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**ENDURING GENDERED
MOBILITY PATTERNS
IN CONTEMPORARY SENEGAL**

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Enduring gendered mobility patterns in contemporary Senegal*

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Abstract

This study explores internal migration patterns of men and women using individual panel data from a nationally representative survey collected in two waves, in 2006-2007 and 2010-2012, in Senegal. The data used are unique in that they contain the GPS coordinates of individuals' location in both waves. We are thus able to precisely calculate distances and map individual moves, avoiding limitations and constraints of migration definitions based on administrative units. Our results reveal major differences across gender. Women are found to be more likely to migrate than men. However, they move less far and are more likely to migrate to rural areas, especially when originating from rural areas. Education is found to increase the likelihood of migration to urban destinations, especially for women. An analysis of the motives for migrating confirms the existence of gendered migration patterns, as female mobility is mostly linked to marriage while labor mobility is frequently observed for men.

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1 Introduction

Gender differences in access to - and forms of - migration have been increasingly documented in the last decades (Donato et al., 2006). Many studies in different disciplinary fields have stressed the limited geographic mobility of women, explained by gender roles or family constraints (Kanaiaupuni, 2000; Assaad and Arntz, 2005; Massey, Fischer, and Capoferro, 2006; Chort, 2014). However, the African continent has been poorly represented in this literature. Moreover, a strong focus on international migration may have somewhat overshadowed more modest - and maybe more feminized - internal moves. Yet, in patrilocal societies, notably in sub-Saharan Africa, female internal mobility is high and largely associated with marriage (Kudo, 2015). It seems important to assess the differences between female and male mobility patterns in such a context.

The aim of this paper is to study the gender-specific determinants of internal migration and distance travelled in Senegal. We use individual panel data from a nationally representative survey collected in 2006-2007 and 2010-2012 (PSF, *Enquête sur la Pauvreté et la Structure Familiale*). Our data are unique first in that all individuals in the household are tracked, within the country boundaries, whatever their gender and their relationship to the household head. Second, our data contain the GPS coordinates of individuals' location in both waves. We are thus able to calculate distances precisely and map individual mobilities, avoiding limitations and constraints of migration definitions based on administrative units. In addition, the PSF survey includes several modules containing valuable demographic and economic information at the individual, household, and community levels, which allows us to analyze a large set of economic and non-economic determinants of internal mobility. We use in addition data from the 2002 Senegalese census to investigate the role of migration "push-factors" at the sub-regional level (*département*). The econometric analysis of the determinants of migration decision, distance travelled and rural or urban location is complemented with a descriptive study of migration motives and a mapping of individual moves using cartographic tools.

The econometric analysis first reveals that women are more likely to migrate than men. A careful analysis of attrition between the two survey waves nuances this observation as the attrition rate is significantly higher for men, which suggests that women who migrate are less likely than men to live alone and be lost with their entire household, or to lose contact with their origin household. Consistent with this interpretation, we find that the distance travelled is significantly lower for women than for men. We find that women are more likely than men to experience rural-to-rural migration and that for women this kind of migration is associated with marriage. Importantly, education is found to increase both men and women's probability of migrating to urban areas.

This article makes several contributions. First, it focuses on gender differences in internal migration patterns which have been largely overlooked. Our findings suggest little evolution in the last 30 years, as the conclusion by [Chant et al. \(1992\)](#) based on numerous case studies in the developing world are unchallenged: in contemporary Senegal, women are less likely than men to migrate independently for employment. More specifically, this article links gender-specific migration patterns to the analysis of rural-urban mobility. Regarding internal migrations in sub-Saharan Africa, studies have nuanced the overwhelming focus on rural-to-urban mobility and have highlighted the importance of rural-to-rural migration ([Beauchemin and Bocquier, 2004](#); [Beauchemin, 2011](#); [Bocquier and Mukandila, 2013](#)). Recent research suggest that the urbanization rate in the region has been overstated ([Potts, 2012](#)). [De Brauw, Mueller, and Lee \(2014\)](#) shows that rural-urban migration rates in sub-Saharan Africa are lower than the microeconomic theory would predict given the large and positive income differentials between urban and rural areas. It is argued here that the observed rural-to-rural patterns in our data have a strong gender component. Female mobility appears to be constrained, more limited geographically, and in a large part subordinate to family reasons. However, the fact that education is found to increase women's likelihood of migrating to urban destinations, suggests possible channels to overcome barriers to female migration.

Second, the current state of the literature allows this paper to provide rare insight into

the dynamics of migration and distance within the context of a developing country (see [Lucas \(2016\)](#) for a review)). Indeed, recent research has tried to grapple with limitations of migration data aggregated by administrative units ([Long, Tucker, and Urton, 1988](#); [Bell et al., 2015](#)). In developed countries, the rationales for migration have been found to differ depending on distance travelled: whereas short-distance mobility is associated with housing and life-cycle motives, long-distance migration is driven by employment motivations ([Cordey-Hayes and Gleave, 1974](#); [Clark and Huang, 2004](#); [Niedomysl and Fransson, 2014](#)). To our knowledge, this article provides the first study using migration distances based on GPS coordinates in sub-Saharan Africa. Interestingly, our findings are rather consistent with the above categories, but we add to this strand of literature by showing that they are strongly linked to gender-specific migration paradigms. We tend to observe a predominance of short-distance rural-rural marriage-related migrations among women, and more diverse patterns for men with a non-negligible share of long-distance labor-related migration to urban destinations driven by the unrivaled attractiveness of the capital city, Dakar. By combining survey and census data this article simultaneously considers individual, household, community and regional determinants of migration and distance travelled. It thus complements the analysis by [Herrera and Sahn \(2013\)](#) who focus only on Senegalese youth (21-35 year old) and measure internal migration based on retrospective data collected in 2003.

This study contributes to the sociological and anthropological literature on gender differences in access to migration in sub-Saharan Africa. While the feminization of internal migration flows has increased in Senegal as well as in other sub-Saharan countries in the 1980s ([Antoine and Sow, 2000](#)), studies focusing on the recent period show a more nuanced picture. In Mali, [Lesclingand and Hertrich \(2017\)](#) find an increasing gap between male and female mobility patterns in the recent period. [Comoe \(2013\)](#) questions the alleged autonomy of female internal migration in Ivory Coast by showing that the mobility of women is almost exclusively driven by family motives. Similarly, focusing on migration of Senegalese to Dakar, [Duboz et al. \(2011\)](#) show that family motives for migration are

predominant among women. The comparative analysis provided by [Vause, Toma, and Richou \(2015\)](#) shows marked differences between Senegal and the Democratic Republic of the Congo. They find that Senegalese women are less likely to migrate abroad than Congolese ones, and less likely to migrate independently and point to the more rigid patriarchal system prevailing in Senegal as an explanation. Contributions in this literature generally rely on retrospective data to reconstruct migration trajectories ([Lesclingand and Hertrich, 2017](#); [Vause, Toma, and Richou, 2015](#); [Herrera and Sahn, 2013](#)), subject to recall and selection biases, or focus on one specific region (the capital city Dakar for [Duboz et al. \(2011\)](#) and [Vause, Toma, and Richou \(2015\)](#)). By using nationally representative survey data, and measuring migrations based on actual GPS coordinates, we are able to provide a representative nation-wide picture of Senegalese mobility in the second half of the 2000s.

The next section describes the data used. Section 3 presents our empirical methodology and discusses attrition issues. Section 4 presents the econometric results for the determinants of internal migration rural/urban migration and distance traveled, depending on gender. Finally Section 5 concludes.

2 Data

2.1 The PSF Individual Panel Survey

The data used in this study come from the two waves of the “Poverty and Family Structure” Survey (PSF), conducted in Senegal in 2006-07 for the first wave, and from late 2010 to the beginning of 2012 for the second wave¹. The sample in the first wave is nationally representative and made of 1750 households (14,450 individuals), in 150 randomly drawn

¹The survey has been conducted by a team of French researchers and researchers from the National Statistical Agency of Senegal and is described in detail in [DeVreyer et al. \(2008\)](#). Momar Sylla and Matar Gueye of the Agence Nationale de la Statistique et de la Démographie of Senegal (ANSD) on the one hand and Philippe De Vreyer (Paris-Dauphine Dauphine, IRD-DIAL), Sylvie Lambert (PSE) and Abba Safir (World Bank) designed the survey. The data have been collected by the ANSD thanks to the funding of the IDRC (International Development Research Center), INRA Paris and CEPREMAP.

census districts. All individuals surveyed in the first wave have been tracked, except when abroad, forming an individual panel. The attrition rate between the two waves is 11.6%. As attrition may result in a great part from internal migration, issues related to attrition are carefully discussed in Section 3.2.

The PSF surveys are particularly suited to the study of internal migration since they provide the exact location of individuals through GPS coordinates in both waves of the panel. Thanks to these coordinates, we calculate Euclidean distances traveled by individuals between the two waves ².

The PSF data contain in addition rich information on individual and household socio-demographic characteristics, and on community infrastructures, which allows us to finely document the determinants of internal migration. In particular, consumption data are collected for each household subgroup referred to as a cell. Cells are semi-autonomous consumption units including a cell head and all her dependents (in particular her children, foster children and widowed mother or father). The average number of cells per household is 2.5 ³. We are thus able to account for consumption at both the household and cell levels. We include in all our regressions variables for the household and cell size, and for the relative consumption of the cell. To complement objective wealth indicators and account for relative deprivation as a potential driver of internal migration, we use two distinct questions about the perceived wealth of the household on the one hand, and the community on the other, with 5 modalities each (from “very poor” to “very rich”). Households are classified as “richer” than their community if their self-assessed wealth level is higher than the one reported for their community.

Communities in PSF data are classified as being urban or rural, based on the cate-

²While Senegalese geography offers further complexity when it comes to using Euclidean distances, due to the position of the Gambia along the Gambia river, Euclidean measurement is the most relevant and accessible means of computing distances of internal migration (Bell et al., 2002). Note in addition that most mobility observed from and to the area south of the Gambia, the Casamance, made of the regions of Ziguinchor and Kolda, is connected to the capital city Dakar, as shown in Figure 1. The cities of Dakar and Ziguinchor are connected once more by ferry since 2005, after the dramatic sinking of *Le Joola* in 2002, and very few travellers choose the land route. The Euclidean distance thus seems to be a relevant proxy for the travel distance even from and to the regions of Senegal south of the Gambia.

³See Lambert, Ravallion, and van de Walle (2014) for a more detailed description of cell definition.

gories used by the Senegalese Statistical Institute (ANSD). We use these categories in the following analysis to provide a finer description of mobility patterns.

We used in addition data from a 10% sample of the 2002 Senegalese census to calculate indicators of poverty and inequality⁴ at the county level, based on 2006 administrative boundaries⁵.

2.2 Descriptive Statistics

The present analysis focuses on individuals 15 years and older, as the mobility of younger individuals is more likely to be decided on by their parents and subject to specific motives⁶. Therefore, the initial database is reduced to a panel of 6,986 individuals (8,636 including attritors, individuals deceased between the two waves and those migrating abroad). To avoid the inherent problems of administrative geography (Bell et al., 2015), our definition of internal migrants is based on the distance between the two locations calculated from recorded GPS coordinates. We use 5km⁷ as a lower bound for internal migration as it represents in the Senegalese context a significant enough distance that there are costs attached to this mobility. However, results are robust to using other cut-offs (see below). Based on Euclidean distances, 670 individuals moved of more than 5km between the first and second wave of the survey.

Migrants account for 9.6% of individuals tracked in the panel. Descriptive statistics in the Appendix present characteristics of individuals and of their household in the first wave of the survey, which are relevant for understanding the determinants of migration between the two survey waves. When including all types of migration (internal and international), internal migration accounts for 69% of migrants, making it a significant phenomenon to study. As appears in Table 1, migrants are more likely to be women

⁴Both measures were obtained using the PovMap2 software developed by the World Bank (Zhao and Lanjouw, 2009; Elbers, Lanjouw, and Lanjouw, 2003)

⁵Senegal was subdivided into 34 counties (*départements*) in 11 regions in 2006. In 2008, Senegal underwent administrative reforms: the country is currently subdivided into 45 counties (*départements*) and 14 regions.

⁶Child fostering, in particular, is widespread in Senegal.

⁷Approximately one-hour walk.

Table 1: Descriptive statistics: comparison between non-migrants and migrants

	(1) Non-Migrant	(2) Migrant	(3) Total	(4) t/χ^2 diff (1) - (2)
Individual Characteristics				
Male (d) (%)	45	41	44	2.68
Age in years	35.1	28.2	34.5	6.9***
Fostered (d)(%)	14	17	14	4.6**
First-born (d) (%)	34	32	33	1.1
Ethnicity (%)				20.0***
...Wolof/Lebou	42	38	42	
...Serere	12	16	13	
...Poular	27	24	27	
...Diola	5	7	5	
...Other	13	15	14	
Rel. to Head of Household (%)				126.1***
...Head of Household	21	11	20	
...Spouse/Parent	23	12	22	
...Child/Sibling	37	49	38	
...Other/Non-Related	19	29	19	
Education (%)				17.3***
...No Education	38	37	37	
...Primary Education	25	24	25	
...Secondary or University Education	18	29	24	
...Quranic School	18	9	14	
...Missing	1	0	0	
Socio-Professional Categories (%)				64.3***
...Agricultural Worker	13	9	13	
...Independent/Employer	15	9	14	
...Salaried Worker	8	9	8	
...Family/Intern/Trainee	11	12	11	
...Student	6	11	6	
...Inactive/Unemployed	29	26	29	
...Missing	18	24	18	
Household Characteristics				
Consumption p.a.e. (10^3 XOF)	488.5	710.6	509.7	-222.1***
Household Size	11.3	10.9	11.3	0.5
Household Cell Size	4.3	4.6	4.3	-0.3**
Cell/Household Expenditure	0.46	0.50	0.46	-0.04***
Household vs Community Wealth (%) (Self-Reported)				
...Richer (d)	14	13	14	0.9
...Poorer (d)	20	23	21	3.6*
Community Characteristics				
Environment (%)				2.6
...Dakar	33	33	33	
...Other cities	24	22	24	
...Rural	42	45	42	
Public Services				
Public Hospital (%)	39	37	39	1.9
Nb Public Primary Schools	1.9	1.8	1.9	0.1*
Nb Public Secondary Schools	1.7	1.6	1.7	0.1
County (Département) Characteristics				
Headcount Poverty	0.45	0.46	0.45	-0.02**
Gini Index	0.44	0.43	0.43	0.01***
Observations	6305	670	6975	6975

Source: Poverty and Family Structure Survey, 2006-2007 and 2010-2012

†Consumption per adult equivalent in thousands XOF (619 XOF \approx 1 USD)

All means are calculated at the individual level, to make the comparison between the different groups easier as households may include both migrants and non-migrants. Large households thus tend to be over-represented in the reporting of descriptive statistics for household variables.

Table 2: Urban/Rural Internal Migrations

Destination	Urban Origin			Rural Origin			Total		
	No.	%Col	%Row	No.	%Col	%Row	No.	%Col	%Row
Urban	284	77%	61%	184	61%	39%	468	70%	100%
<i>Intra-Dakar (Regional)</i>	116	41%							
Rural	86	23%	43%	116	39%	57%	202	30%	100%
Total	370	100%	55%	300	100%	45%	670	100%	100%

Source: Poverty and Family Structure Survey, 2006-2007 and 2010-2012

(58.6% compared to 55.3% for non-migrants), they tend to be better educated (29.1% have a secondary education or higher compared to 19% among non-migrants) and are younger (66.5% are under 30 compared to 46.3% for non-migrants).

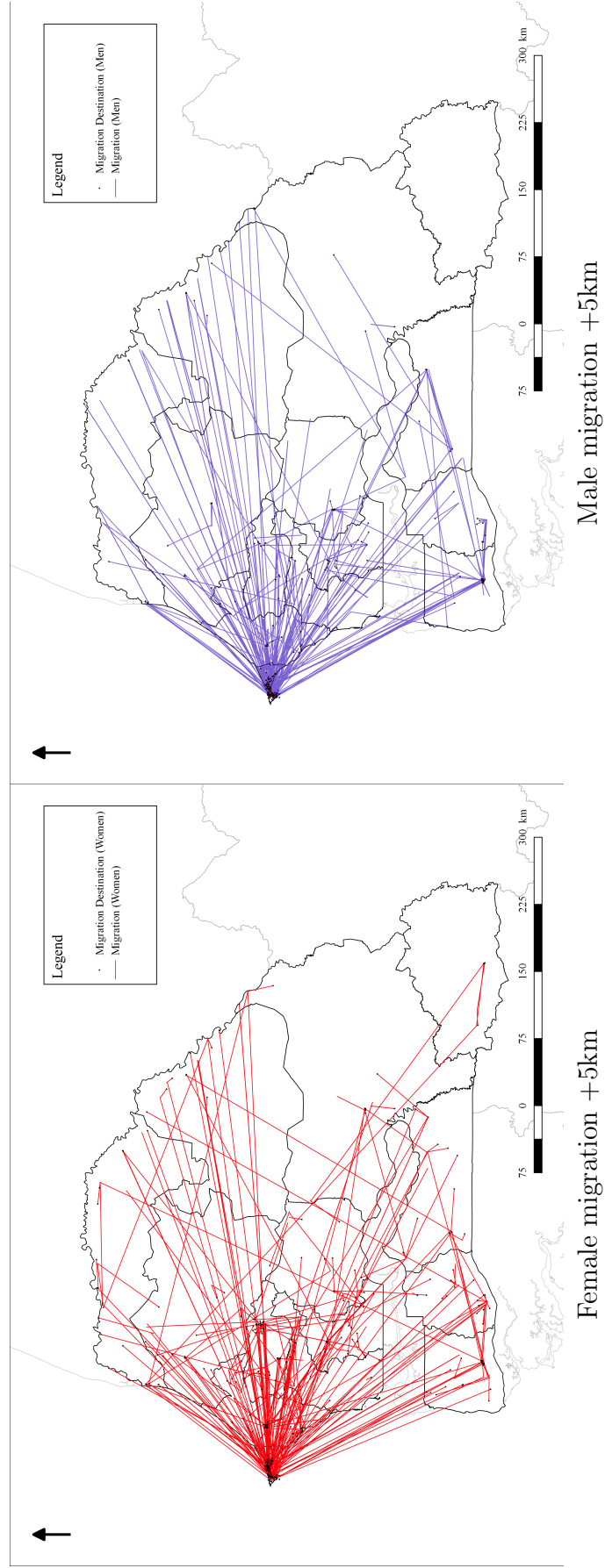
Regarding the geography of internal migrations, the data reveal the overwhelming polarity and attractiveness of Dakar. Indeed 16.1% of internal migrants in our data come from Dakar, while 21% move to Dakar between the two survey waves (excluding Intra-Dakar mobility). In addition, intra-Dakar mobility (of more than 5km) represents 17.3% of internal migration. Overall, internal migrants going to or from Dakar represent 37.2% of all migrants (54.4% including intra-Dakar mobility) while the Dakar metropolitan area accounts for 20% of the Senegalese population in 2002 (ANSD, 2006). As a robustness check, we exclude intra-Dakar migrants from our sample of internal migrants, since mobility within Dakar, even though on a distance larger than 5km, might not be considered migration.

Table 2 focuses on rural/urban migratory dynamics and confirms the intensity of migration to urban centers, with 70% of internal migrants moving to urban settings. Particularly notable is the intensity of migration from urban-to-urban settings which accounts for 77% of migrations for individuals originating in urban areas. This should be in part nuanced by the intensity of mobility within the region of Dakar, which accounts for 41% of all urban-to-urban mobility. This intensity of intra-Dakar mobility finds parallels with part of the argument made by Beauchemin and Bocquier (2004) on migration and

urbanization whereby intra-urban mobility (and its peri-urban spaces, which are Pikine and Guédiawaye for Dakar) better explains urban expansion than in-migration initially.

Figure 1 represents male and female mobilities between the two survey waves, based on GPS coordinates, each line standing for one individual. Dots materialize destinations. For both women and men, the attractiveness of Dakar is illustrated by the numerous lines converging towards the capital city. Male and female patterns differ in that female mobilities are more diverse, include more short-distance and rural-to-rural moves, while male migration is almost exclusively directed towards Dakar.

Figure 1: Migration by gender



Source: Poverty and Family Structure Survey, 2006-2007 and 2010-2012

Figure 2 represents the distribution of migration distance for women and men, for distances over 5km. The distributions are significantly different at the 5% level according to a Kolmogorov-Smirnov test: women are more likely to move on short-distances, while men are over-represented in long-distance migrations.

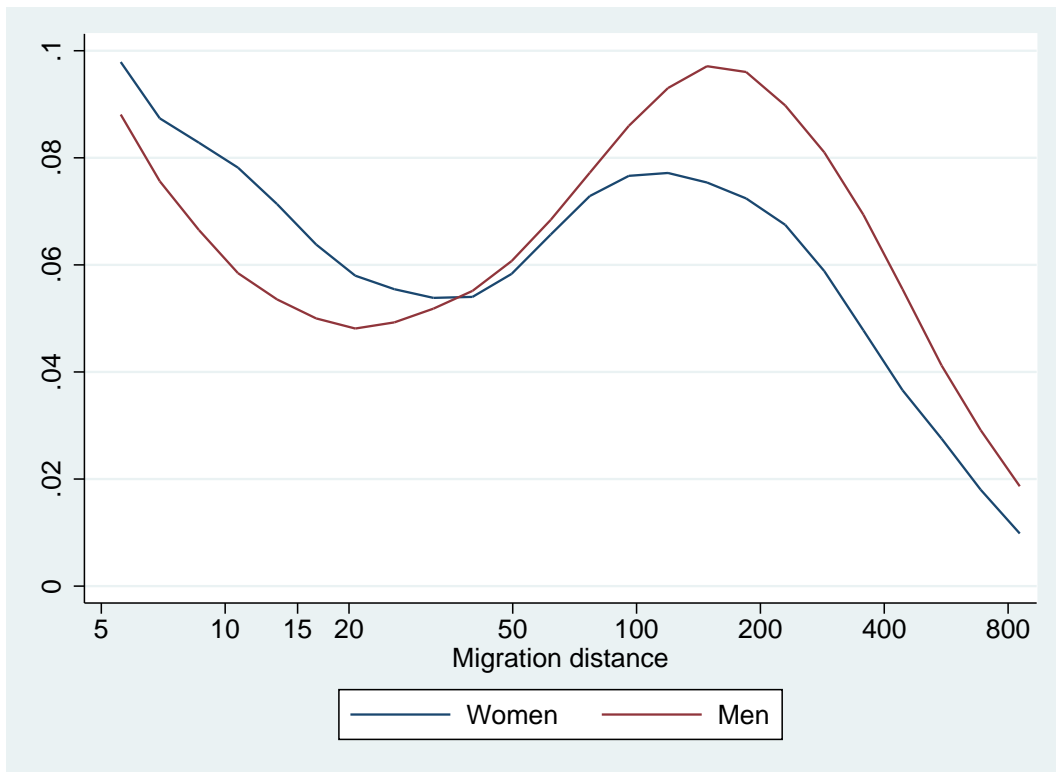
Figure A in the Appendix shows the distribution of reasons for migration across distance travelled and reveals a striking contrast with regards to reasons for moving between women and men. Regardless of distance, 40 to 60% women’s mobility is explained by marriage or return to spousal home. Employment and education are marginal migration motives for women and appear only for medium to long distances. By contrast, except for very short distances (under 50km), 40 to 66% of male migration is explained by either education or employment.

3 Empirical approach

3.1 Empirical models

In line with the individual models of migration derived from [Todaro \(1997\)](#) explaining migration decision by earning differentials we explore the role of individual variables such as gender, age, education or socio-professional category in the migration decision. We account for the contributions of the literature initiated by [Stark and Bloom \(1985\)](#) and [Rosenzweig and Stark \(1989\)](#) that emphasized the household dimension of the migration decision by considering individuals’ relative position in the household. We control in particular for the relationship to the household head and for the birth rank among siblings as previous research in the case of Senegal has shown that elders are more likely to migrate as they are expected to send more remittances ([Chort and Senne, 2015](#)). In addition, we investigate the question of relative deprivation as a potential driver of migration ([Stark, 1984](#); [Stark and Taylor, 1989](#)) at three different levels. At the household level first, we exploit the rich data on consumption disaggregated at the cell (household subgroup) level to proxy for the relative economic status and/or bargaining power within the household.

Figure 2: Kernel density estimates of migration distance, by gender



Second, we use subjective data on household wealth compared to the perceived average wealth of the community. Finally, we explore the impact of inequality at the county level, as, according to [Stark \(1984\)](#), we should observe more migration where the distribution of income is more unequal. Building on the literature focusing on the impact of the quality of amenities on migration ([Dustmann and Okatenko, 2014](#)), we control for the availability of education and health services in the community.

We estimate a probit model for migration decision where our dependent variable is a dummy variable equal to one if individual i has migrated internally between the two survey waves. More precisely, internal migrants are defined as individuals surveyed in the second wave at a location distant of more than 5km from their initial location. As robustness checks, we use a 10km threshold instead and we exclude mobilities within the capital city of Dakar (see [Tables A and B](#) in the Appendix). Note that for lack of exhaustive retrospective information on individual migration trajectories, we cannot account for

temporary mobility that occurred between the two survey waves, i.e. individuals who migrated and settled back in their household of origin. The set of explanatory variables includes individual, household, community and county (*département*) characteristics. Individual variables are gender, age, education, ethnicity, dummies for having been fostered before the age of 15 and for first-borns, relationship to the household head, and socio-professional status. Household controls are the size of the household, a consumption index per adult equivalent, the size of the cell, the ratio between cell consumption and household consumption and a measure of self-reported wealth within the community.

Community determinants include controls for the environment (urban or rural) and public services (public hospital, primary and secondary schools). Finally, two variables are defined at the county (*département*) level: a measure of poverty (headcount) and a measure of inequality (Gini index).

We estimate our model on the pooled sample (men and women) and separately for each gender, as we expect migration determinants to vary across gender.

Second, on the sample of migrants, we investigate the determinants of distance travelled. Our dependent variable is the log of the Euclidian distance between locations of individual at waves 1 and 2, computed based on the GPS coordinates collected by the surveyors.

Finally, we estimate a multinomial logit model to investigate the issue of rural/urban migrations. Instead of considering the binary decision to migrate or stay, we model the three-option choice to migrate to an urban area, to a rural area, or stay.

3.2 Treatment of attrition

A crucial issue when studying migration using panel data is linked to attrition. 89.4% of individuals surveyed in the first waves were tracked and surveyed again in the second wave. Our definitions of migrants is based on the distance (measured by surveyors with GPS) . Individuals who were not found in the second survey wave are presumably in large part individuals who left their household of origin, and maybe moved far away

enough that surveyors were not able to find them in their community of origin⁸. It could thus be argued that attritors should be treated as migrants. However, as we focus on internal migration such a solution tends to overinflate both the importance of internal migration and the consequences of attrition. Indeed, a non-negligible share of attritors is expected to fall outside the scope of our analysis: first, whereas it seems doubtless that individuals who could not be found in their household of origin have moved, some are likely to have migrated abroad. Second, even when excluding international migrants, attritors do not exactly match our definition of migrants, as we consider a lower bound of 5km as the minimum distance associated with mobility costs high enough to discriminate migration from mere housing mobility. Indeed, a significant share of attritors may have moved relatively close to their household of origin and still be lost, especially in Dakar. Note that 57% of attrition concerns individuals living in Dakar, where individuals may not be as easily traced as in smaller towns or rural communities. Furthermore we observe a high mobility within Dakar, which supports our assumption that among attritors who were still alive and remained in Senegal, a non negligible share falls out of our definition of internal migrants. Tables C and D in the Appendix compare the observed characteristics of attritors to those of four distinct groups: internal migrants (i.e. individuals who moved of more than 5km), deceased individuals, international migrants and movers of less than 5km. Columns 6 to 9 test the equality of the mean or percentages for the different variables used in the analysis. The tests suggest that attritors have characteristics which are closer on average to those of international migrants than to any other group. This is particularly true with regard to education, socio-professional category, household measured and self-perceived wealth, and community infrastructures, for which no significant difference is observed between individuals who could not be tracked and international migrants. This observation, although it cannot be used as a proof, suggests that international migration is probably a major driver of attrition.

⁸To contribute to limit attrition when whole households moved between two survey waves, surveyors were instructed to collect information from neighbors or reference persons in the community or neighborhood.

In order to analyze the sensitivity of our results to attrition, we estimate a probit model for internal migration treating attritors as internal migrants. For the above stated reasons, considering individuals who could not be tracked as internal migrants leads us to overinflate the internal migrant category, since, as discussed above, attrition is also probably caused in part by death, international migration and short-distance housing mobility.

Attrition may also be an issue for the analysis of migration distance. Indeed, as attrition is partly caused by internal migration, it may be correlated with migration distance. The sign of the correlation is however ambiguous: individuals migrating further away may be less easily tracked, but short-distance urban mobility may generate more attrition due to the weaker neighbourhood networks. Our estimates of the determinants of migration distance may thus be biased by selective attrition. However, the distance travelled by those among attritors who are indeed internal migrants is unknown. The above robustness checks consisting in pooling attritors and internal migrants in the analysis of the probability of migrating is not applicable for migration distance. In order to investigate this issue we thus choose another approach. Following [Senne \(2014\)](#), we estimate a two-step [Heckman \(1979\)](#) selection model, using dummies for second-wave fieldwork controller in charge of first recontacting households at their first-wave location as excluded instruments⁹. Indeed, the success of the tracking of individuals who had left their initial household heavily relied on the accuracy of information collected among other household members found at first-wave location of the household, or among neighbours if the whole household had moved. We expect individual characteristics of fieldwork controllers to have an impact on tracking outcomes, and thus on attrition, while being uncorrelated with migration distance.

⁹Ten teams of two to three surveyors were managed on the field by one controller each, who was in particular in charge of checking compliance with procedures and of verifying that accurate tracking information had been reported by surveyors.

4 Empirical findings

4.1 Determinants of migration

Table 3 presents the estimation results of a Probit model for internal migration decision on the whole sample (columns 1 and 2), and separately for women (column 3 and 4) and men (columns 5 and 6). According to our definition of internal migrants, the dependent variable is a dummy equal to one for individuals who were living in the second survey wave in a household distant of more than 5km from their household in wave 1. In addition to individual and household determinants of migration, specifications shown in columns 2, 4 and 6 include migration push-factors at the community and county level.

As a robustness check, we used an alternative threshold of 10km for the definition of migrants. The results are very similar, as shown in Table A in the Appendix. Moreover, to avoid mixing intra-urban relocation and internal migration, we replicated the analysis excluding individuals moving within the capital city of Dakar, irrespective of the distance. Results are shown in Table B in the Appendix.

Since the decision to migrate within the country and abroad are probably interconnected, we estimated a multinomial logit model for migration with three alternatives: stay (the reference), migrate internally, or migrate abroad. Results are shown in Table E and are remarkably close to those obtained in our main specifications, with only marginal differences in the coefficients on the ethnicity dummies.

As mentioned above, attrition is a major concern as we expect internal migration to be the major cause of attrition between the two survey waves. We provide regression results including attrition in Table 4.

Table 3: Probit models of internal migration decision (marginal effects)

	All			Women			Men		
	(1)	(2)	(3)	(4)	(5)	(6)			
Individual Characteristics									
Male									
Age in years	-0.025*** (0.008)	-0.025*** (0.001)	-0.003* (0.002)	-0.003* (0.002)	0.001 (0.002)	0.001 (0.002)			
Age squared	-0.002 (0.001)	-0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)			
Fostered	0.021** (0.010)	0.020** (0.010)	0.015 (0.014)	0.014 (0.014)	0.026* (0.014)	0.025* (0.014)			
First-born	0.007 (0.008)	0.006 (0.008)	0.016 (0.010)	0.015 (0.010)	-0.005 (0.011)	-0.006 (0.011)			
Serere	0.022* (0.011)	0.018 (0.011)	0.023 (0.011)	0.018 (0.016)	0.022 (0.016)	0.016 (0.016)			
Poular	-0.004 (0.009)	-0.005 (0.009)	0.005 (0.012)	0.002 (0.013)	-0.013 (0.013)	-0.012 (0.013)			
Diola	0.032** (0.016)	0.041*** (0.016)	0.054** (0.021)	0.061*** (0.021)	0.008 (0.023)	0.018 (0.023)			
Other Ethnic Group	0.013 (0.011)	0.013 (0.011)	0.027* (0.015)	0.026* (0.015)	-0.005 (0.016)	-0.002 (0.017)			
Spouse/Parent of the Head	-0.014 (0.015)	-0.017 (0.015)	-0.026 (0.022)	-0.029 (0.022)					
Child/Sibling of the Head	0.052*** (0.014)	0.051*** (0.014)	0.046* (0.024)	0.045* (0.024)	0.058*** (0.019)	0.056*** (0.019)			
Other/Non-Relatives	0.066*** (0.015)	0.067*** (0.015)	0.033 (0.024)	0.034 (0.024)	0.110*** (0.020)	0.113*** (0.020)			
Primary Education	0.008 (0.010)	0.010 (0.010)	-0.010 (0.017)	-0.009 (0.017)	0.031** (0.015)	0.033** (0.015)			
Secondary Education or University	0.026** (0.011)	0.029** (0.011)	0.005 (0.011)	0.004 (0.011)	0.052*** (0.016)	0.054*** (0.016)			
Quranic Education	-0.000 (0.011)	-0.002 (0.011)	0.004 (0.015)	0.004 (0.015)	-0.001 (0.016)	-0.004 (0.016)			
Independent/Employer	0.009 (0.016)	0.014 (0.016)	-0.020 (0.024)	-0.012 (0.024)	0.031 (0.020)	0.030 (0.020)			
Salaried Worker/Intern/Trainee	0.016 (0.015)	0.020 (0.016)	-0.011 (0.025)	-0.001 (0.025)	0.029 (0.019)	0.030 (0.020)			
Family Worker	0.020 (0.017)	0.017 (0.017)	0.030 (0.023)	0.029 (0.023)	0.002 (0.024)	-0.001 (0.024)			
Student	0.035* (0.018)	0.037** (0.018)	0.020 (0.027)	0.025 (0.027)	0.042* (0.024)	0.041* (0.024)			
Inactive/Unemployed	0.012 (0.013)	0.019 (0.014)	0.010 (0.019)	0.021 (0.019)	0.009 (0.021)	0.017 (0.021)			
Missing Employment Category	0.034** (0.014)	0.035*** (0.014)	0.042** (0.019)	0.048** (0.019)	0.017 (0.019)	0.016 (0.019)			
Household Characteristics									
Consumption Index (adult eq.)	0.010** (0.005)	0.014*** (0.005)	0.007 (0.007)	0.011 (0.007)	0.016** (0.007)	0.019*** (0.007)			
Household Size	-0.001* (0.001)	-0.001 (0.001)	-0.002 (0.001)	-0.002 (0.001)	-0.001 (0.001)	-0.001 (0.001)			
Household Cell Size	-0.002 (0.002)	-0.002 (0.002)	-0.002 (0.003)	-0.001 (0.003)	-0.002 (0.003)	-0.003 (0.003)			
Cell/Household Expenditure	0.014 (0.021)	0.021 (0.021)	0.015 (0.030)	0.016 (0.030)	0.012 (0.030)	0.022 (0.030)			
Self-Reported Richer than Community		-0.001 (0.010)		0.011 (0.014)		-0.018 (0.016)			
Self-Reported Poorer than Community		0.011 (0.009)		0.012 (0.012)		0.009 (0.013)			
Community Characteristics									
Other cities	-0.002 (0.010)	-0.046*** (0.013)	-0.021 (0.014)	-0.065*** (0.017)	0.018 (0.014)	-0.021 (0.018)			
Rural	0.036*** (0.010)	-0.023 (0.016)	0.007 (0.014)	-0.046** (0.022)	0.076*** (0.016)	0.018 (0.024)			
Public Hospital		-0.002 (0.010)		0.018 (0.014)		-0.023 (0.015)			
Nb Public Primary Schools		-0.004 (0.003)		-0.003 (0.004)		-0.007 (0.004)			
Nb Public Secondary Schools		-0.004 (0.003)		-0.005 (0.004)		-0.002 (0.005)			
County (<i>Département</i>) Characteristics[†]									
Headcount Poverty		0.184*** (0.047)		0.230*** (0.065)		0.114* (0.069)			
Gini Index		-0.232** (0.093)		-0.229* (0.125)		-0.268* (0.139)			
Observations	6906	6906	3842	3842	3043	3043			

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

α Reference for categorical variables: Wolof/Lebou, head of household, no education, agricultural employment, Dakar, self-reported household vs community wealth: similar

[†] County characteristics computed based on 2002 Senegalese Census (ANSD); Headcount Poverty & Gini Index generated with PovMap2 (World Bank, 2009)

Source: Poverty and Family Structure Survey, 2006-2007 and 2010-2012

What appears evident from Table 3, Column 1 is the importance of a gendered component to internal migration: women are more likely to be internal migrants than men. As discussed above in Section 3.2, this highly feminized migration dynamic may be nuanced as models with attrition reveal that men are more likely to have been lost between the two survey waves, although not all of them can be considered internal migrants.

A few characteristics are common to male and female migrants, in particular those measured at the household, department and county level. First, as expected, migrants tend to be younger than stayers. The effect is found to be significant for women only, most probably caused by marriage as one of the main motive of female migration. Second, regardless of gender, being a child or sibling of the household head is associated with a significantly greater probability of migrating. Third, household income, proxied by consumption per adult equivalent, tends to be positively correlated with the probability of migrating of both men and women, although the coefficient on the consumption variable is larger and significant only for men. Once controlling for the characteristics of the environment, i.e. living in the capital city, in another city or in a rural area, and poverty and inequality at the county level, we find no significant impact of amenities at the community level at conventional levels. Note however that most coefficients are negative and that the coefficient on the dummy for a public hospital is significant at the 10% level for men when excluding intra-Dakar migration (Table B, column 6). Interestingly, this result is consistent with [Dustmann and Okatenko \(2014\)](#) who analyze emigration intentions and find a negative correlation between contentment with local amenities and intention to migrate in sub-Saharan Africa, and with [Castaing Gachassin \(2013\)](#), whose work on Tanzania shows that an increase in paved road density decreases the propensity to migrate, due to improved living standards. Finally, at first glance county characteristics seem to have comparable impacts on men and women's migration: poverty has a positive effect on migration, though twice larger for women than for men, and inequality tends to decrease migration. However, when excluding intra-Dakar migration, we find a positive effect of poverty on female migration only, suggesting that poverty at the regional level is

an important “push-factor” for women. However, we do not know whether they migrated in a less poor area, as we do not have enough variation in the poverty rate at destination due to the high share of internal migrants going to Dakar ¹⁰. This finding is also consistent with the persistence of traditional practices of marriage-related female migration in the poorest and most remote areas of the country. This issue is further discussed in the following sections.

Separate regressions for men and women reveal numerous differences in the individual migration determinants of the two groups. Having been fostered is associated with a significantly higher probability of internal migration for men only. This finding is in line with the literature on fostering as a household strategy aimed at increasing children’s social mobility which could be associated with a greater geographic mobility in adulthood. The difference across genders is linked to the different motives behind boys and girls’ fostering, as women are more likely to be fostered into households in which they will be married (Beck et al., 2015).

Ethnicity is found to be correlated with female migration only. Women belonging to Diola ethnic group and, to a lesser extent, to the Serere ethnic group are more likely to migrate than members of the Senegalese largest Wolof ethnic group. This finds parallels in the work of Brockerhoff and Eu (1993) documenting mobility by Serere and Diola women to urban regions for domestic work.

As for education, we find that men with at least some primary education are more likely to become internal migrants than those with no education at all (Table 3, Column 5-6), while for women, no significant differences in migration propensities are observed depending on educational level.

4.1.1 Attritors as internal migrants

¹⁰Although there is variation in the poverty rate within Dakar between poor areas like *Guédiawaye* and rich ones such as the *Almadies*, the 10% extract of the 2002 census that we could exploit does not allow us to construct poverty measure at a finer level of disaggregation than the county level (*département*). The same limitations applies to our county-level inequality measure which is included as a “push” factor only.

Table 4: Probit models of internal migration decision including attrition (marginal effects)

	Probits on Migration - Attriters treated as Migrants			Probits on Attrition		
	All (1)	Women (2)	Men (3)	All (4)	Women (5)	Men (6)
Individual Characteristics						
Male	0.013 (0.011)			0.037*** (0.009)		
Age in years	-0.005*** (0.002)	-0.008*** (0.002)	0.001 (0.003)	-0.004*** (0.001)	-0.006*** (0.002)	0.000 (0.002)
Age squared	0.000 (0.000)	0.000*** (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000*** (0.000)	0.000 (0.000)
Fostered	0.029** (0.013)	0.034** (0.017)	0.019 (0.019)	0.012 (0.010)	0.021 (0.013)	-0.002 (0.016)
First-born	-0.009 (0.010)	0.004 (0.013)	-0.026* (0.014)	-0.017** (0.008)	-0.010 (0.010)	-0.025** (0.012)
Serere	0.062*** (0.014)	0.089*** (0.019)	0.027 (0.022)	0.050*** (0.011)	0.079*** (0.014)	0.006 (0.019)
Poular	0.022* (0.011)	0.036** (0.015)	0.005 (0.017)	0.029*** (0.009)	0.040*** (0.012)	0.012 (0.014)
Diola	0.026 (0.021)	0.061** (0.028)	-0.022 (0.033)	-0.014 (0.018)	-0.001 (0.023)	-0.041 (0.029)
Other Ethnic Group	0.063*** (0.014)	0.072*** (0.019)	0.048** (0.021)	0.052*** (0.011)	0.054*** (0.015)	0.047*** (0.017)
Spouse/Parent of the Head	-0.008 (0.017)	0.003 (0.026)	0.173** (0.080)	0.014 (0.014)	0.030 (0.020)	0.169*** (0.062)
Child/Sibling of the Head	0.036** (0.017)	0.058** (0.029)	0.016 (0.023)	-0.002 (0.014)	0.017 (0.022)	-0.024 (0.019)
Other/Non-Relatives	0.101*** (0.017)	0.082*** (0.028)	0.133*** (0.025)	0.056*** (0.014)	0.058*** (0.022)	0.055*** (0.021)
Primary Education	-0.052*** (0.013)	-0.050*** (0.017)	-0.058*** (0.020)	-0.069*** (0.011)	-0.050*** (0.013)	-0.098*** (0.017)
Secondary Education or University	-0.008 (0.014)	-0.009 (0.020)	-0.013 (0.021)	-0.036*** (0.011)	-0.022 (0.015)	-0.058*** (0.017)
Quranic Education	-0.027** (0.014)	-0.004 (0.019)	-0.061*** (0.020)	-0.033*** (0.011)	-0.012 (0.015)	-0.063*** (0.017)
Independent/Employer	0.012 (0.020)	-0.016 (0.030)	0.035 (0.026)	-0.002 (0.016)	-0.003 (0.025)	0.004 (0.022)
Salaried Worker/Intern/Trainee	0.025 (0.020)	0.063** (0.031)	0.007 (0.026)	0.007 (0.016)	0.063** (0.025)	-0.022 (0.022)
Family Worker	0.007 (0.023)	0.027 (0.031)	-0.010 (0.034)	-0.024 (0.021)	-0.015 (0.029)	-0.018 (0.031)
Student	0.037 (0.024)	0.023 (0.036)	0.061* (0.033)	0.000 (0.020)	0.003 (0.030)	0.019 (0.029)
Inactive/Unemployed	0.012 (0.018)	0.023 (0.025)	0.023 (0.028)	-0.006 (0.015)	0.007 (0.021)	0.007 (0.023)
Missing Employment Category	0.043** (0.018)	0.061** (0.026)	0.025 (0.025)	0.010 (0.015)	0.023 (0.022)	0.003 (0.022)
Household Characteristics						
Consumption Index (adult eq.)	0.040*** (0.006)	0.040*** (0.009)	0.040*** (0.009)	0.030*** (0.005)	0.032*** (0.007)	0.026*** (0.008)
Household Size	-0.002* (0.001)	-0.002 (0.001)	-0.002 (0.002)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Household Cell Size	-0.015*** (0.003)	-0.009** (0.004)	-0.017*** (0.004)	-0.013*** (0.002)	-0.009*** (0.003)	-0.014*** (0.003)
Cell/Household Expenditure	0.124*** (0.025)	0.062* (0.036)	0.180*** (0.038)	0.101*** (0.020)	0.054* (0.028)	0.152*** (0.031)
Self-Reported Richer than Community	0.025** (0.013)	0.030* (0.017)	0.020 (0.020)	0.029*** (0.010)	0.023* (0.013)	0.036** (0.016)
Self-Reported Poorer than Community	0.022** (0.011)	0.007 (0.015)	0.036** (0.017)	0.011 (0.009)	-0.007 (0.012)	0.027* (0.014)
Community Characteristics						
Other cities	-0.071*** (0.016)	-0.079*** (0.021)	-0.058** (0.023)	-0.031** (0.013)	-0.022 (0.016)	-0.039** (0.019)
Rural	-0.098*** (0.021)	-0.115*** (0.028)	-0.066** (0.031)	-0.092*** (0.017)	-0.086*** (0.022)	-0.092*** (0.027)
Public Hospital	-0.024* (0.013)	-0.005 (0.017)	-0.048** (0.019)	-0.024** (0.010)	-0.018 (0.013)	-0.031** (0.016)
Nb Public Primary Schools	-0.005 (0.004)	-0.006 (0.005)	-0.005 (0.005)	-0.002 (0.003)	-0.005 (0.004)	0.001 (0.004)
Nb Public Secondary Schools	0.001 (0.004)	0.002 (0.005)	0.002 (0.006)	0.006* (0.003)	0.008* (0.004)	0.005 (0.005)
County (<i>Département</i>) Characteristics[†]						
Headcount Poverty	0.088 (0.059)	0.156** (0.079)	0.035 (0.088)	-0.056 (0.048)	-0.039 (0.062)	-0.041 (0.074)
Gini Index	-0.063 (0.119)	-0.054 (0.156)	-0.105 (0.184)	0.169* (0.099)	0.161 (0.125)	0.169 (0.156)
Observations	7932	4338	3594	7932	4338	3594

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Reference for categorical variables: Wolof/Lebou, head of household, no education, agricultural employment, Dakar, self-reported household vs community wealth: similar

[†] County characteristics computed based on 2002 Senegalese Census (ANSD); Headcount Poverty & Gini Index generated with PovMap2 (World Bank, 2009)

Source: Poverty and Family Structure Survey, 2006-2007 and 2010-2012

As discussed above, in Section 3.2, attrition may be correlated with internal migration. If so, results may be biased. To assess such bias, we estimate our model treating attritors as internal migrants. Results are presented in Table 4, columns 1 to 3 for the total sample, and separately for women and men, together with the results of probit models for the determinants of attrition. First, the coefficient on the male dummy in column 1 is not significant when treating attrition as internal migration. Indeed, men are more likely than women to be lost between the two survey rounds. This finding confirms that female migration is less independent than male migration, as women are more easily tracked, meaning that they may be less likely to cut-off links with their origin household when moving. In addition, the share of attrition due to the loss of the entire household is lower for women (45.9%) than for men (52.3%). The difference is partly due to the frequent loss of urban one-person households characterized by a higher mobility and a lower insertion in local networks. One-person households lost are almost exclusively male as women living alone is a very marginal phenomenon: 43 male individuals living alone were lost, representing 15.2% of male attrition, compared to 6 women only (2.6% of female attrition). However, apart from the different gender composition of the attrited and migrant population, most observations driven from Table 3 are unchallenged when treating attrition as internal migration. When looking more specifically at the determinants of attrition, we find that individuals with low levels of education, weak ties to the head of the household and living in Dakar are more likely to have been lost. For women, attrition is very likely driven in part by the high mobility of young salaried domestic workers (maids or *petites bonnes*), documented in the Malian case by Lesclingand (2011). Such an interpretation is supported by the positive and significant coefficient on the salaried worker dummy in the female regression (column 5) and the positive correlation with household income as only relatively wealthy households can afford to employ domestic workers. By contrast, male attrition may be caused in part by international migration, as male spouses of the head are more likely to be lost, as well as individuals from wealthier households. This result is consistent with the descriptive statistics showing that attritors

and international migrants share many common features (C and D). In sum, although male attrition is more frequently observed, it may have little impact on our analysis, as it seems to be driven in part by international migration. On the other hand, female attrition is less frequent but seems to be specific to vulnerable populations with low-level and precarious jobs. Our study probably misses part of the phenomenon of female migration by losing track of these highly mobile urban populations living at the periphery of their household. However, to mitigate this issue, it is important to note that such mobility could be called secondary in the sense that in order to get employed, these women had already migrated from their household of origin with which they may have kept links. The primary mobility of this specific population should thus appear in our data.

4.2 Migration distance

Table 5: Determinants of migration distance - Heckman model estimation (sample: adult migrants (+15 years) > 5km)

	All			Women		Men	
	(1)	(2)	(3)	(4)	(5)	(6)	
Individual Characteristics							
Male							
Age in years	0.237* (0.133)	0.348*** (0.132)	0.032 (0.132)	0.021 (0.026)	-0.035 (0.025)	-0.028 (0.032)	
Age squared	0.010 (0.020)	0.002 (0.020)	-0.000 (0.000)	-0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	
Fostered	-0.165 (0.147)	-0.214 (0.140)	-0.112 (0.140)	-0.147 (0.201)	-0.278 (0.198)	-0.405** (0.198)	
First-born	-0.116 (0.118)	-0.119 (0.112)	-0.290* (0.140)	-0.268* (0.155)	0.095 (0.151)	0.074 (0.161)	
Serere	-0.128 (0.175)	0.030 (0.167)	0.067 (0.167)	0.094 (0.237)	-0.267 (0.230)	-0.138 (0.234)	
Poular	0.223 (0.141)	0.114 (0.139)	0.206 (0.139)	0.030 (0.183)	0.320 (0.186)	0.190 (0.201)	
Diola	0.495** (0.235)	0.222 (0.234)	0.430 (0.234)	0.335 (0.317)	0.588* (0.321)	0.064 (0.357)	
Other ethnic group	0.131 (0.178)	-0.036 (0.173)	0.331 (0.173)	0.083 (0.225)	-0.117 (0.225)	-0.178 (0.265)	
Spouse/Parent of the Head	-0.089 (0.257)	0.054 (0.245)	-0.358 (0.245)	-0.193 (0.374)			
Child/Sibling of the Head	0.456* (0.247)	0.504** (0.239)	0.148 (0.239)	0.266 (0.390)	0.562 (0.382)	0.320 (0.375)	
Other/Non-Relatives	0.501** (0.248)	0.509** (0.239)	0.271 (0.239)	0.342 (0.386)	0.566 (0.376)	0.369 (0.373)	
Primary Education	-0.092 (0.160)	-0.276* (0.159)	-0.188 (0.159)	-0.318 (0.203)	0.069 (0.198)	-0.256 (0.318)	
Secondary Education or University	-0.357** (0.179)	-0.539*** (0.177)	-0.096 (0.177)	-0.209 (0.239)	-0.383 (0.235)	-0.734** (0.328)	
Quranic Education	0.070 (0.177)	0.043 (0.170)	-0.029 (0.170)	-0.029 (0.226)	0.289 (0.223)	0.089 (0.286)	
Independent/Employer	0.203 (0.261)	0.243 (0.247)	-0.233 (0.247)	-0.165 (0.408)	0.601* (0.402)	0.450 (0.305)	
Salaried Worker/Intern/Trainee	0.163 (0.245)	0.302 (0.234)	0.175 (0.234)	0.338 (0.394)	0.529* (0.319)	0.418 (0.310)	
Family Worker	0.326 (0.264)	0.307 (0.248)	0.069 (0.248)	0.100 (0.342)	0.612 (0.332)	0.638* (0.357)	
Student	0.604** (0.264)	0.625** (0.249)	0.440 (0.249)	0.389 (0.381)	0.673* (0.376)	0.673** (0.315)	
Inactive/Unemployed	0.320 (0.211)	0.337* (0.203)	0.095 (0.203)	0.168 (0.284)	0.598* (0.282)	0.607* (0.311)	
Missing Employment Category	0.618*** (0.214)	0.632*** (0.205)	0.337 (0.205)	0.443 (0.289)	0.926*** (0.283)	0.710** (0.291)	
Household Characteristics							
Consumption Index (adult eq.)	0.060 (0.074)	0.044 (0.072)	-0.111 (0.072)	-0.109 (0.107)	0.203** (0.104)	0.151 (0.095)	
Household Size	0.029** (0.014)	0.024* (0.013)	0.018 (0.013)	0.019 (0.019)	0.039** (0.018)	0.029 (0.018)	
Household Cell Size	-0.067** (0.032)	-0.065** (0.031)	-0.099** (0.031)	-0.099** (0.045)	-0.030 (0.044)	-0.027 (0.041)	
Cell/Household Expenditure	0.725** (0.304)	0.755** (0.287)	0.484 (0.287)	0.537 (0.430)	0.954** (0.419)	1.011** (0.412)	
Self-Reported Richer than Community		-0.094 (0.159)		0.129 (0.205)		-0.479* (0.254)	
Self-Reported Poorer than Community		0.101 (0.127)		0.110 (0.185)		0.088 (0.174)	
Community Characteristics							
Other cities	1.127*** (0.161)	1.172*** (0.187)	0.783*** (0.187)	0.739*** (0.208)	1.523*** (0.253)	1.668*** (0.271)	
Rural	0.808*** (0.195)	0.850*** (0.234)	0.337 (0.234)	0.089 (0.238)	1.497*** (0.321)	1.654*** (0.353)	
Public Hospital		-0.087 (0.170)		-0.204 (0.231)		0.205 (0.248)	
Nb Public Primary Schools		0.028 (0.045)		0.021 (0.058)		0.059 (0.068)	
Nb Public Secondary Schools		0.085* (0.050)		0.052 (0.066)		0.062 (0.076)	
County (<i>Département</i>) Characteristics †							
Headcount Poverty		0.545 (0.742)		1.806* (0.968)		-0.907 (1.087)	
Gini Index		7.162*** (1.457)		7.379*** (1.876)		7.287*** (2.380)	
Constant	1.145 (0.759)	-1.820* (1.048)	3.059*** (1.048)	-0.867 (1.030)	0.004 (1.380)	-1.513 (1.751)	
$\hat{\rho}$	0.565*** (0.160)	0.338* (0.204)	0.434* (0.204)	0.478** (0.230)	0.680*** (0.227)	0.091 (0.440)	
χ^2 test of joint significance of controller dummies (1st-step)	92.83*** (0.000)	73.36*** (0.000)	78.26*** (0.000)	69.09*** (0.000)	35.03*** (0.000)	27.25*** (0.001)	
Observations	1656	1656	869	869	787	787	

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Reference for categorical variables: Wolf/Lebou, head of household, no education, agricultural employment, Dakar, self-reported household vs community wealth: similar

† County characteristics computed based on 2002 Senegalese Census (ANSD); Headcount Poverty & Gini Index generated with PovMap2 (World Bank, 2009)

Source: Poverty and Family Structure Survey, 2006-2007 and 2010-2012

Having evaluated selection into migration, we explore the determinants of migration across distance. Table 5 shows the second-stage estimates of a two-step Heckman selection model, described in Section 3.2, with dummies for second-wave fieldwork controller as excluded instruments to correct for selection biases due to attrition.¹¹

Table 5 confirms the gendered nature of migration patterns as the distance travelled by men is around 45% greater than that travelled by women. Separate regressions by gender reveal different determinants of migration distance for men and women. Women are found to migrate less far when they are the eldest of their siblings, consistent with gender roles in the Senegalese society. Indeed, eldest daughters have an important parental role for their youngest siblings. In addition, since marriage in Senegal is accompanied by a bridewealth payment to the wife’s family, the marriage of the eldest daughter is expected to provide their younger brothers with the resources to get married. This financial dependency of the household on the marriage of the eldest daughter which is common to many other African societies (Trinitapoli, Yeatman, and Fledderjohann, 2014; Horne, Dodoo, and Dodoo, 2013) may explain in part that the eldest daughter moves less far, as their household of origin seeks to maintain close links with her.

As for men, we find a positive impact of household wealth proxied by consumption per adult equivalent on migration distance which is robust to the exclusion of intra-Dakar migration. This result is consistent with the existence of migration costs, but also with education as one of the primary reason for male migration that implies moving to the capital city of Dakar and that only richer household can afford. Men with secondary or higher education are found to move less far, which is very likely explained by higher educational levels in regions close to the capital city where employment opportunities are concentrated.

A common feature of male and female migrations is the positive relationship between inequality in the county of origin and distance travelled. This finding is in line with the theoretical framework developed by Stark (1984) and with relative deprivation as a driver

¹¹Naive OLS regressions however produce similar results (available upon request), suggesting that in our case the bias due to attrition is small.

of migration, as individuals living in areas with a higher income inequality may move further to escape relative poverty. Such result is also linked to the geography of Senegal and the attractiveness of Dakar. As illustrated by Figure 1, a majority of individual trajectories converge from all regions towards Dakar. Moreover, the most remote regions in the South-East of the country are also characterized by the largest levels of inequality. By contrast, poverty at the county level is not significantly correlated with migration distance. However, additional results (available upon request) show that the coefficient on the poverty headcount becomes significant for women only, when excluding intra-Dakar migrants. Note also that the negative effect of Dakar location (as opposed to rural and other urban areas) on migration distance is fully explained by intra-Dakar migration, as the effect vanishes and even reverses for women when excluding intra-Dakar relocation.

4.3 Rural-urban migration patterns

Table 6: Multinomial Logit models of rural/urban migration decision (marginal effects)

	(1) All			(2) Women			(3) Men		
	Urban Dest.	Rural Dest.	Urban Dest.	Rural Dest.	Urban Dest.	Rural Dest.	Urban Dest.	Rural Dest.	
Individual Characteristics									
Male									
Age in years	-0.010 (0.007)	-0.017*** (0.005)	-0.002* (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.002)	-0.000 (0.001)	-0.000 (0.001)
Age squared	-0.001 (0.000)	-0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Fostered	0.007 (0.008)	0.012** (0.005)	-0.005 (0.005)	0.020** (0.012)	0.018 (0.012)	0.018 (0.012)	0.018 (0.012)	0.004 (0.007)	0.004 (0.007)
First-born	0.000 (0.006)	0.006 (0.004)	0.004 (0.004)	0.012* (0.009)	0.012* (0.009)	0.012* (0.009)	0.012* (0.010)	-0.001 (0.005)	-0.001 (0.005)
Born in Dakar	-0.063*** (0.010)	-0.019* (0.011)	-0.064*** (0.011)	-0.023** (0.014)	-0.023** (0.014)	-0.023** (0.014)	-0.023** (0.016)	-0.013 (0.013)	-0.013 (0.013)
Born in rural area	-0.026*** (0.010)	0.047*** (0.008)	-0.026** (0.011)	0.057*** (0.013)	0.057*** (0.013)	0.057*** (0.013)	0.057*** (0.015)	0.031*** (0.010)	0.031*** (0.010)
Born in other country	-0.017 (0.020)	0.021 (0.015)	-0.010 (0.015)	0.027 (0.023)	0.027 (0.023)	0.027 (0.023)	0.026 (0.038)	0.015 (0.022)	0.015 (0.022)
Serere	0.016* (0.009)	-0.008 (0.007)	0.024* (0.012)	-0.015 (0.012)	-0.015 (0.012)	-0.015 (0.012)	0.007 (0.013)	0.007 (0.009)	0.007 (0.009)
Poular	-0.005 (0.008)	-0.000 (0.005)	0.005 (0.005)	-0.004 (0.011)	-0.004 (0.011)	-0.004 (0.011)	-0.018 (0.012)	0.008 (0.007)	0.008 (0.007)
Diola	0.023* (0.012)	0.006 (0.010)	0.054*** (0.010)	-0.022 (0.015)	-0.022 (0.015)	-0.022 (0.015)	0.021 (0.021)	0.026** (0.010)	0.026** (0.010)
Other ethnic group	-0.001 (0.010)	0.008 (0.006)	0.012 (0.006)	0.005 (0.013)	0.005 (0.013)	0.005 (0.013)	0.012 (0.016)	0.012 (0.008)	0.012 (0.008)
Spouse/Parent of the Head	-0.014 (0.013)	0.002 (0.011)	-0.028 (0.011)	0.018 (0.017)	0.018 (0.017)	0.018 (0.017)	0.045 (23.431)	-0.172 (12.650)	-0.172 (12.650)
Child/Sibling of the Head	0.039*** (0.012)	0.031*** (0.011)	0.019 (0.019)	0.063*** (0.017)	0.063*** (0.017)	0.063*** (0.017)	0.048*** (0.017)	0.016 (0.011)	0.016 (0.011)
Other/Non-Relatives	0.043*** (0.012)	0.030*** (0.011)	0.013 (0.011)	0.044* (0.019)	0.044* (0.019)	0.044* (0.019)	0.071*** (0.018)	0.036*** (0.011)	0.036*** (0.011)
Primary Education	0.030*** (0.009)	-0.011* (0.006)	0.020* (0.006)	-0.019** (0.011)	-0.019** (0.011)	-0.019** (0.011)	0.040*** (0.014)	0.001 (0.008)	0.001 (0.008)
Secondary Education or University	0.042*** (0.010)	-0.008 (0.008)	0.040*** (0.008)	-0.043*** (0.013)	-0.043*** (0.013)	-0.043*** (0.013)	0.051*** (0.015)	0.008 (0.008)	0.008 (0.008)
Quranic Education	-0.001 (0.010)	-0.004 (0.005)	-0.007 (0.005)	-0.007 (0.015)	-0.007 (0.015)	-0.007 (0.015)	0.000 (0.016)	-0.006 (0.008)	-0.006 (0.008)
Independent/Employer	0.033** (0.015)	-0.024** (0.011)	0.024 (0.011)	-0.048** (0.022)	-0.048** (0.022)	-0.048** (0.022)	0.037* (0.019)	-0.010 (0.011)	-0.010 (0.011)
Salaried Worker/Intern/Trainee	0.033** (0.014)	-0.010 (0.009)	0.017 (0.009)	-0.019 (0.023)	-0.019 (0.023)	-0.019 (0.023)	0.042** (0.019)	-0.008 (0.010)	-0.008 (0.010)
Family Worker	0.009 (0.017)	0.005 (0.007)	0.010 (0.007)	0.009 (0.024)	0.009 (0.024)	0.009 (0.024)	0.010 (0.024)	-0.005 (0.010)	-0.005 (0.010)
Student	0.043*** (0.016)	0.003 (0.010)	0.038* (0.018)	0.038* (0.023)	0.038* (0.023)	0.038* (0.023)	0.044** (0.022)	0.001 (0.010)	0.001 (0.010)
Inactive/Unemployed	0.030** (0.013)	-0.004 (0.007)	0.032* (0.019)	-0.002 (0.019)	-0.002 (0.019)	-0.002 (0.019)	0.034* (0.020)	-0.016 (0.012)	-0.016 (0.012)
Missing Employment category	0.038*** (0.013)	0.004 (0.007)	0.051*** (0.007)	0.005 (0.019)	0.005 (0.019)	0.005 (0.019)	0.022 (0.018)	-0.002 (0.008)	-0.002 (0.008)
Household Characteristics									
Consumption Index (adult eq.)	0.012*** (0.004)	-0.000 (0.003)	0.010* (0.003)	-0.002 (0.005)	-0.002 (0.005)	-0.002 (0.005)	0.014** (0.006)	0.001 (0.004)	0.001 (0.004)
Household Size	-0.001 (0.001)	-0.001 (0.000)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.000 (0.001)	-0.000 (0.001)
Household Cell Size	-0.003* (0.002)	0.002* (0.001)	-0.003 (0.001)	0.003* (0.002)	0.003* (0.002)	0.003* (0.002)	-0.003 (0.003)	0.001 (0.001)	0.001 (0.001)
Cell/Household Expenditure	0.029* (0.017)	-0.018 (0.013)	0.026 (0.013)	-0.019 (0.023)	-0.019 (0.023)	-0.019 (0.023)	0.031 (0.026)	-0.019 (0.017)	-0.019 (0.017)
Self-Reported Richer than Community	0.002 (0.009)	-0.003 (0.006)	0.008 (0.006)	0.006 (0.011)	0.006 (0.011)	0.006 (0.011)	-0.006 (0.014)	-0.023* (0.014)	-0.023* (0.014)
Self-Reported Poorer than Community	0.016** (0.007)	-0.007 (0.005)	0.020** (0.005)	-0.013 (0.009)	-0.013 (0.009)	-0.013 (0.009)	0.008 (0.011)	0.000 (0.006)	0.000 (0.006)
Community Characteristics									
Other cities	-0.046*** (0.012)	-0.045*** (0.009)	-0.055*** (0.009)	-0.066*** (0.015)	-0.066*** (0.015)	-0.066*** (0.015)	-0.038** (0.018)	-0.020* (0.011)	-0.020* (0.011)
Rural	-0.008 (0.015)	-0.070*** (0.011)	-0.024 (0.011)	-0.091*** (0.020)	-0.091*** (0.020)	-0.091*** (0.020)	0.019 (0.023)	-0.036*** (0.014)	-0.036*** (0.014)
Public Hospital	0.001 (0.009)	-0.007 (0.006)	0.018 (0.006)	-0.007 (0.011)	-0.007 (0.011)	-0.007 (0.011)	-0.021 (0.013)	-0.004 (0.008)	-0.004 (0.008)
Nb Public Primary Schools	-0.001 (0.002)	-0.002 (0.002)	-0.000 (0.002)	-0.002 (0.003)	-0.002 (0.003)	-0.002 (0.003)	-0.002 (0.004)	-0.005* (0.003)	-0.005* (0.003)
Nb Public Secondary Schools	-0.002 (0.003)	-0.003 (0.002)	-0.003 (0.002)	-0.004 (0.003)	-0.004 (0.003)	-0.004 (0.003)	-0.000 (0.004)	-0.003 (0.003)	-0.003 (0.003)
County (<i>Département</i>) Characteristics†									
Headcount Poverty	0.077* (0.041)	0.112*** (0.029)	0.107** (0.029)	0.141*** (0.054)	0.141*** (0.054)	0.141*** (0.054)	0.040 (0.062)	0.060 (0.037)	0.060 (0.037)
Gini Index	-0.189** (0.083)	-0.054 (0.053)	-0.154 (0.053)	-0.064 (0.106)	-0.064 (0.106)	-0.064 (0.106)	-0.245* (0.130)	-0.046 (0.070)	-0.046 (0.070)
Observations	6906	6906	3842	3842	3842	3842	3064	3064	3064

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Reference for categorical variables: Wolof/Lebou, head of household, no education, agricultural employment, Dakar, self-reported household vs community wealth: similar

† County characteristics computed based on 2002 Senegalese Census (ANSD); Headcount Poverty & Gini Index generated with PovMap2 (World Bank, 2009)

Source: Poverty and Family Structure Survey, 2006-2007 and 2010-2012

In order to complement our analysis of the determinants of migration distance, we take into account the rural-urban dimension of internal migration, related to gender. Table 6 presents the results of a multinomial logit models where migration is decomposed into rural and urban destinations, the reference being not migrating. What appears clear from Column 1 is that women are more likely than men to move to rural areas. This is especially true of first-born women, consistent with marriage-driven migration (Herrera and Sahn, 2013; Quisumbing and McNiven, 2010). Educational achievement has opposite effects on the decision to move to an urban or rural destination (Table 6, Column 1). Those with primary or secondary education are more likely to move to urban areas and less likely to move to rural areas than non-educated individuals. This finds parallels in works on internal migration in other countries. Ackah and Medvedev (2012) notably find for Ghana that individuals are more likely to move to urban settings from areas where infrastructure is lacking. Msigwa and Mbongo (2013) observe similar trends for Tanzania with younger, educated males moving to urban settings. While they do not use personal education, Herrera and Sahn (2013) find for Senegal that father's education has a positive influence especially on female migration to urban settings. The correlation between education and rural-urban migration is particularly significant for women - positive with migration to urban areas, negative with migration to rural areas, which may reveal a rift in opportunities and rationales for moving for women depending on educational achievement. Interestingly, the effect of education is robust to the exclusion of intra-Dakar migration for women, while it loses its significance for men.

Relationship to the household head highlights different trajectories of sons and daughters: while male children or siblings of the household head are more likely to migrate to urban centers, female children and siblings have a higher probability to migrate to rural areas. Furthermore, certain socio-professional categories are more likely to select migration to urban areas rather than rural areas: this is clear for independents, salaried workers, students and the unemployed. Cities remain the main centers for employment and education (Beauchemin and Bocquier, 2004). Unsurprisingly, individuals from wealthier

households tend to migrate to urban areas. Interestingly, subjective relative household wealth is related in a different way to male and female migration. Men in self-perceived richer households have a lower probability to move to rural areas, while women in relatively poor households are more likely to migrate to urban settings. Our results for women are consistent with relative deprivation as a driver of migration decisions, but such an assumption is not supported by empirical evidence for men. The effect of indices measured at the county level confirm that higher poverty rate increase female migration to both destinations.

Excluding intra-Dakar mobility, we find that being born in a rural area has a positive effect on the probability of migrating to a rural area which is found significant for women only. Additional specifications decomposing migration by both destination and origin provide consistent evidence that women are more likely to experience rural-to-rural moves than men (results not shown, available upon request).

5 Conclusion

This article studies the determinants of internal migration using rich individual panel survey data, that are nationally representative and were collected in Senegal in 2006-07 and 2010-12. The tracking of all individuals who remained in Senegal, whatever their gender, allow us to identify and map gender-specific migration patterns between the two survey waves using the GPS coordinates at both dates. These features of our data are unique in this region of the world and allow us to make a significant contribution to the literature on internal migration and gender in sub-Saharan Africa. Using distance rather than administrative boundaries has the advantage of providing us with a definition of migration which is less arbitrary and homogeneous across regions.

The empirical analysis reveals clear differences between women and men. Women are more likely than men to have migrated between the two survey rounds, however, they tend to migrate over shorter distances. The decomposition of the migration decision

in rural and urban destinations confirms and complements this study by showing that women are more likely than men to migrate to rural areas, especially when originating from rural areas. Such moves are related to the different motivations behind male and female migration. The primary reason for migrating for women in our sample is marriage, whatever the distance travelled. By contrast, labor and education are the most cited motives behind male migration.

Our findings reveal little change since the pioneering works on female migration dating back from the early 1990s ([Chant et al., 1992](#)). Female migration in Senegal still depends in a large part on family events and has few connections with labor market participation, contrary to male migration. For this reason, women are over-represented in rural-to-rural flows while rural-to-urban migration is more commonly observed for men. These findings echo those of [Comoe \(2013\)](#) for Ivory Coast. They are also consistent with [Duboz et al. \(2011\)](#) who show that family motives are prevalent among Senegalese women having migrated to Dakar, and [Vause, Toma, and Richou \(2015\)](#) who find little independent international migration of Senegalese women. We find that education increases the likelihood of migrating to urban areas especially for women and could thus be an effective channel for promoting women's access to independent migration. However, the question of the actual benefits from migrating for women and men remains open and left for future research.

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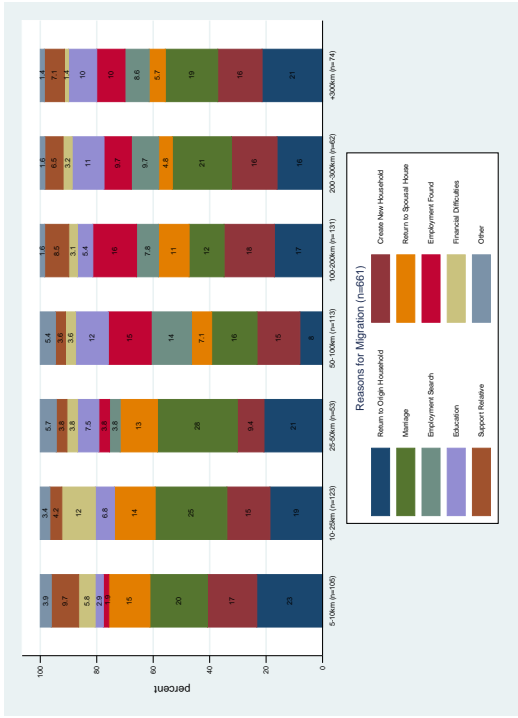
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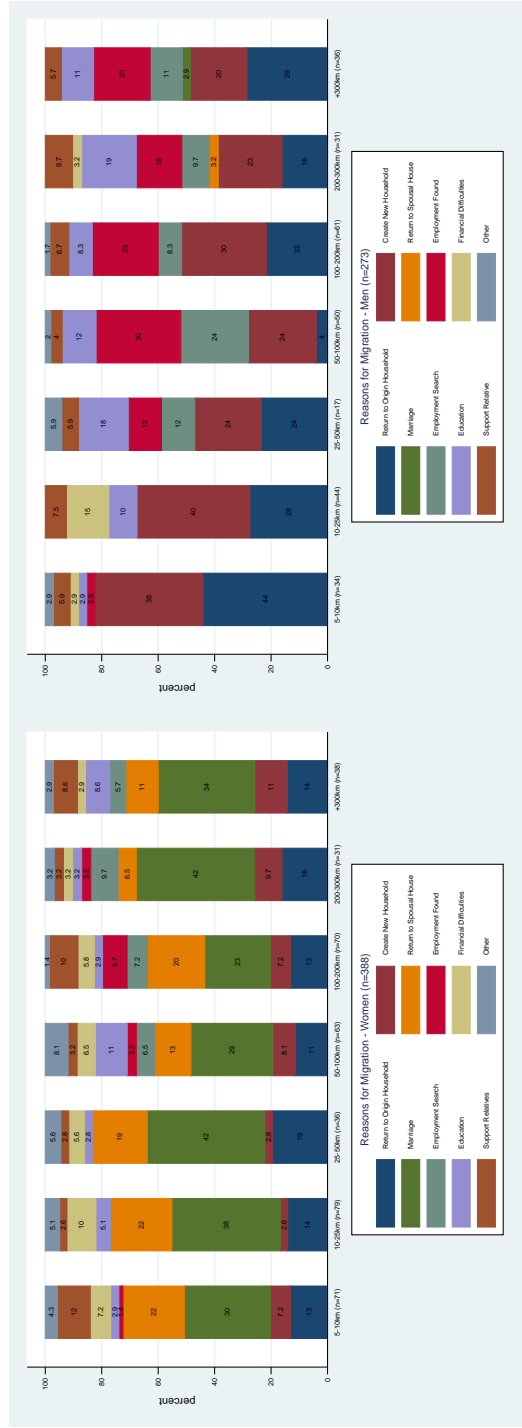
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Appendix

Figure A: Reasons for Migration



All Reasons for Migration - 661 Adults



Reasons for Migration (Women)

Reasons for Migration (Men)

Source: Poverty and Family Structure Survey, 2006-2007 and 2010-2012

Table A: Probit models of internal migration decision (marginal effects) - alternative definition of internal migrant (>10 km)

	All			Women			Men			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
Individual Characteristics										
Male	-0.016**	-0.016**	-0.002	(0.002)	-0.002	(0.002)	0.000	(0.002)	0.000	(0.002)
Age in years	-0.001	-0.001	0.000	(0.001)	0.000	(0.000)	-0.000	(0.000)	-0.000	(0.000)
Age squared	0.016*	0.016*	0.016	(0.009)	0.014	(0.013)	0.014	(0.014)	0.013	(0.013)
Fostered	0.006	0.006	0.013	(0.007)	0.010	(0.010)	-0.002	(0.010)	-0.003	(0.010)
First-born	0.017*	0.016	0.026*	(0.010)	0.023	(0.014)	0.007	(0.015)	0.005	(0.015)
Serere	-0.002	-0.003	0.007	(0.008)	0.001	(0.011)	-0.010	(0.012)	-0.008	(0.012)
Poular	0.034**	0.038***	0.054***	(0.014)	0.057***	(0.019)	0.010	(0.021)	0.016	(0.021)
Diola	0.010	0.008	0.023*	(0.010)	0.019	(0.014)	-0.007	(0.015)	-0.005	(0.016)
Other Ethnic Group	-0.015	-0.017	-0.028	(0.014)	-0.030	(0.020)	0.050***	(0.018)	0.100***	(0.019)
Spouse/Parent of the Head	0.045***	0.045***	0.038*	(0.013)	0.037*	(0.022)	0.098***	(0.019)	0.023	(0.014)
Child/Sibling of the Head	0.059***	0.059***	0.027	(0.014)	0.027	(0.022)	0.020	(0.015)	0.036**	(0.015)
Other/Non-Relatives	0.002	0.002	-0.012	(0.009)	-0.014	(0.012)	-0.006	(0.015)	-0.008	(0.015)
Primary Education	0.017	0.017	0.002	(0.011)	0.002	(0.015)	0.023	(0.019)	0.022	(0.019)
Secondary Education or University	-0.002	-0.003	0.003	(0.010)	0.003	(0.014)	0.024	(0.018)	0.009	(0.022)
Quranic Education	0.004	0.008	-0.021	(0.015)	-0.015	(0.023)	0.010	(0.022)	0.046**	(0.022)
Independent/Employer	0.014	0.017	-0.001	(0.014)	0.007	(0.023)	0.015	(0.019)	0.024	(0.018)
Salaried Worker/Intern/Trainee	0.019	0.017	0.025	(0.015)	0.024	(0.021)	0.010	(0.022)	0.009	(0.022)
Family Worker	0.039**	0.040**	0.027	(0.016)	0.031	(0.025)	0.015	(0.019)	0.020	(0.020)
Student	0.013	0.018	0.011	(0.012)	0.020	(0.017)	0.023	(0.017)	0.021	(0.017)
Inactive/Unemployed	0.033***	0.034***	0.038**	(0.012)	0.044**	(0.018)	0.014**	(0.006)	0.015**	(0.006)
Missing Employment Category	0.007	0.009*	0.001	(0.004)	0.004	(0.006)	-0.000	(0.001)	-0.000	(0.001)
Household Characteristics										
Consumption Index (adult eq.)	-0.001	-0.001	-0.001	(0.001)	-0.001	(0.001)	-0.003	(0.003)	-0.003	(0.003)
Household Size	-0.003	-0.003	0.024	(0.002)	0.023	(0.027)	0.043	(0.028)	0.047*	(0.028)
Household Cell Size	0.033*	0.036*	0.024	(0.019)	0.013	(0.013)	-0.023	(0.016)	-0.023	(0.016)
Cell/Household Expenditure		-0.001			0.018		0.012		0.012	
Self-Reported Richer than Community		0.015*			0.018		0.012		0.012	
Self-Reported Poorer than Community										
Community Characteristics										
Other cities	0.021**	-0.008	0.001	(0.009)	-0.034**	(0.012)	0.043***	(0.013)	0.025	(0.018)
Rural	0.048***	0.009	0.016	(0.010)	-0.027	(0.021)	0.093***	(0.015)	0.063***	(0.023)
Public Hospital		-0.005			0.006				-0.017	
Nb Public Primary Schools		-0.002			-0.000				-0.004	
Nb Public Secondary Schools		-0.002			-0.002				-0.002	
County (<i>Département</i>) Characteristics†										
Headcount Poverty		0.124***			0.190***				0.033	
Gini Index		-0.090			-0.072				-0.141	
Observations	6906	6906	3842		3842		3043		3043	

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

α Reference for categorical variables: Wolof/Lebou, head of household, no education, agricultural employment, Dakar, self-reported household vs community wealth: similar

† Department Characteristics computed based on 2002 Senegalese Census (ANSD); Headcount Poverty & Gini Index generated with PovMap2 (World Bank, 2009)

Source: Poverty and Family Structure Survey, 2006-2007 and 2010-2012

Table B: Probit models of internal migration decision with intra-Dakar movers treated as non-migrants (marginal effects)

	All			Women			Men		
	(1)	(2)	(3)	(4)	(5)	(6)			
Individual Characteristics									
Male									
Age in years	-0.020*** (0.007)	-0.020*** (0.001)	-0.002 (0.002)	-0.002 (0.002)	-0.000 (0.002)	-0.000 (0.002)			
Age squared	-0.001 (0.001)	-0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)			
Fostered	0.015* (0.009)	0.015* (0.007)	0.014 (0.009)	0.013 (0.010)	0.015 (0.010)	0.014 (0.010)			
First-born	0.003 (0.007)	0.002 (0.010)	0.009 (0.010)	0.009 (0.014)	-0.005 (0.015)	-0.006 (0.015)			
Serere	0.013 (0.008)	0.011 (0.008)	0.018 (0.003)	0.015 (0.012)	0.008 (0.012)	0.005 (0.012)			
Poular	-0.010 (0.017)	-0.010 (0.015)	-0.003 (0.039*)	-0.005 (0.044**)	-0.016 (0.022)	-0.013 (0.022)			
Diola	0.014 (0.010)	0.021 (0.014)	0.026** (0.013)	0.024* (0.014)	0.000 (0.014)	0.003 (0.015)			
Other Ethnic Group	0.014 (0.014)	0.014 (0.014)	-0.018 (0.023)	-0.019 (0.023)	0.046*** (0.017)	0.046*** (0.017)			
Spouse/Parent of the Head	-0.010 (0.050***)	-0.011 (0.049***)	0.052** (0.013)	0.052** (0.023)	0.097*** (0.019)	0.099*** (0.019)			
Child/Sibling of the Head	0.050*** (0.014)	0.049*** (0.014)	0.040* (0.014)	0.040* (0.014)	0.024* (0.014)	0.026* (0.014)			
Other/Non-Relatives	0.064*** (0.003)	0.064*** (0.009)	-0.015 (0.009)	-0.013 (0.013)	0.037** (0.015)	0.038** (0.015)			
Primary Education	0.018* (0.011)	0.020* (0.011)	0.007 (0.016)	0.005 (0.016)	0.000 (0.014)	0.003 (0.014)			
Secondary Education or University	0.002 (0.010)	0.000 (0.010)	-0.000 (0.013)	0.005 (0.013)	0.000 (0.014)	0.003 (0.014)			
Quranic Education	0.002 (0.014)	0.005 (0.014)	-0.023 (0.023)	-0.018 (0.023)	0.019 (0.018)	0.017 (0.018)			
Independent/Employer	0.010 (0.014)	0.012 (0.014)	0.004 (0.023)	0.012 (0.023)	0.011 (0.018)	0.011 (0.018)			
Salaried Worker/Intern/Trainee	0.019 (0.016)	0.018 (0.016)	0.029 (0.025)	0.029 (0.025)	0.003 (0.021)	0.003 (0.021)			
Family Worker	0.034** (0.012)	0.035** (0.012)	0.028 (0.016)	0.032 (0.017)	0.035* (0.018)	0.034 (0.019)			
Student	0.007 (0.034***)	0.011 (0.012)	0.007 (0.041**)	0.016 (0.017)	0.009 (0.016)	0.013 (0.016)			
Inactive/Unemployed	0.034*** (0.012)	0.034*** (0.012)	0.041** (0.012)	0.047*** (0.017)	0.020 (0.016)	0.018 (0.016)			
Missing Employment Category									
Household Characteristics									
Consumption Index (adult eq.)	0.006 (0.004)	0.007 (0.005)	0.001 (0.006)	0.003 (0.006)	0.014** (0.006)	0.014** (0.006)			
Household Size	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.000 (0.001)	-0.000 (0.001)			
Household Cell Size	-0.002 (0.002)	-0.002 (0.002)	-0.002 (0.003)	-0.002 (0.003)	-0.002 (0.003)	-0.003 (0.003)			
Cell/Household Expenditure	0.035* (0.019)	0.038** (0.019)	0.025 (0.019)	0.024 (0.027)	0.046* (0.027)	0.050* (0.027)			
Self-Reported Richer than Community									
Self-Reported Poorer than Community									
Community Characteristics									
Other cities	0.052*** (0.009)	0.031** (0.012)	0.037*** (0.013)	0.009 (0.016)	0.068*** (0.014)	0.059*** (0.018)			
Rural	0.083*** (0.010)	0.053*** (0.016)	0.059*** (0.014)	0.021 (0.021)	0.117*** (0.015)	0.101*** (0.023)			
Public Hospital									
Nb Public Primary Schools									
Nb Public Secondary Schools									
County (Département) Characteristics†									
Headcount Poverty									
Gini Index									
Observations	6906	6906	3842	3842	3043	3043			

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Reference for categorical variables: Wolof/Lebou, head of household, no education, agricultural employment, Dakar, self-reported household vs community wealth, similar

† County characteristics computed based on 2002 Senegalese Census (ANSD); Headcount Poverty & Gini Index generated with PovMap2 (World Bank, 2009)

Source: Poverty and Family Structure Survey, 2006-2007 and 2010-2012

Table C: Descriptive statistics: comparison between internal migrants (distance > 5km), deceased, international migrants, movers (distance < 5km) and attritors

	(1) Migrant	(2) Deceased	(3) Abroad	(4) Moved	(5) Lost	(6) t/χ^2 (1)-(5)	(7) t/χ^2 (2)-(5)	(8) t/χ^2 (3)-(5)	(9) t/χ^2 (4)-(5)
Individual Characteristics									
Male (d) (%)	41	54	61	43	52	18.6***	0.3	7.2***	24.0***
Age in years	28.2	56.7	28.5	34.8	31.0	-2.8***	25.7***	-2.5**	3.8***
Fostered (d) (%)	17	15	13	14	17	0.2	0.8	3.5*	7.2***
First-born (d) (%)	32	57	28	33	29	0.9	66.8***	0.1	5.2**
Ethnicity (%)									
...Wolof/Lebou	38	37	32	40	36	10.7**	3.5	44.7***	28.8***
...Serere	16	13	5	12	16				
...Poular	24	31	37	29	27				
...Diola	7	4	1	6	4				
...Other	15	15	25	13	18				
Rel. to Head of Household (%)									
...Head of Household	11	40	12	21	21	52.3***	86.4***	47.9***	57.3***
...Spouse/Parent	12	29	6	23	15				
...Child/Sibling	49	16	53	36	34				
...Other/Non-Related	29	15	29	20	30				
Education (%)									
...No Education	37	33	23	37	23	62.4***	3.0	0.9	41.3***
...Primary Education	24	22	20	27	22				
...Secondary or University Education	29	0	24	17	23				
...Quranic School	9	22	17	19	20				
...Missing	0	22	16	1	13				
Socio-Professional Categories (%)									
...Agricultural Worker	9	14	8	14	8	44.8***	67.7***	4.3	95.1***
...Independent/Employer	9	13	16	14	14				
...Salaried Worker/Intern/Trainee	13	8	18	13	20				
...Family Worker	8	3	5	8	3				
...Student	11	0	6	5	8				
...Inactive/Unemployed	26	43	26	29	26				
...Missing	24	18	21	17	21				
Observations	670	252	317	3214	1062				

Source: Poverty and Family Structure Survey, 2006-2007 and 2010-2012

†Consumption per adult equivalent in thousands XOF (619 XOF \approx 1 USD)

Table D: Descriptive statistics: comparison between internal migrants (distance > 5km), deceased, international migrants, movers (distance < 5km) and attritors (continued)

	(1) Migrant	(2) Deceased	(3) Abroad	(4) Moved	(5) Lost	(6) t/χ^2 (1)-(5)	(7) t/χ^2 (2)-(5)	(8) t/χ^2 (3)-(5)	(9) t/χ^2 (4)-(5)
Household Characteristics									
Consumption p.a.e. (10^3 XOF)†	710.6	406.5	665.0	502.4	734.0	-23.4	-327.5***	-69.0	-231.6***
Household Size	10.9	10.7	12.0	11.3	8.9	1.9***	1.8***	3.0***	2.3***
Household Cell Size	4.6	3.0	4.8	4.3	4.0	0.6***	-1.0***	0.8***	0.3**
Cell/Household Expenditure	0.50	0.40	0.52	0.46	0.56	-0.06***	-0.16***	-0.04*	-0.10***
Household vs Community Wealth (%) (Self-Reported)									
...Richer (d)	13	12	16	18	18	9.0***	5.3**	0.7	2.9*
...Poorer (d)	23	18	25	21	23	0.0	3.3**	0.4	2.9*
Community Characteristics									
Environment									
...Dakar	33	31	46	32	56	137.2***	98.8***	29.8***	237.5***
...Other cities	22	19	20	25	24				
...Rural	45	49	34	43	19				
Public Services									
Public Hospital (%)	37	34	47	37	53	43.8***	29.1***	3.1*	79.6***
Nb Public Primary Schools	1.8	1.9	2.0	1.8	2.1	-0.3***	-0.2	-0.1	-0.3***
Nb Public Secondary Schools	1.6	1.7	1.9	1.7	2.2	-0.6***	-0.5***	-0.2*	-0.5***
County (Département) Characteristics									
Headcount Poverty	0.46	0.46	0.42	0.45	0.38	0.08***	0.08***	0.04***	0.07***
Gini Index	0.43	0.43	0.46	0.43	0.45	-0.02***	-0.01***	0.01**	-0.01***
Observations	670	252	317	3214	1062				

Source: Poverty and Family Structure Survey, 2006-2007 and 2010-2012

†Consumption per adult equivalent in thousands XOF (619 XOF \approx 1 USD)

All means are calculated at the individual level, to make the comparison between the different groups easier as households may include individuals in several categories. Large households thus tend to be over-represented in the reporting of descriptive statistics for household variables.

Table E: Multinomial logit models of internal and international migration decision (marginal effects)

	All			Women			Men		
	Internal (1)	International (2)	International (3)	Internal (4)	International (5)	International (6)	Internal (5)	International (6)	
Individual Characteristics									
Male									
Age in years	-0.025*** (0.008)	0.024*** (0.006)	-0.003 (0.002)	0.002 (0.002)	0.001 (0.001)	0.003* (0.002)	0.001 (0.002)	0.003* (0.002)	
Age squared	-0.001 (0.000)	0.002 (0.000)	0.000 (0.000)	-0.000* (0.000)	0.000 (0.000)	-0.000** (0.000)	0.000 (0.000)	-0.000** (0.000)	
Fostered	0.020** (0.009)	0.000 (0.007)	0.015 (0.015)	0.003 (0.014)	0.024* (0.009)	-0.007 (0.013)	0.024* (0.013)	-0.007 (0.012)	
First-born	0.006 (0.007)	-0.003 (0.005)	0.015 (0.015)	-0.012* (0.010)	-0.007 (0.007)	0.006 (0.010)	-0.007 (0.010)	0.006 (0.009)	
Serere	0.021** (0.011)	-0.019* (0.011)	0.022 (0.011)	-0.006 (0.015)	0.020 (0.015)	-0.033* (0.019)	0.020 (0.015)	-0.033* (0.019)	
Poular	-0.006 (0.009)	0.023*** (0.006)	0.000 (0.006)	0.025*** (0.012)	-0.013 (0.013)	0.021** (0.010)	-0.013 (0.013)	0.021** (0.010)	
Diola	0.045*** (0.015)	-0.050** (0.023)	0.108 (1.678)	-0.385 (0.029***)	0.023 (0.008)	-0.036 (0.031)	0.023 (0.021)	-0.036 (0.031)	
Other ethnic group	0.011 (0.011)	0.031*** (0.007)	0.023 (0.023)	0.029*** (0.016)	-0.003 (0.016)	0.034*** (0.012)	-0.003 (0.016)	0.034*** (0.012)	
Spouse/Parent of the head	-0.014 (0.015)	-0.019 (0.013)	-0.032 (0.023)	-0.003 (0.033**)	-0.892 (43.882)	0.147 (2.972)	-0.892 (43.882)	0.147 (2.972)	
Child/Sibling of the head	0.050*** (0.014)	0.030*** (0.009)	0.042* (0.024)	0.033** (0.024)	0.053*** (0.018)	0.035** (0.015)	0.053*** (0.018)	0.035** (0.015)	
Other/Non-Relatives	0.064*** (0.015)	0.033*** (0.010)	0.031 (0.024)	0.026** (0.016)	0.102*** (0.019)	0.058*** (0.016)	0.102*** (0.019)	0.058*** (0.016)	
Primary Education	0.012 (0.010)	-0.028*** (0.007)	-0.007 (0.013)	-0.019** (0.016)	0.037*** (0.015)	-0.043*** (0.012)	0.037*** (0.015)	-0.043*** (0.012)	
Secondary Education or University	0.029*** (0.011)	-0.019*** (0.007)	0.009 (0.007)	-0.005 (0.016)	0.055*** (0.008)	-0.038*** (0.012)	0.055*** (0.008)	-0.038*** (0.012)	
Quranic Education	-0.002 (0.011)	-0.003 (0.007)	0.004 (0.015)	-0.011 (0.025)	-0.004 (0.016)	-0.010 (0.011)	-0.004 (0.016)	-0.010 (0.011)	
Independent/Employer	0.009 (0.016)	0.029*** (0.011)	-0.017 (0.025)	0.004 (0.025)	0.023 (0.019)	0.047*** (0.016)	0.023 (0.019)	0.047*** (0.016)	
Salaried Worker/Intern/Trainee	0.018 (0.015)	0.024** (0.011)	-0.003 (0.025)	-0.002 (0.022)	0.026 (0.019)	0.040** (0.016)	0.026 (0.019)	0.040** (0.016)	
Family Worker	0.018 (0.016)	0.002 (0.013)	0.026 (0.022)	0.006 (0.026)	0.004 (0.017)	-0.000 (0.023)	0.004 (0.023)	-0.000 (0.023)	
Student	0.036** (0.017)	0.004 (0.014)	0.026 (0.026)	-0.009 (0.019)	0.038* (0.022)	0.013 (0.023)	0.038* (0.022)	0.013 (0.023)	
Inactive/Unemployed	0.017 (0.013)	0.024** (0.010)	0.018 (0.019)	0.014 (0.019)	0.015 (0.021)	0.034* (0.018)	0.015 (0.021)	0.034* (0.018)	
Missing Employment Category	0.032** (0.013)	0.021** (0.010)	0.043** (0.019)	0.018 (0.019)	0.015 (0.018)	0.017 (0.016)	0.015 (0.018)	0.017 (0.016)	
Household Characteristics									
Consumption Index (adult eq.)	0.013*** (0.005)	0.011*** (0.003)	0.012* (0.007)	0.002 (0.007)	0.016** (0.004)	0.020*** (0.005)	0.016** (0.006)	0.020*** (0.005)	
Household Size	-0.001* (0.001)	0.001 (0.001)	-0.002 (0.001)	-0.000 (0.001)	-0.001 (0.001)	0.002** (0.001)	-0.001 (0.001)	0.002** (0.001)	
Household Cell Size	-0.002 (0.002)	-0.001 (0.001)	-0.001 (0.003)	-0.000 (0.003)	-0.003 (0.003)	-0.000 (0.002)	-0.003 (0.003)	-0.000 (0.002)	
Cell/Household Expenditure	0.014 (0.020)	0.035*** (0.013)	0.007 (0.028)	0.028* (0.028)	0.015 (0.016)	0.050** (0.023)	0.015 (0.029)	0.050** (0.023)	
Self-Reported Richer than Community	-0.002 (0.010)	0.014** (0.007)	0.011 (0.011)	0.008 (0.011)	-0.023 (0.007)	0.019 (0.012)	-0.023 (0.007)	0.019 (0.012)	
Self-Reported Poorer than Community	0.009 (0.008)	0.008 (0.006)	0.010 (0.006)	0.013** (0.011)	0.008 (0.007)	-0.001 (0.010)	0.008 (0.012)	-0.001 (0.010)	
Community Characteristics									
Other cities	-0.040*** (0.012)	-0.014 (0.009)	-0.059*** (0.017)	-0.005 (0.017)	-0.016 (0.010)	-0.026* (0.015)	-0.016 (0.017)	-0.026* (0.015)	
Rural	-0.018 (0.016)	-0.012 (0.012)	-0.041* (0.022)	-0.011 (0.022)	0.022 (0.014)	-0.014 (0.019)	0.022 (0.022)	-0.014 (0.019)	
Public Hospital	-0.000 (0.010)	0.003 (0.007)	0.016 (0.014)	0.005 (0.014)	-0.019 (0.007)	-0.001 (0.011)	-0.019 (0.014)	-0.001 (0.011)	
Nb Public Primary Schools	-0.003 (0.003)	0.000 (0.002)	-0.001 (0.004)	0.002 (0.004)	0.002 (0.002)	-0.001 (0.003)	0.002 (0.004)	-0.001 (0.003)	
Nb Public Secondary Schools	-0.004 (0.003)	-0.002 (0.002)	-0.005 (0.004)	-0.001 (0.004)	-0.003 (0.002)	-0.003 (0.005)	-0.003 (0.005)	-0.003 (0.004)	
County (Département) Characteristics†									
Headcount Poverty	0.176*** (0.046)	0.042 (0.032)	0.226*** (0.064)	0.007 (0.064)	0.092 (0.037)	0.084 (0.055)	0.092 (0.065)	0.084 (0.055)	
Gini Index	-0.251*** (0.090)	0.296*** (0.058)	-0.240** (0.122)	0.267*** (0.122)	-0.316** (0.132)	0.307*** (0.099)	-0.316** (0.132)	0.307*** (0.099)	
Observations	7218	7218	3965	3965	3253	3253	3253	3253	

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

† Reference for categorical variables: Wolof/Lebou, head of household, no education, agricultural employment, Dakar, self-reported household vs community wealth: similar

† County characteristics computed based on 2002 Senegalese Census (ANS); Headcount Poverty & Gini Index generated with PovMap2 (World Bank, 2009)

Source: Poverty and Family Structure Survey, 2006-2007 and 2010-2012