A missing link in the fertility literature? Evidence of household structure effects on fertility from Ghana Demographic and Health Surveys

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Abstract

The goal of this study is to explore the relationship between fertility levels and household structure in Ghana, focusing on whether a woman's level of reproduction is related to the type of household in which she lives. The analysis is based on the Ghana Demographic and Health Surveys for the years 1993, 1998 and 2003. Household structure is approximated through a series of dummy variables that define the organization of the family unit, such as the couple's composition (cohabitation, polygamy and monogamy) and the management of extended family with a special focus on practice of fosterage. The characteristics of these household arrangements are systematically linked to two major structural determinants of reproductive behavior in west-Africa: ethnicity and religion. Fertility is defined for this analysis as a set of dummy variables based on women having (1) at least one live birth in the last year and (2) at least one in the last five years. A series of logistic regressions are run to estimate the degree of correlation between the two sets of variables controlling for age, education, income, parity, knowledge and the use of contraceptive. Results for 1993, 1998 and 2003 are compared for the purpose of examining regional and temporal patterns in this correlation. Results indicate that whereas the number of household members has a positive relationship to fertility levels some specific type of family composition are negatively correlated to reproduction.

Introduction

The Demographic Transition model explains the global trend towards fertility decline by relating it to urbanization and industrialization (Mason 1997; Weeks 2008). Developed countries experienced the onset of this fertility transition at the beginning of the 20th century (Reher 2004) attaining a fertility level of 1.5 children in 2005 (United Nations 2006). Developing countries, on the other hand, started their fertility transitions between the mid 1970s and the late 1980s (Reher 2004). While the fertility rates of developing countries are still relatively high at around 2.9 children (United Nations 2006), they are projected to catch up in time with the rates of most developed countries. Of the least developed countries, the region that has the highest fertility rate is Africa with 4.98 children (United Nations 2006). Within Africa, sub-Saharan Africa holds an even higher rate of 5.49 children (United Nations 2006). Despite the difficulty in establishing the rate at which fertility is declining in the region with certitude, it is generally recognized that this trend exists (Cohen 1998). In fact, studies have revealed regional variability within Africa, indicated by a faster and earlier onset of fertility decline occurring in Southern Africa contrasted

by a much slower rate observed in West Africa (Cohen 1998). In West Africa, Ghana is leading the transition with a 4.4 total fertility rate (TFR), which is below its neighbors Cote D'ivoire 's 5.3 and Burkina Faso's 5.9 (Agyei-Mensah 2006).

The traditional fertility transition model has been criticized because it was based on the demographic changes that occurred throughout Europe and the West at the end of the 19th century, where urbanization and industrialization were identified as major drivers of fertility decline. In other regions of the world, however, it appears that fertility transitions are driven by multiple interacting factors (Mason 1997); factors that are less related to industrialization and economic growth than they are to an urban transition. It is widely recognized that urban areas tend to have lower fertility rates when compared with rural areas (White et al. 2005). Since Africa is urbanizing at a rapid pace (United Nations 2006), one would expect a strong decline in overall fertility rates, which is currently not the case. The steady growth of population in sub-Saharan Africa is due mainly to improvements in health care that are lowering infant and childhood death rates. Rural areas, characterized by their fragile economies, are incapable of absorbing this population increase which generates a rural exodus (Weeks et al. in press).

In sub-Saharan Africa one of the main reasons why fertility has remained so hard to control is the cultural importance of reproduction as a means to ensure the survival of traditional lineages (Caldwell 1996). Given the prevalence of high fertility in the region, the slow spread of birth control seems not to be driven by the need to reduce the number of children, but rather by a need to space pregnancies (Bongaarts, Frank, and Ron 1984; Caldwell, Orubuloye, and Caldwell 1992; Cohen 1998; Bledsoe and Hill 1998). Sustained fertility decline, as Coale (1973) explains, occurs when three preconditions are met; fertility must be within the calculus of conscious choice; reduced fertility must be advantageous and effective; and techniques of fertility reduction must be available. Kingsley Davis's (1963) theory of demographic change and response emphasizes the importance of social structure in shaping demographic behavior. Following Davis and also Lesthaeghe (1989) the central hypothesis that guides this research is that in sub-Saharan Africa the family, and more specifically the structure of the household, plays a major role in influencing couples' fertility choices and also in defining women's perception of reproduction as advantageous or disadvantageous.

This study focuses on the examination of household structure as an important determinant of fertility in Ghana and how it varies across space and over time. The goal is to explore the relationship between fertility levels and household structure, focusing on whether a woman's level of reproduction is related to the type of household in which she lives. Households are characterized by patterns of cohabitation identifying for example single parent households, extended family households or households with foster children. The analysis is based on the Ghana Demographic and Health Surveys (GDHS) for the years 1993, 1998 and 2003. Using data at the individual level from the GDHS allows the major spatial and temporal trends of both fertility and family structure to be examined. The correlation between fertility and family structure is estimated through logistic regression analyses while controlling for age, education, income, use of contraceptive, and other factors. Results for 1993, 1998, and 2003 are compared for the purpose of examining temporal patterns with a regional scope.

Background

Fertility decline, as Notestein defined in the 1950s, was part of the demographic change that would transform agrarian societies into industrial ones. Industrial societies facing a lower demand for agricultural labor and a higher demand for better education would see a decline in

the economic value of children (Bongaarts and Watkins 1996). Studies in developing countries have established a correlation between higher incomes and lower fertility rates (Bollen, Glanville, and Stecklov 2002; Bollen 2007), however this correlation has not been able to explain the fertility behavior of people in many parts of the developing world (Mason 1997). Fertility transitions taking place currently in Sub-Saharan Africa differ from previous transitions in terms of their pace (Casterline 2001), but also in what can be defined as their drivers. The reduction in fertility rates in these countries is not correlated with a reduction in reproduction expectations, as it was in the West. Instead, it is linked to an increased practice of spacing births (Caldwell, Orubuloye, and Caldwell 1992; Cohen 1998; Bledsoe and Hill 1998).

In developing countries, Bongaarts and Watkins (1996) explain that reproduction decisions are highly influenced by levels of social interaction. Regions, countries and areas that have not gone through fertility transitions are spaces that are relatively isolated in terms of social interaction. In the case of West Africa, Addai and Trovato (1999) discuss the prevalence of a high "ethnic fertility" characterized by a cultural background that promotes high reproductive expectations. Fertility levels that appear to be strongly influenced by this ethnic component are susceptible to a process of structural assimilation, where assimilation is defined by first by increasing levels of education, later marriages and a stronger female presence in the labor force (Weeks et al. 2004).

Education has proven to play a major role in determining fertility rates. Mass education, by shaping family's economies and the world view of family members, has been recognized as a major driver of reproduction onsets both in developed and developing countries (Caldwell 1980). At the same time, the impacts of education on fertility vary globally. In the case of Latin America and Asia, education is a strong determinant of fertility transitions, whereas in the case of Sub-Saharan Africa its impacts seem to be less noticeable (Cleland and Rodriguez 1988). Regional differences are also evident in Sub-Saharan Africa. The spread of primary schooling in countries that have achieved levels of mass education such as South Africa, Zimbabwe or Kenya has had a strong effect on reducing fertility rates by increasing the demand for contraception (Kirk and Pillet 1998); whereas in countries where education levels remain low, its impact on fertility is less important (Lloyd, Kaufman, and Hewett 2000).

Urbanization stimulates assimilation and social interaction and thus has been regularly linked to fertility declines in both developed and developing countries (Mason 1997). In Ghana, the southern regions, which have smaller rural populations, have a clear tendency towards lower fertility. This stands in contrast to the northern more traditional and rural regions that have characteristically much higher fertility prevalence (Caldwell 1967). Migration to the city and the process of assimilation to the urban lifestyle has been shown by White et al. (2005) to have an impact on reproduction decisions in Ghana. Urban areas in developing countries, with their high population densities and high cultural diversity, gather a diverse set of reproductive strategies, which means wider ranges in fertility levels (Montgomery 2003). In Cairo, Weeks et al. (2004) showed that the higher fertility levels in the city are actually comparable to those found in rural Egypt, while Weeks et al. (in press) , showed that in Accra fertility levels are more strongly correlated to housing characteristics with the highest fertility rates occurring in slums and slum-like neighborhoods. The differences in fertility rates observed in the city can be interpreted as the different degrees of assimilation to the urban lifestyle. Areas with higher fertility rates tend to be areas with lower access to services, a characteristic that makes them comparable to rural villages. Results from Accra suggest that the relationship between slums and fertility are significant at the neighborhood level, but much weaker at the individual level of observation. Although housing

characteristics do correlate with fertility, the weakening of the relationship at the individual level points to its insufficiency as a unique determinant of fertility. The variables that are traditionally omitted when studying the connection between socio-economic status and fertility are the ones that relate to the cultural context; a context that has proven to be strongly connected to reproduction decisions in Sub-Saharan Africa (Caldwell and Caldwell 1987; Lesthaeghe 1989).

Reproductive decisions in Sub-Saharan Africa are highly influenced by religion (Caldwell and Caldwell 1987) and family system (Caldwell 1996). In Ghana, Gyimah et al. (2008) have shown that there is a connection between a couple's religion and their level of fertility. Couples belonging to traditional African faiths have higher fertility rates than Muslim and Christian couples. Kinship not only represents the foundation of the organization of traditional groups in Ghana, it defines clans at the regional scale and lineages at the local scale (Nukunya 2003). In West Africa, Caldwell (1996, p. 335) characterizes lineages for their 'reverence for ancestry and descent' referring to them as a 'continuing line stretching infinitely backward into the past and forward into future'. Elders in these traditional societies are not only respected by the young; they are also supported by them as an obligation to the survival of the lineage. Belonging to a lineage in West Africa is permanent. Members stay as a part of their own lineages of origin even after marriage, and this means that the link to the lineage is a much stronger link than the conjugal one (Caldwell 1996). Takyi and Dodoo (2005) found that in matrilineal ethnic groups in Ghana, the connection between women's reproductive preference and their effective use of contraceptive is stronger compared to patrilineal ones, because matrilineal groups give more power and independence to women compared to patrilineal ones.

In Ghana, residential units normally correspond to extended family units and the composition of these units is based on the adopted line of descent. The definition of a lineage as patrilineal or matrilineal plays a major role in determining where the family members reside. Patrilineal descent tends to be the most common type of descent in Africa; however Ghana is predominantly matrilineal when it comes to descent patterns. The Ashanti or Akan, the largest ethnic group in the country, are a matrilineal society. They are followed in numbers by bilateral descent groups such as the traditional kingdoms of Gonja, Dagomba and Wala; whereas patrilineal descents are the least common, they are present in northern tribes such as the Tallensi and southeastern societies such as the Ga and Adangme (Nukunya 2003). Patrilineal societies tend to be virilocal, meaning that the family settles in the husband's compound. Exceptions to this, however, are quite common as in the case of the Ga, where men and women live in different compounds with boys moving out of the female's compound at puberty (Nukunya 2003). Matrilineal societies, on the other hand, are considered matrilocal which means that in most cases men and women will also live in different compounds and children are generally not allowed to live with their fathers (Nukunya 2003). Children's residential arrangements in fact are very diverse because of the importance of the practice of fosterage in the region which allows parents to send their children to be raised in a different household (Caldwell 1996). Lineages define a variety of living arrangements, household sizes and structures. In this context family systems are not only very difficult to standardize in Ghana, but are also difficult to relate to the western paradigms of household structure (Desai 1992; Van de Walle 2006).

Household structure has been linked to fertility from different perspectives. Studies have found that household size correlates positively with fertility (Bongaarts 2001), couple's characteristics relate to reproduction rates (Oheneba-Sakyi and Takyi 2001), while polygamy has been associated with lower fertility rates (Bongaarts, Frank, and Ron 1984; Dodoo 1998). Research that focuses on living arrangements has found that parent-child cohabitation plays a

role in defining reproduction decisions (McDaniel and Zulu 1996) and female cohabitation with a family member of the same generation has a negative relationship to birth rates (Moultrie and Timus 2001).

The hypothesis to be tested in this study is that fertility varies according to the organization of the family structure in the household. A corollary to this is that since family structure varies by region, fertility will also vary not only from household to household, but also will vary spatially across different regions.

Methodology

Household Structure and Fertility for Ghana from GDHS Data

The analysis is based on data from the Ghana Demographic and Health Surveys (GDHS) from 1993, 1998 and 2003. The main value of the GDHS is that they enable the examination of regional and temporal trends in both fertility and family structure. Surveyors collect data at the individual level from a sample of women of reproductive ages (15 to 49) from the household where she lives, from her children and her partner. The individual module was used to generate the fertility dependent variable, whereas the household member module was used to generate the household structure variables. Independent and dependent variables are defined as a set of dummy variables.

Household Structure and Fertility Variables from GDHS

Two measures of fertility were defined as the dependent variables; the first one corresponds to the event of a woman of reproductive age having a birth in the last year, while the second one corresponds to a birth in the five years prior to the survey. Independent variables were used to portray family structure, socio-economic status, religion and ethnicity. Household structure variables were derived from each household member's relationship to the head of the household. Households are classified as two parent, single parent, polygamist and extended family. Household composition patterns were further examined by identifying the presence of different generations in the household, parents, siblings and grandchildren of the head. Finally the last set of composition variables identified households with children that have a mother or a father living away and households with foster children (both mother and father living away). An additional variable was created to identify the practice of fosterage but this time by looking at women that have children living elsewhere. The socio-economic status and attitude towards family planning were measured through variables of age, education, occupation, place of residence, and use of contraceptive. The age of the respondent was classified in three different categories that represent different cohorts, less than 25 years old, between 25 and 34 and 35 to 49 years old. Education of the respondent was classified in three categories of no schooling, primary and higher education. A self reported variable of place of residence classified as urban or rural was used. The use of contraceptive was defined as women having ever used modern contraception, as opposed to no use at all or the use of traditional and folkloric methods. Additionally, women that are the head of households and wives of the head of the household were identified using two dummy variables. Finally, households were classified based on the religion and ethnicity of the head.

Logistic Multiple Regression Models at the National Level with GDHS Data

The correlation between household structure and fertility was estimated through a logistic multiple regression model where fertility was defined as the dependent variable and

household structure as a set of independent variables controlling for religion, ethnicity, age, education, household wealth, parity, use of contraceptives, region, and urban or rural residence, (Eq. 1):

$$Log\left(\frac{p}{1-p}\right) = b_0 + b_1 x_1 + b_2 x_2 + ... + b_k x_k + e \quad (1)$$

where *p* is the probability of having had a live birth in the given interval (one or five years) prior to the survey, *b* corresponds to the beta coefficients for each one of the *x* independent variables. The use of the logistic regression approach allowed us to model the odds of a woman having a birth in the last year or in the last five years given the organization of her household while keeping the control variables constant. Running these regression models allowed us to understand the connection between household structure and fertility, including not only how it varies according to ethnic or religious denomination, but also in terms of the temporal trend of this correlation between 1993 and 2003.

Logistic regressions were run with three different sets of independent variables for each one of the three years of GDHS data. Model 1 corresponds to the household structure variables of interest, ethnicity and religion. Model 2 includes the variables of interest plus the socio-economic control variables; age, use of contraception, education and occupation. Model 3 includes the variables of interest and socio-economic controls plus region and place of residence. Variables that show significant effects for both measures of fertility at the same time are interpreted as having a considerable impact on reproduction.

Results

Examining the GDHS data (Table 1), we see that the most common household structure for the three survey years has been extended family, followed by two-parent households. Living arrangements that include, parents, parents in law and siblings of the head of the household follow an increasing trend between 1993 and 2003. Additionally, the practice of fosterage is a significant part of living arrangements along with increasing values for both mother and father living outside of the household.

Table 1. Household Structure of DHS Respondents in Percent for 1993, 1998, and 2003

	1993	1998	2003
Household structure			
Single parent	26.1	21.5	15.1
2 parents	32.4	34.5	31.5
Polygamist household	5.7	5.8	4.9
Extended family	35.8	38.2	48.5
Parent of the head in household	3.2	4.0	7.1
Sibling of the head in household	6.0	5.9	7.7
Foster children in household	17.5	17.5	22.0
Mother living away	18.4	18.4	22.3
Father living away	42.9	38.8	41.0
number of hh members (mean)	5.3	5.3	5.9
male head	58.2	62.7	66.8
age head (mean)	41.1	43.5	45.0

Results from the logistic regression in model1 for 1993 (Table 2) indicate that six of the household structure variables have a significant effect on reproduction. Households with higher fertility levels are two parent households, households where grandchildren of the head reside and households with more members. The result of two parent households showing higher fertility levels is an expected result since women involved in relationships have a higher probability of becoming pregnant. The variable with the highest positive effect on fertility is grandchildren of the head residing in the household, a variable that denotes the positive effect of extended family on fertility. The importance of household size in defining fertility levels can also be depicted through the number of household members, which has a strong positive effect on the dependent variable. Households where women are married to the household head have the second highest fertility levels, a result that is consistent with the strong effect that two parent households have on fertility. The only variable having a negative effect on fertility is age of the household head; an outcome that points to the change of cohorts. Interestingly, the variable father of children lives away, has a very strong positive effect on fertility, which is a surprising result since one might expect that the absence of the husband in the household would act as a deterrent to having additional children.

When the control variables are added in models 2 and 3, the effects of the household structure variables on fertility are consistent with model 1 with the exception of four significant variables: foster children, sibling of the head of household, single-parent head of household, female head of household. The presence of foster children and siblings of the head in the household have a negative effect on fertility, whereas single parent households and households with a female head have a positive effect on fertility. In terms of fosterage, the negative correlation between the presence of foster children in the household and fertility levels can be interpreted as both cause and effect, since women having fewer children would be expected to be willing to take additional foster children under their care. The negative relationship between siblings of the head and fertility is an unexpected result since one could infer that the assistance

provided by these additional household members might act as an incentive for reproduction. The positive effect of the variables, single parent households and female head, on fertility is unexpected since one would assume that the absence of partners would translate into lower fertility levels

Table 2. Logistic Regression Estimates of the Effects of Household Structure on the Odds of a Woman Having a Birth in the Last Year and in the Last Five Years for 1993

Variables	Model 1 Birth in 1 Year exp(b)	Model 1 Birth in 5 Years exp(b)	Model 2 Birth in 1 Year exp(b)	Model 2 Birth in 5 Years exp(b)	Model 3 Birth in 1 Year exp(b)	Model 3 Birth in 5 Years exp(b)
Religion (traditional)						
Protestant	0.663**	0.493**	0.724*	0.588**	0.745	0.576**
Catholic	0.72*	0.473**	0.839	0.599**	0.871	0.581**
Other Christian	0.713*	0.635**	0.787	0.785	0.804	0.765
Muslim	0.918	0.661*	1.005	0.889	1.064	0.766
Ethnicity (Other)						
Akan	0.837	0.747	0.864	0.762	0.773	0.634*
Ga	0.909	0.614*	0.92	0.669	0.94	0.652
Ewe	0.735	0.691	0.698	0.727	0.669	0.735
Mole Dagbani	0.865	0.99	0.782	0.806	0.786	1.046
Grussi	0.867	1.331	0.78	1.163	0.775	1.397
Household Structure (extended family)						
Single Parent	1.415	1.686**	3.027**	2.363**	2.937**	2.236**
2 Parents	1.779**	1.721**	2.834**	2.961**	2.702**	2.897**
Polygamist	1.004	0.988	1.09	0.96	1.073	0.958
Parent of the head in household (no)						
Yes	1.341	1.137	0.79	0.704	0.755	0.689
Grandchildren of the head in household (no)						
Yes	2.965**	4.222**	1.946**	3.288**	1.964**	3.3**
Sibling of the head in household (no)						
Yes	0.939	0.817	0.556*	0.46**	0.524*	0.482**
Foster children in household (no)						
Yes	0.836	0.7	0.439**	0.437**	0.444**	0.432**
Mother of children lives away (no)						
Yes	0.738	0.561**	0.79	0.669*	0.782	0.677*
Father of children lives away (no)						
Yes	1.606**	2.113**	1.674**	1.99**	1.602*	1.955**
Number of household members	1.153**	1.174**	1.844**	1.847**	1.855**	1.839**

Table 2. (continued)

Sex of head of household (male)						
Female	1.237	1.756**	1.821**	1.997**	1.81*	2.027**
Age of the head of household	0.96**	0.946**	0.973**	0.966**	0.973**	0.965**
woman has children living away (no)						
yes	1.134	1.842**	1.055	1.326*	1.057	1.267
woman is the spouse of head (no)						
yes	2.665**	8.894**	3.183**	3.79**	3.16**	3.826**
Age of respondent (more than 35)						
Less than 25			1.366	0.603**	1.321	0.594**
25 to 34			1.903**	2.193**	1.884**	2.174**
Use of contraception (no)						
yes			0.863	1.843**	0.873	1.865**
Highest education (Higher)						
No schooling			1.404	1.594*	1.297	1.411
Primary			1.521	1.603**	1.44	1.486*
Work of partner (non agricultural)						
Agricultural work			1.174	1.89**	1.101	1.858**
Not working			1.257	2.15*	1.312	2.083*
Parity (no previous births)						
At least one previous birth			0.525**	0.471**	0.525**	0.474**
Region (Greater Accra)						
Western					0.981	1.044
Central					1.117	1.446
Volta					0.885	0.901
Eastern					0.693	1.127
Ashanti					1.206	1.426
Brong Ahafo					0.824	1.081
Northern					0.759	1.03
Upper West					0.522	0.522
Upper East					1.104	0.676
Place of residence (rural)						
Urban					0.78	0.867
Constant	0.248**	1.751	0.016**	0.137**	0.022**	0.173**

*p<0.05 **p<0.01 parentheses indicate omitted/reference category

Results from the logistic regression for model 1 in 1998 (Table 3) indicate that all of the variables except for two parent households are significant in both 1993 and 1998. The variable, households where the grand children of the head reside, has the strongest positive effect on fertility, followed by women is the spouse of the head in both 1993 and 1998. In contrast to 1993, grandchildren of the head in the household is not significant for models 2 and 3. In both of these models, the variables single parent and two parent households have a positive effect on fertility while the variables siblings of the head and foster children in the household have a negative effect on fertility levels. It is also noteworthy that we continue to see the variable father of children lives away exhibiting one of the strongest positive effects on both measures of fertility (2.32, and 2.30 respectively).

In 2003 (Table 4) the variables that were significant for model 1 remained significant through models 2 and 3. Consistent with previous years, the variable with the strongest positive effect on fertility is grandchildren of the head in the household, followed by women in the household married to the head. The key difference between the results in 2003 and those from 1993 and 1998 is that the variables foster children and siblings of the head in the household were significant for all of the models, both with and without the control variables. This result could be interpreted as a trend towards the increasing importance of these two particular types of co-habitation practices on fertility levels. Conversely, the decreasing effect of two-parent households and single parent households on fertility suggests that the latter two household structures may no longer be an important determinant reproductive decision in this context.

In terms of household size, larger households exhibit higher fertility levels for the three years, which may relate to the fact that these households have additional people present to assist with child rearing. This effect is most pronounced for cases where the grandchildren of the head are present in the household. The exception to this trend occurs when you have foster children and siblings of the head of household present. In those two household structures, lower fertility levels were identified for the three survey years.

Analyzing the variables pertaining to religion, results from 1993 reveal that protestant and catholic households had fewer children in comparison to other religions. This relationship between religion and fertility, however, does not appear significant in either 1998 or 2003. In terms of contraception practice and its impact on fertility levels, there is an unexpected positive correlation between the use of contraception and increased fertility throughout the GDHS survey periods. The use of contraception in this context has been recognized in previous research as a means to space births apart rather than to reduce reproduction levels (Caldwell, Orubuloye, and Caldwell 1992; Cohen 1998; Bledsoe and Hill 1998).

Taking into account the region and place of residence, results from model 3 show the presence of regional variability in terms of the strength of the relationship between household structure and fertility (Figure 1, p. 30). Positive effects on fertility occur for the following six variables: two parent households, grandchildren of the head in the household, father living away, number of household members, female head and women as the wives of the head of household. While the coefficients remain positive across regions, the degree to which they vary ranges from low (values close to 0) to high (values greater than 10) probability of having an impact on fertility levels. Only three variables are shown to have a negative effect on fertility; single parent households, foster children and age of the head (Figure 1, maps d, e, and i, respectively). An example of this regional variability can be seen through the analysis of single parent households on fertility levels. In the Volta Region, single parent households have a pronounced negative effect on fertility while in the Central Region the effect is the opposite (Figure 1, map a). Focusing on the place of residence, results indicate that women from urban areas had lower

fertility levels when compared to women from rural areas for the years 1998 and 2003, but not 1993.

Table 3. Logistic Regression Estimates of the Effects of Household Structure on the Odds of a Woman Having a Birth in the Last Year and in the Last Five Years for 1998

Variables	Model 1 Birth in 1 Year exp(b)	Model 1 Birth in 5 Years exp(b)	Model 2 Birth in 1 Year exp(b)	Model 2 Birth in 5 Years exp(b)	Model 3 Birth in 1 Year exp(b)	Model 3 Birth in 5 Years exp(b)
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yes	2.665**	8.894**	3.183**	3.79**	3.16**	3.826**
Age of respondent (more than 35)						
Less than 25			1.366	0.603**	1.321	0.594**
25 to 34			1.903**	2.193**	1.884**	2.174**
Use of contraception (no)						
yes			0.863	1.843**	0.873	1.865**
Highest education (Higher)						
No schooling			1.404	1.594*	1.297	1.411
Primary			1.521	1.603**	1.44	1.486*
Work of partner (non agricultural)						
Agricultural work			1.174	1.89**	1.101	1.858**
Not working			1.257	2.15*	1.312	2.083*
Parity (no previous births)						
At least one previous birth			0.525**	0.471**	0.525**	0.474**
Region (Greater Accra)						
Western					0.981	1.044
Central					1.117	1.446
Volta					0.885	0.901
Eastern					0.693	1.127
Ashanti					1.206	1.426
Brong Ahafo					0.824	1.081
Northern					0.759	1.03
Upper West					0.522	0.522
Upper East					1.104	0.676
Place of residence (rural)						
urban					0.78	0.867
Constant	0.248**	1.751	0.016**	0.137**	0.022**	0.173**

*p<0.05 **p<0.01 parentheses indicate omitted/reference category

Table 4. Logistic Regression Estimates of the Effects of Household Structure on the Odds of a Woman Having a Birth in the Last Year and in the Last Five Years for 2003

	Model 1	Model 1	Model 2	Model 2	Model 3	Model 3

Variables	Birth in 1 Year exp(b)	Birth in 5 Years exp(b)	Birth in 1 Year exp(b)	Birth in 5 Years exp(b)	Birth in 1 Year exp(b)	Birth in 5 Years exp(b)
Religion (traditional)						
Protestant	0.8	0.604**	1.083	0.893	1.127	0.943
Catholic	0.548**	0.583**	0.721	0.822	0.706	0.838
Other Christian	0.793	0.626**	1.006	0.824	1.029	0.846
Muslim	0.756	0.657**	0.929	0.916	0.95	0.915
Ethnicity (Other)						
Akan	0.536**	0.772	0.763	0.966	0.74	0.953
Ga	0.647*	0.98	0.781	1.09	0.871	1.239
Ewe	0.554**	0.745	0.703	0.787	0.658	0.749
Mole Dagbani	0.924	1.24	0.811	0.951	0.796	1.077
Grussi	0.476**	1.202	0.495*	1.141	0.507*	1.412
Household Structure (extended family)						
Single Parent	1.203	1.57**	1.284	1.431	1.265	1.353
2 Parents	1.637**	1.451**	1.574*	1.644**	1.528*	1.532**
Polygamist	1.001	1.304	0.95	1.297	0.908	1.157
Parent of the head in household (no)						
Yes	0.961	1.241	0.784	1.115	0.77	1.092
Grandchildren of the head in household (no)						
Yes	3.471**	4.418**	2.547**	2.9**	2.422**	2.726**
Sibling of the head in household (no)						
Yes	0.61*	0.939	0.417**	0.54**	0.411**	0.488**
Foster children in household (no)						
Yes	0.582**	0.702*	0.457**	0.607**	0.459**	0.62**
Mother of children lives away (no)						
Yes	0.955	0.573**	1.007	0.582**	0.996	0.563**
Father of children lives away (no)						
Yes	1.684**	1.834**	1.628**	1.816**	1.598**	1.753**
Number of household members	1.115**	1.104**	1.254**	1.288**	1.258**	1.281**

Table 4. (continued)

Sex of head of household (male)						
Female	0.989	1.494**	1.103	1.379*	1.159	1.501**
Age of the head of household	0.959**	0.967**	0.971**	0.977**	0.972**	0.978**
woman has children living away (no)						
Yes	1.313*	2.691**	1.044	1.659**	1.009	1.574**
woman is the spouse of head (no)						
Yes	2.987**	9.074**	2.476**	3.865**	2.513**	3.973**
Age of respondent (more than 35)						
Less than 25			1.367*	0.886	1.316	0.827
25 to 34			1.981**	3.268**	1.972**	3.262**
Use of contraception (no)						
Yes			0.899	1.772**	0.911	1.894**
Highest education (Higher)						
No schooling			1.614**	1.8**	1.549**	1.651**
Primary			1.442**	1.552**	1.401*	1.449**
Work of partner (non agricultural)						
Agricultural work			2.184**	2.881**	1.915**	2.346**
Not working			0	0	0	0
Parity (no previous births)						
At least one previous birth			0.783**	0.708**	0.776**	0.699**
Region (Greater Accra)						
Western					1.458	1.081
Central					1.178	1.194
Volta					1.373	1.198
Eastern					1.07	0.989
Ashanti					1.246	1.316
Brong Ahafo					1.136	1.148
Northern					1.304	1.743*
Upper West					1.229	0.73
Upper East					1.011	0.969
Place of residence (rural)						
Urban					0.744*	0.609**
Constant	0.334**	0.626	0.063**	0.135**	0.063**	0.168**

*p<0.05 **p<0.01 parentheses indicate omitted/reference category

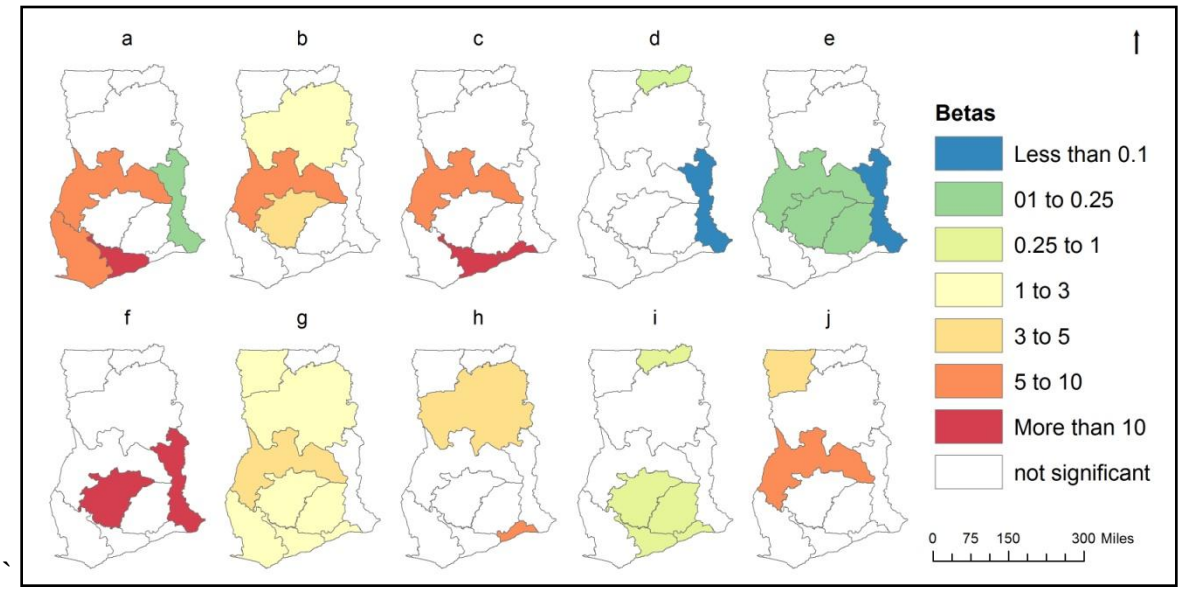

Figure 1. Regional estimates of the effects of household structure on the odds of a woman having a birth in the last year for 2003. (a) single parent household, (b) two parent households, (c) grandchildren of the head in the household, (d) single parent households, (e) foster children in the household, (f) father of children in the household living away, (g) number of household members, (h) female head, (i) age of the head, (j) female spouse of the head.

Conclusions

The hypothesis driving this research is that decision-making involving reproduction in West Africa is influenced by the social interaction of family members in the household. Measurement of these complex social interactions presents a challenge for demographic research. For the purpose of this study the assumption was made that indicators of household structure serve as a proxy for the nature of interpersonal relations that are taking place within the household. Furthermore, we test the hypothesis that the correlation between household structure and fertility is not constant across space.

The results from this research indicate that fertility levels correlate to a variety of living arrangements. At the national level, there is a consistent trend of larger households exhibiting higher levels of reproduction, particularly for households where grandchildren of the head reside. However, for the specific cases of households with foster children and siblings of the head cohabitating the opposite effect is observed. Conversely, households with children that have fathers residing elsewhere showed a consistent higher fertility level for the three years of the GDSH survey. While this result appears to counter the view that one would expect fewer children in households where the father is absent, it may provide some useful insight when looking at the effects of circular migration on reproductive decision-making in Ghana. The full paper will extend the analysis of these patterns across regions over time, and will incorporate data from the 2008 GDHS into the analysis.

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