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Fertility in Advanced Societies: A Review of Research

La fécondité dans les sociétés avancées: un examen des recherches

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Abstract This paper provides a review of fertility research in advanced societies, societies in which birth control is the default option. The central aim is to provide a comprehensive review that summarizes how contemporary research has explained ongoing and expected fertility changes across time and space (i.e., cross- and within-country heterogeneity). A secondary aim is to provide an analytical synthesis of the core determinants of fertility, grouping them within the analytical level in which they operate. Determinants are positioned at the individual and/or couple level (micro-level), social relationships and social networks (meso-level); and, by cultural and institutional settings (macro-level). The focus is both on the quantum and on the tempo of fertility, with a particular focus on the postponement of childbearing. The review incorporates both theoretical and empirical contributions, with attention placed on empirically tested research and whether results support or falsify existing theoretical expectations. Attention is also devoted to causality and endogeneity issues. The paper concludes with an outline of the current challenges and opportunities for future research.

Keywords Fertility tempo · Postponement · Fertility quantum · Low fertility · Determinants of fertility

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Résumé Cet article présente un aperçu des recherches dans le domaine de la fécondité réalisées dans les sociétés dites avancées, c'est-à-dire les sociétés dans lesquelles le contrôle des naissances est l'option par défaut. L'objectif principal est de fournir une vue d'ensemble complète résumant comment la recherche contemporaine explique les changements de fécondité actuelle et prévue dans le temps et dans l'espace (c'est-à-dire l'hétérogénéité à l'intérieur d'un pays ou entre pays). Un second objectif vise à fournir une synthèse des principaux déterminants de la fécondité en les regroupant par niveau d'analyse dans lequel ils se situent. Les déterminants sont ainsi situés au niveau individuel ou au niveau du couple (niveau micro), au niveau des relations sociales et des réseaux sociaux (niveaux méso) et au niveau des cadres institutionnels et culturels (niveau macro). L'accent est mis tant sur l'intensité que le calendrier de la fécondité avec un intérêt particulier sur le report de la procréation. Cette synthèse de la littérature concerne les recherches tant théoriques qu'empiriques, une attention particulière étant portée à celles qui sont testées empiriquement et dont les résultats confirment ou infirment les théories explicatives existantes. De même nous nous sommes particulièrement intéressés aux problèmes de causalité et d'endogénéité. En conclusion, un tableau des défis actuels et des perspectives futures en matière de recherche est esquissé.

Mots-clés Calendrier de la fécondité · Report de la procréation · Intensité de la fécondité · Basse fécondité · Déterminants de la fécondité

1 Introduction

Fertility has been a central topic of research within the discipline of demography, but has also achieved considerable interest within sociology, anthropology, economics, medicine and psychology. During the last two decades, research about fertility in advanced societies—societies in which birth control is the default option—has flourished. It is not surprising, therefore, that several reviews of the existing fertility literature have been undertaken (Hirschman 1994; Caldwell and Schindlmayr 2003; Sobotka 2004; Butler 2004; Morgan and Taylor 2006; Mills et al. 2011). These reviews have provided important insights (although sometimes focusing on specific disciplines or geographical areas), while simultaneously outlining potential directions for future research. Since the 1980s, an increasing number of European and Asian countries reached very low fertility levels (Caldwell and Schindlmayr 2003) and virtually all advanced societies witnessed a 'postponement' transition (Kohler et al. 2002a, b). For this reason, the topic of low fertility dominated fertility research in advanced societies. During the late 2000s, a reversal of the fertility decline in most advanced countries—albeit with great heterogeneity—has drawn considerable attention (Goldstein et al. 2009; Myrskyla et al. 2009; OECD 2011). Furthermore, the impact of economic uncertainty and the recent economic recession on fertility is another emerging topic (Mills and Blossfeld 2005; Kreyenfeld 2010; Sobotka et al. 2011).

The central and overarching question of this study is: What is the state of fertility research today and where is it going? To achieve this goal, our review first classifies existing studies according to the determinants of fertility. We then ask: To what extent can we make use of the determinants of fertility described in existing research to explain ongoing and expected fertility changes over time and space (i.e., cross-country and within-country heterogeneity in fertility levels)? A secondary aim is to provide an analytical synthesis of the core determinants of fertility, grouping them within the analytical level at which they operate. Determinants are positioned at the micro-level, including determinants at the individual and/or couple level; the meso-level, which encompasses social relationships and social networks (i.e., characteristics pertaining to the network of friends, coworkers, relatives and/or to the relationship that links them to the individual); at the macro-level of the cultural and institutional settings where individuals and couples are embedded. This article not only provides a contemporary review of research and delineation of determinants, but extends our knowledge by adopting an analytical strategy to categorize these determinants, with the aim to provide a better understanding of the often highly interdisciplinary and complex task of explaining fertility trends and differences.

We likewise extend existing reviews by adopting a broader multidisciplinary approach, which takes into account relevant contributions from different disciplines beyond those that have been examined previously (i.e., often demography and sociology). We also embrace the most contemporary advances in the field, with attention to the recent fertility reversal in advanced societies. We acknowledge that the topic is highly interdisciplinary, with the term 'fertility' often taking on different meanings across disciplines. Subject areas are also diverse with research that examines non-human and non-animal fertility, mainly within the biological and environmental sciences. We focus only on human fertility within advanced societies, and cover research primarily within the disciplines of demography, sociology, medicine, biochemistry, genetics, molecular biology, economics and econometrics, psychology, decision and health sciences.

The present study reviews existing fertility research in a systematic and comprehensive manner, by looking at the two components that constitute human fertility: *tempo* (i.e., the timing of childbirth) and *quantum* (i.e., the total number of children). When examining *tempo*, we know that OECD countries have witnessed a rising mean age at first birth since the 1970s, coupled with an increasing proportion of births among mothers at advanced ages, albeit with considerable country-level variation (Billari et al. 2007; Sobotka et al. 2010; Mills et al. 2011). This process is generally referred to as the postponement of childbearing, which is the central focus of tempo studies in fertility research. The emergence of a 'postponement transition' of higher ages at first birth is a core phenomenon that has emerged in the last decades (Kohler et al. 2002a, b; Billingsley 2010).

Quantum is related to the number of children (including childlessness). While demographic transition theory implies that the quantum of fertility would stabilize around the replacement level of around 2.1 children per woman (e.g., Bongaarts 2002), during the last decades of the twentieth century, advanced societies witnessed low, or even the 'lowest-low' or 'ultra-low' fertility levels close to 1 (e.g., Kohler et al. 2002a, b; Frejka et al. 2010). The novelty of this phenomenon

captivated demographers and raised the concerns of policy-makers about both the long-term demographic sustainability of their populations and concerns about the growing gap between desired and achieved fertility (Chesnais 1996; Bongaarts 2001; Goldstein et al. 2003; OECD 2011). Research has demonstrated that actual childbearing levels (i.e., the number of children born by the end of the reproductive age span) have not been as low as the standard quantum measure, the total fertility rate (TFR), would suggest (Bongaarts ad Feeney 1998; Kohler et al. 2002a, b; Sobotka 2004). Just as there appeared to be a consensus that advanced societies would either remain at low fertility levels or reach even lower levels (e.g., Lutz et al. 2003), new research produced evidence demonstrating the start of a fertility reversal during the 2000s (Goldstein et al. 2009; Myrskyla et al. 2009; OECD 2011).

Postponement is clearly interrelated with quantum since the age at first birth influences the (final) total number of children. Timing has always had an important influence on quantum, which is largely a measurement issue, since some of the measures that are used to study the quantum of fertility are not exclusively affected by changes in the timing of fertility. The most well-known case, for instance, is the TFR. Even at the micro-level there is still an influence of timing on quantum, since 'postponement' or earlier (perhaps unplanned) births are likely to affect the total number of children in some way. This is particularly relevant when studying the intended parity-progression over a certain time interval (a growing topic during the recent years). For these reasons, we will also highlight the interaction between tempo and quantum.

The remainder of this article is structured as follows. Section 2 focuses on the determinants of fertility at the micro-level, followed by Sect. 3, which investigates factors acting at the meso-level. Section 4 reviews fertility research at the macro-level. We conclude with a discussion that examines the current challenges and suggestions for future fertility research.

2 Micro-Level Determinants of Fertility

Research at the micro-level focuses on the individual and/or couple decision-making process underlying the choice to have a child and investigates which circumstances affect decisions regarding the timing and number of children. Choices are often characterized as a rational response to uncertainty and/or as conformity to the prescribed 'sequencing' of life course events. A rich body of research has studied the link between life course circumstances and trajectories (mainly, partnership, education, employment and economic conditions) and fertility behavior. Other research has instead focused on the role of social class and family or origin, which in turn shapes an individual's values and preferences. A major obstacle in this line of research is the challenge to establish causality, or in other words, the ability to empirically determine whether these life course factors are actual determinants of fertility or whether certain life course factors and fertility behavior are simultaneously affected by the presence of other common determinants (endogeneity or reverse causality).

2.1 Role of Intentions in The Fertility Decision-Making Process

Many scholars have used *fertility intentions* as a proximate determinant for actual fertility behavior, examining which factors influence the formation, realization and/or change in fertility intentions (e.g., Westoff and Ryder 1977; Schoen et al. 1999; Quesnel-Vallée and Morgan 2003; Berrington 2004; Liefbroer 2009; Philipov 2009; Spéder and Kapitány 2009; Morgan and Rackin 2010; Iacovou and Tavares 2011). Others have identified the systematic gap between intended and actual fertility as one of the causes of low fertility (Morgan and Taylor 2006), since it reveals an 'unmet need' for children (Liefbroer 2009).

Spéder and Kapitany (2009) provide a detailed overview of the rich debate on the predictive power of fertility intentions on actual behavior. Next to critical approaches that downplay the explanatory power of intentions and less individual-specific measures such as ideal family size (e.g., Westoff and Ryder 1977; Quesnel-Vallée and Morgan 2003), other studies argue that intentions are effective predictors of actual fertility (Schoen et al. 1999; Berrington 2004). The majority of these latter studies draw upon the social-psychological literature, often employing the theory of planned behavior (TPB) (Ajzen 1991). The TPB has been explicitly adopted, among others, by for example, Billari et al. (2009) in a study of Bulgaria, Dommermuth et al. (2009) in Norway, as well as used to develop the questionnaires in the Generation and Gender Programme (Vikat et al. 2007). According to the TPB, intentions are the culmination of a combination of three antecedents: (i) attitudes (i.e., perceived costs and benefits); (ii) subjective norms (e.g., influence of close friends and relatives); and, (iii) perceived control over behavior (i.e., extent to which behavior is perceived as subject to control by the individual).

Using a different social-psychological approach, Miller and Pasta (1994, 1995) adopt the traits-desires-intentions-behavior framework (T-D-I-B), where fertility intentions are placed within a complex decision-making framework. Miller (2011) argues that having a child is the result of a sequence of motivational traits that translate into desires, which in turn form the fertility intention. That intention then translates into the behavior of avoiding or realizing a pregnancy. An alternative model to explain human fertility is the theory of conjunctural action (TCA), recently introduced by Morgan and Bachrach (2011). According to the TCA, fertility behavior is the result of an interaction between a unique set of social circumstances (e.g., normative expectations and structural factors) and schemas, which are mental structures that the human brain uses to represent the surrounding world and to process information. This theory differs from the TPB in that it acknowledges that fertility behavior might not only be the result of a reasoned rational deliberation, but also the result of automatic unconscious processing.

Within the existing literature, two main types of fertility intentions have been examined: (1) *quantum intentions* (i.e., intended family size); and, (2) *parity-progression intentions* (i.e., intentions to have a(nother) child at all or within a specific time frame). Quantum intentions have been shown to be a rather poor predictor of the total actual or realized number of children (Quesnel-Vallée and Morgan 2003), as they are subject to downward or upward adjustments over the life course (Liefbroer 2009; Iacovou and Tavares 2011). The main factors causing

variations in fertility intentions appear to be partner's expectations (Iacovou and Tavares 2011), changes in partnership status, activity status and actual fertility events (Liefbroer 2009). Parity-progression intentions are instead considered as more stable and reliable (Schoen et al. 1999; Philipov 2009), despite the fact that some studies have demonstrated a mismatch between intentions and actual behavior (Westoff and Ryder 1977; Toulemon and Testa 2005). Specifying a time frame (e.g., 2 or 3 years) has been shown to significantly improve the predictive value of fertility intentions (Billari et al. 2009; Philipov 2009).

2.2 Partner and Partnership

Changes in partnership dynamics experienced in the past decades across advanced societies has been linked to the postponement of parenthood. A growing number of studies has shown a parallel tendency to delay union formation and parenthood (Corijn and Klijzing 2001; Mills and coworkers 2005), an increased frequency to have several partners before the first child (Wu and Schimmele 2005), and a rise in unmarried cohabitation, which has been associated with a later age at entry marriage (Bumpass et al. 1991; Mills 2004), if not a 'retreat from marriage' (Gibson-Davis et al. 2005).

The partner's fertility intentions also play an important role in the realization of an individual's intentions, since generally childbearing in advanced societies is a joint couple decision. If there is a disagreement about childbearing expectations within the couple, the positive fertility intentions of one of the partners are less likely to be realized (Thomson 1997; Schoen et al. 1999; Thomson 2002). Partnership status is also a strong predictor, with those who are not in a stable relationship being less likely to have a child (Hobcraft and Kiernan 1995; Philipov et al. 2006; Testa 2006). There has also been a growth in the decoupling of first births from marriage (Buchmann and Kriesi 2011), which is associated with an upward trend in non-marital childbearing (Dalla Zuanna 2001; Billari and Kohler 2004). Although the risk of having a first child has been shown to be lower in cohabiting versus marital unions (Brien et al. 1999; Baizán et al. 2003, 2004; Spedér and Kapitány 2009), the role of cohabitation and its relationship with childbearing compared to marriage differs across countries (Heuveline and Timberlake 2004). In France, cohabiting couples have approximately the same probability of having a child as their married counterparts (Toulemon and Testa 2005), while in the U.S., cohabitation is associated with a lower probability of childbearing (Heaton et al. 1999). Beyond the partners' childbearing desires, a variety of other characteristics of both partners or of the couple have likewise been found to influence childbearing (e.g., Thomson et al. 1990; Corijn et al. 1996; Thomson and Hoem 1998; Jansen and Liefbroer 2006).

With the growth of more unstable relationships and higher levels of separation and divorce, another relevant topic has been the influence of union (in)stability and/or low relationship quality on childbearing. Although causal links are complex and there are important feedback mechanisms (Waite and Lillard 1991), the existing literature provides evidence for two opposing mechanisms. On the one hand, some studies find a negative relationship between low quality/instability of partnership

and having children (Thornton 1978; Myers 1997). Couples experiencing marital instability are at a lower risk of having a child due to a reduced frequency of intercourse (Cohen and Sweet 1974; Thornton 1977, 1978) or because they consider the fact that children might raise dissolution costs (Lillard and Waite 1993). On the other hand, Friedman et al. (1994) argue that union instability leads to earlier childbearing since children are seen as a source of uncertainty reduction and thereby operate to enhance marital solidarity. This latter argument has also been supported by additional empirical studies (Wu 1996; Myers 1997). Rijken and Thomson (2011) find a non-linear relationship between relationship quality and fertility: women who experience a medium-quality relationship are the most likely to have a(nother) child, because they are the ones that are the most eager to invest in their relationship. Rijken and Liefbroer (2009) also investigate the impact of partnership quality on the timing of childbearing. Once again, two alternative mechanisms were isolated: the first is that a high-quality relationship offers a 'favorable environment' to raise children and second, that having a child may be means of 'revitalization' of one's relationship.

2.3 Gendered Division of Labor

Another important factor influencing fertility is the gendered division of domestic labor of couples within the household. Contemporary work builds on McDonald's (2000a, b) gendered fertility theory, which argues that very low fertility is the result of a hiatus of sustained gender inequity in family-oriented social institutions. Esping-Andersen (2009), also drawing on the work by the economist Goldin (2006), sees low fertility as a consequence of the "incompleteness" of the revolution that transformed women's roles. Empirical studies that examine gender equity at the micro-level provide interesting insights on how the gender role-set within the family affect an individual's probability to have a child. In a qualitative study of women's fertility in Canada, Matthews (1999) reports that women responded to feeling overburdened at home by having fewer children. Using U.S. data, Miller Short and Torr (2004) find a U-shaped relationship between gender equity within the couple and fertility: the probability of having a second child is higher in families with either very low or very high gender equality. Tazi-Preve et al. (2004) demonstrates that the unequal distribution of household labor lowered men's fertility intentions in Austria. This concurs with the work of Oláh (2003), who in a comparison of Sweden and Hungary finds that a more equal gender division in household tasks accelerates the transition to the second child, noting that specific policies in Sweden supported this transition. In a study on Italy and Spain, Cooke (2009) finds that increases in employment equity between partners increased equity in the division of household labor, which had beneficial effects on the progression to a second child. The effects, however, differed across countries. In a comparative study of the Netherlands and Italy, Mills et al. (2008) find that an unequal division of household labor significantly impacts women's fertility intentions when they already have a heavy load (more work hours, children), which is particularly salient for working women in Italy. Begall and Mills (2011) also demonstrate that the degree of work–family conflict plays an important role for women across many European countries, with

the prevalence of part-time work and higher perceived control over work significantly predicting the intention to become a mother.

2.4 Stepfamily Fertility

The increase in unstable and multiple unions has also brought a growth in the study of *stepfamily fertility*. This body of research demonstrates that partners who already have children from previous unions are more likely to have a child together, often considered as a union commitment effect (e.g., Vikat et al. 1999; Buber and Prskawetz 2000; Stewart 2002; Thomson 2002; Prskawetz et al. 2003). Jefferies et al. (2000) for instance, find that among British women, almost half of those who experienced a marital dissolution subsequently experience a conception within twelve months, with age of the woman and age of her youngest child being the most important factors, together with repartnering. Repartnering might therefore further fuel higher fertility quantum. Given that one child is enough to indicate commitment in a partnership, multiple relationships and subsequent partnerships might significantly contribute to total fertility.

2.5 Income, Education and Human Capital

Socio-economic circumstances of individuals have also been studied as determinants of fertility quantum and timing. Income (and wages in particular) has attracted considerable research interest in economics. Depending on the economic model that is adopted, the effect might be different. The family economics approach, pioneered by Becker (1960), maintains that individuals obtain direct pleasure from having and raising children, and from their well-being. Children, and possibly their quality level, thus resemble a consumption good in the utility function of their parents. While the initial formulation of this theory implies a positive link between income and number of children, the large body of literature that followed focused on a *negative* relationship between income and fertility, emphasizing two aspects (see Jones et al. 2011). A first approach focuses on the *quality-quantity tradeoff*, proposed by Becker and Lewis (1973) and Willis (1973) (see also Becker et al. 1990). Here the argument is that an increase in income may lead to fewer children. This attributed to the fact that parents with a higher-income value children's quality, but a focus on higher-quality raises the cost of having (and raising) children, thereby potentially reducing fertility levels. Lee and Mason (2010) apply this model to show that as income increases, lower fertility is associated with an increased expenditure in children's human capital.

A second approach focuses on the *opportunity cost* of having children, especially for women. Since raising children requires parental (and especially maternal) time, fertility is more costly for higher-income mothers, who are therefore expected to have fewer children (e.g., Kravdal 1992). This is related to the literature that demonstrates a 'motherhood wage penalty', with postponement providing considerable earnings returns for higher educated women or those in professional occupations (Van Bavel 2010; Begall and Mills 2012). Miller (2010) demonstrated for example, that a year of delayed motherhood increased women's earnings by

9 %, their work experience by 6 % and average wage rates by 3 %. Others have extended Becker's static model by setting up dynamic economic models of the optimal timing of first birth (mostly focusing on women), based on the minimization of opportunity costs of childbearing, 'wage penalty' and income loss (Happel et al. 1984; Cigno and Ermisch 1989). They theorized and demonstrated that the higher the accumulation of human capital during education or the higher the returns to education, the later the transition to motherhood. Gustafsson (2001, 2002) demonstrated that women's career planning was the main explanation for postponement, a finding replicated in more recent studies in Sweden (Gustafsson 2005), the U.K. (Kneale and Joshi 2008), Ireland (O'Donoghue et al. 2011), the U.S. (Amuedo-Dorantes and Kimmel 2005; Miller 2010) and Italy (Rondinelli et al. 2010).

A similar approach has been adopted by the rich body literature that focuses on the relationship between education and labor market trajectories and the timing of first birth. The argument is that due to the accumulation of human capital, women with higher levels of education are more likely to pursue careers and increase their earning power. This likewise releases them from the pressure to get married and have a child for economic reasons. As the opportunity costs of childbearing and childrearing increase with human capital, highly educated women are more likely to postpone marriage and births. An important critique of this approach has been put forth by Oppenheimer (1994), who argues that highly educated women are more likely to find partners who are highly educated as well. This in turn operates as an incentive for women (because they can further pool economic resources) to enter into a union and subsequently have children once they complete their education. In line with Oppenheimer's approach, other studies find that the higher educated are more likely to have a(nother) child or have overall, higher fertility (Mencarini and Tanturri 2006; Mills et al. 2008), since: (i) they are also likely have a partner with higher education and therefore a higher wage (Behrman and Rosenzweig 2002); (ii) they have stronger bargaining power within the couple, leading to a more equal division of domestic labor; and, (iii) they can outsource housework. Although higher educated women have their first child later than their lower educated counterparts, some studies (Sobotka 2004; Kravdal and Rindfuss 2008) have highlighted that the higher educated are also more likely to recuperate at a later age. Or in other words, that the cumulative impact of late motherhood on higher-order birth rates (i.e., second or third births) disappears.

The results linking education to fertility are, however, mixed, with recent empirical results instead showing a non-relevant association between education and fertility (e.g., Skirbekk 2008). Using a natural experiment approach on school entry policies in California and Texas (which should be able to unravel causality), McCrary and Royer (2011) find that education does not significantly impact fertility. Several studies also find a strong inverse relationship between educational attainment and the timing of first births in different countries (Rindfuss et al. 1980, 1996; Martin 2000 for the U.S.; Joshi 2002 for U.K.; Lappegard 2002 for Norway; Meron and Widmer 2002 for France; Noguera et al. 2003 for Spain).

Other researchers have instead focused on the importance of educational enrolment, as opposed to the highest achieved level of education. Here findings

show that individuals who are still enrolled in education are at a lower risk of having a child, likely attributed to the presence of a 'sequencing norm' of first finishing education, followed by parenthood (Hoem 1986 for Sweden; Goldscheider and Waite 1986 for the U.S.; Blossfeld and Huinink 1991 for Germany; Kravdal 1994, for Norway). Others have extended this research to also examine the importance of the educational field of study in relation to either socialization or self-selection effects into later occupations, which in turn impact fertility (e.g., Hoem et al. 2006; van Bavel 2010; Begall and Mills 2012). Almost all studies focus exclusively on women, with some noticeable exceptions. Winkler-Dworak and Toulemon (2007), for instance, explicitly study the convergence in explanatory factors explaining the age at first birth for women and men.

2.6 Economic and Employment Uncertainty

Further, mostly sociological studies focus on the importance of employment status and particularly economic uncertainty on fertility outcomes. Theories of (largely economic) uncertainty are reminiscent of Easterlin's (1976) theory of economic deprivation, which posits that in historical periods of general economic uncertainty and rising unemployment, the tendency to marry and have children appears to diminish. This also relates to Oppenheimer's (1988, 2003; Oppenheimer et al. 1997) work on the impact of uncertainty in social and economic roles on the timing of family transitions. An increasing number of studies link economic uncertainty—often in the form of unemployment and precarious labor market situations—to the postponement of parenthood. In order to empirically measure the impact of uncertainty on the entry into parenthood in a cross-national context, Mills and Blossfeld (2005) developed a schema consisting of three types of uncertainty: economic, temporal, and employment relation. They found that under conditions of economic uncertainty, which is the caliber of economic precariousness of an individuals' employment circumstances (e.g., lower earnings, unemployment), youth deferred long-term binding commitments such as parenthood that require a secure economic basis (Oppenheimer 1988) or what Rindfuss and Vandenheuvel (1990) refer to as the 'affordability clause' to have a child. Following Breen (1997), temporal uncertainty (i.e., often in the form of temporary or fixed-term contracts) reduced youth's ability to make long-term commitments such as parenthood. Finally, lower employment relationship uncertainty (e.g., dependent workers versus self-employed or contract workers) were impeded by their more precarious positions. The impact of uncertainty, however, was highly filtered by national-level institutions, such as the amount of protection young adults received from the welfare state to shelter them from uncertainty, and gender systems, which resulted in differential responses to uncertainty of women across different national contexts (Mills and coworkers 2005).

Kreyenfeld (2010) finds that both objective economic uncertainty (unemployment) and subjective uncertainty (fear of economic situation and job security) have little impact on the postponement of parenthood, with the level of education operating as the underlying driver of the process. In other words, lower educated

mothers respond to economic uncertainty by adopting the role of mothers, while their highly educated counterparts postpone childbearing.

2.7 Fertility Preferences

An individual's fertility decisions are shaped by his or her own *preferences*, which several authors emphasize, are shaped early in an individual's life. Catherine Hakim's *Preference Theory* (2003) positions the heterogeneity of women's lifestyle preferences at the heart of fertility (and labor market) choices in advanced societies. Hakim assumes that lifestyle preferences are rather constant across the life course, with three main types: career-oriented, family-oriented and those oriented towards combining work and family. These lifestyle preferences are seen as the main driver, with policies required that take into account this heterogeneity. In a comparative study within Europe, Vitali et al. (2009) find that family-oriented women are the most fertile, whereas work-oriented women usually have fewer children or even no children at all (albeit the causal direction remains unclear). Other studies (Mencarini and Tanturri 2006; Agrillo and Nelini 2008) find that, among other factors, preferences play a crucial role in the decision to remain voluntarily childless or 'child-free'. While Agrillo and Nelini (2008) provide a detailed overview of the psychological and sociological factors associated with voluntary childlessness, medical research often focuses on physical causes related to infertility.

Research on preferences for the sex composition of children shows an effect of sex preferences on the probability to have more children, albeit with considerable variation across countries (Hank and Kohler 2000). Andersson et al. (2006a, b) and Mills and Begall (2010), for instance, find the presence of a mixed-sex preference (i.e., preference to have at least one boy and one girl), which prompts a significantly higher likelihood to the progression to the third child to reach this goal.

2.8 Intergenerational Transmission of Values and Behavior

The similarities of fertility histories across successive generations has also been a core area of research, focusing mainly on the stable result of a positive correlation between the number of siblings and number of own children (e.g., Berent 1953; Duncan et al. 1965; Johnson and Stokes 1976; Zimmer and Fulton 1980; Thornton 1980; Anderton et al. 1987; Axinn et al. 1994; Murphy and Wang 2001) or between the age at first birth of parents and that of their children (Rijken and Liefbroer 2009). The majority of studies concerning tempo focus on teenage motherhood, demonstrating that having had a young mother increases the risk of having a child at a young age (Furstenberg et al. 1990; Horwitz et al. 1991; Kahn and Anderson 1992; Manlove 1997). Barber (2000, 2001) and Steenhof and Liefbroer (2008) also find corresponding results for later ages and for men. Within this body of literature, the intergenerational transmission of behavior is considered to be driven by intra-familial socialization processes that occur during childhood and adolescence (Hendershot 1969; Thornton 1980; Axinn et al. 1994; Murphy and Wang 2001). The assumption is that parents transmit family values, preferences and attitudes, as well as contraceptive knowledge. Rijken and Liefbroer (2009), however, show that this

effect is fully mediated by the child's own degree of religiosity. Intergenerationally transmitted knowledge, attitudes and values can be seen as individual characteristics that have a long-term effect in the same way that genetic heritage is transmitted from parents to children.

2.9 Biodemography of Fertility

Next to socialization mechanisms, biological and genetic factors have also been used to explain intergenerational similarities in fertility preferences and behavior (Wachter and Bulatao 2003). A series of studies have linked biological and genetic components to fertility behavior (Kohler et al. 1999; 2002a, b; Kohler and Rodgers 2003; Rodgers et al. 2008). This body of research focuses on studying the interplay between fertility, environment and genetic make-up of individuals and demonstrates that differences in the genetic composition of individuals affect their fertility outcomes and fertility related behavior. They often adopt a 'twin design' which compares monozygotic twins (with virtually identical genetic makeup) with dizygotic twins. This permits the separation of what proportion of the variance is attributed to genetic, shared-environment (i.e., growing up in the same household, environment) or non-shared-environment (i.e., all other factors such having different partners). Kohler et al. (1999), for example, used Danish twin data to disentangle genetic and social influences on the patterns of heritability for the number of children, finding that genetic influences appeared to largely override previous shared social (familial) environments for younger cohorts.

These types of studies are part of the emerging field of the biodemography of fertility, which is an interdisciplinary area of fertility research that combines theories from the social sciences (sociology, economics) with approaches from behavioral and molecular genetics, neuro-endocrinology, and evolutionary theory (Wachter and Bulatao 2003). The central premise is that genetic and biological dispositions of individuals influence fertility either directly via genetically mediated variations or, since many aspects regulating fertility possess considerable volitional control (e.g., decision of age at first birth, fertility preferences), via underlying temperament or personality influences on fertility decisions (Jokela et al. 2009). There is also growing evidence that genetic variance changes over time and across educational levels, meaning that the importance of social norms and individual decision-making change across time (Kohler et al. 1999; 2002a, b; Kohler and Rodgers 2003). The biology of fertility has also been revolutionized by the rapid diffusion of various types of assisted reproductive technologies (ART). ART not only provides new opportunities to extend the reproductive window for couples who desire to have children at a later age, but also enables parenthood for many couples that would have previously been considered sterile, with ART utilization increasing rapidly across Europe (de Mouzon et al. 2010).

2.10 Socioeconomic Status and Cultural Context of Family of Origin

A related stream of research investigates the effect of the socio-economic and cultural context of the family of origin on an individual's age at childbearing and

fertility quantum decisions. Some studies have shown that there is a negative relationship between parents' educational level (especially father's education) and age at first birth (Michael and Tuma 1985; Blossfeld and Huinink 1991; Billari 2001a, b) as well as the number of children (Murphy and Wang 2001; Rijken and Liefbroer 2009). A negative relationship has also been found between parents' financial situation (i.e., job status) and (expected) number of children (Thornton 1980, Murphy and Wang 2001) and age at first birth (Rijken and Liefbroer 2009). These findings suggest that in higher educated and high-status families, other goals beyond family formation are more easily transmitted, together with aspirations for material goods (Easterlin 1969; Pampel and Peters 1995). Therefore, if consumption aspirations are high, parenthood will be reduced or at least postponed. This is in line with findings that show a negative effect of employed mothers (compared to non-employed ones) on the age of first birth of their offspring (Barber 2000). For the opposite reason, parents' religiosity is positively associated with their children's fertility (Rijken and Liefbroer 2009).

2.11 Reverse Causality at the Micro-Level

Several articles have explicitly attempted to uncover causality in the relationship between partnership and childbearing. Using simultaneous hazard models on U.S. data, Brien et al. (1999) show that common factors exist, with being in a partnership resulting in a higher likelihood of childbearing. The comparison between cohabitation and marriage, with similar approaches based on simultaneous hazard equations, is the focus of Baizán et al. (2003 for Spain; 2004 for Sweden and Germany), Le Goff (2002) for France and West Germany, Steele et al. (2005, 2006) and Aassve et al. (2007) for Britain. Spéder and Kapitany (2009), instead, use time-dependent fertility intentions (i.e., intention to have a child within 3 years) and look at the realization of these intentions to investigate which micro-level factors are associated with a higher probability of postponing the realization of childbearing intention beyond the planned time span.

Just as the relationship between partnership and fertility, the relationship between education and the timing of childbearing can be spurious (i.e., affected by common observed or unobserved factors), reversed, or the result of an individual's simultaneous choice in the two life spheres. Therefore, in order to properly estimate the effect of education (or job career, or education field) on the age at first birth, potential endogeneity issues must be taken into account (Billari and Philipov 2004).

Another topic where causality is a key challenge is studying the relationship between childbearing and well-being. A limited, but growing body of research has highlighted the role of happiness as a determinant of fertility, with consistent results for both sexes. Using the European Social Survey, Billari (2009) demonstrates that happier people are more likely to intend to have a(nother) child, while using longitudinal data from Australia, Parr (2010), finds that life satisfaction is a determinant of fertility.

More attention has been devoted to investigating the opposite direction of the relationship between childbearing and well-being. While older studies seem to

imply that in advanced societies children were detrimental to marital well-being (see the review of McLanahan and Adams 1987), more recent research connect childbearing decisions with well-being, in various other ways. The 'value of children' theory (Hoffman and Hoffman 1973; Hoffman and Manis 1979; Friedman et al. 1994), recently reconceptualized as a special case of the general theory of social production functions (see, e.g., Nauck 2007), envisions having children as instrumental in maximizing individual utility as expressed by the combination of physical well-being and social esteem. In this sense, having children when fertility control is available positively contributes to individual well-being. Building on this approach, Kohler et al. (2005) demonstrate that becoming a parent contributes positively to parents' *happiness*. Using Danish twin data and a rigorous econometric approach that accounts for possible sources of endogeneity (e.g., genetic factors), the authors find a non-linear effect of children on happiness, especially for women. Women's happiness increases after the first child, but having higher-order children is not associated with further increases in well-being. In Europe, parents have been found to be generally happier than non-parents (Aassve et al. 2011). Examining the dynamic relationship between having children and happiness, Pouwels (2011) finds an inverse U-shaped effect of first birth, by showing that in the year before and after the first childbirth, parents experience a sharp increase in the level of happiness. Happiness, however, appears to drop some months after the delivery and new parents are found to be unhappier than previously for a considerable period. Margolis and Myrskyla (2011) also investigate the age- and context-specificity of the relationship between happiness and childbearing.

Finally, another emerging body of research where reverse causality is relevant is the link between the field of education and age at first birth (Lappegard 2002; Lappegård and Rønsen 2005 for Norway; Martin-Garcia and Baizan 2006 for Spain; Neyer and Hoem 2008 for Austria; McDonald and Kippen 2009 for Australia; Van Bavel 2010, several countries; Begall and Mills 2012 for the Netherlands). These studies show earlier fertility among women in educational fields related to the more 'feminine' fields of caring (e.g., teaching, health), although there are no clear causal relationships. The mechanism is that women either self-select themselves into educational paths that lead to jobs where they are more able to combine motherhood and employment or, the difficulty of combing career and children varies by chosen career type.

3 Meso-Level Determinants of Fertility

In recent years, increasing attention has been devoted to developing and applying theories that take into account the fact that individuals are positioned as social actors who make decisions and act while embedded in a web of social relationships with kin and peers. While some studies focus on the role of interpersonal interactions in shaping an individual's fertility decision-making, others investigate how the place of residence is associated with reproductive choices. Finally, another body of research looks at the social network as a source of social capital in the form of emotional and material aid. The acknowledgement of the importance of the social

network in explaining observed fertility patterns has not as of yet, however, been coupled with a convincing body of empirical research. The central reason rests with the lack of suitable data and the difficulty to model and properly identify social interaction effects and disentangle them from selection and contextual factors.

3.1 Social Interaction

The impact of social interaction on fertility choices has received considerable attention (e.g., Bongaarts and Watkins 1996; Entwisle et al. 1996; Montgomery and Casterline 1996; Kohler 1997, 2001; Bernardi 2003). This literature has predominately focused on the diffusion of contraceptive methods in developing countries (Kohler et al. 2001) and identified two channels via which social interaction takes place. The first is *social learning*, or how individuals gain knowledge from others, and the second is *social influence*, which is how consensus in peer groups constrains attitudes and behavior (Montgomery and Casterline1996; Kohler et al. 2001).

In advanced societies, the evidence largely comes from small-scale qualitative studies, which illustrate that personal network contacts such as coworkers or friends are pivotal in shaping both fertility timing as well as quantum decisions (Bernardi 2003; Bernardi et al. 2007; Keim et al. 2009; Rossier and Bernardi 2009; Bernardi and White 2009). Individuals look to coworkers, for example, as a key source of social learning, to see how and whether they successfully navigate the combination of having children with a career.

Rigorous quantitative studies, however, are still lacking. To our knowledge, only a handful of studies have adopted a quantitative approach. Axinn et al. (1994) showed that the higher the number of nephews and nieces, the higher the preferred number of children. Manski and Mayshar (2003) interpret the peculiarity of Israeli's fertility transition in light of social interactions. Billari et al. (2009), integrating a network-based approach into the Theory of Planned Behavior, find that social pressure from relevant others significantly influences women's intention to have a child. Balbo and Mills (2011) consistently find that social pressure from kin and friends to have another child is associated with positive fertility intentions to have a second or third child. Turning to the timing of childbearing, the few quantitative studies that investigate the impact of social interaction demonstrate that when a sibling (Kuziemko 2006; Lyngstad and Prskawetz 2010) or a co-worker (Hensvik and Nilsson 2010) have a child, the risk for the individual to have a child also increases. These studies have adopted event history analysis techniques that uncover a short-term, U-shaped effect, with the contagion effect very strong and increasing in the 12th (Lyngstad and Prskawetz 2010) or 24th month (Kuziemko 2006; Hensvik and Nilsson 2010) after the relevant other's childbearing. It then declines, becoming negligible in the long run.

An innovative approach is the one adopted by Aparicio Diaz et al. (2011), who apply an agent-based simulation model to study the effect of social interactions on the transition to parenthood in Austria during the period 1984-2004. Their simulations showed that social interdependencies among individuals can explain the substantial shift of first birth to a later age that occurred in Austria in the past decades.

3.2 Place of Residence

Several studies document fertility differences by place of residence along several lines. First, fertility continues to vary across regions (Hank 2001, 2002; Caltabiano 2008; Kertzer et al. 2009). According to Kulu (2011), differences in desired family size explain fertility differentials between small towns and rural areas on the one hand, and urban areas on the other. Second, within urban areas, suburbs are consistently found to have higher fertility (Kulu et al. 2009), with single-family households associated with higher fertility (Kulu and Vikat 2007). These differentials persist when controlling for the socio-economic composition of areas (Kulu and Boyle 2009), suggesting that contextual effects shape fertility decisions. It is interesting to note that differences in urban and rural fertility quantum persist over time (Kulu et al. 2009), whereas differences in fertility timing have only recently emerged. As a result, postponement has been more pronounced in larger rather than in smaller settlements.

3.3 Social Capital

The body of research focusing on the social network as a source of *social capital* (Bühler and Philipov 2005; Philipov et al. 2006) stems largely from sociological theory (Lin et al. 2001; Flap and Völker 2004; Mandemakers and Dykstra 2008). Social capital is defined as the resources that individuals have access to via personal relationships and can include goods, as well as information, money, capacity to work, influence, power or active help (Granovetter 1973; Bourdieu 1986; Coleman 1988). Building on previous sociological applications (Granovetter 1973; Bourdieu 1986; Lin et al. 2001; Flap and Völker 2004), some demographic studies have demonstrated how social capital (or the lack thereof), next to economic and cultural resources, shapes fertility decision-making (e.g., Schoen et al. 1997, Astone et al. 1999; Bühler and Philipov 2005; Philipov et al. 2006). This research looks at long-term, stable and trusting relationships (e.g., family members, grandparents, close friends or relatives) that can provide the individual or the couple with fertility-relevant supportive resources. Therefore, although the exchange of these resources occurs only ad hoc, that is, whenever they are needed (e.g., use of informal childcare when children are young), the set of relationships from which they are drawn is likely to be stable over the life course.

The majority of existing studies on social capital as a determinant of (low) fertility has focused on ex-communist Eastern European countries. This region has undergone a period of extreme socio-economic uncertainty after the end of the Soviet Union. Bühler and Philipov (2005) provide an extensive theoretical discussion of how social capital is related to social networks and how it affects the formation of fertility intentions. They also show that, in such a context, supportive network relationships and resources play a crucial role in an individual's fertility decision-making. Consistent with this argument, other empirical studies demonstrate that the greater the social capital, the higher the probability to have (or want) a(nother) child (Philipov 2002 for Russia; Philipov et al. 2006 for Bulgaria

and Hungary; Bühler and Fratzcak 2007 for Poland) and to have the child sooner (Bühler and Philipov 2005; Philipov et al. 2006).

Bühler and Fratzcak (2007) find a positive effect of social capital on fertility, with this influence being highly parity-specific and particularly strong for second births. As far as Western European countries are concerned, Hank and Kreyenfeld (2003) find that in West Germany, access to informal care arrangements (i.e., care provided by grandparents) increases the risk of first birth. Balbo and Mills (2011) show a non-linear relationship (i.e., inverse U-shaped) between informal childcare and the probability for German men of wanting a second or third child. Receiving no support at all and receiving support from too many sources (i.e., several different people) are both associated with a lower probability of intending to have another child, with the latter likely related to coordination problems.

The U.S. literature focuses on the support that kin provide to mothers, including childcare and help with raising children, especially for single mothers—here kin are seen as providing 'safety nets'. This is particularly significant given the high rates of partnership instability and single parenthood (Swartz 2009) and is a strong focus of the 'Fragile Families' study (Harknett et al. 2001). Harknett and Knab (2007) find that multipartnered fertility, through the difficulties of maintaining kin networks, lowers the financial, housing and child-care support to mothers. Harknett and Hartnett (2011) likewise find that support from kin and friends are more often available to mothers who can reciprocate, and families with more difficulties have lower support.

3.4 Confounding Factors and Reverse Causality at the Meso-Level

The acknowledgement of the importance of social interaction in explaining observed fertility patterns has not yet, however, been coupled with a convincing body of empirical research. The central reason rests with the lack of suitable data and the difficulty to model and properly identify social interaction effects (Manski 1993, 1995). The social context or other individual-level factors common among individuals can also explain similarities in behavior (e.g., same timing of childbearing) (Christakis and Fowler 2007; Cohen-Cole and Fletcher 2008; Bramoullé et al. 2009; Steglich et al. 2010; Fletcher 2011), and the social network may be chosen according to desired behaviors and changes over time.

Finally, it is essential to note that the association between the place of residence and fertility choices raises causality concerns, since the relation might be spurious and the effect can work in both directions.

4 Macro-Level Determinants of Fertility

A vast literature focuses on how the cultural and institutional setting in which individuals and couples are embedded affects their fertility decision-making. Here an 'economy versus culture' dichotomy can be identified (Billari 2004). Whereas several studies investigate how economic trends, social policies, institutional constraints and welfare regimes influence fertility tempo and quantum, other

contributions focus on the influence of values, attitudes and culture in reproductive behavior. Moreover, next to these two broad approaches, other macro-level studies look at the role of contraceptive technologies in fertility dynamics. Once again, the main challenge of this literature rests on how to deal with endogeneity and causality issues, which are elaborated upon at the end of this section.

4.1 Economic Trends

Period effects of economic trends on fertility are usually investigated by linking the TFR to macroeconomic indicators (e.g., GDP and unemployment rate). As mentioned in the introduction, despite the fact that the influence of the timing of fertility on the TFR is mainly a measure of fertility quantum, it does incorporate timing aspects as well. The relationship between TFR and GDP is ambiguous, as Sobotka et al. (2011) demonstrated. Using data from 26 OECD countries for the period 1971–2008, they report a weak correlation between changes in GDP and period TFR, arguing that this might be a result of cross-country differences. Several studies find a pro-cyclical relationship between economic growth and fertility in the developed world. Martin (2004), for example, finds that a higher GDP is associated with higher fertility in Australia. Fertility decline during economic recessions are seen as a result of childbearing postponement, especially of first births, which can later be largely compensated during times of economic prosperity (Neels 2010). Similar arguments can be found in Kohler et al. (2002a, b); Mills and Blossfeld (2005) and Sobotka et al. (2010), who maintain that an economic downturn brings about uncertainties that in turn, lead to postponement. Some empirical studies also support this hypothesis. Santow and Bracher (2001) find a negative effect of the GDP decline on first birth rates in Sweden. Sobotka et al. (2011) show that the recent economic crisis that occurred in 2008–2009 in Europe and the U.S. seems to be associated with a decline in fertility, likely due to postponement effects.

Other studies, however, find contrasting results. Butz and Ward (1979) suggest that economic upswings bring about the increased employment of women, making children more expensive during times of economic prosperity. Therefore fertility trends are likely to be counter-cyclical. Macunovich (1996) finds evidence for this expectation in the U.S. The negative relationship between economic growth and postponement also seems to be contradicted by some recent studies. Billingsley (2010) finds that the GDP in Eastern Europe after 1990 is positively correlated with fertility postponement, a result also observed in Hungary for the timing of first birth (Aassve et al. 2006). These latter studies are examples of a broader literature that adopts the economic crisis argument to explain the sharp decline in fertility that Central and Eastern European countries have undergone after the fall of communism. Once again, however, the evidence is mixed. Kohler and Kohler (2002), using Russian data, find, for instance, a negative association between a drop in GDP and TFR at the macro-level, but this finding is not observed at the micro-level.

A related approach that has recently received great attention is the one that explains fertility patterns and cross-country fertility differences in terms of socio-economic development. Myrskylä et al. (2009) provide evidence for a fundamental

change in the well-established negative relationship between fertility and development (Bryant 2007). They find that while low and medium levels of the human development index (HDI) are associated with persistent low fertility, higher HDI levels seem to promote fertility, reversing the declining pattern.

Instead of looking at GDP, other researchers maintain that indicators of consumer confidence are a better measure of economic recessions, because they reflect the subjective perception of crisis. Van Giersbergen and de Beer (1997) and Fokkema et al. (2008) find a positive relationship between this indicator and TFR in The Netherlands.

4.2 (Un)employment Trends

Economic uncertainty has also been studied by examining the effects of *unemployment* trends on the TFR. Findings consistently showed a negative association: the higher the unemployment, the lower the quantum of fertility (Macunovich 1996; Adserà 2004; Örsal and Goldstein 2010) or the higher the postponement, which was found for first and second births (Adserà 2010, 2011).

Adopting a complementary approach, other studies focus on the relationship between female labor force participation (LFP) and TFR, showing that in OECD countries, this association has changed from negative (where countries with higher LFP had lower TFR) to positive during the 1980s. Benjamin (2001), Pampel (2001), Ahn and Mira (2002), and Kögel (2004) provide some theoretical explanations and empirical evidence to describe the change in this cross-country correlation. It is, however, challenging to assess whether this implies a change in the causal relationship between the two variables. Mishra et al. (2010), engaging in a macro-econometric analysis aimed at ruling out endogeneity in order to unravel causation, find that causality runs from changes in fertility (TFR) to changes in LFP.

Another approach on the effects of economic trends has been developed by Easterlin (1961, 1968). According to Easterlin, cyclical changes in fertility are mainly due to fluctuations in birth rates and cohort size. Members of larger cohorts face more competition and thereby reduced economic opportunities, leading to lower fertility (for further details, see review of Pampel and Peters 1995).

4.3 Policy Measures

A second stream of research has studied the impact of policy measures (e.g., labor market, fiscal, family, or housing policies) on the timing of parenthood, as well as on fertility quantum. There is mixed evidence regarding the effectiveness of social policies on fertility (Neyer 2003; Gauthier 2007; Hoem 2008; Mills et al. 2011). Gauthier (2007) argues that their effects, although small, seem to affect the timing of fertility rather than the number of children.

A large number of studies investigate the effects of childcare provision on fertility. Most of the empirical research shows mixed findings. While some studies find that regions with poor childcare coverage have higher fertility (e.g., Kravdal 1996; Rosen 2004), others, arguing that they take endogeneity into account, find that

public availability of childcare has a positive effect on fertility (Del Boca 2002; Rindfuss et al. 2010). Manuelli and Seshadri (2009) present a model and empirical analyses in which higher tax rates determine low fertility. Social security systems, and the reform in social security, have been discussed as determinants of fertility (Cigno and Rosati 1992). The relevance of social security for fertility choices is also linked to the idea that children may provide security in old age, also in advanced societies (Rendall and Bahchieva 1998; Mills and Begall 2010). Galasso et al. (2009), for instance, show that the generosity of public pensions is negatively associated with fertility.

Similar to economic factors, with which they are closely interrelated (Hoem and Hoem 1997), the effect of family policies varies according to the institutional context and individual-level determinants. For this reason, there has been only minor attention to pure macro analyses, focusing on time-series variation within a country. This includes an article by Ermisch (1999), who finds that generous child allowances in Britain encourage young motherhood and Hoem (2005) and Andersson et al. (2006a, b), who show that parental-leave allowance reduces postponement in Sweden. The majority of research on policy measures and timing of childbearing consists of either micro-level (individual or couple) studies, where the policy variable is one of the independent variables, or cross-national studies (sometimes multilevel) involving nations with differing policies. Although each approach has its drawbacks (for a detailed discussion see Neyer and Andersson 2008), the latter two methods permit the examination of interactions between analytical levels.

4.4 Welfare Regimes

Building on the work of Esping-Andersen (1990, 1999), numerous scholars have explained cross-country differences in fertility and life course patterns by linking them to different institutional constellations (e.g., Mills and Blossfeld 2005; see also Neyer 2003 for a feminist critique). As described in Mills and Blossfeld (2005), who link different welfare regimes to fertility postponement, differences between welfare regimes manifest themselves in the priority of: (1) active employment-sustaining labor market policies (i.e., the commitment to full employment); (2) welfare-sustaining employment exit policies (i.e., support for those who are outside of the labor market such as youth, unemployed, ill, poor, family care workers, pensioners); (3) the scope and generosity of family allowances and services (i.e., maternity/paternity leave, childcare); and, (4) the share of the public sector in the labor force. This constellation of policies in turn impacts the safety net that individuals can draw upon if they are unemployed, employment regulations and family-related services (childcare, leave), which in turn enable or constrain decision-making about entry into parenthood or having additional children.

Defamilialized regimes, where the households' welfare and caring responsibilities are largely supported by the welfare state (and not the family), such as Nordic socio-democratic countries, or market provision (Anglo-Saxon liberal market regimes), enable higher fertility. Conversely, familistic states (Conservative and

especially Southern European regimes), where the majority of the economic and caring responsibilities rest on the family, where institutions also support a traditional division of the domestic labor (i.e., the so-called male-breadwinner model; Blossfeld and Drobnič 2001), constrain fertility, resulting in lower fertility levels.

This literature is mainly developed at the theoretical level. Researchers focus on the different manifestations of lack of state support, describing how these factors make it difficult to combine work and family, especially for women, forcing them to choose between a career versus motherhood, thereby resulting in postponing or forgoing of children (e.g., Castles and Ferrera 1996; Mayer 2004). The direct empirical research linking specific welfare regimes explicitly to fertility is limited due to the high complexity of modeling these regimes and, similar to research on social policies and fertility, it consists of either analyses at the micro-level where the effect of the different welfare regimes is measured by simple dummy variables, or cross-national studies (sometimes multilevel) involving countries with different institutional arrangements. Examples of this empirical body of research are reviewed in the final section of this paper (Sect. 5), where the interaction between micro- and macro-level is discussed.

4.5 Value and Attitude Changes

This stream of research largely stems from the 'second demographic transition' (SDT), developed by Lesthaeghe and van de Kaa (1986) to interpret demographic changes in industrialized societies. According to this theory, ideational changes, that mainly consist of the rejection of institutional control, accentuation of individual autonomy and the rise of self-realization needs (Surkyn and Lesthaeghe 2004), are the driving forces of new family arrangements and behaviors, among which fertility postponement, reduced number of children, or childlessness, that have developed since the 1960s. The SDT framework has been used as an alternative (Lesthaeghe 1983 for Belgium) or complementary explanation (Billingsley 2010 for Eastern European countries), next to economic cycle effects, to fertility quantum variations. Lesthaeghe (2010, p. 242), one of the proponents of this theory, has however underlined that "the SDT theory fully recognizes the effects of macro-level structural changes and of micro-level economic calculus. But… the SDT theory does not consider cultural change as endogenous to any economic model, but as a necessary additional force with its own exogenous effects on demographic outcomes".

As highlighted by van de Kaa (1997), such ideational changes may occur in different periods and at a different intensity across diverse areas. Some articles provide support for the SDT, showing a delay of fertility in relation to increased autonomy and independence, such as Liefbroer (2005) for the Netherlands and Bernhardt and Goldscheider (2006) for Sweden. An interesting approach is the developmental idealism framework elaborated by Thornton and Philipov (2009), according to which ideational influences and the intersection of these ideational

influences with structural factors are the main forces driving the fertility decline in Central and Eastern Europe after the end of the Soviet Union.

Other studies focus on the impact of changing social norms on fertility. Several researchers have documented the relevance of *age deadlines* for childbearing (i.e., ages after which it is not socially acceptable to become a parent) (Settersten and Hagestad 1996; Liefbroer and Billari 2010). Billari et al. (2011) illustrate that age deadlines are positively associated with the prevalence of ART in a given country.

Similar to the welfare-regime research, this literature is also mainly theoretical. This is primarily attributed to the difficulties in collecting data on ideational changes at the societal level. To overcome this issue, some studies (e.g., Liefbroer 2005; Bernhardt and Goldscheider 2006) empirically operationalize changes in values and norms using micro-level individual measurements, although they assume the value changes to occur at the societal level.

4.6 Historical and Cultural Continuities

Some studies identify historical and cultural continuities—or path dependency—as the roots of present fertility behaviors, reaching similar conclusions to that of Esping-Andersen (Reher 1998; Micheli 2000; Dalla Zuanna 2001). However, this literature, by strongly emphasizing the importance of cultural background, assumes that culture has shaped institutional settings (Pfau-Effinger 1999).

This body of research can be distinguished along East–West and North–South divides (see Billari 2004 for a more detailed overview). The East–West divide in Europe, running along an imaginary line connecting Trieste and St. Petersburg, was first noticed by Hajnal (1965). On the West side of the 'Hajnal line,' areas were characterized by late and not universal marriage, whereas to the East of the line, marriage was early and widespread. Historical continuities are then assumed to explain why birth happen earlier to the East of the Hajnal line. The North–South divide, first elaborated by Reher (1998), considers the strength of intergenerational family ties: while Southern countries are characterized by strong family ties, Northern areas generally have weak family ties. The main argument is that systems characterized by strong kinship and intergenerational relationship (e.g., Southern European familistic countries) are those where couples have lower fertility (Dalla Zuanna 2001; Livi-Bacci 2001) and young people delay the transition to adulthood, in turn implying a postponement of childbearing (Billari 2004). It is essential to note that familistic regimes, both from an institutional as well as cultural point of view, are not 'per se' detrimental to fertility. It is rather the interaction of these systems with the recent increased female status in the educational and labor market system and lack of institutional support to combine work and family that is the root cause of low fertility (Feyrer et al. 2008; Mills et al. 2008).

Studies on immigrants, linking fertility in the place of origin to the behavior of individuals in a 'destination' country have also shown the relevance of cultural continuities (Fernández and Fogli 2006, 2009), with continuity in behavior. Nevertheless, migrants often show behavior that converges to their place of destination, demonstrating that adaptation prevails on selectivity (Kulu 2005).

4.7 Contraceptive and Reproductive Technologies

Fertility differentials at the macro-level are not only explained by 'economy' and 'culture'. Researchers have widely studied the crucial role of the 'contraceptive revolution' on fertility quantum (e.g., Frejka 2008) and fertility postponement (for a detailed review see Sobotka 2004). The spread of modern contraception, and especially the pill, has radically changed the nature of the fertility decision-making and contributed to the reduction in the number of children and the postponement of childbearing (Goldin 2006). Murphy (1993) argues that short-term changes in fertility in England and Wales during the 1970s and the early 1980s can be better explained by the swings in *contraceptive pill use*, due to fears of the pill's side effects. Bailey (2010) exploits variation in laws permitting the sales of contraceptives in U.S. states as a natural experiment to show that contraception causally contributed to the reduction of period fertility rates. Sobotka et al. (2010) assesses the importance of ART (Assisted Reproductive Technology) on fertility using data from Denmark. They project a rising share of children born as a result of ART, with a 5 % contribution to the TFR of the 1975 birth cohort. Moreover, the development ART seems to challenge the biological limits to postponement (Billari et al. 2007; see Leridon 2008 for an analysis of the extent to which ART affects the probability of becoming a parent at advanced ages).

4.8 Endogeneity of Policies and Reverse Causality at the Macro-Level

Difficulties in disentangling the impact of policies from other observable or unobservable factors have often frustrated the effort to uncover policy effects on fertility. It is difficult to separate the impact of any specific policy from the broad range of policy instruments that potentially influence fertility and it is problematic to empirically establish whether a specific policy was successful due to the temporal lag between policy initiation and take-up. Finally, there is the problem of endogeneity of policies, in that they may not only impact fertility and induce change, but are often a reaction to changes in fertility and an integral feature of these changes. A rigorous analysis conducted by Kalwij (2010), however, finds a positive effect on fertility quantum due to an increased expenditure for family policy programs that help women to combine family and employment, thereby reducing the opportunity cost of children. Fiscal policies, that more easily allow implementing quasi-experimental strategies, have attracted the attention of many economists. Positive effects of fiscal incentives on fertility quantum have been found in Germany (Buttern and Lutz 1990), Sweden (Walker 1995), Canada (Milligan 2005), and the U.S. (Whittington 1993). Gauthier and Hatzius (1997) found more mixed results in employing a cross-country panel.

5 Discussion

Our review demonstrates that research on fertility in advanced societies is not only extensive, but continues to thrive and evolve in innovative ways. The central goal of

this paper was to evaluate the current state of fertility research in order to classify and assess different approaches and the knowledge they have added. A secondary goal was to classify existing research according to the three analytical levels of macro-, meso- and micro-level approaches and findings. We likewise placed considerable attention to causality and endogeneity issues.

We first demonstrated that there have been considerable advances on several fronts in the study of micro-level determinants. In addition to the consideration of key determinants, such as employment, income, and education (and nuances within these areas), promising new and innovative research has focused on how the gendered division of labor, family composition (e.g., stepfamilies), preferences and intergenerational transmission of values and behavior impact fertility. Although there have been recent advances in including new topics such as the biological and genetic underpinnings of fertility and new family forms, considerable challenges for future research still remain. The first is the availability and affordability of data with sufficient information such as biomarkers or genetic data, but also data that properly captures new types of family forms. Although growing, this type of data that combines genetic and social survey data remains limited. A second related issue, particularly for the introduction of serious biodemographic research, is the need to collaborate with experts and properly understand how to properly integrate this type of information and biological mechanisms in our theoretical, but also statistical models.

This review also highlighted core meso-level factors impacting fertility, including the emerging field of social interaction, social capital and networks and place of residence. Although a growing number of (primarily qualitative) studies started to address these meso-level factors, core challenges still remain. As noted previously, there is no large-scale quantitative network data that has been collected to examine how social networks impact fertility. Of the data that has been collected, the network measurements remained limited. This is partially attributed the high costs of collecting such data, but also the high respondent burden when gathering this type of information, which makes it difficult to include within an existing survey.

At the macro-level we summarized the key determinants that have been studied, ranging from economic and (un)employment trends, to policy measures, welfare regimes, value and attitude changes, historical and cultural continuities, contraceptive use and new reproductive technologies. As we noted previously, a key challenge for the credible integration of these macro-level factors for understanding fertility is the need to move from purely theoretical discussions to more convincing empirical tests of this link. Although researchers often claim that macro-level factors such as the welfare regime constellation or societal values impact fertility (and other demographic) behavior, there are few successful empirical attempts to empirically underpin these claims. At all levels we also addressed challenges related to reverse causality and confounding factors and for macro-level factors, the issue of the endogeneity of social policies and reverse causality, which will be discussed in more detail shortly.

Some more general problems of current research that we can draw from a broader reading of this review can provide opportunities in helping us to understand

improvements for future research. Two problems that became apparent during this review were the clear boundaries between disciplines and geographical areas. First, research on fertility is highly multidisciplinary, i.e., researchers from several disciplines engage in explaining the timing and quantum issues surrounding fertility. However, there are limited instances of interdisciplinary research, simultaneously involving scholars from different disciplines or adopting theoretical and/or methodological approaches of different disciplines. Citation patterns are highly disciplinary-specific, with articles often ignoring clearly relevant research published from other disciplines. It is easy to say that research on fertility would highly benefit by crossing disciplinary boundaries more often, perhaps starting from reading each other's research more often.

A second related point is the relevance of geographic boundaries. Research on fertility on Europe (mostly conducted by European scholars) and research on fertility on North-America (mostly conducted by North-American scholars), or in other words, the bulk of research on fertility, often do not communicate with one another. This was apparent during several places during our review where conflicting theories and findings were presented from North-American and European scholars. Topics, approaches (including the type of data) and again citations remain somehow separated, albeit research in Europe has clearly been fundamental in illuminating the role of macro-level factors, largely due to the often cross-national comparative approach. Not surprisingly, scholars working on other advanced areas are more successful in bridging the two continents over the Atlantic. Also, here it is easy to say that a general understanding of fertility choices would be easier by bridging the findings and approaches related to all advanced societies.

Two additional problems are related to methods, data and analytical strategy, which once again are apparent when we stand back to reflect in more general terms from this literature review. First, and related to the international character of fertility research, despite efforts of developing comparative, mostly aggregate data (such as the Human Fertility Database by the Max Planck Institute for Demographic Research and the Vienna Institute of Demography), most research focuses on micro-data that do not usually permit highly comparable research. We could therefore improve fertility research by developing comparable data collection in many countries—including very importantly, the U.S. and Japan in micro-level comparative fertility research. This is even more important given the increasing geographical mobility across countries. Only further collaborative efforts by researchers and funding agencies will enable us to uncover fundamental mechanisms operating at different levels and affecting fertility choices. Second, given that fertility can only be observed (as opposed to experimentally induced) by researchers, the issue of causation versus spurious association lingers as a major problem. Attention to causality is heterogeneous in the literature—undoubtedly with an advantage for studies arising from the tradition of economics. Causal interpretations are widespread also in studies that discover associations (which is a serious problem), but some studies clearly do not aim at understanding or studying causation (which is a lower-order problem related to how ambitious researchers and disciplines are). Further steps towards recognizing the importance of methods aimed at unraveling causality in observational data would contribute to conducting

higher-quality fertility research. Researchers and policy-makers alike would gain much more by adopting a program evaluation perspective for the evaluations of policies that might affect fertility choices.

Furthermore, our review uncovered that three problems emerge concerning the actual factors studied, ranging from individuals to context. Research on men, or in other words, the fertility of men and fatherhood, remains very limited, albeit growing. It is clear that a gendered approach is necessary, but this implies that both genders should play an equal role in our understanding of fertility choices. More research including both men and women would improve our knowledge. Related to this first problem is the second problem of couples. For both theoretical and (lack of) data-related reasons, fertility choices have been investigated mostly from an individual perspective. The limited research, and data, existing on couples show the incredible value of addressing fertility as a joint decision. A third problem relates to the limited knowledge of the importance of meso-level factors. Here the theory is more developed than the actual instruments such as the collection of quantitative data having a kinship and/or network-based approach, which we addressed previously. Efforts in using innovative analytical techniques such as agent-based modeling are promising. Recent innovative designs (e.g., the Add Health study in the U.S. or the Netherlands Kinship Panel Study) also provide some insights on future directions.

Finally, promising research avenues are those emphasizing the interaction of factors located at different analytical levels. As already mentioned in the policies and welfare regime sections, studies that adopt a cross-country comparative life course approach often position nation-specific institutions as path-dependent structures that shape micro-level individuals' characteristics and enable or inhibit the ability to have children and to have them at a particular period in their lives (i.e., during education, while remaining employed). National institutions or forces such as employment and education systems, welfare regimes, social policies, family, and gender systems are historically based and country-specific and determine the degree to which people are affected by macro-level changes (Mayer 2004). Micro-level factors, such as partnership status, might interact with the macro-level of institutions and culture. One example is the difference between cohabitation and marriage as determinants of childbearing. Baizán et al. (2004) find that in Sweden such differences are almost negligible as compared to West Germany. Comparing the 1958 and 1970 birth cohorts in the UK, Steele et al. (2006), find that the links between cohabitation and childbearing have strengthened over time because of changing cultural forces. Women may decide to postpone childbearing to avoid marriage particularly in less gender-equal societies (e.g., Japan) because they do not want to be forced into motherhood and out of employment (Rindfuss et al. 2004).

Throughout this review, we have already cited some studies that adopt a cross-country approach, showing how forces and constraints at the macro-level can impact micro-level dynamics. Kalwij (2010) and Begall and Mills (2011), for example, show how different welfare regimes and family policies can facilitate or constraint an individual's work–family balance.

McDonald's gender theory (2000a, 2000b) and related approaches (Chesnais 1996; Esping-Andersen 1999, 2009) are among the most relevant examples of interaction between micro-level factors (i.e., employment status and gender equity

within the family) and macro-level factors, (i.e., welfare regime) (see also Cooke and Baxter 2010). McDonald claims that very low fertility occurs where and when high levels of gender equity in individual-oriented institutions, such as education and market employment, are coupled with low levels of gender equity in the family and family-oriented institutions. Put differently, if women are provided with opportunities near to equivalent to those of men in education and labor market systems, but these opportunities are then severely limited by having children because they cannot reconcile work and motherhood, then, on average, women will restrict the number of children. Although this theory has often been used in explaining low fertility, empirical applications are still lacking (see Mills 2010).

Another example of meso-macro interaction is the study of Balbo and Mills (2011). They show that social pressure and social capital are highly institutionally filtered, having a much stronger effect on an individual's intention to have another child in familistic contexts, that leave caring responsibilities to the family and encourage a male-breadwinner model.

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References

Aassve, A., Billari, F. C., & Speder, Z. (2006). Societal transition, policy changes and family formation: Evidence from Hungary. *European Journal of Population, 22*(2), 127–152.

Aassve, A., Billari, F. C., & Piccarreta, R. (2007). Strings of adulthood: A sequence analysis of young British women's work–family trajectories. *European Journal of Population, 23*(3–4), 369–388.

Aassve, A., Goisis, A., & Sironi, M. (2011). Happiness and childbearing across Europe. *Social Indicators Research*, 1–22.

Adserà, A. (2004). Changing fertility rates in developed countries. The impact of labor market institutions. *Journal of Population Economics, 17*, 17–43.

Adserà, A. (2010). Where are the babies? Labor market conditions and fertility in Europe. *European Journal of Population, 27*(1), 1–32.

Adserà, A. (2011). The interplay of economic uncertainty and education in explaining second births in Europe. *Demographic Research, 25*(16), 513–544.

Agrillo, C., & Nelini, C. (2008). Childfree by choice: A review. *Journal of Cultural Geography, 25*, 347–363.

Ahn, N., & Mira, P. (2002). A note on the changing relationship between fertility and female employment rates in developed countries. *Journal of Population Economics, 15*, 667–682.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179–211.

Amuedo-Dorantes, C., & Kimmel, J. (2005). The motherhood wage gap for women in the United States: The importance of college and fertility delay. *Review of Economics of the Household, 3*, 17–48.

Andersson, G., Hank, K., Rønsen, M., & Vikat, A. (2006a). Gendering family composition: Sex preferences for children and childbearing behavior in the Nordic countries. *Demography, 43*(2), 255–267.

Andersson, G., Hoem, J. M., & Duvander, A. Z. (2006b). Social differentials in speed-premium effects in childbearing in Sweden. *Demographic Research, 14*(4), 51–70.

Anderton, D. L., Tsuya, N. O., Bean, L. L., & Mineau, G. P. (1987). Intergenerational transmission of relative fertility and life course pattern. *Demography, 24*, 467–480.

Aparicio Diaz, B., Fent, T., Prskawetz, A., & Bernardi, L. (2011). Transition to parenthood: The role of social interaction and endogenous networks. *Demography, 48*(2), 559–579.

Astone, N. M., Nathanson, C. A., Schoen, R., & Kim, Y. J. (1999). Family demography, social theory, and investment in social capital. *Population and Development Review, 25*(1), 1–31.

Axinn, W. G., Clarkberg, M. E., & Thornton, A. (1994). Family influences on family size preferences. *Demography, 31*, 65–79.

Bailey, M. J. (2010). Momma's got the pill. How Anthony Comstock and Griswold v. Connecticut shaped US childbearing. *American Economic Review, 100*(1), 98–129.

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

Baizán, P., Aassve, A., & Billari, F. C. (2004). The interrelations between cohabitation, marriage and first birth in Germany and Sweden. *Population and Environment, 25*(6), 531–561.

Balbo, N., & Mills, M. (2011). Social capital and pressure in fertility decision-making: second and third births in France, Germany and Bulgaria. *Population Studies, 65*(3), 335–351.

Barber, J. S. (2000). Intergenerational influences on the entry into parenthood: Mothers' preferences for family and non-family behavior. *Social Forces, 79*, 319–348.

Barber, J. S. (2001). The intergenerational transmission of age at first birth among married and unmarried men and women. *Social Science Research, 30*, 219–247.

Becker, G. S. (1960). An economic analysis of fertility. In G. S. Becker (Ed.), *Demographic and economic change in developed countries* (pp. 209–231). Princeton: Princeton University Press.

Becker, G. S., & Lewis, H. G. (1973). On the interaction between the quantity and quality of children. *Journal of Political Economy, 81*(2), S279–S288.

Becker, G. S., Murphy, K. M., & Tamura, R. (1990). Human capital, fertility, and economic growth. *Journal of Political Economy, 98*(5), S12–S37.

Begall, K., & Mills, M. (2011). The impact of perceived work control, job strain and work–family conflict on fertility intentions: A European comparison. *European Journal of Population, 27*(4), 433–456.

Begall, K., & Mills, M. C. (2012). The influence of educational field, occupation, and occupational sex segregation on fertility in the Netherlands. *European Sociological Review*. doi:10.1093/esr/jcs051.

Behrman, J. R., & Rosenzweig, M. R. (2002). Does increasing women's schooling raise the schooling of the next generation? *American Economic Review, 92*(1), 323–334.

Benjamin, K. (2001). *Men, women, and low fertility: Analysis across time and country*. Unpublished Working Paper: University of North Carolina.

Berent, J. (1953). Relationship between family sizes of the successive generations. *Milbank Memorial Fund Quarterly Bulletin, 31*, 39–50.

Bernardi, L. (2003). Channels of social influence on reproduction. *Population Research and Policy Review, 22*, 527–555.

Bernardi, L., & White, R. (2009). Close kin influences on fertility behaviour. In P. Heady & M. Kohli (Eds.), *Family, kinship and state in contemporary Europe. Perspectives on theory and policy (Vol. 3)*. Frankfurt: Campus.

Bernardi, L., Keim, S., & von der Lippe, H. (2007). Social influences on fertility: A comparative mixed methods study in eastern and western Germany. *Journal of Mixed Methods Research, 1*, 23–47.

Bernhardt, E., & Goldscheider, F. (2006). Gender equality, parenthood attitudes, and first births in Sweden. *Vienna Yearbook of Population Research, 2006*, 19–39.

Berrington, A. (2004). Perpetual postponers? Women's, men's and couple's fertility intentions and subsequent fertility behaviour. *Population Trends, 117*, 9–19.

Billari, F. C. (2001a). A log-logistic regression model for a transition rate with a starting threshold. *Population Studies, 55*(1), 15–24.

Billari, F. C. (2001b). A sickle transition rate model with starting threshold. *Statistical Methods and Applications, 10*, 139–155.

Billari, F. C. (2004). Becoming an adult in Europe: A macro(/micro)-demographic perspective. *Demographic Research, 3*(2), 13–44.

Billari, F. C. (2009). The happiness commonality: Fertility decision in low-fertility settings. In UNECE (Ed.), *How generations and gender shape demographic change* (pp. 7–38). New York/Geneva: United Nations.

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

Billari, F. C., Kohler, H.-P., Andersson, G., & Lundström, H. (2007). Approaching the limit: Long-term trends in late and very late fertility. *Population and Development Review, 33*, 149–170.

Billari, F. C., & Philipov, D. (2004). *Education and the transition to motherhood: a comparative analysis of Western Europe*. European Demographic Research Paper No.3. Vienna Institute of Demography.

Billari, F. C., Philipov, D., & Testa, M. (2009). Attitudes, norms and perceived behavioural control: Explaining fertility intentions in Bulgaria. *European Journal of Population, 25*(4), 439–465.

Billari, F. C., Goisis, A., Liefbroer, A. C., Settersten, R. A., Aassve, A., Hagestad, G., et al. (2011). Social age deadlines for the childbearing of women and men. *Human Reproduction, 26*(3), 616–622.

Billingsley, S. (2010). The post-communist fertility puzzle. *Population Research and Policy Review, 29*(2), 193–231.

Blossfeld, H.-P., & Drobnič, S. (2001). *Careers of couples in contemporary societies: A cross-national comparison of the transition from male breadwinner to dual earner families*. Oxford: Oxford University Press.

Blossfeld, H.-P., & Huinink, J. (1991). Human capital investments or norms of role transition? How women's schooling and career affect the process of family formation. *American Journal of Sociology, 97*, 143–168.

Blossfeld, H.-P., Klijzing, E., Mills, M., & Kurz, K. (2005). *Globalisation, uncertainty, and youth in society*. London: Routledge.

Bongaarts, J. (2001). Fertility and reproductive preferences in post-transitional societies. *Population and Development Review, 27*, 260–281.

Bongaarts, J. (2002). The end of the fertility transition in the developed world. *Population and Development Review, 28*(3), 419–443.

Bongaarts, J., & Feeney, G. (1998). On the quantum and tempo of fertility. *Population and Development Review, 24*, 271–291.

Bongaarts, J., & Watkins, S. (1996). Social interactions and contemporary fertility transitions. *Population and Development Review, 22*(4), 639–682.

Bourdieu, P. (1986). The forms of capital. In J. G. Richardson (Ed.), *Handbook of theory and research for the sociology of education* (pp. 241–258). New York: Greenwood.

Bramoullé, Y., Djebbari, H., & Fortin, B. (2009). Identification of peer effects through social networks. *Journal of Econometrics, 150*(1), 41–55.

Breen, R. (1997). Risk, recommodification and stratification. *Sociology, 31*(3), 473–489.

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

Bryant, J. (2007). Theories of fertility decline and the evidence from development indicators. *Population and Development Review, 33*, 101–127.

Buber, I., & Prskawetz, A. (2000). Fertility in second unions in Austria: Findings from the Austrian FFS. *Demographic Research, 3*(2).

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

Bühler, C., & Fratczak, E. (2007). Learning from others and receiving support: the impact of personal networks on fertility intentions in Poland. *European Societies, 9*(3), 359–382.

Bühler, C., & Philipov, D. (2005). Social capital related to fertility: Theoretical foundations and empirical evidence from Bulgaria. *Vienna Yearbook of Population Research, 2005*, 53–81.

Bumpass, L., Sweet, J., & Cherlin, A. (1991). The role of cohabitation in declining rates of marriage. *Demography, 53*, 913–927.

Butler, D. (2004). The fertility riddle. *Nature, 432*, 38–39.

Buttern, T., & Lutz, W. (1990). Estimating fertility responses to policy measures in the German Democratic Republic. *Population and Development Review, 16*(3), 539–555.

Butz, W. P., & Ward, M. P. (1979). The emergence of countercyclical U.S. fertility. *The American Economic Review, 69*(3), 318–328.

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

Caltabiano, M. (2008). Has the fertility decline come to an end in the different regions of Italy? New insights from a cohort approach. *Population, 63*(1), 157–172.
Castles, F. G., & Ferrera, M. (1996). Home ownership and the welfare state: Is Southern Europe different? *South European Society & Politics, 1*(2), 163–185.
Chesnais, J.-C. (1996). Fertility, family, and social policy. *Population and Development Review, 22*(4), 729–739.
Christakis, N. A., & Fowler, J. H. (2007). The spread of obesity in a large social network over 32 years. *New England Journal of Medicine, 357*(4), 370–379.
Cigno, A., & Ermisch, J. (1989). A microeconomic analysis of the timing of first births. *European Economic Review, 33*, 737–760.
Cigno, A., & Rosati, F. C. (1992). The effects of financial markets and social security on saving and fertility behaviour in Italy. *Journal of Population Economics, 5*(4), 319–341.
Cohen, S. B., & Sweet, J. A. (1974). The impact of marital disruption and remarriage on fertility. *Journal of Marriage and the Family, 36*, 87–96.
Cohen-Cole, E., & Fletcher, J. M. (2008). Is obesity contagious? Social networks vs. environmental factors in the obesity epidemic. *Journal of Health Economics, 27*(5), 1382–1387.
Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology, 94*(Supp), S95–S120.
Cooke, L. P. (2009). Gender equity and fertility in Italy and Spain. *Journal of Social Policy, 38*(1), 123–140.
Cooke, L. P., & Baxter, J. (2010). "Families" in international context: Comparing institutional effects across western societies. *Journal of Marriage and Family, 72*(3), 516–536.
Corijn, M., & Klijzing, E. (2001). *Transitions to adulthood in Europe*. Dordrecht: Kluwer.
Corijn, M., Liefbroer, A. C., & De Jong Gierveld, J. (1996). It takes two to tango, doesn't it? The influence of couple characteristics on the timing of the birth of the first child. *Journal of Marriage and the Family, 58*, 117–126.
Dalla Zuanna, G. (2001). The banquet of Aeolus: A familistic interpretation of Italy's lowest low fertility. *Demographic Research, 4*(5), 133–162.
De Mouzon, J., Goossens, V., Bhattacharya, S., et al. (2010). Assisted reproductive technology in Europe, 2006: Results generated from European registers by ESHRE. *Human Reproduction, 25*, 1851–1862.
Del Boca, D. (2002). The effect of child care on participation and fertility. *Journal of Population Economics, 15*(3), 549–573.
Dommermuth, L., Klobas, J. E., & Lappegård, T. (2009). *Now or later? The theory of planned behaviour and fertility intentions*. Dondena working paper. Milan: Carlo F. Dondena Centre for Research on Social Dynamics.
Duncan, O. D., Freedman, R., Coble, J. M., & Slesinger, D. P. (1965). Marital fertility and size of family of orientation. *Demography, 2*, 508–515.
Easterlin, R. A. (1961). The American baby boom in historical perspective. *American Economic Review, 51*, 869–911.
Easterlin, R. A. (1968). *Population, labor force, and long swings in economic growth: The American experience*. New York: Columbia University Press.
Easterlin, R. A. (1969). Towards a socioeconomic theory of fertility: A survey of recent research on economic factors in American fertility. In S. J. Behrman, L. Corsa Jr, & R. Freedman (Eds.), *Fertility and family planning: A world view* (pp. 127–156). Ann Arbor: University of Michigan Press.
Easterlin, R. A. (1976). The conflict between aspirations and resources. *Population and Development Review, 2*(3), 417–425.
Entwisle, B., Rindfuss, R. R., Guilkey, D. K., Chamratrithirong, A., Curran, S. R., & Sawangdee, Y. (1996). Community and contraceptive choice in rural Thailand: A case study of Nang Rong. *Demography, 33*, 1–11.
Ermisch, J. (1999). Prices, parents, and young people's household formation. *Journal of Urban Economics, 45*(1), 47–71.
Esping-Andersen, G. (1990). *The three worlds of welfare capitalism*. Oxford: Polity Press.
Esping-Andersen, G. (1999). *Social foundations of postindustrial economies*. Oxford: Oxford University Press.
Esping-Andersen, G. (2009). *The incomplete revolution: Adapting welfare states to women's new roles*. Cambridge: Polity Press.

Fernández, R., & Fogli, A. (2006). Fertility: The role of culture and family experience. *Journal of the European Economic Association, 4*(2–3), 552–561.
Fernández, R., & Fogli, A. (2009). Culture: An empirical investigation of beliefs, work, and fertility. *American Economic Journal: Macroeconomics, 1*(1), 146–177.
Feyrer, J., Sacerdote, B., & Stern, A. (2008). Will the stork return to Europe? Understanding fertility within developed nations. *Journal of Economic Perspectives, Summer, 22*(3), 3–22.
Flap, H., & Völker, B. (2004). *Creation and returns of social capital: A new research program*. London: Routledge.
Fletcher, J. M. (2011). Peer influences on adolescent alcohol consumption: evidence using an instrumental variables/fixed effect approach. *Journal of Population Economics*. doi:10.1007/s00148-011-0365-9.
Fokkema, T., de Valk, H., de Beer, J., & van Duin, C. (2008). The Netherlands: Childbearing within the context of a "Poldermodel" society. *Demographic Research, 19*(21), 743–794.
Frejka, T. (2008). Birth regulation in Europe. Completing the contraceptive revolution. *Demographic Research, 19*, 73–84.
Frejka, T., Jones, G. W., & Sardon, J.-P. (2010). East Asian childbearing patterns and policy developments. *Population and Development Review, 36*, 579–606.
Friedman, D., Hechter, M., & Kanazawa, S. (1994). A theory of the value of children. *Demography, 31*, 375–401.
Furstenberg, F. F., Jr, Levine, J. A., & Brooks-Gunn, J. (1990). The children of teenage mothers: Patterns of early childbearing in two generations. *Family Planning Perspectives, 22*, 54–61.
Galasso, V., Gatti, R., & Profeta, P. (2009). Investing for the old age: Pensions, children and savings. *International Tax and Public Finance, 16*(4), 538–559.
Gauthier, A. (2007). The impact of family policies on fertility in industrialized countries: A review of the literature. *Population Research and Policy Review, 26*, 323–346.
Gauthier, A., & Hatzius, J. (1997). Family benefits and fertility: An econometric analysis. *Population Studies, 51*, 295–306.
Gibson-Davis, C. M., Edin, K., & McLanahan, S. (2005). High hopes but even higher expectations: The retreat from marriage among low-income couples. *Journal of Marriage and the Family, 67*, 1301–1312.
Goldin, C. (2006). The quiet revolution that transformed women's employment, education, and family. *American Economic Review, 96*(2), 1–21.
Goldscheider, F. K., & Waite, L. J. (1986). Sex differences in the entry into marriage. *American Journal of Sociology, 92*, 91–109.
Goldstein, J., Lutz, W., & Testa, M. R. (2003). The emergence of sub-replacement family size ideals in Europe. *Population Research and Policy Review, 22*(5), 479–496.
Goldstein, J. R., Sobotka, T., & Jasilioniene, A. (2009). The end of lowest-low fertility? *Population and Development Review, 35*(4), 663–700.
Granovetter, M. (1973). The strength of weak ties. *American Journal of Sociology, 78*(6), 1360–1380.
Gustafsson, S. S. (2001). Optimal age at motherhood. Theoretical and empirical considerations on postponement of maternity in Europe. *Journal of Population Economics, 14*(2), 225–247.
Gustafsson, S. S. (2005). Having kids later. Economic analyses for industrialized countries. *Review of Economics of the Household, 3*(1), 5–16.
Hajnal, J. (1965). European marriage patterns in perspective. In D. S. Glass & D. E. C. Eversley (Eds.), *Population in history* (pp. 101–143). London: Edward Arnold.
Hakim, C. (2003). A new approach to explaining fertility patterns: Preference theory. *Population and Development Review, 29*(3), 349–374.
Hank, K. (2001). Regional fertility differences in western Germany: An overview of the literature and recent descriptive findings. *International Journal of Population Geography, 7*(4), 243–257.
Hank, K. (2002). Regional social contexts and individual fertility decisions: A multilevel analysis of first and second births in western Germany. *European Journal of Population, 18*(3), 281–299.
Hank, K., & Kohler, H.-P. (2000). Gender preferences for children in Europe: Empirical results from 17 FFS countries. *Demographic Research, 2*(1), 133–144.
Hank, K., & Kreyenfeld, M. (2003). A multilevel analysis of child care and women's fertility decisions in western Germany. *Journal of Marriage and the Family, 65*(3), 584–596.
Happel, S. K., Hill, J. K., & Low, S. A. (1984). An economic analysis of the timing of childbirth. *Population Studies, 38*, 299–311.

Harknett, K. S., & Hartnett, C. S. (2011). Who lacks support and why? An examination of mothers' personal safety nets. *Journal of Marriage and Family, 73*(4), 861–875.
Harknett, K., & Knab, J. (2007). More kin, less support: Multipartnered fertility and perceived support among mothers. *Journal of Marriage and Family, 69*(1), 237–253.
Harknett, K., Hardman, L., Garfinkel, I., & McLanahan, S. S. (2001). The fragile families study: Social policies and labor markets in seven cities. *Children and Youth Services Review, 23*(6–7), 537–555.
Heaton, T. B., Jacobson, C. K., & Holland, K. (1999). Persistence and change in decisions to remain childless. *Journal of Marriage and the Family, 61*(2), 531–539.
Hendershot, G. E. (1969). Familial satisfaction, birth order, and fertility values. *Journal of Marriage and the Family, 31*, 27–33.
Hensvik, L., & Nilsson P. (2010). *Business, buddies and Babies*. IFAU Working Paper.
Heuveline, P., & Timberlake, J. M. (2004). The role of cohabitation in family formation: The United States in comparative perspective. *Journal of Marriage and the Family, 66*, 1214–1230.
Hirschman, C. (1994). Why fertility changes. *Annual Review of Sociology, 20*, 203–233.
Hobcraft, J., & Kiernan, K. (1995). Becoming a parent in Europe, Vol. 1. In EAPS-IUSSP (Ed.), *European population conference* (pp. 27–65). Milan: Franco Angeli.
Hoem, J. M. (1986). The impact of education on modern family-union initiation. *European Journal of Population, 2*, 113–133.
Hoem, J. M. (2005). Why does Sweden have such high fertility? *Demographic Research, 13*(22), 559–572.
Hoem, J. M. (2008). Overview chapter 8: The impact of public policies on European fertility. *Demographic Research Special Collection, 7*(19), 249–260.
Hoem, B., & Hoem, J. M. (1997). Sweden's family policies and roller-coaster fertility. *Jinko Mondai Kenkyu (Journal of Population Problems), 52*, 1–22.
Hoem, J. M., Neyer, G., & Andersson, G. (2006). Educational attainment and childlessness: The relationship between educational field, educational level, and childlessness among Swedish women born in 1955–59. *Demographic Research, 14*, 331–380.
Hoffman, L. W., & Hoffman, M. L. (1973). The value of children to parents. In J. T. Fawcett (Ed.), *Psychological perspectives on population* (pp. 19–76). New York: Basic Books.
Hoffman, L. W., & Manis, J. D. (1979). The value of children in the United States: A new approach to the study of fertility. *Journal of Marriage and the Family, 41*(3), 583–596.
Horwitz, S. M., Klerman, L. V., Kuo, H. S., & Jekel, J. F. (1991). Intergenerational transmission of school-age parenthood. *Family Planning Perspectives, 23*(168–172), 177.
Iacovou, M., & Tavares, L. P. (2011). Yearning, learning, and conceding: reasons men and women change their childbearing intentions. *Population and Development Review, 37*(1), 89–123.
Jansen, M. D., & Liefbroer, A. C. (2006). Couples' attitudes, childbirth and the division of labor. *Journal of Family Issues, 27*, 1487–1511.
Jefferies, J., Berrington, A., & Diamond, I. (2000). Childbearing following marital dissolution in Britain. *European journal of Population, 16*, 193–210.
Johnson, N. E., & Stokes, C. S. (1976). Family size in successive generations: The effects of birth order, international change in lifestyle, and familial satisfaction. *Demography, 13*, 175–187.
Jokela, M., Kivimäki, M., Elovainio, M., & Keltikangas-Järvinen, L. (2009). Personality and having children: A two-way relationship. *Journal of Personality and Social Psychology, 96*(1), 218–230.
Jones, L. E., Schoonbroodt, A., & Tertilt, M. (2011). Fertility theories. Can they explain the negative fertility-income relationship? In J. B. Shoven (Ed.), *Demography & the economy* (pp. 43–100). Chicago: University of Chicago Press.
Joshi, H. (2002). Production, reproduction and education: Women, children and work in a British perspective. *Population and Development Review, 28*, 445–474.
Kahn, J. R., & Anderson, K. E. (1992). Intergenerational patterns of teenage fertility. *Demography, 29*, 39–57.
Kalwij, A. (2010). The impact of family policy expenditure on fertility in western Europe. *Demography, 47*(2), 503–519.
Keim, S., Klärner, A., & Bernardi, L. (2009). Qualifying social influence on fertility intentions: composition, structure, and meaning of fertility-relevant social networks. *Current Sociology, 57*(6), 1–20.
Kertzer, D. I., White, M. J., Bernardi, L., & Gabrielli, G. (2009). Italy's path to very low fertility: The adequacy of economic and second demographic transition theories. *European Journal of Population, 25*(1), 89–115.

Kneale, D., & Joshi, H. (2008). Postponement and childlessness: Evidence from two British cohorts. *Demographic Research, 19*, 1935–1968.
Kögel, T. (2004). Did the association between fertility and female employment within OECD countries really change its sign? *Journal of Population Economics, 17*(45), 65.
Kohler, H.-P. (1997). Learning in social networks and contraceptive choice. *Demography, 34*, 369–383.
Kohler, H.-P. (2001). *Fertility and social interaction. An economic perspective*. Oxford: Oxford University Press.
Kohler, H.-P., & Kohler, I. (2002). Fertility decline in Russia in the early and mid 1990s: The role of economic uncertainty and labour market crises. *European Journal of Population, 18*(3), 233–262.
Kohler, H. P., & Rodgers, J. L. (2003). Education, fertility, and heritability: Explaining a paradox. In K. W. Wachter & R. A. Bulatao (Eds.), *Offspring: Fertility behavior in biodemographic perspective* (pp. 46–90). Washington, DC: National Academies Press.
Kohler, H. P., Rodgers, J. L., & Christensen, K. (1999). Is fertility behavior in our genes? Findings from a danish twin study. *Population and Development Review, 25*, 253–288.
Kohler, H.-P., Behrman, J. R., & Watkins, S. C. (2001). The density of social networks and fertility decisions: Evidence from South Nyanza District, Kenya. *Demography, 38*(1), 43–58.
Kohler, H. P., Billari, F. C., & Ortega, J. A. (2002a). The emergence of lowest-low fertility in Europe during the 1990s. *Population and Development Review, 28*, 641–681.
Kohler, H.-P., Rodgers, J. L., & Christensen, K. (2002b). Between nurture and nature: The shifting determinants of female fertility in Danish twin cohorts 1870–1968. *Social Biology, 49*, 218–248.
Kohler, H.-P., Behrman, J. R., & Skytthe, A. (2005). Partner + children = happiness? The effects of partnerships and fertility on well-being. *Population and Development Review, 31*(3), 407–445.
Kravdal, Ø. (1992). The emergence of a positive relation between education and third birth rates in Norway with supportive evidence from the United States. *Population Studies, 46*(3), 459–475.
Kravdal, Ø. (1994). The importance of economic activity, economic potential and economic resources for the timing of firth birth in Norway. *Population Studies, 48*, 249–267.
Kravdal, Ø. (1996). How the local supply of day-care centers influences fertility in Norway: A parity-specific approach. *Population Research and Policy Review, 15*(3), 201–218.
Kravdal, Ø., & Rindfuss, R. R. (2008). Changing relationships between education and fertility: A study of women and men born 1940 to 1964. *American Sociological Review, 73*, 854–873.
Kreyenfeld, M. (2010). Uncertainties in female employment careers and the postponement of parenthood in Germany. *European Sociological Review, 26*(3), 351–366.
Kulu, H. (2005). Migration and fertility: Competing hypotheses re-examined. *European Journal of Population, 21*(1), 51–87.
Kulu, H. (2011). Why do fertility levels vary between urban and rural areas? *Regional Studies*, 1–17.
Kulu, H., & Boyle, P. J. (2009). High fertility in city suburbs: Compositional or contextual effects? *European Journal of Population, 25*(2), 157–174.
Kulu, H., & Vikat, A. (2007). Fertility differences by housing type: The effect of housing conditions or of selective moves? *Demographic Research, 17*(26), 775–802.
Kulu, H., Boyle, P., & Andersson, G. (2009). High suburban fertility: Evidence from Four Northern European Countries. *Demographic Research, 21*(31), 915–944.
Kuziemko, I. (2006) *Is having babies contagious? Fertility peer effects between adult siblings*. Princeton University (working paper).
Lappegard, T. (2002). *Education attainment and fertility pattern among Norwegian women*. Documents 2002/18. Department of Social Statistics, Statistics Norway, Oslo.
Lappegård, T., & Rønsen, M. (2005). The multifaceted impact of education on entry into motherhood. *European Journal of Population, 21*, 31–49.
Le Goff, J.-M. (2002). Cohabiting unions in France and in West Germany. Transitions to first birth and first marriage. *Demographic Research, 7*(18), 594–624.
Lee, R., & Mason, A. (2010). Fertility, human capital, and economic growth over the demographic transition. *European Journal of Population, 26*(2), 159–182.
Leridon, H. (2008). A new estimate of permanent sterility by age: Sterility defined as the inability to conceive. *Population Studies, 62*(1), 15–24.
Lesthaeghe, R. (1983). A century of demographic and cultural change in Western Europe: An exploration of underlying dimensions. *Population and Development Review, 9*(3), 411–435.
Lesthaeghe, R. (2010). The unfolding story of the second demographic transition. *Population and Development Review, 36*(2), 211–251.

Lesthaeghe, R., & van de Kaa, D. (1986). Twee demografische transities? (Two demographic transitions?). In Lesthaeghe & van de Kaa (Eds.), *Bevolking—Groei en krimp, mens en maatschappij* (pp. 9–24). Deventer: Van Loghum Slaterus.

Liefbroer, A. C. (2005). The impact of perceived costs and rewards of childbearing on entry into parenthood: evidence from a panel study. *European Journal of Population, 21*(4), 367–391.

Liefbroer, A. C. (2009). Changes in family size intentions across young adulthood: A life-course perspective. *European Journal of Population, 25*(4), 363–386.

Liefbroer, A. C., & Billari, F. C. (2010). Bringing norms back in: A theoretical and empirical discussion of their importance for understanding demographic behaviour. *Population, Space and Place, 16*(4), 287–305.

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

Lin, N., Cook, K. S., & Burt, R. S. (2001). *Social capital: Theory and research*. New Brunswick: Aldine Transaction.

Livi-Bacci, M. (2001). Too few children and too much family. *Daedalus, 130*, 139–156.

Lutz, W., O'Neill, B. C., & Scherbov, S. (2003). Europe's population at a turning point. *Science, 299*, 1991–1992.

Lyngstad, T. H., & Prskawetz, A. (2010). Do siblings' fertility decisions influence each other? *Demography, 47*(4), 923–934.

Macunovich, D. J. (1996). Relative income and price of time: Exploring their effects on US fertility and female labor force participation. *Population and Development Review, 22*, 223–257.

Mandemakers, J. J., & Dykstra, P. A. (2008). Discrepancies in parent's and adult child's reports of support and contact. *Journal of Marriage and the Family, 70*(2), 495–506.

Manlove, J. (1997). Early motherhood in an intergenerational perspective: The experiences of a British cohort. *Journal of Marriage and the Family, 59*, 263–297.

Manski, C. F. (1993). Identification of endogenous social effects: The reflection problem. *The Review of Economic Studies, 60*(3), 531–542.

Manski, C. F. (1995). *Identification problems in social sciences*. New York: Harvard University Press.

Manski, C. F., & Mayshar, J. (2003). Private incentives and social interactions: Fertility puzzles in Israel. *Journal of the European Economic Association, 1*(1), 181–211.

Manuelli, R. E., & Seshadri, A. (2009). Explaining international fertility differences. *Quarterly Journal of Economics, 124*(2), 771–807.

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

Martin, S. P. (2000). Diverging fertility among U.S. women who delay childbearing past age 30. *Demography, 37*, 523–533.

Martin, J. (2004). *The ultimate vote of confidence': Fertility rates and economic conditions in Australia, 1976–2000. Australian Social Policy 2002–2003* (pp. 31–54). Canberra: Commonwealth of Australia.

Martin-Garcia, T., & Baizan, P. (2006). The impact of type of education and of educational enrolment on first births. *European Sociological Review, 22*, 259–275.

Matthews, B. (1999). The gender system and fertility: An exploration of the hidden links. *Canadian Studies in Population, 26*(1), 21–38.

Mayer, K. U. (2004). Whose lives? How history, societies, and institutions define and shape life courses. *Research in Human Development, 1*(3), 161–187.

McCrary, J., & Royer, H. (2011). The effect of female education on fertility and infant health: Evidence from school entry policies using exact date of birth. *American Economic Review, 101*(1), 158–195.

McDonald, P. (2000a). Gender equity in theories of fertility transition. *Population and Development Review, 26*(3), 427–439.

McDonald, P. (2000b). Gender equality, social institutions and the future of fertility. *Journal of Population Research, 17*, 1–16.

McDonald, P., & Kippen, R. (2009). *Fertility in South Australia: An overview of trends and socio-economic differences, 2009. Report to the Department of Trade and Economic Development*. Adelaide: Government of South Australia.

McLanahan, S., & Adams, J. (1987). Parenthood and psychological well-being. *Annual Review of Sociology, 13*, 237–257.

Mencarini, L., & Tanturri, M. L. (2006). High fertility or childlessness: Micro-level determinants of reproductive behaviour in Italy. *Population, 61*(4), 389–416.

Meron, M., & Widmer, I. (2002). Unemployment leads women to postpone the birth of their first child. *Population, 57*(2), 301–330.
Michael, R. T., & Tuma, N. B. (1985). Entry into marriage and parenthood by young men and women: The influence of family background. *Demography, 22*, 515–544.
Micheli, G. A. (2000). Kinship, family and social network: The anthropological embedment of fertility change in Southern Europe. *Demographic Research, 3*(13).
Miller, A. R. (2010). The effect of motherhood timing on career path. *Journal of Population Economics, 24*(3), 1071–1100.
Miller, W. B. (2011). Comparing the TPB and the T-D-I-B framework. *Vienna Yearbook of Population Research, 9*(1), 19–29.
Miller, W. B., & Pasta, D. J. (1994). The psychology of child timing: A measurement instrument and a model. *Journal of Applied Social Psychology, 24*, 218–250.
Miller Torr, B. M., & Short, S. E. (2004). Second births and the second shift: A research note on gender equity and fertility. *Population and Development Review, 30*, 109–130.
Milligan, K. (2005). Subsidizing the stork: New evidence on tax incentives and fertility. *Review of Economics and Statistics, 87*(3), 539–555.
Mills, M. (2004). Stability and change: The structuration of partnership histories in Canada, the Netherlands and the Russian Federation. *European Journal of Population, 20*, 141–175.
Mills, M. (2010). Gender roles, gender (in)equality and fertility: An empirical test of five gender equity indices. *Canadian Population Studies, 37*(3/4), 445–474.
Mills, M., & Begall, K. (2010). The impact of gender preferences on third Births in Europe: A multilevel examination of men and women. *Population Studies, 64*(1), 77–95.
Mills, M., & Blossfeld, H.-P. (2005). Globalization, uncertainty and the early life course: A theoretical framework. In H.-P. Blossfeld, E. Klijzing, M. Mills, & K. Kurz (Eds.), *Globalization, uncertainty and youth in society* (pp. 1–24). London/New York: Routledge Advances in Sociology Series.
Mills, M., Mencarini, L., Tanturri, M. L., & Begall, K. (2008). Gender equity and fertility intentions in Italy and the Netherlands. *Demographic Research, 18*(1), 1–26.
Mills, M., Rindfuss, R. R., McDonald, P., & te Velde, E. (2011). Why do people postpone parenthood? Reasons and social policy incentives. *Human Reproduction Update, 17*(6), 848–860.
Mishra, V., Nielsen, I., & Smyth, R. (2010). On the relationship between female labour force participation and fertility in G7 countries: Evidence from panel cointegration and Granger causality. *Empirical Economics, 38*(2), 361–372.
Montgomery, M. R., & Casterline, J. B. (1996). Social influence, social learning, and new models of fertility. In J. Casterline, R. Lee, & K. Foote (Eds.), *Fertility in the United States: New patterns, new theories* (pp. 87–99).
Morgan, S. P., & Bachrach, C. A. (2011). Is the theory of planned behaviour an appropriate model for human fertility? *Vienna Yearbook of Population Research, 9*(1), 11–18.
Morgan, S. P., & Rackin, H. (2010). The correspondence between fertility intentions and behavior in the United States. *Population and Development Review, 36*(1), 91–118.
Morgan, S. P., & Taylor, M. G. (2006). Low fertility at the turn of the twenty-first century. *Annual Review of Sociology, 32*, 375–399.
Murphy, M. (1993). The contraceptive pill and women's employment as factors in fertility change in Britain 1963–1980: A challenge to the conventional view. *Population Studies, 47*(2), 221–243.
Murphy, M., & Wang, D. (2001). Family-level continuities in childbearing in low-fertility societies. *European Journal of Population, 17*, 75–96.
Myers, S. M. (1997). Marital uncertainty and childbearing. *Social Forces, 75*, 1271–1289.
Myrskyla, M., Kohler, H.-P., & Billari, F. C. (2009). Advances in development reverse fertility declines. *Nature, 460*(7256), 741–743.
Nauck, B. (2007). Value of children and the framing of fertility: Results from a cross-cultural comparative survey in 10 societies. *European Sociological Review, 23*(5), 615–629.
Neels, K. (2010). *Temporal variation in unemployment rates and their association with tempo and quantum of fertility: Some evidence for Belgium, France and the Netherlands.* Paper presented at the Annual meeting of the Population Association of America, Dallas, 17 April.
Neyer, G. (2003). *Family policies and low fertility in Western Europe*. Rostock: Max Planck Institute for Demographic Research (MPIDR Working Paper).
Neyer, G., & Andersson, G. (2008). Consequences of family policies on childbearing behavior: Effects or artifacts? *Population and Development Review, 34*, 699–724.

Neyer, G. R., & Hoem, J. M. (2008). Education and permanent childlessness: Austria vs. Sweden; a research note. In J. Surkyn, P. Deboosere, & J. Van Bavel (Eds.), *Demographic challenges for the 21st century: A state of the art in demography*. Brussels: VUBPRESS.

Noguera, C. S., Golsch, K., & Stainhage, N. (2003). Increasing uncertainty in the Spanish labour market and entry into parenthood. *Genus, 58*(1), 77–119.

O'Donoghue, C., Meredith, D., & O'Shea, E. (2011). Postponing maternity in Ireland. *Cambridge Journal of Economics, 35*(1), 59–84.

OECD (2011), *Doing better for families.* OECD Publishing.

Oláh, L. S. (2003). Gendering fertility: Second births in Sweden and Hungary. *Population Research and Policy Review, 22*, 171–200.

Oppenheimer, V. K. (1988). A theory of marriage timing. *American Journal of Sociology, 94*, 563–591.

Oppenheimer, V. K. (1994). Women's rising employment and the future of the family in industrial societies. *Population and Development Review, 20*, 293–342.

Oppenheimer, V. K. (2003). Cohabiting and marriage during young men's career-development process. *Demography, 40*, 127–149.

Oppenheimer, V. K., Kalmijn, M., & Lim, N. (1997). Men's career development and marriage timing during a period of rising inequality. *Demography, 3*, 311–330.

Örsal, D. D. K., & Goldstein J. R. (2010). The increasing importance of economic conditions for fertility. MPIDR Working Paper WP 2010-014. Rostock: Max Planck Institute for Demographic Research.

Pampel, F. C. (2001). *The institutional context of population change*. Chicago: The University of Chicago Press.

Pampel, F. C., & Peters, H. E. (1995). The Easterlin effect. *Annual Review of Sociology, 21*, 163–194.

Parr, N. (2010). Satisfaction with life as an antecedent of fertility: Partner + happiness = children? *Demographic Research, 22*(21), 635–661.

Pfau-Effinger, B. (1999). Change of family policies in the socio-cultural context of European Societies. In A. Leira (Ed.), *Family policies. Yearbook comparative social research (135–159)*. Stamford: JAI press.

Philipov, D. (2002). *Fertility in times of discontinuous societal change: the case of Central and Eastern Europe, MPIDR Working Paper 2002–024*. Rostock: Max Planck Institute for Demographic Research.

Philipov, D. (2009). Fertility intentions and outcomes: The role of policies to close the gap. *European Journal of Population, 25*, 355–361.

Philipov, D., Speder, Z., & Billari, F. C. (2006). Soon, later, or ever? The impact of anomie and social capital on fertility intentions in Bulgaria (2002) and Hungary (2001). *Population Studies, 60*(3), 289–308.

Pouwels, B. J. (2011). *Work, family, and happiness: essays on interdependencies within families, life events, and time allocation decisions*. PhD Dissertation: Utrecht University.

Prskawetz, A., Vikat, A., Philipov, D., & Engelhardt, H. (2003). Pathways to stepfamily formation in Europe: Results from the FFS. *Demographic Research, 8*(5), 107–149.

Quesnel-Vallée, A., & Morgan, S. P. (2003). Missing the target? Correspondence of fertility intentions and behavior in the U.S. *Population Research and Policy Review, 22*, 497–525.

Reher, D. S. (1998). Family ties in western Europe: Persistent contrasts. *Population and Development Review, 24*(2), 203–234.

Rendall, M. S., & Bahchieva, R. A. (1998). An old-age security motive for fertility in the United States? *Population and Development Review, 24*(2), 293–307.

Rijken, A. J., & Liefbroer, A. C. (2009). The effects of relationship quality on fertility. *European Journal of Population, 25*, 27–44.

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

Rindfuss, R., & Vandenheuvel, A. (1990). Cohabitation: A precursor to marriage or an alternative to being single? *Population and Development Review, 16*(4), 703–726.

Rindfuss, R. R., Bumpass, L., & St. John, C. (1980). Education and fertility: Implications for the roles women occupy. *American Sociological Review, 45*, 431–447.

Rindfuss, R. R., Morgan, S. P., & Offutt, K. (1996). Education and changing age pattern of American fertility: 1963–1989. *Demography, 33*, 277–290.

Rindfuss, R. R., Choe, M. K., Bumpass, L. L., & Tsuya, N. O. (2004). Social networks and family change in Japan. *American Sociological Review, 69*, 838–861.

Rindfuss, R. R., Guilkey, D. K., Morgan, S. P., & Kravdal, O. (2010). Child-care availability and fertility in Norway. *Population and Development Review, 36*(4), 725–748.

Rodgers, J. L., Kohler, H. P., McGue, M., Behrman, J. R., Petersen, I., Bingley, P., et al. (2008). Education and cognitive ability as direct, mediating, or spurious influences on female age at first birth: Behaviour genetic models fit to Danish Twin data. *American Journal of Sociology, 114*(Supp), S202–S232.

Rondinelli, C., Aassve, A., & Billari, F. C. (2010). Women's wages and childbearing decisions: Evidence from Italy. *Demographic Research, 22*(19), 549–578.

Rosen, M. (2004). Fertility and public policies-evidence from Norway and Finland. *Demographic Research, 10*(6), 143–170.

Rossier, C., & Bernardi, L. (2009). Social interaction effects on fertility: Intentions and behaviors. *European Journal of Population, 25*, 467–485.

Santow, G., & Bracher, M. (2001). Deferment of the first birth and fluctuating fertility in Sweden. *European Journal of Population, 17*, 343–363.

Schoen, R., Kim, Y., Nathanson, C., Fields, J., & Astone, N. M. (1997). Why do Americans want children? *Population and Development Review, 23*(2), 333–358.

Schoen, R., Astone, N. M., Kim, Y. J., Nathanson, C. A., & Fields, J. M. (1999). Do fertility intentions affect fertility behavior? *Journal of Marriage and the Family, 61*(3), 790–799.

Settersten, R. A. J., & Hagestad, G. O. (1996). What's the latest? Cultural age deadlines for family transitions. *Gerontologist, 36*(2), 178–188.

Skirbekk, V. (2008). Fertility trends by social status. *Demographic Research, 18*(5), 145–180.

Sobotka, T. (2004). *Postponement of childbearing and low fertility in Europe*. Amsterdam: Dutch University Press.

Sobotka, T., Billari, F. C., & Kohler, H.-P. (2010). *The return of late childbearing in developed countries: Causes, trends and implications*. Vienna: Vienna Institute of Demography.

Sobotka, T., Skirbekk, V., & Philipov, D. (2011). Economic recession and fertility in the developed world. *Population and Development Review, 2*, 267–306.

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

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

Steele, F., Joshi, H., Kallis, C., & Goldstein, H. (2006). Changing compatibility of cohabitation and childbearing between young British women born in 1958 and 1970. *Population Studies, 60*(2), 137–152.

Steenhof, L., & Liefbroer, A. C. (2008). Intergenerational transmission of age at first birth in the Netherlands for birth cohorts between 1935 and 1984: Evidence from municipal registers. *Population Studies, 62*, 69–84.

Steglich, C., Snijders, T. A. B., & Pearson, M. (2010). Dynamic networks and behavior: Separating selection from influence. *Sociological Methodology, 40*, 29–393.

Stewart, S. D. (2002). The effect of stepchildren on childbearing intentions and births. *Demography, 39*(1), 181–197.

Surkyn, J., & Lesthaeghe, R. (2004). Value orientations and the second demographic transition (SDT) in northern, western and southern Europe: An update. *Demographic Research* (Special Collection 3).

Swartz, T. T. (2009). Intergenerational family relations in adulthood: Patterns, variations, and implications in the contemporary United States. *Annual Review of Sociology, 35*, 191–212.

Tazi-Preve, I., Bichlbauer, D., & Goujon, A. (2004). Gender trouble and its impact on fertility intentions. *Yearbook of Population Research in Finland, 40*, 5–24.

Testa, M. R. (2006). *Childbearing preferences and family issues in Europe*. Special Eurobarometer 253/Wave 65.1—TNS Opinion & Social.

Thomson, E. (1997). Couple childbearing desires, intentions and births. *Demography, 34*, 343–354.

Thomson, E. (2002). Motherhood, fatherhood and family values. In R. Lesthaeghe (Ed.), *Meaning and choice: Value orientations and life course decisions* (pp. 251–272). The Hague: NIDI/CBGS Publications No. 37.

Thomson, E., & Hoem, J. M. (1998). Couple childbearing plans and births in Sweden. *Demography, 35*, 315–322.

Thomson, E., McDonald, E., & Bumpass, L. L. (1990). Fertility desires and fertility: Hers, his, and theirs. *Demography, 27*, 579–588.

Thornton, A. (1977). Children and marital stability. *Journal of Marriage and the Family, 39*, 531–540.

Thornton, A. (1978). Marital dissolution, remarriage, and childbearing. *Demography, 15*, 361–380.
Thornton, A. (1980). The influence of first generation fertility and economic status on second generation fertility. *Population and Environment, 3*, 51–72.
Thornton, A., & Philipov, D. (2009). Sweeping changes in marriage, cohabitation and childbearing in Central and Eastern Europe: New insights from the developmental idealism framework. *European Journal of Population, 25*(2), 123–156.
Toulemon, L., & Testa, M. R. (2005). Fertility intentions and actual fertility: A complex relationship. *Population & Societies, 415*, 4.
Van Bavel, J. (2010). Choice of study discipline and the postponement of motherhood in Europe: The impact of expected earnings, gender composition and family attitudes. *Demography, 47*, 439–458.
Van de Kaa, D. J. (1997). Options and sequences: Europe's demographic patterns. *Journal of the Australian Population Association, 14*, 1–29.
Van Giersbergen, N. P. A., & De Beer, J. (1997). Geboorteontwikkeling en consumentenvertrouwen: een econometrische analyse (Birth trends and consumer confidence: An econometric analysis). *Maandstatistiek van de Bevolking, 1997*(11), 23–27.
Vikat, A., Hoem, J. M., & Thomson, E. (1999). Stepfamily fertility in contemporary Sweden: The impact of childbearing before the current union. *Population Studies, 53*, 211–225.
Vikat, A., Spéder, Z., Beets, G., Billari, F. C., Bühler, C., Desesquelles, A., et al. (2007). Generations and gender survey (GGS): Towards a better understanding of relationships and processes in the life course. *Demographic Research, 17*, 389–439.
Vitali, A., Billari, F. C., Prskawetz, A., & Testa, M. R. (2009). Preference theory and low fertility: A comparative perspective. *European Journal of Population, 25*(4), 413–438.
Wachter, K. W. & Bulatao, R. A. (2003) *Offspring: Human fertility behavior in biodemographic perspective*. *National Research Council, Committee on Population, Division on Behavioral and Social Sciences and Education*. Washington, DC: The National Academies Press.
Waite, L. J., & Lillard, L. A. (1991). Children and marital disruption. *American Journal of Sociology, 96*(4), 930–953.
Walker, J. R. (1995). The Effect of public policies on recent Swedish fertility behavior. *Journal of Population Economics, 8*(3), 223–251.
Westoff, C., & Ryder, N. (1977). The predictive validity of reproductive intentions. *Demography, 4*, 431–453.
Whittington, L. A. (1993). State income tax policy and family size: Fertility and the dependent exemption. *Public Finance Quarterly, 21*(4), 378–398.
Willis, R. J. A. (1973). New approach to the economic theory of fertility behavior. *Journal of Political Economy, 81*(2), S14–S64.
Winkler-Dworak, M., & Toulemon, L. (2007). Gender differences in the transition to adulthood in France: Is there convergence over the recent period? *European Journal of Population, 23*(3), 273–314.
Wu, Z. (1996). Childbearing in cohabitational relationships. *Journal of Marriage and the Family, 58*, 281–292.
Wu, Z., & Schimmele, C. M. (2005). Repartnering after first union disruption. *Journal of Marriage and the Family, 67*, 27–36.
Zimmer, B. G., & Fulton, J. (1980). Size of family, life chances, and reproductive behaviour. *Journal of Marriage and the Family, 42*, 657–670.