Migration and Fertility in Burkina Faso:[1]

Evidence from the 2000 Survey on Migration/Urbanization and Environment

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Abstract. This study represents one of the study attempts on life course analysis of migration and fertility using biographic data from a developing country. The analyses are based on the exceptional reliable survey data, EMIUB which was conducted in Burkina Faso in 2000. The study utilizes samples of 4,568 women who were aged 15-64 at the time of survey. The respondents had provided completed biographic histories on fertility (births), residential movements, marital status, and social-economies activities.

Results of the analysis revealed that four tested hypotheses (i.e. selection, adaptation, disruption, and socialization) robustly emerge in the effect of migration on fertility in Burkina Faso. For *socialization* effect, the study reveals that those who spent their childhood period extensively in urban areas have lower fertility than those originally from rural areas. Moreover, recent movers to urban areas are more likely to exhibit lower fertility rates (*disruption*) than their counterparts who are native urban dwellers. Yet, the fertility rates of urban natives are still lower than those movers who have been in urban for longer period, which shows the *adaptation* process took effect into their fertility behavior. In terms of s*electivity*, migrants are more likely to have lower fertility, especially among younger cohort and stay in urban areas. In short, all the effect of migration and urbanization is strong, both before and after controlling for the effects of certain covariates.

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1. Introduction

In most African countries, and Burkina Faso is no exception, fertility is significantly lower in urban areas than in rural areas (Cohen, 1993; Shapiro and Tambashe, 2001). According to the recent Demographic and Health Survey (DHS) from 25 different African countries, the average total fertility rate in urban areas was 4.6 children per woman as compared to an average of 6.4 children for rural areas (Shapiro and Tambashe, 2001). In addition, the fertility is being low in principal/capital cities as compared to other urban and rural areas. In the context of Burkina Faso, for example, the total fertility rate in 2003 was still at 6.2 children per women, but it was around 3.1 children in Ougadougou (Burkina Faso's capital city) and 4.4 children in other urban areas (INSD, 2004). Over the last two decades, fertility in this country has remained fairly stable in rural areas while urban areas have experienced a significant fertility decline. A combination of three proximate determinants —i.e. an increased use of modern contraceptive methods, a delay in age at marriage and more frequent induced abortions— account for this urban fertility decline. Moreover, socio-economic determinants for these fertility changes in urban areas notably include better female education, increased access to contraception, and changes in values regarding fertility among urban residents.

At the same time, rural-urban migrations in Burkina Faso have accounted for a large part of the population increase of Ouagadougou and Bobo Dioulasso over the last two decades. As a result, a large proportion of urban residents are in fact rural-urban migrants and, overall, half of the women living in Ouagadougou and Bobo Dioulasso in 2000 were in fact born in rural areas (Schoumaker *et al.*, 2002). As a consequence, by their sheer number, rural-urban migrants may have a significant impact on the level of fertility in the cities, and the relationship between migration and fertility is thus an important question to address in the context of Burkina Faso.

Established researches on migration and fertility analysis make it clear that the ideal design for testing the relationship between these two requires life histories of migration and fertility, with appropriate information on background characteristics at different points in the life cycle. Nevertheless, the availability of such ideal data sets is still

few, especially among developing countries. It is no wondered therefore that there have been very few empirical studies on migration-fertility interrelationship in Africa.

Given the facts mentioned above, this study attempts to fill some of the gaps through a detailed examination of the relationship between migration and fertility in Burkina Faso. It represents one of the study attempts on life course analysis of migration and fertility using biographic data from a developing country. Specifically, the main purpose of this paper is to conduct an analysis of the relationship between personal characteristics, urban residence and fertility in Burkina Faso by incorporating an event history analysis. Research questions that can be raised here are whether rural-urban migration has significant impacts on the level of fertility in the urban areas, and whether migration and fertility in general have a strong relationship in the context of Burkina Faso, through socialization, adaptation, selection, and disruption hypotheses.

The present paper starts with the description of the country setting in section 2, with emphasize more on the patterns and levels of migration and fertility in Burkina Faso, and then continues with a further elaboration on the theoretical framework in Section 3. We examine the data in Section 4, which also describes the applied regression model. Results from the statistical analyses are elaborated in Section 5. At the end, it is concluded by a discussion of the relationship between migration, urbanization and fertility in Burkina Faso and of future direction of research in Section 6.

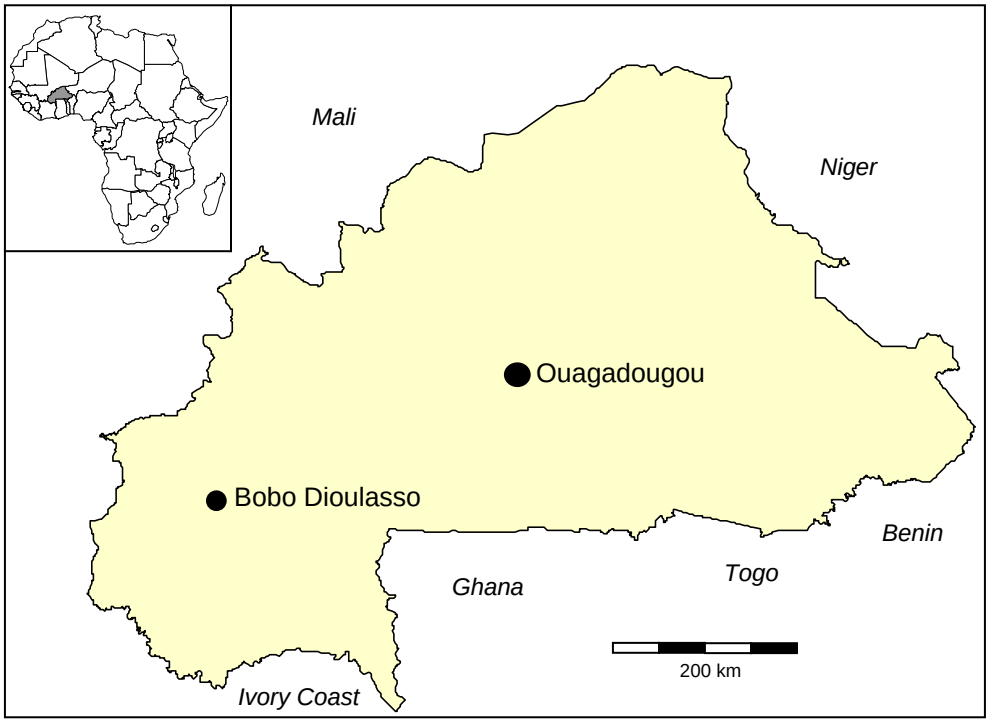
2. Country Setting and Demographic Development

Burkina Faso is a landlocked Sahel country, located in the hearth of West Africa between Niger, Mali, Ivory Coast, Ghana and Bénin (Figure 1). It is one of the poorest countries in the world: it ranked 159th of 162 countries in the UNDP's human development index (UNDP 2001), and its gross domestic product (GDP) per capita was approximately $230 US at the end of the 1990s (IMF 2000).

The population of Burkina Faso, estimated at 4.3 million in 1960, is now about 10.3 million (based on the 1996 census) and growing at an average annual rate of around 2.5%. The population age structure is relatively young with 47.9% of people aged less than

15 years old and 4.1% of people aged 65 years and over, and women account for 52% of the population. The country is characterized by large disparities in population density with the central over-crowed plateau around the capital city (Ouagadougou) and the less densely populated provinces in the Sahelian, eastern and southwestern parts of the country. The densities range from 335 per square kilometer in Kadiogo Province to 5.8 per square kilometer in Komandjoari Province.

Figure 1: Map of Burkina Faso showing Ouagadougou and Bibo Dioulasso.



Only slightly more than 20% of the total population lived in urban areas (Beauchemin *et al.*, 2002), in which Ouagadougou and Bobo Dioulasso together represent approximately half the urban population (11 % of the total population). In other words, Burkina Faso remains of low urbanized country even by African standards. It is no wonder therefore the country's economy depends heavily on farming by growing corps or rearing livestock. Vast majority of the population (90%) is engaged in these activities. These sectors account for one-third of the country's GDP and 80% of total exports in 1998 (INSD, 2000). However, these sectors are still characterized by low productivity.

Agriculture is largely dominated by small family farms which are engaged primarily in subsistence agriculture. Grain crops are occupying 88% of the land area cultivated each year. Moreover, both agriculture and livestock productions are greatly affected by the unfavorable climate and soil conditions, such as irregular rainfall and soils with low organic content.

Burkina Faso remains the country with the lowest rates of completion and enrollment of primary school education (41% of the gross enrollment rate in 1998-99 and about 32% was girls). As a result, literacy is still relatively low but increasing. Overall, one person out of five was literate in 1996 and only one female out of ten. Differences were also marked between urban and rural environments (13.6% in rural areas compared to 56.6% in urban areas).

Regarding to demographic indicators, Burkina Faso is still in the early stage of the demographic transition. It is characterized by the fall of death rates but birth rates continue at the high rates. Infant mortality rates declined significantly from 212 deaths per thousands in 1960 to 105 deaths per thousands in 1996. Accordingly, the life expectancy at birth increased from 32 years in 1960 to 54 years in 1996, with higher life expectancy in urban environments. Nevertheless, this relatively short life expectancy could be further reduced in the coming years due to the dramatic effect of the spread of HIV infection (7% infection rate among its adult population) (IRIN, 2003).

Despite the fact that mortality has declined, fertility in Burkina Faso is still high compared to the other West African countries. The total fertility rates was 6.1 children per woman in 1960, increased to 6.7 in 1976 and 7.2 in 1985, and then declined to 6.9 in 1993, 6.8 in 1998/99 and 6.2 in 2003. The period of fertility decline since 1985 has been marked as “a stabilization period” (Sinare, 1994). Furthermore, the fertility rates are notably difference according to the residential area. A tendency of fertility decline has already started in urban areas (especially in Ouagadougou), while it has not been observed in rural areas. TFR in urban areas declined from 6.5 in 1985 to 5.0 in 1993, to 4.1 in 1998/99, and to 3.7 in 2003. On the other hand, the figure continued to grow and highly stabile in rural areas with TFR was 7.3 children in the period 1973-1999 and slightly declined to 6.9 in

2003. Significant difference is also noticed by educational level. Based on the 2003 DHS, women with higher education have lower fertility (i.e. TFR=2.8) than their counterparts have (i.e. lower education, TFR=5.8 and no education, TFR=6.7).

In terms of migration, Burkina Faso has traditionally been characterized by intense mobility, both within and across the country (Cordell *et al*. 1996; Hampshire and Randall 1999; Adepoju, 2003). Internal migration from rural to urban areas is significant, but the migrations from one rural to another rural area are still dominant. Migrations from rural areas towards urban centers have contributed significantly to the process of urbanization since the postwar years (Cordell *et al*., 1996). Ouagadougou and Bobo-Dioulasso, Burkina Faso's two largest urban centers have attracted the largest share of rural-urban migrants over the last decades, although smaller towns have also received important numbers of migrants.

Migrations within rural areas involve both short-distance and long-distance moves. The former disproportionately concerns women migrating for family reasons, such as marriage and separation, while long-distance moves mainly consist of agricultural migrations. One specific type of long-distance move in rural Burkina Faso developed from the late 1960s and involves migrations from densely populated areas in the Mossi Plateau to the less populated areas of Burkina Faso's southwest (Cordell *et al*. 1996; Goldberg and Frongillo 2001). Migrations between rural areas were also encouraged by resettlement programs, such as the AVV (*Aménagement des Vallées des Voltas*) program launched in the early 1970s to develop regions freed from onchorcercosis (Sidibe, 1986; Guiella, 1996).

As in other developing countries, return migration and circulation is also a prominent feature of Burkinabé migration (Blion 1995; Cordell *et al*. 1996). People continue to maintain strong links with their place of origin, and a large fraction of migrants tend to return to their village at some point. In Burkina Faso, the probability of returning to

the village is especially high among men: 60% of those leaving their village after age 15 return within 10 years, while the corresponding figure for women is around 15%[3].

International migration from Burkina Faso to its neighboring countries greatly represents a large proportion of rural migrants, especially as labor migrants. It is estimated that nearly three million of Burkinabe now live outside the country. Côte d'Ivoire, one of the adjacent countries, has long been the principal destination. Labor migration to Côte d'Ivoire can be traced back to historical factors such as forced labor policies and colonial taxation under the French colonial rule (Cordell *et al*. 1996). Recently, Côte d'Ivoire has continued to attract a large number of Burkinabé migrants (Cordell *et al*., 1996; Roncoli *et al*. 2001). In the 1990s, about 80% of international migrants were attracted to that neighbor country (Henry *et al*., 2004). Yet, the situation is likely to change with recent events in Côte d'Ivoire.

In summary, migration within and across Burkina Faso and its neighboring countries would likely become an important issue in the near future. The significance of female migration has increased. Some important shifts in the spatial patterning of population movement are observed including increased levels of rural to urban movement and a reversal of the trends over the periods. Explanations provided for this trend may be explained by socioeconomic and political changes, globalization processes, transportation and communication improvements, and the proliferation of migration networks. It is believed that the demographic changes (including fertility and migration behaviors) have influenced and will continue to have major implications in the socioeconomic development of the country in the near future.

3. Theoretical Framework

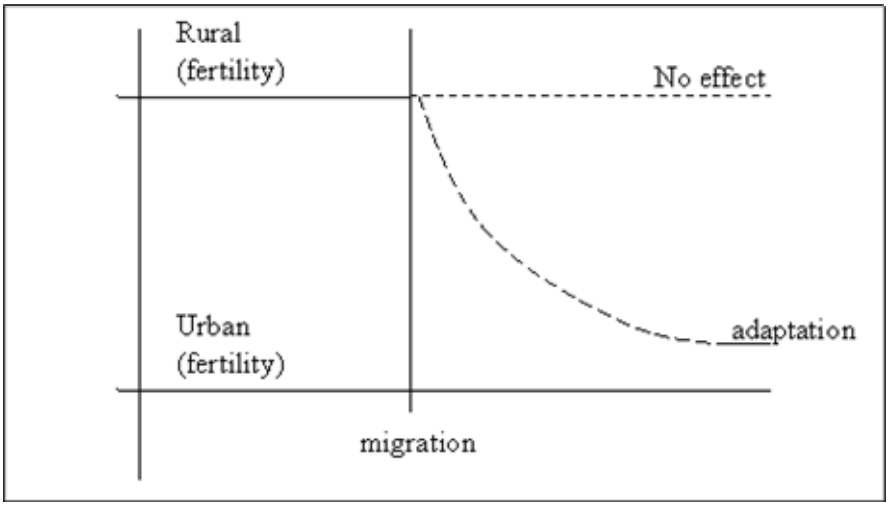
Most empirical research relating migration and fertility in sub-Saharan Africa has assumed a causal effect of migration on fertility (e.g. Brockerhoff and Yang, 1994; Brockerhoff, 1995; McKinney, 1993; Omondi & Ayiemba, 1999; and White *et al.* 2004). Evidences

[3] These results were computed from the survey used in this study. Cordell et al. (1996) reached similar conclusions using the 1974-1975 National Migration Survey.

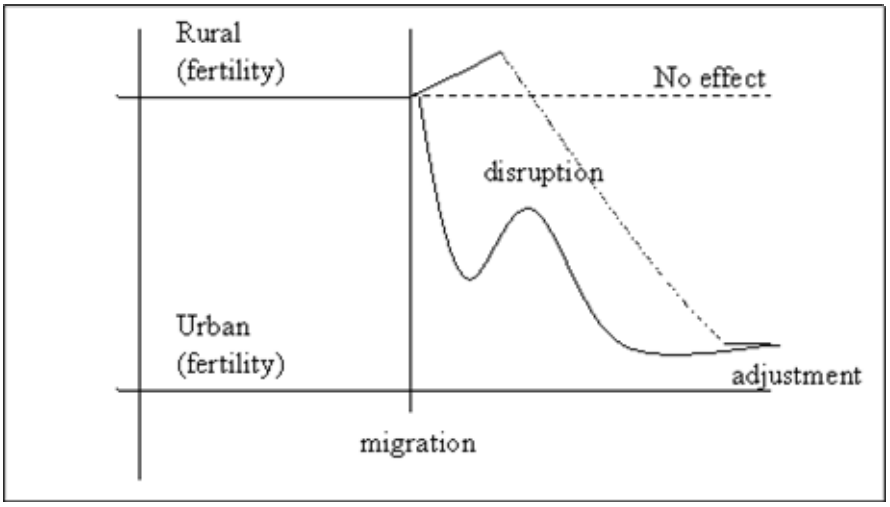
regarding the effect of migration on fertility are mixed. The migration can have negative and positive impacts on fertility. Nevertheless, these linkages have critical implications for government programs for fertility reduction. These relationships have usually been investigated by acknowledging the type of migration (i.e. international, internal and urban-rural residential) and its interaction with each other as well as with other population parameters, such as the age/sex structure, education, marital status, and socio-economic circumstances.

Four hypotheses have usually been identified to link rural-urban migration and fertility as proposed in Goldstein and Goldstein (1983). These are selectivity, adaptation, disruption and socialisation hypotheses. According to the *selectivity hypothesis*, women who migrate are "a select group with different socio-economic and demographic characteristics from that of the rural population, and their preferred family size may also be different" (Lee and Farber, 1984). In that case, it is not migration as such that influences fertility, but the association between migration and fertility reflects the fact that women who migrate are also more likely to want fewer children and to be better able to control their fertility. In that sense, the selectivity hypothesis does not refer to a direct causal link between migration and fertility, and "migrants" would still have had a lower fertility if they had stayed in rural areas (Brockerhoff, 1998).

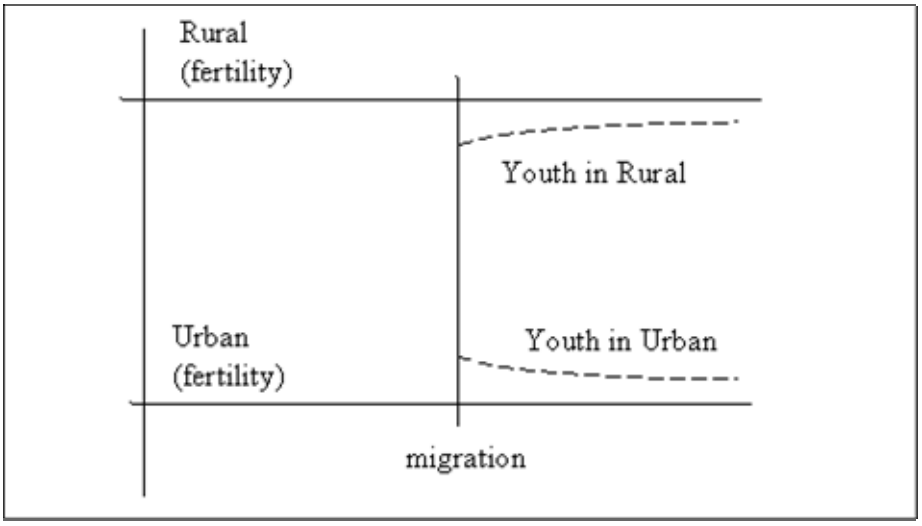
The *adaptation hypothesis* on the other hand emphasizes the role of the urban environment on fertility behaviour. Migrants arrive in a new environment that may influence their demand for children and the costs of fertility regulation. For instance, greater availability of contraception, better access to health care, increased contacts with "modern values", greater employment opportunities-- may all contribute to a lower fertility among migrants than among rural stayers. In other words, the characteristics of the urban environment conduce women to reduce their fertility compared to what it would have been had they not migrated to urban areas (Lee, 1992). Rural-urban migrants' fertility would then tend to the level of fertility of urban natives (Brockerhoff, 1998) as the fertility preferences of migrants gradually may adapt to the new environment (economic, social, and cultural) at the destination place.



The *disruption hypothesis* is somewhat more limited in scope, in the sense that its effects are presumably restricted to a short time window before and/or after migration. According to the disruption hypothesis, migrants' fertility decreases temporarily just before and/or after migration because of disruptive factors associated with the migration process (Lee and Pol, 1993:36). One of these disruptive factors is the separation of spouses that can occur in the early stage of migration (Lee and Pol, 1993; Brockerhoff, 1998). Smith (1983) also suggests that, among unmarried migrant women, marriage may be delayed because "institutional arrangements for meeting and evaluating potential spouses are weak or inefficient". Physiological effects due to the stress associated with the migration have also been cited as possible mechanisms for the disruptive effects. The long-term effect on fertility depends on whether women subsequently compensate for the disruptive effect by a higher fertility. This disruption effect is likely for migrations involving major changes, such as long distance moves and moves to greatly different environments or severe climate.



The *socialization hypothesis* premises the belief that fertility behavior of migrant reflects the fertility preference prevalent in their childhood environment. Rural-urban migrants are then expected to exhibit levels of fertility similar to rural residents and convergence toward the lower fertility levels of urban residents is expected to occur only after at least a generation has elapsed. Rural fertility levels remain to exceed urban fertility.



Those four mechanisms can obviously operate together to influence fertility. It is for example quite likely that migrants are a selected group of women regarding their

fertility preferences, but it does not preclude an adaptation to the urban environment. It is also quite likely that, because they are a select group, migrants are more likely to adapt their fertility in urban areas. The theoretical framework discussed here is applied in this study, which will be further elaborated in the next section on data source and method.

4. Data Source and Method

4.1. Data Sources

The data for this study come from a unique nationally-representative retrospective survey entitled "Migration Dynamic, Urban Integration and Environment Survey of Burkina Faso" (EMIUB) carried out between March and July 2000 by the University of Montreal (Canada), the University of Ouagadougou (Burkina Faso) and the CERPOD (Mali). The survey contains extensive histories of respondents' biographic (life course) including residence and birth histories, which thus offers a possibility to perform a statistical analysis on the possible relationship between those two variables. It completely interviewed 8,644 individuals (i.e. 4,076 males and 4,568 females) aged between 15 and 64 years old, from 3,570 households (Schoumaker *et al.* 2002). Considering the fact that problem on memory recall may exists among older respondents, this present analysis on migration and fertility is then limited to look at women below age 50 and lived in Burkina Faso at the time of survey. At the end, the life histories of about 4,101 women between the ages 15-50 years are taken into account in this analysis.

Besides fertility and migration variables, the analysis also considers other socioeconomic characteristics (i.e. generation/cohort, ethnicity, education, economic activity, and marital status) which may associate with the fertility of women. All together, the information has been reformed into a life history calendar, which consists of person-life spell of women. The life history calendar has then allowed us to construct more complex measures for analyzing the relationship between migration and fertility. In order to represent survey sampling, weight values are applied in this study.

4.2. Method

To examine the effect of migration on fertility, we will focus on the timing of birth's conception which is assumed about 9 months before an event of birth. Given the nature of the data source, in which the time of event occurrence was recorded at exact date, it allows us to measure time variable in a continuous scale. In other words, events may occur at any point in time. After considerable initial consideration, we chose to apply the Cox model[4] as discussed in Allison (1984).

The birth's conception interval spell is our basic unit of analysis. At first, we considered age at first union to be the starting point of the risk reproductive period. To simplify, all spell begin from age 12 as the initiation of reproductive age.[5] The event of birth's conception therefore defines the end of one spell and the beginning of another. The exposure period end at age 49 (the end of childbearing age) or is right-censored at current age by the survey. Each spell contains several characteristics some of which are fixed for all time, while others may change from time to time (time-varying). In short, the model for this analysis is:

$$h(t \mid x) = h_0(t)\exp(x_i\beta_i + x_j\beta_j) \qquad (1)$$

where $\mathbf{X_i}$ is a matrix of fixed covariates, and $\mathbf{X_j}$ is a matrix of time-varying covariates, and $\boldsymbol{\beta_i}$ and $\boldsymbol{\beta_j}$ are the respective vectors of coefficients. The analysis starts with a simple *multivariate* model, focused solely on the effect of migration on fertility, and then moves to a more complete analysis that includes other characteristics of the woman. We will run the event history models for all parities.

4.3. Covariates and Definitions

In order to draw out the four hypotheses addressed earlier (selection, adaptation, disruption, and socialization) into the analysis, we introduce control variables that are

[4] The results were robust to model specifications. Models of continuous exponential and discrete time gave substantively similar results.

[5] There were about 1.7% (37 out of 4101) respondents reported to have union (cohabit or marriage) before 12 years old.

known to determine those assumptions. Operational definitions of all selected variables analyzed in this study are summarized in Table 1.

Our primary explanatory variable – migration or change residence – is defined as a move from an administrative area (in this case district/department) to another area for duration of at least 6 months. The feature of residential change data, which consists of information on staying duration and geographical boundary units, allows us to construct this definition of migration. Thus, the residence changes that took place within a village and inter-village and/or in the duration of less than 6 months will not be taken into account. A woman might move to her parent residence or other family just before giving a birth and then return to her usual residence within a short period. Regarding to the short distance moving (such as within or inter-village), a family might try to move to a larger lodging within a closer distance simply to have room for more desired children. It would then rather to accelerate the fertility than otherwise. In addition, the short distance migration may have less effect on the *disruption effect* as it may generally not involve a greater change in social and economic environment.

In the analysis, migration is mainly defined based on urban and rural categorized. Yet, the information on residential place was self reported by respondents. Answers to this question can measure place of residence, because the response categories for this question (city, town and village) are well understood. In order to explore the accuracy of this information, we use a definition of urban places as settlements with at least 10,000 inhabitants, anytime, as utilized in the previous study of Beauchemin *et al*. (2002). This definition, however, can only be applied to the place of residence in Burkina Faso as detailed information on region settlements was provided for residence in the country. Therefore, we combine other related information to defining the place of residence for those who were staying abroad or outside Burkina Faso. In this survey, respondents provided a complete history of their activities by time period, which can be used as a proxy measure of residence. For example, respondents who reported to have agricultural jobs are assumed to stay in rural areas. On the other hand, those who had jobs on non-agriculture sectors are grouped into urban dweller.

Table 1. Operational definition of variables considered for the relationship between migration and fertility in Burkina Faso

Variable	***Definition***
Time Variant	
Birth Parity	Parity of children ever born 0 = first birth, 1=second birth, 2=third birth, 3=fourth birth+
Age group	Six groups of reproductive age women: before 20 (*reference*), 20-24, 25-29, 30-34, 35-39, and 40-49
Education	School attainment by women No education (*reference*), Primary school, Secondary school +
Marital status	Combined with spouse's education No spouse (*reference*), Spouse's no-school, Spouse's primary school, and Spouse's secondary school+
Occupation	Working status of women Not working (*reference*), Paid and Un-paid workers
SES Index	Poor (*reference*), Intermediate, and Rich
Contraceptive use	Not using (*reference*), used traditional or modern methods
Region of residence	Ouaga, Bobo-Banfora, Center (*reference*), Rest of BF, and Abroad
Socialization factor	Residence during childhood period Urban origin, Rural origin (*reference*), and Movers
Adaptation & Disruption factors	Duration at current residence Urban native, Urban most recent (last 1-2 years), Urban recent (3-5 years), Urban not-recent (6 years+), Rural native (*reference*), and Rural movers
Non-time Variant	
Cohort	Cohort/generation of women <1965 (*reference*), 1966-1975, 1976-1985
Religion	Traditional (*reference*), Muslim, and Christian
Ethnicity	Ethnicity from women's father Mossi (*reference*), Bobo, Fulani, Gourmantche, Other in Burkina, and Other outside Burkina

Note: SES index was calculated by considering the characteristics of household's lodging.

For *selectivity* factor, we include some basic characteristics relevant to fertility and migration behaviors, such as age, cohort, education, marital status, activity, and socioeconomic status (SES). In order to examine the effect of spouse's education on women's fertility behavior, marital status here has been combined with the educational level of her spouse. Those who were single (not in union) would have no spouse's education and be considered as a reference.

The *socialization* effects, we introduce a variable for indicating of upbringing residence as place-of-origin and examine if this variable reveals a difference on their fertility levels. The variable is based on the childhood residence. There are three types of place-of-origin: (1) really urban, (2) really rural, and (3) in-between. The socialization hypothesis will likely come out of the real urban versus the real rural categories. These types are defined as follows:

- *Rural origin* or *really rural*: woman spent at most 2 years residing in the urban area (or outside the country) prior to age 15.
- *Urban origin* or *really urban*: woman spent at most 2 years residing in a rural area prior to age 15.
- *Movers* or *in between*: the residual (others).

The *adaptation* effect in this case has a significant relationship with the *disruption* effect. Variable of duration at current residence and birth parity are introduced. The respondents may have been living in urban or rural areas continuously (natives) or occasionally (movers). In order to examine the urbanization effect, we also include the duration at urban residence, which indicates the respondents as urban natives or urban movers. In the case of urban movers, they were categorized into recently and not-recently movers.

5. Results and Discussions

5.1. Demographic Characteristics

Before exploring the effect of migration on fertility in Burkina Faso, it is worthy here to get some insights about the samples utilized in this analysis. Table 2 shows basic characteristics of weighted samples and the association of their current residence (urban and rural areas) and migration experience. As mentioned earlier, about 4,101 women aged between 15 to 50 years old were selected from the 2000 EMIUB data set. The greater samples consist of women who recently lived in rural areas, 84 percent (1,950 women), and mostly belong to younger cohort groups (more than 40 percent) and ever migrated. In general, the mean age for the samples is 37 years old, while it is about 30 years and 27 years, respectively, for rural and urban women.

Socioeconomic characteristics have some significant differences among women who lived in urban and rural areas. In terms of educational level, for example, women in Burkina Faso are still having lower level of education, especially for rural dwellers. There are more than 90 percent of rural women who never attended school. In contrary, this number is about 48 percent in urban areas. There are still few women who graduated from secondary school or higher education. Yet, migrants tend to be higher educated than their counterparts who have never migrate in both urban and rural areas. Working status is more diverse in urban areas than in rural areas. Among rural women, more than 40 percent engaged in the self-employment works as well as in the non-paid jobs. This situation is different for urban women. For migrant women in urban areas, only 11 percent of them worked in the non-paid jobs and 13 percent worked as regular employers (not self-employee). The same phenomenon emerges for the socioeconomic status, which applies SES index as its proxy. Proportions of women in lower socioeconomic status were higher in urban areas than in rural areas.

Table 2. Proportion of Samples by Socio-demographic Characteristics

Variables	*Urban*		*Rural*	
	Ever Migrate	*Non-migrant*	*Ever Migrate*	*Non-migrant*
Proportion Sample (row)	9.92	6.18	44.57	39.33
(N, un-weighted)	(1,430)	(721)	(961)	(989)
(Mean Age)	(29)	(25)	(31)	(28)
Birth Cohorts				
Born <1965	28.46	12.14	33.20	27.86
Born 1966-1975	29.54	25.25	29.24	22.09
Born 1976-1985	42.00	62.61	37.56	50.04
Education				
None	50.53	43.05	90.14	91.81
Primary School	21.30	28.06	7.45	7.81
Secondary School +	28.17	28.89	2.41	0.38
Occupation				
Not working	30.53	33.76	6.32	4.00
Work Paid (self)	45.61	36.10	49.85	47.10
Work Paid (employ)	12.61	8.19	0.85	0.45
Work No-paid	11.25	21.95	42.98	48.45
Socioeconomic Status				
Lower (poor)	40.97	54.66	28.51	34.59
Intermediate	41.01	31.83	48.17	51.04
High (rich)	18.01	13.51	23.32	14.37
Union Status				
Not in Union	27.32	43.50	4.67	21.70
Married Monogamy	61.10	46.26	63.29	54.31
Married Polygamy	11.58	10.24	32.04	23.99
Ethnicity				
Mossi	54.16	57.34	54.25	39.69
Fulani	3.75	1.80	7.62	8.18
Gourmantche	4.30	0.41	3.70	13.50
Bobo	1.49	3.16	1.84	2.33
Others, inside Burkina	31.99	33.45	32.18	35.58
Others, outside Burkina	4.31	3.83	0.41	0.72
Religion				
Traditional	1.34	6.59	22.91	37.85
Muslim	58.86	57.98	59.68	42.67
Christian	39.80	35.42	17.41	19.48

Nevertheless, it is found slightly different among migrant and non-migrant samples in terms of their ethnicity. More than 50 percent of non-migrant and migrant have ethnicity of Mosi, except for non-migrant in rural areas (40 percent). In other words, the ethnicity

may have less influenced migration behavior of women. Meanwhile, marital status among women is not proportionally distributed in urban and rural areas. Urban areas is mainly characterized by women in non-union status or united with one partner. On the contrary, women in rural areas stand out for united, either in terms of monogamy or polygamy union.

Regarding religion factor, there is significant different situation between urban and rural residents. Women in urban areas are mostly Muslim (58 percent) or Christian (35 percent), both migrant and non-migrant. In the meantime, rural resident women are dominated by Muslim and traditional religion.

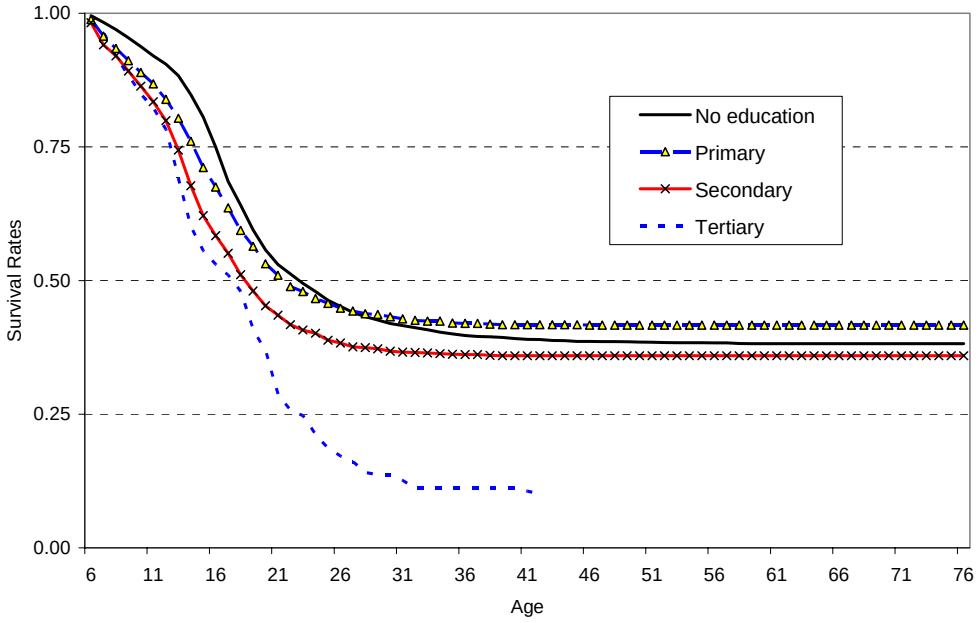
5.2. Patterns of Migration and Fertility

Using the definition of inter-region migration as discussed previously (See data and method), it is found that more than 50 percent women in Burkina Faso are migrants. Table 3 demonstrates that this figure is 62 and 53 percent, respectively, for urban and rural areas. Among migrants, many of them were migrated for one or two times. According to their age at first move, the migration is relatively occurred in younger age. It is similar to the general findings on migration studies that migration is mainly age sensitive. The highest rates occur in the early adult years, when individuals leave their parental home for education, marriage, or job-related reasons. In the case of women in Burkina Faso, their first residential change is still dominated by union or joining spouse reason in both urban and rural areas (58 and 32 percent, respectively). However, urban women are somehow having a proportional distribution for other reasons (i.e. job, schooling and other). On the other hand, migrations due to union or joining spouse are greatly occurred among women who resided in rural areas. Furthermore, Figure 1 illustrates that the inter-regional migration in the context of Burkina Faso is preferred by those who have higher education.

Fertility characteristics here are represented by three variables, namely (1) CEB, number of children ever born, (2) age at first union, and (3) family planning practice or experience in using contraceptive use method. The indicator of CEB corresponds to cumulative fertility of women during their entire life (up to the survey time). In average, urban women in

Burkina Faso have 1 child fewer than their counterparts in rural areas have (i.e. 3.6 versus 4.5 children, respectively). It is due to the fact that women in urban areas are significantly dominated by having fewer children. About 57 percent were having 1 to 3 children. The same proportion (57 percent) appears for women population in rural areas who have 4 children and more.

Figure 1. Survival Rate of First Migration by Education in Burkina Faso (Source: the 2000 EMIUB)



Empirical and literature studies have revealed that the level of women's fertility is determined by some factors, such as the age at first union and the practice of family planning by using a contraceptive method. The age of first union highly relates with the starting point of women's reproductive period. The earlier age to be in a union state, the more likely to give any birth, and accordingly the more children will be had. In the case of Burkina Faso, women in urban areas get married bit later than women in rural areas do. It is about one or two years later (i.e. 18.0 and 16.8 years, respectively). The practice of modern contraceptive method is still less favored among Burkinabe women, especially in rural areas. Close to 60 percent that women in rural areas were not utilizing any

contraceptive method, neither modern nor traditional. Based on these facts, therefore, it is no wonder that fertility rates in rural areas have been higher than in the urban areas do.

Table 3. Proportion of Samples by Migration and Fertility Characteristics

Variables	**Recently in Urban**		**Recently in Rural**	
	N (unweig.)	*% (weigth)*	*N (unweig.)*	*% (weigth)*
Ever changed residents	**1,430**	61.62	**961**	53.12
Number of move (times)	(1.93)	(1.88)	(1.75)	(1.75)
Age at 1st move				
Age <15	667	49.09	378	37.31
Age 16-24	650	44.17	499	56.02
Age 25-34	83	5.35	51	4.13
Age >35	30	1.39	33	2.54
Main reason of 1st move				
Marriage/join spouse	510	32.30	552	58.07
Other family matters	255	18.54	142	14.64
Economic matters	288	21.89	157	13.98
Other reasons	377	27.27	110	13.31
Ever gave any birth	1,581	65.36	1,710	82.00
Mean CEB (child ever born)	(3.8)	(3.6)	(4.8)	(4.5)
CEB (mean)				
1-3 Children	817	56.76	633	42.81
4-6 Children	520	29.95	621	33.09
7+	244	13.29	456	24.10
Age at 1st union (mean)	(18.1)	(18.0)	(16.4)	(16.8)
Age <15	281	19.37	632	27.33
Age 16-17	498	30.91	617	42.53
Age 18-19	385	24.82	285	19.65
Age 20+	416	24.90	176	10.49
Contraceptive use				
Never use	661	44.81	970	58.83
Traditional method	642	37.21	715	39.55
Modern method	278	17.98	25	1.62

Note: Migration was defined as a residential movement beyond within-village and stayed at least for 6 months.

5.3. Multivariate Analysis

Using biographic data sets provided from the 2000 EMIUB, this study has succeeded in analyzing four hypotheses in the effects of migration on fertility in Burkina Faso. These are socialization, adaptation, disruption, and selectivity effects. This section extensively describes those effects on fertility variable (in this case the conception's time). Table 4 presents the results of our analysis. The event history regression was applied for all parities in one model as well as for each parity (i.e. 0, 1, 2 and 3+ separately). A descriptive analysis was also conducted, presented in Table 5, for supporting the findings from the regression analysis.

Background's characteristics

Statistical results demonstrate that the hazard rates of fertility decrease with birth parity (number of children ever born), age, younger generation, higher educated, using contraceptive method, currently not married, having lower socioeconomic status (poor), and working as not-self employee. Regarding the employment status, the results indicate that women who actively work are not always having lower risk in decreasing women's fertility rates. It shows that self-employee women are more likely to have higher fertility rates, in all parities. Based on the previous discussion on fertility patterns, most self-employee women are vastly living in rural areas. As a result, therefore, women in the self-employee group will be then more likely to have higher fertility rates. In addition, women who worked not for money (i.e. non-paid work, such as family worker) tend to have high risks for giving births than those who actively work and receive salary (paid job).

Interesting to see the results based on women's marital status. Married respondents with higher educated spouse are likely to have higher hazard rate, particularly at lower birth parity (i.e. before 3rd children). This relationship, however, is reversing after the third parity or fourth children. Ethnicity and religion, although have no significance effect in some birth parities, would increase the fertility rates, except in the first birth (i.e. Parity 0). It implies that women from the ethnic groups of Mosi, Bobo, Fulani and Gourma are more likely to delay their first birth. The same phenomenon occurred among women based on

their religions. Christian and Muslim women are more likely to delay their first birth than the traditional believers.

Disruption and Adaptation Hypotheses

Disruption effect in this study was expressed in terms of delayed fertility. Considering the duration of current residence, results from the statistical analyses (Table 4) shows that migration and urbanization are likely to decrease the hazard rates of conception/birth. Migrants in urban areas (i.e. especially most recent or less than 2 years) have lower hazard rates in all parities, except in the first birth. Meanwhile, the fertility rates among migrants in rural areas are more likely closer to the urban natives. In other words, living environments tend to influence migrant's fertility behavior. Such finding also implies the fact that an adaptation effect took effect in the relationship between migration and fertility in Burkina Faso. These data point to the importance of the timing of migration on fertility and suggest that adaptation to fertility norms at destination occurs with increasing length of residence. Table 5 illustrates the same conclusion by applying the descriptive analysis on the cumulative fertility (number of children ever born, CEB). It reveals that the cumulative fertility of most recent urban resident (i.e. CEB=1.06) are lower than the fertility of native (i.e. CEB=1.92) and non-recent migrants (i.e CEB=3.62).

Socialization Hypothesis

Socialization effect was tested by using the childhood residence of women. There are three groups of this variable, namely: (1) Urban origin, (2) Rural origin, and (3) Urban-rural origin (childhood mover). The results from the event history regression presented in Table 4 show that having an urban place-of-origin (i.e. lived mostly in urban areas during childhood) is more likely to decrease the fertility rates. However, this variable does not solely contribute to the decline in fertility rates. In this case, urbanization has a significant influence. Such result also shows that migration and urbanization are clearly associated with adaptation effect.

Using the variable of cumulative fertility (CEB), the significant of socialization effect in this study is supported. The average number of children ever born from women who spent their childhood period mostly in urban areas is fewer than those who originally grown-up in rural areas. It was about 2 or 3 children for urban childhood origin and 3 or 4 children for rural childhood origin. Interestingly, the cumulative fertility of women grown-up in both urban and rural areas during their childhood is relatively closer to the urban childhood origin.

Selectivity Hypothesis

The statistical analysis resulted from a logistic regression model presented in Table 6 relates for responding to the selectivity hypothesis. It assesses differences between the migrant and non migrant in terms of their socioeconomic and fertility preference characteristics. In order to see the significant contribution of migration triggers, particularly the reasons of union/joining spouse and economic, two additional models are distinguished.

Statistical results show that age has a very strong influence on the probability of migration. Education has a positive influence on the migration in general. Higher educated women are likely to migrate than their counterparts in lower education. However, this is contrary with Model 2 where educated women are less likely to migrate for union/joining spouse. Married and actively employed women have lower risk of moving. Though it is not statistically significant, women involved in the self-employee works are more likely migrate due to union purpose. In the case of migration due to economic reason, however, the employment status has positive relationship among women who engaged in non-self employee jobs. Regarding the socioeconomic status, statistical results show a similar direction and magnitude though they have different levels. In general, lower socioeconomic status is less likely to migrate. In the case of migration for union purpose, nevertheless, lower women are more likely to migrate than those who have higher economic status.

Using information on the fertility characteristics, the analyses show that women in Burkina Faso are more likely to migrate if they have fewer children and not recently gave any birth. The descriptive analysis (Table 5) shows that women's migration due to join their spouses has very strong relationship to the cumulative fertility. In short, a selection effect was strongly found in this study.

6. Conclusions

This paper has showed that an empirical study on the relationship between migration and fertility in Burkina Faso can be done comprehensively by using a life history (biographic) data, namely the 2000 survey on "Migration Dynamic, Urban Integration and Environment of Burkina Faso" (EMIUB). One of the main novelties of this study, in the context of d African countries in general and Burkina Faso in particular, is the application of life history analysis for examining more closely the validity of the socialization, selection, adaptation, and disruption hypotheses. These analyses were undertaken by taking advantage of the unique opportunities available with the life histories data, including migration and fertility histories as well as its determinant factors.

Results from the statistical analyses show that migration and urbanization tend to decrease the hazard rates of fertility. The study reveals that four hypotheses (i.e. adaptation, disruption, socialization, and selection) robustly emerge in the effect of migration on fertility in Burkina Faso. For *socialization* effect, the study reveals that those who spent their childhood period extensively in urban areas have lower fertility than those originally from rural areas. Recent movers to urban areas are more likely to exhibit lower fertility rates (*disruption*). Yet, the fertility rates of urban natives are still lower than those movers who have been in urban for longer period, which shows an *adaptation* process. In terms of s*electivity*, migrants are more likely to have lower fertility, especially among younger cohort and reside in urban areas. In short, all the effect of migration and urbanization is strong, both before and after controlling for the effects of certain covariates.

Both empirical analysis and theoretical review on migration and fertility studies have shown that many factors may affect individual to migrate or to have children. Some of these are more or less constant throughout the life of the individual, while other are associated with changes in their life events and environments. In the near future, the modernity and globalizations systems may affect the concept of family, including in Burkina Faso. Family may attempts to limit their size, more women actively participate in the labor force, and people thus tend to postpone their marriage time for forming a family. As a result of this modernization process and enhancement in economic opportunities along with demographic development in the country, the characteristics of migration and fertility in Burkina Faso in particular and African in general may also change significantly. Consequently, the relationship of migration and fertility in population growth and redistribution could also change and thus important to be further studied.

Table 4. Coefficients for Event History Regression of the effects of Migration on Fertility in Burkina Faso with selected independent variables

			Birth Parity							
Variables	***All Parity***		***First Birth***		***2nd Birth***		***3rd Birth***		***4th Birth+***	
Parity	-0.029								-0.059	
Age										
Age	-0.059	***	0.158	**	-0.163	***	-0.160	**	-0.046	
Age square	-0.001	***	-0.007	***	0.000		0.001		-0.001	*
Birth Cohort										
Born <1965	1.037	***	1.889	***	1.038	***	0.796	***	0.754	***
Born 1976-1985	-0.998	***	-1.684	***	-0.921	***	-0.512	***	-0.414	***
Education										
Primary education	-0.034		-0.168	*	0.011		-0.026		0.042	
Secondary education+	-0.258	**	-0.333	**	-0.112		-0.440		-0.185	
Marital Status										
Has spouse w/ no education	0.580	***	0.429	***	0.388	*	0.000		0.013	
Has spouse w/ primary	0.606	***	0.536	***	0.444	**	0.033		-0.015	
Has spouse w/ secondary	0.673	***	0.622	***	0.506	**	0.145		-0.097	
Working status										
Work paid (self employ)	0.163	**	0.310	***	0.080		0.087		0.014	
Work paid (others)	-0.190	*	-0.204		-0.176		-0.090		-0.341	**
work nopaid	0.048		0.119		0.044		-0.083		-0.058	
Socioeconomic status										
Lower (poor)	0.050		0.086		0.025		0.047		0.024	
Higher (rich)	-0.136	**	0.021		-0.220	***	-0.057		-0.219	***
Religion										
Muslim	0.018		-0.132	*	0.084		0.076		0.074	
Christian	0.074		-0.175	**	0.062		0.139	*	0.219	**
Ethnicity										
Mosi	0.021		-0.094		0.124	**	0.018		0.077	
Bobo, Fulani & Gourma.	0.003		-0.115		0.057		0.052		0.056	
Contraceptive Use Method										
Modern cont. use	-2.132	***	-2.587	***	-2.302	***	-3.308	***	-1.760	***
Traditional cont. use	-1.617	***	-2.716	***	-1.557	***	-1.787	***	-1.564	***
Current residence & duration										
Urban, natives	-0.075		0.005		-0.078		-0.093		-0.167	*
Urban, most recent (1-2 yrs)	-0.250	**	-0.071		-0.546	**	-0.939	**	-0.483	*
Urban, recent (3-5 years)	0.037		0.076		0.020		-0.118		-0.207	
Urban, longer period (6+yr)	-0.222	***	-0.209		-0.194		-0.212	**	-0.276	***
Rural, non natives	-0.006		-0.027		0.010		-0.027		0.003	
Current residence & childhood										
Urban, origin urban	-0.159	***	-0.182	**	-0.089		-0.090		-0.211	***
Rural, origin urban	0.252	***	0.688	***	0.087		0.047		0.188	*
Urban, childhood mover	-0.227	*	-0.250		-0.208		-0.251		-0.227	*
Rural, childhood mover	0.142		0.171		0.175		0.289	*	0.001	
Urban, origin rural	-0.042		0.609	***	-0.103		-0.255	**	-0.294	***

Note: Significant values for *** (p<0.001), ** (p<0.01) and * (p<0.05)

Table 5. Migration's effects on Fertility (Number of Children Ever Born)

Hypothesis	***CEB***	***Mean Age***	***Age 1st Union***	***N*** Unweight	***%*** Weighted
1. Adaptation & Disruption				4,101	100.0
Duration of residence					
Recently in Urban	2.32	27.7	18.1	2,151	16.1
Continuously	1.92	26.1	18.4	1,314	10.4
Movers (occasionally)					
Last 1-5 years	1.06	21.5	16.6	140	1.2
Last 6 years and over	3.62	33.0	17.9	693	4.5
Recently in Rural	3.67	29.6	16.8	1,950	83.9
Continuously	3.71	29.6	16.6	1,626	68.7
Movers (occasionally)					
Last 1-5 years	0.86	20.9	17.9	29	1.7
Last 6 years and over	3.82	30.5	17.2	295	13.5
2. Socialization					
Childhood Residence					
Urban Origin	2.53	27.9	18.1	1,578	16.3
Rural Origin	3.70	29.8	16.7	2,289	79.2
Others	2.44	26.0	17.7	234	4.6
3. Selection					
Reason of 1st migration					
Union/join spouse	4.15	31.7	16.8	1,062	29.1
Family matters	3.44	29.4	17.2	397	8.4
Economic	3.95	31.5	17.4	445	8.4
Others	2.55	27.5	17.9	487	8.6

Table 6. Coefficients for Event History Regression with Migration as Dependent Variable

Variables	***Migrate for Any reason***			***Migrate for Union/Join Sp.***			***Migrate for Economic***		
	Coef.	*p<|Z|*		*Coef.*	*p<|Z|*		*Coef.*	*p<|Z|*	
Age									
Age	0.322	0.000	***	0.709	0.000	***	0.072	0.010	*
Age square	-0.006	0.000	***	-0.015	0.000	***	-0.002	0.011	*
Birth Cohort									
Born <1965	0.030	0.692		-0.090	0.432		0.033	0.837	
Born 1976-1985	0.097	0.265		-0.147	0.260		-0.099	0.660	
Education									
Primary	-0.034	0.759		-0.642	0.001	**	0.291	0.123	
Secondary+	0.144	0.351		-1.732	0.000	***	0.735	0.035	*
Marital status									
Married	-2.335	0.000	***	-3.742	0.000	***	-0.364	0.033	*
Working status									
Work paid (self)	-0.462	0.000	***	0.056	0.745		-0.546	0.007	**
Work paid (other)	-0.086	0.544		-0.790	0.014	*	1.184	0.000	***
Work non paid	-0.324	0.003	**	-0.067	0.679		-0.528	0.006	**
Socioeconomic status									
Lower (poor)	0.022	0.758		0.185	0.113		0.038	0.784	
High (rich)	0.158	0.048	*	0.137	0.423		0.169	0.327	
Urban residence									
Urban natives	-0.542	0.000	***	-1.061	0.000	***	-0.164	0.442	
Urban migrants	1.086	0.000	***	0.214	0.232		1.296	0.000	***
Rural migrants	1.314	0.000	***	0.843	0.000	***	0.956	0.000	***
Region of residence									
Ouagadougou	0.046	0.717		0.096	0.611		0.457	0.201	
Bobo-Banfora	0.186	0.066		0.005	0.980		0.600	0.022	*
Rest of Burkina	-0.164	0.024	*	-0.187	0.111		0.367	0.042	*
Others	1.103	0.000	***	1.094	0.000	***	1.240	0.000	***
Fertility behaviors									
Gave birth recently	-3.158	0.000	***	-2.346	0.000	***	-3.535	0.000	***
CEB	-0.260	0.012	*	-0.488	0.015	*	-0.042	0.806	
Constant	-4.314	0.000	***	-8.743	0.000	***	-4.729	0.000	***

Note: Significant values for *** (p<0.001), ** (p<0.01) and * (p<0.05)

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