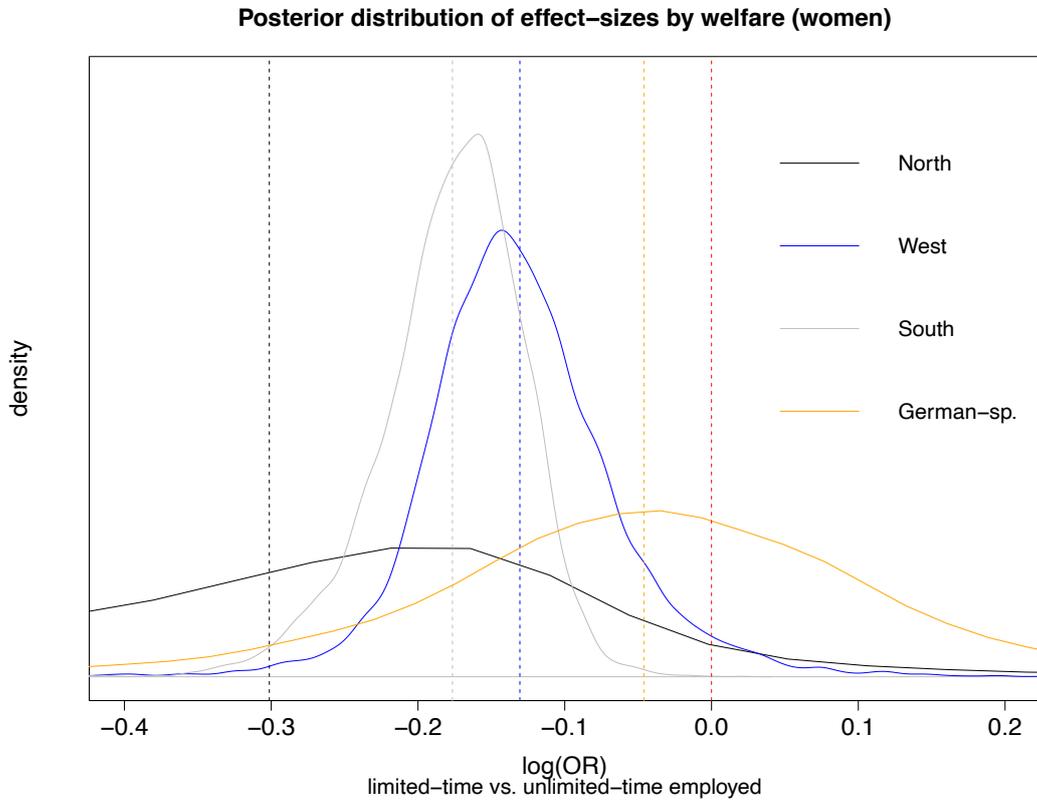


Table 1A – Results of the Egger’s test for the asymmetry of funnel plots for each meta-analysis. When the test detects relevant asymmetry in the funnel plot (i.e., when $p < 0.05$), this is indicative of publication bias.

Unemployment vs. employment				Time-limited vs. unlimited-time employment			
Gender	Country group	z	p-value	Gender	Country group	z	p-value
Women	all	2.34	0.02	Women	all	0.27	0.79
Men	all	0.33	0.74	Pooled	all	-1.29	0.20
Women	Nordic	0.59	0.55	Women	Nordic	-1.07	0.28
Men	Nordic	0.56	0.57	Pooled	Nordic	-1.45	0.15
Women	Western	2.39	0.02	Women	Western	0.38	0.70
Men	Western	1.10	0.27	Pooled	Western	0.14	0.88
Women	Southern	0.25	0.80	Women	Southern	0.67	0.50
Men	Southern	-	-	Pooled	Southern	-0.13	0.89
Women	German-sp.	1.89	0.51	Women	German-sp.	-0.35	0.72
Men	German-sp.	0.46	0.65	Pooled	German-sp.	-0.26	0.79
Women	CEE	-1.25	0.21				
Men	CEE	-	-				

Source: our elaboration on the meta-sample.

Pairwise meta-analyses with frequentist approach

Tables 1B and 1C show the results of random-effects frequentist meta-analyses on the relationship between unemployment and employment, by gender and welfare state. Compared to the results obtained with the Bayesian approach, the average effects are extremely similar, the largest variation is 0.1 (in the case of women from Western countries, 1.27 vs 1.17). Significance is virtually unchanged. Similarly, Tables 1D and 1E report the same results about time-limited employment versus unlimited-time employment. In this case, variations between the two approaches are even smaller than in the case of unemployment. The larger difference is a 0.05 shift in the average effect for Nordic countries. Again, significance levels are virtually unchanged.

Table 1B – Random-effects frequentist meta-analyses about unemployment vs. employment, gender-specific results. ORs are reported.

	Average effect	p-value	Number of effect-sizes
Women	1.04	0.01	81
Men	0.89	0.04	26

Source: our elaboration on meta-sample

Table 1C – Random-effects frequentist meta-analyses about unemployment vs. employment, results by welfare states. ORs are reported.

Country group	Gender	Average effect	p-value	Number of effect-sizes
Nordic	Women	1.02	0.21	20
	Men	0.91	0.06	8
Western	Women	1.17	0.01	20
	Men	1.07	0.65	6
Southern	Women	0.95	0.53	13
	Men	-	-	2
German-speaking	Women	1.16	0.01	19
	Men	0.76	0.01	8
CEE	Women	1.37	0.02	6
	Men	-	-	1

Source: our elaboration on meta-sample

Table 1D – Random-effects frequentist meta-analyses about time-limited employment versus unlimited-time employment, gender-specific results. ORs are reported.

	Average effect	p	Number of effect-sizes
Women	0.86	0.01	32
Men	0.95	0.02	13

Source: our elaboration on meta-sample

Table 1E – Random-effects frequentist meta-analysis for time-limited employment *versus* unlimited-time employment, results by welfare states. ORs are reported.

Country group	Gender	Average effect	p	Number of effect-sizes
Nordic	Women	0.72	0.08	3
	Total	0.86	0.01	5
Western	Women	0.89	0.02	9
	Total	0.90	0.01	15
Southern	Women	0.84	0.01	14
	Total	0.85	0.01	16
German-speaking	Women	0.97	0.74	3
	Total	0.99	0.67	5
CEE	Women	-	-	-
	Total	-	-	-

Source: our elaboration on meta-sample

Sources of the studies used in the meta-analyses

Adsera (2011a); Adsera (2011b); Andersson (2000); Andersson and Scott (2005); Andersson and Scott (2008); Anderson et al. (2014); Baizan (2005); Baizan (2009); Barbieri et al. (2015); Berinde (1999); Bernardi and Nazio (2006); Billingsley et al. (2014); Bygren et al. (2006); Conti and Sette (2013); d'Albis et al. (2017); de Lange et al. (2014); De la Rica and Iza (2005); Del Bono et al. (2015); Dupray and Pailhé (2018); Francesconi and Golsch (2006); Golsch (2003); Gonzalez and Jurado-Guerrero (2006); Grogan (2006); Inanc (2015); Jalovaara and Miettinen (2013); Kieffer et al. (2006); Kohler and Kohler (2002); Kravdal (2002); Kreyenfeld (2009); Kreyenfeld and Andersson (2014); Kreyenfeld (2016); Kulu and Hannemann (2016); Kurz et al. (2006); Liefbroer (2006); Lundstrom and Andersson (2012); Lyons-Amos and Schoon (2017); Martin Garcia (2010); Meron et al. (2002); Olah (2003); Olah and Frateczak (2004); Ozcan et al. (2010); Pailhé and Solaz (2012); Schmitt (2012a); Schmitt (2012b); Sinyavskaya and Billingsley (2015); Sutela (2012); Testa and Toulemon (2006); Vignoli et al. (2012); Vikat (2004); Wolbers (2007); Wood et al. (2017).

Table 1F - Articles and effect-estimates included in the meta-analysis about time-limited (LT) employment vs. unlimited-time (UT) employment (MA1), in the meta-analysis about employment (EM) vs. unemployment (UN) (MA2) and in the Network meta-analysis (NMA). For each article, ORs/RRs with standard errors are reported, plus the main characteristic of the model (gender, parity, countries involved).

Article code	Comparison	MA1	MA2	NMA	Gender	Parity	Country	OR/RR	SE
Adsera_11a	LT vs. UT	x		x	F	second child	multiple	0.824	0.077
Adsera_11a	LT vs. UT	x		x	F	second child	multiple	0.829	0.131
Adsera_11a	UN vs. EM		x		F	second child	multiple	1.046	0.135
Adsera_11a	UN vs. EM		x		F	second child	multiple	1.133	0.283
Adsera_11b	LT vs. UT	x		x	F	second child	multiple	0.832	0.058
Adsera_11b	UN vs. EM		x		F	second child	multiple	1.059	0.130
Adsera_11b	UN vs. EM		x		F	third child	multiple	0.962	0.220
Andersson_00	UN vs. EM		x		F	first child	Sweden	1.208	0.037
Andersson_00	UN vs. EM		x		F	second child	Sweden	0.950	0.016
Andersson_00	UN vs. EM		x		F	third child	Sweden	1.100	0.029
Andersson_05	UN vs. EM		x		F	first child	Sweden	0.929	0.013
Andersson_08	UN vs. EM		x		F	second child	Sweden	0.790	0.120
Andersson_08	UN vs. EM		x		M	second child	Sweden	0.840	0.089
Andersson_08	UN vs. EM		x		F	third child	Sweden	0.980	0.032
Andersson_08	UN vs. EM		x		M	third child	Sweden	1.060	0.092
Andersson_14	UN vs. EM		x		F	first child	Germany	1.080	0.035
Andersson_14	UN vs. EM		x		F	second child	Germany	1.130	0.204
Andersson_14	UN vs. EM		x		F	third child	Germany	1.630	0.817
Andersson_14	UN vs. EM		x		F	first child	Denmark	1.320	0.084
Andersson_14	UN vs. EM		x		F	second child	Denmark	0.970	0.009
Andersson_14	UN vs. EM		x		F	third child	Denmark	1.070	0.021
Baizan_05	LT vs. UT	x		x	F	second+ child	Denmark	0.719	0.230
Baizan_05	LT vs. UT	x		x	F	second+ child	Italy	1.010	0.230
Baizan_05	LT vs. UT	x		x	F	second+ child	Spain	0.619	0.230
Baizan_05	LT vs. UT	x		x	F	second+ child	UK	0.657	0.350
Baizan_05	UN vs. EM		x		F	second+ child	Denmark	0.970	0.190
Baizan_05	UN vs. EM		x		F	second+ child	Italy	0.887	0.210
Baizan_05	UN vs. EM		x		F	second+ child	Spain	0.970	0.180
Baizan_05	UN vs. EM		x		F	second+ child	UK	1.786	0.300
Baizan_09	LT vs. UT	x		x	F	first child	Spain	0.654	0.159
Baizan_09	LT vs. UT	x		x	F	second+ child	Spain	0.732	0.236
Baizan_09	UN vs. EM		x		F	first child	Spain	0.640	0.123
Baizan_09	UN vs. EM		x		F	second+ child	Spain	0.868	0.162
Barbieri_15	LT vs. UT	x		x	F	first child	Italy	1.363	0.519
Barbieri_15	LT vs. UT	x		x	F	first child	Spain	0.827	0.318
Berinde_99	UN vs. EM		X		F	third child	Sweden	1.170	0.080
Bernardi_05	LT vs. UT	x		x	M	first child	Italy	0.527	1.071

Bernardi_05	LT vs. UT	x		x	F	first child	Italy	1.448	0.619
Bernardi_05	UN vs. EM		x		M	first child	Italy	0.869	0.234
Bernardi_05	UN vs. EM		x		F	first child	Italy	0.698	0.602
Billingsley_14	UN vs. EM		x		-	first child	Estonia	0.780	0.269
Bygren_05	UN vs. EM		x		M	first child	Sweden	2.132	2.538
Bygren_05	UN vs. EM		x		F	first child	Sweden	1.642	1.281
Conti_13	LT vs. UT	x		x	F	any	Italy	0.874	0.027
Dalbis_17	UN vs. EM		x		F	second child	multiple	0.835	0.064
Delange_14	LT vs. UT	x		x	M	first child	Netherlands	2.250	3.052
Delange_14	LT vs. UT	x		x	F	first child	Netherlands	1.370	0.721
Delange_14	UN vs. UT		x	x	-	first child	Netherlands	0.800	0.373
Delange_14	UN vs. UT		x	x	F	first child	Netherlands	0.860	0.252
Delarica_05	LT vs. UT	x		x	F	first child	Spain	0.657	0.231
Delbono_15	UN vs. EM		x		F	any	Austria	0.968	0.004
Dupray_18	LT vs. UT	x		x	F	first child	France	0.787	0.034
Dupray_18	LT vs. UT	x		x	M	first child	France	0.833	0.049
Dupray_18	UN vs. UT		x	x	F	first child	France	0.705	0.053
Dupray_18	UN vs. UT		x	x	M	first child	France	0.759	0.079
Francesconi_05	LT vs. UT	x		x	M	first child	UK	0.905	0.167
Francesconi_05	LT vs. UT	x		x	F	first child	UK	0.952	0.082
Francesconi_05	UN vs. EM		x		M	first child	UK	1.281	0.414
Francesconi_05	UN vs. EM		x		F	first child	UK	3.116	1.261
Garcia_10	UN vs. EM		x		F	first child	Spain	1.426	0.188
Garcia_10	UN vs. EM		x		F	second child	Spain	1.141	0.283
Garcia_10	UN vs. EM		x		F	third child	Spain	1.125	0.279
Golsch_03	LT vs. UT	x		x	M	first child	Spain	0.079	2.343
Golsch_03	LT vs. UT	x		x	F	first child	Spain	55.813	207.1
Golsch_03	UN vs. UT		x	x	M	first child	Spain	0.352	0.296
Golsch_03	UN vs. UT		x	x	F	first child	Spain	0.830	0.230
Gonzalez_06	LT vs. UT	x		x	F	first child	Spain	0.779	0.084
Gonzalez_06	LT vs. UT	x		x	F	first child	France	1.000	0.086
Gonzalez_06	LT vs. UT	x		x	F	first child	Italy	0.844	0.118
Gonzalez_06	LT vs. UT	x		x	F	first child	Germany	1.051	0.154
Gonzalez_06	UN vs. UT		x	x	F	first child	Spain	0.827	0.093
Gonzalez_06	UN vs. UT		x	x	F	first child	France	0.779	0.083
Gonzalez_06	UN vs. UT		x	x	F	first child	Italy	1.209	0.100
Gonzalez_06	UN vs. UT		x	x	F	first child	Germany	1.462	0.198
Grogan_06	UN vs. EM		x		F	any	Russia	0.891	0.449
Inanc_15	UN vs. EM		x		M	first child	UK	1.315	0.170
Inanc_15	UN vs. EM		x		F	first child	UK	3.813	0.188
Jalovaara_13	UN vs. EM		x		M	first child	Finland	1.060	0.024
Jalovaara_13	UN vs. EM		x		F	first child	Finland	1.050	0.024
Kieffer_05	UN vs. EM		x		F	first child	France	1.029	0.088
Kohler_02	UN vs. EM		x		F	any	Russia	0.829	0.401

Kohler_02	UN vs. EM		x	F	any	Russia	0.616	0.490
Kravdal_02	UN vs. EM		x	F	first child	Norway	1.060	0.014
Kravdal_02	UN vs. EM		x	F	second+ child	Norway	0.960	0.011
Kravdal_02	UN vs. EM		x	M	first child	Norway	0.800	0.013
Kravdal_02	UN vs. EM		x	M	second+ child	Norway	0.870	0.012
Kreyenfeld_09	UN vs. EM		x	F	first child	W Germany	0.740	0.504
Kreyenfeld_09	UN vs. EM		x	F	first child	W Germany	1.150	0.234
Kreyenfeld_09	UN vs. EM		x	F	first child	E Germany	1.310	0.452
Kreyenfeld_14	UN vs. EM		x	M	first child	Germany	0.662	0.118
Kreyenfeld_14	UN vs. EM		x	M	second child	Germany	0.670	0.143
Kreyenfeld_14	UN vs. EM		x	M	third child	Germany	1.660	0.234
Kreyenfeld_14	UN vs. EM		x	F	first child	Germany	0.900	0.112
Kreyenfeld_14	UN vs. EM		x	F	second child	Germany	1.140	0.219
Kreyenfeld_14	UN vs. EM		x	F	third child	Germany	1.400	0.155
Kreyenfeld_16	UN vs. EM		x	F	first child	Germany	1.028	0.159
Kreyenfeld_16	UN vs. EM		x	F	second child	Germany	1.270	0.134
Kreyenfeld_16	UN vs. EM		x	F	third child	Germany	1.740	0.197
Kulu_16	UN vs. EM		x	F	first child	UK	1.300	0.093
Kulu_16	UN vs. EM		x	F	second child	UK	0.810	0.332
Kulu_16	UN vs. EM		x	F	third child	UK	1.920	0.232
Kulu_16	UN vs. EM		x	F	fourth child	UK	1.320	0.437
Kurz_05	LT vs. UT	x	x	F	first child	Germany	0.733	0.519
Kurz_05	LT vs. UT	x	x	M	first child	Germany	0.990	0.017
Kurz_05	UN vs. EM		x	F	first child	Germany	1.391	0.552
Kurz_05	UN vs. EM		x	M	first child	Germany	0.449	0.449
Liefbroer_05	LT vs. UT	x	x	F	first child	Netherlands	0.527	0.286
Liefbroer_05	LT vs. UT	x	x	M	first child	Netherlands	0.861	0.251
Lundstrom_12	LT vs. UT	x	x	F	first child	Sweden	0.771	0.040
Lundstrom_12	LT vs. UT	x	x	M	first child	Sweden	0.862	0.030
Lundstrom_12	UN vs. UT		x	F	first child	Sweden	0.815	0.041
Lundstrom_12	UN vs. UT		x	M	first child	Sweden	0.830	0.037
Lyons_17	UN vs. EM		x	F	first child	UK	1.410	0.150
Meron_02	LT vs. UT	x	x	F	first child	France	0.909	0.052
Meron_02	UN vs. UT		x	F	first child	France	1.025	0.015
Olah_03	UN vs. EM		x	F	second child	Sweden	1.280	0.413
Olah_03	UN vs. EM		x	M	second child	Sweden	0.420	1.451
Olah_03	UN vs. EM		x	F	second child	Hungary	1.430	0.127
Olah_03	UN vs. EM		x	M	second child	Hungary	0.740	0.504
Olah_04	UN vs. EM		x	F	first child	Hungary	0.600	0.855
Olah_04	UN vs. EM		x	F	first child	Poland	1.380	0.539
Ozcan_10	UN vs. EM		x	F	first child	E Germany	1.568	0.351
Ozcan_10	UN vs. EM		x	F	first child	W Germany	0.921	0.463
Ozcan_10	UN vs. EM		x	M	first child	E Germany	0.468	0.665
Ozcan_10	UN vs. EM		x	M	first child	W Germany	0.591	0.562

Pailhé_12	LT vs. UT	x	x	M	first child	France	0.849	0.092	
Pailhé_12	LT vs. UT	x	x	F	first child	France	0.819	0.061	
Schmitt_12a	LT vs. UT	x	x	M	first child	Germany	1.030	0.049	
Schmitt_12a	LT vs. UT	x	x	F	first child	Germany	0.920	0.139	
Schmitt_12a	LT vs. UT	x	x	M	first child	UK	0.990	0.017	
Schmitt_12a	LT vs. UT	x	x	F	first child	UK	1.430	0.201	
Schmitt_12a	UN vs. UT		x	x	M	first child	Germany	1.340	0.490
Schmitt_12a	UN vs. UT		x	x	F	first child	Germany	1.320	0.128
Schmitt_12a	UN vs. UT		x	x	M	first child	UK	1.200	0.305
Schmitt_12a	UN vs. UT		x	x	F	first child	UK	2.690	0.353
Schmitt_12b	UN vs. EM		x		M	first child	France	1.200	0.375
Schmitt_12b	UN vs. EM		x		M	first child	Germany	1.270	0.362
Schmitt_12b	UN vs. EM		x		M	first child	UK	1.190	0.370
Schmitt_12b	UN vs. EM		x		F	first child	France	0.680	0.206
Schmitt_12b	UN vs. EM		x		F	first child	Germany	2.170	0.300
Schmitt_12b	UN vs. EM		x		F	first child	UK	2.400	0.400
Sinyavskaya_15	UN vs. EM		x		F	first child	Russia	1.330	0.278
Sinyavskaya_15	UN vs. EM		x		F	second child	Russia	1.650	0.224
Sutela_12	LT vs. UT	x		x	F	first child	Finland	0.462	0.279
Sutela_12	LT vs. UT	x		x	M	first child	Finland	0.555	0.332
Testa_06	UN vs. EM		x		-	first child	France	0.100	0.820
Vignoli_12	LT vs. UT	x		x	F	first child	Italy	0.500	0.420
Vignoli_12	UN vs. EM		x		F	first child	Italy	1.060	0.443
Vikat_04	UN vs. EM		x		F	first child	Finland	1.009	0.012
Vikat_04	UN vs. EM		x		F	second child	Finland	1.030	0.013
Vikat_04	UN vs. EM		x		F	third child	Finland	1.060	0.018
Wolbers_07	LT vs. UT	x		x	M	first child	multiple	0.864	0.230
Wolbers_07	LT vs. UT	x		x	F	first child	multiple	0.975	0.040
Wood_17	UN vs. EM		x		F	first child	Belgium	1.090	0.025
Wood_17	UN vs. EM		x		F	second child	Belgium	1.112	0.030
Wood_17	UN vs. EM		x		F	third child	Belgium	1.220	0.057

Appendix 2

Table 2A - Descriptive statistics.

Variables	Italy		Sweden	
	Mean/proportion	N	Mean/proportion	N
Childbirth		111,608		2,320,280
<i>Yes</i>	13.57%	15,146	15.48%	359,298
<i>No</i>	86.42%	96,452	84.52%	1,960,982
Age	30.62	111,608	33.52	2,320,280
Educational Level		111,608		2,320,280
<i>Low</i>	36.88%	41,161	14.90%	345,680
<i>Medium</i>	48.18%	53,772	40.74%	945,167
<i>High</i>	14.94%	16,675	42.34%	982,473
<i>Missing</i>	-	-	2.02%	46,960
Parity		111,608		2,320,280
<i>Childless</i>	57.02%	63,639	41.66%	966,622
<i>Parent</i>	42.98%	47,969	58.34%	1,353,658
Civil Status		111,608		2,313,173
<i>Unmarried</i>	49.76%	55,536	36.40%	841,943
<i>Married</i>	43.87%	48,962	55.64%	1,287,239
<i>Sep./Wid./Div.</i>	6.37%	7,110	7.96%	183,991
Wave		111,608		2,320,280
2009	52.60%	58,705	49.49%	1,148,394
2012	47.40%	52,903	50.51%	1,171,886
Migrant Status		111,608		183,991
<i>Native</i>	86.35%	96,374	81.60%	1,893,461
<i>Migrant <10yrs</i>	7.50%	8,371	9.08%	210,602
<i>Migrant >10yrs</i>	6.15%	6,863	9.23%	214,166
Nuts1		111,608		2,320,280
<i>North(IT) / East(SW)</i>	43.77%	48,851	39.04%	905,880
<i>Center(IT) / South(SW)</i>	16.17%	18,047	43.54%	1,010,251
<i>South(IT) / North(SW)</i>	40.06%	44,710	17.42%	404,149
Employment Status		111,608		2,320,280
<i>Unstable Career</i>	29.18%	32,566	35.27%	818,292
<i>Employed >3yrs</i>	35.74%	39,885	50.19%	1,164,439
<i>Unemployed >3yrs</i>	1.86%	2,077	11.43%	265,166
<i>Inactive >3yrs</i>	33.22%	37,080	3.11%	72,383
ISCO (Grouped)				1,164,439
<i>Self-Employed</i>	18.18%	7,253	4.20%	48,906
<i>Managers/Directors</i>	9.43%	3,763	24.96%	290,643
<i>Clerks</i>	55.46%	22,122	62.33%	725,795
<i>Workers</i>	16.92%	6,747	8.51%	99,095

Source: Elaboration of the authors based on Swedish Population Registers and Italian LFS.

Table 2B - Linear probability model of having a child by parity in Sweden and Italy.

Variables	Childless				Mothers			
	Sweden		Italy		Sweden		Italy	
	<i>N</i> = 966,622		<i>N</i> = 63,644		<i>N</i> = 1,353,658		<i>N</i> = 47,964	
	Coeff.	p	Coeff.	p	Coeff.	p	Coeff.	p
Age	-0.009	0.000	-0.004	0.000	-0.032	0.000	-0.021	0.000
Age Squared	-0.001	0.000	-0.001	0.000	0.001	0.000	0.000	0.000
Education								
<i>Medium</i>	-0.032	0.000	-0.016	0.000	0.009	0.000	0.033	0.000
<i>High</i>	-0.008	0.000	0.003	0.554	0.081	0.000	0.142	0.000
Civil Status								
<i>Married</i>	0.253	0.000	0.364	0.000	0.001	0.754	0.017	0.060
<i>Sep./Div./Wid.</i>	0.041	0.000	0.064	0.000	-0.016	0.000	-0.041	0.000
Wave								
2012	-0.003	0.000	0.002	0.426	0.003	0.000	0.008	0.084
Migration Status (Ref. Native)								
<i>Migrant < 10yrs</i>	-0.011	0.000	0.013	0.237	0.027	0.000	-0.024	0.069
<i>Migrant > 10yrs</i>	-0.036	0.000	0.007	0.567	-0.001	0.201	-0.020	0.065
Wave 2012*Migrant								
2012*Migrant <10yrs	-0.010	0.000	-0.008	0.569	-0.003	0.233	0.002	0.873
2012*Migrant >10yrs	-0.004	0.121	-0.029	0.087	0.000	0.829	0.000	0.976
Residence (Ref. South Se / North It)								
<i>East Se / Center It</i>	-0.009	0.000	-0.003	0.531	0.010	0.000	0.000	0.956
<i>North Se / South It</i>	0.004	0.000	-0.015	0.000	-0.009	0.000	-0.015	0.001
Intercept	0.257	0.000	0.113	0.000	0.203	0.000	0.269	0.000

Source: Elaboration of the authors based on Swedish Population Registers and Italian LFS.

Table 2C - Linear probability model of having a child by migration status in Sweden and Italy.
Interaction model with employment status.

Variables	Natives				Migrants				
	Sweden <i>N = 1,893,461</i>		Italy <i>N = 96,370</i>		Sweden <i>N = 426,819</i>		Italy <i>N = 15,238</i>		
	Coeff.	p	Coeff.	p	Coeff.	p	Coeff.	p	
Age	-0.012	0.000	-0.009	0.000	-0.015	0.000	-0.010	0.000	
Age Squared	-0.001	0.000	-0.001	0.000	-0.001	0.000	-0.001	0.000	
Education									
	<i>Medium</i>	-0.002	0.012	0.000	0.977	0.003	0.034	0.001	0.943
	<i>High</i>	0.051	0.000	0.053	0.000	0.027	0.000	0.039	0.003
Parity (Ref. Childless)	<i>Parent</i>	0.084	0.000	-0.074	0.000	0.077	0.000	-0.031	0.004
Civil Status	<i>Married</i>	0.031	0.000	0.270	0.000	0.151	0.000	0.163	0.000
	<i>Sep./Div./Wid.</i>	-0.000	0.785	0.153	0.000	0.068	0.000	0.028	0.013
Migration Status (Ref. Migrant<10yrs)	<i>Migrant>10yrs</i>					-0.033	0.000	-0.019	0.013
Wave	<i>2012</i>	0.033	0.000	0.019	0.000	0.019	0.000	-0.002	0.896
Residence (Ref. South Se/North It)	<i>East Se / Center It</i>	0.001	0.005	0.001	0.790	0.000	0.639	0.001	0.935
	<i>North Se / South It</i>	-0.002	0.003	-0.017	0.000	0.001	0.635	-0.036	0.000
Employment Status (Ref. Employed)	<i>Unstable Careers</i>	0.078	0.000	-0.021	0.000	0.063	0.000	0.018	0.181
	<i>Unemployed</i>	0.019	0.000	-0.063	0.000	0.081	0.000	-0.076	0.041
	<i>Inactive</i>	0.025	0.000	-0.012	0.010	0.023	0.000	0.112	0.000
Interaction 2012*Employment Status	<i>2012*(Unstable Careers)</i>	-0.074	0.000	-0.015	0.024	-0.039	0.000	0.006	0.733
	<i>2012*Unemployed</i>	-0.028	0.000	-0.027	0.090	-0.013	0.000	0.073	0.151
	<i>2012*Inactive</i>	-0.027	0.000	-0.023	0.000	-0.021	0.000	-0.013	0.504
Intercept		0.142	0.000	0.128	0.000	0.138	0.000	0.143	0.000

Source: Elaboration of the authors based on Swedish Population Registers and Italian LFS.

Table 2D - Linear probability model of having a child in Sweden and Italy.
Women employed for at least 3 years.

Variables	Sweden <i>N</i> = 1,178,321		Italy <i>N</i> = 39,885		
	Coeff.	p	Coeff.	p	
Age	-0.014	0.000	-0.005	0.000	
Age Squared	-0.001	0.000	-0.002	0.000	
Education					
	<i>Medium</i>	0.004	0.000	0.023	0.000
	<i>High</i>	0.075	0.000	0.084	0.000
Parity (Ref. Childless)					
	<i>Parent</i>	0.029	0.000	-0.061	0.000
Civil Status					
	<i>Married</i>	0.021	0.000	0.218	0.000
	<i>Sep./Div./Wid.</i>	0.038	0.000	0.099	0.000
Wave					
	<i>2012</i>	0.032	0.000	0.016	0.001
Migration Status (Ref. Native)					
	<i>Migrant < 10yrs</i>	-0.002	0.590	-0.051	0.000
	<i>Migrant > 10yrs</i>	-0.010	0.000	-0.000	0.099
Wave 2012*Migrant					
	<i>2012*Migrant <10yrs</i>	-0.018	0.000	-0.028	0.122
	<i>2012*Migrant >10yrs</i>	-0.006	0.001	-0.014	0.430
Residence (Ref. South Se / North It)					
	<i>East Se / Center It</i>	0.005	0.000	0.007	0.244
	<i>North Se / South It</i>	-0.006	0.000	-0.026	0.000
Intercept		0.141	0.000	0.142	0.000

Source: Elaboration of the authors based on Swedish Population Registers and Italian LFS.

Table 2E - Linear probability model of having a child by migration status in Sweden and Italy. Interaction model with type of occupation. Women employed for at least 3 years.

Variable	Natives				Migrants			
	Sweden N = 851,641		Italy N = 35,339		Sweden N = 326,680		Italy N = 4,546	
	Coeff.	p	Coeff.	p	Coeff.	p	Coeff.	p
<i>Age</i>	-0.014	0.000	-0.004	0.000	-0.014	0.000	-0.008	0.000
<i>Age Squared</i>	-0.001	0.000	-0.002	0.000	-0.000	0.000	-0.001	0.000
Education								
<i>Medium</i>	0.004	0.009	0.021	0.001	0.004	0.073	0.005	0.705
<i>High</i>	0.065	0.000	0.000	0.000	0.043	0.000	0.040	0.043
Parity (Ref. Childless)								
<i>Parent</i>	0.032	0.000	-0.067	0.000	0.010	0.000	-0.027	0.108
Civil Status								
<i>Married</i>	0.014	0.000	0.231	0.000	0.061	0.000	0.130	0.000
<i>Sep./Div./Wid.</i>	0.003	0.001	0.119	0.000	0.024	0.000	0.011	0.435
Status (Ref. Migrant<10yrs)								
<i>Migrant>10yrs</i>					-0.007	0.000	0.028	0.031
Wave								
2012	0.016	0.000	0.041	0.001	0.008	0.011	-0.006	0.707
Residence (Ref. South Se / North It)								
<i>East Se / Center It</i>	0.003	0.000	-0.005	0.377	0.002	0.139	0.002	0.878
<i>North Se / South It</i>	-0.006	0.000	-0.022	0.000	0.001	0.705	-0.033	0.018
ISCO (Ref. Workers)								
Self-Employed	0.075	0.000	0.009	0.369	0.076	0.000	0.075	0.028
Managers	0.040	0.000	0.044	0.007	0.048	0.000	0.081	0.205
Clerks	0.014	0.000	0.030	0.001	0.014	0.000	0.001	0.977
Wave 2012*ISCO								
2012*Self-Employed	-0.013	0.000	-0.019	0.248	-0.005	0.436	-0.037	0.382
2012*Managers/Directors	0.016	0.000	-0.045	0.028	0.020	0.000	-0.040	0.610
2012*Clerks	0.019	0.000	-0.029	0.036	0.019	0.000	0.022	0.393
Intercept	0.124	0.000	0.120	0.000	0.124	0.000	0.106	0.000

Source: Elaboration of the authors based on Swedish Population Registers and Italian LFS.

Appendix 3

Table 3A – All the results from the lognormal survival models among men – independent and joint models.

Independent models				Joint models			
Entry into first union				Entry into first union			
		coef.				coef.	
macro area (ref. North)				macro area (ref. North)			
	<i>Centre</i>	-0.04			<i>Centre</i>	-0.03	
	<i>South</i>	-0.16	***		<i>South</i>	-0.05	**
calendar year (ref. <1998)				calendar year (ref. <1998)			
	<i>after 1998</i>	1.14	***		<i>after 1998</i>	0.36	***
education (ref. primary or lower secondary)				education (ref. primary or lower secondary)			
	<i>upper secondary</i>	0.21	***		<i>upper secondary</i>	-0.12	***
	<i>tertiary</i>	1.71	***		<i>tertiary</i>	0.40	
	<i>still studying</i>	0.25	***		<i>still studying</i>	0.11	***
employment (ref. permanent)				employment (ref. permanent)			
	<i>temporary employed</i>	0.29	***		<i>temporary employed</i>	-0.05	
	<i>self-employed</i>	0.05			<i>self-employed</i>	0.06	*
	<i>no work</i>	0.42	***		<i>no work</i>	0.38	***
Transition to parenthood				Transition to parenthood			
		coef.				coef.	
macro area (ref. North)				macro area (ref. North)			
	<i>Centre</i>	0.14			<i>Centre</i>	0.17	
	<i>South</i>	0.15			<i>South</i>	0.22	**
calendar year (ref. <1998)				calendar year (ref. <1998)			
	<i>after 1998</i>	1.19	***		<i>after 1998</i>	1.05	***
education (ref. primary or lower secondary)				education (ref. primary or lower secondary)			
	<i>upper secondary</i>	0.45	***		<i>upper secondary</i>	0.42	***
	<i>tertiary</i>	1.54	***		<i>tertiary</i>	1.57	***
	<i>still studying</i>	0.38	**		<i>still studying</i>	0.40	**
employment (ref. permanent)				employment (ref. permanent)			
	<i>temporary employed</i>	0.34	**		<i>temporary employed</i>	0.14	
	<i>self-employed</i>	0.13			<i>self-employed</i>	0.17	
	<i>no work</i>	0.11			<i>no work</i>	-0.05	
				<i>rho = 0.31 [0.18; 0.42]</i>			

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Source: elaboration of the authors on FSS 2009 data

Table 3B – All the results from the lognormal survival models among women – independent and joint models.

Independent models				Joint models			
Entry into first union				Entry into first union			
		coef.				coef.	
macro area (ref. North)				macro area (ref. North)			
	<i>Centre</i>	-0.07	**		<i>Centre</i>	-0.02	
	<i>South</i>	-0.13	***		<i>South</i>	0.03	
calendar year (ref. <1998)				calendar year (ref. <1998)			
	<i>after 1998</i>	1.11	***		<i>after 1998</i>	0.19	***
education (ref. primary or lower secondary)				education (ref. primary or lower secondary)			
	<i>upper secondary</i>	0.26	***		<i>upper secondary</i>	-0.17	***
	<i>tertiary</i>	1.62	***		<i>tertiary</i>	0.23	
	<i>still studying</i>	0.54	***		<i>still studying</i>	0.31	***
employment (ref. permanent)				employment (ref. permanent)			
	<i>temporary employed</i>	0.52	***		<i>temporary employed</i>	0.13	**
	<i>self-employed</i>	0.15	***		<i>self-employed</i>	0.08	
	<i>no work</i>	-0.04	*		<i>no work</i>	0.06	*
Transition to parenthood				Transition to parenthood			
		coef.				coef.	
macro area (ref. North)				macro area (ref. North)			
	<i>Centre</i>	0.08			<i>Centre</i>	0.07	
	<i>South</i>	-0.03			<i>South</i>	-0.02	
calendar year (ref. <1998)				calendar year (ref. <1998)			
	<i>after 1998</i>	1.34	***		<i>after 1998</i>	1.27	***
education (ref. primary or lower secondary)				education (ref. primary or lower secondary)			
	<i>upper secondary</i>	0.52	***		<i>upper secondary</i>	0.38	***
	<i>tertiary</i>	1.98	***		<i>tertiary</i>	1.74	***
	<i>still studying</i>	1.01	***		<i>still studying</i>	0.78	***
employment (ref. permanent)				employment (ref. permanent)			
	<i>temporary employed</i>	0.35	**		<i>temporary employed</i>	0.18	
	<i>self-employed</i>	-0.02			<i>self-employed</i>	-0.02	
	<i>no work</i>	-0.26	***		<i>no work</i>	-0.27	***
				<i>rho = -0.04 [-0.18; 0.09]</i>			

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Source: elaboration of the authors on FSS 2009 data