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Abstract

This paper investigates the importance and role of migration networks in Senegal using a new nationally representative survey conducted in 2006-2007. Using a sample of 1707 Senegalese households I explore potentially differential effects of networks on international migration depending on their characteristics in terms of composition and destination. Results from logit and multinomial logit regressions show that household networks seem to be destination-specific and have a greater positive influence on migration than community networks. Networks also seem to have heterogeneous effects on migration depending on gender, household wealth or size which is consistent with previous findings in the literature and backs up a networks effects story.

Keywords: Migration, migrant networks, Senegal

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1 Introduction

Empirical studies on the determinants of migration generally find a large and positive influence of migration networks on the decision to move and on location choices (Massey, 1986; Massey and Espinosa, 1997; Davis, Stecklov, and Winters, 2002). Indeed, networks enhance migration by lowering migration costs and uncertainty. First, networks help reduce migration costs by providing direct financial assistance to new migrants in the destination country. Second, network members supply migration candidates with useful information on the destination country, for example concerning labor market conditions.

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However, the overwhelming majority of quantitative studies on migration networks rely on data on Mexico-US migration flows, the exceptional quality of available Mexican data on migration permitting furthermore interesting refinements of networks decomposition and differential influences (see for example Massey, 1986 ; Massey and Espinosa, 1997; Davis, Stecklov, and Winters, 2002; Aguilera and Massey, 2003; Bauer, Epstein, and Gang, 2002; Curran and Rivero-Fuentes, 2003; McKenzie and Rapoport, 2007; Winters, de Janvry, and Sadoulet, 2001).

By contrast very few studies aim at documenting African migration networks, and the main reason for this may be lack of appropriate data. Having access to an exceptionally rich dataset from a new nationally representative household survey conducted in Senegal in 2006-2007, I intend to provide a description of Senegalese outmigrations before investigating the correlations between migrant networks and the decision to migrate. In line with the migrant networks literature and in the specific Senegalese context, the four following hypotheses are explored: First, migrant networks do increase the probability that individuals or households participate in international migration. Second, the strength of the links between network members matters, which means that community networks do not play the same role as household networks. Third, networks are destination-specific and fourth, networks may have heterogeneous impacts, in particular depending on gender, but also on household income or structure.

This article is divided into six sections. Section II provides a brief overview of Senegalese migrations whereas section III presents the main findings and challenges of the migration networks literature. The data are presented and described in section IV. Section V uses successively a logit model to study the role of networks on the decision to migrate, and a multinomial logit model to examine the issue of destination-specific networks. Moreover the potential heterogeneity in networks effects depending on gender, wealth and family structure is investigated, and alternative interpretation are discussed. The final section presents concluding remarks.

2 Overview of Senegalese International Migrations

Over a population of 12 million, the number of Senegalese living abroad is estimated to between 400,000 and 2 million[1]. In contrast with a widespread idea, the largest part of them is located in Africa. Long ignored, West-African migrations have been drawing much political attention

[1]The lower bound estimate is the 2005 figure produced by the World Bank and the Senegalese Foreign Ministry

in Europe in the past few years. Migration policies became more restrictive in Europe in the 1990s (Cornelius, Martin, and Hollifield, 1994) while the media spread a representation of West-African migrants as invaders of a new kind, threatening the European "fortress" (de Haas, 2007)[2]. It is thus necessary to put current migratory trends back in their historical context.

Indeed, Senegalese migrations have deep historical roots and current migration flows cannot be explained without evoking traditions of mobility in Western Africa. The first region of Senegal to participate in massive international migration is the Senegal river valley adjoining Mauritania and Mali. Clark (1994) shows the links between current migration flows from this region and the high mobility characterizing the inhabitants of the valley as far back as pre-colonial times. Large population movements responded to numerous reasons: environmental, colonial, religious and historical factors contributed to make the economy of the region depend on emigration flows. In 1995, according to an International Labour Organization survey (Barou, 2002), migrants' remittances in this region represented between 30 and 80% of households needs. But nowadays outmigration concerns all Senegalese regions and ethnic groups.

Senegalese outmigrations developed under the French colonization period. After the Second World War and until the end of the 1970s migration of Western-Africans to Europe was encouraged due to the needs of unskilled workers in Europe. Family reunification policies soon introduced led to a relative feminization of Senegalese migration flows. In the 1990s, immigration policies in France and in Europe became more and more restrictive. At the same time new destination countries emerged, among which Southern Europe countries such as Spain and Italy attracting mostly unskilled migrants, and Germany, the United Kingdom or even North America for skilled migrants.

As for migration within Africa, Ghana, Nigeria and Côte d'Ivoire successively attracted Senegalese migrants before embarking on violent anti-immigration policies. Relatively wealthy countries such as Gabon and the two Congos also became destination countries for Senegalese migrants, mostly traders. In the 1990s North-African countries experienced an increase in Sub-Saharan migration flows and became destination countries in themselves as well as transit countries for migrants en route for Europe.

To the best of my knowledge however no valuable quantitative study of migration deter-

[2]Indeed, the media and public opinion in Europe tend to focus on illegal migration: see for example the large media coverage of the events of Ceuta and Melilla in 2005 and more recently the numeral stories of canoes trying to reach the Canary Islands coasts.

minants and migration networks on Senegalese data can be found. And yet, a number of historical, sociological or anthropological case studies on Senegalese migrations document the importance and functioning of a large variety of migration networks. These networks may be based on either ethnic or geographic characteristics, or even occupation, or religion. Among others, Adams (1977) and Guilmoto (1998) provide descriptions of community networks originating from the Senegal river valley, Ndione and Lalou (2005) on the other hand show evidence of networks' impact on migration in the urban context of Dakar. Bredeloup (2007) illustrates the role of occupational networks on migration in the diamond trade sector. Murid networks are much documented (see for example Bava (2003)), whereas Elia (2006) or Mboup (2001) provide detailed analyses of Senegalese migrant networks in a destination country, namely Italy. In addition, Dia (2009) documents the specialization of households regarding the destination their migrant members choose and thus provides evidence of the destination-specific aspect of migration networks.

3 Networks in the Migration Literature

At the micro-level, the reference neoclassical works consider the decision to migrate in a cost-benefit framework: migration occurs in response to (expected) earnings differentials net of migration costs accross regions or countries (Sjaastad, 1962; Harris and Todaro, 1970). And yet, empirical observations tend to support the view of migration as a self-sustaining network-based process, unrelated with differences in actual or expected incomes in the sending and receiving countries (Massey, 1986; Moretti, 1999; Carrington, Detragiache, and Vishwanath, 1996). Nevertheless, considering migration costs as a decreasing function of network size allows the neoclassical migration model to account for this empirical puzzle (Carrington, Detragiache, and Vishwanath, 1996).

Indeed, most studies concerned about migration networks assess their positive impact on migration through cost-decreasing effects. First, current migrants can provide direct assistance to candidates to migration. Such an assistance is not limited to financial aid and can consist in psychological support as well. Second, current and former migrants are a much valuable source of information for would-be emigrants. Both channels suggest that migration networks are at least partly destination specific. Most information conveyed by the network is relevant

only to the specific country, region or even city where it is settled. Leaving aside the issue of whether network effects on migration result in the first place from direct assistance helping reduce financial costs of migration, or from pure information transfers (Bauer, Epstein, and Gang, 2002), migrant networks have an unambiguous positive impact on migration.

As for the definition of migrant networks in the related literature, it varies from family members with a past or current migration experience to the whole group of fellow-countrymen living in a destination city or country. Most recent studies concerned with migration networks have dealt with the effects of different networks' compositions. A first decomposition of networks, taken from social networks theory (Granovetter, 1983), has been made between "strong ties" associated with family networks and "weak ties" relative to community networks (Davis, Stecklov, and Winters, 2002; Curran and Rivero-Fuentes, 2003; Grieco, 1998). Disaggregating further family networks according to kinship structure, Davis, Stecklov, and Winters (2002) show that the stronger the ties, the larger the positive impact of networks on migration. Recent empirical studies also distinguish networks made of current migrants from networks whose members have a past migration experience (Davis, Stecklov, and Winters, 2002; Winters, de Janvry, and Sadoulet, 2001). Indeed these two types of networks are expected to influence migration through different channels since current migrants are able to provide direct assistance in the receiving country and up to date information whereas historic networks indicate a family or community tradition of mobility. Disaggregating networks according to their gender composition allows Davis and Winters (2001) or Curran and Rivero-Fuentes (2003) to emphasize the existence of gendered migration patterns. In addition the migration decision is usually considered as a multiple-option choice between several destination places, thus leading to the obvious decomposition of networks according to their destination content (Davis, Stecklov, and Winters, 2002; Curran and Rivero-Fuentes, 2003).

Finally, networks are not found to be equally useful to potential migrants. Indeed, networks may help the poorest households overcome liquidity constraints that would prevent them from participating in international migration (Stark, Taylor, and Yitzhaki, 1986; 1988). On the other hand, McKenzie and Rapoport (2007) relate networks effects to self-selection issues. Using Mexican data, they show that the propensity to migrate is positively related to education in communities with small networks, whereas it decreases with education in communities with

large networks. Their results are thus consistent with both the positive self-selection of migrants driven by high migration costs and the negative self-selection of migrants due to lower returns to education in the United-States than in Mexico for highly educated Mexicans. Networks are thus expected to have a greater impact on the migration of the most economically, or educationally deprived individuals or households.

Basing on the main empirical and theoretical findings in the above reviewed literature, I try to assess the impact of migrant networks on migration decision and migrants' destination by investigating the four following hypotheses, mentioned in the introduction. First, migrant networks increase the probability that individuals or households participate in international migration. Second, the strength of the links between network members matters, which means that community networks do not play the same role as household networks. Third, networks are destination-specific and fourth, networks may have heterogeneous impacts, in particular depending on gender, but also on household income or structure.

Note that this work inevitably shares with a number of empirical studies of migration, particularly those based on cross sectional data, a double problem with the failure to account for migration dynamics, and with endogeneity issues (Davis, Stecklov, and Winters, 2002; Winters, de Janvry, and Sadoulet, 2001; McKenzie and Rapoport, 2007). Lacking relevant instruments, or even historic migration rates (used by McKenzie and Rapoport (2007)[3], to instrument for current community networks), I choose to provide a merely descriptive analysis. Nonetheless, results of the regressions run in section V are consistent with a networks effects story. Alternative interpretations are also discussed in section V.

4 Data and Summary Statistics

4.1 The Survey

The data used in this study come from the "Enquête sur la Pauvreté et la Structure Familiale" (EPSF) survey [4], that was conducted in Senegal in 2006-2007 (DeVreyer, Lambert, Safir, and

[3]The authors make the questionable assumption that historic migration variables affect current migration only through networks effects. In fact, communities which have high historic migration rates may have been and may continue to be more prone to respond positively to migration for unobserved reasons.

[4]The EPSF survey was designed by Momar Sylla and Matar Gueye of the Agence National de la Statistique et de la Démographie of Senegal, on the one hand and Philippe De Vreyer (EQUIPPE, University of Lille 2 and IRD-DIAL), Sylvie Lambert (LEA-INRA and PSE) and Abla Safir (CREST-INSEE and LEA-INRA) on the other. The data collection was conducted by the ANSD thanks to the funding of the IRDC (International

Sylla, 2008). The data comprises 1785 households distributed among 150 clusters[5]. A two stage sampling procedure based on a double stratification using the 2004 census data ensures that the resulting sample is nationally representative. Survey design and sampling weights are exploited to draw inferences on the whole Senegalese population. Unless otherwise mentioned, all summary statistics and regressions results are based on weighted data.

The PSF survey includes information on socio-economic characteristics of households as well as detailed information on their migrant members. The sample is restricted to households whose head is Senegalese in order to exclude immigrant households settled in Senegal. Indeed, including these non-Senegalese households would lead to an over-evaluation of the size and influence of household networks, since these may have left some of their members in their home country. The nationality criterion would raise selection concerns if large numbers of immigrants in Senegal were likely to have acquired the Senegalese nationality. According to Fall (2003), because of restrictive legal conditions, cumbersome and costly (100,000 XOF in 2001) administrative procedures, only 592 naturalization decrees were signed between 1971 and 2001, granting the Senegalese nationality to at most 9,000 individuals (since collective decrees can concern 8 to 15 individuals), which is not likely to be a number large enough to affect the composition of my sample. The estimation sample thus comprises 1707 households whose head is Senegalese and 8,645 individuals aged 15 and over.

Migrants are defined as household members aged more than 15 years, who were living abroad at the time of the survey, and who once lived in the surveyed household. Relatives of household members living in another country but who have never lived in the surveyed household are thus not counted as migrants. Actually, the design of the survey allows to identify migrants only if they are close relatives to a household member present in the household at the time of the survey, unless they left less than five years before the time of the survey. Hence, the population of migrants built from PSF survey data is made of a representative sub-sample of migrants who left after 2001 added to with a sub-sample of individuals who migrated before 2001 and left behind them at least a spouse, a parent or a child. The data allow to differentiate migrants depending on the broad destination they chose. It is known whether the migrant was living in an African country or in a non African country at the time of the survey. Information on the

Development Research Center.)

[5]Clusters are drawn among census districts which are small demographic units of about one hundred households: they amount to one village in rural areas to a few blocks in Dakar.

exact destination has not been collected. Nonetheless, the distinction between African and non African countries is meaningful : African destinations are much less costly than others, and most of them do not require any visa, according to CEDEAO agreements. This feature is exploited to see whether and how networks' destination content affect their correlation with the probability to migrate abroad and within Africa. Migrant households are defined as households with at least one adult member currently living abroad. Overall 255 adults in the estimation sample are international migrants, among which 105 were living in another African country at the time of the survey, and 150 in a non-African country. Using sampling weights, this population of adult migrants represents more than 160,000 individuals, that is 2.5% of the total adult population of Senegal[6]. Summary statistics on the characteristics of migrants and migrant households are presented in table 1 and 2.

The 255 international migrants are distributed among 186 households (10.3 % of our sample). 81 households (4.8 %) have a migrant in an African country whereas 108 (5.8 %) have a migrant out of Africa. It is noteworthy that only four households actually have migrants both in Africa and out of Africa[7]. Migrant households have between one and six international migrants with an average of 1.36. As can be seen in table 2 the average number of migrants per household is slightly higher for households participating in migration out of Africa (1.41) than for households with migrants in an African country (1.34). However, a huge majority of migrant households (74.3 %) only have one migrant.

As shown in table 1, more than two thirds of the migrants are men. This is all the more true for migrants out of Africa (76.4 % are men). As for education, migrants greatly differ depending on their destination: the percentage of migrants to an African country without education is 40.8 %, very close to the percentage of non educated non-migrant adults (42.6 %) whereas only 16.2 % of migrants out of Africa never went to school. The difference in the education profiles of migrants in Africa and migrants out of Africa is even more striking when comparing the percentages of individuals with tertiary education (2.0 % for migrants in Africa, 13.9 % for migrants out of Africa)[8]. Very interestingly, the percentage of individuals with Koranic schooling only is 10 percentage points higher in the subsample of migrants (regardless

[6]Note that this figure is obtained from data on migration outflows and is thus not comparable to estimates of the stock of Senegalese living abroad.

[7]Those households were not included in the estimation sample in the multinomial logit regression.

[8]Note that it is not known whether they reached their education level before leaving the country or whether they attended university abroad

Table 1: Individual characteristics of migrants and non migrants

	Migrants in Africa	**Migrants out of Africa**	*test (1)-(2)*	**All migrants**	**All adults**	*test (3)-(4)*
Number of observations	105	150		255	9747	
Subpopulation size (individuals)	*69,954*	*91,512*		*161,466*	*6,462,475*	
Percentage of total	1.1	1.4		2.5	100	
Sex (% male)	63.9	76.4	**	70.9	47.2	***
Age	35.3	34.6		34.9	34.2	
Percentage of individuals:						
Without education	40.8	16.2	***	26.8	42.6	**
With Koranic education only	25.5	23.1		24.1	15.6	**
With primary education	19.4	19.2		19.3	27.2	**
With secondary education	12.2	27.7	**	21.1	12.5	**
With tertiary education	2.0	13.9	***	8.9	2.1	***

Source: PSF Data collected in 2006.
Tests of equality of the means between migrants in Africa and migrants out of Africa on the one hand, and between migrants and non-migrants on the other hand are obtained from an adjusted Wald test.

of the destination) than in the whole population of adults.

Additional information about the reason for leaving and the exact destination place is available for two different subsets of 154 and 168 migrants. Though not exploited in the remainder of this study, these additional data provide an insight about the migration process. Job-related reasons come first (more than 70%) for male migrants whatever their destination whereas it is only second for women with 23%, far below marriage which is put forward by 42% of female migrants. This feature suggests that migration patterns probably differ for men and women. Second, as concerns migrants' destination, 22 countries are mentioned. Most frequently named are France (43 individuals), The Gambia and Mauritania (21 and 23 migrants), followed by Italy and Spain (17 and 11 migrants). All other destination countries are chosen by less than seven migrants. Note that among African countries, those adjoining Senegal are the top destinations, whereas among non African countries France comes first, in spite of the growing attractiveness of new destinations of Southern Europe.

Table 2: Characteristics of migrant and non migrant households

	Units	(1) **Households with Migrants in Africa**	(2) **Households with Migrants out of Africa**	*test (1)-(2)*	(3) **Households with Migrants**	(4) **Households without Migrants**	*test (3)-(4)*	(5) **All Households**
Number of observations (households)		81	108		186	1530		1716
Percentage of total		4.8	5.8		10.3	89.7		100
Household								
Size		9.6	10.8		10.2	7.7	***	7.9
Dependency ratio		0.45	0.43		0.44	0.40	**	0.41
Gender composition	ratio	0.48	0.41	**	0.44	0.51	***	0.50
Age of the household head	years	51.8	53.4		52.5	49.7	**	50.0
Sex of the household head	% male	61.5	49.3	**	55.0	81.9	***	79.1
Murid	%	14.7	33.7	***	24.1	34.1	***	33.0
Educ. of the head, no formal education	%	64.7	62.0		63.0	66.4		66.1
Educ. of the head, primary	%	18.5	10.8		14.6	19.2	*	18.7
Educ. of the head, secondary and higher	%	16.8	27.3	***	22.5	14.4	**	15.2
Wealth indicators								
Land	%	46.9	25.2	***	34.7	41.9	*	41.2
Net per capita total expenditures	10^6 XOF	0.401	0.792	**	0.626	0.542		0.551
Location								
Rural	%	55.1	38.2	**	43.7	53.7	*	52.9
Dakar	%	24.9	42.5	***	35.4	27.5	**	28.3
North and East	%	24.4	17.6		20.6	14.1	**	14.8
South	%	25.6	4.6	***	13.9	9.6	*	10.0
Center	%	11.6	28.7	***	21.1	39.6	***	37.6

Dependency ratio is the share of households resident members aged 0-15 and aged 65 and over; gender composition is the proportion of male household members
Dakar is the administrative Dakar region ; North and East represents the regions of Saint-Louis Matam and Tambacounda;
South, the regions of Kolda and Ziguinchor; and Center, the five regions of Thiès, Louga, Fatick, Diourbel and Kaolack.
Tests of equality of the means between households with migrants in Africa and households with migrants out of Africa on the one hand, and between households with and without migrants on the other hand are obtained from an adjusted Wald test.
Means are found to be different at the following significance levels * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Source: PSF Data collected in 2006.

Characteristics of households depending on their migration status are presented in table 2. Demographic characteristics (household size, gender or age composition) are based on remaining members of the household only, that is individuals residing in the surveyed household in Senegal [9]. The variables used are described in table footnotes wherever needed. Migrant households are found to be different from non migrant households in many demographic indices: they are on average larger households, whose head is slightly older and more often a woman, with a biased gender composition (lower percentage of male among adults), and more dependants. These statistics are consistent with the labor migration of male of active age.

On the other hand, migrant households form two distinct groups depending on the destination of their migrant members[10]. In particular households with migrants in Africa are less often Murid and less wealthy in terms of per capita expenditures than average. As for households with migrants in non African countries, their head has more frequently some secondary or tertiary education (27.3% against 14.4% in the whole population), they are more than 50% richer and urban (42.5% of such households are located in Dakar, against 27.5% of all households). As concerns location, North-East and South regions, bordering two of the most frequently cited destination countries, Mauritania and The Gambia, are unsurprisingly overrepresented among households with migrants in Africa.

4.2 Migration Networks

The networks approach chosen in this paper follows a methodology applied to Mexican data by Winters, de Janvry, and Sadoulet (2001) or Davis, Stecklov, and Winters (2002). Not only does this approach seem to be generally approved but it also fits particularly well the nature of information collected by the PSF survey. We first define two types of networks: family networks and community networks. Subsequently both kind of networks are disaggregated further by their destination content (Africa versus out of Africa), and community networks are decomposed into historic and current migration networks.

Household networks variables account for the migration history of the household. They are based on the presence of return migrants in the surveyed households. Two household networks

[9] Such a restrictive choice could be discussed, since the limits to be given to a household is a tricky issue, and probably even more in Senegal. Including migrants could be a possibility and avoid some reverse causality issues, but the question of whether including internal migrants would be more complex, and lead to arbitrary choices.

[10] 4 households only have migrants in both destinations

dummy variables are created to account for the two broad destinations migrants can choose: the first dummy variable equals one when at least one member of the household returned from an African country and the second dummy variable equals one when at least one member of the household returned from a non-African country.

At the community level, the construction of networks variables exploits the design of the survey as follows: Remember that the sampling process led to the drawing of 150 clusters in each of which 12 households were randomly drawn to be interviewed. For each household, community networks variables thus summarize information on migrants in the 11 other surveyed households from the same cluster. Two strong assumptions are needed: First it is assumed that surveyed households can be considered representative of their census districts, in spite of a serious concern about the small number of surveyed households in each census district. Indeed, a measurement error depending on the size of clusters (which varies from 25 to 400 households with an average of 100) arise from the use of survey data to construct community networks variables. Though the bias generated is well known as attenuation bias, in a non-linear regression framework with multiple covariate we have a priori no clue about the magnitude and direction of the bias (Bound, Brown, and Mathiowetz, 2007; Stefanski, Buzas, and Tosteson, 2005). The second assumption is that census districts do correspond to actual communities, implying for example that social relationships exist between individuals and households living in the same census districts. For lack of migration data at the community level, above discussed community networks variables are nevertheless considered acceptable proxies for community networks.

Two sets of networks variables are thus defined at the community level to take into account both past and current migration facts[11]. For a given household the historic community networks variable is defined as the sum of the number of return international migrants over the 11 other households from the same cluster. Similarly current migration networks variables at the community level are defined as the total number of current migrants to Africa on the one hand, and out of Africa on the other hand, in other surveyed households from the same census district.

[11] After testing for different specification the decomposition according to destination (within Africa or out of Africa) was not retained for historic community networks, since it did not seem to supply enough information to make up for the cost of adding one more variable in the model

Table 3: Family and community networks at the household level

	Units	(1) **Households with Migrants in Africa**	(2) **Households with Migrants out of Africa**	*test (1)-(2)*	(3) **Households with Migrants**	(4) **Households without Migrants**	*test (3)-(4)*	(5) **All Households**
Number of observations (households)		81	108		186	1530		1716
Percentage of total		4.8	5.8		10.3	89.7		100
Household migration and networks								
Current migrants								
Number of migrants		1.34	1.41		1.36	0	-	0.16
Historic migrants (networks)								
Former migrants, Africa	%	27.4	11.1	***	17.8	7.0	***	8.1
Former migrants, out of Africa	%	3.4	12.5	***	8.6	1.9	***	2.6
Community networks								
Number of current migrants, Africa		1.6	1.0	**	1.3	0.7	***	0.7
Current migrants, Africa	%	60.9	38.7	***	48.6	34.2	***	35.7
Number of current migrants, out of Africa		1.1	1.3		1.2	0.8	***	0.8
Current migrants, out of Africa	%	48.9	55.1		53.0	41.6	**	42.8
Former migrants	%	82.4	71.0	*	75.6	60.2	***	61.8
Number of former migrants		2.9	2.5		2.6	2.1	***	2.1

Tests of equality of the means between households with migrants in Africa and households with migrants out of Africa on the one hand, and between households with and without migrants on the other hand are obtained from an adjusted Wald test.
Means are found to be different at the following significance levels :* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Source: PSF Data collected in 2006.

Descriptive statistics for household and community migration networks are presented in table 3. Community networks can take different values for households living in the same community since they are based on the total number of migrants in all surveyed households in the community minus their own contribution. Not surprisingly households migration networks in Africa are significantly higher for households with migrants in Africa and households with migrants out of Africa have larger networks out of Africa. But distribution of networks according to the destination of migrants is not perfectly symmetrical: the proportions of households with former migrants returned from a non-African country and from Africa are very close for households currently participating in migration out of Africa (11.1 and 12.5%), whereas more than a quarter of households with current migrants in Africa have historic networks in Africa and only 3.4% of them have historic networks out of Africa. Historic connections with Africa are thus more evenly distributed than historic networks out of Africa.

5 Multivariate Analysis and Discussion

5.1 Regression Results

At first, households and individuals are considered to be faced with the choice of whether to participate in international migration or not. The migration decision is thus modelled as a binary output using a logistic regression model. Results of the household level regression are presented in table 4[12].

Subsequently, following Davis, Stecklov, and Winters (2002), a multinomial logit regression model is used to represent the migration decision taking into account the two broad destinations migrants can choose. Migrants or migrant households are considered to take the decision whether to participate in migration to Africa, to participate in migration out of Africa, or not participate in international migration at all. The three options being unordered, the multinomial logit regression model is best suited. A Hausman test has been conducted and does not lead to reject the assumption of independence of irrelevant alternatives (IIA)[13]. Results

[12]Binary logit results at the individual level are very similar to results shown in table 4, and are therefore not commented here but are presented in Appendix (table 14).

[13]In both household and individual regression model, when either migration in Africa, migration out of Africa alternatives, or no-migration alternatives are dropped, Hausman tests show that IIA assumption holds. For more robustness alternative regression models using multinomial probits were also run. Up to a scale factor, similar results were found.

Table 4: Migration decision: household logit regression model

Logistic regression Number of observations=1,779	Participate vs non participate in migration		
	coef.	*t-stat*	*p-value*
Household			0.000
Size	0.081^{***}	(6.03)	
Dependency ratio	0.708	(1.65)	
Gender composition	-1.287^{***}	(-3.10)	
Age of the household head	0.004	(0.72)	
Household head male (d)	-1.465^{***}	(-7.78)	
Murid (d)	-0.176	(-1.00)	
Education of the head, primary (d)	0.063	(0.27)	
Education of the head, secondary or higher (d)	0.830^{***}	(3.73)	
Education of the head, koranic only (d)	0.326^{*}	(1.79)	
Wealth variables			0.093
Land (d)	-0.283	(-1.35)	
Total net expenditures	0.037^{*}	(1.89)	
Location			0.000
Rural (d)	0.213	(0.97)	
North and East (d)	-0.277	(-1.26)	
South (d)	0.330	(1.42)	
Center (d)	-0.906^{***}	(-3.71)	
Community migration networks			0.002
Historical migration	-0.019	(-0.93)	
Current migration in Africa	0.141^{***}	(3.61)	
Current migration out of Africa	0.076^{*}	(1.90)	
Household migration networks			0.000
Historical migration in Africa (d)	0.982^{***}	(4.47)	
Historical migration out of Africa (d)	1.589^{***}	(4.30)	
Constant	-2.192^{***}	(-4.88)	

Survey design and weights are used in the multinomial regression
(d) indicates dummy variables
p-value for groups of variables are obtained from an adjusted Wald test
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Source: PSF Data collected in 2006.

of the estimation of this model (at both household and individual level) are shown in table 5 and 6[14]. In both tables, the two columns show results for the alternatives "participate in migration in Africa" and "participate in migration out of Africa", relative to the third option, that is, not participate in international migration. Table 6 presents a regression model adapted to the individual dataset and incremented with individual variables. Then, in order to allow for the possibility of internal migration, we consider a more realistic set of migration choices, by considering for migrants originated from regions other than Dakar, the migration decision as a choices between four alternatives: stay, move to Dakar, migrate to an Africa country, or migrate to farther destinations. Results are presented in table 8, whereas table 9 investigates potential specificities in migration decisions of individuals whose origin household is settled in Dakar.

5.1.1 Household composition, wealth, human capital and location variables

The main findings for the non-networks variables are first discussed here. Results mostly confirm what summary statistics suggested as regards household composition, physical capital and location variables. Among household composition variables, household size is positively and significantly related with the participation in migration. Similarly, the coefficient on the dependency ratio is also positive (though not significant at the 10% level), implying a positive correlation between the share of dependants relative to members of the household of active age and the participation in migration. Conversely, the fact that the household is headed by a man is unsurprisingly negatively correlated with the probability that the household participate in migration. Reverse causality may explain all these results, if migrants are male of active age, which is confirmed by the regression run at the individual level (table 6. In particular, as regards the gender of the household head, indeed when the male household head is abroad, the household tends to be more frequently headed by his wife. In order to avoid such reverse causality concerns, those three variables most likely to be involved (gender composition, dependency ratio and gender of the head) are not included in the subsequent regressions. However, note that including them does not affect the results.

As can be seen in table 4, households whose head has either Koranic education or at least

[14]In all regressions the survey design is taken into account, observations are weighted using survey weights, and residuals are allowed to be correlated within clusters: standard errors are clustered by district for household level regressions and by household for individual regressions.

Table 5: Migration decision: household multinomial logit regression model

Multinomial logit regression
Number of observations=1,779

	Migration to: Africa versus none		Out of Africa versus none		
	coef.	*t-stat*	coef.	*t-stat*	*p-value*
Household					0.000
Size	0.060^{***}	(2.75)	0.104^{***}	(6.50)	
Age of the household head	-0.000	(-0.04)	0.008	(1.08)	
Household head male (d)	-1.598^{***}	(-6.98)	-1.850^{***}	(-10.68)	
Murid (d)	-0.706^{**}	(-2.22)	0.136	(0.63)	
Education of the head, primary (d)	0.170	(0.57)	-0.293	(-0.87)	
Education of the head, secondary or higher (d)	0.733^{*}	(1.89)	0.831^{***}	(3.51)	
Education of the head, koranic only (d)	0.422	(1.65)	0.140	(0.52)	
Wealth variables					0.048
Land (d)	0.032	(0.11)	-0.629^{**}	(-2.50)	
Total net expenditures	-0.066	(-0.61)	0.040^{*}	(1.98)	
Location					0.000
Rural (d)	0.244	(0.71)	0.438	(1.41)	
North and East (d)	0.133	(0.36)	-0.423	(-1.43)	
South (d)	0.967^{***}	(2.70)	-0.745^{*}	(-1.93)	
Center (d)	-1.220^{**}	(-2.59)	-0.624^{**}	(-2.07)	
Community migration networks					0.002
Historical migration	-0.045	(-1.40)	0.003	(0.10)	
Current migration in Africa	0.151^{***}	(3.60)	0.133^{***}	(3.03)	
Current migration out of Africa	0.087^{**}	(1.99)	0.045	(0.77)	
Household migration networks					0.000
Historical migration in Africa (d)	1.290^{***}	(4.38)	0.395	(1.35)	
Historical migration out of Africa (d)	0.493	(1.13)	2.032^{***}	(4.96)	
Constant	-2.839^{***}	(-4.84)	-3.097^{***}	(-7.06)	

Survey design and weights are used in the multinomial regression
(d) indicates dummy variables
p-value for groups of variables are obtained from an adjusted Wald test
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Source: PSF Data collected in 2006.

Table 6: Migration decision: individual multinomial logit regression model

Multinomial logit regression
Number of observations=8,644

	Migration to: Africa versus none		Out of Africa versus none		
	coef.	*t-stat*	coef.	*t-stat*	*p-value*
Individual					0.000
Age	0.188^{***}	(3.90)	0.285^{***}	(5.15)	
Age squared	-0.002^{***}	(-4.41)	-0.003^{***}	(-4.22)	
Male (d)	0.585^{**}	(2.26)	0.738^{***}	(3.07)	
Education, primary (d)	-0.403	(-1.11)	0.428	(0.90)	
Education, secondary and higher (d)	-0.749	(-1.59)	1.272^{***}	(2.89)	
Education, koranic only (d)	0.542	(1.40)	1.739^{***}	(3.87)	
Child of the head (d)	-0.263	(-0.68)	1.479^{***}	(3.17)	
Household					0.000
Size	-0.040	(-1.34)	0.041^{*}	(1.77)	
Age of the household head	0.019^{*}	(1.74)	-0.024	(-1.54)	
Education of the head (d)	0.544	(1.55)	-0.369	(-1.23)	
Education of the head, koranic only (d)	-0.293	(-0.85)	-1.275^{***}	(-2.69)	
Wealth variables					0.162
Land (d)	-0.056	(-0.15)	-1.014^{**}	(-2.56)	
Total net expenditures	0.028	(0.64)	0.036	(1.44)	
Location					0.000
Rural (d)	-0.324	(-0.84)	0.516	(1.19)	
North and East (d)	0.981^{**}	(2.46)	0.087	(0.22)	
South (d)	1.524^{***}	(4.07)	-0.980^{*}	(-1.94)	
Center (d)	-0.373	(-0.66)	-0.673^{*}	(-1.70)	
Community migration networks					0.008
Historical migration	-0.049	(-1.21)	0.051	(0.98)	
Current migration in Africa	0.205^{***}	(4.19)	-0.018	(-0.21)	
Current migration out of Africa	0.098	(1.53)	-0.016	(-0.22)	
Household migration networks					0.000
Historical migration in Africa (d)	1.147^{***}	(3.71)	-0.072	(-0.21)	
Historical migration out of Africa (d)	0.520	(0.95)	1.215^{***}	(2.84)	
Constant	-9.303^{***}	(-6.60)	-10.352^{***}	(-8.54)	

Survey design and weights are used in the multinomial regression
(d) indicates dummy variables
p-value for groups of variables are obtained from an adjusted Wald test
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Source: PSF Data collected in 2006.

some secondary education are more likely to participate in migration. Due to small cells issues, the variable for the education of the household head in the multinomial logit model (table 5) is a dummy variable taking the value 1 when the head has at least some primary education. When primary education and higher levels of education are aggregated, the coefficient on the education of the head variable remains positive and significant. Neither the age of the head nor the Murid dummy variable is significant[15]. Results for household composition variables are found to be robust across specifications and similar whatever the destination. Note however that the household size is not significantly correlated with migration in the multinomial logit regression at the individual level.

Coefficients on physical capital variables are found to be jointly significant at least at the 10% level in all specifications. But actually, as shown in table 5 the coefficient on the expenditures variable (defined as the logarithm of per capita annual expenditures) used as a proxy for household income, is found positive and significant, for migration out of Africa only. It means that there is a positive relationship between wealth measured by expenditures and the participation in migration out of Africa. One may interpret this result as indicating that richer households are more likely than poorer to participate in costly international outmigration. But such an interpretation is not the only one allowed by our specification, since wealth is highly endogenous with regard to migration by means of remittances, even after deduction of the expenditures directly taken care of by migrants. Alternative interpretations could be that the income generated by migration to European or American countries increases the expenditures of migrant households through remittances in a way that is not accurately taken into account here, or that migration to high income countries enhances through remittances and investments the ability of households to receive a higher income at home. Because of the potential endogeneity of the expenditures variables, I tested different specifications of the model excluding it. In particular, wealth and education could be positively correlated, and such a correlation could affect the coefficients on the education of the head variables. Indeed, when excluding the expenditure variable of the model, the coefficient on the education of the head variables come to zero, as regards migration to Africa. Conversely, the positive correlation between secondary and higher levels of education of the head and the probability to have migrants out of Africa

[15]This result, despite having to be considered cautiously due to the small number of observations, is interesting considering the vast literature on Murid migration networks. According to our results, Murid do not migrate more than other Senegalese.

remains unchanged. All other results are robust to the inclusion of the expenditures variable.

Gender, age and education variables, as well as a dummy indicating that the individual is the son or daughter of the household head, are included in the individual multinomial logit whose results are shown in table 6. Not surprisingly, the probability to migrate is a quadratic function of age, increasing with age up to a turning point at around 39 years of age for both destinations. Being a man is associated with a higher probability to migrate to an African country and a non-African country, holding all other explanatory variables constant. As for education, adults with some primary education do not migrate more than those with no education at all, but highest levels of education (secondary and higher) are positively correlated with the probability that an individual migrate out of Africa and negatively correlated with the probability to migrate within Africa. This latter result is consistent with the findings of the migration literature: the cost of entry into international migration is even higher for migration to Europe and the United-States, which could favor emigrants with a greater educational background. Conversely, our finding that Senegalese with higher levels of education have a lower probability to migrate to African countries suggests that returns to education are higher at home than in another African country. A noticeable finding is the positive correlation between Koranic education and the propensity to migrate out of Africa, which may be explained by the existence of religion-based international networks, or household strategies of investment in both education and migration (as in Auriol and Demonsant (2011)). Note that sons or daughters of household heads are more likely to migrate, especially to non African countries, which is consistent with households models of migration : closer family ties are expected to create more remitting obligations, thus households are likely to sponsor migration of sons (Stark and Lucas (1988), Hoddinott (1994)).

As for location variables, regional dummies are aggregated in four categories[16]. The reference category for regional dummies is the Dakar region. First note that households located in the regions of Thies, Diourbel, Kaolack and Fatick are less likely to participate in international migration (table 4). Negative (though non significant) coefficients on the "North and East" dummy in table 4 suggest that, all else equal, households located in the regions of Saint-Louis, Matam and Tambacounda, in spite of the fact that the latter two include the upper Senegal river valley kwnown as a major emigration area, are no more likely to have migrants than households located in Dakar. The coefficient on the "North and East" dummy is however significantly

[16]The regional categorization is described in table 2's footnotes.

correlated with migration in Africa in some specifications (see table 6), as expected of regions bordering Mauritania.

Table 5 also shows that the coefficients on all three regional dummies are negative, as regards the probability to migrate in a non African country. This latter finding is not much surprising since most international migrants going to Europe, whatever their geographical origin, first move to Dakar before leaving the country.

5.1.2 Networks variables

Results of the binary logit regression in table 4 suggest that all network variables except historic community networks are positively correlated with the probability that households participate in international migration. Moreover these effects seem to be larger for family networks: having one more person in its community network in Africa is associated with a probability 1.2 times higher to participate in migration, but all else equal and all other variables taken at their mean value, the same probability is multiplied by 2.6 when households have former migrant members back from Africa (historic household network)[17].

Multinomial logit regressions run at both household and individual levels allow to go into networks correlation with the probability to migrate with regard to the destination. Two unequivocal results stand out in table 5: First, at the household level, as expected, networks seem to be destination-specific. The dummy for the presence of former migrants to Africa in the household is positively related to the probability to have current migrants in Africa, whereas the dummy for former migrants out of Africa is positively related to the probability for the household of participating in migration out of Africa. Interpreting these results in terms of relative risk ratios for household level regression (table 5), means that having a former migrant to Africa back in the household is correlated with a probability 4.2 times higher for the household to participate in current migration to Africa. Similarly having a former migrant to a non-African country is associated with a probability 7.9 times higher for a household to participate in migration out of Africa. Conversely, having household networks in Africa is not correlated with a greater participation in migration out of Africa, and vice versa.

Second, conversely, community networks seem to be less destination-specific than family

[17]Part of the difference in scale between the two coefficients could be explained by a measurement error bias, as explained above.

networks (see table 5) The positive correlation between the variable for community networks in Africa and the probability to participate in African migration is significant and robust. On the opposite, the non-African community network is not found to affect migration outside Africa. In between, results depend on which model is estimated (individual versus household). Note in particular that at the household level the variable for community networks in Africa is positively correlated with both probabilities to participate in migration in and out of Africa.

Table 7: Community networks and family networks: complements or substitutes?

Logistic regression Number of observations=8645 (individuals)	Participate versus non participate in migration		
	coef.	*t-stat*	*p-value*
Migration networks			0.0001
Community level			
Historical migration	0.004	(0.14)	
Current migration in Africa (d)	0.557^{***}	(2.39)	
Current migration out of Africa (d)	0.552^{**}	(2.25)	
Household level			
Historical migration (d)	1.704^{***}	(4.68)	
Community current migration Africa (d) X			
Household historical migration (d)	-0.527	(-1.29)	
Community current migration out of Africa (d) X			
Household historical migration (d)	-0.988^{**}	(-2.36)	
Controls	*yes*		
Constant	-9.212^{***}	(-8.96)	

Survey design and weights are used in the multinomial regression
(d) indicates dummy variables
Controls included are individual and household non-networks variables figuring in table 3
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Source: PSF Data collected in 2006.

The relationship between community and household migration networks is investigated further by introducing interaction terms between both types of networks. The relatively small number of observations in the subsample does not allow to explore interactions between household and community level network variables and at the same time break down migrants destination into African and non-African countries. In order to get round small cells problems a new household network dummy variable is thus constructed taking the value one when the household has one or more former international migrant back either from Africa or from a non-African country. Interactions between this new variable for household network and the two above defined community variables for current migration networks are explored in a binary logit model run on individual data. Results are shown in table 7[18]. The negative sign of

[18]In spite of interpretation issues raised by interactions in non linear models demonstrated by **?**, the interpretation presented here is reinforced by the fact that similar results are obtained when computing counterfactuals

the interaction term between community networks in Africa and household networks suggest that household networks and community networks in Africa are partly substitutable, whereas household network and community network out of Africa seem to have no interaction.

To sum up, results presented above seem to imply first that migration networks at the household level have a greater positive influence on the probability to migrate than community networks, which is consistent with the above mentioned distinction between "strong" and "weak" ties. It might be advanced that while information can be provided by community networks, direct financial assistance is more likely to be given to the would-be migrant by members of her own household, although the available data cannot help differentiate these two channels. Second, migration networks at the household level appear to be destination specific in the sense that having family networks in Africa does not affect the decision to participate in migration out of Africa, and vice versa. Third, having access to community networks in Africa seems to be positively related with the probability that a household participate in migration whatever the destination chosen[19]. This finding is indeed consistent with numerous empirical evidence suggesting that migrants to Northern countries often pass in transit through African countries before reaching their final destination. In such a perspective, migrants from the same community settled in an African country may turn out to be major assets in a migration strategy intended to reach Europe. Fourth, community networks, in Africa only, are found to be partial substitutes for household networks which means that the former type of networks is relatively more useful to help migrate individuals that do not benefit from family networks than those who are already endowed with family networks.

5.2 Migration to Dakar

International and rural-urban migrations cannot be considered in isolation. Indeed, as suggested by the above results on geographical patterns of Senegalese migrations, most migrants heading towards Europe or America necessarily transit through Dakar. For that reason, table 8 present regressions results where migration is represented as a choice between four options, with the possibility to move to Dakar being added to the two broad foreign destinations and the stay option. It is interesting to note that adding an extra destination does not affect, on average,

(see in Appendix).

[19]Note that this latter result is found only in the household regression (table 5).

Table 8: Migration decision: individual multinomial logit regression model, regions other than Dakar

Multinomial logit regression
Number of observations=5,566

	Migration to: Dakar versus none		Africa versus none		Out of Africa versus none		
	coef.	*t-stat*	coef.	*t-stat*	coef.	*t-stat*	*p-value*
Individual							0.000
Age	0.054**	(2.05)	0.190***	(3.98)	0.287***	(5.22)	
Age squared	−0.001**	(−2.20)	−0.002***	(−4.48)	−0.003***	(−4.27)	
Male (d)	0.263*	(1.87)	0.594**	(2.29)	0.740***	(3.00)	
Education, primary (d)	0.467**	(2.00)	−0.374	(−1.04)	0.403	(0.87)	
Education, secondary and higher (d)	0.549*	(1.94)	−0.712	(−1.52)	1.286***	(3.01)	
Education, koranic only (d)	0.779***	(3.01)	0.558	(1.42)	1.755***	(4.02)	
Child of the head (d)	0.766***	(3.43)	−0.235	(−0.62)	1.529***	(3.47)	
Household							0.000
Size	−0.071***	(−3.94)	−0.043	(−1.45)	0.034	(1.58)	
Age of the household head	0.011*	(1.76)	0.020*	(1.72)	−0.025*	(−1.72)	
Education of the head (d)	−0.198	(−0.88)	0.546	(1.51)	−0.372	(−1.31)	
Education of the head, koranic only (d)	−0.557**	(−2.25)	−0.321	(−0.93)	−1.318***	(−2.89)	
Wealth variables							0.012
Land (d)	0.483**	(2.36)	−0.027	(−0.07)	−1.013**	(−2.54)	
Total net expenditures	−0.014	(−0.22)	0.033	(0.74)	0.042	(1.52)	
Location							0.000
Rural (d)	−0.013	(−0.07)	−0.382	(−1.08)	0.254	(0.70)	
North and East (d)	−0.191	(−0.80)	1.135***	(3.46)	0.561	(1.38)	
South (d)	0.281	(1.12)	1.759***	(5.52)	−0.602	(−1.32)	
Community migration networks							0.000
Historical migration	−0.016	(−0.54)	−0.044	(−1.12)	0.075	(1.58)	
Current migration in Dakar	0.119***	(8.72)	−0.024	(−0.45)	0.023	(0.48)	
Current migration in Africa	−0.006	(−0.09)	0.212***	(4.51)	−0.016	(−0.19)	
Current migration out of Africa	0.052	(0.93)	0.121*	(1.83)	−0.004	(−0.05)	
Household migration networks							0.015
Historical migration in Africa (d)	−0.076	(−0.24)	1.153***	(3.72)	−0.095	(−0.28)	
Historical migration out of Africa (d)	0.483	(1.34)	0.527	(0.96)	1.277***	(3.09)	
Historical migration in Dakar (d)	0.574***	(3.25)	0.123	(0.38)	0.555**	(2.07)	
Constant	−5.507***	(−9.13)	−9.503***	(−6.85)	−10.717***	(−8.84)	

Survey design and weights are used in the multinomial regression
(d) indicates dummy variables
p-value for groups of variables are obtained from an adjusted Wald test
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Source: PSF Data collected in 2006.

above commented results as regards the two other alternatives (migrate in Africa and out of Africa), consistently with the IIA assumption, and even though the regression sample is different since it here excludes households located in Dakar. Results suggest that migrant household members settled in Dakar are on average more educated than stayers, which can be explained both by the fact that moving to Dakar often proves the only possibility to pursue one's education, or by the lack of job opportunities for skilled individuals in other regions. Coefficients on migration networks seem to corroborate the role played by Dakar of a stopping-off city between all Senegalese regions (since none of the coefficients on regional dummies is found significant) and Europe or America. Indeed, individuals with family networks in Dakar, consistently with the idea of destination-specific networks, but also in non African countries are more likely to move to Dakar.

Table 9: Migration decision: individual multinomial logit regression model, Dakar

Multinomial logit regression
Number of observations=3,079

	Migration to: Africa versus none		Out of Africa versus none		
	coef.	*t-stat*	coef.	*t-stat*	*p-value*
Individual					0.000
Age	0.135	(1.43)	0.246***	(3.70)	
Age squared	−0.002	(−1.50)	−0.002***	(−2.91)	
Male (d)	0.645	(1.34)	0.208	(0.63)	
Education, primary (d)	−1.651**	(−2.42)	−0.419	(−0.68)	
Education, secondary and higher (d)	−1.766**	(−2.48)	0.448	(0.87)	
Education, koranic only (d)	−0.585	(−0.92)	0.178	(0.20)	
Child of the head (d)	−0.200	(−0.23)	2.850***	(3.74)	
Household					0.002
Size	−0.003	(−0.10)	0.024	(0.86)	
Age of the household head	−0.017	(−0.71)	−0.053**	(−2.40)	
Household head male (d)	−1.018*	(−1.82)	−0.856**	(−2.01)	
Education of the head (d)	0.845	(1.33)	0.513	(1.17)	
Education of the head, koranic only (d)	0.638	(0.84)	−1.202*	(−1.70)	
Wealth variables					0.290
Total net expenditures	0.038	(1.17)	0.042*	(1.71)	
Community migration networks					0.368
Historical migration	−0.055	(−0.75)	0.090	(1.44)	
Current migration in Africa	0.217*	(1.75)	0.064	(0.45)	
Current migration out of Africa	−0.023	(−0.16)	−0.143	(−1.32)	
Household migration networks					0.002
Historical migration (d)	1.187**	(2.51)	0.919**	(2.10)	
Constant	−6.088**	(−2.52)	−8.390***	(−6.52)	

Survey design and weights are used in the multinomial regression
(d) indicates dummy variables
p-value for groups of variables are obtained from an adjusted Wald test
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Source: PSF Data collected in 2006.

Symmetrically, table 9 focuses on migration of individuals originated from households settled in Dakar. Very strikingly, the only significant characteristic found to be correlated with their propensity to migrate to non African destinations, except their age, is the existence of family networks. Because of the reduced size of the sample, household networks cannot be differentiated with regard to their destination content. As for migration within Africa, it is positively correlated with household networks but also, even in such an urban context, with community networks in Africa. In addition, no difference is found between migrants from Dakar and from other regions as regards their educational characteristics: migrants in Africa are on average less educated whereas farther destinations attract or select the most educated ones.

Note that the fact that migrants may transit through Dakar before migrating to Europe or America may raise a concern about double counting. Indeed, those migrants from rural areas or regional towns might be declared to have left two households : their origin household, and the household that gave them shelter in Dakar. Since our sample is representative, there is in theory a double counting of migrants originated from regions other than Dakar, if migrants stayed long enough to be considered to have been once member of the household, and declared to surveyors. Moreover, if they left their shelter household in Dakar more than 5 years before the survey and had no direct family tie to remaining members, they are missed by the survey. Even if (theoretical) double counting may explain to some extent the fact that most migrants are originated from Dakar, since we are not trying to estimate the incidence of migration, but rather explore the relation between networks and migration, there is no much cause of concern.

On the other hand, the recall bias analysed by Safir (2009), who contributed to design the survey, may have greater consequences. Indeed, she shows that households tend to under-declare the departures of women, especially those marrying out in rural areas. However, this may not be the main explanation for our results, since we expect households to keep better memories of women who migrated abroad, and in particular to a non African country.

5.3 Exploring Heterogeneity in Networks Effects

5.3.1 Gendered Migration Patterns?

In order to go further into the description of migration, heterogeneities in networks effects depending on gender are investigated. Since the male dummy variable seems to be a key deter-

minant of migration, it is interesting to explore whether family networks tend to amplify such a gender bias in migration, or instead, whether networks act as substitutes of such individual characteristics facilitating migration. Indeed, within the household do women benefit from family networks more than men ? There is a priori no reason why household networks would affect the same way all members of a given household. Gender issues are thus investigated using logit regressions, whose results are shown in table 10.

Table 10: Gender issues: logistic regressions at the individual level

Logistic regression	(1) Men	(2) Women	(3) Men	(4) Women	(5) All adults
Community networks					
Current migration in Africa (d)	0.486**	0.483	0.517**	0.499*	0.455**
	(2.08)	(1.54)	(2.23)	(1.67)	(2.25)
Current migration out of Africa (d)	0.563**	−0.232	0.566**	−0.208	0.278
	(2.27)	(−0.69)	(2.31)	(−0.62)	(1.28)
Household networks					
Historical migration (d)	0.537*	1.554***			1.498***
	(1.95)	(5.00)			(4.78)
Female historical migration (d)			0.470	1.283***	
			(1.29)	(3.41)	
Male historical migration (d)			0.119	0.991**	
			(0.32)	(2.51)	
Male (d)					1.273***
					(6.29)
Male (d) x historical migration (d)					−0.912**
					(−2.44)
Household characteristics					
Education of the head (d)	0.226	0.776***	0.226	0.745**	0.424**
	(0.96)	(2.72)	(0.97)	(2.57)	(2.22)
Land (d)	−0.535*	0.577	−0.526*	0.543	−0.233
	(−1.79)	(1.62)	(−1.75)	(1.59)	(−0.94)
Total net expenditures	0.031	0.144*	0.032	0.151**	0.052**
	(1.40)	(1.89)	(1.45)	(2.07)	(2.05)
Controls	*yes*	*yes*	*yes*	*yes*	*yes*
Constant	−9.570***	−7.738***	−9.617***	−7.589***	−9.081***
	(−6.60)	(−5.57)	(−6.59)	(−5.35)	(−9.17)
Observations	4364	4987	4364	4987	9351

t statistics in parentheses
Controls included are age and age squared, household size and composition variables, sex and age of the head and geographical controls
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Source: PSF Data collected in 2006.

In the first four columns of table 10, logit regressions are run separately for men and women. First it is interesting to note that none of the two community network variables significantly

affects the probability of women to migrate whereas both are significantly correlated with a higher probability to migrate for men (column one and two). Conversely, the coefficient on the household network variable is larger and more significant for women than for men. In the next two columns, family networks are disaggregated depending on their gender composition into female and male networks. Very interestingly, female migration is positively correlated with both gendered family network variables. Once disaggregated, on the contrary, family networks are not found to significantly affect men's probability to migrate. In addition, a selection of non networks variables are shown in table 10. Separate regressions on male and female subsamples emphasize a number of differences in male and female migration patterns. On the one hand, indeed, when the head of the household has at least some primary education, women are found to be more likely to migrate whereas this positive correlation is not significant for men. On the other hand, wealth variables do not symmetrically affect men's and women's probability to migrate: female migrants are more likely to come from richer households, and men are less likely to migrate when the household has land assets. This latter finding should be related to inheritance issues, land assets being most frequently transmitted to male heirs, thus given the responsibility to exploit them.

In column five, the male dummy variable is interacted with the aggregate household networks dummy variable in order to study whether family networks are more useful to men or women. While the male dummy and the household historical migration dummy are both positively correlated with the probability to migrate, the coefficient on their interaction term is negative and significant, suggesting a substitution effect between being a man and having family networks. Although, as noted above, interpretation of coefficients on interacted variables in a non-linear framework might be taken cautiously, I can be reasonably confident in the validity of these results since counterfactual analysis bring consistent elements : household networks seem to be (slightly) more efficient for women than for men[20]. Therefore, female migrations are found to apparently rely more on household networks and less on community networks. This finding is consistent with the observation that a non negligible share of female migrants move in

[20]Indeed, the estimated probability to migrate for female adults with no family networks is 1.18%. Had these women benefited from family networks, this estimated probability would be multiplied by 2.4 (2.83%). Had they been men without networks instead, all their other characteristics being unchanged, their estimated probability would be 3.07%. Finally, had they in addition benefited from family networks, this latter estimated probability to migrate would be multiplied by 2.28 (7.00%). The comparison between the estimated probabilities to migrate for these counterfactuals suggests that household networks may be slightly more efficient for women than for men, although the difference might not be large enough to be considered statistically reliable.

order to get married (based on survey answers of remaining household members to the question about the motives for departure of the considered individual). A more general interpretation could be that the first link in the family migration chain is most probably a man, and it is only once the chain exists that female migration occurs.

5.3.2 Networks as substitutes for household financial or social resources?

Heterogeneities in community networks' effects depending on household and individual characteristics are explored by interacting networks and a number of household or individual variables. Results are shown in tables 11 and 12. OLS regressions are presented along with logits, in order to provide a reasonable first approximation and avoid interpretation problems of interactions in non-linear regressions.

In table 11, I investigate potential heterogeneity in networks effects depending on household wealth. Different measures of household wealth are presented. First, I define a relative poverty index, with poor households defined as the poorest 30% in their community, based on a comparison of annual per capita expenditures among households from the same cluster. Second, using an absolute poverty line, I identify households living with less than 1 dollar a day per capita (based on declared expenditures amounts). 44.2% adults in my sample live in poor households according to this measure. Then the rural dummy (45.1% individuals) is also interacted with networks variables since it may be a suitable proxy for liquidity constraints, due to a more difficult access to banking and credit facilities. Very interestingly, community networks variables are found to be positively correlated with migration only for the poorest part of the population, whatever the variable used to capture poverty, although this is observed for community networks in Africa only. This finding is consistent with previous results in the literature and backs up the idea that networks may be good substitutes for economic or social capital. Those households that have less financial resources, or access to modern banking facilities are found to be less likely to participate in international migration (though not significantly in any specification), but when having access to community networks in Africa, they are found to migrate with a significantly higher probability than better-off households. Again, the fact that community networks in Africa only are correlated with a higher probability to participate in migration suggests that the extended network, beyond family links, provides

mainly non-monetary help to potential migrants through information on opportunities abroad. Since migration within Africa is not much costly, lack of information might be considered the main obstacle to migration. Community networks could then prove to be a valuable source of information and offer the opportunity to participate in African migrations to poor household that would otherwise be excluded from the international migration "market". However such an interpretation cannot be proved with the available data.

Table 11: Interactions between networks variables and household economic characteristics: OLS and logit regressions at the individual level

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)
Probability to migrate	OLS	Logit	OLS	Logit	OLS	Logit
Household networks						
Historical migration (d)	0.028***	0.912***	0.028***	0.915***	0.028***	0.893***
	(3.63)	(4.06)	(3.55)	(4.22)	(3.51)	(4.09)
Community networks						
Current community	−0.000	0.100	−0.002	−0.022	−0.001	0.013
network in Africa (d)	(−0.00)	(0.38)	(−0.44)	(−0.09)	(−0.11)	(0.05)
Current community network	0.005	0.273	0.005	0.305	−0.000	0.049
out of Africa (d)	(0.98)	(1.06)	(1.06)	(1.15)	(−0.02)	(0.20)
Poor (relative) (d)	−0.004	−0.044				
	(−0.72)	(−0.14)				
Poor (relative) (d) * current	0.025***	0.706**				
cty network in Africa (d)	(2.71)	(1.99)				
Poor (relative) (d) * current	0.004	−0.082				
cty network out of Africa (d)	(0.52)	(−0.22)				
Poor (<1USD) (d)			−0.001	−0.105		
			(−0.25)	(−0.29)		
Poor (<1USD) (d) * current			0.028***	0.935**		
cty network in Africa (d)			(3.25)	(2.56)		
Poor (<1USD) (d) * current			−0.001	−0.202		
cty network out of Africa (d)			(−0.09)	(−0.50)		
Rural (d)					−0.005	−0.437
					(−0.66)	(−1.01)
Rural (d) * current					0.025***	0.922**
cty network in Africa (d)					(2.83)	(2.03)
Rural (d) * current					0.011	0.301
cty network out of Africa (d)					(1.42)	(0.68)
Controls	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
Constant	−0.045***	−8.512***	−0.043***	−8.412***	−0.039**	−8.225***
	(−2.87)	(−9.28)	(−2.75)	(−9.01)	(−2.53)	(−8.89)
Observations	9364	9364	9364	9364	9364	9364

(d) indicates dummy variables
t statistics in parentheses
Controls included are age and age squared, household size, composition and wealth variables, gender, age and education of the head and geographical controls
Poor (relative) equals to one when the household is among the poorest 30% of its community, based on per capita annual expenditures and survey data.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Source: PSF Data, collected in 2006

Strikingly, when community networks variables are interacted with household demographic variables (in table 12), only community networks out of Africa are now found to be significantly and positively correlated with migration when interacted with variables proxying for a lack of social capital, that is dummies for mononuclear and non polygamous households (though the coefficient is not significant in the logit regression for the former). Non polygamous households are much less likely to participate in international migration, but having access to community networks out of Africa seems to compensate for their disadvantage. This finding suggests that what prevents non polygamous households to send migrants abroad is the lack of family network that could provide them with useful information rather than financial barriers, since wealth variables are controlled for. Consequently, community networks may also be viewed as substitutes for social capital.

Table 12: Interactions between networks variables and household demographic characteristics: OLS and logit regressions at the individual level

Dependent variable:	(1)	(2)	(3)	(4)
Probability to migrate	OLS	Logit	OLS	Logit
Household networks				
Historical migration (d)	0.029***	0.941***	0.029***	0.906***
	(3.72)	(4.19)	(3.70)	(4.28)
Community networks				
Current community	0.010**	0.407*	0.012	0.302
network in Africa (d)	(2.19)	(1.79)	(1.51)	(1.00)
Current community	0.004	0.189	−0.005	−0.273
network out of Africa (d)	(0.98)	(0.79)	(−0.66)	(−0.86)
Mononuclear (d)	0.005	0.167		
	(0.42)	(0.38)		
Mononuclear (d) * current	0.005	0.175		
cty network in Africa (d)	(0.29)	(0.34)		
Mononuclear (d) * current	0.022	0.438		
cty network out of Africa (d)	(1.47)	(0.92)		
Non polygamous (d)			0.000	−0.924***
			(.)	(−3.10)
Non polygamous (d) * current			−0.003	0.246
cty network in Africa (d)			(−0.31)	(0.67)
Non polygamous (d) * current			0.017**	0.878**
cty network out of Africa (d)			(2.07)	(2.34)
Controls	*yes*	*yes*	*yes*	*yes*
Constant	−0.057***	−8.917***	−0.037**	−8.046***
	(−3.30)	(−9.13)	(−2.16)	(−8.27)
Observations	9364	9364	9364	9364

(d) indicates dummy variables
t statistics in parentheses
Controls included are age and age squared, household size, composition and wealth variables, gender, age and education of the head and geographical controls
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Source: PSF Data, collected in 2006

On the other hand, neither of the interactions between education and networks variables (not shown here) is found significant.

5.4 Discussion: endogeneity issues

As noted already, problems of interpretation of the above results arise, in particular from the use of cross-sectional data. A positive correlation between networks and current migration could be interpreted twoways: it could be the sign of a causal relation, but one could also argue that both networks and migration choices at the household level are caused by a third unobserved variable, say preferences of the household. If panel data were available, this issue could be partially addressed, for example by introducing household fixed-effects into the initial regression model.

5.4.1 Household unobservables: risk-aversion?

The main challenging interpretation would be that unobservable characteristics of households, say preferences, would explain both historic migration, and thus household networks formation, as well as current migration behaviors. Those different preferences can be considered to amount to different attitudes towards risk. Indeed migration is a lucrative but high-risk strategy. In addition, among the destinations that are available to emigration candidates, European or American countries are associated with higher expected gains but also higher risk. Thus one may consider that among households and individuals deciding to participate in international migration, those which are more risk-averse choose African destinations instead. Indeed, the two populations — in Africa and out of Africa— of migrants and migrant households differ a lot on a number of observable characteristics such as wealth proxied by the per capita amount of expenditures or education. It may be plausibly inferred from that statement that the two subsamples also differ on a number of unobservable characteristics.

This could explain why households with migrants who returned from an African country are more likely to have current migrants in an African country. But more puzzling is the result that households with return migrants from a non African country are not found to be more likely to have current migrants in Africa and vice versa. Indeed, risk aversion is most plausibly a continuum and if a lower degree of risk aversion is what explains past and current

migration out of Africa, there is no reason why having return migrants from a non African country, if revealing a low degree of risk-aversion, would not be associated as well with a higher probability for a household to have migrants in Africa today (still more risky than have no migrants at all), which is not the case, as is shown in table 5.

Also puzzling if one believes that the above results for household networks variables are only driven by household unobservables is the fact these household networks variables are correlated differently with individuals' migration, depending on their gender. The coefficient on the interaction between the male and household historical migration dummies is indeed negative (see table 10 column 5). If household networks were only proxies for risk-aversion, results shown in table 10 would mean that, at the household level, being less risk-averse would be associated with a larger probability to have female than male migrants, which is not particularly intuitive. At this stage, the interpretation in terms of networks effects seems at least as plausible as a gender biased household risk-aversion. Indeed, the fact that networks are found to be correlated with a higher increase in the probability to migrate for women than for men within the same household, suggesting that women depend more on family network than men to migrate, is perfectly consistent with anecdotal evidence[21] and previous findings on female migration (although on other countries) such as the works of Kanaiaupuni (2000), qualifying women of "associational migrants" (after Balan (1981)).

5.4.2 Community unobservables?

Another interpretation issue arises from the impossibility to identify the real impact of community networks by differentiating it from the impact of other variables at the community level that would positively influence past as well as current migration at the community level. Similarly indeed, individual preferences (or degree of risk aversion) could be positively correlated among communities. A reason for that could be the endogeneity of community formation, but this correlation might also be driven by unobservable variables operating at the community level. A so-called community networks effect is thus as questionable as household networks effects, and for the same reasons causal interpretations are challenged by endogeneity issues.

Nevertheless two comforting points can be emphasized:

[21] Dia (2009) reports for example numerous cases of Senegalese women entering migration by getting married with a member of the extended family already settled abroad.

First, if risk aversion were the whole story, a number of community characteristics would be expected to at least partially capture risk aversion, such as different measures of education. In order to test this hypothesis, I ran logit regressions at the individual level for the probability to migrate on individual and household controls, community networks variables and different sets of community variables (results shown in table 13). Among the latter are a dummy that equals one if the access to the community remains passable during the rainy season, a dummy that equals one if the main communication route is an asphalt road, a dummy that equals one if the community is served by at least one bus service, a dummy for community health centre, the number of secondary schools in the community, and the share of adults living in the community with at least some secondary education. This last variable is a proxy for the education level in the community, based on answers to household questionnaires for the 11 other households surveyed in the same community. Note that all education variables are largely correlated with regional variables, the education level being much higher in the Dakar region. For that reason, regional dummies could not be kept in the set of controls in regressions including community education variables. The consequence is that the positive correlation observed between community education variables and the probability to migrate could be attributed to a Dakar effect. In order to investigate further this issue, the regression sample is restricted to communities outside Dakar (columns 7 and 8): in that case, community education variables are no longer significant at the 10% level, which suggests that the correlation between community education variables and migration is spurious and caused by the non-included Dakar dummy[22].

[22]Interpretations of the positive correlation between residing in Dakar and the probability to migrate abroad are provided in the previous section.

Table 13: Community networks and other characteritics: Logit regressions

Dependent variable: Probability to migrate	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Current community network in Africa	0.111*** (2.79)	0.107*** (2.66)	0.111*** (2.87)	0.112*** (2.84)	0.170*** (4.85)	0.181*** (4.90)	0.179*** (4.35)	0.182*** (4.23)
Passable access (d)	0.046 (0.26)							
Asphalt road (d)		0.225 (0.92)						
Bus service (d)			0.023 (0.09)					
Health center (d)				−0.021 (−0.10)				
Number of secondary schools					0.065* (1.91)		0.071 (0.99)	
Pct of adults with secondary education						0.018*** (2.85)		0.023 (1.51)
Controls	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
Constant	−8.853*** (−9.08)	−8.460*** (−8.62)	−8.446*** (−8.62)	−8.433*** (−8.59)	−8.98*** (−9.48)	−8.961*** (−9.76)	−10.217*** (−8.08)	−10.168*** (−8.44)
Observations	8,645	7999	7999	7999	7999	8645	5088	5566

(d) indicates dummy variables
t statistics in parentheses
Controls included are age and age squared, household size, composition and wealth variables, gender, age and education of the head and geographical dummies.
Regressions in columns (7) and (8) are run on the subsample of individuals not residing in Dakar.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Source: PSF Data, collected in 2006

As appears in table 13, and taking into account the above reservations about the interpretation of the coefficients on the education variables, no community variable other than networks is significantly correlated with the probability to migrate. This finding may not entirely rule out an interpretation in terms of community unobservables, but it rather supports the networks story.

Second, interpretations in terms of community unobservables, as well as household unobservables, do not seem particularly well suited to account for results presented in tables 11 and 12, where community networks are interacted with household characteristics (economic and demographic variables). In particular, for example, one does not see an obvious reason why less risk averse communities (with migrant networks) would have more migrants among poor than richer households. The networks story is particularly suited to explain these heterogeneities: networks are more useful to those lacking other or better forms of socio-economic assets.

On the other hand, if community networks variables only revealed a low degree of risk-aversion, one would expect the community network out of Africa variable to be positively correlated with migration, whereas this correlation is not found significant in any specification. If interpreted in terms of networks effects, the absence of correlation suggests that community networks mostly convey information, whereas financial aid is most needed by migrants to Europe or America, thus relying more on family networks.

All the above arguments do not definitely rule out alternative explanations, but they provide convergent elements supporting an interpretation in terms of networks effects.

6 Conclusion

Thanks to a new nationally representative dataset, this paper is primarily intended to contribute to a better understanding of Senegalese migration networks and their potential impact on migration. Exploiting the features of the survey, migration networks are decomposed into community and household networks, but also according to their destination — African countries and non-African countries — and gender contents.

Modelling the migration decision either at the household level or at the individual level as a binary choice, it is shown that household networks seem to have a more positive influence on migration decisions than community networks. Subsequently the migration decision is rep-

resented as a multiple options choice, accounting for the two broad destinations migrants can choose. Results from the multinomial logistic regressions show that household networks are doubtlessly destination specific. On the contrary, the impact of community networks does not seem to be destination specific. A positive correlation is observed between the availability of current community networks in Africa and the probability to migrate, whatever the destination, and no or weak impact of community networks out of Africa on the relative probability to migrate. Anyhow, all regression results suggest that besides an obvious path-dependency of migration choices and the geographical specificity of migratory careers, family networks may have a greater influence on faraway migrations whereas community networks would play a more important role for migrations within Africa.

Separate regressions for men and women reveal the existence of gendered migration patterns. First, women are found to migrate much less than men. Their probability to move is nevertheless higher when the head of the household has a higher level of education or when the household is better-off, which is not true for men. Also, very interestingly, family networks, whatever their gender content, seem to affect more positively and significantly female than male migration. Conversely, unlike men, women's probability to migrate is not higher when community networks out of Africa are available.

All results shown in this article could receive at least two interpretations: a strictly causal interpretation is challenged by both endogeneity issues and unobservable variables biases. Nonetheless, the interpretation in terms of networks effects well seems to be the only one that could relevantly account for all of the correlations uncovered in this paper. Then, while being very careful not to over-interpret my results, I am still confident in the fact that networks effects are undoubtedly part of the story.

Appendix

Counterfactuals

In order to get round the difficulty to interpret the coefficients on interacted terms in non linear regressions and propose an alternative approach, counterfactuals are built for specific subpopulations, basing on the regression shown in table 7. Consider the interaction between the family networks and the community networks in Africa variables: first the subsample of individuals with none of these networks (5303 observations) is isolated. Their estimated probability to migrate is 1.42%. Then, this probability is compared to the mean of the predicted probability to migrate for individual from this specific subsample, if they had community networks in Africa. The probability for this counterfactual is 2.15%, which amounts to a 66% increase. If these individuals had family networks instead, their probability to migrate would be 3.36%. Then, had they in addition community networks, the predicted probability to migrate would jump to 4.98%. The transition between these latter two counterfactuals increases the predicted probability to migrate by 48%. Therefore having community networks in Africa seems to increase more the probability to migrate for individuals without family networks than for those endowed with family networks[23]. As concerns the relationship between family networks and community networks out of Africa, the same exercise shows no difference in increase in predicted probabilities to migrate depending on the availability of household networks.

[23]Note that the predicted probabilities to migrate for each constructed counterfactual are very close to the predicted probabilities for the true subpopulations, which reinforces the credibility of the results.

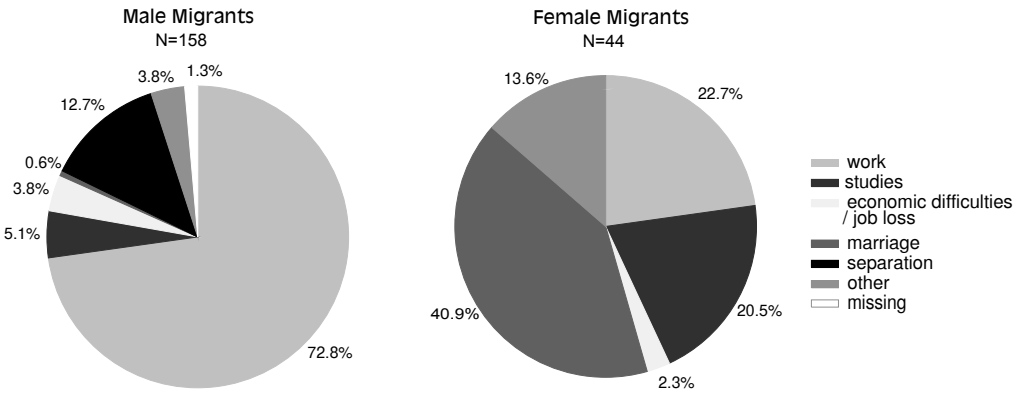

Figure 1: Reasons for Migrants Leaving

Table 14: Migration decision: individual logit regression model

Logistic regression Number of observations=8,644	Migrate abroad		
	coef.	*t-stat*	*p-value*
Individual			0.000
Age	0.218^{***}	(6.36)	
Age squared	-0.003^{***}	(-6.16)	
Male (d)	1.096^{***}	(4.94)	
Education, primary (d)	-0.187	(-0.64)	
Education, secondary and higher (d)	0.110	(0.38)	
Education, koranic only (d)	0.857^{***}	(2.80)	
Household			0.000
Size	-0.005	(-0.24)	
Dependency ratio	1.256^{**}	(2.10)	
Gender composition	-2.375^{***}	(-3.66)	
Age of the household head	0.014^{*}	(1.87)	
Household head male (d)	-0.780^{***}	(-3.89)	
Education of the head (d)	0.492^{**}	(2.02)	
Education of the head, koranic only (d)	-0.454	(-1.58)	
Wealth variables			0.035
Land (d)	-0.265	(-1.13)	
Total net expenditures	0.055^{**}	(2.38)	
Location			0.000
Rural (d)	-0.005	(-0.02)	
North and East (d)	0.101	(0.40)	
South (d)	0.326	(1.20)	
Center (d)	-0.918^{***}	(-3.42)	
Community migration networks			0.094
Historical migration	0.015	(0.47)	
Current migration in Africa	0.099^{**}	(2.34)	
Current migration out of Africa	0.030	(0.54)	
Household migration networks			0.000
Historical migration in Africa (d)	0.717^{***}	(3.28)	
Historical migration out of Africa (d)	1.069^{***}	(3.04)	
Constant	-8.135^{***}	(-8.67)	

Survey design and weights are used in the multinomial regression
(d) indicates dummy variables
p-value for groups of variables are obtained from an adjusted Wald test
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Source: PSF Data collected in 2006.

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