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Migration and Fertility in Ghana: Beyond Rural-Urban Differentials

(Short Title: Migration and Fertility in Ghana)

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and

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Abstract

This paper seeks to disentangle the relative role of three mechanisms –selection, adaptation and disruption—in influencing migrant fertility in Ghana. Using the 1998 Ghana Demographic and Health Survey, we fit poisson regression and sequential logit regression models to discern the effects of the above mechanisms on cumulative fertility and annual birth probabilities separately. Four types of migration streams are examined and compared with non-migrants at origin and destination. We find substantial support for the selection hypothesis among all migrant groups. Migrants to urban areas, whether from rural or urban origins, exhibit lower rates of childbearing. Adaptation is evident mostly for urban-rural migrants. We fail to find any support for the disruption hypothesis in Ghana. Our findings suggest that targeting urban-rural migrants, who form the largest group of migrants in Ghana, for motivational change, may be a good strategy for family planning policy makers.

Introduction

Demographers have long been interested in the social and economic processes that affect fertility, such as cultural diffusion, assimilation, economic development and transformation of family roles that migration, particularly rural to urban migration entails. This interest stems from a concern for rapid growth of the urban population. Therefore, considerable amount of research has been carried out over the last few decades into the impact of migration on fertility; much of which has focused on movements of rural population to cities (see e.g. Goldstein 1973; Green 1978; Bach 1981; Lee & Farber 1984; McKinney 1993; Brockerhoff &Yang 1994; White et al. 1995; Goldstein et al. 1997 among others). This focus largely ignores other streams of migration, as well as the impact of migration on rural fertility (for an exception see Goldscheider 1984). While these studies have provided significant findings for specific cases, methodological and data constraints have often resulted in confounded and contradictory findings regarding the mechanism generating migrant-native fertility differentials. Furthermore, there have been very few empirical studies on migration-fertility interrelationship in Africa. In this paper we address these shortcomings by examining all four migration streams –rural-urban, rural-rural, urban-rural, and urban-urban, as well as the non-migrants in destination and origin to delineate the processes through which residential mobility impacts fertility in Ghana.

Theoretical Framework and Previous Research Findings

Three mechanisms have been identified in the theoretical literature that accounts for migrant-native fertility differences: selection effect, adaptation effect, and disruption effect (Goldstein & Goldstein 1983). These differ from each other in their emphasis on exposure to different residential environments versus the circumstances of the move itself. The selectivity hypothesis refers to the tendency for migrants to be self selected for individual characteristics that are associated with lower or higher than average fertility compared to non migrants at the origin. Migrants often differ from non-migrants on observable socioeconomic characteristics –education, age at marriage and employment-- which have an impact on fertility. For example, women who migrate to urban areas may have higher education and age at marriage, and therefore fewer children compared to non-migrants producing a lower urban fertility rate (Goldstein & Goldstein 1981; Hervitz 1985). Selectivity may also occur on the basis of unobserved characteristics such as the propensity to postpone childbearing, openness to change or fertility aspirations (Ribe & Schultz 1980).

Whether or not migrants are selected for characteristics that are associated with lower/higher fertility requires information on non-migrants in the communities of origin. Studies (Kahn 1988; Campbell 1989) conducted with data on destination area only cannot be used to test the selection effect. Furthermore, the degree to which migration is selective depends upon the context of migration. Migrants moving to fulfill their social mobility aspirations are a select group at their place of origin. Once in their destination, their high aspirations may lead to reduced fertility. On the other hand selectivity for migrants moving for family reasons may be considerably less. For example, Lindstrom and Saucedo’s (2002) results with regard to selectivity suggest that migrants may be differentially selected on fertility preferences with respect to migration strategy. Because migrants have heterogeneous preferences with respect to family size, decisions about choice of destination will be influenced by the cost of service and family maintenance in alternative locations, and hence the extent and type of selection will also vary.

A second mechanism is disruption in childbearing through spousal separation or a desire to delay childbearing until after the move. This disruption effect would lower fertility of migrants compared to non-migrants. The interruption in childbearing caused by migration in such cases may be followed by accelerated fertility among migrants (Sharma 1992). The impact of disruption therefore, would be found in the timing of a woman's fertility and the impact may last only a short duration.

The disruption effect has been studied most often in the context of temporary migration. Sharma (1992) explored the impact of temporary separation on fertility and concluded that any relationship between migration and fertility is reflected only in cumulative fertility and that disruption was not a major factor. Hampshire and Randall (2000) find that although seasonal migration is associated with substantially lower fertility, the fertility differential is caused largely by secondary sterility rather than disruption. Disruption has also been studied with detailed data on the timing of the two events (White et al. 1995; Lindstrom & Saucedo 2002). White et al. (1995) found that a residential move reduced the likelihood of childbearing in that year, which provides evidence for disruption effect. However, Goldstein et al. (1997) examined migrant fertility under very restrictive state policy regarding mobility and family planning, and they report conflicting findings. On the one hand they find that rural-urban migrants tend to have later first births, which the authors attribute to the disruption. On the other hand they find that temporary migrants have a slightly higher chance of (first) birth in a year. Using retrospective fertility and migration histories Lindstrom and Saucedo (2000) find, like Sharma (1992), that spousal separation due to temporary migration reduces birth probabilities in the short run, but has little impact on the long run marital fertility. Disruption effect may also be modified by gender and the purpose of migration (Lindstrom and Saucedo, 2000). If women migrate for marriage then we may see not disruption, but rather a short-term spike in fertility.

The third mechanism is adaptation to the fertility regimes of the destination. The adaptation theory has its roots in both sociological and economic theories explaining determinants of fertility (Findley 1980). From the sociological perspective adaptation theory rests on the premise that fertility is determined by social and cultural norms present in the residential environment and emphasizes factors that are important in shaping and transmitting values and ideas (Caldwell 1982). The economic perspective describes the adaptation process primarily in terms of household income and the relative cost of children. Rural-urban wage differentials for men, women and children, and price and income constraints at the destination area, along with employment and educational opportunities change the real and opportunity cost of childbearing, which alters fertility behavior (Becker 1981). Exposure to different socio-cultural norms and relative costs of childbearing will lead to changes in fertility behavior, such that migrant fertility will ultimately converge to that of the urban non-migrants. Typically migrants are coming from high fertility (rural) origins and this convergence implies a decline in the rate of childbearing. The process of assimilation/adaptation is therefore gradual and typically takes a longer time to influence fertility. Sometimes adaptation across generation is termed “socialization”. Therefore ‘duration of exposure’ to the new norms, as measured by length of residence is the crucial element that drives the extent of fertility change due to migration.

Often researchers are unable to test for adaptation effects, because the time span of their data is not long enough (White et al. 1995). A number of studies using US census data do find a negative relationship between fertility and time spent in the destination area --US. These studies attribute this relationship to the gradual assimilation of low fertility norms and to the influence of economic opportunities and constraints in the US that discourage large families (Bean et al. 1984). Kahn (1988) opines that for migrants moving between two types of areas with inherently different norms, their fertility behavior will reflect the combined influence of both the areas.

The empirical evidence on the mechanism generating migrant-native fertility differentials is not clear. A wide array of findings is reported on the influence of the three processes in determining migrant fertility. For example, Bach (1981) finds that adaptation is stronger in explaining migrant fertility than what he calls the "migration effect" --selection or disruption. Trovato (1987) reports that in keeping with the adaptation hypothesis migrants in urban areas eventually reduce their fertility, once assimilation to the urban milieu has taken place. Similarly, Lee & Pol (1993) report a significant rural-urban adaptation effect in Korea and Mexico, even after the selection effect had been controlled, yet they found little evidence of adaptation in Cameroon. Goldstein and Goldstein (1981) in their Thai study found support for both selectivity and disruption. Kahn (1988) finds support for adaptation in that although migrants to the United States tend to display the fertility pattern of their origins, the overall native-migrant completed fertility differentials are quite modest. Campbell's (1989) study on desired family size fits better with disruption than adaptation. In Sub-Saharan Africa Brockerhoff (1995) finds that new arrivals in cities actually exhibit much lower fertility than long term residents of similar age and parity, indicating a selection effect and no adaptation effect. Moreover, adaptation in Sub-Saharan Africa can affect fertility positively or negatively—through use of modern contraceptive or by shortening of the period of post partum abstinence. Adewuyi's (1986) study reveals that there may be situations when migration is not selective, and neither is there any opportunity to change behavior after migration.

These three mechanisms are not mutually exclusive. In addition there may be some interdependence among the three processes. It is likely that a strong selection effect may make adaptation moot. On the other hand, a high level of disruption could lead couples to make up for lost fertility by spacing births more closely after migration and /or delaying the age at which childbearing is stopped. It is necessary, therefore to distinguish the potential effects of migration on cumulative fertility versus the effect on immediate fertility. In so doing, we can better understand the effect of geographic mobility on national fertility trends.

Common to the three theories are two assumptions: 1) rural fertility levels exceed urban fertility and 2) fertility levels of rural-urban migrants are lower than rural residents. Indeed such a broad association between residence and fertility is evident in most societies. However, relatively little is known about the ways in which long term female migrants contribute to fertility change in Africa. Studies have been limited and few data sources are suitable for disentangling the relationships. However, these linkages have critical implications for government programs for fertility reduction. For example, if migrants are self selected for lower fertility they can act as innovators in the community. Similarly, those who move into an area with a propensity for higher fertility can serve as the target group for fertility programs.

Data and Methods

The analysis uses data collected by the Demographic and Health Surveys (DHS) conducted in Ghana between November 1998 and February 1999. The survey is a nationally representative, stratified, self-weighting probability sample of women aged 15-49. It interviewed 4843 women between the ages 15-49 from 6003 households, and collected data on fertility, family planning, and maternal and child health, including complete birth histories. Information on demographic characteristics of the respondents, such as age, education, religion, and region of residence was also collected. The Ghana DHS also contains data from four questions on lifetime mobility: childhood residence, previous residence, current residence, and duration at current residence.

In order to examine the effect of migration on fertility, it is important to look at the impact of migration on total fertility as well as, the timing of births. For example it may be the case that migrants and non-migrants have the same number of children, but migrants complete their family building process more quickly than non-migrants. Therefore, in this analysis we seek to determine the effect of migration on both aspects of fertility. First we examine how past migration experience impacts the total number of children born to a woman. Secondly, we use a sequential logit event history approach to analyze the effect of migration on the pace and timing of births.

To bring out the selection of migrants by observable factors we introduce controls for variables that are known to influence selectivity. For example, in Sub-Saharan Africa unmarried and single, better educated, and adult women in their 20's are more likely to move to urban areas (Brockerhoff & Eu, 1993). In addition to age, education and marital status, we also introduced other control variables, which are known to influence migration and fertility in Ghana (McKinney 1993; Brockerhoff & Yang 1994; Tawiah 1997) --religion, region of residence, age at first marriage (or union) for ever married women and, a measure of household wealth[1]. After eliminating the observable factors, we envisage that any remaining fertility differential between migrants and their area of origin is attributable to the migrant selection by unobservable factors such as motivation or family orientation. We test the disruption effect first by comparing the fertility of migrants who have moved to the same type of place as their place of origin –rural-rural and urban-urban—with the non-migrants in the origin area. Moreover we explicitly examine the effect of experiencing a move on the probability of having a birth in the same year since the impact of disruption is expected to lie in the timing fertility and the impact may not be discernible in the *number* of children born.

The adaptation effect is also measured in two ways. First, we introduce a variable for duration of residence and examine if this variable reveals a converging or diverging trend to the fertility of non-migrants in destination area. Secondly, we examine the coefficients of rural-urban and urban-rural migrants associated with childhood residence and last residence.

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[1] DHS data do not contain direct information on household income or wealth. The possession of household assets is, therefore, used as proxy, with a categorization that reflects low, medium, high and very high household wealth according to the quartiles of the distribution. Note 2 of Table 1 describe how the wealth score was calculated.

<u>Migration and Cumulative Fertility:</u> We use bivariate and multivariate methods to study how past migration experience affects the total number of children a woman bears. The dependent variable is children ever born (CEB), and the primary independent variable is migration status. Given the skewed distribution of our dependent variable (Appendix A), we decided to use a count model, here a Poisson model, for our multivariate analysis of cumulative fertility where the distribution of the number of births a woman has is given by

$$P(Y = y) = \frac{e^{-\lambda}\lambda^{y}}{y!}$$

Here the incidence rate of birth λ is influenced by a set of explanatory variables X_is.

$$\lambda = \exp\,(b_0 + \Sigma b_i X_i)$$

where b_0 is the constant term, and b_i's are the effect coefficients. Our primary explanatory variable --migration status-- is determined from the questions on current residence, childhood residence, last residence and duration of residence at the current place. We identified migrants and non-migrants from responses to the duration of residence question. Any woman who responded 'always' (lived in this place) to the question was classified as a non-migrant; others were classified as migrants. We constructed four categories of the migrants: rural-urban, urban-urban, urban-rural and rural-urban depending on the type of childhood/last residence and current residence[2]. We excluded visitors from our analysis of migration (52 respondents or 1.07% of the sample).

[2] We also examined another migration variable based on childhood residence, last residence, and current place of residence. The analysis did not differ significantly, and so we report only these results.

Table 1 about here

In addition to migration status, we also included age and other socioeconomic background variables mentioned earlier. The definitions of these variables are quite straightforward. Because of the nonlinear effect of age on fertility, we introduced a quadratic term in age in our model specification. Table 1 gives the sample characteristics of the Ghana DHS by type of current residence. We find, from table 1, that the level of population mobility in Ghana is quite high. About 60% of the respondents had changed places since their childhood. The socioeconomic and fertility differentials between rural and urban residents in Ghana are also quite obvious. On the average rural residents have one additional child compared to urban residents. Rural residents are also somewhat older, less migratory, less educated, less wealthy, less likely to be Christian, and more likely to be married.

Migration and Timing of Births

In this second analysis we us annual birth histories, together with the information on the characteristics of the origin and destination areas, to assess the effect of migration on the timing of births. We estimate a discrete time hazard model (sequential logit model) and therefore use a person-year data structure. Each year from age 11 of a person constitutes a record for the analysis. Given the nature of our analysis we had to choose among several possible starting times. We considered age at first intercourse to be the start of the risk period. However, this would mean the starting time would be subject to individual variation not controlled for in our study. We chose to use age 11 as the starting point in our analysis because it represents a fixed starting point for all individuals, and would yield a positive probability for all births in the sample[3]. The exposure period ends at age 49 –the end of childbearing period-- or is censored at current age by the survey.

Unlike many applications of event history, the event of interest in our analysis –births—is a repeatable event. We therefore, chose a time interval of one year for a record, which is sufficiently short so that no more than one event occurs in any discrete time unit. Each record –that is, a year in a respondent's life from age 11 to age at survey date-- contains several characteristics some of which are fixed for all the records of an individual, while others change from record to record. This structure for our data[4] allows us to use logistic regression to estimate the annual birth probabilities. In short, the log odds of a birth occurring in a year 't' is given by:

$$Ln\left(\frac{p_{it}}{1-p_{it}}\right) = b_0 + \sum b_i X_i + \sum b_j X_{jt} + e_{it} \qquad (1)$$

Where Xi's represent the values of fixed covariates, unchanged in the observation period for each individual woman. These include migration status, education, age at first marriage/union, religion, region of residence, and household wealth. Xj's represent time-varying covariates that change as life experience changes. These include respondent's age, marital status, birth order etc. To estimate the right hand side of equation (1) we define an indicator for whether or not a birth occurred in a year of the person year file. Moreover, we model the first birth and higher order births separately since these are essentially different processes with biological factors exerting a greater influence on the

[3] Two births in the sample were recorded as occurring before age 11. Both were assessed as bad data based on the timing of first intercourse.
[4] Using person-year data does not automatically lead to underestimated standard errors or overestimated test statistics, unless the model is mispecified and there is unobserved individual variation, for which the analysis fails to control.

probability of first births than in higher order births. Once an event, for example the first birth, takes place, the woman is removed from the risk set for that event. Censoring via the survey or reaching age 50 also ends the observation. A description of the independent variables used in the study is given below:

Migration experience is defined as lifetime status as in the CEB analysis. Given the nature of DHS questions on migration and residence changes, it was not possible to determine the changing migration experience for each year of an individual. Therefore, this variable is kept in the hazard model as a fixed covariate.

Selection of other appropriate socioeconomic and demographic background variables for controls in the analysis was aided by former studies on migration and fertility and theoretical considerations. Ten variables were chosen for in-depth analysis. Socioeconomic variables included were respondent's education, religion, region of residence, marital status and, a measure of household wealth as in the case of cumulative fertility. Marital status was introduced as a time varying covariate in the model. However, in the absence of a complete marital history, it was only possible for us to determine the ever-married status for all the years in the person year data based on age at first marriage (or union).

Among demographic variables we included maternal age, measured as age of the mother at the time of the birth to capture the age effect on the biology of fertility. We also included a measure of sex composition of prior births, which has been identified as an important determinant of the probability of giving birth. Since each individual may contribute more than one event to the sample, it was necessary to consider controlling for the dependence of the hazard rate on individuals' previous history. We constructed a variable (parity), which was coded 'k' for all years starting from the year after the k^{th} birth to the year of the $(k+1)^{th}$ birth. We modeled first births and higher order births separately, because we believe that the two processes are intrinsically different. Certain variables such as number and timing of prior births may be important determinants of the timing of higher order births only. Therefore, for second and higher order births we introduced the number and sex composition of previous births and the length of time between consecutive births as a covariate. However, it should be borne in mind that if unobserved heterogeneity exists in the population, these variables would not be exogenous and therefore, would lead to biased estimates of the effects (Allison 1982). The analysis was conducted using the statistical package, STATA. Table 1 gives the sample characteristics.

Results

Migration and Cumulative Fertility: Table 2 gives the results of the bivariate analysis for the association between migration status and completed fertility. The relationship appears to be quite strong. Migrants to rural areas have higher fertility, compared to non-migrants and migrants to urban areas regardless of the type of origin area. This, along with the data in Table 1 seems to indicate a selection effect, where people, who are younger, more educated and less traditional move to urban areas compared to those moving to rural areas. It seems unlikely that people adapt to the higher fertility norms of rural areas after they migrate since the fertility of rural non-migrants is somewhat less than that of the migrants to rural areas. Migrants to urban areas have lower cumulative fertility compared to movers to rural areas, but higher fertility than urban non-migrants.

This could be because of either a selection effect or an adaptation effect. Disruption seems to have no apparent effect in lowering cumulative rural or urban fertility in Ghana. This is because both rural-rural and urban-urban migrants have higher number of births compared to natives of those places. We will further test the role of these forces in generating migrant-non-migrant and fertility differentials through a multivariate analysis controlling for several variables known to impact fertility independently.

Table 2 about here

The coefficients from our Poisson regression model are in table 3. The first thing to notice is the remarkable similarity of the coefficients between model 1, which is based on residence change since childhood and model 2 based on the last move. This indicates first that our model is quite robust to alternative definitions of migration. Secondly, to the extent that the type of last residence is different from childhood residence, the similarity of the coefficients across two definitions of migration indicates nonexistent, or at most a modest, adaptation effect. For the remainder of this section our analysis will employ the migration definition based on last place of residence –models 2 and 3 of Table 3. We see that despite controlling for known or observed factors affecting migrant selectivity, many of the coefficients for migration related variables are statistically significant, indicating perhaps a migrant selection effect based on motivational factors (Ribe & Schultz, 1980; Kahn 1988). For example, the migration related coefficients show that rural origin migrants to urban areas have lower ($p<.05$) fertility than rural non-movers. On the average rural-urban migrants have, about 10 to 12 ($e^{-0.11}=0.90$; $e^{-0.13} = 0.88$) percent fewer children compared to rural non-migrants of similar characteristics. Similarly, urban-rural migrants seem to be selected for somewhat higher fertility.

Compared to urban stayers migrants to rural areas have higher fertility ($p<.01$) even though their expected fertility is slightly lower than rural non-movers. Moreover, when we add the duration of residence effect to gauge adaptation for these women (model 3), the coefficient remains significantly higher than urban non-migrants, and attains the fertility level of rural natives. This along with the fact that the length of stay in a rural area has a positive and significant effect on fertility suggests a fairly strong adaptation effect in the case of urban rural migrants. An additional 10 years in the rural area following migration predicts a 5% ($e^{.05} = 1.05$) increase in fertility. The coefficient of urban duration provides little support for the adaptation effect in the case of rural urban migrants. The statistical non-significance of coefficients for migrants moving to and from similar places offers little credence to the disruption hypothesis.

Table 3 about here

We know from previous literature that age has a significant and nonlinear effect on fertility. This is once again established by this analysis. Education, particularly education beyond primary school has a negative influence on fertility. We see a consistently negative wealth effect on the number of children borne by a woman in Ghana. Religion seems to have little effect on the number of children a woman has in Ghana, and region residence is significant only for those residing in the West, Central, Brong-Ahafo and North. However, compared to the Accra region, residence in any other region is associated with higher fertility. This is not unexpected since the Accra region is mostly metropolitan, contains the capital and is probably the most urbane and modern city in Ghana. Ever-married status and marriage age have the expected effects –formerly and currently married women have higher number of children, and a later age at marriage is associated with fewer children.

In summary, the analysis of migration and the total number of children born to a woman shows little evidence of disruption effect of geographic mobility. Rather the analysis suggests a self-selection mechanism: Those who have a proclivity for higher fertility move to rural areas, whereas those who tend to have fewer children move to urban areas. The adaptation effect is discernible only for migrants from urban to rural areas.

Migration and Fertility Timing:

Table 4 gives the effect of migration experience on the annual birth probabilities controlling for demographic and socioeconomic factors. This model differs from that of Table 3 in that it more explicitly examines birth timing. Columns 1 and 2 of the table show the effect of migration and other variables on the risk of experiencing the first birth, while columns 3 and 4 give the effect of the explanatory variables on the risk of experiencing higher order births. We find that except for urban to urban movers, migration status in general does not have a statistically significant (p=.18) impact on the hazard of first birth. We also find that the act of moving in a particular year does not impact the probability of a first birth in that year. This seems quite plausible as first births are influenced more by biological and socioeconomic background factors, rather than migration experience. On the other hand, urban bound migrants have significantly lower risk of having a second or higher order births compared to rural non-migrants (OR=.79). Thus as in the case of cumulative fertility, we see a likely selection effect on the pace of childbearing among the rural-urban migrants. Moreover the similarity of the coefficients between rural-urban migrants and urban non-migrants indicates some tendency to adapt to the urban norm. The coefficient for urban-rural migrants shows that these women have the same pace of childbearing as rural non-migrants and a significantly faster rate of childbearing than urban non-migrants. This finding reiterates our results with respect to total children born (CEB). That is, migrants to rural areas from urban places seem to be selected for higher fertility and they soon attain the (fertility) pace of rural non-migrants for births of order higher than the first. We may be observing the behavior of individuals who are only temporary (or circular) residents of urban places. The coefficients of the migration variables for movers from and to same types of places do not provide any evidence of disruption in childbearing attributable to migration. This is further established by the non-significance of the variable indicating a move in the current year.

Table 4 about here

As expected, age has a very strong influence on the timing of the first birth, and also on higher order births. Education beyond primary school exerts a negative influence on the hazard of first and higher order births, as does household wealth. Moslem's tend to have delayed first births, but do not differ significantly in the timing of higher order births compared to those belonging to traditional religion or having no religion. Women living in the Ashanti and Volta regions have earlier first births compared to those living in the capital region of Accra. On the other hand, women living in the West, Central, North and Brong-Ahafo regions have higher odds of higher order births. Married persons have a significantly higher risk of both the first and higher order births. The greater the number of prior children, especially female children, the less likely a woman is to experience a higher parity birth in a year.

Summary and Conclusion

The analysis of total fertility and fertility timing reveals a significant selection effect in case of both the rural-urban and urban-rural migrants. Compared to rural stayers those who move to urban areas display considerably lower levels of cumulative fertility, and annual rates of childbearing beyond the first birth. Similarly, in keeping with the selection hypothesis urban to rural migrants are associated with higher and faster pace of childbearing than non-migrants at the origin.

We find appreciable effects of place of residence and change in residence (rural-urban migration etc.) on fertility. The nature of these effects is quite diverse, by place of origin, place of destination and previous childbearing. Our results are most consistent with the selection process (model), with some evidence for adaptation, and little for disruption.

We do not find any effect of migration on the probability and timing of first birth. The effect of disruption is not visible in this analysis. In addition to the fact that migrants between similar origin and destination places have similar or faster rate of childbearing compared to non-movers of that type of place, (a finding that is repeated in the cumulative fertility analysis), we also find the coefficient for the variable "move in the year" to be non-significant. Although it is difficult to capture the disruption effect in cumulative fertility, we had expected that in keeping with earlier studies (White et al. 1995; Lindstrom & Saucedo 2002) we would find some evidence of delayed fertility in the sequential logit analysis. The discrepancy between our finding from Tawiah's, (1997) on migrants in US and Peru may be because of low contraceptive prevalence in Ghana. Women in Ghana may not be able to control their fertility in the same way as in South America.

In contrast to disruption, adaptation typically takes a longer time to set in, and therefore its effect may be visible only in terms of cumulative fertility. We find mixed evidence for an adaptation effect. In the case of rural-urban migrants in Ghana we do not find any influence of length of stay on the total number of children born to a woman. This could be because adaptation to urban fertility pattern implies some positive and some negative changes. For example, by adapting to urban norms, migrants from rural areas may, on the one hand, start using modern contraception, and on the other, shorten the period of post-partum abstinence and breast-feeding. It is possible that these positive and negative influences cancel each other out. Though the effect is small, duration of stay in a rural place is associated with significantly greater cumulative childbearing for migrants from urban areas suggesting that migrants may adopt the fertility norm of the rural destination. This is further evidenced by the fact that, both in terms of timing and level of fertility, urban-rural migrants are similar to rural natives. However, both in the case of urban-rural migrants and rural-urban migrants the level and timing of fertility match very closely with the level and timing of fertility for natives at destination. This seems to substantiate the existence of an adaptation effect as reported in the study by Brockerhoff and Yang (1994), but it can also be the result of a very high degree of selection at the origin for rural-urban migrants.

TABLE 1: SAMPLE CHARACTERISTICS

Variable	Rural Sample		Urban Sample	
	Mean	S.D.	Mean	S.D.
Mean Children Ever Born***	3.06	2.78	2.03	2.24
Mean Age**	29.59	9.71	28.75	9.39
Migration status				
Non-Migrants***	40.83	0.49	37.18	0.48
Duration at current residence	17.16	12.80	15.62	12.21
Education***				
None	36.2	0.5	16.5	0.38
Primary	19.9	0.4	15.0	0.36
Secondary	39.1	0.5	48.5	0.50
High	4.9	0.1	20.0	0.21
Age at first marriage/union	18.51	3.85	18.91	3.95
Never married***	18.9	0.39	30.0	0.46
Region***				
Accra	2.33	0.15	39.08	0.49
West	21.63	0.41	10.2	0.30
Central	9.33	0.29	8.88	0.28
East	26.27	0.44	15.54	0.36
North	8.28	0.27	5.52	0.23
Volta	11.48	0.32	3.87	0.19
Ashanti	13.10	0.34	12.75	0.33
Brong-Ahafo	7.56	0.26	4.06	0.20
Religion***				
Christian	67.57	0.47	81.66	0.39
Moslem	12.54	0.33	14.59	0.35
Other[1]	19.89	0.40	3.74	0.19
Household wealth score[2]	1.39	1.77	3.75	2.69
Total sample	3258		1585	

Note 1: Includes no religion and traditional religion

2: We assigned a score of 1 each if the household had electricity, radio, or a bicycle; a score of 2 each for the possession of television, refrigerator, or motorcycle; and a score of 3 for the possession of a car. The household wealth score is the sum of these scores.

*** p<.01

** p<.05

Table 2: Mean and Standard Deviation of Cumulative Fertility by Migration Status

Migrant Status[1]	Percentage	Children Ever Born	
		Mean	Std. Deviation
Urban Non-Migrant	12.3	1.71	2.11
Rural Non Migrant	27.6	2.67	2.72
Rural-Rural	16.8	3.83	2.91
Urban-Rural	22.6	2.99	2.65
Rural-Urban	4.2	2.46	2.26
Urban-Urban	16.4	2.16	2.29

1. Based on last residence and current residence
p-value for Pearson Chi-square <0.00

Table 3: Coefficients from Poisson Regression Model on Children Ever Born.

Variable	Model 1	Model 2	Model 3
Age	0.27***	0.27***	0.27***
	(0.01)	(0.01)	(0.02)
Age squared (increments of 10 years)	-0.03***	-0.03***	-0.03***
	(0.00)	(0.00)	(0.00)
Migrant status[1] (vs.Rural Non-Migrant)			
Rural-Rural	0.03	0.04*	0.04*
	(0.02)	(0.02)	(0.02)
Urban-Rural	0.01	0.01[a]	-0.05[b]
	(0.02)	(0.02)	(0.04)
Rural-Urban	-0.14***	-0.11**	-0.13
	(0.05)	(0.05)	(0.08)
Urban-Urban	-0.13***	-0.14***	-0.14***
	(0.03)	(0.03)	(0.03)
Urban non -migrant	-0.14***	-0.14***	-0.14***
	(0.04)	(0.04)	(0.04)
Duration of residence (increments of 10 years)			
Rural-Urban	---	---	0.01
			(0.00)
Urban –Rural	---	---	0.05**
			(0.00)
Marital status (vs. Never Married)			
Ever married	2.98***	2.98***	2.98***
	(0.11)	(0.11)	(0.20)
Age at Marriage[c]	-0.05***	-0.05***	-0.05***
	(0.00)	(0.00)	(0.00)
Education (vs. None)			
Primary	-0.03	-0.03	-0.02
	(0.03)	(0.03)	(0.03)
Secondary	-0.18***	-0.17***	-0.17***
	(0.02)	(0.02)	(0.04)
High	-0.39***	-0.38***	-0.38***
	(0.08)	(0.08)	(0.08)
Household Wealth (vs. Low Wealth)			
Medium	-0.05**	-0.05**	-0.05**
	(0.02)	(0.02)	(0.02)
High	-0.06**	-0.06**	-0.06**
	(0.02)	(0.02)	(0.02)
Very high	-0.16***	-0.16***	-0.16***
	(0.03)	(0.03)	(0.03)

Table 3 continued

Variable	Model 1	Model 2	Model 3
Religion (vs. Traditional)			
Moslem	-0.05	-0.05	-0.05
	(0.03)	(0.03)	(0.03)
Christian	-0.01	-0.01	-0.01
	(0.02)	(0.02)	(0.02)
Region (vs. Accra)			
West	0.08**	0.08**	0.08**
	(0.04)	(0.04)	(0.04)
Central	0.13***	0.13***	0.13***
	(0.04)	(0.04)	(0.04)
Volta	-0.01	-0.02	-0.01
	(0.04)	(0.04)	(0.04)
East	0.01	0.01	0.01
	(0.04)	(0.04)	(0.04)
Ashanti	0.06	0.06	0.06
	(0.04)	(0.04)	(0.04)
Brong-Ahafo	0.09*	0.08*	0.08*
	(0.05)	(0.05)	(0.05)
North	0.14***	0.13***	0.14***
	(0.05)	(0.05)	(0.05)
Constant	-6.32	-6.25	-6.24
	(0.18)	(0.18)	(0.18)

Note: Model 1 uses childhood residence to determine migration status, Models 2 and 3 use last place of residence to determine migration status.
Figures in parenthesis represent standard errors.
Reference category for migrant status is rural non-migrants, for education is no education, for household wealth it is low wealth, traditional and no religion for religion, and Accra for the variable for region.

a. significantly higher than urban non-migrants (p<.01)
b. significantly higher than urban non-migrant (p<.05)
c. For ever married persons only.
*** p<.01
** p<.05
* p<.10

Table 4: Coefficients from Logistic Regression Model of Annual Birth Probabilities.

	First Birth		Higher Order Births	
Variable	Coefficient	Std. Error	Coefficient	Std. Error
Age	0.84***	0.04	0.27***	0.01
Age squared	-0.02***	0.00	-0.01***	0.00
Migrant status[1] (vs. Rural Non-Migrant)				
Rural-Rural	-0.02	0.06	0.09**	0.03
Urban-Rural	-0.03	0.06	-0.02[a]	0.03
Rural-Urban	0.02	0.11	-0.24***	0.07
Urban-Urban	-0.15**	0.07	-0.19***	0.04
Urban non migrant	-0.12	0.08	-0.24***	0.05
Move in year	-0.04	0.18	-0.08	0.12
Married (time varying)	2.59***	0.04	0.50***	0.07
No. of female children	--	--	-0.02**	0.01
No. of male children	--	--	-0.00	0.01
Education (vs. None)				
Primary	-0.03	0.06	-0.09*	0.03
Secondary	-0.22***	0.06	-0.32***	0.03
High	-0.47***	0.15	-0.52***	0.10
Household Wealth (vs. Low)				
Medium	-0.13**	0.05	-0.04	0.03
High	-0.17**	0.06	-0.06*	0.03
Very high	-0.28***	0.07	-0.15***	0.04
Religion (vs. Traditional)				
Moslem	-0.15*	0.08	-0.05	0.04
Christian	0.10	0.06	-0.05	0.03
Region (vs. Accra)				
West	0.14	0.08	0.10*	0.05
Central	0.11	0.09	0.21***	0.06
Volta	0.17*	0.10	0.04	0.06
East	-0.08	0.08	0.04	0.05
Ashanti	0.23**	0.08	0.08	0.05
Brong-Ahafo	0.15	0.10	0.16***	0.06
North	0.05	0.10	0.21***	0.06
Constant	-11.93	0.38	-4.75***	0.22

Note: [1]Migration categories are based on last place of residence.
Reference category for migrant status is rural non-migrants, for education is no education, for household wealth it is low wealth, traditional and none for religion, and Accra for the variable for region.

*** P<.01
** P<.05
* P<.10
a Significantly higher than urban non-migrants (p <.01)

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Appendix A

Frequency Distribution of Cumulative Fertility in Ghana DHS

Total Children Ever Born	Frequency	Percent	Cumulative Percentage
0	1327	27.70	27.70
1	695	14.51	42.20
2	614	12.82	55.02
3	526	10.98	66.00
4	461	9.62	75.62
5	358	7.47	83.09
6	311	6.49	89.58
7	210	4.38	93.97
8	128	2.67	96.64
9	81	1.69	98.33
10	45	0.94	99.27
11	23	0.48	99.75
12	8	0.17	99.92
13	2	0.04	99.96
14	2	0.04	100.00
Total	4791	100.00	