DHS WORKING PAPERS

Demographic and Health Surveys

Impact of Rural-Urban Migration on Migrant Fertility in Senegal

Barbara J. McKinney

MACRO INTERNATIONAL INC.

DHS Working Papers
Number 6

Impact of Rural-Urban Migration on Migrant Fertility in Senegal

Barbara J. McKinney

Macro International Inc.
Columbia, Maryland, USA

December 1993

Barbara McKinney is a Professor of the Department of Population Dynamics, the Johns Hopkins University, School of Public Health, Baltimore, Maryland.

The Demographic and Health Surveys Program is designed to collect data on fertility, family planning, and maternal and child health. DHS is funded by the United States Agency for International Development. DHS Working Papers are intended to disseminate early findings of in-depth analysis of DHS data. Comments about this working paper or requests for information about the DHS program should be sent to: DHS, Macro International Inc., 11785 Beltsville Drive, Calverton, MD 20705 USA (Telephone 301-572-0200; Fax 301-572-0999).

Introduction

This study focuses on the impact of rural-urban migration on the fertility of migrants in Senegal. In Section I, the determinants of rural and urban fertility levels are investigated. This investigation tests the hypothesis that the urban and rural populations are composed of quite different groups with respect to their fertility, which may be due to their migration experience. In Section II, differentials in fertility levels between migrants and nonmigrants are examined to test three theories in the demographic literature explaining the mechanisms by which migration can affect fertility.

The paper begins with an outline of the theoretical framework and relevant research findings from Africa, and provides background information on Senegal. The second part describes the analytical framework and the data to be used, followed by multivariate analyses on the outcome of interest, i.e., children ever born (CEB).

Theoretical Framework

In the demographic literature there are three theories — selection, disruption, and adaptation -- which seek to explain how rural-urban migration can affect fertility. They differ in that each one proposes a different time during the migration process, i.e., either before, during, or after the move, when the impact of migration on fertility is greatest. Common to these theories are two assumptions: 1) rural fertility levels exceed urban fertility levels, and 2) fertility levels of rural-urban migrants are lower than rural residents.

The selection theory suggests that migrants are a self-selected group who differ from nonmigrants in the rural areas based on higher educational attainment, later age at marriage, lower pre-migration fertility, and employment for wages (Holmes, 1976; Goldstein and Goldstein, 1982; Hervitz, 1985). As hypothesized, the impact of migration on fertility has its effect before the move, since the pre-migration characteristics believed to motivate migration are also associated with both lower pre- and postmigration fertility. Ribe and Schultz (1980) suggest that migrant selection is based on distinct preferences for family size, which are not predicted by socioeconomic characteristics, and these determine who migrates and to where. For example, women (families) with small family-size ideals move to large urban areas.

The disruption theory posits that the act of migration interrupts fertility during the period of the move. This could be due to physical separation of spouses or a conscious decision to postpone childbearing (Goldstein and Goldstein, 1982; Bach, 1982). This disruptive effect necessarily curtails a woman's reproductive performance around the time of the move, and can lead to lower fertility among migrants relative to people who have never moved, or it can lead to accelerated fertility in the post-migration period, called the "catch-up" effect (Hervitz, 1985; Goldstein and

Goldstein, 1982). The impact of the catch-up effect depends on the woman's age at migration, i.e., the amount of reproductive time left and the level of fecundity during that period.

The adaptation theory has its roots in both sociological and economic theories explaining the determinants of fertility (Findley, 1980). From the sociological perspective, the adaptation theory posits that fertility is determined by social and cultural norms operating in the area of residence. For migrants moving between two types of areas, rural and urban, where presumably these norms differ, their fertility behavior will reflect the combined influence from both areas (Ritchey and Stokes, 1972; Kahn, 1988). Ribe and Schultz (1980) describe the adaptation process primarily from an economic perspective, naming rural-urban differences in relative wages for men, women and children, and price and income constraints, as explanatory variables for fertility change due to urban migration. Exposure to different relative incomes and costs will lead to adaptation of different fertility behavior, such that migrant fertility will ultimately converge to that of urban nonmigrants. In either case, it is the "duration of exposure" to urban norms, measured by length of residence, which determines the extent of fertility change due to migration.

It has been suggested that the degree to which migrants are self-selected or adapt to the urban environment depends on the context in which migration occurs. For example, during early stages of urbanization, when barriers to migration are great, only the highly motivated or selected people move; they are also the most likely to adapt to behavior norms in the new environment. Later in the urbanization process, as rural-urban transportation and communication improve, migration is easier and less selective. Consequently, migration to certain urban communities that are composed increasingly of migrants could reduce both the need and the opportunity to change behavior (Adewuyi, 1986). Another factor that may influence the degree of selection or adaptation is the magnitude of rural-urban differentials in terms of costs of childbearing and wage differentials. The greater the differentials, the greater the potential for adaptation (Ribe and Schultz, 1980).

Of course, these theories are not mutually exclusive. It is probable that all three hypothesized effects of migration on fertility operate to some extent during the migration process. In addition, it is likely that a strong selection effect accelerates adaptation, whereas the absence of selection may retard adaptation. Along the same lines, a substantial disruption in fertility due to migration could lead couples to make up for lost fertility, which would be interpreted as an absence of adaptation in the post-migration period. Given this "dynamic" relationship between selection, disruption, and adaptation, it is necessary to identify the independent contribution of each effect to understand the implications for national fertility trends of sustained, if not increased, rural-urban migration.

Previous Research Findings

The evidence in Africa to suggest that increased duration of residence leads to lower migrant fertility vis-a-vis urban or rural nonmigrants has been scant. Stolnitz (1984) suggests that the absence of a significant rural-urban fertility

differential in many African countries limits the potential impact of migration on fertility. Other studies (Oppong, 1987; Lee, 1985; Adepoju, 1978) have suggested that an absence of fertility differentials by migrant status may be explained by the offsetting effects of migration on the various proximate determinants. For example, the negative effect on migrant fertility of later age at marriage or higher levels of contraceptive use (whether as a result of selection or adaptation) may be balanced by the positive effect of shorter periods of lactation, thus mitigating the effect of migration on fertility.

The relationships between these factors are likely to vary by country. In Cameroon, Lee (1985) found evidence of fertility adaptation after 20 years of urban residence and hypothesized that the weak negative relationship between duration of urban residence and fertility was due to decreased sterility in the urban areas. In Nigeria, Adewuyi (1986) found no evidence of adaptation; instead he found that husband's income was positively related to fertility in the urban areas, suggesting that if migration leads to improved economic status of the family, then fertility may increase, not decrease, with longer durations of residence in the urban area.

In an analysis of the migration-fertility relationship using the 1978 Senegalese World Fertility Survey data, Diop (1985) explained the observed fertility differential as based on later age at marriage and higher educational attainment of migrants relative to rural nonmigrants. Yet, it was also noted that rural-urban migrant women, age 40-49 at the time of the interview, reported a desired family size which approximated that reported by urban nonmigrants (almost two children fewer than reported by rural nonmigrants of the same age), whereas younger migrant women at the time of the survey reported desired family size similar to that of their rural counterparts. Although these findings are suggestive of both selection and adaptation, they are not conclusive, since the data did not contain information on duration of residence for the migrant population.

Absence of a consensus as to the effect of rural-urban migration on migrant fertility in Africa is not only due to variations in data, definitions of migrants, or the analytical approach. Historical differences in levels and trends of urbanization, as well as differences in the pace of rural and urban socioeconomic development, are important distinguishing features which may make the migration-fertility relationship unique in each national setting. Yet, the emergence of migration and rapid urbanization as crucial issues in the development process of many sub-Saharan countries makes it all the more necessary that a strategy for systematically testing the hypotheses and permitting cross-national comparisons be developed (Morrison, 1983). This study will introduce such a strategy by applying relatively simple statistical techniques to Demographic and Health Survey data, which are widely available for developing countries.

Senegalese Context

The demographic profile of Senegal, provided by a series of surveys and censuses since 1960, is characterized by high growth rates and high levels of internal migration. During the periods of 1960-1970 and 1976-1988 the national growth rate remained at 2.7%, and the proportion that is urban grew from 24% in 1960 to 39% in 1988 (Mbodj, 1989). Zacharai and Nair (1980) estimated that 60% of urban growth during the 1960-1970 period was due to rural-urban migration, and the 1976 census provided estimates that 51% of all internal migration was towards the Dakar region alone (Gueye, 1989).

During the period 1976-1988 the growth rate of the Dakar region exceeded that in all other regions of the country (Table 1). It is not surprising therefore that by 1988, after 3 decades of sustained rural-urban migration directed mainly towards the Dakar region, 22% of the total population resided in that region, even though it constituted only 0.3% of the total land area of the country. These statistics alone illustrate the substantial demographic impact of internal migration and also point to the potential socioeconomic consequences of rural-urban migration for both the rural and urban areas in Senegal.

Table 1. Demographic profiles of Senegal by region (1988)

	TOTAL POP.	DENSITY	% URBAN	SEX RATIO	GR. RATE
SENEGAL	6,881,919	35	39	96.9	2.70
Dakar	21.8%	2728	96	101.0	3.97
Zinguinchor	5.8%	54	38	98.5	2.63
Diourbel	8.9%	141	22	92.3	3.18
Saint-Louis	9.5%	15	27	92.5	1.98
Tambacounda	5.6%	6	27	98.1	2.44
Kaolack	11.7%	50	22	96.9	2.52
Thies	13.6%	142	34	96.1	2.77
Louga	7.1%	17	15	93.2	1.29
Fatick	7.4%	64	10	96.6	1.81
Kolda	8.6%	28	10	99.2	2.54

Note: Sex ratio is the ratio of men/100 women. Growth rate (GR) is the estimate of the intercensal rate of growth between 1976-1988.

Source: F. Mbodj (1989) "Interpretation des resultats préliminaires du Recensement General de la Population et de l'Habitat de 1988 au Senegal," Tables 1-5.

To better understand the impact of rural-urban migration on the fertility of those who migrate it is necessary to determine who migrates and how they adapt to the urban environment. First the question of who migrates: results from the 1988 census (Table 1) show that the sex ratio is relatively stable throughout the country, slightly higher in the Dakar region than elsewhere. The National Demographic Survey in 1971 reported a sex ratio of 89 men for

100 women among migrants to the Dakar region (Zacharai and Nair, 1980). This suggests that rural-urban migration is not exclusively, or even primarily, a male phenomenon, as often thought. Further evidence comes from case studies on migration by ethnic group which show that among certain ethnic groups (primarily the Serer and Diola) rural-urban migrants to Dakar are more likely to be women (Ba, 1981; Sow, 1981; Roch, 1975). Among other groups (for example the Poular), men migrate first and then bring their wives if and when they are successfully installed. Since the 1970's, however, the perceived risks associated with a move have been reduced as a growing network of migrants in urban areas serves to welcome and help new arrivals (Hamer, 1981). As a result, couple migration as well as migration of unmarried women have become more frequent (Lericollais, 1975; Lericollais and Verniere, 1975; Diop, 1987; Hamer, 1981).

The reasons for which women migrate naturally influence the degree to which they adapt to the urban environment and, as a result, their postmigration fertility. More and more it appears that women are "active" migrants, meaning their own role as a migrant (not only that of their husbands) is linked to economic gain, whether their own or their family's (Makinwa-Adebusoye, 1990; Findley, 1989; Hamer, 1981). Consequently, rural-urban migration for women may be associated with changes in their societal role previously defined primarily by childbearing (Locoh, 1989; Oppong, 1987). Under such circumstances it is possible that urban living would affect women's reproductive intentions and behavior, presumably downward.

In addition, urban living greatly increases women's opportunity for paid employment, both in the formal and informal sectors. Although estimation of employment, especially within the informal sector, is difficult, it is generally accepted that female labor force participation in urban areas in Senegal has greatly increased over the past two decades and includes women from all social strata. The 1982 Survey of Employment and Migration indicated that women represented 60% of workers in the informal economy and 22% in the formal economy (Organisation International du Travail, 1985). Female employment becomes even more important as levels of unemployment rise. Under such circumstances workers in the formal sector suffer the most, and workers in the informal sector play a greater role in sustaining household incomes. The importance of female employment is therefore not only due to the fact that women are working outside of their "traditional" sphere of activity, namely the household, and thereby increasing their exposure to variations in lifestyles in the urban area, but also because they are providing cash income for the family and in so doing assume a slightly different role within the household than that of "just" food provider.

It can be argued that irrespective of the motivating force of migration, mere exposure to the urban environment would lead to changes in fertility behavior. The striking differences between the rural and urban areas (Table 2) in terms of important fertility-related factors, infant mortality, and contraceptive knowledge and use, suggest that living in the urban environment would ultimately affect women's reproductive aspirations as well as behavior. The figures in Table 2 show that fertility levels have declined in the urban area between 1978 and 1986, whereas little change is evident in the rural area during this period. Although the rural-urban difference in the infant mortality

rate (IMR) has narrowed since 1978, due to advances in infant survival in the rural areas, the gap is still tremendous and is probably an important reason for higher fertility in the rural areas. Rural-urban differences in contraceptive use are even more striking than the figures indicate since the proportion who ever used any method includes traditional methods, which are more widely used in the rural than urban areas. The proportion of women who ever used modern methods in 1986 was 16% in the urban area versus 1% in the rural area.

Table 2. Rural-urban differentials in selected factors in 1978 and 1986

Residence	RURAL		URBAN	
Year	1978	1986	1978	1986
Total Fertility Rate	7.5	7.1	6.5	5.4
Infant Mortality Rate (IMR)	136.8	102.3	71.4	69.8
Knowl. of Contraception	55.6	89.2	70.1	96.5
Ever-use of Contraception	11.6	35.6	9.3	42.6

Source: 1986 Enquête Démographique et de la Santé (DHS)
1978 Enquête Sénégalaise sur la Fécondité (WFS)

The degree to which urban living affects a woman's life depends on, among other things, the persons with whom she is in contact. Since the 1950's, migrants to Dakar have had to settle further and further outside the city due to overcrowding (Lericollais and Verniere, 1975). Table 3 shows that Dakar's neighboring city, Pikine, experienced tremendous growth since the 1950's compared to Dakar, primarily because of in-migration. Settlers to Pikine, therefore, live primarily with other migrants and may have little contact with long-term urban dwellers or exposure to "urban" attitudes and lifestyles (Sow, 1981). The exceptionally high growth rates between 1955-1960 reflect two major changes in the political and administrative organization in Senegal: movement of the capital to Dakar from St. Louis in 1958 and declaration of the independence of the Republic of Senegal in 1960 (Antoine and Savane, 1990). For both of these events there was heavy in-migration to the Dakar "metropole." The sustained high growth rate of Pikine in the following years illustrates that migration to the urban areas around Dakar continues.

Table 3. Distribution of the population in Dakar "metropole," in thousands

	1955	1960		1976		1988	
	#	#	Rate '55-60	#	Rate '60-76	#	Rate '76-88
Dakar	231	303	6.2	515	4.4	687	2.8
Pikine	7	72	18.6	299	14.2	622	9.0
TOTAL	238	375	11.5	814	7.3	1309	5.1

Note: # is the estimated population size in thousands.
Rate is the annual population growth rate over the specified period.
Source: P. Antoine and L. Savane (1990) "Urbanisation et Migration en Afrique," Table 4.

Policies designed to influence population distribution in the country date back to 1934, under the French colonial administration. The objective of these programs, as well as of the more recent ones in the 1970's, was to resettle some of the population from the "peanut basin," where population density was increasing and fertility of the land was decreasing, to areas in the eastern part of the country (Dubois, 1975). Subsequent programs, focusing on other regions of the country with the objective of stopping urban-ward migration, have tried to diversify crop production as well as introduce irrigation schemes. Yet, the programs have not been overly successful in either stemming the tide of migration to the urban area or in retaining those who moved within the rural area in the resettlement programs (Marcoux, 1990; Adepoju and Ngom, 1989; Trincaz, 1979; Dubois, 1975).

Rural-urban migration continues to play an important role as a survival strategy to cope with current economic and social realities in Senegal. This study seeks to illustrate the impact of rural-urban migration on one demographic phenomenon, the fertility of migrants, with the hope of better understanding the larger consequences of continued rural-urban migration for the prospects of fertility decline in Senegal.

Analytical Framework

In order to assess the effect of rural-urban migration on fertility it is necessary to first determine if and why fertility differs between the two areas. In the first part of the analyses, therefore, the determinants of rural and urban fertility levels are examined. Two specific questions are asked. Do the same factors affect fertility in the urban and rural areas and is the urban area homogeneous? For example, when current urban residents are classified by migration status (as in Table 4), do the same factors operate in the urban migrant subsamples as they do in the full urban sample?

Table 4. Migration status of all women by current residence

Currently Rural		Currently Urban	
NR	988	NU	787
RRR	1230	UUU	234
RUR	61	RRU	456
URR	19	RUU	89
UUR	62	URU	54
Total	2360	Total	1620

Note: Total sample size is 4415. 435 women have been excluded: 224 with childhood or previous residence in other country or missing and 211 women without information on duration of residence, of whom 190 are reported as visitors. See page 10 for letter definitions.

That there is an interaction effect on fertility between rural/urban residence and the independent variables has been hypothesized by many researchers studying African fertility patterns (Lesthaeghe, 1989; Findley, 1980) especially concerning the effect of education, woman's employment, and family wealth. Yet there have not been many attempts to disaggregate the current urban population by migration status to examine their fertility determinants. It is hypothesized that the current urban population is composed of quite different groups of women with respect to their fertility, which may be due to their migration experience.

The second part of the analyses focuses on differentials in CEB, and will test the three hypotheses noted above. In all the analyses, the sample of rural-urban migrants (described below) is disaggregated according to duration of residence in the urban area. The test for selection seeks to determine if duration of marriage, level of education, work experience (mainly pre-marriage employment for wages), and ethnic group, can explain any observed differential between rural-urban migrants and rural nonmigrants. In other words, can the case of an observed fertility differential (presumably lower migrant CEB) be explained by the same factors that may have distinguished the migrants from the rural nonmigrants before the move, i.e., later age at marriage, higher educational attainment, and a specific ethnic group. The control variable in these regression models is the respondent's age.

The adaptation hypothesis is tested by examining differentials in CEB between rural-urban migrants and urban nonmigrants. The first objective is to determine whether migrant fertility levels converge to those of urban nonmigrants with increased duration of residence in the urban area. The second objective is to determine if any observed differentials in CEB (presumably higher migrant CEB relative to their nonmigrant urban counterparts) can be explained by differentials in current socioeconomic characteristics, such as postmarriage employment, wealth status, or husband's occupation. The "selection" factors identified above are controlled for in these models to estimate an unbiased effect of the postmigration characteristics. In the test for disruption, fertility levels of rural-urban migrants who recently migrated to the urban area (0-3 years ago) relative to the nonmigrants are compared.

Particular attention is paid to type of marriage. The objective is to examine the effect on CEB of marital disruption (through divorce or widowhood) and polygamous unions. As found in most populations in the Western Sahel, Senegal has high rates of divorce, particularly in the urban area (Ben-Geloune, 1984; Lo Ndiaye, 1985). Despite the fast pace of remarriage, divorce significantly reduces the amount of time a women is at risk of becoming pregnant (Lesthaeghe, 1984; Bongaarts, 1987). In the absence of high contraceptive prevalence, marital disruption may be an important determinant of cumulative fertility level as well as an important source of fertility differentials between the rural and urban areas.

The role of marriage type within the migration-fertility framework is not clear, however. Marital disruption possibly is an important selection factor for migration: recent divorce or widowhood may motivate women to migrate to the urban areas for financial reasons or to move in with a family member (Findley, 1989). On the other hand, marital disruption may be a consequence of urban living, and therefore an adaptation factor: after a given period of urban living, women develop more independence, which leads to divorce. Since the timing of divorce, widowhood, or remarriage is not available, the effect of this variable is not hypothesized to be one specifically associated with either selection or adaptation, but the effect of marital disruption on cumulative fertility is expected to be negative.

Results of studies on fertility and polygyny have suggested that women in polygamous unions have lower fertility levels than those in monogamous marriages, one reason being the selection into polygynous marriages of sterile or

subfecund women (Pison, 1986; Pebley and Mbugua, 1989), another reason may be the older age of husbands (Boserup, 1985; Lesthaeghe, 1984; Garenne and van de Walle, 1989). The relationship between polygyny and migration has not been addressed in previous research, but it is possible that women with co-wives may be more likely to migrate because they receive less financial assistance (either in terms of cash or use of land) from their husbands and need to migrate to earn money. Thus, the effect of polygyny on fertility is hypothesized to be negative, but not directly related to a selection or adaptation effect. Two dummy variables are included to compare women who have experienced marital disruption (those who are currently divorced/widowed or in a second union) or a polygamous union (those who are in their first union which is polygamous) to women who are in their first union which is monogamous, as defined at the time of survey.

Descriptive Statistics

Senegal Demographic and Health Survey

The DHS data from Senegal (1986) contain responses to four questions on life-time mobility: childhood residence, previous residence, current residence, and duration at current residence. Migrant categories are created based on urban or rural classification at these 3 periods. For example, a woman who reported childhood and previous residences as rural, and current residence as urban, is classified as an RRU migrant. The RRU migrants are the rural-urban migrant group of interest since it is only for this group that reported duration of residence in the urban area can serve as an approximate measure of urban exposure. Table 4 shows the breakdown of the full sample by migration status.

The nonmigrant groups of interest are classified as nonmigrant rural (NR) and nonmigrant urban (NU) based upon their reported duration at the current residence as "always." The RRR and UUU refer to women whose childhood, previous, and current residences have all been either rural or urban, but not in the same locality. They are included to illustrate variation within the rural and urban populations, and perhaps indicate what might be an effect of migration per se independent of the effect of exposure to a different social and economic environment. They are not included as a comparison group with the migrants since residence outside the rural or urban area may have occurred but was not reported.

Sample Characteristics

Before looking at specific characteristics of each migrant category, it is helpful to consider characteristics of the full sample and the rural-urban breakdown. Table 5 illustrates rural-urban differentials in terms of selected demographic and socioeconomic characteristics.

Table 5. Percent distribution of selected demographic and socioeconomic characteristics for full sample and rural and urban subsamples (all women)

Sample	URBAN	RURAL	ALL
ALL WOMEN (N)	1812	2603	4415
MEAN CEB	2.74	3.62	3.26
Age distribution			
15-19	24	21	22
20-24	22	19	20
25-29	18	20	19
30-34	16	14	15
35-39	10	11	11
40-44	5	8	7
45-49	5	7	6
Age married			
Never married	32	11	19
< =14	11	21	17
15-17	30	52	44
> =18	27	16	20
Marriage type			
Never married	32	11	19
1st marr/mono	29	38	35
1st marr/poly	16	32	26
2nd+ marr	23	19	20
Education			
0 years	54	94	78
1-6 years	25	5	13
7+ years	21	1	9
Wealth[1]			
High	22	21	21
Medium	34	56	47
Low	44	23	32
Husband's occupation[2]			
Laborer	26	15	19
Prof	30	12	20
Agric	4	58	36
Unempl	8	4	6
(No husband)	32	11	19
Ethnicity			
Wolof	49	38	42
Poular	19	26	23
Serer/Diola	18	21	20
Other	14	15	15
Residence			
Dakar/urban	63		
Other/urban	37		
West Region		14	38
Other region		86	62

[1] Wealth index: created for rural and urban areas separately.
[2] Occupation of most recent husband for ever-married women.

Rural-urban differences in nuptiality and education are as expected. Overall, fewer women are married in the urban areas, and those who are, did so at a later age. Polygyny is twice as common in the rural areas than in the urban areas, and there is slightly more marital disruption in the urban areas.[1] As expected, female education is much more prevalent in the urban than the rural areas: 46% of urban women have some education compared with 6% of rural women. This is perhaps the most significant factor which could lead to urban-rural fertility differentials in that it can operate not only through delay of marriage but also through attitudinal differences towards childbearing, childrearing, and contraception.

Differences in the household wealth status show that rural residents are more heavily represented in the medium category, whereas a larger portion of urban residents are in the low category. The criteria for classification were slightly different for urban and rural residents so direct comparison is cautioned. In general, rural-urban differences in husband's occupation are as expected. The majority of rural husbands are employed in agriculture and the majority of urban husbands are distributed in professional and manual labor occupations. Twice as many urban women report that their husbands are unemployed or they don't know the occupation. The overall low level of unemployment does not capture the extremely high levels of underemployment, which is much more prevalent in the urban than the rural areas.

Table 6 illustrates the differences in demographic characteristics of women by migration status. The older age distribution of the migrant groups (RRU, UUU, and RRR) is expected; older women have had more time to migrate. This explains in part the higher mean CEB for ever-married women among the migrant groups compared to the nonmigrant groups. Differences in mean CEB among all women is probably due to variations in proportions married.

It is of interest to compare rural-urban migrants (RRUs) to women in both the rural area (nonmigrants, NR, and rural migrants, RRR) and in the urban area (nonmigrants, NU, and urban migrants, UUU). The proportion of evermarried RRU migrants who married before age 14 reflects the pattern of women living in the rural area, whereas the proportion who has experienced marital disruption is more similar to the urban women's experience. Further, the proportions of RRU women who married after age 18 or who are currently in a polygamous union fall between the two other groups. Overall, RRU migrants are a unique group with respect to their nuptiality, but evidence that more women marry later than the rural nonmigrants does suggest selection.

[1] It is not possible to determine whether the first marriage ended in divorce or widowhood. It is likely, however, that divorce is the more common cause of marital disruption in the urban area while widowhood is more frequent in the rural areas (Ben-Geloune, 1984).

Table 6. Percent distribution of demographic characteristics of all women and ever-married women by migration status

Current Residence	URBAN			RURAL	
Migration Status	NU	UUU	RRU	NR	RRR
ALL WOMEN	774	231	451	963	1208
Age distribution					
15-19	33	19	15	31	14
20-24	25	21	18	17	20
25-29	13	25	21	17	22
30-34	14	19	17	12	17
35-39	7	9	14	10	12
40-44	4	4	8	7	8
45-49	4	3	7	6	8
Married					
Ever-married	54	69	84	80	97
Never married	46	31	16	20	3
Mean CEB	2.05	2.92	3.57	3.13	4.05
Ever-married	419	159	376	758	1175
Age married					
<=14	11	13	22	24	23
15-17	45	35	49	58	62
>=18	44	52	29	18	15
Marriage Type					
1st marr/mono	45	49	39	45	42
1st marr/poly	22	19	29	39	35
2nd+ marr	33	32	32	16	23
Mean CEB	3.63	4.12	4.25	3.94	4.17

Note: NR non-mig. rural; RRR rural-rural mig.; RRU rural-urban mig.; NU non-mig. urban; UUU urban-urban mig.

Figure 1 illustrates mean CEB by age at time of survey for RRU migrants and urban and rural nonmigrants, and provides further evidence that the RRU migrant group is unique. Between the ages 20-24 and 35-39 (when data on reported CEB are most reliable) the mean CEB of RRU migrants falls between that of the rural and urban nonmigrants.

Table 7 presents the socioeconomic characteristics of the 5 migrant groups. Again, the RRU migrants emerge as a unique group, not quite like women in either the rural or urban areas. Their educational attainment suggests a greater proportion of women with some primary education compared to rural residents, but far from the levels attained by urban residents. A similar pattern is evident for contraceptive use: more RRU migrants have used modern contraception than women born in the rural area, but not as many as among women born in the urban area.

Figure 1. Mean number of children ever born (CEB) to all women by age and migrant status

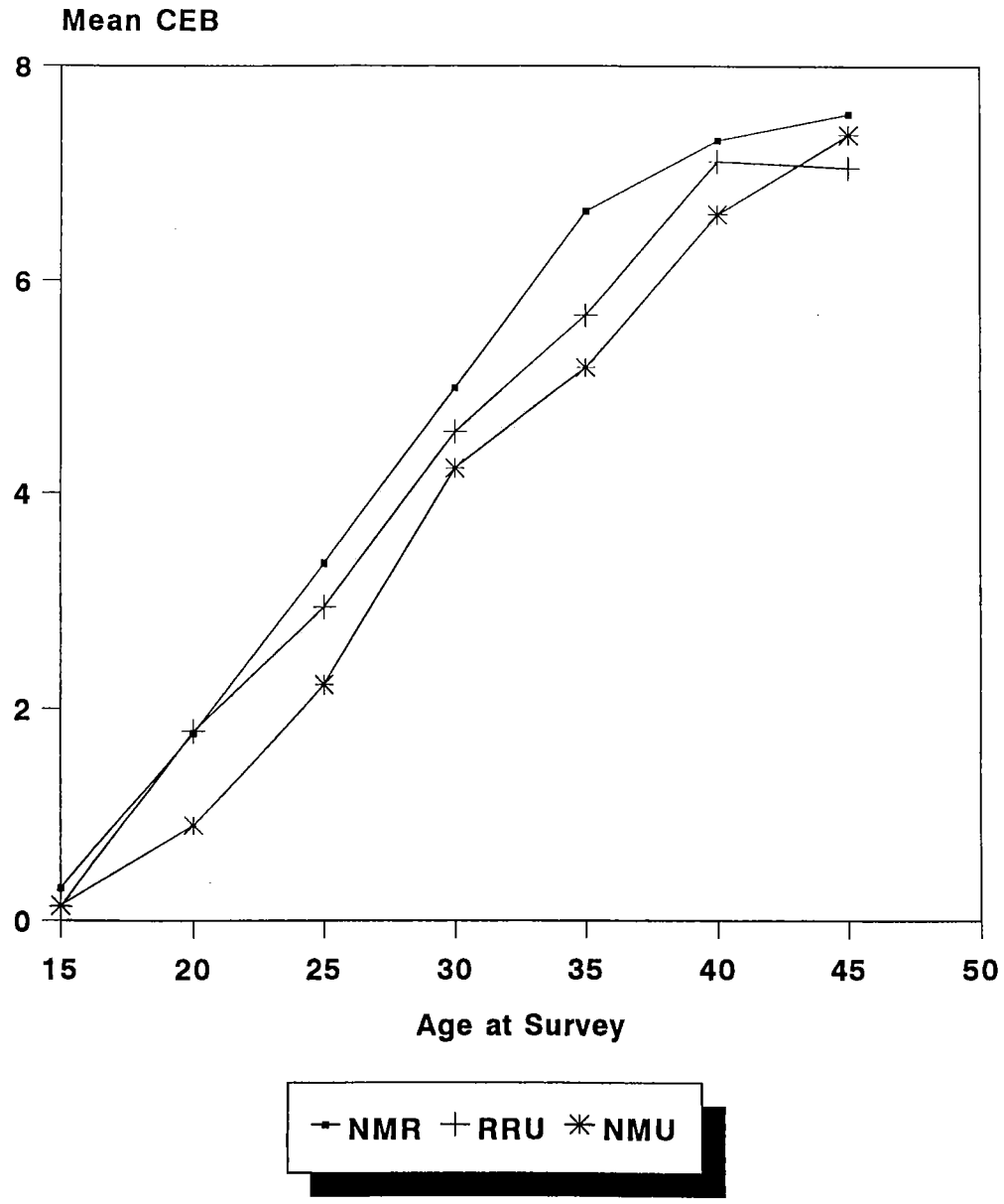

Table 7. Percent distribution of socioeconomic characteristics by migration status

Current Residence	URBAN			RURAL	
Migration Status	NU	UUU	RRU	NR	RRR
Ever Married	419	159	376	758	1175
Education					
0 years	50	53	86	95	96
1-6 years	31	21	12	4	3
7+ years	19	26	2	1	1
Contraceptive Use					
Never	59	47	63	68	64
Traditional only	19	28	31	31	35
Modern	22	25	6	1	1
Work					
Never	53	48	46	59	53
Before marriage only	14	15	12	11	13
After marriage only	17	17	20	17	19
Before & after	16	20	21	13	15
Wealth					
Low	41	49	62	29	37
Medium	38	33	29	58	56
High	21	28	9	23	17
Husband's occupation[1]					
Laborer	41	37	45	20	15
Professional	49	50	37	14	12
Agriculture	3	2	10	62	71
Unemployed/dk[2]	7	11	8	4	2
Ethnic					
Wolof	61	53	42	41	40
Poular	17	21	21	23	29
Serer/Diola	11	12	26	18	21
Other	11	14	11	18	10
Residence					
Dakar	58	67	64		
Other urban	42	33	36		
West region				14	13
Other region				86	87

[1] Occupation of most recent husband, current, divorced or dead.

[2] Don't know

Although all groups have roughly the same employment history, the RRU group has the highest proportion of women who have worked since marriage. Similarly, the RRU group has the highest proportion of women in the lowest wealth category, which may suggest that RRU migrant women are working because they are poor. There are clear distinctions in the occupation of the husband (most recent husband if not currently married) between rural and urban groups, especially in the field of agriculture. However, whereas the husbands of RRU migrant women

tend to be laborers, the husbands of other urban women are concentrated in the professional category. The distribution of migrants and nonmigrants by ethnic group and by place of residence is quite interesting. The majority of nonmigrants in the urban area (NU) are Wolof; their distribution is greater than any other migrant group. Among the urban migrants (UUU) a smaller proportion are Wolof, but their overall distribution by ethnic group reflects that of the nonmigrants. In contrast, the rural-urban migrants (RRU) include a smaller proportion of Wolof, quite similar to the rural population. The RRU migrant group also has the largest proportion of women from the Serer and Diola ethnic groups, as has been noted in previous studies on internal migration in Senegal (Sy, 1991; Ba, 1981; Hamer, 1981). It is also interesting that the urban nonmigrants are relatively equally distributed between Dakar and other urban areas, whereas the migrant groups within the urban population are more concentrated in Dakar. There is little variation in geographic distribution between migrants and nonmigrants within the rural population.

Based on these data, the socioeconomic status of evermarried RRU migrant women does not reflect that of other urban residents and, on average, is lower. Working under the assumptions that improved economic status and higher educational attainment have negative effects on fertility, this finding would suggest that RRU migrant fertility would exceed that of other urban resident fertility. Yet, the relationship between socioeconomic status or educational attainment and fertility behavior cannot be inferred from this table. In the following section multivariate regression will be used to estimate the effect of demographic and socioeconomic variables on the CEB by current rural or urban residence and migrant status.

Fertility Determinants

The results in Table 8 indicate that demographic and socioeconomic characteristics, most notably education and husband's occupation, affect CEB differently in the urban and rural areas. The positive effect of a few years of school (1-6) on fertility in urban areas is consistent with findings from the World Fertility Surveys of a curvilinear relationship between education and fertility (Singh and Casterline, 1985). Yet, the expected negative effect of higher education (7+ years) is evident only in the urban area, and its effect is not significant. Small numbers of women with higher education in the rural area make the estimates unstable and therefore interpretation is difficult. The effect of husband's occupation also differs between the urban and rural areas. A significant negative effect of professional occupation is evident only in the rural area.

A striking difference between the full models for rural and urban areas is that high and medium wealth categories have a negative effect on CEB only in the rural area, suggesting that among the rural poor the benefit of more children outweighs whatever costs are involved. In the urban area, however, the positive effect of the wealth variable may indicate that some wealth leads to relaxation of traditional birth spacing behavior, i.e., shorter durations of breastfeeding without any substitute of contraception.

Table 8. Regression models on CEB of demographic and socioeconomic characteristics for currently urban and rural residents separately (ever-married women)

Residence	CURRENTLY URBAN			CURRENTLY RURAL		
Model	I	II	FULL	I	II	FULL
AGE [1]	.289***	.290***	.310***	.396***	.394***	.384***
AGE SQ.	-.004***	-.004***	-.005***	-.006***	-.006***	-.006***
Year Married [1]	.241***	.242***	.262***	.205***	.204***	.227***
Marriage Type						
1st/poly			-.007			-.056
2+ marr			-1.078***			-.934***
Education						
1-6 years	.339***		.272*	-.230		-.113
7+ years	-.269		-.208	.424		.928
Work						
Before marriage			.141			-.164
After marriage			-.137			-.074
Before & after			-.014			-.102
Wealth						
Medium			.070			-.192*
High			.059			-.227**
Occupation						
Professional		-.047	-.072		-.300**	-.301**
Agriculture		-.235	-.250		.075	.036
Unemployed/dk		.338	.411*		-.552**	-.402*
Ethnic						
Poular			-.275*			-.302***
Serer/Diola			-.259			-.012
Other			-.126			-.103
Residence						
Dakar			-.214*			
West Region						.111
R SQ (adj)	.530	.528	.557	.579	.581	.597
N		1228			2326	

Note: * $p<0.10$; ** $p<0.05$; *** $p<0.005$
[1] Continuous variable

The negative effect of residence in Dakar is as expected. The diversity of such a large urban center in terms of economic and social organization is likely to have a stronger inhibiting effect on fertility than do smaller and more homogeneous urban areas (Peil, 1981). The coefficient for residence in Dakar is significantly larger when marriage type is not in the model. This is again not shown due to the negative effect of marital disruption on fertility. This result is consistent with the 1978 Senegalese WFS findings which illustrated that the highest incidence of marital disruption occurs among educated women and in the urban areas, particularly Dakar (Lo Ndiaye, 1985). The results indicate that CEB does not vary by geographic region among the rural population.

The next step is to examine the effects of these variables on CEB for each of the migrant groups in the urban area separately.[2] The objective is to determine if there are significant differences in the determinants of fertility by migrant status. Table 9 presents regression analyses on CEB for the 3 migrant groups currently living in the urban areas. There is some evidence that the effect of socioeconomic factors on CEB varies by migration group. Higher

Table 9. Regression models on CEB of demographic and socioeconomic characteristics for currently urban residents, by migration status separately (ever-married women).

Status	NU		UUU		RRU	
Model	I	II	I	II	I	II
AGE	.291***	.289***	.369**	.371**	.251**	.287**
AGE Sq.	-.005***	-.005***	-.005**	-.004**	-.004**	-.004**
Years Married	.247***	.263***	.237***	.232***	.235***	.257***
Marriage type						
1st/poly		-.130		.639		-.335
2+ marr		-.987***		-.517		-1.477***
Education						
1-6 years	.308	.352*	-.161	-.160	.239	.106
7+ years	-.562**	-.295	-.339	-.309	-.422	-.552
Work						
Before marriage	.303	-.114	-.613	-.666	.485	.524
After marriage	.096	-.038	-.107	-.070	-.514	-.449
Before & after	.394	.351	-.751*	-.648	-.248	-.137
Wealth						
Medium	.638***	.549**	.535	.447	-.358	-.342
High	.299	.200	.197	.154	.362	.445
Husb. occup.						
Professional	-.302	-.355*	.077	-.038	.043	.085
Agriculture	-.038	-.024	1.734*	1.650	-.195	-.200
Unemployed/dk	.158	.067	.070	.150	.315	.541
Ethnic						
Poular	-.100	-.192	-.348	-.412	-.493	-.543*
Serer/Diola	-.305	-.340	-.334	-.627	-.180	-.287
Other	.007	.099	-.329	-.319	.234	.213
Residence						
Dakar	-.130	-.095	-.259	-.084	-.492*	-.379
R SQ (adj)	.595	.619	.599	.613	.436	.471
N	419		159		376	

Note: * $p<0.10$; ** $p<0.05$; *** $p<0.005$

[2] Similar analyses were conducted on the separate migrant groups in the rural area, but because there were no significant differences the results are not shown here.

education has a significant negative effect on CEB only among the nonmigrants (NU). The positive effect of "high" wealth status, found in the complete urban sample, is the same for all groups, whereas the effect of "medium" wealth is positive and significant for the NU group and negative for the RRU group. Interestingly, employment experience before marriage has a significant negative effect only for the urban migrants (UUU). This group is also unique in that marital disruption is not significantly associated with lower fertility as for the other groups, and polygamous unions have a positive, but not significant, effect. Another interesting finding is that the significant effect of residence in Dakar found in the complete urban sample is evident only among the RRU migrant group.

Another striking difference between the migrant groups is the change in the coefficient for education (7+ yrs) when marriage type is included in the model. The negative effect of marital disruption reduces the size and significance of the effect of higher education only for the NU group. This suggests that the negative effect of education on fertility among this group is due not only to delay of entry into marriage but perhaps also to increased incidence of marital disruption. Among the evermarried NU group with higher education (N=81), 43% are currently single or in a second union. Among the other groups of urban women with higher education this proportion does not exceed 19%. This not only illustrates one of the mechanisms by which education may affect fertility (marriage instability), it also sheds some light on the fertility-related behavior of the "receiving" urban population and possible signs or expectations of "adaptative" behavior by rural-urban migrants.

The determinants of CEB for rural and urban residents as well as for subsamples in the urban area based on migrant status have been examined in this section. Within the complete urban sample the effect of education on CEB is as expected: a few years of education has a positive effect and 7+ years has a negative effect. In contrast, among the rural sample 7+ years of education has a positive effect, although not significant. Another interesting contrast is the effect of husband's unemployment. For the complete urban sample, husband's unemployment has a positive effect on CEB, whereas for the rural sample it has a negative effect; in both cases the effects are significant. Irrespective of place of residence, marital disruption is an extremely important determinant of CEB. Given low levels of contraceptive prevalence in both the urban and rural areas, it is expected that marital disruption plays a major role in determining fertility levels.

When the urban sample is broken down by migration group, it is clear that determinants of CEB also differ between these sub-samples. Among currently urban residents, education has the expected significant negative effect only among the nonmigrant group (NU). Interestingly, only among the urban-urban migrants (UUU) does work experience, both before and after marriage, have an important negative effect on CEB, not found in any of the other groups. For the RRU group, the distinguishing feature that explains the variation in CEB, besides demographic factors, is residence in Dakar. Since this group does not differ from the other urban groups in the proportion living in Dakar, this may suggest a selection effect of women with lower CEB to Dakar or more adaptative behavior of RRU migrants in Dakar relative to other urban areas. This issue will be addressed further when considering differentials in fertility.

Overall, these analyses confirm the hypothesis that the determinants of CEB differ not only in the urban and rural areas, but also within these areas. They have also illustrated that the classification of current urban residents by their migration history (although far from complete) can help explain the determinants of CEB within the aggregate urban population.

These findings are also important because they underscore the need to select homogeneous groups (i.e., NU or NR) for comparison with the RRU migrants in the subsequent tests for selection, disruption, and adaptation. Evidence that the determinants of CEB differ significantly for NU and UUU migrant groups may suggest important selection factors for migration within the urban area which would confuse the identification of selection factors for migration from the rural area to the urban area. Therefore, in the following analyses of CEB differentials the RRU migrant group is compared to the nonmigrants only, i.e., the NR and NU groups.

Fertility Differentials

Before examining CEB differentials between migrant and nonmigrant groups it is instructive to consider differentials between nonmigrants themselves in urban and rural areas, in other words between the NU and NR groups. As illustrated in Figure 1, there is a substantial difference in CEB between the NU and NR groups by age at survey. In this section these differentials are examined in a multivariate framework.

The previous analyses did not indicate a significant variation in CEB by geographic region for the rural sample, but did suggest that within the urban sample Dakar residents have lower CEB than residents in other urban areas. Therefore, the nonmigrant urban sample is broken down by type of urban residence (Dakar or other urban area) and the nonmigrant rural sample remains a single category.

The models presented in Table 10.1 include the demographic and socioeconomic covariates that are most important in explaining rural-urban differentials. Model I shows that the nonmigrants in all urban areas have significantly lower CEB than the nonmigrants in the rural area when controlling for age. When duration since first marriage is added to the model, the significant negative effect of residence in other urban areas disappears (model II), while that of urban residence in Dakar is reduced but remains significant at $p<0.10$. This suggests that later age at marriage is an important characteristic in all urban areas, yet only outside Dakar does it fully explain lower CEB relative to the rural areas.

Higher education (7+ years) has the expected negative effect on CEB and its presence in the model erases the remaining significant effect of urban residence in Dakar. Among the other variables considered in these analyses, husband's occupation and marriage type also explain the remaining difference between urban nonmigrants living in Dakar and rural nonmigrants. This suggests that lower CEB in Dakar is among women with some education, women whose husbands are in a professional occupation, or women who have experienced marital disruption.

Table 10.1. Regression on CEB of demographic and socioeconomic characteristics for rural and urban nonmigrants, N = 1177 (ever-married women)

Sample	NMR and NMU				
Model	I	II	III	IV	V
MIG STAT					
NMU/Dakar	-.745***	-.244*	-.034	-.189	-.036
NMU/other	-.467**	-.146	.043	-.123	.076
AGE [1]	.480***	.323***	.340***	.332***	.323***
AGE2	-.004***	-.005***	-.005***	-.005***	-.005***
Year Married[1]		.245***	.261***	.240***	.241***
Marriage type					
1st/poly			-.075		
2nd+			-1.137***		
Education					
1-6 years				.181	
7+ years				-.523**	
Occupation					
Professional					-.407***
Agriculture					.105
Unemployed/dk					.064
R Sq. (Adj)	.580	.636	.657	.638	.639

Note: * $p<0.10$; ** $p<0.05$; *** $p<0.005$.
[1] Continuous variable

The models in Table 10.2 include the remaining covariates. Premarital work experience has a significant negative effect on CEB, although it has no impact on explaining the rural-urban differential and is correlated neither with education (model VI) nor with husband's occupation (model VII). In contrast, higher education is correlated with husband's occupation and its negative effect on CEB is significantly reduced when occupation is controlled. Interestingly, neither wealth status nor ethnic group has a significant effect on CEB or on the other variables in the model. Only when marriage type is added to the model are the effects of education and work experience significantly reduced, whereas the negative effect of husband's occupation remains unaltered.

Overall, these results suggest that demographic factors, such as duration of marriage (or age at marriage) and marriage type (particularly experience of marital disruption), are essential in explaining differentials in cumulative fertility between nonmigrants in the rural and urban areas. Among the socioeconomic characteristics, these analyses point to education and occupation of the husband as the main factors that explain differentials in fertility once the demographic characteristics are accounted for. The results also indicate that levels of CEB vary by type of urban area (which is not very surprising given the vast difference in size, and social and economic organization of cities across regions of Senegal) and illustrate the need to qualify urban classifications when examining rural-urban differentials.

Table 10.2. Regression on CEB of demographic and socioeconomic characteristics for rural and urban nonmigrants, N=1177 (ever-married women)

Sample	NMR and NMU			
Model	VI	VII	VIII	IX
MIG STAT				
NMU/Dakar	-.169	-.015	-.003	.109
NMU/other	-.119	.006	.040	.107
AGE [1]	.336***	.336***	.325***	.339***
AGE2	-.005***	-.005***	-.005***	-.005***
Years Married [1]	.238***	.238***	.244***	.262***
Marriage type				
1st/poly				-.077
2nd+				-1.093***
Education				
1-6 years	.182	.203	.172	.189
7+ years	-.567**	-.416*	-.413*	-.221
Work				
Before marriage	-.326**	-.336**	-.425**	-.271
After marriage	-.115	-.131	-.169	-.199
Before & after	.045	.006	-.067	-.028
Wealth				
Medium		.096	.085	.055
High		-.108	-.106	-.158
Occupation				
Professional		-.344**	-.349**	-.336**
Agricultural		.076	.063	.031
Unemployed/dk		.062	.086	.045
Ethnic				
Poular			-.193	-.192
Serer/Diola			.167	.117
Other			-.164	-.155
R Sq. (Adj)	.638	.641	.641	.661

Note: * $p<0.10$; ** $p<0.05$; *** $p<0.005$
[1] Continuous variable

The next stage in the analyses is to examine differentials in CEB between RRU migrants and the nonmigrant groups, NU and NR. The objective is to test the three theories seeking to explain how migration from rural to urban can affect the fertility of migrants. Critical to all three theories is the duration since the last move (or duration of residence in the urban area). As mentioned above, the impact of migration on migrant fertility can be measured best by examining the effect of explanatory variables on differentials at progressive durations of residence. Table 11 presents the demographic characteristics of RRU migrants by their reported duration in the urban area.

Table 11. Percent distribution of RRU migrants by selected characteristics and by reported duration of residence in urban area

Duration of Residence	0-3 Years	4-9 Years	10+ Years	ALL RRU
All women	145	136	170	451
(% of total)	(32)	(30)	(38)	(100)
% ever married	75	80	93	83
Median age				
At survey	24	26	35	28
At migration	22	19	18	20
Ever-married women	109	109	158	376
(% of total)	(29)	(29)	(42)	(100)
Median age				
At survey	26	27	36	31
At migration	24	21	18	21
Residence at marriage				
Rural	97	85	73	84
Urban	3	15	27	16

The top panel of Table 11 shows the characteristics of all RRU women. Women who migrated less than 10 years prior to survey are of similar ages at time of survey, whereas long-term migrants (women who migrated 10+ years prior to survey) are on average 10 years older. Such variations in the age distribution by duration of residence explain a large part of the difference in the proportions married, i.e., 75% of recent migrants compared with 93% of long-term migrants. Another difference in demographic characteristics between recent and long-term migrants is the median age at migration. Because of the survey sample selection of women age 15 years and older, the group of recent migrants cannot include women who migrated at less than 12 years of age. Among the long-term migrants, many of whom are older at the time of survey, 25% had migrated before age 15. All the analyses have been conducted on a sample of RRU migrants who migrated after age 15 (to standardize for age at migration), but since the results did not significantly change they are retained for the purpose of sample size.

The next to bottom panel of Table 11 shows that the median ages at survey and at migration for ever-married women are slightly higher than for all women. The difference is clearly stronger among recent migrants since 25% are not yet married. The last variable presented in Table 11 is residence at marriage. This variable distinguishes between ever-married migrants who married before the most recent migration (rural residence at marriage) and those who married after the most recent migration (urban residence at marriage). It should be noted that women who married within 12 months after migration are classified as being married before migration. The assumption is that if a marriage occurred within the 12 months after migration then the migrant was most probably "engaged" at migration. Additional reasoning for this assumption is that the dating of both marriage and the last migration are subject to recall error. The window of 12 months will accommodate some of this error.

The distinction between rural and urban residence at marriage is important because evidence of fertility disruption due to migration should theoretically occur only among women who are at risk of childbearing during the migration process. Although the number of ever-married women who married after migration (i.e., married in the urban area) is small (N=58), they will be excluded from subsequent regression analyses. Limiting the sample to women who had married before migration (or within the 12 months after migration) will strengthen any conclusion that observed lower fertility among recent migrants is due to the disruptive effect of migration. It will also serve as an informal standardization of the three duration categories by age at migration since it will remove from the 10+ years category all women who migrated at least below age 10, since they were presumably not married at that age.

Differences between migrants by duration of residence exist for other important fertility-related characteristics (Table 12). A much smaller proportion of recent migrants married before age 14, and the fact that 25% of all recent migrants (from Table 8) have not yet married suggests that a much larger portion will marry at age 18 years or older compared to the long-term migrants. Despite their younger age, 37% of recent migrants have experienced marital disruption, a higher proportion than the long-term migrants who are, on average, 10 years older. Another striking characteristic of the recent migrants is that 25% of the women worked outside the home both before and after marriage, which is noticeably higher than the other migrant categories. Concerning contraceptive use, there appears to be a clear progression of increased use of modern methods with increased duration of residence in the urban areas, even though the proportion who have never used any method is the same at all durations, 63%. The level of education, on the other hand, is quite similar across all duration categories, and there are only slight differences in the distribution across wealth and husband's occupation categories.

Overall, these results do not suggest that there are significant differences in the socioeconomic indicators (except work experience) by duration of residence, although there is some evidence that recent migrants do differ from long-term migrants in certain demographic characteristics, such as age at marriage and marital disruption. The next step is to determine whether the CEB of RRU migrants at different durations of residence differs from that of nonmigrants.

Test for Selection

The test for selection uses a sample composed of RRU migrants and rural nonmigrants (NR). Limiting the analyses to these two groups is consistent with the theory stating that rural-urban migrants are selected for certain characteristics that distinguish them from rural nonmigrants and these same characteristics can explain the expected lower migrant fertility relative to nonmigrants. The hypothesized selection factors are: higher education, premarital employment, older age at marriage, and member of the Serer or Diola ethnic groups. Place of destination is also included within this framework under the hypothesis that the selection factors are stronger among migrants to the west region where the two largest cities, Dakar and Thies, are located.

Table 12. Percent distribution of RRU migrants by demographic and socioeconomic characteristics and by reported duration of residence in urban area (women who married before migration)

Duration of Residence	0-3 Years	4-9 Years	10+ Years	ALL RRU
# EVER-MARRIED	106	95	117	318
(% of total)	(33)	(30)	(37)	(100)
Age married				
<=14	19	23	28	24
15-17	56	50	48	51
>=18	25	27	24	25
Marriage type				
1st marr/mono	41	43	28	37
1st marr/poly	22	26	42	31
2+ marr	37	31	30	32
Education				
0 years	86	82	91	86
1-6 years	13	16	7	12
7+ years	1	3	2	2
Contraceptive use				
Never	63	63	63	63
Traditional only	35	33	27	31
Modern	2	4	10	6
Work				
Never	49	55	36	46
Before marriage only	14	9	15	13
After marriage only	12	19	31	21
Before & after	25	17	18	20
Wealth				
Low	55	65	63	61
Medium	39	24	28	31
High	6	11	9	8
Occupation				
Laborer	39	51	46	45
Professional	39	42	34	38
Agricultural	12	3	13	10
Unemployed/dk	10	4	7	7
Ethnic				
Wolof	35	46	50	44
Poular	27	21	18	22
Serer/Diola	27	24	24	25
Other	11	9	8	9
Residence				
Dakar	59	69	59	65
Other	41	31	41	35

Regression coefficients for the hypothesized selection factors are presented in Table 13. Model I shows that RRU migrants who moved less than 10 years prior to the survey have significantly lower CEB relative to rural women

who never moved, when accounting for age. When duration of marriage is in the model, the coefficients do not change significantly, suggesting that lower CEB of recent migrants relative to nonmigrants of the same age is not a function of age at marriage. The other selection factors expected to account for variation in CEB by migrant status have little effect.

Table 13. Regression on CEB of selection factors for RRU and NMR, N=1076 (ever-married women)

Model	I	II	III	IV	V
MIG STATUS					
RRU 0-3 yrs	-.835***	-.713***	-.766***	-.763***	-.707***
RRU 4-9 yrs	-.631***	-.569**	-.665**	-.667**	-.609**
RRU 10+ yrs	.012	.048	.205	.241	.253
AGE [1]	.476***	.318***	.342***	.352***	.331***
AGE SQ.	-.004***	-.005***	-.005***	-.005***	-.005***
Years married [1]		.227***	.225***	.215***	.224***
Education					
1-6 years			-.048		
7+ years			.016		
Work					
Before marriage only				-.086	
After marriage only				-.294*	
Before & after				-.169	
Ethnic					
Poular					-.165
Serer/Diola					.184
Other					-.096
Residence					
West Region					-.131
R SQ (adj)	.551	.590	.596	.597	.596

Note: * $p<0.10$; ** $p<0.05$; *** $p<0.005$
[1] Continuous variable

If the hypothesized selection factors do not explain CEB differentials between RRU migrants and rural nonmigrants, what are the reasons for such significant variation? Table 14 presents results of regression models that include explanatory variables not directly linked to the selection theory since they are measures of the current socioeconomic status of migrants. The wealth variable has a negative effect on CEB and its presence in the model increases the coefficients for RRU migrants (0-3 and 4-9 years duration), suggesting that lower migrant fertility is not a function of higher wealth status. There appears to be no significant variation in levels of CEB by husband's occupation.

Table 14. Regression on CEB of selection and adaptation factors for RRU and NMR, N = 1076 (ever-married women)

Model	VI	VII	VIII	IX
MIG STATUS				
RRU 0-3 yrs	-.695***	-.824***	-.739***	-.538**
RRU 4-9 yrs	-.613**	-.767***	-.664**	-.570**
RRU 10+ yrs	.294	.162	.248	.261
AGE [1]	.343***	.345***	.347***	.368***
AGE SQ.	-.005***	-.005***	-.005***	-.005***
Years married [1]		.221***	.220***	.243***
Marriage type				
1st/poly				-.217
2nd+				-1.248***
Education				
1-6 years	-.098	-.060	-.040	-.073
7+ years	.062	.146	.235	.020
Work				
Before marriage	-.212	-.198	-.194	-.076
only	-.343**	-.348**	-.345**	-.303*
After marriage only	-.283	-.287	-.295	-.218
Before & after				
Wealth		-.281*	-.265*	-.236
Medium		-.339*	-.290	-.270
High				
Husband's			-.149	-.101
occupation			.103	.113
Professional			.105	.155
Agriculture				
Unemployed/dk				
	-.222	-259*	-.256	-.236
Ethnic	.250	.214	.188	.118
Poular	-.127	-.139	-.151	-.159
Serer/Diola				
Other				
	-.114	-.098	-.087	-.014
Residence				
West Region				
R SQ (adj)	.596	.597	.597	.619

Note: * $p<0.10$; ** $p<0.05$; *** $p<0.005$.
[1] Continuous variable

When marriage type is added to the model (column VIII) the negative coefficient for RRU migrants of 0-3 years residence is significantly reduced in size, whereas that for long-term migrants increases. This may suggest that marital disruption has been an important motivating factor for rural-urban migration, but its negative effect on fertility is more apparent among recent migrants, and less apparent among long-term migrants who have had a

longer time to "catch up" on lost fertility through remarriage. Finally, region of residence has no effect on any of the other variables, suggesting that region of residence has little effect on CEB once demographic and socioeconomic factors are accounted for.

However, absence of a significant effect of region of residence would not preclude an interaction effect between place of urban residence and duration of residence for the migrants. Based on earlier results that residence in Dakar has a significant negative effect on CEB for RRU migrants, it is possible that such an effect could differ at varying durations of residence. Table 15 shows two models where the RRU group is classified by place of residence.

Table 15. Regression on CEB of selection and adaptation factors for RRU and NMR, with interaction terms RESID*MIG STATUS, N=1076 (ever-married women)

Model	X	XI
RESID * MIG STATUS		
Dakar & RRU (0-3 yrs)	-.796***	-.549**
Dakar & RRU (4-9 yrs)	-.877***	-.711**
Dakar & RRU (10+ yrs)	-.100	-.042
Other & RRU (0-3 yrs)	-.798**	-.570
Other & RRU (4-9 yrs)	-.380	-.307
Other & RRU (10+ yrs)	.608*	.530*
AGE [1]	.346***	.367***
AGE SQ.	-.005***	-.005***
Years married [1]	.221***	.243***
Marriage type		
1st/poly		-.217
2nd+		-1.228***
Education		
1-6 years	-.062	-.093
7+ years	.227	.016
Work		
Before marriage only	-.186	-.070
After marriage only	-.342**	-.301*
Before & after	-.281	-.207
Wealth		
Medium	-.274*	-.245*
High	-.302	-.275
Husband's occupation		
Professional	-.167	-.118
Agricultural	.090	.099
Unemployed/dk	.111	.154
Ethnic		
Poular	-.257	-.243
Serer/Diola	.179	.119
Other	-.157	-.172
R SQ (adj)	.598	.619

Note: * $p<0.10$; ** $p<0.05$; *** $p<0.005$
[1] Continuous variable

In model X, which does not include the variable marriage type, the effect of duration of residence on CEB differs substantially by place of residence. This effect is not evident among recent migrants, who have lower CEB irrespective of place of urban residence. But it is much more apparent among long-term migrants: long-term migrants in Dakar have lower CEB, although not significant, while those in other urban areas have significantly higher CEB, compared to the rural non-migrants.

When marriage type is added, model XI, the coefficients are reduced in size and significance as in previous analyses (Table 14). Yet the coefficients remain large for short-term migrants: they are significant at $p<0.05$ for migrants to Dakar and insignificant for migrants to other urban areas, but this is primarily due to small numbers of observations resulting in large standard errors. These results suggest that the differential effect of type of urban residence appears to be more significant for migrants of long durations than for recent migrants.

Although the results do not indicate that the hypothesized selection factors influence the observed fertility differential between RRU migrants and rural nonmigrants, there is some evidence that the urban area to which RRU women migrate plays a role in explaining fertility differentials. When controlling for selection factors and current socioeconomic factors, recent migrants to Dakar continue to have significantly lower CEB than rural nonmigrants. Among long-term migrants, CEB levels are lower for migrants to Dakar, but higher for those residing in other urban areas, relative to the rural nonmigrants. This could suggest a strong disruption effect associated with migration to any urban area that is followed by substantial catch-up behavior only among those migrating to urban areas other than Dakar. It is possible that migrants to other urban areas are not exposed to the same forces inhibiting high fertility as are migrants to Dakar. As such, migrants to other urban areas sustain high fertility behavior, something that migrants to Dakar either cannot do or choose not to do. An alternative interpretation is that there has been a change in the selection factors over the past 10 years such that recent migrants are selected for lower CEB in comparison to long-term migrants, and perhaps the selection for lower CEB is stronger for women migrating to Dakar.

Test for Adaptation and Disruption

This analysis examines differentials in CEB between RRU migrants at different durations of residence and urban nonmigrants (NU). Evidence of adaptation would be that increased duration of residence leads to similar levels of CEB for migrants and nonmigrants of similar age, once selection factors are controlled. Further evidence of adaptation would be that the expected higher CEB of recent migrants is explained by differentials in current socioeconomic status. The first step in these analyses is to examine CEB differentials when controlling for age only, and then introduce the hypothesized selection and adaptation factors separately to the model.

The first set of models, Table 16, shows that there is significant variation in CEB between RRU migrants and the NU group, but in the opposite direction from that hypothesized by the adaptation theory. Recent migrants have lower CEB than urban nonmigrants and long-term migrants have significantly higher CEB, when controlling for mother's age. When duration of marriage is added to the model (model II) these effects are altered. It appears that high levels of CEB among long-term migrants is in part due to longer duration of marriage, which translates into earlier age at marriage when controlling for age. Among recent migrants, on the other hand, their CEB is significantly lower than that of their nonmigrant counterparts of the same age and duration of marriage, which is not explained by the other hypothesized selection factors, i.e., education, premarital work experience, ethnic group, and place of destination.

Table 16. Regression on CEB of selection factors for RRU and NMU, N=737 (ever-married women)

Model	I	II	III	IV	V
MIG STATUS					
RRU 0-3 yrs	-.279	-.595**	-.616**	-.612**	-.547**
RRU 4-9 yrs	-.002	-.374*	-.448*	-.433*	-.375
RRU 10+ yrs	.764***	.391*	.593**	.606**	.625**
AGE	.377***	.248***	.283***	.279***	.271***
AGE SQ	-.002**	-.004**	-.004***	-.004***	-.004***
Years married [1]		.241***	.238***	.230***	.228***
Education					
1-6 years			.334*		
7+ years			-.440*		
Work					
Before marriage only				-.034	
After marriage only				-.153	
Before & after				.010	
Ethnic					
Poular					-.188
Serer/Diola					-.102
Other					.092
Residence					
Dakar					-.235
R SQ (adj)	.454	.519	.528	.522	.523

Note: * $p<0.10$; ** $p<0.05$; *** $p<0.005$
[1] Continuous variable

In Table 17 the hypothesized adaptation factors are added to the model, which includes the selection factors as control variables (model VI). There is no evidence that differences in wealth status or husband's occupation are the source for observed fertility differentials between the RRU and NU groups. Interestingly, when marriage type is added to the model the effects are apparent among both the recent and long-term migrants. In the previous analyses between RRU and NR, where the effect was strongest among recent migrants, the opposite was true (Table 14). These results indicate that lower fertility among RRU migrants who recently moved, relative to their nonmigrant urban counterparts, is partially explained by an experience of marital disruption. In contrast, higher CEB of long-term migrants relative to their urban counterparts is explained, in large part, by the negative effect of marital disruption within the urban population itself, not the migrant population. In other words, once the negative effects of marital disruption on fertility within the "receiving" population (NU) are controlled, the fertility of the long-term migrants is only slightly higher.

Table 17. Regression on CEB of selection and adaptation factors for RRU and NMU, N=737 (ever-married women)

Model	VI	VII	VIII	IX
MIG STATUS				
RRU 0-3 yrs	-.560**	-.555**	-.536**	-.419*
RRU 4-9 yrs	-.380	-.341	-.331	-.372
RRU 10+ yrs	.641**	.666**	.667**	.431*
AGE (1)	.282***	.276***	.277***	.302***
AGE SQ	-.004***	-.004***	-.004***	-.005***
Years married [1]	.227***	.231***	.230***	.249***
Marriage type				
1st/poly				-.088
2nd+				-1.172***
Education				
1-6 years	.339*	.294	.275	.260
7+ years	-.446*	-.548**	-.510*	-.324
Work				
Before marriage only	-.002	.017	-.018	.149
After marriage only	-.160	-.155	-.158	-.176
Before & after	.125	.174	.154	.184
Wealth				
Medium		.243	.226	.175
High		.302	.303	.223
Occupation				
Professional			-.144	-.164
Agricultural			-.261	-.274
Unemployed/dk			.359	.345
Ethnic				
Poular	-.173	-.148	-.164	-.232
Serer/Diola	-.211	-.184	-.208	-.286
Other	.084	.110	.085	.116
Residence				
Dakar	-.230	-.264*	-.284*	-.218
R SQ (adj)	.526	.527	.527	.554

[1] Continuous variable
Note: * $p<0.10$; ** $p<0.05$; *** $p<0.005$

The differential effect on CEB of duration of residence by type of urban residence is examined by classifying the RRU group by residence in Dakar or in other urban areas. Table 18 presents two models for the RRU and NU groups and shows the same models from analyses of RRU and NR groups (from Table 15) for easy comparison.[3] When either urban or rural nonmigrants are the reference group, the effect of duration of residence is essentially

[3] It is important to note that when the nonmigrant samples are classified by place of residence, as are the migrant sample, the coefficients for the nonmigrants do not differ for either the NU or NR. To save one degree of freedom the nonmigrant samples are not classified by place of residence.

Table 18. Regression on CEB of selection and adaptation factors with an interaction term RESID*MIG STATUS (ever-married women)

Nonmigrant reference	nonmigrant = NU		nonmigrant = NR	
Model	X	XI	X	XI
RESID * MIG STATUS				
Dakar & RRU (0-3 yrs)	-.591**	-.450*	-.796***	-.549**
Dakar & RRU (4-9 yrs)	-.505*	-.524*	-.877***	-.711**
Dakar & RRU (10+ yrs)	.346	.218	-.100	-.042
Other & RRU (0-3 yrs)	-.567	-.464	-.798**	-.570*
Other & RRU (4-9 yrs)	-.126	-.169	-.380	-.307
Other & RRU (10+ yrs)	1.049***	.678**	.608*	.530*
AGE [1]	.278***	.303***	.346***	.367***
AGE SQ	-.004***	-.005***	-.005***	-.005***
Years married [1]	.232***	.250***	.221***	.243***
Marriage type				
1st/poly		-.080		-.217
2nd+		-1.163***		-1.228***
Education				
1-6 years	.257	.249	-.062	-.093
7+ years	-.525*	-.333	.227	.016
Work				
Before marriage only	-.041	.132	-.186	-.070
After marriage only	-.144	-.166	-.342**	-.301*
Before & after	.138	.169	-.281	-.207
Wealth				
Medium	.205	.156	-.274*	-.245*
High	.227	.164	-.305	-.275
Husband's occupation				
Profession	.148	-.168	-.168	-.118
Agriculture	-.274	-.284	.090	.099
Unemployed/dk	.343	.331	.111	.154
Ethnic				
Poular	-.147	-.218	-.257	-.243
Serer/Diola	-.192	-.274	.179	.119
Other	.068	.107	-.157	-.171
R SQ (adj)	.526	.553	.598	.619
N	737		1076	

Note: * $p<0.10$; ** $p<0.05$; *** $p<0.005$
[1] Continuous variable

the same by place of residence. Recent migrants to both Dakar and other urban areas have lower fertility than the nonmigrants; this suggests a disruption effect. In contrast, long-term migrants to other urban areas have significantly higher fertility levels than the nonmigrants, whereas long-term migrants to Dakar do not. These results indicate that the catch-up effect is less strong in Dakar. This may also support the theory that adaptation is more likely to occur in Dakar than in other urban areas.

Summary and Conclusion

These results point to three possible interpretations about the effect of rural-urban migration on fertility. First, lower fertility among recent RRU migrants could suggest a selection effect of lower fertility at the time of migration among women who migrated after 1975, whereas women who migrated before 1975 had either similar or higher fertility than the nonmigrants. Since none of the hypothesized selection factors could explain lower fertility among the recent migrants, this may indicate selection for other factors not considered in the selection theory and not available in the data. Second, lower fertility among recent migrants could indicate a disruption effect. Assuming that the negative effect of disruption would be the same for migrants to Dakar and to other urban areas, then higher fertility among long-term migrants in other urban areas may indicate a stronger catch-up effect for these migrants in comparison to the migrants to Dakar. Third, absence of significant catch-up behavior among long-term migrants to Dakar may indicate an adaptation effect: migrants to Dakar are exposed to social and economic conditions that have a negative effect on fertility, whereas such conditions are not as influential in other urban areas.

Overall, it appears that the impact of rural-urban migration on fertility is negative, as shown in the level of CEB by age in Figure 1. This is probably due to the combined effects of selection for lower fertility at the time of migration (the causes of which remain unknown) as well as a disruptive effect of migration. Yet, this negative effect is mitigated to a large degree by migrant fertility behavior in the post-migration period, probably indicating shorter periods of breastfeeding which is not balanced by increased use of contraception, such that long-term migrants have slightly higher fertility than nonmigrants.[4] Further analyses showed that the fertility differentials between nonmigrants and long-term migrants vary by place of urban residence, indicating that there is a difference in post-migration fertility behavior between those migrants who moved to Dakar and those who moved to other urban areas. Similar fertility levels between long-term migrants to Dakar and urban nonmigrants, in contrast to higher fertility levels among long-term migrants to other urban areas, suggests that migrant adaptation occurs in Dakar but not elsewhere. This makes sense given that the focus of development programs has been in and around Dakar, such that opportunities for employment and continued education, as well as access to family planning and health centers, are much greater in Dakar (Ngom, 1989).

Two conclusions can be drawn from these results concerning the impact of sustained migration on national fertility levels. First, although the negative effect of rural-urban migration on fertility is due primarily to selection and disruption effects, there is some evidence of adaptation among migrants to Dakar. If the use of contraception continues to increase in Dakar, it is likely that an adaptation effect among rural-urban migrants to Dakar will

[4] Analyses conducted on differentials in duration of birth intervals and duration of breastfeeding indicate that long-term RRU migrants exhibit similar patterns as the NU, which are significantly different from those of both recent migrants and NR (McKinney, 1992a).

become more pronounced, leading to a stronger negative effect of migration on migrant fertility, which would in turn have a negative effect on national fertility levels.

The second conclusion to be drawn from this study is based on the evidence that fertility levels of long-term migrants are higher in the secondary cities than in the capital city, which is also true among nonmigrants.[5] This suggests that the possibility of a significant fertility decline on the national level, in the face of continued rural-urban migration, will require that secondary cities are the target of more concerted efforts to reduce fertility. Although the Senegalese government adopted in 1981 a plan to integrate family planning in the national health program, by 1985 there were only 22 government clinics in the country, with more than 25% located in Dakar (Posner and Mbodj, 1989; Ndiaye et al., 1988). Increased attention towards the development of secondary cities would produce two benefits. First, it would attract rural out-migrants to urban centers other than Dakar, thus alleviating further population pressure on the already overburdened infrastructure in Dakar (White, 1989). Second, it would help to establish the social and economic conditions in the secondary cities that are associated with lower fertility in the capital city, such as employment and educational opportunities, as well as better access to health services. The prospect for fertility decline in Senegal depends, to a large extent, on the process of urbanization on the national level, not just in the capital city, and to this end government policy can be instrumental by focusing development initiatives in secondary cities throughout the country.

[5] A separate study examining the proximate determinants of fertility in Senegal, comparing WFS and DHS data, showed strong evidence of the beginnings of fertility decline in Dakar, but not in secondary cities (McKinney, 1992b).

BIBLIOGRAPHY

Adepoju, A. 1978. Migration and Fertility: A Case Study in South-West Nigeria. In *Marriage, Fertility and Parenthood in West Africa*, ed. C. Oppong et al. The Australian National University Canberra Monograph Series, No. 4. New York: Dover Publications Inc.

Adepoju, A. and P. Ngom. 1989. Efforts to Retain Rural Migrants in Senegal. In *Urbanization and Geographical Distribution of Population*, CICRED Inter-Center Cooperative Research Project.

Adewuyi, A.A. 1986. Interrelations between Duration of Residence and Fertility in a Nigerian Primate City. *Nigerian Journal of Economic and Social Studies* 28(2): 197-211.

Antoine P. and L. Savanne. 1990. Urbanisation et Migration en Afrique. Paper presented at Conference on the Role of Migration in African Development: Issues and Policies for 1990's, Dakar, Senegal.

Ba, F. 1981. Northern Senegal In *The Uprooted of the Western Sahel: Migrants' Quest for Cash in the Senegambia*, ed. Lucie Colvin. New York: Praeger Publishers.

Ba, F. 1987. Migrations et Développement dans la Vallée du Fleuve Sénégal. In *Population et Développement en Afrique*, ed. Hedi Jemai. CODESRIA.

Bach, R. 1982. Migration and Fertility in Malaysia: A Tale of Two Hypotheses. *International Migration Review* 15(3): 502-521.

Boserup, E. 1985. Economic and Demographic Interrelationships in sub-Saharan Africa. *Population and Development Review* 11(3): 383-397.

Bongaarts, J. 1987. The Proximate Determinants of Exceptionally High Fertility. *Population and Development Review* 13(1): 131-139.

Ben-Geloune, B. 1984. Patterns of First Marriage and Its Disruption for Senegalese Women. *Studies in African and Asian Demography*, Cairo Demographic Center Annual Seminar, No. 12: 423-447.

Diop, F. 1985. Fécondité et Migration au Sénégal. In *Nuptialité et Fécondité au Sénégal*, Travaux Documents No. 112. Paris, France: Institut National des Etudes Démographiques.

Diop, M. 1987. Les Femmes Migrantes de Basse Casamance à Dakar: Condition de Vie et de Participation au Développement des Zones de Départ. Paper presented at Conference on Insertion of Migrants in Cities of West Africa, Lomé, Togo.

Dubois, 1975. Les Serers et la Question des Terres Neuves au Sénégal, *Cahiers ORSTOM*, Série Sciences Humaines Vol. XII, No. 1.

Findley, S. 1980. A Suggested Framework for Analysis of Urban-Rural Fertility Differentials with an Illustration of the Tanzanian Case. *Population and Environment* 3(3-4): 237-261.

Findley, S. 1989. Les Migrations Féminines dans les Villes Africaines: Leurs Motivations et Expériences. *L'Insertion Urbaines des Migrants en Afrique*, Collections Colloques et Séminaires, Editions de l'ORSTOM.

Garenne, M. and E. van de Walle. 1989. Polygyny and Fertility Among the Serer in Senegal. *Population Studies* 43(2): 267-283.

Goldstein S. and A. Goldstein. 1982. The Impact of Migration on Fertility: An "Own Children" Analysis for Thailand. *Population Studies* 35: 265-284.

Gueye, C. 1989. Migrations Inter-Régionales au Sénégal: 1960-1980. *Historiens Géographes du Sénégal* No. 4-5, 2nd Semester: 24-33. University of Dakar: IFAN.

Hamer, A. 1981. Diola Women and Migration: A Case Study. In *The Uprooted of the Western Sahel: Migrants' Quest for Cash in the Senegambia*, ed. L. Colvin. New York: Praeger Publishers.

Hervitz, H. 1985. Selectivity, Adaptation or Disruption? A Comparison of Alternative Hypotheses on the Effects of Migration on Fertility: The Case of Brazil. *International Migration Review* 19(2): 293-317.

Holmes, D.N. 1976. Introduction. In *The Dynamics of Migration: Internal Migration and Migration and Fertility*, Interdisciplinary Communications Program, Smithsonian Institute. Occasional Monograph Series No. 5, Vol. 1.

Kahn, J. 1988. Immigrant Selectivity and Fertility Adaptation in the United States. *Social Forces* 67(1): 108-128.

Lee, B.S. 1985. Fertility Adaptation by Rural-Urban Migrants in Cameroon. Doctoral Dissertation, University of Nebraska.

Lericollais, A. 1975. Peuplement et Migrations dans la Vallée du Sénégal, *Cahiers ORSTOM*, Série Sciences Humaines. Vol. XII, No. 2.

Lericollais, A. and M. Verniere. 1975. L'Emigration Toucouleur du Fleuve Senegal à Dakar, *Cahiers ORSTOM*, Série Sciences Humaines. Vol. XII, No. 2.

Lesthaeghe, C. 1989. Regional Variation in Components of Child-Spacing: The Role of Women's Education. In *Reproduction and Social Organization in Sub-Saharan Africa.* ed. C. Lesthaeghe. Berkley, CA: University of California Press.

Lesthaeghe, R. 1984. *Fertility and Its Proximate Determinants in sub-Saharan Africa: The Record of the 1960's and 1970's.* Working Paper 1984-2. Brussels: Vrije University.

Lo Ndiaye, K. 1985. Entrée en Union et Divorce. In *Nuptialité et Fécondité au Sénégal*, Travaux et Documents Cahier No. 112. Presse Universitaires de France.

Locoh, T. 1989. Le Role des Familles dans l'Accueil des Migrants vers les Villes Africaines. In *L'Insertion Urbaines des Migrants en Afrique*, Collections Colloques et Séminaires, Editions de l'ORSTOM.

Makinwa-Adebusoye, P. 1990. Female Migration in Africa: An overview presented at the Conference on the Role of Migration in African Development: Issues and Policies for the 1990's. Dakar, Senegal.

Marcoux, R. 1990. Caractéristiques villageoises et rétention des populations: Les cas de la vallée du fleuve Sénégal. *Labour, Capitaland Society* 23(1): 100-133.

Mbodj, F. 1989. Interprétations des Résultats Préliminaires du Recensement Général de la Population et de l'Habitat de 1988 au Sénégal. *Historiens Géographes du Sénégal* No. 4-5, 2nd Semester: 24-33. University of Dakar: IFAN.

McKinney, B. 1992a. The Impact of Rural-Urban Migration on Migrant Fertility in Senegal. Doctoral dissertation, the Johns Hopkins University, School of Hygiene and Public Health. Baltimore, Maryland.

McKinney, B. 1992b. Fertility and its Proximate Determinants in Senegal. Paper commissioned by the National Academy of Sciences, Panel on Sub-Saharan Africa, Working Group on Senegal. Restricted.

Morrison, P. 1983. Introduction and Overview. In *Population Movements: Their Forms and Functions in Urbanization and Development*, ed. P. Morrison. Liege, Belgium: Ordina Editions.

Ndiaye, S., I. Sarr, and M. Ayad. 1988. *Enquête Démographique et de Santé au Sénégal 1986.* Ministère de l'Economie et des Finances [Sénégal] and the Institute for Resource Development/Macro Systems, Inc., Columbia, Maryland.

Ngom, T. 1989. Appropriate Standards for Infrastructure in Dakar. In *African Cities in Crisis: Managing Rapid Urban Growth*, ed. R.E. Stren and R.R. White. Colorado: Westview Press.

Oppong, C. 1987. Introduction. In *Sex Roles, Population and Development in West Africa*, ed. C. Oppong. London, England: International Labour Organization.

Organisation International du Travail. 1985. L'Emploi des Femmes au Sénégal. Programmes des Emplois et des Compétences Techniques pour L'Afrique. Addis Ababa, Ethopia: United Nations.

Pebley A. and W. Mbugua. 1989. Polygyny and Fertility in Sub-Saharan Africa. In *Reproduction and Social Organization in sub-Saharan Africa*, ed. C. Lesthaeghe. Berkeley, CA: University of California Press.

Peil, N. 1981. *Cities and Suburbs: Urban Life in West Africa.* New York: Africanna Publishing Co.

Pison, G. 1986. La Démographie de la Polygamie. *Population* 41(1): 93-122.

Posner, J. and F. Mbodj. 1989. Men's Attitudes about Family Planning in Dakar, Senegal. *Journal of Biosocial Science* 21: 279-291.

Ribe H. and T. Schultz. 1980. Migrants and Native Fertility in Columbia in 1973: Are Migrants Selected According to their Reproductive Preferences? Economic Growth Center, Yale University. Center Discussion Paper, No. 355.

Ritchey, P.N. and C.S. Stokes. 1972. Residence Background, Migration and Fertility. *Demography* 9(2): 217-230.

Roch, J. 1975. Les Migrations Economiques de Saison Sèche en Bassin Arachidier Sénégalais, *Cahier ORSTOM*, Série Sciences Humaines, Vol. XII, No. 1.

Singh, S. and J. Casterline. 1985. The Socioeconomic Determinants of Fertility in *Reproductive Change in Developing Countries*, ed. J. Cleland and J. Hobcraft. England: Oxford University Press.

Sow, F. 1981. Migration to Dakar. In *The Uprooted of the Western Sahel: Migrants' Quest for Cash in the Senegambia*, ed. L. Colvin. New York: Praeger Publishers.

Stolnitz, G. 1984. *Quantitative Approaches to Analyzing Socioeconomic Determinants of Third World Fertility Trends: Review of the Literature.* Indiana University Fertility Determinants Group. Project Final Report.

Sy, M. 1991. Les Raisons de Migrer, des Sénégalaises Déterminées par l'Appartenance Ethnique et le Statue Social. *Pop Sahel* No. 16: 29-35.

Trincaz, P. 1979. Transformations Sociales dans les Zones Nouvelles d'Implantation Rurale: Les Serers dans les Terres Neuves du Sénégal Oriental. In *Cahier ORSTOM* Vol. XVI, Nos. 1 & 2.

White, R.R. 1989. The Influence of Environment and Economic Factors on the Urban Crisis. In *African Cities in Crisis: Managing Rapid Urban Growth*, ed. R.R. Stren and R.R. White. Colorado: Westview Press.

Zacharai, K.C. and N.K. Nair. 1980. Senegal: Patterns of Internal and International Migration in Recent Years. In *Demographic Aspects of Migration in West Africa - Vol. 2*, ed. K.C. Zacharia, J. Conde, and N.K. Nair. World Bank Staff Working Paper No. 415. Washington, DC: World Bank.