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Women's Educational Attainment and the
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Abstract

This paper examines the effects of women's educational attainment on the timing of parenthood in Ghana. Given the more enhanced career opportunities in recent years, it is argued that the opportunity cost of parenthood may be higher for contemporary educated women, and as such, they are expected to delay parenthood for longer periods than their counterparts in the past. Using data from the 1998 Ghana Demographic and Health Survey, we found that while higher educational attainment was associated with delayed parenthood, significant cohort differences were noticeable. Consistent with our expectations, the effect of higher educational attainment was substantially greater among younger women, indicating a longer transition to parenthood. Besides educational attainment, religion, ethnicity, age at marriage birth, and place of residence were also found to associate with the timing of parenthood.

Word count: 131

Key words – Age at first birth/ timing of parenthood, cohort, educational attainment, Ghana/ Sub-Saharan Africa.

Introduction

The timing of parenthood— defined as a woman’s age at first birth— has been found to have broader implications over the life course (Gyimah, forthcoming; Mirowsky, 2002; Mirowsky and Ross, 2002; Pienta, 1999; Taniguchi, 1999; Morgan and Rindfuss, 1999; Grindstaff et al., 1991; Balakrishnan et al., 1988; Rindfuss et al., 1984; Hirschman and Rindfuss, 1980; Trussell and Menken, 1978; Bumpass et al., 1978). In the absence of effective contraception, for instance, the total number of children a woman bears is principally a function of the age at which childbearing begins.¹ The recent decline in fertility in parts of sub-Saharan Africa has been attributed, in part, to the rising age at first birth (Kirk and Pillet, 1998).

Additionally, there is a growing body of literature that suggests that family well-being is conditioned by how soon childbearing begins. There is evidence, for instance, that women who have early first births tend to be poorly educated and have lower income and fewer assets later in life. Early first birth may also signify a poor start to family formation and may be associated with things such as premarital parenthood and unstable marriage, creating the conditions that may result in social-psychological problems such as increased risk of depression.

¹Although the age at first birth has become less relevant in determining completed family size in some developed countries as a result of low fertility norms and greater use of contraception (Morgan and Rindfuss, 1999; Grindstaff et al., 1991; Balakrishnan et al., 1988; Wineberg, 1988), recent evidence from Ghana suggests it is still an important determinant of children ever born (Gyimah, forthcoming).

The timing of the first birth thus provides clues on the development of future life course alternatives for women. As Morgan and Rindfuss (1999:62) point out “ . . . an early birth is a burden that makes other goals seem less attainable”. The postponement of childbearing may therefore allow women to take advantage of other opportunities including education and paid work which have obvious implications for their independence and social-status.

Considering the potentially wide-ranging consequences of age at first birth, it is surprising that few analytic studies in sub-Saharan Africa have explored the underlying determinants. Research elsewhere has, however, identified a number of factors that seem to have a significant bearing on the age at first birth (Sarjono, 1993; Dewit and Rajulton, 1992; Rao and Balakrishan, 1988; Rao and Murty, 1987; Rindfuss and John, 1983; Rindfuss et al., 1984; Trussell and Bloom, 1983; Hirschman and Rindfuss, 1980). Among these, women’s educational attainment appears to be particularly salient. In general, higher educational attainment has been found to delay childbearing.

To our knowledge, the nature of the association between women’s educational attainment and timing of first birth has not been fully examined in sub-Saharan Africa, particularly the relative effects of education across generations of women. The cohort perspective becomes more important considering the changing educational and career opportunities for young women in the region. In Ghana, for example, literate females as a percent of total adult women increased from 17 to 63 percent between 1970 and 1990 while females as a percent of secondary school students also increased from 26 to 39

percent (UNESCO, 2000). These changes have resulted in significant representations of women in higher status jobs which have implications for their traditional roles as housewives and mothers. Given these, it is possible that the relationship between women's educational attainment and timing of first birth is also changing over time. Accordingly, this paper primarily examines the effects of educational attainment on the age at first birth, and assesses the nature of the association over time using data from Ghana.

Education and age at first birth— a framework

There is considerable empirical evidence that associates higher education with delayed childbearing (Dewit and Rajulton, 1992; Rao and Balakrishan, 1988; Maxwell, 1987; Rao and Murty, 1987; Rindfuss and John, 1983; Rindfuss et al., 1984; Hirschman and Rindfuss, 1980; Trussell and Bloom, 1983). The theoretical link between women's educational attainment and the timing of the first birth may be classified into proximate factors, economic, and cultural factors. The proximate effects operate mainly through variations in age at marriage and contraceptive usage. The economic factors involve the value and cost of children which may depend on the relative priority given to various possible life-pursuits while the cultural considerations include variations in norms and ideas on women's traditional roles as mothers and wives.

The long years of formal education invariably delay a woman's entrance into marriage which indirectly raises the age at first birth. In sub-Saharan Africa, Westoff (1992) has demonstrated that higher education delays marriage and postpones childbearing among women. Estimates from the 1998 Ghana Demographic and Health Survey (GDHS) indicate a median age at marriage of 21 years for ever-married women with 11 or more years of education compared with 18 years for those with no education.

Education also affects the age at first birth indirectly through the use of more effective contraceptive. In several studies in the developing world, the likelihood of contraception use has been found to be significantly higher among highly educated women (Addai, 1999a; Khan and Rahman, 1997; Oheneba-Sakyi and Takyi, 1997; Martin, 1995; Oheneba-Sakyi, 1992). This empirical regularity is due, in part, to greater access to information and greater specialized knowledge on the effectiveness of contraceptives. In the context of Ghana, the probable role of induced abortion in postponing first births among educated women also needs to be recognized. In their study in Ghana, Lamptey et al. (1985) found that educated women were more likely to use modern contraception alongside abortions for timing and spacing of births.

From an economic standpoint, education also affects the timing of the first birth through changes in real and perceived costs and utilities of children (Kasarda et al., 1986; Maxwell, 1987). The decision to have a child entails costs which educated women are better able to assess. Given the higher investment in education, the opportunity cost of leaving the labor market to become a mother is higher for educated women which often

results in the postponement of child bearing or forgoing it altogether as has been observed in some Western countries (e.g., Rajulton et al., 1990). Higher education also enhances opportunities alternative to childbearing such as paid wages. Participation in the labor force, particularly in the modern sector, however, has some implicit norms and values that are often incompatible with childbearing. With higher education, investment cost in children may also increase given the higher socio-economic and cultural aspirations for children of the better educated. Delays may thus follow from decisions to postpone the first birth until the woman feels sufficiently secure to provide for her children (Dewit and Rajulton, 1992).

Culturally, attendance of school takes girls out of the domestic environment and offers literacy and exposure to new ideas that may compete with traditional customs that promote early marriages (Westoff, 1992). By exposing women to non-traditional roles and providing them with the means to establish viable alternatives to motherhood, education expands women's life choices. From this perspective, we would expect that as the duration of a woman's education increases, the decision to become a mother will be delayed because the costs of motherhood will diminish the gains realized by her career goals. The primary effect of education on the timing of first births may thus relate to the development of value orientations that favor personal fulfilment over more traditional roles or marriage and childbearing. Where educated women perceive childbearing as incompatible with attaining personal goals and ambitions, childbearing is likely to be delayed or postponed altogether. Educational attainment and career aspirations thus exert influences that ultimately delay

a women's entry into parenthood.

Notwithstanding the strong theoretical link between educational attainment and the timing of parenthood, a fundamental issue often neglected is the extent to which the relationship may change over time. This is particularly so in societies undergoing major structural changes in women's educational attainment such as those in sub-Saharan Africa. Not only has there been a significant rise in the proportion of women in higher education in Ghana but their career opportunities have also expanded considerably (UNESCO, 2000). Although not on the same scale as observed in the West, recent decades have witnessed the proliferation of economic and political roles for educated Ghanaian women outside the home, a development that has enabled many to include an element of choice in the decision making process on family life.

Moreover, the pronatalist and pro-marriage ideology that in the past confined women to the home is changing. Increasingly, women's education is seen as a practical investment and a pathway to economic success, independence, and enhanced social status. While certain deeply entrenched gender inequalities and attitudinal biases still exist, contemporary educated women in Ghana are freer to pursue non marital careers than those of past generations. These structural and attitudinal changes suggest that the association between education and the timing of the first birth may also be changing over time. Given the enhanced social context and career opportunities for young women, this paper tests the hypothesis that the opportunity cost of starting a family may be higher for contemporary educated women than those of past generations. Accordingly, the transition to parenthood

is expected to be longer for contemporary educated women than their older counterparts.

Data, measures and methods

The data for this study come from the women's questionnaire of the 1998 GDHS. Undertaken by the Ghana Statistical Service in collaboration with Macro International, the GDHS is a nationally representative, stratified, self-weighting probability sample survey of women in the reproductive ages of 15 to 49 years with the objective of providing information that can be used to inform policy. The quality of DHS data has been extensively discussed in the literature and will not be highlighted here. Although there are non sampling errors on some age-related variables, evaluation studies suggest the DHS compares favorably with other large scale surveys such as the World Fertility Survey (Gage, 1995). A major limitation, however, relates to the fact that the data on age at first birth were based on retrospective reports of women which are susceptible to misplacement and omission biases. As Casterline and Trussell (1980) emphasize, however, first births tend to be accurately reported than births of a higher order.

To examine generational differences in educational attainment on age at first birth, three cohorts of ever married women identified by age at survey (under 30 years; 30-39 years; 40-49 years) were isolated. These cohorts are indicative of cultural, social-economic and political factors that have shaped the life course experiences of individual women. While there are significant differences in the experiences of individual women, the prevailing socio-economic and cultural contexts may lead them to similar life experiences.

It needs to be recognized that the older cohorts were exposed to well-defined gender roles and became adolescents at the time when non marital careers were limited.

The dependent variable is the age at first birth measured in completed years. This may also be interpreted as survival time from a childless state to parenthood. Throughout this interval, women may either experience birth or be right censored at the time of the survey. Because censored cases require special treatment in estimating exposure time, normal regression procedures are inappropriate.² To overcome the problem of censoring, survival models make the assumption that censored individuals will eventually experience the event at some future time. Additionally, censoring is assumed to occur randomly over the interval such that censored individuals are assumed to be at risk of experiencing the event at the mid point of the interval.

The Cox proportional hazard model was used to examine the effects of the theoretically relevant covariates on the risk of parenthood. The model also recognizes the fact that the occurrence of first birth is age dependent and not constant over time. Unlike parametric models, the Cox model does not make any assumption about the functional distribution of the timing function and thus appropriate for events whose empirical distribution is unknown. The model is based on the assumption that the ratio of the hazard functions of two individuals is constant throughout the period of observation³. As a result,

²Allison (2000:80), for instance, argues, “while least squares can be used with certain adjustments for censoring, such estimates often have larger standard errors, and there is little available theory to justify the construction of hypothesis test or confidence intervals.”

³The proportionality assumption was examined by plotting the log-minus log on survival time.

two individuals characterized by time invariant covariates vectors x_i and x_j will have the following hazard functions:

$$\frac{h(t / x_i)}{h(t / x_j)} = \frac{h_0(t) \cdot \exp(x_i' b)}{h_0(t) \cdot \exp(x_j' b)} = \exp(x_i - x_j)' b.$$

For each covariate, a positive coefficient implies a higher risk of first birth while a negative connotes a lower risk. For an intuitive interpretation, the coefficients will be transformed by exponentiation (e^β) and can be interpreted as relative risks. A risk ratio significantly greater than one indicates that women with this attribute have a higher risk (earlier timing) of first birth than women in the reference category. Conversely, if the relative risk ratio is less than one, women with this attribute are expected to have a significantly lower risk (later timing) of first birth than women in the reference category.

The main independent variable of this study is women's educational attainment measured in years. It is worth noting that the information on education in the GDHS pertains to the level at the time of the survey but not at the birth of the first child. However, since educational attainment of women in sub-Saharan Africa does not change radically once childbearing starts, we can assume that the level of education at survey is similar to education at the birth of the first child. In this paper, years of educational attainment is categorized into four groups: none, 1-6 years, 7-10 years, and 11 or more

years. While we expect the risk of first birth to be lower among women with higher educational attainment, the magnitude of the effect is expected to be larger among younger cohorts as hypothesized⁴.

Although education's impact on the timing of parenthood is the main focus of this study, we also consider a number of other explanatory variables that affect the timing of births in Ghana.⁵ Variable definitions and descriptive statistics for the control variables—place of residence, ethnicity, religion and age at first marriage— are presented in Table 1. Considering that education affects age at first birth partly through age at marriage as earlier discussed, it is essential to control for the latter in order to explore the net effects of education. Since the age at marriage is usually a normative proxy for the exposure to the risk of conception, we expect women who marry early to have an early first birth and vice-versa.

Table 1 about here

⁴ Although there is some debate on the causal process of education and first birth, evidence elsewhere suggests no effect of early motherhood on educational attainment (see Rindfuss et al., 1984).

⁵ Although contraceptive use and work status before birth have been found to associate with the timing of the first birth, these variables were not included in study because of data limitations.

Ethnicity is also an important variable to consider when examining the timing of births in Ghana. This is because an individual's beliefs and attitudes on reproduction are initially acquired within ethnic and family settings. As is the case in many African countries, Ghana has several ethnic groups that can be identified on the basis of language and similarities in social systems and cultural practices. The main ethnic groups are the *Akan, Mole-Dagbani, Ga, Ewe* and a residual class of Others. These groups have been found to differ in traditions, values, and attitudes toward fertility and reproductive-related behavior (Gyimah, 2001; Addai, 1999a, 1999b; Benefo et al., 1994; Aryee, 1985). Akan women, for example, have been found to be sexually active at an earlier age than non-Akan women which Addai (1999b) attributes to differences in lineage patterns.

The ethnic groups are also regionally based, and as such, have been differentially impacted by modernization.⁶ In general, groups in the 'south' (Akan, Ga-Adangbe and Ewe) have been more exposed to modernization than those in the 'north' (Mole-Dagbani). If ethnic differences in timing of first birth mainly reflect socio-economic disparities among groups, such differences could be expected to disappear over time given the policy emphasis of successive Ghanaian governments to bridge the 'north-south' inequality in development.

Further, due in large part to the pervasiveness of religious institutions in Ghana, a growing body of literature has emerged that examines the role of religio-cultural factors

⁶Spatial disparities in development places certain ethnic groups in a disadvantageous position with respect to educational opportunities and modernization in general .

in the form of beliefs, practices, and norms on reproductive behavior (e.g., Addai, 2000; Addai, 1999a; Dodoo & van Landewijk 1996; Dodoo et al., 1997). While religious norms and beliefs that affect the risk of births cannot be assessed directly due to data limitations, religious affiliation can be used as a proxy. This is based on the assumption that denominational differences in moral proscriptions and normative expectations are vital to behavior formation. Given that many Ghanaians spend considerable amount of time on faith and church-based activities, religion may also provide the milieu for the dissemination and diffusion of family planning messages and reproductive related issues.

It needs to be recognized, however, that religious experiences in Africa have been significantly impacted by what Mazrui (1986) terms the “Triple Heritage”. The African indigenous heritage often serves as the background against which the activities of Islam and Christian cultures take place. In the context of Ghana, there is often a clash between cultures leading to unusual accommodations. Aryee (1985) gives the example of contraception and polygamy which a practicing Catholic in the West finds unacceptable but many Ghanaian Catholics can live with without qualms. Not surprising, Addai (2000) found that women who belonged to what he called the “liberal” religious groups (Protestants and Catholics) were more likely to report engaging in premarital sex than women from conservative Pentecostal and other religious persuasions.

Place of residence is also expected to associate with the timing of parenthood. In general, rural residence has been found to associate with early marriage and early childbearing. The explanations for the rural-urban differential can be grouped broadly

under economic and cultural factors. On the economic front, it has been argued that not only are urban women more educated than their rural counterparts but they are also active players in the formal labor market. Additionally, urban women tend to have better access and knowledge of contraception and are more likely to use efficient methods than rural women (Mauldin and Segal, 1988; Oheneba-Sakyi and Takyi, 1997).

Culturally, rural areas in sub-Saharan tend to be pro-family and are characterized by institutional and normative structures that promote early birth. For instance, while kinship and the extended family system have been found to have profound influence on reproductive behavior in sub-Saharan Africa (e.g., Caldwell and Caldwell, 1987), such influences are less pronounced in urban areas. In this study, a new measure derived from childhood and current place of residence was created that corresponds to the following categories; women who lived in a (a) rural area in childhood and currently live in a rural area; (b) rural areas in childhood but currently live in an urban area; (c) urban area in childhood but currently live in a rural area; and d) urban area in childhood and currently live in an urban area. In the light of the above considerations, we expect urban non migrants to associate with the lowest risk of first births.

Findings and Discussion

In exploratory life table analysis (not reported here), the median age at first birth was found to be 20 years but considerable differences by educational attainment were noticeable. Consistent with theoretical expectations, the median age at first birth was

considerably higher for highly educated women: 19.8 years for women with no education, 19.6 years for those with 1-6 years of education, 20 years for those with 7-10 years of education and 23.7 years for those with 11 or more years of education.

In Figure 1, we explore the differences in educational attainment further by examining the cumulative proportions experiencing first birth at specified ages. For the ease of comparison, only the two extreme education sub groups (no education, 11 or more years) are shown. At all durations, there is evidence that the cumulative proportion attaining first birth is higher among women with no education. At age 20, for example, about 53 percent of women with no education had experienced a first birth compared with only 20 percent of those with 11 years or more of education. Similarly, while about 87 percent of those with no education had given birth at age 25, about 60 percent of the highly educated had started childbearing at that age.

[Figure 1 about here]

Evidence from Figure 1 thus substantiates the effects of higher educational attainment on the later timing of childbearing. However, because no controls are introduced at this level, we are unable to assess the net effects of educational attainment. Against this background, two separate multivariate analyses are estimated, first to explore the net effects of education in the pooled sample, and second, to examine its relative effects across cohorts. For each analysis, three nested models are estimated: Model 1 examines only the effect of education, Model 2 combines education with age at first marriage while Model 3, the full model, includes education with all the theoretically relevant covariates.

The findings from the pooled sample are presented in Table 2. As suggested by the log likelihood ratios and the associated chi-squares, the models are statistically significant. Substantively, educational attainment has a positive and robust association with age at first birth which is consistent with findings elsewhere (Dewit and Rajulton, 1992; Rao and Balakrishan, 1988; Rao and Murty, 1987; Rindfuss and John, 1983; Rindfuss et al., 1984; Hirschman and Rindfuss, 1980; Trussell and Bloom, 1983). As Model 1 indicates, the risk of a first birth is 47 percent lower for women with 11 or more years of education compared with those with no education. In Model 2, there is a reduction in the effects of higher education after controlling for age at first marriage. This suggests that the association between education and age at first birth is partly explained through age at first marriage.

Highly educated women are thus likely to marry late which invariably delays the

onset of parenthood. The significance effects of education in Model 2 validates the other theoretical pathways through which education affects the timing of first birth such as greater access and more efficient use of modern contraception although we cannot explicitly test this due to data limitations. Overall, the linear effects of age at first marriage are also consistent with theoretical expectations. In general, early age at first marriage associates with a higher risk of first birth and vice-versa. In Model 3, for example, the risk of first birth is about 7.47 times higher for women who married under 16 years compared with those who married after 20 years.

[Table 2 about here]

In the full model (Model 3), the effects of ethnicity, religion and residence are also significant. Compared with the *Akan*, the risk of a first birth is 15 and 28 percent lower for *Ga-Adangbe* and *Mole-Dagbani* respectively. The relatively high risk among *Akan* women relative to the other groups could perhaps be traced to differences in lineage and residential patterns. Unlike the patrilineal groups, the matrilineal *Akans* are known to be more liberal towards sexual behavior (Fortes, 1978) and have been associated with a higher likelihood of premarital sex (Addai, 1999b). Catholics also seem to have a higher risk of first birth which could perhaps be explained through doctrinal teachings on abortion, contraception and reproduction in general. As hypothesized, rural non migrants also have a significantly

higher risk compared with urban non migrants which could be due to family-oriented sub-culture and the lack of educational opportunities and non farm careers in rural areas.

In Table 3, we examine the effects of educational attainment across cohorts. Before discussing the results, it is worth noting that the percent censored is significantly higher among the younger cohort. This validates the choice of a statistical procedure that accounts for censoring in the estimation procedures. Substantively, while there are differences in the age at first birth among women with varying levels of education, striking differences can also be seen across cohorts. In all cohorts, higher education associates with later timing of first birth, but the magnitude of the effects are substantial for the younger cohorts. In the full model (Model 3), for instance, 11 or more years of educational attainment reduces the risk of the first birth by 54 percent, 25 percent, and 14 percent for the 15-29, 30-39 and 40-49 cohorts respectively. The overall pattern of risks among education and over cohorts is consistent with the hypotheses formulated earlier— a strong negative relationship and hence a strong delaying effect on the timing of parenthood.

Consistent with our arguments, the pronounced effects of education among recent cohorts could be attributed to the breakdown of cultural barriers that in the past saw motherhood as the main career for women, and also the enhanced career opportunities for contemporary educated women. Given the predominant pro-family ideology in the past,

enormous social pressure was often exerted on women, including those educated, to go into marriage and parenthood in order not to miss out. Increasingly, such attitudes are becoming less pervasive such that contemporary educated women are at liberty to dictate their own reproductive preferences than doing so under parental or societal expectations. Consequently, contemporary educated women delay childbearing for longer periods in order to focus on career aspirations.

The control variables also show some interesting patterns across cohorts. While significant ethnic and religious differences are seen among the oldest cohort, such differences have disappeared among the youngest cohort. In particular, Catholic, Moslem and Traditional women in the past tended to have early first births but such differences have disappeared over time. Similar trends are seen with respect to ethnicity where remarkable differences in the past seem to be declining in recent years. The religious differences in the past could perhaps be attributed to the strict adherence to religious doctrines. As has been observed elsewhere (see Westoff and Jones, 1977), religious differences tend to disappear over time as socio-economic disparities between groups diminish. The convergence in ethnic differences in recent years could also be due to the influence of education. As mentioned earlier, ethnic groups in Ghana are regionally based but varied government policies aimed at bridging regional disparity since independence might have had an impact in reducing inequalities over time.

Summary

Given the far ranging implications of age at first birth over the life course of women, this study examines the role of educational attainment. Considering the changing educational and career opportunities for women, it was argued that the opportunity cost of starting a family may be higher for contemporary educated women than their counterparts in the past. Accordingly, the risk of first birth was expected to be lower among highly educated women than older counterparts. In general, our findings on educational attainment were consistent with previous research elsewhere. The risk of first birth was found to be significantly lower for women with higher educational attainment, indicating a longer transition to parenthood.

While higher educational attainment was found to delay the timing of first birth, the effects were largest among contemporary women. The pronounced effects among recent cohorts has been explained through the enhanced career opportunities for contemporary educated women and breakdown of cultural factors that in the past saw motherhood as the main occupation for women. Besides education, age at marriage, ethnicity, religion, and residence were also found to affect the timing of first birth. Although there were generational variations in ethnicity and religion, such differences have attenuated among contemporary women.

The findings suggest that policies and programs that improve higher educational opportunities for women will be useful in delaying early childbearing. Again, to the extent that most births occur within marriage, there is the need to pay closer attention to policies that might raise the age at marriage. While it is difficult to envision direct policies and

programs to increase age at marriage, education again remains a potentially significant link. With the recent appointment of a substantive Minister with oversight responsibility for Girl Child Education in Ghana, it is expected that more resources including bursaries and special scholarships will be allocated to enhance female education.

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Table 1: Percent distribution of covaraites, Ghana 1998

	Pooled sample	Age at survey (years)		
		15-29	30-39	49-49
Years of education				
None	42.1	37.3	41.5	51.2
1-6 years	17.5	19.4	16.9	15.1
7-10 years	33.0	36.8	33.3	26.0
11 or more years	7.4	6.5	8.3	7.8
Age at First Marriage				
under 16 years	18.8	21.2	16.5	18.0
16-19 years	47.4	50.8	44.7	45.3
20+ years	33.8	28.0	38.7	36.7
Religion				
Protestant	17.0	14.3	18.6	19.4
Catholic	15.4	15.7	14.2	16.5
Moslem	13.3	14.4	12.8	12.1
Traditional	8.9	5.6	9.8	13.1
No religion/others	10.3	10.1	10.9	9.9
Other Christian	35.1	39.9	33.8	28.9
Ethnicity				
Akan	45.2	46.0	44.8	44.5
Ga-Adangbe	6.8	6.4	7.6	6.3
Ewe	12.6	12.0	13.5	12.4
Mole-Dagbani	31.7	31.9	30.5	33.2
Others	3.6	3.7	3.6	3.5
Childhood - current residence				
Rural-rural	42.4	41.7	40.7	46.2
Rural-urban	5.8	5.2	6.2	6.1
Urban-rural	28.0	30.4	27.6	24.7
Urban-urban	23.8	22.7	25.5	23.0
Percent total	100.0	100.0	100.0	100.0
Sample size	3751	1565	1270	916

Table 2: A Hazard Model of the Risk First Birth (pooled sample), Ghana

Variables in the Equation	Model 1	Model 2	Model 3
Years of education			
1-6 years	1.06	1.09	1.00
7-10 years	0.93!	0.96	0.85***
11 or more years	0.53***	0.68***	0.64***
No education (reference)	1.00	1.00	1.00
Age at first Marriage			
under 16 years		7.15***	7.47***
16-19 years		3.19***	3.22***
20+ years (reference)		1.00	1.00
Religion			
Protestant			1.04
Catholic			1.13*
Moslem			0.98
Traditional			1.02
No religion/others			1.17*
Other Christian (reference)			1.00
Ethnicity			
Ga-Adangbe			0.85*
Ewe			0.98
Mole-Dagbani			0.78***
Others			0.72***
Akan(reference)			1.00
Childhood - current residence			
Rural-urban			1.01
Urban -rural			1.02
Urban-urban			0.90***
Rural -rural (reference)			1.00
-2log likelihood	50731	49307	49246
Chi-square change (df)	102 (3)	1424 (2)	60 (12)
Model significance	0.000	0.000	0.000
Sample size	3751		
Percent censored	8.6		

Significance: ***p<0.000; **p<0.01; *p<0.05; !p<0.10.

Table 3: A Hazard Model of the Risk of First Birth by Age at Survey, Ghana, 1998

VARIABLES IN MODEL	AGE AT SURVEY (YEARS)								
	Under 30			30-39			40-49		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Years of education									
1-6 years	1.01	1.05	1.00	0.95	1.05	0.95	1.20!	1.16	1.07
7-10 years	0.76***	0.78***	0.75**	0.92	1.03	0.92	1.25**	1.15!	1.05
11 or more years	0.39***	0.46***	0.46***	0.54***	0.75***	0.70**	0.69***	0.90	0.86
No education (reference)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Age at first Marriage									
under 16 years		8.24***	8.52***		6.50***	7.20***		7.16***	8.14***
16-19 years		3.51***	3.53***		3.08***	3.13***		3.05***	3.13***
20+ years (reference)		1.00	1.00		1.00	1.00		1.00	1.00
Religion									
Protestant			1.08			0.93			1.03
Catholic			1.08			1.10			1.20!
Moslem			0.93			0.83			1.27*
Traditional			0.98			1.04			1.16
No religion/others			1.17			1.04			1.31*
Other Christian (reference)			1.00			1.00			1.00
Ethnicity									
Ga-Adangbe			1.19			0.66***			0.75*
Ewe			1.08			0.90			0.97
Mole-Dagbani			0.95			0.75***			0.60***
Others			1.01			0.62***			0.53***
Akan (reference)			1.00			1.00			1.00
Residence									
Rural-urban			1.04			0.97			0.88
Urban -rural			1.15*			0.97			0.92
Urban-urban			0.89			0.92			0.85!
Rural -rural (reference)			1.00			1.00			1.00
-2 Log likelihood	17145	16565	16544	15523	15043	15004	10752	10387	10348
Chi-square change (df)	74(3)	580(2)	21 (12)	35(3)	479 (2)	39 (12)	23 (3)	364 (2)	39 (12)
Model significance	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sample size	1565			1270			916		
Percent censored	17.1			3.5			1.3		

Significance: ***p<0.000; **p<0.01; *p<0.05; !p<0.10.

Figure 1: Survival Plot of First Birth by Educational Attainment, Ghana.

