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Employment Instability and Fertility in Europe: A Meta-Analysis

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ABSTRACT The relationship between employment instability and fertility is a major topic in demographic research, with a proliferation of published papers on this matter, especially since the Great Recession. Employment instability, which most often manifests in unemployment or time-limited employment, is usually deemed to have a negative effect on fertility, although different fertility reactions are hypothesized by sociological theories, and micro-level evidence is fragmented and contradictory. We used meta-analytic techniques to synthesize European research findings, offer general conclusions about the effects of employment instability on fertility (in terms of direction and size), and rank different sources of employment instability. Our results suggest that employment instability has a nonnegligible negative effect on fertility. Men's unemployment is more detrimental for fertility than men's time-limited employment; conversely, a woman having a fixed-term contract is least likely to have a child. Next, the negative effect of employment instability on fertility has become stronger over time, and is more severe in Southern European countries, where social protection for families and the unemployed is least generous. Finally, meta-regression estimates demonstrate that failing to account for income and partner characteristics leads to an overestimation of the negative effect of employment instability on fertility. We advance the role of these two factors as potential mechanisms by which employment instability affects fertility. Overall, this meta-analysis provides the empirical foundation for new studies on the topic.

KEYWORDS Fertility • Employment instability • Meta-analysis • Europe • Economic uncertainty

Introduction

Having a stable source of income is an important precondition for family formation (Kohler et al. 2002). It was once relatively common in Europe to work on a permanent contract and hold one job for most of one's career, but individuals now increasingly experience at least short spells of unemployment and have to accept unstable fixed-term contracts to make ends meet (OECD 2015). Employment instability affects the ability to cover household expenses and generates uncertainty about future earning opportunities. Employment instability may thus discourage individuals from making

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long-term commitments and force them to postpone leaving the parental home, establishing their own household, and having children (Billari 2005). Persistent uncertainty may even lead to the perpetual postponement of family formation and thus to a smaller family size or even no children at all (Busetta et al. 2019). On the other hand, individuals may use periods of unemployment or precarious employment to have children, particularly if they have other income sources (Mills et al., 2005; Vignoli et al. 2012) or they have little to lose in terms of future employment prospects (Friedman et al. 1994).

Empirical studies have not provided clear predictions about the relationship between employment instability and fertility. The ample published research on the topic has produced heterogeneous and contradictory results. Moreover, micro-level studies are context-dependent, elucidating only one part of the nexus between employment instability and fertility. Different indicators have been used to assess the effect of employment instability, primarily unemployment and time-limited contracts. At the same time, researchers have often focused on parity-specific transitions, a particular period, or specific cohorts; they have also included different control variables in their model equations. All this has made for a crowded but fragmented state-of-the-art body of research on this topic.

In this article, we aim to draw general conclusions from existing micro-level results about the size and direction of employment instability's impact on fertility in Europe. Our analysis focuses on European countries because they display an interesting variation in fertility and labor market patterns but show economic, social, and cultural similarities. 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 aim to inspect how the association between employment instability and fertility changes across time and space (i.e., between different families and different labor market regimes).

Meta-analysis and meta-regression analysis have been successfully employed in family demography research (Matysiak et al. 2014; Matysiak and Vignoli 2008). Meta-analysis is an objective and rigorous approach to systematic reviews, producing a quantitative synthesis of the effects investigated (Stanley and Doucouliagos 2012). A standard literature review usually consists of commentary on previous research findings, but its character is qualitative. It neither allows for a quantitative assessment of the effect of interest nor provides a means to standardize the effect for different features of original studies. These problems can be overcome by applying a meta-analysis, a quantitative literature review. Meta-regression analysis is especially useful for investigating the main sources of heterogeneity among the reported estimates. Among other factors, each model specification choice affects the final estimates, and the correct model specification is often unknown. The widespread use of meta-regression analysis in economic research has confirmed that significant misspecification biases are commonly detected, especially when dealing with observational (i.e., non-experimental) data (see Stanley and Doucouliagos 2012), as is the case for demographic studies. The crucial advantage of a meta-analysis over a single comparative study is the generality of its findings, even though each component study is specific to a particular set of circumstances and based on certain assumptions (e.g., Shadish et al. 2002). In the case of a meta-analysis of homogeneous studies, there is also a gain in terms of statistical power.

In this article, we also offer a step forward to the classic meta-analysis. We performed not only classic pairwise meta-analyses, separately comparing the effects on fertility of two conditions of employment instability—that is, unemployment/time-limited employ-

ment versus employment/unlimited-time employment—but also a network meta-analysis (hereafter, NMA), which included unemployment, time-limited employment, and unlimited-time employment in a common network of evidence. This approach enables us to offer general conclusions about the relative ranking of these three conditions on fertility. The NMA is widely used in medicine as a tool to combine information from clinical trials in the presence of multiple competing treatments. Compared with pairwise meta-analyses, a network meta-analysis allows for the combination of estimates on specific pairwise comparisons directly obtained from data (direct evidence) and estimates that are indirectly derived from other direct comparisons (indirect evidence; e.g., when the condition B vs. condition C comparison is indirectly derived from the A vs. B and A vs. C comparisons). It also estimates the relative effectiveness of each treatment in respect to each other and ranks them according to their efficacy (Grant and Calderbank-Batista 2013; Tonin et al. 2017). To our knowledge, this is the first implementation of a network meta-analysis in population research.

Background

The Puzzle to Solve

Employment instability over the life course has become increasingly typical in Europe since the oil crisis in the 1970s. Unemployment was marginal before the oil shock, but it soared during the economic crisis and has never returned to the pre-crisis levels. This phenomenon has often been attributed to the rigidity of European labor markets in terms of its excessive protection of permanent jobs (Blanchard 2006; Cutuli and Guetto 2013). Consequently, in the last two decades of the twentieth century, Western European labor markets experienced strong deregulation, which led to the spread of fixed-term contracts and gave rise to perpetual temporary employment without much change for unemployment (Bentolila et al. 2012; Blanchard and Landier 2002; Rubery 2015). 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 employment contracts (Lehmann and Muravyev 2012; Mickiewicz and Bell 2000). The ongoing integration of the global economy and progressive privatization and liberalization have further intensified labor market volatility and have led to an unprecedented level of structural uncertainty in Europe (Mills et al. 2005; Standing 2014; Vignoli, Bazzani et al. 2020). This condition has affected many workers and has been shown to affect family life (Blossfeld, Buchholz et al. 2005; Blossfeld, Klijzing et al. 2005; Kreyenfeld et al. 2012; Mills and Blossfeld 2013). Since the Great Recession, papers addressing the effects of employment instability on fertility intentions and behavior have increased drastically, many of which were available as working papers or were undergoing review at the time of this writing. Nevertheless, the employment instability/fertility nexus is far from being clearly understood: theoretical premises are weak, and empirical findings offer conflicting messages.

Oppenheimer's works (1988, 1994) pioneered the literature on the relationship between growing instability of men's careers and changing demographic behaviors. Oppenheimer's *uncertainty hypothesis* states that unstable employment conditions (such as unemployment and time-limited employment) threaten men's breadwinning capability, which hampers union formation and fertility. Likewise, Easterlin argued

that cohorts who have to compete in the crowded labor markets, in which it is difficult to fulfill material aspirations, will have lower fertility (Easterlin 1966). Following Dixit and Pindyck (1994) and the financial option literature, Rajan (1999) theorized that uncertainty about future income leads people to postpone childbearing to less uncertain times. On the other hand, the work by Friedman and colleagues (1994) suggested that uncertainty may have a positive effect on fertility: when a woman has limited possibilities in the labor market, she might choose the "alternative career" of becoming a mother. This possibility is even more likely if a mother has an alternative income source—for instance, if her partner is established in the labor market (Vignoli et al. 2012) or she receives reasonable support from the welfare state (Blossfeld and Mills 2005). However, this kind of behavior is less typical of men, particularly in countries with a traditional division of household labor (Schmitt 2008).

The effects of employment instability on fertility may also depend on age, education, and the number of children the couple already has. Younger women experiencing work instability may be more likely to postpone childbearing than women who are reaching the end of their reproductive life (Currie and Schwandt 2014; Kreyenfeld and Andersson 2014). Studies have suggested that highly educated women are more prone to delay parenthood because they usually have better chances of becoming established in the labor market than low-educated women (Kreyenfeld 2010; Pailhé and Solaz 2012). They may also value a professional career more strongly and thus may be more eager to search for a stable job than to use a period of employment instability to have a child. Finally, the relationship between employment instability and fertility may also depend on parity. Individuals who are uncertain about their economic prospects are usually likely to postpone family formation until they can accumulate resources and at least one of the partners is established in the labor market. After entering parenthood, however, they may decide to proceed with their childbearing plans regardless of the employment circumstances, perhaps because they have little time to postpone higher-order births or because they want to provide a companion for their first child (Kreyenfeld and Andersson 2014; Wood and Neels 2017). On the other hand, they may postpone or even reverse their decision to enlarge the family if they (continue to) experience uncertainty after becoming parents (Kreyenfeld and Andersson 2014). Financial factors are important in the decision about a higher-order birth, whereas the decision to have the first child is strongly determined by emotional reasons, such as the need to love and care for a child or the desire to bring spouses closer and experience fun around the house (Bulatao 1981). At the same time, family enlargement may require substantial additional expenses, such as a car or more spacious living accommodations.

In this article, we view employment instability as an individual risk factor related to spells of unemployment and time-limited contract jobs. These two indicators have been most often used in the literature to operationalize employment uncertainty and have been found to generate income penalties that have an impact on family formation in contemporary Europe (Blossfeld, Buchholz et al. 2005; Kohler and Kohler 2002; Kreyenfeld et al. 2012; Vignoli et al. 2012; Vignoli, Tocchioni et al. 2020).

Unemployment and Fertility

Unemployment is a crucial indicator of employment instability and has often been used in demographic research (e.g., Özcan et al. 2010; Pailhé and Solaz 2012; Schmitt

2012b). Opposing theoretical effects of unemployment on fertility can be anticipated. On the one hand, unemployment erodes household financial resources by reducing a man's or a woman's income, inhibiting the demand for children (an *income* effect). Unemployment also results in uncertainties about the future: potential parents do not know the length of the unemployment spell, the resulting 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 having children (*substitution* effect). Given a continuing gendered household division of labor, the 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, favoring fertility postponement or even a reduction in family size (Schmitt 2008).

Many articles have addressed the nexus between unemployment and fertility, but their conclusions vary. A positive relationship between unemployment and fertility has been the most frequent result among women (e.g., Adsera 2011b; Andersson 2000; Gonzalez and Jurado-Guerrero 2006; Liefbroer and Corijn 1999; Schmitt 2008, 2012a; Sinyavskaya and Billingsley 2015). However, some studies have yielded statistically insignificant findings (e.g., Gutiérrez-Domènech 2008; Özcan et al. 2010) or a negative result (e.g., Kravdal 2002). By contrast, male unemployment has typically been found to be related to lower birth risks (Kravdal 2002; Neels et al. 2013; Pailhé and Solaz 2012), although unemployment was found to be positive for men's fertility in some cases (e.g., Inanc 2015).

Time-Limited Employment and Fertility

With the rise in temporary employment, increasingly more research has been conducted on time-limited jobs and fertility (e.g., Pailhé and Solaz 2012; Sutela 2012; Vignoli, Tocchioni et al. 2020). Temporary contracts have some advantages. The availability of temporary employment may increase employment chances for individuals who would otherwise be cut out of the labor market (OECD 2002). In addition, compared with unlimited-time employment, some temporary jobs require lower engagement levels; this lower engagement along with reduced working hours may facilitate work-family reconciliation among individuals who give priority to family life over career (Pirani and Salvini 2015; Scherer 2009). Despite being unstable, some kinds of flexible contracts 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, which is connected to low employment protection and to wage penalties, and may translate into a feeling of economic uncertainty for individuals (Scherer 2009; Schmitt 2012b). In addition, individuals with time-limited employment tend to have physically stressful work, jobs involving monotonous and repetitive tasks, and 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. Having no stable job generates fears and anxiety that might have negative consequences for individuals' quality of life and subjective well-being (D'Ambrosio 2012; Vignoli, Mencarini et al. 2020). Women

are often overrepresented in time-limited employment due, at least in part, to the greater family responsibilities they shoulder (Schmitt 2012b).

Because of the instability and rather low quality of temporary contracts, time-limited jobs might be expected to be detrimental for fertility, at least for men. For women, the relationship may be more ambiguous for the same reasons as the relationship between unemployment and family formation. Empirical findings, however, are not always consistent with expectations. For instance, analyzing the transition to parenthood among European graduates, Wolbers (2007) did not find significant differences between individuals with unlimited-time and those with 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, several studies found evidence in support of 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; Lundström and Andersson 2012 for Sweden; Baizán 2005 for Denmark, Spain, and the United Kingdom; Blossfeld, Klijzing et al. 2005 for Germany). Studies detecting gender differences in the relationship between time-limited employment and fertility have typically found that this kind of employment instability is more detrimental for women than for men (e.g., Pailhé and Solaz 2012).

Differences by Family and Labor Market Regimes

Differences between micro-level findings are likely to be driven by the social context of a given country. Theoretically, public policies play an important role in altering the effects of employment instability 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 labor market. Besides family policies, labor market policies (such as unemployment benefits, assistance in job searches, or the level of employment protection) may also influence the relationship between employment instability and fertility by affecting unemployment duration or opportunities for entering stable employment and providing financial support in the case of unemployment (Adsera 2004, 2005; Caroleo and Pastore 2007; OECD 2006). For instance, in countries with more flexible labor markets (such as Denmark or the United Kingdom), temporary employment may be a stepping-stone to unlimited-time employment and thus may be less detrimental to fertility than in the two-tier labor markets typical of Spain or France, where employees on permanent contracts are strongly protected against a job loss and temporary workers usually pass from one temporary contract to another with few prospects for a long-term contract. Finally, the incidence of women's labor force participation and the gender division of labor may also affect the magnitude of the relationship being studied. In countries with a lower presence of women in the labor market and a more traditional division of labor, women may be more likely to use unemployment or temporary employment to have children; families in such a context might reason that women's

economic careers are less important than their male partners (Schmitt 2012b). At the same time, unemployed men and men with time-limited contracts may be more likely to postpone childbearing in these countries.

In Europe, Nordic countries are known for providing strong welfare support and for implementing active labor market policies that facilitate entry into employment (Esping-Andersen 1999; Thévenon 2011). These countries also display high labor force participation among women and a more egalitarian division of household labor (Altintas and Sullivan 2016; Kan et al. 2011). Western Europe (e.g., Belgium, France, 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). These countries, particularly German-speaking countries (Austria and Germany), still lag behind the Nordic countries when it comes to women's labor force participation and gender equality in the household (Steiber et al. 2016). Women's labor force participation is moderate and usually takes the form of part-time employment (Riederer and Berghammer 2020; Yerkes and Visser 2006), whereas men tend to work long hours and have limited time for their families (Adler and Lenz 2016). 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) (Caroleo and Pastore 2007; Esping-Andersen 1999; Javornik 2014). In addition, Southern Europe is known for high employment protection (particularly among more senior workers) and thus high youth unemployment, high temporary employment, and high involuntary self-employment (Adsera 2011b; Barbieri and Scherer 2009; Barbieri and Bozzon 2016; Venn 2009). The gender division of labor is heavily asymmetric both in Eastern and Southern Europe, but women's employment plays a substantially greater role in Eastern European countries, where it constitutes an important income source for families (Matysiak 2011).

Data and Methods

Meta-Sample

Meta-analyses aim to cover all the articles published on the topic of interest. We followed a systematic procedure to retrieve and select articles using inclusion/exclusion criteria. Our search procedure followed standard guidelines for meta-analysis reporting (e.g., Stanley et al. 2013).

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 published 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 (see Table A4 in the online appendix for a full list of the keywords used for the search), we checked references within retrieved articles to find articles that had been missed or omitted from the database. Finally, we sent our list of articles to 11 experts on the topic, asking them to check whether any important contributions were missing.

We select results for inclusion in the meta-analysis using the following criteria: (1) we restricted the search to studies conducted in European countries; (2) we included

only articles and book chapters, excluding conference and working papers; (3) we excluded qualitative works that did not provide a quantitative measure of the effect of interest; and (4) we disregarded macro-level studies about unstable employment and fertility, given that we are interested in the micro-level research. Furthermore, to obtain comparable effect estimates, we included studies that produced effect estimates measured in terms of odds ratios (ORs) or relative risks (RRs). Finally, any article that reported an estimate of the relationship between unemployment or time-limited employment and fertility was included in the final meta-sample, even if analyzing the relationship between employment/economic conditions and fertility was not the main aim of that paper. Nevertheless, about 90% of retrieved articles focused on the effect of employment or economic conditions on fertility.[1]

We considered articles in English only. As shown by the flow chart of the selection process in Figure 1, starting from a very large initial number of articles retrieved in the literature, we finally selected 49 papers according to our inclusion/exclusion criteria. Of these 49 articles, 22 compared time-limited employment with unlimited-time employment, and 42 juxtaposed unemployment against employment; some of them studied both comparisons. We excluded articles that did not distinguish between non-employment and unemployment because those who opt for the homeworker role are out of the labor market. Given 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. We obtained a final sample of 45 effect estimates regarding time-limited employment versus unlimited-time employment and 109 effect estimates about unemployment versus employment. Although the effects of employment instability on birth risks may vary by education and by woman's age (as noted in the previous section), only a few studies investigated this relationship in any kind of detail. Thus, we could not collect effect estimates by woman's age and education despite the theoretical relevance of this information.

Because studies reporting significant results could have a higher probability of being published than those not finding significant evidence, a typical first step in the meta-analysis is to test for such a publication bias (Card 2012). To do so, we used funnel plots, in which the effect estimates 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 A1, A3, A5, and A7 in the online appendix). The symmetry of the funnel plot around the vertical line corresponding to the meta-analytic overall effect is indicative of no relevant publication bias. We tested for funnel plot asymmetry using Egger's test (Egger et al. 1997) (see Table A1 in the online appendix).

[1] The studies used in the meta-analyses were Adsera (2011a, 2011b), Andersson (2000), Anderson et al. (2014), Andersson and Scott (2005, 2008), Baizán (2005, 2009), Barbieri et al. (2015), Berinde (1999), Bernardi and Nazio (2005), Billingsley et al. (2014), Bygren et al. (2005), 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 (2005), Golsch (2003), Gonzalez and Jurado-Guerrero (2006), Inanc (2015), Jalovaara and Miettinen (2013), Kieffer et al. (2005), Kohler and Kohler (2002), Kravdal (2002), Kreyenfeld (2010, 2016), Kreyenfeld and Andersson (2014), Kulu and Hannemann (2016), Kurz et al. (2005), Liefbroer (2006), Lundstrom and Andersson (2012), Lyons-Amos and Schoon (2018), Martin Garcia (2010), Meron et al. (2002), Oláh (2003), Oláh and Frątczak (2004), Özcan et al. (2010), Pailhé and Solaz (2012), Schmitt (2012a, 2012b), Sinyavskaya and Billingsley (2015), Sutela (2012), Vignoli et al. (2012), Vikat (2004), Wolbers (2007), and Wood et al. (2017).

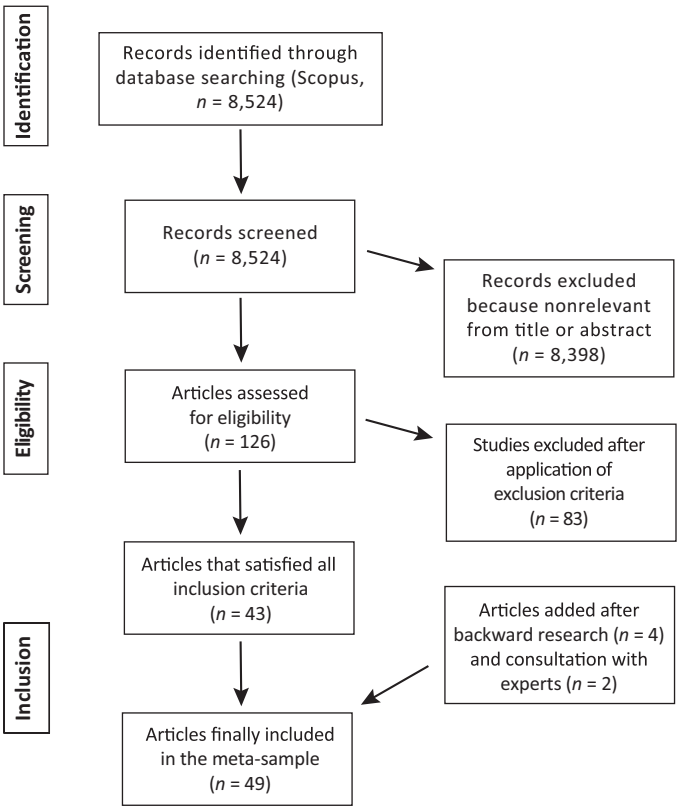

Fig. 1 Flow chart of the selection process

Some of the typical factors considered for quality assessment in the clinical context (e.g., random assignment of treatments, blind or double-blind studies) do not apply here. A description of factors that may help to evaluate the strengths, limitations, and bias of each paper is shown in Table A3 (see the online appendix). Most importantly, articles in which employment is time-varying (about 80% of the articles included in the meta-analysis) are certainly more reliable in displaying the real relationship between employment instability and fertility than studies in which employment is measured at the beginning of the observation period. Furthermore, studies based on register data potentially provide more solid evidence than results from surveys, which suffer from attrition and possibly recall bias related to the retrospective collection of employment histories. Among the articles in our sample, 15% used register data, 45% used panel survey data, and 40% used retrospective survey data. As a robustness check, we verified whether using different types of data in original studies has an effect on the final results. Our analysis confirmed that no significant difference arises from the different types of data (see Table A9 in the online appendix). Finally, studies using a rigorous causal approach, addressing selectivity and endogeneity issues, should provide estimates that are closer to true causal-like effects (Hoffmann et al. 2017). However, such studies are rare and were not included in our meta-sample because they used variables and methods that are not easily comparable

to those included in the large majority of articles retrieved. Most of the studies we included (73%) used event-history techniques (Cox model, piecewise constant models, and discrete-time event history), and the remainder used logit, multinomial logit, or probit regressions. Hence, the evidence we summarize through our meta-analysis is mostly descriptive.

Random-Effects 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 or whether the analysis covered more than one country) and the associated standard errors. The effect estimates consisted of RRs or ORs of childbearing for individuals with a time-limited contract versus an unlimited-time contract (LT/UT) and for unemployed individuals compared with the employed (UN/EM). First, for each pairwise comparison of interest, we specified random-effects meta-analysis models, which accounted for within-study sampling errors (measured by the estimated standard errors reported in the papers) and the heterogeneity of the effect estimates among studies. In this way, we relaxed the assumption that each estimate represented a measure of the same "true effect," allowing for the variation in the effect estimates according to study characteristics (Borenstein et al. 2010). For studies that included more than one effect estimate (e.g., country-specific, gender-specific), we assumed, for simplicity, independence between estimates. We performed all the meta-analyses within a Bayesian framework, which provides a more appropriate quantification of between-study heterogeneity and better reflects the overall uncertainty in the estimates than the frequentist approach (Dias et al. 2018; Sutton and Abrams 2001). As a robustness check, we repeated all the analyses adopting a frequentist approach and found no substantive differences. Results from frequentist models are reported and discussed in the online appendix (Tables A5–A8).

Some studies did not report statistics that would have allowed us to compute the standard error (e.g., t statistics or p value). In such cases, in line with the literature on meta-analysis, we made the following assumptions. When the result was marked significant and no other details were available, we set the p value equal to .05. When the study used register data, we set a p value of .01. When the result was not significant and the upper limit was .05, we set the p value at .55. When the significance level was marked with asterisks only, we assumed that the p value was equal to the midpoint of its interval.

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

$$b_i \left| \beta_i, s_i^2 \sim N\left(\beta_i, s_i^2\right) \right. \qquad \beta_i \left| \beta, \tau^2 \sim N\left(\beta, \tau^2\right), \right.$$

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 hyperparameters must be specified and are then combined with the likelihood of the observed data to

obtain a joint posterior distribution. We specified noninformative priors on β and τ^2 (a normal distribution with mean equal to 0 and variance equal to 10^6 for β, and an inverse-gamma distribution with parameters equal to 10^{-4} for τ^2) to reflect our *a priori* ignorance about the value of the hyperparameters. We then obtained a sample from the joint posterior distribution of the model parameters using the Gibbs sampling algorithm implemented in the WinBUGS software (Lunn et al. 2012). Three chains of 25,000 values were generated, and a 3,000-run burn-in was applied. The marginal posterior distributions of the parameters of interest were obtained through the marginalization of the joint posterior distribution.

Univariate Analysis and Meta-Regressions

As outlined in the literature review, the impact of employment instability on fertility has been shown to vary by gender. In addition, these relationships may be further modified by the social context. Hence, we *a priori* decided to perform subgroup analyses and meta-regression analyses by these well-known moderators, regardless of the estimated degree of between-study heterogeneity. We clustered the countries covered by the original studies into country groups, as discussed earlier.[2]

Following the theoretical predictions outlined earlier, we next investigated whether the effects of employment instability on fertility obtained from more recent data were stronger than those based on older data, differed between a transition to first or to second and higher-order birth, and depended on controls for income (any source of income, either an individual or a household) and partners' characteristics (educational attainment, labor market status, earnings). We conducted this investigation within the meta-regression framework. The meta-regression model can be formalized as follows. Let $x_1, x_2, \ldots, x_K$ be K covariates to be included in the meta-regression model, and let $\gamma_1, \gamma_2, \ldots, \gamma_k$ be the associated parameters. We assumed the following:

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

As in the previous models, vague priors were specified for the hyperparameters: $\gamma_k \sim N(0, 10^4)$, $\beta \sim N(0, 10^6)$, and $\tau^2 \sim IG(10^{-3}, 10^{-3})$.

We performed meta-regressions for the relationship between time-limited employment and fertility and the relationship between unemployment and fertility. The meta-regressions on unemployment were performed separately for women and men. We could not run separate models by gender for time-limited employment because there were too few collected effect estimates, particularly for men. In both cases, we controlled for the country group and first added parity and period as explanatory variables. *Parity* was set to 0 if the effect referred to the progression to first birth and to 1 if the effect referred to the progression to second and higher-order births. *Period* was computed as the median year of the study period. For example, if the original

[2] Because of the small sample size, we grouped the United Kingdom and Ireland with the other Western countries. In a robustness check, the results were virtually unchanged when the United Kingdom and Ireland were excluded from the cluster.

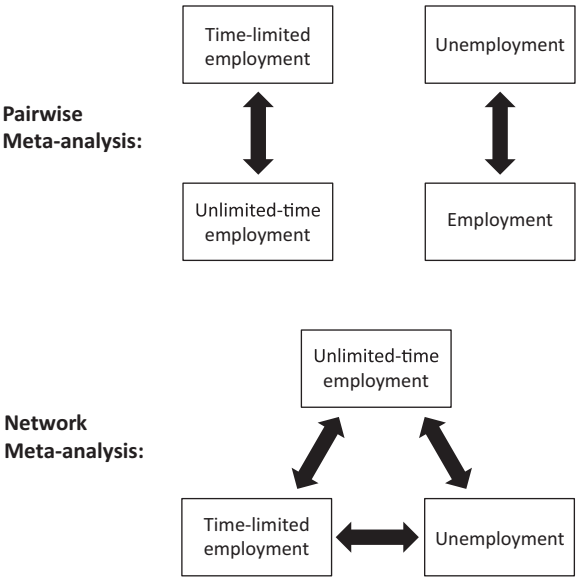

Fig. 2 Schemes of the classic pairwise meta-analyses and network meta-analysis implemented in this article

model included births occurring between 1990 and 2000, the period was set equal to 1995. We also included *couple*, which was 0 if the study did not control for partner's characteristics and 1 otherwise. In the meta-regressions for time-limited employment, we added *income*, which assumed the value 0 if the estimated effect was adjusted for individual or household income and 1 otherwise; income was not included in the meta-regression on unemployment because most studies on unemployment did not control for income given that unemployed individuals do not receive any income from work. Considering the small sample size, we preferred using two separate models to investigate the couple effect and the income effect in the meta-regressions for time-limited employment.

Network Meta-Analysis

The NMA allows for a comparison between multiple conditions of employment instability. We pooled the collected evidence in a network of comparisons among unlimited-time employment, time-limited employment, and unemployment. Figure 2 displays the difference between the classical pairwise meta-analysis and the network meta-analysis. Because we needed to focus on mutually exclusive employment conditions for NMA, we did not include the effect estimates comparing unemployed and employed individuals when the latter category included both time-limited and unlimited-time workers. Consequently, although the number of effect estimates involving time-limited employment did not change, the number of effect estimates involving unemployment fell to 24 (see Table A2 in the online appendix for a complete list of studies and their inclusion in the meta-analyses and the network meta-analysis).

Along with the within-trial variability and between-trial heterogeneity, network meta-analysis exhibits an additional source of variability: inconsistency. Heterogeneity captures discrepancies between estimates of the same effect arising from studies with the same design (i.e., studies comparing the same employment conditions). Inconsistency is a special kind of heterogeneity that captures divergences arising when the same effect is measured in studies with different designs or when direct evidence and indirect evidence provide different results (e.g., when the effect of time-limited employment versus unemployment on fertility is directly observed or derived from other effect estimates). Following Higgins et al. (2012), we specified a model to account for inconsistency through the inclusion of random terms w on specific comparisons. The model can be formalized as follows:

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

$$u_{ibk} \sim N\left(0, \tau^2\right) \qquad w_{bk}^{D_i} \sim N\left(0, \tau_w^2\right),$$

where i indicates the study; k, b are the "treatments" (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 ith 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 a mean of 0 and variance τ^2, which expresses the heterogeneity among studies for the comparison k versus b; and $w_{bk}^{D_i}$ is a random term from a normal distribution with a mean of 0 and variance τ_w^2, which expresses the inconsistency for the comparison k versus b in the design of the ith study (D_i) and captures the network incoherence. We set some of the $w_{bk}^{D_i}$ terms to 0 to avoid overparametrization of the NMA model. We assumed random terms in the model to be mutually independent. Noninformative priors were defined on all the hyperparameters 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 (Lu and Ades 2006; Lumley 2002).

Results

Search Outcome

Table 1 shows, for each 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 employment instability 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 investigated transition to higher-order births among individuals with time-limited employment. It would have been interesting 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 Meta-samples for the two pairwise meta-analyses: Time-limited employment vs. unlimited-time employment and unemployment vs. employment

Meta-sample	Number of Estimates	Country Group	Number of Estimates
A. Time-Limited Employment vs. Unlimited-Time Employment			
Women	32	Nordic countries	5
Men	13	Western countries	15
Childless	36	Southern countries	16
Parents	8	German-speaking countries	5
B. Unemployment vs. Employment			
Women	81	Nordic countries	28
Men	26	Western countries	26
Childless	63	Southern countries	15
Parents	43	German-speaking countries	27
		CEE countries	9

Note: Nordic countries (Denmark, Finland, Norway, and Sweden), Western countries (Belgium, France, Ireland, Netherlands, and the United Kingdom), Southern countries (Italy, Greece, Portugal, and Spain), German-speaking countries (Austria, Germany, and Switzerland), and Central and Eastern European (CEE) countries (Bulgaria, Estonia, Georgia, Hungary, Latvia, Lithuania, Moldova, Slovenia, Slovakia, Poland, Russia, Romania, and the Czech Republic). All the effect sizes for the relationship between unemployment and fertility in the CEE countries come from the post-communism period.

Source: Our elaboration on the meta-sample.

Unemployment and Fertility

Pairwise Meta-Analyses

In the first step, we tested for publication bias. The funnel plots and the posterior distributions of the effects are shown in Figures A2–A5 in the online appendix. The funnel plots are symmetric, with the exception of the one for the pairwise meta-analysis on women, as confirmed by Egger's test for funnel plot asymmetry (see Table A1 in the online appendix). As can be seen from the plot, fewer effect estimates are in the lower-left corner, which means that fewer retrieved studies reported a negative and uncertain (i.e., with large standard error) effect of unemployment on women's fertility. However, once the sample is further divided by country groups, a significant publication bias is detected only among studies on women in Western countries. Because this is the only significant result from the Egger's test, and there are no *a priori* reasons to support the presence of a publication bias only among Western countries, we did not introduce any adjustment in the subsequent analyses (for a more in-depth discussion on publication bias in meta-analyses, see Stanley and Doucouliagos 2007, 2012).

Next, we performed meta-analyses separately by gender and then by country group and gender. For each meta-analysis, we report the following results (Tables 2 and 3): the posterior mean of the overall effect (OR = exp(β)), the 90% credibility interval, probability (*p*), the posterior median of the I^2 index, and the number of effect estimates covered by the meta-analysis. The credibility interval represents the range in which the OR falls with a probability of 90%. We call *p* the posterior probability

Table 2 Random-effects meta-analyses about unemployment versus employment, by gender

	Average Effect (OR)	Credible Interval	*p*	I^2 (%)	Number of Effect Estimates
Women	1.08	(1.03, 1.14)	.99	63.9	81
Men	0.91	(0.82, 1.01)	.93	33.8	26

Note: *p* is the posterior probability that the odds ratio (OR) is smaller (or larger) than 1 if the posterior mean of the OR is smaller (or larger) than 1.

Source: Authors' elaboration on meta-sample.

for the effect to be larger/smaller than 1 (when the posterior mean was larger/smaller than 1). 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 (for more information on the Bayesian *p*, see Berger et al. 1997; Casella and Berger 1987). 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.

Although the findings for men were based on a much smaller number of effect estimates, our results suggest a substantial difference in the relationship between unemployment and birth risks between men and women (Table 2): unemployed men were less likely to have a child than their employed counterparts (–9%), but women exhibited higher odds of childbearing if unemployed (+8%). We also investigated how these findings by gender varied by country group (Table 3). Overall, unemployed women were consistently more likely to have a child than employed women in all country groups save for the Nordic countries, for which the odds ratios are close to 1, and Southern European countries, for which the relationship is negative. Unemployed men were less likely to have a child in all country groups apart from Western countries (although the findings for men in Western European countries are rather uncertain, $p = .57$). Finally, results for women are generally more heterogeneous (i.e., more uncertain) than those for men. Note that for CEE countries and Southern European countries, we located only one and two studies, respectively, on men's unemployment and fertility. We thus decided to show no estimates for these groups.

Meta-Regression

As a second step, we studied the role of parity, period, and partner's characteristics in the relationship between employment instability and fertility by gender by performing meta-regressions. We did not include the indicator of income from work because the unemployed do not have an income from work, and too few studies about unemployment and fertility controlled for household income. In Table 4, we report 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 does not appear to have shaped the relationship between unemployment and fertility ($p = .77$ among women and $p = .87$ among men). A different pattern is evident for

Table 3 Random-effects meta-analyses about unemployment versus employment, by country group

Country Group	Gender	Average Effect (OR)	Credible Interval	*p*	I^2 (%)	Number of Effect Estimates
Nordic	Women	1.02	(0.99, 1.06)	.86	89.7	20
	Men	0.92	(0.83, 1.01)	.93	75.4	8
Western	Women	1.24	(1.02, 1.52)	.96	86.1	19
	Men	1.04	(0.82, 1.39)	.57	30.2	6
Southern	Women	0.95	(0.84, 1.08)	.75	41.6	13
	Men	—	—	—	—	2
German-Speaking	Women	1.17	(1.06, 1.30)	.99	31.7	19
	Men	0.82	(0.61, 1.12)	.87	40.6	8
CEE	Women	1.34	(1.04, 1.69)	.96	6.2	6
	Men	—	—	—	—	2

Note: p is the posterior probability that the odds ratio (OR) is smaller (or larger) than 1 if the posterior mean of the OR is smaller (or larger) than 1. CEE = Central and Eastern European.

Source: Authors' elaboration on meta-sample

period: more recent articles found a more strongly negative relationship between unemployment and fertility among both men and, to a smaller extent, women. Finally, studies that controlled for partners' characteristics found a weaker negative association between unemployment and fertility for men, suggesting that studies that failed to account for partners' characteristics overestimated the role of male unemployment for fertility.

Time-Limited Employment and Fertility

Pairwise Meta-Analyses

First, we tested for publication bias. The funnel plots (Figures A5 and A7, online appendix) are substantially symmetric, and the Egger's tests are not significant, suggesting the absence of a publication bias.

Results concerning the relationship between time-limited contracts and fertility show that working on a time-limited contract is significantly negatively related to fertility for both men and women. This negative association is particularly strong for women, who had a 14% lower risk of having a child if they worked on a time-limited contract (in comparison with women on unlimited-time contracts; see Table 5). This estimate is very reliable: *p* is close to 1, and heterogeneity is low. The relationship for men is weaker and slightly less precise.

We also investigated how these associations vary by country group (Table 6). We present only the findings for women by country group because we have few estimates for men. We also show the results for women and men combined because the relationship between time-limited employment and fertility is negative for both. The OR for having a child for time-limited female workers compared with unlimited-time female workers is 0.89 in Western European countries and 0.81 in Southern Europe; the OR for Germany is not significant. The relationship between time-limited employment

Table 4 Meta-regression by gender (dependent variable is effect estimates about unemployment vs. employment)

	Women ($n=79$)			Men ($n=25$)		
	Coefficient	Credible Interval	p	Coefficient	Credible Interval	p
Second or Higher-Order Birth (ref. = first birth)	0.047	(–0.064, 0.157)	.77	–0.013	(–0.240, 0.258)	.87
Period	–0.006	(–0.014, 0.002)	.90	–0.016	(–0.037, 0.004)	.91
Couple Level (ref. = individual level)	–0.010	(–0.147, 0.124)	.54	0.182	(–0.038, 0.420)	.92

Notes: Results are controlled for gender and country group. p is the posterior probability that the odds ratio (OR) is smaller (or larger) than 1 if the posterior mean of the OR is smaller (or larger) than 1.

Source: Authors' elaboration on the meta-sample.

and fertility is strongest in the Scandinavian countries, where the OR is 0.74 for women (and 0.81 for the whole sample), although this result is based on few original studies. In this analysis, the I^2 index (52.1%) is indicative of moderate heterogeneity among Nordic studies. The posterior distributions of the overall effects are shown in Figures A6 and A8 (see the online appendix).

Meta-Regressions

Table 7 shows the results from meta-regression models examining the role of parity, period, partner's characteristics, and income (individual or household). Because of the small size of the time-limited versus unlimited-time employment sample, it was impossible to run gender-specific meta-regressions; the results were too imprecise, yielding unreliable estimates. Accordingly, Table 7 reports average effects across genders.

Results show that time-limited employment is slightly more detrimental for parents' transition to higher-order births than for the transition to parenthood. In addition, the negative relationship between time-limited employment and fertility becomes slightly stronger over time. The positive coefficient for the couple indicator means that studies that controlled for some partner characteristics found, on average, a weaker association between time-limited employment and fertility. Finally, the income variable had a positive coefficient, which means that studies controlling for individual or household income found, on average, a weaker link between time-limited employment and fertility.

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,

Table 5 Random-effects meta-analyses about time-limited employment versus unlimited-time employment, by gender

	Average Effect (OR)	Credible Interval	*p*	I^2 (%)	Number of Effect Estimates
Women	0.86	(0.82, 0.89)	.99	12.2	32
Men	0.94	(0.88, 0.99)	.97	14.4	13

Note: p is the posterior probability that the odds ratio (OR) is smaller (or larger) than 1 if the posterior mean of the OR is smaller (or larger) than 1.

Source: Authors' elaboration on the meta-sample.

time-limited employment, and unemployment. The NMA allowed us to estimate, at the same time, the ORs of time-limited employment and unemployment compared with unlimited-time employment (taken as the reference), enabling us to rank the three employment conditions according to their effect on fertility. We conducted an NMA first on the whole subset of studies and then separately for men and women. Finally, we ran separated NMA for childless individuals and parents. We could run gender-specific NMA for childless individuals, but small sample sizes prevented us from doing so for individuals who already had at least one child. For the same reason, we could not run NMA specific to country groups (as in Table 3).

Our findings again are clearly gender-specific. Among women, time-limited employment is linked to lower fertility than unemployment (with respect to unlimited-time employment). The OR of time-limited versus unlimited-time employment is 0.90, and the OR of unemployment versus unlimited-time employment is 0.98 (not significant). Unemployed women are more likely than employed women to have a child. In the three-way comparison of the NMA, this distinction (also considering the smaller sample) is not clear-cut, perhaps because unemployment is compared with any employment in the pairwise meta-analyses (including time-limited employment, which is particularly detrimental for fertility) but is compared with only unlimited-time in the NMA. Hence, the OR of having a child for the comparison of unemployed with permanently employed might be less positive than the comparison involving all employed: "all employment" includes temporary employment, and having a temporary contract is particularly detrimental for fertility. For men, the opposite was true. We found unemployment to be more detrimental for fertility than time-limited employment (OR = 0.87 vs. OR = 0.93) (Table 8). This is a novel result: the gender-specific ranking of unemployment and time-limited employment was possible because this study employed an NMA.

Parity does not seem to moderate the relationship between employment instability and fertility. The findings for childless women and men closely mimic those on the pooled sample (Table 9). The findings for parents are not available separately for women and men, but they present a pattern similar to that for a sample of childless women, most likely because the sample of studies on parents is dominated by studies on mothers. More specifically, among parents, time-limited employment is negatively related to the probability of having another child (the OR of time-limited employment vs. unlimited-time employment is 0.82), whereas unemployment has virtually no effect.

Table 6 Random-effects meta-analysis for time-limited employment versus unlimited-time employment, by country group

Country Group	Gender	Average Effect (OR)	Credible Interval	*p*	I^2 (%)	Number of Effect Estimates
Nordic	Women	0.74	(0.44, 1.05)	.93	52.1	3
	Total	0.81	(0.60, 0.96)	.98	31.1	5
Western	Women	0.89	(0.80, 0.99)	.96	62.5	9
	Total	0.89	(0.84, 0.95)	.99	50.4	15
Southern	Women	0.81	(0.74, 0.88)	.99	8.7	14
	Total	0.81	(0.74, 0.88)	.99	8.0	16
German-Speaking	Women	0.96	(0.71, 1.25)	.62	34.2	3
	Total	1.00	(0.91, 1.09)	.53	14.3	5
CEE	Women	—	—	—	—	—
	Total	—	—	—	—	—

Note: p is the posterior probability that the odds ratio (OR) is smaller (or larger) than 1 if the posterior mean of the OR is smaller (or larger) than 1. CEE=Central and Eastern European.

Source: Authors' elaboration on meta-sample.

For simplicity, we do not report results about heterogeneity and inconsistency in the tables. However, our results suggest that the largest share of the total variability originates from heterogeneity among studies that focus on the same comparisons (τ^2) rather than from heterogeneity related to discrepancies in study design (τ^2_w).

Discussion

The relationship between employment instability and fertility has received increasing research interest. Such studies, however, have produced fragmented and inconsistent evidence. Because micro-level studies have often focused on one country or a particular issue, their findings may not be generalizable. To address this problem, we conducted a meta-analysis based on findings on the impact of unstable employment on fertility in European countries from the early 1970s to 2015. We systematized and performed a quantitative summary of published research findings, allowing us to draw conclusions from previous studies on the direction and the magnitude of this relationship as well as its variation over the life course and across gender, countries, and time.

Several conclusions can be drawn from the study. First, our findings revealed clear gender-specific relationships between fertility and time-limited employment/unemployment. From the pairwise meta-analyses, we found that women on fixed-term contracts had lower fertility than women in unlimited-time employment and that the relationship between contract type and childbearing was weaker for men. Furthermore, unemployed men—but not women—were clearly less likely to have a child. Results from the NMA confirm and generalize this ranking: with 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. This finding is likely driven by the traditional division of paid and unpaid labor between partners. In a couple, the man is often the main earner who can have a child if he

Table 7 Meta-regressions (dependent variable is effect estimates about time-limited employment vs. unlimited-time employment)

	Model 1			Model 2		
	Coefficient	Credible Interval	*p*	Coefficient	Credible Interval	*p*
Second or Higher-Order Birth (ref.=first birth)	−0.168	(−0.288, −0.028)	.97	−0.182	(−0.310, −0.044)	.98
Period	−0.004	(−0.010, 0.000)	.90	−0.004	(−0.010, 0.001)	.89
Couple Level (ref.=individual level)	0.087	(0.001, 0.157)	.95			
Control for Income (ref.=no control for income)				0.105	(0.015, 0.185)	.97

Notes: Results are controlled for gender and country group ($n=44$). *p* is the posterior probability that the odds ratio (OR) is smaller (or larger) than 1 if the posterior mean of the OR is smaller (or larger) than 1.

Source: Authors' elaboration on meta-sample.

is employed and provides sufficient income. In addition, unemployed men increase their time spent on housework and childcare to a lesser extent than unemployed women (Berik and Kongar 2013; Gimenez-Nadal and Sevilla 2014; Pailhé and Solaz 2008). At the same time, as both partners increasingly search for employment before having children, the risk of an accumulation of unstable work positions within the same household increases (Grotti and Scherer 2014), fostering income instability and uncertain futures. The persistent precariousness of contemporary life courses—often gendered, with women more exposed to employment uncertainties than men—is central in European fertility dynamics.

The welfare state proved to be a significant moderator of the relationship between employment instability and fertility. We found that the negative relationship between time-limited employment and fertility was the strongest in Nordic countries and Southern European countries. Similarly, these two country groups stand out from the rest regarding the link between women's unemployment and fertility. Although this association appeared to be positive in all remaining country groups, it was insignificant in Nordic Europe and even negative in Southern Europe. Note that the effect analyzed concerns unemployment, not joblessness, which includes both unemployment and inactivity statuses. In Nordic countries, women commonly work for pay, and housework and childcare are more equitably divided between partners than anywhere in Europe (Kan et al. 2011; Nieuwenhuis 2014). Furthermore, welfare policies in Nordic Europe are particularly strongly geared toward encouraging women's employment and supporting parents in combining paid work and care. In this context, it is certainly financially more beneficial for women to have children while in employment, and it is easier to combine work with childbearing than in other countries. The findings for Southern Europe, where there is far less gender equality in the households, are likely driven by a different set of factors: namely, large difficulties with establishing a position in the labor market, widespread unemployment among the youth, and weak welfare support for families (Barbieri and Scherer 2009). There

Table 8 Network meta-analysis, by gender

	Women ($n=38$)				Men ($n=21$)			
Rounded Rank	Effect	OR	Credible Interval	p	Effect	OR	Credible Interval	p
#1	Time-limited	0.90	(0.81, 1.00)	.95	Unemployment	0.87	(0.74, 1.00)	.97
#2	Unemployment	0.98	(0.88, 1.09)	.66	Time-limited	0.93	(0.83, 1.03)	.92

Notes: p is the posterior probability that the overall odds ratio (OR) is smaller (or larger) than 1 if the posterior mean of the OR is smaller (or larger) than 1. The reported rank is computed as the median of the posterior distribution of the rank of each employment condition.

Source: Authors' elaboration on meta-sample.

are remarkable risks to remaining trapped in precarious, poorly protected, and low-paying jobs, especially for young adults and women (Lucifora et al. 2005), and this persistent state of instability is especially detrimental for fertility (Busetta et al. 2019). There is, meanwhile, no effect in Western European and German-speaking countries. Where the state supports a "nontargeted" labor market deregulation, the relative deterioration of employment for workers in nonstandard positions has been relatively limited when compared with the working population as a whole (Esping-Andersen and Regini 2000). In these country groups, unemployment is often used as an opportunity window for having children.

Results from the meta-regressions are particularly noteworthy because they allowed the investigation of the role of multiple factors in explaining the relationship between employment instability and fertility, such as time and parity, always controlling for gender and country group. We found that the relationship between employment instability and fertility was not steady over time. During the decades covered by our meta-study, the relationship between fertility and both unemployment and time-limited employment became more negative. The oldest collected works included data from the late 1970s and 1980s, but most collected works covered primarily the 1990s and especially the 2000s, when the diffusion of time-limited jobs started to become an issue. Some very recent publications spanned the years of the Great Recession. Reflecting on the deep transformations in labor market dynamics over the last 40 years (deregulation and structural and individual insecurity levels), we note that the persistence—or even the escalation—of employment instability levels hampers fertility with growing intensity, at least in institutional contexts that failed to adapt to the aforementioned changes in economic and social conditions.

On average, the relationship between employment instability and fertility also depends on parity, especially when time-limited employment is considered. Most studies we located addressed the relationship between employment instability (mostly unemployment) and the transition to first birth. The results showed that employment instability might also be important for the transition to higher-order births. Earlier, we formulated two competing hypotheses. The first one predicted that employment instability matters less for higher-order births, given that individuals who transition to parenthood late usually face stronger time constraints and

Table 9 Network meta-analysis, by gender for the transition to the first child and pooled for the transition to second or higher parity

	Transition to the 1st Child, Women ($n=34$)			Transition to the 1st Child, Men ($n=17$)			Transition to Second or Higher Parity, Pooled ($n=8$)		
Rounded Rank	Effect	OR	p	Effect	OR	p	Effect	OR	p
#1	Time-limited	0.91 (0.81, 1.03)	.91	Unemployment	0.85 (0.74, 1.00)	.95	Time-limited	0.82 (0.70, 0.92)	.99
#2	Unemployment	0.99 (0.87, 1.12)	.60	Time-limited	0.93 (0.84, 1.03)	.89	Unemployment	1.00 (0.73, 1.28)	.52

Notes: p is the posterior probability that the odds ratio (OR) is smaller (or larger) than 1 if the posterior mean of the OR is smaller (or larger) than 1. The reported rank is computed as the median of the posterior distribution of the rank of each employment condition. Credible intervals are shown in parentheses.

Source: Authors' elaboration on meta-sample.

need to have a second child quickly if they want to have more than one child. The second hypothesis suggested that employment instability may discourage people from having a second or higher-order child because 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. Although we did not find unemployment to have a 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 employment contract is crucial for enlarging the family. Future research should concentrate on the impact of employment instability on the progression not only to the first child—a standard practice in this literature—but also to higher-order births.

Finally, meta-regression techniques enabled an investigation of the presence of potential misspecification biases, which would not have been possible with meta-analyses only. This investigation allowed us to uncover two potential mechanisms through which employment instability 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) reported, on average, a stronger effect of employment instability on fertility. The extent to which employment instability affects individuals' fertility outcomes thus depends on their partner's characteristics. Because the decision to have a child is usually made within couples, the partner's characteristics might compensate for his or her job instability. In a similar vein, when studies did not control for the respondent's or household income, a stronger negative relationship between time-limited employment and fertility was detected. Hence, failing to control for income and partner characteristics leads to an overestimation of the negative effect of employment instability on 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 voluntarily work on time-limited contracts in well-paying, high-level occupations. Such freedom of choice does not necessarily hinder fertility. Nonetheless, most fixed-term contractual arrangements provide a rel-

atively low salary, and our meta-regression findings suggest that such lack of income represents a major channel through which time-limited employment affects fertility. We conclude that income and the partner's characteristics are crucial mediators of the effects of employment instability on fertility.

Our study did not cover all possible sources of employment instability. Involuntary part-time contracts, on-call jobs, and informal jobs are also important channels of employment instability. We were unable to include studies that investigated the fertility effects of these work arrangements in our analyses because of their limited number. Another limitation is related to the fact that the articles retrieved are not equally representative of all European countries: some countries are overrepresented in our meta-sample, and others are underrepresented. This affects our results in two ways. First, we were unable to include CEE countries in the meta-analysis exploring the relationship between time-limited employment and fertility. Second, the group of German-speaking countries is strongly dominated by studies about Germany. The literature we summarized also suffered from two main limitations. Among the articles composing the meta-sample, virtually no study used a rigorous causal approach, and selectivity and endogeneity issues were not directly addressed. Nonetheless, the literature suggests that when estimating the impact of employment on fertility, it is important to account for work- or family-related predispositions by treating employment and fertility as parallel, endogenous processes (e.g., Matysiak and Vignoli 2013) or (more recently) by using exogenous shocks (Hofmann et al. 2017). Consequently, the literature we summarized is descriptive. Another limitation lies in the fact that studies have very rarely distinguished between voluntary and involuntary employment conditions. Doing so, however, is crucial for a better understanding of the consequences of temporary and uncertain forms of employment on parenthood. In fact, for some occupations—depending, in part, on the prestige of a given job or job satisfaction—short-term contracts, or dispatch jobs, are the norm and are not perceived as heightening uncertainty (e.g., De Cuyper and De Witte 2008). Studies that consider subjective measures of employment uncertainty represent an avenue for future research (Hofmann and Hohmeyer 2013; Kreyenfeld 2010). Finally, although the meta-sample included some very recent publications, we could not incorporate the whole body of literature covering the period of the Great Recession and its aftermath: some new studies were published after we completed our meta-sample, and other studies are currently under review. Changes in the relationship between employment instability and fertility might have occurred over the last decade. Our findings represent the starting point for inspecting and understanding these new trends.

Our analysis contributes to knowledge about the relationship between employment instability and fertility in Europe by integrating and systematizing the existing quantitative findings on the influence of unemployment and time-limited working conditions on fertility. Employment instability has become an intrinsic feature of the globalizing world, and its effects on fertility will be a major research topic for years to come (Vignoli, Guetto et al. 2020). The meta-analysis presented in this article helps translate the fragmented micro-level findings on the topic into general conclusions about the effects of employment instability on fertility. This meta-analysis provides the empirical foundation for new studies on the topic. ■

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