Contexts of Reproduction: Gender Dynamics and Fertility in sub-Saharan Africa

Hilde Bras & Jeroen Smits

Introduction

In 2100, 11 billion people will be living on the earth. Recent forecasts predict that the world population will increase much more rapidly and for a far longer period of time than was previously thought (UN 2017). The core of this persistent growth is *sub-Saharan Africa* (SSA), i.e. the part of the African continent below the Sahara. Population numbers in this region have increased from 179 million in 1950 to 969 million in 2015 and are expected to grow to more than 4 billion people in 2100 – amounting to a more than *twenty-fold increase* in 150 years. While other world regions are characterized by smoothing or even shrinking populations, SSA has experienced and will continue to experience a population boom for the coming century that has a speed and scale unparalleled in history (Panel A, Figure 1). This population explosion, which is one of the most pressing societal issues of the present era, evokes anxiety and speculation as to its immediate and long-term impacts. Will sub-Saharan Africa fall in a demographic trap characterized by food insecurity, scarcity of clean water and energy, lack of housing, and (youth) unemployment, and leading to the degradation of local ecosystems, swelling migration streams, and conflicts, wars, and epidemics? Or will the region be able to harness the demographic dividend, the potentially advantageous situation of a population consisting of relatively more productive (young) adults than dependent children and elderly, instigating economic growth in the region (Groth and May 2017)?

Intriguingly, although most countries in sub-Saharan Africa have experienced shifts in fertility since the 1950s, the inception, direction, and speed of these developments vary immensely across regions. Total fertility rates (TFRs) in Southern Africa are more similar to Asian and Latin American ones, than to those in other regions of SSA, as panel B in Figure 1 shows. At the same time, fertility rates in Central, Western, and Eastern Africa also diverge significantly.

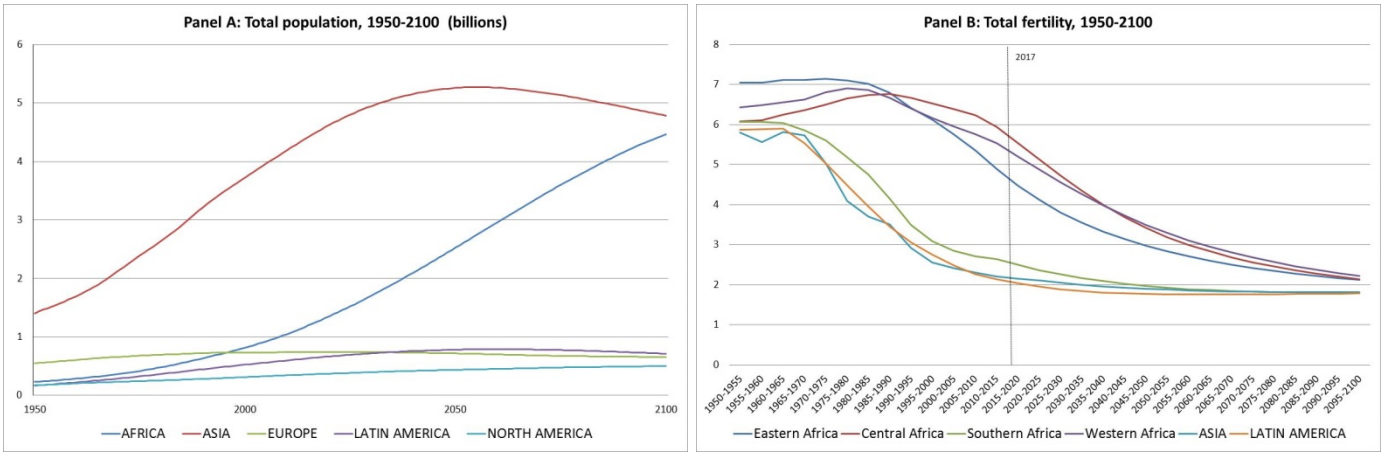
To be sure, the aggregated figures shown in Figure 1 conceal immense disparities in fertility experiences within countries, districts, communities, and even households. For instance, the TFR of rural Ethiopian women declined from 6.4 to 5.9 children between 1990 and 2000, while fertility levels of women in Addis Ababa were already much lower and decreased even faster, i.e. from to 3.1 to 1.9 children, during the same period (Sibanda et al. 2003). Variation is thus paramount, and the idea of an 'African demographic transition' can be called deceptive (Johnson-Hanks 2007).

Yet, the causes of the onset, speed and shape of these divergent population dynamics are still poorly understood, partly because of the localism of much of these changes and partly because of the theories used to grasp them. A fundamental shortcoming of previous approaches to African population change is the static, snapshot-like, way in which changes in fertility and child health, and their determinants, have been investigated, without problematizing *temporal development*, both over people's lives, and over time. Secondly, extant approaches to African population change have not systematically theorized, and tested, how these processes can be expected to differ according to people's *immediate social networks*, and according to their *economic, socio-cultural, institutional, and geographical contexts* (Van der Sijpt 2014; Doyle 2013; Johnson-Hanks 2007, 2006; Bledsoe 2002; Greenhalgh 1995).

An extensive theoretical and empirical literature has accumulated which outlines the reasons for the onset, pace and shape of population change. *Two key points* emerge from this literature, which form the starting points of this paper: (1) the importance of *gendered social determinants*, such as women's education and decision-making power,

and (2) the need to *situate* these processes and understand the *role of context* better. Building further on these achievements, this paper goes beyond the state of the art by creating and testing a *novel theoretical framework* that centers on *gender dynamics* and *contexts of reproduction* to explain societal shifts and geographic variation in fertility in sub-Saharan Africa since 1950.

Figure 1: Demographic trends and projections, sub-Saharan Africa and other world regions, 1950-2100



Sources: Panels A-C: United Nations, *World Population Prospects: 2017 revision*, https://esa.un.org/unpd/wpp/ (accessed 2/8/2017); 2015-2100 projections based on medium fertility

Background

State of the art: Gender and context in research on population change

In most standard demographic explanations, i.e. demographic transition theory (e.g. Notestein 1945), supply-demand (e.g. Easterlin 1978; Easterlin and Crimmins 1985), and innovation-diffusion models (e.g. Casterline 2001; Cleland 2001) the couple is conceptualized as the main decision-making unit. Hence, as has been observed before, such approaches treat the household as a black box and do not problematize how conflict, strife, and power in interior household relations influence reproductive decision-making (Janssens 2007; MacKinnon 1995; Watkins 1993; Seccombe 1992). Whereas mainstream demographic theories have generally eschewed it, a growing number of researchers in, amongst others, gender studies, anthropology, and feminist economics, has been sensitive to incorporating gender relations in their studies of fertility (Abadian 1996; Greenhalgh 1995; Folbre 1994, 1983; Hollerbach 1980). To be sure, gender refers to the expectations and norms shared within a society about appropriate male and female behavior, characteristics, and roles (Blanc 2001).

Academic interest in gender as a factor shaping demographic change started to grow in the 1980s, as a reaction against the schematic representation of household relations in standard theories of population change and fueled by the consistent finding that women's education was one of the most important predictors of fertility decline (Diamond et al. 1999; Lloyd et al. 1999; Glewwe 1999a; Jejeebhoy 1995). Early theoretical and empirical work focused on how *women's education* and *status* influenced fertility levels. Mason (1987, 1986), for instance, developed a theory that connected female status and fertility in which education and women's position in the family and household were seen as the most important characteristics. These influenced women's autonomy from male control, economic independence, and social status, which in turn affected child supply, child demand, and child costs.

In the 1990s, attention shifted from women's education and status to feminist perspectives centering on the influence of *women's empowerment* on fertility and child

health (Prata et al. 2017; Cunningham et al. 2015; Upadhyay et al. 2014; Richards et al. 2013). Empowerment has been conceptualized and measured in various ways (Narayan 2005; Malhotra et al. 2002) but is most commonly defined as "the expansion of people's ability to make strategic life choices in a context where this ability was previously denied to them", with agency and the resources needed to exercise life choices usually envisaged as its central components (Kabeer 1999). A substantial thread of literature accumulated around the empowerment concept, driven partly by development efforts hinging on gender equality and recommending public policies promoting gender equity as a means of ensuring economic growth in low and middle income countries (World Bank 2012; Nussbaum 2011, 2000). Overall, previous research has found strong positive effects of status and empowerment measures on fertility. Although the incorporation of notions of gender, women's status, and empowerment have contributed significantly to constructing more complex and better-fitted explanations of population change, several major knowledge gaps remain.

Firstly, and particularly pertinent, relatively few studies have addressed the links between gender, and fertility in sub-Saharan Africa (only 17% of all recently reviewed studies; Upadhyay et al. 2014). Research has typically focused on South Asia where gender bias has traditionally been strong (Madjdian and Bras 2016). Because of their active participation in agriculture, African women have often been assumed to hold more bargaining power than Asian ones (Boserup 1989). However, recent research shows that the relationships are more complex and that African women's agency in fertility decision-making differ vastly by social group and according to cultural and geographical context (Bras and Mandemakers 2016; Doyle 2013).

Secondly, there is little coherence in the way empowerment is measured or in the effects of different indicators (Malhotra 2002). A recent review identified 19 different domains and three levels -individual, couple, and community- on which women's empowerment has been assessed (Upadhyay et al. 2014). Effects of empowerment measures at different levels were found to vary across settings and subpopulations. This suggests that what constitutes empowerment may vary regionally or even locally. Hence, further development of relevant and valid empowerment measures grounded in regional and local lived experience is needed (Mumtaz and Salway 2009), while work on standardized proxies that allow for comparative research should also continue (Phan 2016). An important issue of this program will be to understand the separate and synergistic effects of women's education, traditionally a key variable in demographic theories, and other empowerment measures, in order to disentangle complex causal pathways.

Thirdly, most research aimed at unraveling the interplay between reproductive experiences and women's empowerment has analyzed a rather limited set of reproductive events, mainly addressing women's (desired) number of children, fertility preferences and birth intervals. Yet, as anthropological studies of African fertility persistently show, reproductive mishaps such as abortions, unintended pregnancies, miscarriages, and stillbirths are very much part of women's reproductive experience (Van der Sijpt 2011; Johnson-Hanks 2006; Bledsoe 2002). Moreover, a more global understanding of women's pregnancy and childbearing trajectories over the life course as women pass through shifting roles and bargaining positions in intrahousehold age and gender hierarchies is completely missing (Das Gupta 1995; Dickerson-Putman and Brown 1994). To be sure, most studies have used cross-sectional data, inhibiting a more profound understanding of the linkages between women's empowerment and fertility over the life course. Longitudinal designs are needed to better reflect the process of women's empowerment and its dynamic interplay with the whole range of reproductive and child care experiences over the life course in order to grasp the causal mechanisms and mediating factors that facilitate or hinder reproduction and child health (Lee-Rife 2010; Stuckelberger 2010).

Fourthly, a truly gender-based approach implies examining the couple as a constellation of *two different people* who may not only differ in opinion or interest about reproductive decisions or the allocation of food and care, but who may also have diverging means of getting their interests realized. However, few studies have adopted a *relational approach* using *matched couples* or, in the case of polygynous unions, husbands with multiple wives. Moreover, there is a surprising lack of studies that examine the relations between gender and fertility from the *male perspective* (Schoumaker 2017; Zhang 2011; Bledsoe, Guyer, and Lerner 2000; Ratcliffe et al. 2000; Greene and Biddlecom 2000).

Finally, while overall, positive associations between women's status and empowerment and fertility are found, results diverge considerably and are sometimes neutral or even reversed. For instance, a study using DHS data on four sub-Saharan African countries found that in Namibia women's greater household decision-making power, and in Zambia the belief in women's rights to refuse sex, was associated with women having more children, not less (Upadhyay and Karasek 2012). Moreover, many studies have found different effects according to the level at which status or gender is measured with both synergistic and countervailing influences of individual-level and community-level measures on reproductive outcomes (Pallitto and O'Campo 2005; Kritz et al. 2000; Balk 1994). These studies demonstrate the need to examine much more closely how social, cultural, institutional, and geographical environments shape empowerment processes in relation to fertility and child health.

If developed further by addressing the current caveats, going significantly beyond the state of the art, an integrated gender perspective holds the promise of explaining societal shifts and regional variation in fertility in sub-Saharan Africa, thereby considerably expanding the scientific horizons of the field.

Theoretical framework

Gendered intra-household bargaining

Our theoretical framework (see Figure 2) departs from Sen's (1990) theory of *intra-household bargaining*, which illustrates how inequalities among members of a household influence decision-making processes and the allocation of resources. Bargaining models resulted from the critique on the assumption of altruism underlying neoclassical household models (Becker 1981, 1974) and incorporate power differences, visualizing household members as negotiating for the best deal (Folbre 1986), or alternatively, seeing household relations as 'cooperative conflict' (Agarwal 1997; Sen 1989). Seminal work by Sen (1981) on the phenomenon of the famine highlighted the differential access to food of different household members. Since then, a large number of studies have used the concept of intra-household bargaining in relation to determinants of fertility (Pilla and Dantas 2016; Sahn and Younger 2009; Tolhurst et al. 2008; Humphries 2007; Marinda 2006; Plassmann and Norton 2004; Madise et al. 1999; Behrman 1997). On the basis of this literature and inspired by the work of Van Eerdewijk and Danielsen (2015) and Verhart et al. (n.d.) we distinguish *four interlinked aspects* of gendered intra-household bargaining: (1) *gendered division of labor*, (2) *access to and control over resources*, (3) *intra-household decision-makin*g, and (4) *norms, values and practices.*

A first aspect is the *gendered division of labor*, i.e. men's and women's roles in work and laboring patterns including the distribution of work tasks, and patterns of time use. A second aspect concerns women's and men's *access to and control over resources*, such as land, income, education, health resources (e.g. nutritional status), and access to (reproductive) health services. Third, we distinguish *intra-household decision-making power*. Although interconnected with resource access, this represents a different aspect since a person's access to resources does not always mean the ability to make decisions over the distribution of these resources. A fourth aspect pertains to *norms, values and*

practices; in this program we centralize particularly norms, values and practices related to aspects of gender dynamics, family, sexuality, and reproduction. These four aspects are thought of as being highly interwoven; they interconnect and reinforce each other, enabling or constraining reproductive intentions, opportunities and outcomes. Key is to understand how different aspects of gender dynamics affect each other and jointly influence reproductive decisions.

We consider intra-household bargaining from both *men's and women's perspectives* as well as in a *relational way*. Hence, both the laboring roles of men and women are important to understand, as well their access to resources, decision-making power, and individual norms, values and practices. Moreover, it is not only the inclusion of the different aspects from *female and male perspectives separately* but also the *discrepancy* or *concordance* between women's and men's gender roles, resources, decision-making power, and norms and values perspectives that is deemed key in understanding gender influences.

Integrating time and context

As I observed earlier, a fundamental shortcoming of previous gender approaches is the static, snapshot-like, way in which the influence of gendered determinants on fertility and child health has been investigated. Questions such as how resources, decision-making, and norms evolve over people's life time in concordance with their fertility experiences cannot be readily answered. Neither do extant gender approaches or, for that matter, intrahousehold bargaining models, provide concrete clues on how these processes can be expected to differ according to people's social environments. To build a theory of *gender dynamics* and *contexts of empowerment* we combine gendered intra-household bargaining models with insights from the life course perspective, institutional approaches, and anthropological notions of contingency, vital conjunctures, and reproductive navigation.

In order to study gender dynamics and fertility as dynamic, contextualized processes, I first of all incorporate the *life course perspective* (LCP), which is an interdisciplinary, theoretical orientation for studying the impact of changing societies on developing lives (Huinink and Kohli 2014; Elder et al. 2003; Giele and Elder 1998; Elder 1994), which underlines both *time* and *context*. The LCP sees human development and aging, whether biological, physiological, psychological, or social, as lifelong processes. The idea of *human agency* is closely related to this. People *age and persist* through life *by making choices and by adapting* to their environments in order to meet their needs. To study temporality, life course researchers use the notion of *transitions*, or *events*, which are shifts between certain positions. Marriage marks for instance the transition between singlehood and the married state. In her research on women's fertility in Cameroon, Johnson-Hanks (2007) coined the term *vital conjunctures* to denote 'structures of possibility that emerge around specific periods of potential transformation'. Vital conjunctures are, according to Johnson-Hanks, 'particularly critical durations when more than usual is in play, when potential futures are galvanized and others made improbable', such as conception, pregnancy, and childbirth (Johnson-Hanks 2006, 3). In this program we try to uncover what are vital conjunctures, under what specific conditions, and what are their short- and long-term consequences? We will do so by studying their place in *pregnancy and reproductive trajectories* (project 3). *Trajectories* or *pathways* are specific series of transitions, positions and turning points (or vital conjunctures) that have a specific form and meaning. As a consequence of the stability of trajectories over time, *advantage or disadvantage* may *accumulate* as people age and develop (Dannefer 2003; Merton 1968). The life course consists of multiple trajectories in different life domains, pertaining not only to reproduction, but also to work, education, and health etc. The program considers how reproductive and other parallel pathways are interwoven and mutually influence each other.

Besides a focus on disentangling patterns through the life course, the LCP also

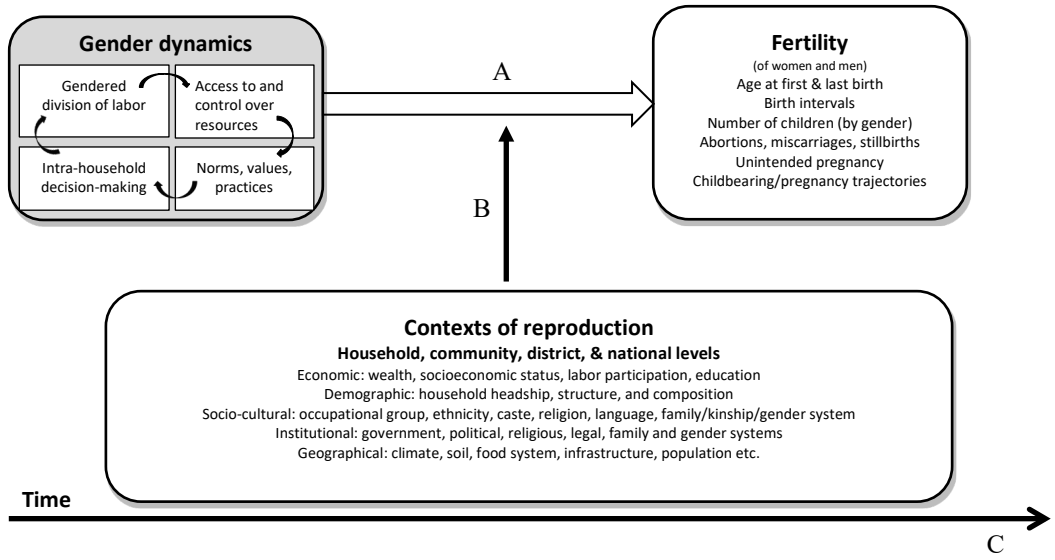
centralizes the influence of *historical time* on lives, usually through identifying cohort, period, and age effects. Children who are prenatally exposed to famine are likely to have higher mortality chances than children who are in utero before or after food scarcities (cohort effect). The introduction of structural adjustment programs in African societies may have implications for women's fertility regardless of their age (period effects). In explaining African fertility, processes of maternal depletion and women's physical, bodily costs of aging have been emphasized as highly *contingent* processes (Bledsoe 2002; Bledsoe, Banja and Hill 1998) (age effect). Thus, the program understands gender dynamics, as well as fertility and child health, as temporal processes in which changes may result from historical events and transformations such as policy changes, epidemics, and economic crises, previous demographic and life course events, and shifting norms, values and practices.

In understanding people's lives, life course research is as much concerned with context as with time. A first aspect of context is the *social location* of lives. The life course principle of *linked lives* emphasizes the fact that human lives are *interdependent,* embedded in social relationships across the life span (Hagestad 2003). In African societies, the household is the basic social and economic unit, regulating production, distribution and consumption, and fulfilling a caregiving function for children, sick, disabled, and elderly. Living arrangements often involve the co-residence of three generations, and even when not co-residing, people's lives are heavily influenced by extended kin, neighbors and the community (Olopade 2014; Madhavan and Townsend 2007; Lloyd and Desai 1992). As Susan Watkins (1993:561) has for instance observed, 'not only relatives in the back bedroom, but also significant others in women's networks, such as friends and neighbors outside the household, would have had forceful opinions that influenced the extent and duration of breastfeeding'. Ethnographic research in sub-Saharan Africa provides overwhelming evidence of how powerfully women's reproductive options and decisions are affected by their position within a wider body of kinship relations, by the position of their kin group within the village, their relation with the (potential) father of the child, the proximity and co-presence of affinal relations, such as in-laws (in virilocal marriages) and of co-wives (in polygynous marriages), and by their ties to others within the village (Van der Sijpt 2014; Doyle 2013; Cornwall 2007). Based on material from Cameroon, Van der Sijpt (2014) coined the term *reproductive navigation* to indicate the ways in which people give direction to their reproductive trajectories within the social complexities, i.e. the social relations and their power dynamics, in which reproductive experiences are embedded. To be sure, mechanisms explaining social influence on fertility and child health include processes of cooperation, resource competition, socialization, social learning, and social pressure (Sear and Coall 2014; Bernardi and Klärner 2014; Steenhof and Liefbroer 2008). This warrants the inclusion of features of people's social configurations. To cite Watkins again: 'if women's interests in more or fewer children can be overruled by their husbands, by others in the family, or by their friends and neighbors, we need to know more about the characteristics of those others' (Watkins 1993: 566). We explicitly focus on the influence of household and community members characteristics (e.g. their marital status, educational level, formal employment status etc.) on fertility (Van der Sijpt 2014; Doyle 2013; Entwisle 2007; Johnson-Hanks 2006; Bledsoe 2002; Greenhalgh 1995).

Of special interest is the influence of different aspects of gender dynamics present in social networks, and as part of institutional endowments that regions or communities have inherited from the past. Gender dynamics are believed to diverge systematically across national, regional, and local settings and across ethnicities and social groups. Such ideas tap into *institutional approaches* of fertility change (e.g. McNicoll 1994; Potter 1983; Lesthaeghe 1980), notions of *gender systems* (i.e. 'sets of beliefs and norms, common practices and associated sanctions through which the meaning of being male or female and the rights and obligations of males and females of different ages and social

statuses are defined') (Mason 2001:161) and ideas about the systematic spatial variation in gender relations such as formulated in the work of Doreen Massey (1984) and in recent work on *spatial gender cultures* (Mönkediek and Bras 2014; Jappens and Van Bavel 2012; Duncan and Smith 2002; Pfau-Effinger 2000).

Figure 2. Conceptual model of the relationships between gender dynamics, fertility, and contexts of reproduction



The *geographical location* of lives is a final context-related aspect of a life course perspective. In this program we distinguish a variety of economic, demographic, socio-cultural, institutional, and geographical context factors at different scales (household, community, district, and national levels) (see Figure 2). We are particularly interested in *the moderating role of contexts* (Warner and Settersten 2017; Sharkey and Faber 2014) (arrow B in Figure 2; direct context effects are also taken into account, but not shown in the figure), and specifically in *interactions* between *gender dynamics* (at different levels) *and context factors.* Central in our program is the question of how the relation between shifts in (aspects of) gender dynamics and changes in fertility differ according to context (so-called *higher order context effects*). We coin the term *contexts of reproduction* to denote settings that *directly* or *indirectly* influence fertility and pathways of childbearing.

Two key objectives are central to the paper. The *first* question (linked to arrow A in Figure 2) is how gender dynamics influence fertility outcomes. The *second,* and main, question (linked to arrows B and C) is how the effect discussed above varies across contexts (B) and has changed over time (C).

Methods

Data

For this study, a dataset prepared by the Global Data Lab (www.globaldatalab.org) was used in which xx Demographic and Health Surveys (DHS, www.dhsprogram.com) for the period 1992-2017 were combined and harmonized. DHS are large, nationally representative surveys that consist of a household survey, in which basic information is collected of all household members, and separate surveys for women and men. In the women's surveys, all usual resident women aged 15 to 49 are invited for an oral interview in which information is obtained on (reproductive) health-related issues plus

demographic and socioeconomic background information. For each survey, non-overlapping area units (often enumeration areas) are randomly selected. These areas (called "clusters" henceforth) are usually communities, villages, or city quarters. In the selected clusters, all households are listed and a random sample of 25–30 households is selected for the interviews. In Appendix A, additional information about the sample can be found. Response rates are generally very high, over 95% in all but one survey.
Our combined dataset contains information derived from xx women's surveys on 678,512 women living in 29,925 local communities (sample clusters) within 337 sub-national regions (provinces) of 39 SSA countries. The household level data was supplemented with context information at the level of provinces and communities/clusters. To get representative samples of the countries, the household weights provided by DHS are used in all analyses. Structural missings on characteristics of partners who were missing from the household were addressed using the dummy variable adjustment procedure, which leads to unbiased estimates of these variables (Allison, 2001; Little and Rubin, 2002).

Method and Variables

The dataset is characterized by a hierarchical structure. Households are nested within sample clusters, within districts and within countries. Three-level multilevel regression analysis is used to address the nesting of the households within sample clusters and districts (Hox, 2002). Fixed effects dummies are included at the national level, to control for the nesting within countries. This strategy allows us to fully control for clustering and confounding at the national level, while retaining the possibility to study the role of context factors at the district and cluster level.

Three separate analyses were performed for the three reproductive outcomes, unmet need, unintended pregnancy and age at first birth. Unmet need and unintended pregnancy are measured by a dummy variables. Age at first birth is measured in years. For unmet need and unintended pregnancy multilevel logistic regression analysis is used and for age at first birth multilevel linear regression analysis.

The key independent variables indicating the gender dynamics are gendered division of labor, access to and control over resources, intra-household decision-making, and norms, values and practices. Gendered division of labor is indicated by the difference in professional status between the woman and her partner, measured with five categories, (1) both a low professional status, (2) both a high professional status, (3) husband high and wife low professional status, (4) husband low and wife high professional status, and (5) professional status differential unknown. Husbands and wives working in managerial, professional, technical and clerical occupations are considered to have high professional status and husbands and wives with other occupations to have low professional status. Access to and control over resources is indicated by the educational difference between the woman and her partner, measured with five categories, (1) husband higher educated, (2) wife higher educated, (3) same number of years of education, and (4) educational differential unknown. Intra-household decision making is indicated by the age difference between the woman and her partner, measured with four categories, (1) husband ten or more years older, (2) husband 3-9 years older, (3) husband same age or wife older, and (4) spousal age gap unknown. Norms, values and practices are indicated by the gender preference for the next child of the woman, measured with four categories, (1) neutral gender preference, (2) girl preference, (3) boy preference, and (4) gender preference unknown.

Of the control factors, age of the woman and her age at first birth are measured in years. Her number of marriages is measured by a dummy variable indicating whether (1) or not (0) her current marriage is a second or later marriage. Household wealth is measured by the International Wealth Index (IWI; Smits and Steendijk, 2015), a comparative asset-based wealth index. Household composition is indicated by seven

categories, (1) male headed nuclear family, (2) male headed multigenerational family, (3) single male head, (4) female headed nuclear family, (5) female headed multigenerational family, (6) single female head, (7) and polygamous family.

To be able to distinguish between the effects of the independent variables at the household and at the community level, all household level variables are also aggregated to the sample cluster (village or neighborhood) level by taking their mean within the sample cluster. To explore whether and in which ways the effects of the key independent variables depend on the context, an explorative interaction analysis is performed in which interactions between these variables and the other variables at household and context level are studied. Interactions that are found significant are included in the final model. In the interaction analysis, centered versions of the involved variables are used, so that the main effects can be interpreted as average effects.

Descriptive information on the dependent variables is presented in Figure 3 and on the gender dynamics indicators in Table 1.

Figure 3. Descriptives of the dependent variables

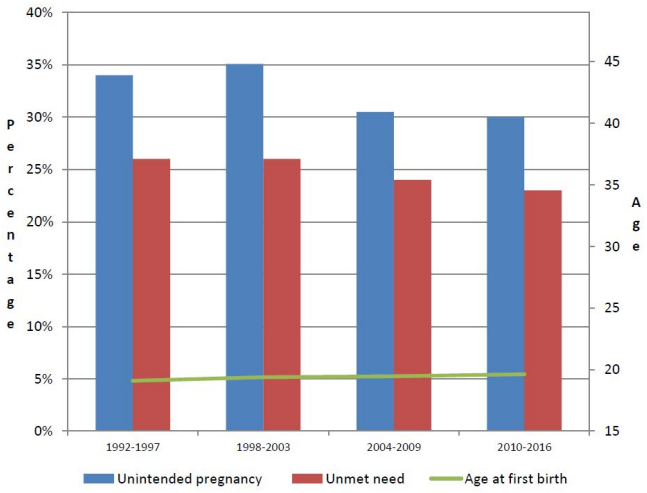


Table 1. Descriptives of gender dynamics measures

Gender dynamics	Unmet need	Unintended pregnancy	Age at first birth
Educational differential husband-wife			
Husband higher educated	30.08%	26.95%	31.15%
Wife higher educated	12.20%	10.93%	12.94%
Same number years education	41.26%	33.57%	39.81%
Educational differential unknown	16.50%	28.55%	16.10%
Professional status differential husband-wife			
Both a low professional status	79.50%	75.27%	79.26%
Both a high professional status	1.92%	1.31%	1.96%
Husband high, wife low professional status	7.57%	6.65%	7.55%
Husband low, wife high professional status	1.58%	1.15%	1.62%
Professional status differential unknown	9.60%	15.62%	9.61%
Gender norms			
Neutral gender preference	51.10%	51.52%	51.46%
Boy preference	20.73%	20.17%	20.29%
Girl preference	11.65%	13.15%	11.57%
Gender preference unknown	16.90%	15.16%	16.68%
Spousal age gap/intra-household decision-making			
Husband >=10 years older	35.71%	28.79%	34.17%
Husband 3-9 years older	41.98%	37.51%	42.58%
Husband same age or wife older	13.07%	12.31%	13.43%
[1]Spousal age gap unknown	9.90%	21.39%	9.82%

Results

Table 2. Regression outcomes unmet need

	Coeff	Sig
Year	-0.015	0.000
Household-level variables		
Control variables		
Age at first marriage/cohabitation	-0.015	0.000
Household wealth	-0.005	0.000
Number of marriage		
First marriage	0.000	Ref
Remarried	-0.131	0.000
Number of marriages unknown	0.102	0.072
Household composition		
Male-headed nuclear	0.000	Ref
Male-headed multigenerational	-0.074	0.000
Single male-headed	-0.045	0.142
Female-headed nuclear	-0.075	0.005
Female-headed multigenerational	-0.081	0.253
Single female-headed	0.020	0.248
Polygamous	0.031	0.007
Gender dynamics		
Educational differential husband-wife		
Husband higher educated	0.000	Ref
Wife higher educated	-0.019	0.155
Same years of education	-0.043	0.000
Educational differential unknown	0.196	0.000
Professional status differential husband-wife		
Both a low professional status	0.000	Ref
Both a high professional status	-0.417	0.000
Husband high, wife low professional status	-0.100	0.000
Husband low, wife high professional status	-0.273	0.000
Professional status differential unknown	0.047	0.023
Gender norms		
Neutral gender preference	0.000	Ref
Boy preference	-0.020	0.056
Girl preference	0.024	0.041
Gender preference unknown	-0.026	0.101
Spousal age gap		
Husband >=10 years older	-0.002	0.860
Husband 3-9 years older	0.000	Ref
Husband <3 years older, same age or wife older	-0.012	0.285
Spousal age difference unknown	0.216	0.000
Community-level variables		
Control variables		
Mean household wealth cluster	-0.001	0.233
Mean number of marriage in cluster		
Percentage first marriage	0.000	Ref
Percentage remarried	0.138	0.004
Percentage marriage # unknown	0.028	0.905
Mean household composition in cluster		
Percentage male-headed nuclear	0.000	Ref
Percentage male-headed multigenerational	0.088	0.146
Percentage single male-headed	-0.160	0.009
Percentage female-headed nuclear	0.242	0.026
Percentage female-headed multigenerational	-0.513	0.046
Percentage single female-headed	-0.129	0.005
Percentage polygamous	-0.058	0.160
Gender dynamics		
Mean educational differential in cluster		
Percentage husbands higher educated	0.000	Ref
Percentage wives higher educated in cluster	-0.055	0.473
Percentage husbands and wives same education	-0.598	0.000
Percentage educational differential unknown	0.052	0.248
Mean professional status differential in cluster		
Percentage husbands and wives low prof status	0.000	Ref
Percentage husbands and wives high prof status	-0.256	0.175
Percentage husbands high, wives low prof status	0.000	0.997
Percentage husbands low, wives high prof status	-0.050	0.805
Percentage prof status differential unknown	-0.072	0.029
Mean gender norms in cluster		
Percentage neutral gender preference	0.000	Ref
Percentage boy preference	0.236	0.000
Percentage girl preference	0.141	0.023
Percentage gender norms unknown	0.256	0.000
Mean spousal age gap in cluster		
Percentage husbands 10 or more years older	0.218	0.000
Percentage husbands 3-9 years older	0.000	Ref
Percentage hus <3 years older, same age or wife older	0.073	0.352
Percentage couples with unknown spousal age gap	-0.348	0.000
Urban cluster	-0.047	0.002
Intercept	27.140	0.000
Number of women	665583	

Note: All models include country dummies

Table 3. Regression outcomes unintended pregnancy

	Coeff	Sig
Year	-0.024	0.000
Household-level variables		
Control variables		
Age at first marriage/cohabitation	-0.026	0.000
Household wealth	-0.003	0.000
Number of marriage		
First marriage	0.000	Ref
Remarried	0.045	0.000
Number of marriage unknown	0.290	0.000
Household composition		
Male-headed nuclear	0.000	Ref
Male-headed multigenerational	0.131	0.000
Single male-headed	0.059	0.032
Female-headed nuclear	0.049	0.071
Female-headed multigenerational	0.102	0.108
Single female-headed	-0.250	0.091
Polygamous	0.016	0.295
Gender dynamics		
Educational differential husband-wife		
Husband higher educated	0.000	Ref
Wife higher educated	0.019	0.148
Same years of education	-0.074	0.000
Educational differential unknown	-0.026	0.079
Professional status differential husband-wife		
Both a low professional status	0.000	Ref
Both a high professional status	-0.330	0.000
Husband high, wife low professional status	-0.002	0.883
Husband low, wife high professional status	-0.130	0.000
Professional status differential unknown	0.006	0.775
Gender norms		
Neutral gender preference	0.000	Ref
Boy preference	-0.016	0.101
Girl preference	0.026	0.017
Gender preference unknown	-0.220	0.000
Spousal age gap		
Husband >=10 years older	-0.025	0.007
Husband 3-9 years older	0.000	Ref
Husband <3 years older, same age or wife older	0.007	0.546
Spousal age difference unknown	0.236	0.000

Community-level variables		
Control variables		
Mean household wealth cluster	0.004	0.000
Mean number of marriage in cluster		
Percentage first marriage	0.000	Ref
Percentage remarried	0.518	0.000
Percentage marriage # unknown	-1.284	0.000
Mean household composition in cluster		
Percentage male-headed nuclear	0.000	Ref
Percentage male-headed multigenerational	0.393	0.000
Percentage single male-headed	-0.274	0.000
Percentage female-headed nuclear	-0.064	0.608
Percentage female-headed multigenerational	-0.172	0.505
Percentage single female-headed	0.004	0.941
Percentage polygamous	-0.003	0.961
Gender dynamics		
Mean educational differential in cluster		
Percentage husbands higher educated	0.000	Ref
Percentage wives higher educated in cluster	0.365	0.000
Percentage husbands and wives same education	-0.944	0.000
Percentage educational differential unknown	0.265	0.000
Mean professional status differential in cluster		
Percentage husbands and wives low prof status	0.000	Ref
Percentage husbands and wives high prof status	-0.298	0.104
Percentage husbands high, wives low prof status	0.083	0.356
Percentage husbands low, wives high prof status	0.091	0.669
Percentage prof status differential unknown	-0.029	0.435
Mean gender norms in cluster		
Percentage neutral gender preference	0.000	Ref
Percentage boy preference	0.258	0.000
Percentage girl preference	0.436	0.000
Percentage gender norms unknown	-0.008	0.844
Mean spousal age gap in cluster		
Percentage husbands 10 or more years older	-0.406	0.000
Percentage husbands 3-9 years older	0.000	Ref
Percentage hus <3 years older, same age or wife older	0.326	0.000
Percentage couples with unknown spousal age gap	-0.181	0.000
Urbanization level cluster	0.040	0.018

Table 4. Regression outcomes age at first birth

	Coeff	Sig
Year	-0.008	0.000
Household-level variables		
Control variables		
Age at first marriage/cohabitation	0.611	0.000
Household wealth	0.004	0.000
Number of marriage		
First marriage	0.000	Ref
Remarried	0.296	0.000
Number of marriage unknown	0.032	0.546
Household composition		
Male-headed nuclear	0.000	Ref
Male-headed multigenerational	-0.234	0.000
Single male-headed	-0.110	0.000
Female-headed nuclear	-0.018	0.475
Female-headed multigenerational	-0.451	0.000
Single female-headed	-0.068	0.000
Polygamous	0.185	0.000
Community-level variables		
Control variables		
Mean household wealth cluster	0.003	0.000
Mean number of marriage in cluster		
Percentage first marriage	0.000	Ref
Percentage remarried	0.048	0.187
Percentage marriage # unknown	0.200	0.246
Mean household composition in cluster		
Percentage male-headed nuclear	0.000	Ref
Percentage male-headed multigenerational	-0.518	0.000
Percentage single male-headed	-0.266	0.000
Percentage female-headed nuclear	-0.107	0.185
Percentage female-headed multigenerational	-0.742	0.000
Percentage single female-headed	-0.168	0.000
Percentage polygamous	-0.638	0.000
Intercept	22.787	0.000
Number of women	581004	

Note: Model includes country dummies

Gender dynamics		
Educational differential husband-wife		
Husband higher educated	0.000	Ref
Wife higher educated	0.027	0.022
Same years of education	0.118	0.000
Educational differential unknown	0.127	0.000
Professional status differential husband-wife		
Both a low professional status	0.000	Ref
Both a high professional status	0.851	0.000
Husband high, wife low professional status	0.118	0.000
Husband low, wife high professional status	0.451	0.000
Professional status differential unknown	0.101	0.000
Gender norms		
Neutral gender preference	0.000	Ref
Boy preference	-0.011	0.250
Girl preference	-0.042	0.000
Gender preference unknown	-0.013	0.389
Spousal age gap		
Husband >=10 years older	-0.083	0.000
Husband 3-9 years older	0.000	Ref
Husband <3 years older, same age or wife older	0.305	0.000
Spousal age difference unknown	0.066	0.025
Gender dynamics		
Mean educational differential in cluster		
Percentage husbands higher educated	0.000	Ref
Percentage wives higher educated in cluster	-0.241	0.000
Percentage husbands and wives same education	0.604	0.000
Percentage educational differential unknown	0.328	0.000
Mean professional status differential in cluster		
Percentage husbands and wives low prof status	0.000	Ref
Percentage husbands and wives high prof status	1.220	0.000
Percentage husbands high, wives low prof status	-0.184	0.002
Percentage husbands low, wives high prof status	0.091	0.531
Percentage prof status differential unknown	-0.045	0.114
Mean gender norms in cluster		
Percentage neutral gender preference	0.000	Ref
Percentage boy preference	0.166	0.000
Percentage girl preference	-0.021	0.000
Percentage gender norms unknown	0.126	0.000
Mean spousal age gap in cluster		
Percentage husbands 10 or more years older	0.367	0.000
Percentage husbands 3-9 years older	0.000	Ref
Percentage hus <3 years older, same age or wife older	-0.030	0.661
Percentage couples with unknown spousal age gap	-0.114	0.003
Urbanization level cluster	-0.057	0.000

Conclusion and discussion

Importance of gender equality, education and professional status;

Regarding norms and intra-household decision-making: results less clear

Community effects: often strong(er), both synergistic and countervailing

Unmet need and unintended pregnancy are complex concepts: dependent on/indicative of calculus of individuals' conscious choice?

Next steps:

- Explicitly include gender dynamics at regional and country levels?
- Different dependent variables: # of children, birth intervals?
- Replace spousal age gap with household decision-making index
- Test for context heterogeneity (cross-level interactions): for what groups does gender context matter and in what ways?

References

Abadian, S. 1996. Women's Autonomy and Its Impact on Fertility, *World Development* 24(12): 1793-1809.

Agarwal, B. 1997. "Bargaining" and Gender Relations: Within and Beyond the Household, *Feminist Economics* 3(1):1-51.

Allendorf, K. 2012. Like daughter, like son? Fertility decline and the transformation of gender systems in the family, *Demographic Research* 27(16):429-454.

Allendorf, K. 2015. Fertility Decline, Gender Composition of Families, and Expectations of Old Age Support, *Population Research and Policy Review* 34:511-539.

Amin, S. and C. Lloyd. 2002. Women's lives and rapid fertility decline: Some lessons from Bangladesh and Egypt, *Population Research and Policy Review* 21:275-317.

Assan, N. 2013. Women empowerment as a tool against food insecurity in Sub Saharan Africa, *Scientific Journal of Revi*ew 2(11):329-339.

Bahwah, A.A., Akweongo, P., Simmons, R. and Phillips, J.F. 1999. Women's Fears and Men's Anxieties: The Impact of Family Planning on Gender relations in Northern Ghana, *Studies in Family Planning* 30(1):54-66.

Balk, D. 1994. Individual and Community Aspects of Women's Status and Fertility in Rural Bangladesh, *Population Studies* 48(1): 21-45.

Becker, G.S., and H.G. Lewis. 1974. Interaction between Quantity and Quality of Children, In: T.W. Schultz (Ed.), *Economics of the Family: Marriage, Children, and Human Capital,* 81-90. Chicago: University of Chicago Press.

Becker, G.S. 1981. *A Treatise on the Family*. Cambridge, Mass.: Harvard University Press.

Behrman, J.R. 1997. Intrahousehold distribution and the family, In: M. Rosenzweig, and O. Stark (Eds.), *Handbook of Population and Family Economics,* 125-187. Amsterdam: Elsevier Science.

Benefo, K. and T.P. Schultz. 1996. Fertility and child mortality in Côte d'Ivoire and Ghana, *The World Bank Economic Review* 10(1):123-158.

Bernardi, L. and A. Klärner. 2014. Social networks and fertility, *Demographic Research* 30(22):641-670.

Birg, H., E.J. Flöthmann, and I. Reiter. 1991. *Biographische Theorie der Demografischen Reproduktion*. Frankfurt am Main: Campus Verlag.

Blanc, A.K. 2001. The Effect of Power in Sexual Relationships and Reproductive Health: An Examination of the Evidence, *Studies in Family Planning* 32(3):189-213.

Bledsoe, C.H. 2002. *Contingent Lives. Fertility, Time, and Aging in West Africa*. Chicago and London: The University of Chicago Press.

Bledsoe, C., F. Banja, and A. Hill. 1998. Reproductive Mishaps and Western Contraception: An African Challenge to Fertility Theory, *Population and Development Review* 24:15-57.

Bledsoe, C., S. Lerner, and J.I. Guyer. 2000. Introduction, In: C. Bledsoe, S. Lerner, and J.I. Guyer (Eds.). *Fertility and the Male Life-Cycle in the Era of Fertility Decline,* 1-26*.* Oxford: Oxford University Press.

Boserup, E. 1989. *Woman's Role in Economic Development*. London and New York: Earthscan.

Bras, H., A.C. Liefbroer, and C.A. Elzinga. 2010a. Standardization of Pathways to Adulthood? An Analysis of Dutch Cohorts born between 1850 and 1900, *Demography* 47(4): 1013-1034.

Bras, H., J. Kok, and K. Mandemakers. 2010b. Sibship Size and Status Attainment across Contexts: Evidence from the Netherlands, 1840-1925, Demographic Research 23(4):73-104.
Bras, H. 2015. *Inequalities in Food Security and Nutrition: A Life Course Perspective.* Inaugural lecture. Wageningen: Wageningen University.
Bras, H. and J. Kok. 2016. Diverging pathways? Sibling differences in marriage timing in a commercialized rural region of the Netherlands, 1860-1940, In: F. Boudjaaba, C. Mouysset, and C. Doucet-Seidden (Eds.). *Brothers and Sisters from the Middle Ages to the Present*. *Frères et sœurs du Moyen Âge à nos jours,* 189-206. Bern: Peter Lang.
Bras, H. and J. Mandemakers. 2016. Women's position, birth order and child nutritional status in Ethiopia. Paper presented at the Conference on Agri-Health Research at the ANH Academy Week, Addis Ababa, 20-24 June 2016.
Burroway, R. 2016. Empowering women, strengthening children: A multilevel analysis of gender inequality and child malnutrition in developing countries, *Advances in Gender Research. Gender and Food: Production to Consumption and After* 22:117-142.
Cantrelle, P., B. Ferry, and J. Mondot. 1978. Relationships between fertility and mortality in Tropical Africa, In: S. Preston (Ed.), *The Effects of Infant and Child Mortality on Fertility*, 181-205. New York: Academic Press.
Casterline, J.B. 2001. Diffusion processes and fertility transition: Introduction, In: J.B. Casterline (Ed.), *Diffusion processes and fertility transition: Selected perspectives,* 1-38. Washington, DC: National Academy Press.
Christiaensen, L. and, H. Alderman. 2004. Child Malnutrition in Ethiopia: Can Maternal Knowledge Augment the Role of Income?, *Economic Development and Cultural Change* 52(2):287-312.
Chung, W. and M. Das Gupta. 2007. The Decline of Son Preference in South Korea: The Roles of Development and Public Policy, *Population and Development Review* 33(4):757-783.
Cleland, J. 2001. Potatoes and pills: An overview of innovation-diffusion contributions to explanations of fertility decline, In: J.B. Casterline (Ed.), *Diffusion processes and fertility transition: Selected perspectives,* 39–65. Washington, DC: National Academy Press.
Collin, Matthew (2006). *Lining up to eat. Birth order and nutritional status in rural Ethiopia*. Master Thesis, St. Anthony's College, Oxford University.
Cornwall, A. 2007. Taking Chances, Making Choices: The Tactical Dimensions of "Reproductive Strategies" in Southwestern Nigeria, *Medical Anthropology* 26:229-254.
Cunningham, K., M. Ruel, E. Ferguson and R. Uauy. 2015. Women's empowerment and child nutritional status in South Asia: A synthesis of the literature, *Maternal and Child Nutrition* 11:1-19.
Dannefer, D. 1988. Cumulative advantage/disadvantage and the life course: cross-fertilizing age and social science theory, *Journal of Gerontology B* 58(6):S327-37.
Darak, S., M. Mills, V. Kulkarni, S. Kulkarni, I., Hutter, and F. Janssen. 2015. Trajectories of Childbearing among HIV Infected Indian Women: A Sequence Analysis Approach, *PLoS ONE* 10(4):e0124537.
Das Gupta, M. 1995. Life Course Perspectives on Women's Autonomy and Health Outcomes, *American Anthropologist* 97(3):481-491.
Das Gupta, M. 2013. Women's Empowerment and Fertility: Policy Lessons. Population Division. Expert Paper No. 2013/2. New York: United Nations.
Deaton, A. 2013. *The Great Escape. Health, Wealth, and the Origins of Inequality*. Princeton: Princeton University Press.
Diamond, I., M. Newby, and S. Varle. 1999. Female Education and Fertility: Examining the Links, In: C. Bledsoe, J. Casterline, J. Johnson-Kuhn, and J. Haaga (eds.), *Critical Perspectives on Schooling and Fertility in the Developing World*, 23-45. Washington, DC: National Academy of Science Press.
Dickerson-Putman, J., and J.K. Brown (eds.). 1994. Women among women. Anthropological Perspectives on Female Age Hierarchies, Special Issue, *Journal of Cross-Cultural Gerontology* 9(2).
Doyle, S. 2013. *Before HIV. Sexuality, Fertility and Mortality in East Africa, 1900-1980*. Oxford: Oxford University Press.
Duncan, S. and D. Smith. 2002. Geographies of family formations: spatial differences and gender cultures in Britain, *Transactions of the Institute of British Geographers* 27:471-493.
Dyson, T., and M. Murphy. 1985. The Onset of Fertility Transition, *Population and Development Review* 11:399–440.
Easterlin, R.A. 1978. The economics and sociology of fertility: A synthesis, In: C. Tilly (Ed.), *Historical Studies of Changing Fertility*. Princeton: Princeton University Press.
Easterlin, R.A., and E.M. Crimmins. 1985. *The Fertility Revolution: A Supply-Demand Analysis*. Chicago: University of Chicago Press.
Elder, G.H. 1994. Time, Human Agency, and Social Change: Perspectives on the Life Course, *Social Psychology Quarterly 57*(1):4-15.

Elder, G.H. Jr., M. Kirkpatrick Johnson, and R. Crosnoe. 2003. The Emergence and Development of Life Course Theory, In: J.T. Mortimer & M.J. Shanahan (Eds.), *Handbook of the Life Course*, 3-16. New York: Kluwer Academic/Plenum Publishers.
Entwisle, B. 2007. Putting People in Place, *Demography* 44(4):687-703.
Folbre, N. 1983. Of patriarchy born: The political economy of fertility decisions, *Feminist Studies* 9(2):261-283.
Folbre, N. 1986. Hearts and Spades: Paradigms of Household Economics, *World Development,* 14(2): 245-255.
Folbre, N. 1994. *Who Pays for the Kids? Gender and the Structures of Constraints.* New York: Routledge.
Garenne, M. 2003. Sex differences in health indicators among children in African DHS surveys, *Journal of Biosocial Science* 35:601-614.
Giele, J.Z., and G.H. Jr. Elder (Eds.). 1998. *Methods of Life Course Research. Qualitative and Quantitative Approaches*. Thousand Oaks: Sage Publications.
Glewwe, P. 1999a. School Quality, Student Achievement, and Fertility in Developing Countries, In: C. Bledsoe, J. Casterline, J. Johnson-Kuhn, and J. Haaga (Eds.), *Critical Perspectives on Schooling and Fertility in the Developing World*, 128-131. Washington, DC: National Academy of Science Press.
Glewwe, P. 1999b. Why does mother's schooling raise child health in developing countries? Evidence from Morocco, *Journal of Human Resources* 34:124–159.
Greene, M.E., and A.E. Biddlecom. 2000. Absent and problematic men: Demographic accounts of male reproductive roles, *Population and Development Review* 26(1):81-115.
Greenhalgh, S. (Ed.) 1995. *Situating Fertility. Anthropology and Demographic Inquiry*. Cambridge: Cambridge University Press.
Groth, H. and J.F. May (Eds.). 2017. *Africa's Population: In Search of a Demographic Dividend*. Cham: Springer.
Guilmote, C.Z. 2009. The Sex Ratio Transition in Asia, *Population and Development Review* 35(3):519-549.
Haddad, L. 1999. Women's Status: Levels, Determinants, Consequences for Malnutrition, Interventions, and Policy. *Asian Development Review 17*(1-2): 96-131.
Hagestad, G.O. 2003. Interdependent Lives and Relationships in Changing Times: A Life-Course View of Families and Aging. In: R.A. Settersten Jr. (Ed.), *Invitation to the Life Course: Toward New Understandings of Later Life,* 135-160. Amityville, NY: Baywood.
Hobcraft, K. 1994. *The Health Rationale for Family Planning: Timing of Births and Child Survival.* New York: United Nations.
Hollerbach, P.E. 1980. Power in Families, Communication, and Fertility Decision-Making. *Population and Environment* 3(2):146-173.
Hox, J. 2002. *Multilevel Analysis. Techniques and Applications*. Mahwah, NJ and London: Lawrence Erlbaum Publishers.
Huinink, J., and M. Kohli. 2014. A life-course approach to fertility, *Demographic Research* 30(45):1293-1326. DOI: 10.4054/DemRes.2014.30.45
Humphries, J. 2007. 'Because They Are too Menny...' Children, Mothers and Fertility Decline – The Evidence from Working-Class Autobiographies of the Eighteenth and Nineteenth Centuries. In: A. Janssens (ed.), *Gendering the Fertility Decline in the Western World,* 113-150. Bern: Peter Lang.
Iliffe, J. 2017. *Africans. The History of a Continent.* Third Edition. Cambridge: Cambridge University Press.
Janssens, A. 2007. Gendering the Fertility Decline in the Western World, In: Janssens, A. (ed.). *Gendering the Fertility Decline in the Western World,* 1-23. Bern: Peter Lang.
Jappens, M. and J. Van Bavel. 2012. Regional family norms and child care by grandparents in Europe, *Demographic Research* 27(4):85-120.
Jejeebhoy, S. 1995. *Women's Education, Autonomy, and Reproductive Behaviour: Experience from Developing Countries.* Oxford, UK: Clarendon Press.
Johnson-Hanks. 2007. Natural Intentions: Fertility Decline in the African Demographic and Health Surveys, *American Journal of Sociology* 112(4):1008-43.
Johnson-Hanks, J. 2006. *Uncertain Honor. Modern Motherhood in an African Crisis*. Chicago and London: The University of Chicago Press.
Kabeer, N. 1999. Resources, Agency, Achievements: Reflections on the Measurement of Women's Empowerment, *Development and Change* 30:435-464.
Kaufman L. and P. Rousseeuw. 1990. *Finding groups in data.* New York: Wiley.
Kravdal, O. 2006. A simulation-based assessment of the bias produced when using averages from small DHS clusters as contextual variables in multilevel models, *Demographic Research* 15(1):1-20.
Kritz, M, P. Makinwa-Adebusoye,and D. Gurak. 2000. The role of gender context in shaping

reproductive behavior in Nigeria, In: H. Presser, and G. Sen (Eds.), *Female Empowerment and Demographic Processes: Moving Beyond Cairo*, 239-260. London: Oxford University Press.
Kuate Defo, B. 1998. Fertility Response to Infant and Child Mortality in Africa with Special Reference to Cameroon, In: M.R. Montgomery and B. Cohen (Eds.), *From Death to Birth. Mortality Decline and Reproductive Change*, 254-315. Washington, D.C.: National Academy Press.
Kuate Defo, B. and A. Palloni. 1996. Determinants of mortality among Cameroonian children: Are the effects of breast-feeding and pace of childbearing artifacts?, *Genus* LI:69-96.
Lesthaeghe, R.J. 1980. On the social control of human reproduction, *Population and Development Review* 6(4):527-548.
Lee-Rife, S.M. 2010. Women's empowerment and reproductive experiences over the life course, *Social Science & Medicine* 71:634-642.
Longwe, A. and J. Smits. 2012. Reproductive Health Outcomes and School Enrollment in Sub-Saharan Africa, *Studies in Family Planning* 43(2):127-134
Lloyd, C., C. Kaufman and P. Hewett. 1999. *The Spread of Primary Schooling in Sub-Saharan Africa: Implications for Fertility Change.* New York: The Population Council.
Lloyd, C.B., and S. Desai. 1992. Children's living arrangements in developing countries, *Population Research and Policy Review* 11*:*193-216.
MacKinnon, A. 1995. Were Women Present at the Demographic Transition? Questions from a Feminist Historian to Historical Demographers, *Gender & History* 7:222-240.
Macmillan, R. 2005. The structure of the life course: Classic Issues and Current Controversies. In: R. Macmillan (Ed.). *The Structure of the Life Course: Standardized? Individualized? Differentiated?*, 3-24*.* Amsterdam: Elsevier.
Madhavan, S., and N. Townsend. 2007. The social context of children's nutritional status in rural South Africa, *Scandinavian Journal of Public Health Supplement* 69:107-117.
Madise, N.J., Z. Matthews, and B. Margetts 1999. Heterogeneity of Child Nutritional Status between Households: A Comparison of Six Sub-Saharan African Countries, *Population Studies* 53(3): 331-343.
Madjdian, D.S., and H. Bras. 2016. Family, Gender, and Women's Nutritional Status: A Comparison Between Two Himalayan Communities in Nepal, *Economic History of Developing Regions*, 31(1): 198-223.
Malhotra, A., S.R. Schuler, and C. Boender. 2002. *Measuring Women's Empowerment as a Variable in International Development.* Washington, D.C.: World Bank Publications.
Malhotra, A. 2012. *Remobilizing the Gender and Fertility Connection: The Case for Examining the Impact of Fertility Control and Fertility Declines on Gender Equality*. International Center for Research on Women, Fertility, and Empowerment. Work Paper Series, 01-1012-ICRW-FE.
Marinda, P.A. 2006. Child-mother nutrition and health status in rural Kenya: The role of intra-household resource allocation and education, *International Journal of Consumer Studies* 30:327-226.
Mason, K. 1986. The Status of Women: Conceptual and Methodological Issues in Demographic Studies, *Sociological Forum* 1(2):284-300.
Mason, K. 1987. The Impact of Women's Social Position on Fertility in Developing Countries, *Sociological Forum* 2(4):718-745.
Mason, K. 2001. Gender and Family Systems in the Fertility Transition, *Population and Development Review* 27:160-176.
Massey, D. 1984. *Spatial divisions of labour.* London:Macmillan.
Mayer, K.U. 1987. Lebenslaufsforschung. In: W. Voges (Ed). *Methoden der Biographie- und Lebenslaufsforschung,* 51-73*.* Opladen: Leske and Budrich.
McNicoll, G. 1994. Institutional analysis of fertility, In: K. Lindahl-Kiessling and H. Landberg (Eds.), *Population, Development and the Environment*. Oxford: Oxford University Press.
Merton, R. 1968. *The Matthew Effect in Science*. Science 159:56-63.
Mönkediek, B. and H. Bras. 2014. Strong and Weak Family Ties Revisited: Reconsidering European Family Structures from a Network Perspective, *The History of the Family. An International Quarterly* 19(2):235-259.
Mumtaz, Z., and S. Salway. 2009. Understanding gendered influences on women's reproductive health in Pakistan: Moving beyond the autonomy paradigm, *Social Science & Medicine* 68:1349-1356.
Murdock, G.P. 1967. *Ethnographic Atlas: A Summary.* Pittsburgh:The University of Pittsburgh Press.
Narayan, Deepa (Ed.). 2005. *Measuring Empowerment. Cross-Disciplinary Perspectives*. Washington, D.C.: The World Bank.
Notestein, F.W. 1945. Population – The Long View. In: Schultz, T. (Ed.) *Food for the World*, 36-57. Chicago: University of Chicago Press.

Nussbaum, M.C. 2000.*Women and Human Development. The Capabilities Approach*. Cambridge: Cambridge University Press.
Nussbaum, M.C. 2011. *Creating Capabilities. The Human Development Approach*. Cambridge, Mass.: Belknap Press.
Olopade, D. 2014. *The Bright Continent. Breaking Rules and Making Change in Modern Africa*. London: Duckworth Overlook.
Pallitto, C.C., & O'Campo, P. 2005. Community level effects of gender inequality on intimate partner violence and unintended pregnancy in Columbia: testing the feminist perspective, *Social Science & Medicine* 60:2205-2216.
Palloni, A., and H. Rafalimanana. 1999. The effects of infant mortality on fertility revisited: New evidence from Latin America, *Demography* 36(1):41-58.
Pfau-Effinger, B. 2000. Gender cultures and the gender arrangements and social change in the European context, In: S. Duncan, B. Pfau-Effinger (Eds.). *Gender, economy and culture in the European Union,* 262-276. London: Routledge.
Phan, L. 2016. Measuring Women's Empowerment at Household Level Using DHS Data of Four Southeast Asian Countries, *Social Indicators Research* 126:359-378.
Pilla, L. and J.A.R. Dantas. 2016. Intra-Household Nutritional Dynamics: A Cross-Sectional Study of Maasai Communities in Kenya, *Qualitative Health Research* 26(6):793-806.
Potter, J.E. 1983. Effects of societal and community institutions on fertility, In: R.A. Bulatao, and R.D. Lee (Eds.), *Determinants of Fertility in Developing Countries*, Vol II, 627-665. New York: Academic Press.
Preston, S.H. 1978. *The Effects of Infant and Child Mortality on Fertility*. New York: Academic Press.
Plassmann, V.S., and M.J.T. Norton. 2004. Child-Adult Expenditure Allocation by Ethnicity, *Family and Consumer Sciences Research Journal* 33(1):475-497.
Prata, N., A. Fraser, M.J. Huchko, J.D. Gipson, M. Withers, S. Lewis, E.J. Ciaraldi & U.D. Upadhyay. 2017. Women's empowerment and family planning: A review of the literature, *Journal of Biosocial Science*, Early Online. DOI: 10.1017/S0021932016000663.
Rashed, S., H. Johnson, P. Dongier, R. Moreau, C. Lee, R. Crepeau et al. 1999. Determinants of the Permethrin Impregnated Bednets (PIB) in the Republic of Benin: the role of women in the acquisition and utilization of PIBs, *Social Science & Medicine* 49(8):993-1005.
Ratcliffe, A.A., A.G. Hill, and G. Walraven. 2000. Separate lives, different interests: Male and female reproduction in the Gambia, *Bulletin of the World Health Organization* 78(5):570-579.
Reher, D.S., G. Sandström, A. Sanz-Gimeno & F.W.A. van Poppel. 2017. Agency in Fertility Decisions in Western Europe During the Demographic Transition: A Comparative Perspective, *Demography* 54:3-22.
Richards, E., S. Theobald, A. George, J.C. Kim, C. Rudert, K. Jehan & R. Tolhurst. 2013. Going beyond the surface: Gendered intra-household bargaining as a social determinant of child health and nutrition in low and middle income countries, *Social Science & Medicine* 95:24-33.
Ritschard, G., Gabadinho, A., Müller, N.S. & Studer, M. (2008). Mining event histories: A social science perspective. *International Journal of Data Mining, Modelling and Management* 1(1): 68-90.
Sahn, D.E., and S.D. Younger. 2009. Measuring intra-household health inequality: Explorations using the body mass index, *Health Economics* 18:S13-S36.
Schoumaker, B. 2017. Measuring male fertility rates in developing countries with Demographic and Health Surveys: An assessment of three methods, *Demographic Research* 36(28):803-850.
Schumacher, R., K. Matthijs and S. Moreels. 2013. Migration and reproduction in an urbanizing context. Family life courses in 19th century Antwerp and Geneva, *Revue Quetelet* 1(1):51-72.
Sear, R. and Coall, D. 2011. How much does family matter? Cooperative breeding and the demographic transition, *Population and Development Review* 37:81-112.
Seccombe, W. 1992. Men's "Marital Rights" and Women's "Wifely Duties": Changing Conjugal relations in the Fertility Decline, In: Gillis, J.R., Tilly, L.A., Levine, D. (Eds.) *The European Experience of Declining Fertility. A Quiet Revolution* 1850-1970, 66-84. Oxford: Blackwell.
Sen, A. 1981. *Poverty and famines: an essay on entitlement and deprivation*. Oxford: Clarendon Press.
Sen, A. 1989. Cooperation, Inequality, and the Family, *Population and Development Review,* 15(Supplement):61-76.
Sen, A. 1990. Gender and cooperative conflicts, In: I. Tinker (Ed.), *Persistent inequalities*: *Women and world development*. Oxford: Oxford University Press.
Sen, A. 1999. *Development as freedom.* Oxford: Oxford University Press.
Sharkey, P. & J.W. Faber. 2014. Where, When, Why, and For Whom Do Residential Contexts

Matter? Moving Away from the Dichotomous Understanding of Neighborhood Effects, *Annual Review of Sociology* 40:559-579.
Sibanda, A., Woubalem, Z., Hogan, D.P, and Lindstrom, D.P. 2003. The Proximate Determinants of the Decline to Below-Replacement Fertility in Addis Ababa, Ethiopia, *Studies in Family Planning* 34(1): 1-7.
Smith, L.C., U. Ramakrishnan, A. Ndiaye, L. Haddad & R. Martorell. 2003. *The Importance of Women's Status for Child Nutrition in Developing Countries*. Washington, D.C.: IFPRI.
Smits, J. 2016. *GDL Area Database. Sub-national development indicators for research and policy-making*. GDL Working paper 16-101.
Steenhof, L., and A.C. Liefbroer 2008. Intergenerational transmission of age at first birth in the Netherlands for birth cohorts born between 1935 and 1984: Evidence from municipal registers, *Population Studies* 62(1):69-84.
Stuckelberger, A. 2010. Why the Life Course Approach to Gender Empowerment is Important? In: UNOSAGI and Qatar Foundation (Eds.), *Promoting Empowerment of Women in Arab Countries*, 40-58. New York: United Nations.
Therneau, T.M. and Grambsch, P.M. 2000. *Modeling Survival Data: Extending the Cox Model.* New York: Springer.
Thomas, D., J. Strauss, and M.-H. Henriques. 1991. How Does Mother's Education Affect Child Height?, *The Journal of Human Resources* 26(2):183-211.
Tolhurst, R., Y.P. Amekudzi, F.K. Nyonator, S.B. Squire, and S. Theobald. 2008. "He will ask why the child gets sick so often": The gendered dynamics of intra-household bargaining over healthcare for children with fever in the Volta Region of Ghana, *Social Science & Medicine* 66:1106-1117.
UNICEF. 2011. *Gender Influences on Child Survival, Health and Nutrition: A Narrative Review*. New York: UNICEF.
UNICEF/WHO/World Bank Group. 2015. *Levels and Trends in Child Malnutrition. Joint Child Malnutrition Estimates. Key findings of the 2015 edition*. New York, Geneva, Washington: Unicef/WHO/WBG.
UNICEF/WHO/World Bank Group. 2017. *Levels and Trends in Child Malnutrition. Joint Child Malnutrition Estimates. Key findings of the 2017 edition*. New York, Geneva, Washington: Unicef/WHO/WBG.
United Nations, Department of Economic and Social Affairs, Population Division (2017). *World Population Prospects: The 2017 Revision, Key Findings and Advance Tables*. Working Paper No. ESA/P/WP/248.
Upadhyay, U.D., and D. Karasek. 2012. Women's empowerment and ideal family size: an examination of empowerment measures in sub-Saharan Africa, *International Perspectives on Sexual and Reproductive Health* 38:78-89.
Upadhyay, U.D., J.D. Gipson, M. Withers, S. Lewis, E.J. Ciaraldi, A. Fraser…N. Prata. 2014. Women's empowerment and fertility: A review of the literature, *Social Science & Medicine* 115:111-120.
Van de Walle, E. 1974.*The Female Population of France in the Nineteenth Century: A reconstruction of 82 Départements*. Princeton, N.J.: Princeton University Press.
Van der Sijpt, E. 2011. *Ambiguous ambitions: on pathway, projects, and pregnancy interruptions in Cameroon.* PhD Thesis, Department of Anthropology, University of Amsterdam.
Van der Sijpt, E. 2014. Complexities and contingencies conceptualized: towards a model of reproductive navigation, *Sociology of Health & Illness* 36(2):278-290.
Van Eerdewijk, A., and K. Danielsen. 2015. *Gender Matters in Farm Power*. Amsterdam: KIT/CIMMYT/CGIAR.
Verhart, N., A. van den Wijngaart, M. Dhamankar, and K. Danielsen (n.d.), *Bringing agriculture and nutrition together using a gender lens*. Amsterdam: KIT/SNV.
Warner, T.D. & R.A. Settersten. 2017. Why Neighborhoods (and How We Study Them) Matter for Adolescent Development, *Advances in Child Development and Behavior* 52:105-152.
Watkins, S.C. 1993. If All We Knew About Women Was What We Read in *Demography*, What Would We Know?, *Demography* 30(4):551-577.
WHO. 2013. *World Health Statistics 2013*. Geneva: World Health Organization.
World Bank. 2012. *Gender Equality and Development. World Development Report 2012.* Washington: The World Bank.
You, D., T. Wardlaw, H. Newby, D. Anthony & K. Rogers. 2013. Renewing the promise of survival for children. *The Lancet* 382:1002-1004.
Zhang, L. 2011. *Male fertility patterns and determinants*. Dordrecht: Springer.