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Research Article

Childhood determinants of internal youth migration in Senegal

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Abstract

BACKGROUND
Internal migration, mostly composed of young adults and the poor, constitutes the largest flow of people in developing countries. Few studies document the patterns and determinants of internal youth migration in sub-Saharan Africa.

OBJECTIVES
This paper analyzes the socioeconomic determinants of the decisions of young adults to internally migrate in Senegal. We focus on whether their decisions to migrate are influenced by individual characteristics, as well as the circumstances in the households and communities where they grew up, and whether these factors are differentiated by gender.

METHODS
Using a unique migration household survey in Senegal, we estimate multinomial logit models to analyze the role of childhood socioeconomic determinants in decisions to later migrate to rural and urban areas.

RESULTS
We find that young people undertake mostly rural-to-rural and urban-to-urban migrations, and more than half of them are temporary migrants. We also find that the determinants are heterogeneous by gender and destination. The higher the fathers' education, the more (less) likely are their daughters to move to urban (rural) areas. Young individuals who spend their childhood in better-off households are more likely to move to urban areas. The presence of younger siblings during childhood increases the propensity of moving to rural areas. Access to primary schools from the childhood residence decreases the likelihood of migrating to urban areas for both men and women.

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CONTRIBUTION

We contribute to the sparse literature on internal youth migration in developing countries by highlighting the role of family- and community-level characteristics during childhood in predicting later migration.

1. Introduction

Internal migration, mostly composed of young adults and people from the lower end of the income distribution, constitutes the largest flow of people in developing countries (UNDP 2009). Although recent empirical evidence has focused on analysis of the determinants and impacts of international migration, the study of internal migration has been far more limited, partly due to the lack of reliable data and because it is less politically salient. Few empirical studies have documented the drivers of internal youth migration in developing countries and whether these determinants are differentiated by gender. In this context, family and social factors weigh in the decisions of young adults to migrate. Households face labor and financial market constraints, and migration can be a strategy to diversify income sources and cope with risks, compensating in some cases for the absence of insurance markets (Rosenzweig and Stark 1989; Stark 1991; Giles and Mu 2007). Families might encourage younger members to migrate, both sons and daughters, not only because they have higher earning potential in the destination locations but also because they are more likely to remit money (Taylor 2001; Heckert 2015). Furthermore, family and socioeconomic circumstances during childhood can influence the probability of migrating later in life (Abramitzky, Boustan, and Eriksson2013).

This paper analyzes the socioeconomic determinants of young adults' decisions to internally migrate in Senegal. We focus on whether migration is influenced by individual characteristics, as well as circumstances in the households and communities where young adults grew up, and whether these factors are differentiated by gender. The study of internal youth mobility is particularly pertinent in Senegal, where, like much of sub-Saharan Africa, 64% of the population is under 25 years old, 59% of the population lives in rural areas, and internal migration plays a critical role in the expansion of economic opportunity and social mobility (de Brauw, Mueller, and Lee 2014).[3]

More broadly, the analysis of the socioeconomic determinants of internal migration is critical in the context of developing countries, where rural-to-urban migration occurs in conjunction with economic development as rural economies undergo structural transformation (Taylor and Martin 2001). Although internal migration is widespread in

[3] According to the 2002 census, a date close to our study, 59% of the population lived in rural areas. More recent figures estimate that this number has decreased to 53% (World Bank 2019).

Africa, more than half of the population still lives in rural areas, and given the large and positive income differentials between urban and rural areas, rural-to-urban migration rates might be expected to be even higher in the future (de Brauw, Mueller, and Lee 2014). Furthermore, recent studies have highlighted that rural-to-rural and even urban-to-rural flows have gained traction as internal migration flows in some francophone African countries (Beauchemin and Bocquier 2004; Beauchemin 2011).

Senegal follows several of these regional patterns of internal migration. Previous research indicates that most of the internal migrants are young people, aged 15 to 34 years old, and the majority of them migrate to look for employment opportunities (Ba and Diop 2017). However, family situations, such as marriage, are the most important reasons for women's internal migration (Chort, De Vreyer, and Zuber 2017). Most migration gravitates toward urban areas, especially to Dakar, which is not surprising in light of the fact that there are large disparities in education and income between rural and urban areas. For instance, in 2005, the poverty rate was 37% in urban areas and 59% in rural areas. While the average number of years of education was 7.3 in urban areas, it was only 4.8 in rural areas.[4] There is, however, also a considerable amount of rural-to-rural migration from semiarid regions (the Middle Valley of the Senegal River) toward the Groundnut Basin (that is, mainly seasonal migrants working in groundnut cultivation). Furthermore, while small in comparison to other internal migration flows, there is even some urban to rural population movements, mainly in the form of migrants who return to invest in the agricultural sector and who build homes in their villages of origin (Ba and Diop 2017).

Information on internal migration in sub-Saharan Africa is scarce. Except for some recent efforts,[5] nationally representative household surveys usually do not include specialized migration modules or specific information to assess migration patterns between rural and urban areas (de Brauw, Mueller, and Lee 2014). In this paper, we exploit a unique module of the 2003 Education et Bien-être des Ménages au Sénégal (Education and Household Welfare in Senegal) survey, which was specifically designed to understand migration decisions by asking retrospective questions to young adults aged 21 to 35 years. Using these household data, we employ a multinomial logit model to empirically estimate whether young people decide to migrate to either rural or urban areas. In addition to individual characteristics, such age, gender, and ethnicity, we include childhood demographic characteristics, such as the number and gender of siblings, the

[4] The average number of years of education is calculated among the population aged 15–19, and the data source is the 2005 Demographic Health Survey. We selected data from 2005 because it is a year close to our survey (2003). Nevertheless, more recent data, from 2014, show that the average number of years of education increased to 6.5 in rural areas, closing the gap with urban areas. However, the gap in poverty rates between rural and urban areas stayed about the same (World Bank 2019).

[5] Some recent panel household surveys have tracked individuals and migrants. These include the Kagera Household Survey (Beegle, De Weerdt, and Dercon 2011) and the World Bank's Living Standards and Measurement Study Surveys.

role of the family's financial constraints measured by the asset index of the household when the child was 10 years of age, parents' education, and shocks, including the death of a father or mother. Furthermore, we control for childhood residence characteristics, such as access to education and health centers.

The remainder of this paper is organized as follows. In Section 2, we describe the conceptual framework that guides our empirical approach. Section 3 describes the household survey data, including a discussion on how we define and classify migrants and a description of the patterns of internal mobility. We also describe our empirical strategy in this section. Section 4 presents econometric results from the multinomial models that explain the determinants of migration. Finally, Section 5 presents the discussion and conclusions.

2. Conceptual framework

Most of the migration literature indicates that migrants are primarily young people (Lloyd 2005; Young 2013), who seek to diversify and expand their economic opportunities, especially in developing country contexts (McKenzie 2008). Multiple individual, household, and contextual factors encourage youths to migrate internally in search of opportunity, which makes the migration process complex and context-specific (Massey et al. 1993; Heckert 2015).

In contrast to economic models of migration that analyze an individual's decision to move as a function of their own expected net economic benefit (Harris and Todaro 1970), a growing literature – the New Economics of Labor Migration (NELM) – has modeled migration as both an individual and a family decision, one that not only maximizes income but also minimizes risks (Stark 1991; Stark and Bloom 1985; Taylor 1999, 2001). If migration is an investment decision whereby individuals incur costs to generate higher incomes, youths have lower costs in moving and have higher lifetime expected returns, not only because of their longer life expectancy compared to older people but also because the opportunity cost of young people in the place of origin can be lower due to, for example, high youth unemployment rates. On the other hand, if migration is a family decision and is perceived as a risk-coping mechanism, the choice of which household member migrates is based on both earning potential and the individual's ability to be engaged in family insurance arrangements. For instance, Rosenzweig and Stark (1989) show that Indian rural farm households tend to engage in long-distance marriage-cum-migration to cope with volatile profits. Also, households might send young members to migrate with the expectation that they will send remittances back home (Heckert 2015).

In this paper, we test whether the decision to migrate is influenced by individual characteristics, as well as circumstances in the households and communities where young

adults grew up, and whether these factors are differentiated by gender. Although we mostly follow the NEML conceptual framework, which explains migration behavior by focusing on households' characteristics in a broader societal context (Taylor and Martin 2001; De Haas 2010; Tegegne and Penske 2016), we build on the work of Abramitzky and colleagues (2013), who underscore the role of childhood conditions on later migration decisions. Using a novel data set of the age of mass migration (1850–1913) from Norway to the United States, Abramitzky and colleagues (2013) find evidence that economic and family conditions of an individual's household during childhood, particularly parental wealth and gender composition of siblings, can shape internal and international migration in adult life. While some studies have analyzed the effect of individual and household conditions, such as birth order and family size, on later economic outcomes, such as labor market performance (Patrinos and Psacharopoulos 1997; Edmonds 2006), there is little evidence on how these conditions affect later internal migration decisions, and even less in the context of developing countries.

Socioeconomic conditions during childhood, such as wealth and parents' levels of education, can shape youth migration. Nevertheless, how and in what direction these factors affect internal migration flows remains an empirical question. On the one hand, we can expect that better-off households will be less likely to encourage their children to migrate, since the higher their assets, the better the potential economic opportunities within the community in which the young adults reside as children.[6] On the other hand, we can expect that asset-poor households are less able to finance the costs of migration; thus, their members are less likely to migrate.[7] Indeed, McKenzie and Rapoport (2007) show that the probability of migrating from Mexico to the United States has an inverse U-shaped relationship with wealth. This nonlinear effect is explained by the heterogeneity of migration networks: In sending communities with smaller migration networks, the costs of migrating are relatively high and wealth is positively correlated with the likelihood of migration. Once the migration networks are larger, the cost, and thus the importance of wealth in the decision to migrate, decreases.

Along the same lines, if migration is considered a family decision, the education of the father and mother is expected to influence a young person's decision to migrate (Smith and Thomas 1998; Quisumbing and McNiven 2006). Parents' education can be a proxy for other household assets, such as networks and family connections, which can increase the probability of migrating. Although we would expect that the more educated the parents, the greater the availability of information about the net benefits of migration, thereby increasing the odds of leaving, the empirical evidence on the effect of parents'

[6] Land tenure systems in developing countries can affect the relationship between wealth and migration, and thus shape youth migration decisions. For example, in the Philippines, young adults stay with their parents if they inherit land (Quisumbing and McNiven 2006).

[7] Mendola (2008) shows that poorer households in Bangladesh are able to afford only domestic migration, while better-off households can afford the costs of international migration.

education on migration of family members is not conclusive (Pessino 1991; Ezra and Kiros 2001).

Gender dynamics may also dictate whether youths migrate, their destinations, and the extent to which households invest in such decisions. There are reasons to believe that the drivers of migration are different for women and men. Some empirical studies in developing countries have shown that young women, unlike men, frequently move to marry (Smith and Thomas 1998; Reed, Andrzejewski, and White 2010; Chort, De Vreyer, and Zuber 2017). Also, gender differences are expected when parents encourage daughters, rather than sons, to migrate because of the expectation that the former are more likely to remit (World Bank 2007). It is also possible that parents provide less financial support to their daughters than to their sons, because parents internalize the idea that daughters' migration returns are lower than those of sons (Heckert 2015).

Furthermore, in Senegal, ethnicity plays an important role in female internal migration (Brockerhoff and Eu 1993; Chort, De Vreyer, and Zuber 2017). Indeed, studies have shown that women's internal migration patterns may be related to the different marital and cultural traditions across ethnic groups (Brockerhoff and Eu 1993). For instance, Serere, Diola, and to a lesser extent Wolof (Oulof) women are more likely to migrate for reasons related to work opportunities than are Toucouleur, Peul, and Soninke women, who virtually never migrate except with their spouses or families (Sy 1991). More broadly, recent evidence from developing countries shows that different ethnic groups can have different preferences toward migration related to, for example, historical shocks, geographical situations, and ethnic-specific languages, among other factors. These preferences encourage mobility from the village of birth or origin among some ethnic groups and deter such movements among others. These different ethnic preferences can be shared through social norms and are likely to affect the decision-making of the individuals within the group (Auwalin 2019). Therefore, we account for ethnicity as a factor that can contribute to internal migration.

Gender can also shape migration decisions through issues related to birth order and norms regarding division of household roles and time use, including the division of household work and labor market activities, or even marriage practices and cultural norms that shape an individual's migration decision. For instance, in the context of migration from Norway to the United States in the 19th century, Abramitzky and colleagues (2013) show that men who had fewer brothers and were the oldest brother in the family were less likely to migrate later in life because the eldest brother was the primary recipient of family inheritance. Younger brothers, having less access to family resources, were more likely to migrate in search of better opportunities. In addition to the household allocation of resources among siblings, there may also be a role played by rights and tasks that relate to a child's birth order position relative to their siblings. For example, Protik and Kuhn (2006) show that, for Bangladesh, the migration of older

brothers decreases the likelihood of sisters marrying and residing in places far from their parents. One explanation the authors give is that to ensure that elder care is provided by their daughters, parents might prevent a marriage that involves migration. Furthermore, a substitution of tasks among siblings of the same gender might shape migration choices. For example, younger sisters are less likely to migrate since they assume expanded responsibilities for performing household chores when replacing older siblings who have migrated (Smith and Thomas 1998; Quisumbing and McNiven 2006).

Although the NELM conceptual framework focuses on household determinants of migration, most of the movements of youths from rural to urban areas is driven by the unequal distribution of opportunities between these two areas (McKenzie 2008). Opportunities available to young migrants depend on the social and economic characteristics of the migrants' places of origin (Heckert 2015). Thus, our models account for whether the availability of community-level social services during childhood can shape later-life migration decisions. Since public policy determines the geographic distribution and disparity of social infrastructure, these variables help us understand the role of government investments in migration choices.

Following this conceptual framework, we model young people's decisions to migrate to either rural or urban areas in Senegal as a function of their individual characteristics and their childhood family and community circumstances prior to departure. Our paper contributes to the literature exploring the determinants and patterns of internal youth migration in developing countries (Clark and Cotton 2013; Beegle and Poulin 2015; Heckert 2015) by highlighting the relevance of family- and community-level characteristics during childhood to later migration (Abramitzky, Boustan, and Eriksson2013). This analysis also contributes to the scant empirical evidence on the determinants of female internal migration in developing countries (Assaad and Arntz 2005; Chort, De Vreyer, and Zuber 2017).

3. Data and methods

3.1 Data sources and descriptives

The data we use in this paper come from the 2003 Household Survey on Education and Welfare in Senegal (EMBS). From 28 rural and 32 urban communities (communes), 1,820 households were surveyed.[8, 9] The 2003 EBMS revisited children originally

[8] EMBS was collected by the Centre de Recherches Economiques Appliquées (CREA) at l'Université Cheikh Anta Diop (Senegal) and Cornell University.

[9] Our household survey defines rural and urban areas following the official definition of the government of Senegal, specifically the Agence National de la Statistique et de la Demographie, which designates certain

included in a 1995–1996 survey: a nationally representative, school-based survey known as PASEC (Programme d'Analyse des Systemes Educatifs de la CONFEMEN). The PASEC survey administered tests of ability to a sample of students (20 per school) in second grade (CONFEMEN 1999). The original PASEC cohort was not a representative sample of all children in the country, because it was school-based; thus, it excluded children who had never enrolled or who had dropped out of school during their first year of enrollment. To address the selection problem of excluding non-enrollees, in 2003 we enumerated all the children and their households in the 60 original PASEC communities included in our survey. We then randomly selected households with children whose ages were similar to those of children included in the original 60 PASEC communities. The participants in the 2003 survey thus included those who were originally part of the PASEC sample and those who were not because they were not enrolled in school at the time of the PASEC survey, either due to delayed enrollment or because they never entered school.

As discussed by Glick and Sahn (2009, 2010), despite these efforts to address the selection problem of enrollment, the sample is not truly nationally representative since it is part of a cohort study of young children. Any cohort study will lose its representativeness over time. To mitigate this concern, as discussed above, we randomly selected the sample new households and their children to ensure that the sample is as close as possible to a random sample of the villages that were initially randomly selected from throughout the country. Of course, the problem remains that the selection of villages sampled in 2003 was based on a listing from eight years earlier, so new villages formed between 1995 and 2003 would not be included in the sample. Considering these concerns, we made a comparison of descriptive statistics from the survey with other national surveys. This effort was quite encouraging, since it showed that for a range of demographic characteristics, as well as other characteristics such as education, the EBMS sample of 1,820 households is consistent with a nationally representative sample.[10] Likewise, the characteristics of the EBMS population, in terms of religion and ethnicity, are also reflective of the nation as a whole. One small difference is that the proportion of rural households in the 2003 EMBS is 53.2%, which is close to but smaller than the rural population at the national level of 59% according to the 2002 census.

In our analysis, we rely extensively on the migration module of the EMBS, which contains information on current residence, birthplace, and residence five years prior to

administrative areas as *communes de ville* or urban areas. Thus, urban areas consist of localities erected in communes regardless of the number of inhabitants, while rural areas (*communautés rurales*) correspond to the rest of the territory (ILO 2018). It is worth noting that a commune is the smallest administrative level in Senegal. This definition has been valid since 1976. Therefore, it is consistent throughout the period of our analysis and does not affect our results.

[10] For example, the net primary enrollment in our sample (primary enrollments of children 7–12) is 66%, compared with 63% for the country as whole in 2000 (World Bank 2006).

the survey (1998). It also provides the number of years of residence in the current location. In addition, this module has retrospective questions for adults above the age of 21 (migrants and nonmigrants) about where they lived, as well as household and community characteristics when they were 10 years old. These data are key components of our methodology because we can observe the childhood characteristics of both migrants and nonmigrants that we use to analyze migration decisions.

Defining a migrant in empirical work is not always straightforward and is often made difficult due to limitations of the available data. We define migrants as individuals who have lived outside of their communities for at least one year, departing from their places of origin after they were 10 years old.[11] Among our sample of 2,676 individuals who fall in the age group of 21 to 35 years old, 35% are defined as migrants. In other words, 937 individuals left their communities for at least for one year after they were 10 years old. It is worth noting that we are accounting for the last move prior to the individual being surveyed, so we calculate the age of departure by subtracting the number of years of residence in the destination (current place) from the young migrant's current age.[12]The median age of departure among these young migrants is 20.

We use the age range 21–35 because previous studies of internal migration have shown that internal flows are the highest for individuals in this age group, especially as they search for employment and better economic prospects (Brockerhoff and Eu 1993; Ezra and Kiros 2001). This cohort is especially important in terms of their experiences and the recentness of their moves.[13]

We also suspect that the recall data is more accurate for these younger adults than for older individuals. Furthermore, we test whether our results change if we exclude individuals who migrated at younger ages, between 10 and 14, who represent 15% of the sample migrants. It is plausible that for these individuals, parents might strongly influence or make their decisions to migrate. If this is the case, the migration decision will be endogenous to other household-level decisions, such as fertility. We find that our key results are not sensitive to the choice of including these younger migrants (see Table A-1 in the Appendix).

Although most of the empirical studies of internal migration in developing countries have focused on out-migration, especially from rural areas, they have neglected a careful

[11]This definition is similar to that of Heckert (2015), who, in the context of Haiti, defines a migrant as an individual who departs after age 10 and who has been outside the place of origin at least for three years.

[12] In other words, this "age of departure" is the age of arrival in the last residence. Although it is reasonable to assume only one migration experience at these young ages, this approach does not account for the possibility of more than one migration experience.

[13] To compare this number of internal migrants with other data sources in Senegal, we use the 2002 census and define an internal migrant as an individual who lives in a region other than the region of birth. We find that 21.65% of individuals aged 21 to 35 are internal migrants. Although this definition is different from the one used in this paper, the magnitude is comparable, as it does not include people who migrate and return within a shorter period of time – that is, our temporary migrants.

examination of different patterns or types of migration, such as rural-to-rural or sequential migration. Mainly, this omission has been justified by the lack of data, as documented in the case of West Africa by Beauchemin and Bocquier (2004). Among the few studies in developing countries, Pessino (1991) analyzed the determinants of different types of migration in Peru. Identifying movements by the degree of urbanization of the origin, the author finds that primary migrants – that is, people who move for the first time – are more likely to come from rural areas, whereas repeat or return migrants – those who have made prior moves – come from urban areas. Reed, Andrzejewski, and White (2010), using a household survey in Ghana, find that past and future mobility are positively and strongly correlated, suggesting that previous mobility reduces the perceived cost of moving again. Another important study that attempts to classify migrants is that of Juan and Kim (1970), who used census data in the Philippines. The authors construct a comprehensive set of categories of migrants that distinguishes migrants by various characteristics, including the number of moves and whether they return to their birthplaces.

Building upon this previous work and using the information from our survey on the place of residence (1) at the time of the survey (2003); (2) five years prior to the survey (1998); (3) when individuals were 10 years old; and (4) when individuals were born, we first focus on the periodicity of movements – that is, how many times the individual moves across these points in time. We distinguish between primary migrants (one move) and repeat migrants (two or more moves), as well as return migrants. The latter category includes those whose second or third move involved returning to their birthplace. To be included in the category of return migrants, by definition, they have to report having lived at a location other than their birthplace either when they were 10 years of age, in 1998, and/or at the time of the survey. In our sample, 25.4% are primary migrants, 3.0% are secondary or tertiary migrants, and 11.9% are return migrants. A final and the largest group of migrants – fully 59.6% – are those we define as temporary migrants, but for them we do not have migration information, other than that they were away from their birthplaces for at least one year. These individuals report that they were residents in another location for at least one year, that their birthplace was the same as their residence at the time of the survey, and that they lived in their birthplace in 1998 as well as when they were 10 years old.[14]

Table 1 shows the distribution of migration by urban/rural origin and destination of the move, as well as the migration categories: primary, return, repeat, and temporary. We

[14] Juan and Kim (1970) (as explained in Bilsborrow, Oberai, and Standing [1984]) classify these persons as nonmigrants because they report the same place of residence at all points of time included in the survey. We acknowledge that there may be some misreporting among this group – that is, errors in reporting that they lived elsewhere for more than one year. However, we expect that the vast majority answered that question correctly and are indeed return migrants who happened not to live away from their place of birth in 1998 and when they were 10 years old. In our analysis, we explore whether the results are sensitive to the inclusion or exclusion of the groups being characterized as migrants.

find that two-thirds of migrants moving from rural to urban areas are primary migrants; this is consistent with the fact that most migrants in Dakar are likely to be permanent migrants (World Bank 2006). Interestingly, we also find that almost 60% of the urban-to-rural flows are of primary migrants. On the other hand, more than 50% of the rural-to-rural and urban-to-urban migrants are temporary movers. Although our data do not allow us to capture trends in migration, the descriptive statistics in Table 1 are consistent with other empirical evidence pointing out that rural-to-rural flows, and even urban-to-rural flows, have gained prominence as internal migration movements in West Africa (Beauchemin and Bocquier 2004; Beauchemin 2011).

Table 1: Distribution of migrants by rural/urban birthplace and 2003 residence

	Urban–rural	Rural–rural	Urban–urban	Rural–urban
Primary	60.6%	7.3%	26.2%	59.8%
Repeat	3.0%	0.5%	4.3%	8.3%
Return	1.5%	14.7%	14.5%	2.3%
Temporary	34.8%	77.5%	55.1%	29.5%
Total	100%	100%	100%	100%
N[a]	66	409	325	132

[a] The total number of migrants by rural/urban birthplace to rural/urban 2003 residence.

Table 2 summarizes the main socioeconomic characteristics of our sample. We include temporary migrants in this table and in the analysis that follows. Given that temporary migrants can have different triggers to migrate internally than the rest of the migrants in the sample, we tested that our main results were robust to excluding this group of temporary migrants from the analysis (see Table A-2 in the Appendix).

Table 2: Socioeconomic characteristics of migrants and nonmigrants

	Migrant	Nonmigrant	Total
Individual characteristics in 2003			
Percentage female	64%	53%	57%
Average age	27.79	26.40	26.90
	(4.55)	(4.42)	(4.52)
Years of education	4.14	4.45	4.34
	(4.61)	(4.25)	(4.38)
Ethnicity groups (%)*			
Wolof	29.4%	35.8%	33.5%
Poular	24.7%	20.0%	21.7%
Sose	13.8%	17.84%	15%
Serere	20.4%	16.2%	18.9%
Diola	8.2%	5.0%	6.2%
% whose father has no education	73.1%	69.2%	70.6%
% whose mother has no education	85.4%	82.7%	83.7%
Characteristics at age 10			
Average number of older siblings	1.80	1.88	1.85
	(2.01)	(2.05)	(2.04)
Average number of younger siblings	2.57	2.42	2.47
	(2.09)	(2.10)	(2.10)
Access to primary school	86%	95%	91%
Access to secondary school	45%	55%	51%
Access to hospital	71%	83%	79%
Distribution by asset quartiles			
First	40.22%	31.5%	34.6%
Second	19.57%	18.1%	18.6%
Third	28.60%	25.6%	23.1%
Fourth	21.61%	24.8%	23.7%
N	855	1546	2401

Notes: Standard deviations are in parenthesis. * Other ethnicity and regional dummy variables are not shown. Individuals from other ethnicities represent 4% of the sample.

Table 2 shows that our young migrants are mostly female. Women represent more than two-thirds of the young migrants, compared to 53% in the nonmigrant group and 57% in the total sample. The female overrepresentation in the group of young migrants can be explained presumably by the association of migration and the decision to marry, as we discuss further in the next section.

Our sample individuals have completed 4.3 years of schooling on average. Although school attainment is slightly higher for the nonmigrant group than the migrant group, this difference is statistically significant. We observe similar patterns regarding parents' education: more than 70% of the migrants' fathers and 85% of their mothers did not go to school. Although this situation is not appreciably different for nonmigrant young adults – 68% of their fathers and 83% of their mothers did not go to school – the differences between these two groups are still statistically significant.

Descriptive statistics on access to social infrastructure when young migrants and nonmigrants were 10 years old indicate that migrants come from areas with less access to a nearby primary school, secondary school, and hospital.[15] Approximately 91% of the young people had a primary school near their residence. However, this figure is only 86% for the young migrants. Similarly, 45% of young migrants come from a community with a secondary school nearby, while this percentage was almost 10 points higher for the nonmigrants. Access to health services was also unequal between migrants and nonmigrants in their childhood residences. While 71% of the migrants had access to hospitals, this percentage was 83% for the nonmigrant population.

Furthermore, we create an asset index following standard procedures, using factor analysis and the characteristics of dwellings where the young adults lived at 10 years of age.[16] While 40% of the migrant children came from the lowest quartile, this figure was 31% among the nonmigrant group. However, this difference seems to be smaller for the highest quartile. Overall, we find that the nonmigrants' asset distribution, first order, dominates that of the migrants.

3.2 Empirical strategy

Empirical studies addressing the determinants of migration face the challenge of observing the individual's migration at one point in time after this decision has been made. Furthermore, the decision to migrate can be made jointly with other household decisions, such as investments in education and resource allocation, raising potential

[15] We define secondary school access as the existence of a lower- or upper-level secondary school within 5 kilometers.

[16] We construct the asset index based on floor material, the source of potable water, and the type of bathroom for the dwelling. These were the only characteristics available in the retrospective survey module.

problems of endogeneity between migration and its determinants. In a regression model, endogeneity is defined as a situation in which the residual or error term is not statistically independent from one or more covariates (Wooldridge 2002). This situation can occur when there is potential reciprocal or simultaneous causation between the dependent and independent variables in the regression model. To a certain extent, and following other demographic research (for example, Robles and Oropresa 2011), we address this issue by using a survey that includes retrospective data on young migrants and nonmigrants aged 21 to 35. This retrospective information on household and community characteristics of individuals when they were 10 years old allows us to estimate the impact of childhood circumstances long before migration, thereby reducing concerns over simultaneous causation or reverse causality. Nevertheless, we acknowledge that we are not able to strictly establish causality of the migration determinants; rather we explain whether these childhood determinants are associated with migration among young adults.

Following our conceptual framework, the decisions to migrate and where to migrate are jointly modeled using a multinomial logit model in which individuals can decide between staying (not moving), migrating to a rural area, or migrating to an urban area. We empirically test whether the decision to migrate is influenced by individual, household, or community characteristics and circumstances of origin – that is, where the migrants grew up. These characteristics and circumstances are based on those that existed when the individuals were 10 years old. More specifically, we estimate the following reduced form regression equation:[17]

$$Ln\left[\frac{p\left(M_i^k{}_{k=1,2}\right)}{p\left(M_i^k{}_{k=0}\right)}\right] = \alpha + X_i\beta^k + E_i\delta^k + H_i\theta^k + C_i\rho^k + R_i\pi^k + \epsilon\varepsilon_i^k ,$$

where M_i^k is the destination variable of individual i and k takes the value of 0 if the individual does not migrate (the base case scenario), 1 if the individual migrates to a rural area, and 2 if the individual migrates to an urban area. X_i represents individual characteristics such as age, ethnicity, and gender.[18] It is worth noting that in addition to running the models with a gender dummy variable, we also account for differences in the determinants of migration by estimating separate models for young women and men. We also control for E_i, the education of the individual's parents. We exclude from the models the individual's educational attainment because of its potential for reversal causality with

[17] Given that the independent variables are from the individual and not the destination choice, we are not required to implement a test of independence of irrelevant assumptions (IIA).

[18] To mitigate concerns related to potential multicollinearity between ethnicity and other control variables, we have calculated the variance inflation factor (VIF), and it is less than 10, suggesting that this issue is not a concern. Our results are also robust to the exclusion of ethnicity as a control variable.

migration.[19] Nevertheless, our results are qualitatively similar when we include the individual's years of education in our models (see Table A-3 in the Appendix).

H_i represents household characteristics when the individuals were 10 years old. To measure a household's wealth and risk aversion, we include an asset index; as described earlier, the index constructed was based on dwelling conditions at age 10.[20] We also include the number and gender composition of the individual's siblings while acknowledging that these variables can be in part a function of household fertility preferences. Nonetheless, the question of whether the presence of younger or older male and female siblings contributes to migration provides for interesting insights about these relationships, even if we cannot draw strict causal inferences from the results. We also control by whether one or both parents had passed away by the time the individual was 10 years old. We capture this by including a dummy variable that takes the value of 1 when the individual reports that their father, mother, or both had passed away by the time they were 10 years old.[21]

Finally, C_i represents community-level characteristics when individuals were 10 years old. We include dummy variables for access to primary and secondary schools and to hospitals when the individuals were 10 years old. For each one of these variables, access is defined as the existence of the corresponding institution within 5 kilometers of the individual's residence when they were 10 years old. Finally, we include $R_{i,}$ a set of regional dummies corresponding to the region of childhood residence, to control for social and economic characteristics that influence costs of migration (for example, the distance to the capital, Dakar) that vary across regions but not over time.[22]

4. Results

Table 3 presents the average marginal effects of our multinomial models. Panel A shows the average marginal effects for all the individuals between 21 and 35 years, while Panels B and C show the results for young men and women, respectively.

[19] Using the 2003 EMBS data, we are not able to instrument the individual's education at the time of the survey; nor can we infer the education completed before the migration decision.

[20] In our models, we tested for an inverse U-shaped relationship between the asset index and the probability of migration by introducing a quadratic term in our regressions, but we did not find any statistically significant result for this nonlinearity.

[21] We could not try a separate dummy variable for each parent's death since the number of cases for either mother or father was too small.

[22] Our sample size is too small to accurately test the determinants of our models for each of the migration dyads: (1) rural to rural; (2) rural to urban; (3) urban to urban; and (4) urban to rural.

Table 3: Average marginal effects of multinomial logits by rural and urban destination

	Panel A ALL		Panel B MEN		Panel C WOMEN	
	Rural	Urban	Rural	Urban	Rural	Urban
Individual characteristics						
Gender	–0.072***	–0.009				
	(0.015)	(0.015)				
Age	0.085***	–0.052**	0.061*	–0.028	0.096***	–0.058*
	(0.024)	(0.024)	(0.034)	(0.037)	(0.034)	(0.031)
Age squared	–0.001***	0.001**	–0.001+	0.001	–0.002***	0.001**
	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Wolof	–0.025	–0.049+	–0.026	–0.111**	–0.029	–0.000
	(0.033)	(0.032)	(0.047)	(0.046)	(0.046)	(0.044)
Poular	–0.016	–0.021	0.045	–0.054	–0.079**	0.008
	(0.027)	(0.032)	(0.034)	(0.046)	(0.040)	(0.045)
Serere	0.004	–0.167***	–0.030	–0.155***	0.033	–0.174***
	(0.035)	(0.042)	(0.048)	(0.058)	(0.050)	(0.059)
Diola	–0.027	–0.006	0.020	–0.013	–0.056	–0.003
	(0.042)	(0.044)	(0.055)	(0.063)	(0.059)	(0.061)
Other ethnicity	–0.099*	–0.071+	–0.062	–0.141*	–0.131*	–0.011
	(0.053)	(0.047)	(0.083)	(0.073)	(0.071)	(0.063)
Household characteristics						
Father's education	–0.018***	0.012***	–0.017*	0.006	–0.022**	0.018***
	(0.007)	(0.004)	(0.009)	(0.006)	(0.009)	(0.005)
Mother's education	–0.006	0.004	0.005	–0.006	–0.012	0.008
	(0.010)	(0.006)	(0.013)	(0.009)	(0.014)	(0.007)
Asset index (z-score)	–0.007	0.029**	–0.021	0.033*	–0.000	0.022
	(0.012)	(0.012)	(0.018)	(0.019)	(0.017)	(0.016)
Older siblings	–0.002	–0.002	–0.009+	–0.006	0.004	–0.000
	(0.004)	(0.004)	(0.006)	(0.005)	(0.006)	(0.005)
Younger siblings	0.009**	0.000	0.002	0.005	0.013**	–0.004
	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)
Loss of parent(s)	0.070***	0.035	0.068*	0.062	0.077**	0.020
	(0.027)	(0.030)	(0.042)	(0.051)	(0.036)	(0.038)
Community characteristics						
Primary school	–0.024	–0.175***	0.027	–0.198***	–0.063*	–0.170***
	(0.024)	(0.037)	(0.034)	(0.061)	(0.033)	(0.048)
Secondary school	–0.002	0.028	0.034	–0.054	–0.033	0.102**
	(0.026)	(0.029)	(0.034)	(0.041)	(0.037)	(0.040)
Hospital	–0.074***	0.044	–0.039+	0.080+	–0.097***	0.020
	(0.020)	(0.035)	(0.027)	(0.055)	(0.028)	(0.045)
Rural at 10 years	0.155***	–0.070**	0.168***	–0.130***	0.129***	–0.022
	(0.031)	(0.029)	(0.043)	(0.043)	(0.043)	(0.040)

Notes: *** p < 0.01, ** p < 0.05, * p < 0.1, + p < 0.15. Standard errors are calculated using the delta method. All models include regional dummies for childhood place when individual is 10 years old. Number of observations: all: 2,401; men: 1,035; women: 1,366.

4.1 Individual characteristics

From the model that includes both men and women, the negative and significant gender variable indicates that women are 7.2% more likely than men to move to rural areas, although no gender difference exists for moves to urban areas. These results may reflect that young women often move as a consequence of following their spouses. While we are unable to prove the causal effect of marriage on female youth migration, we examined the relationship between the age of marriage and the age of migration. First, we note that, on average, among married couples, men are 12 years older.[23] Second, we notice that 72% of the women who migrated were already married, in contrast to only 31% of the male migrants. These descriptive findings are consistent with empirical evidence in Senegal showing that typically marriage is the main reason for migration among women of reproductive age (Safir 2009) and that short-distance rural-to-rural marriage-related migrations are more frequent among women than men (Chort, De Vreyer, and Zuber 2017).

We also examine the marginal effect of age among the cohort of individuals between 21 and 35 years old, as shown in Panel A. Being one year older increases the probability of migrating to rural areas by 8.5% and decreases the probability of migrating to urban areas by 5%. While for men, age has no effect on the likelihood to migrate to urban areas, for women, this effect varies with destination. As age increases, women are 10% more likely to migrate to rural areas and 6% less likely to migrate to urban areas; however, this effect is nonlinear, as seen by the statistical significance of the quadratic term, which indicates that the effect of age is not monotonic along the age range of the women in our sample.

The results also show evidence that ethnicity influences the likelihood of migrating to rural and urban areas.[24] This effect is differentiated by gender. On the one hand, belonging to the Serere group, relative to the Mendingue/Sose group, which was excluded, decreases the likelihood of migrating to urban areas by 17%. This marginal effect has a similar magnitude among women and men. On the other hand, belonging to the Wolof group decreases only male migration to urban areas by 11%, while belonging to the Poular group decreases only female migration to rural areas by 8%. These results are in line with ethnographic evidence underlying the association between ethnicity and migration, particularly for women, in West Africa (Brockerhoff and Eu 1993).

[23] In the 2003 EMBS sample of married couples, the average woman's age is 38, while for men it is 50.

[24] In our models, we include a dummy variable for missing observations, given the substantial amount of misreporting of this variable in the sample (523 observations for nonmigrants and 253 for migrants).

4.2 Demographic and economic household characteristics

Our results indicate that the children of fathers with more education are less likely to move to rural areas and more likely to move to urban areas. Mother's education, however, is not statistically significant in any of our models.[25] When examining the gender-disaggregated results, we observe that the effect of the father's education on youth migration is larger and statistically more robust for daughters than it is for sons.[26] This result may reflect the role of fathers in arranged marriages or perhaps in promoting more educational opportunities for their daughters, which often involves migration to an urban area. In fact, these two mechanisms may be related: Greater education of the fathers, whether because of ability, economic well-being, or more expansive social networks, may enable them to find more favorable husbands for their daughters, who will move with their husbands to the city in pursuit of greater opportunities. Or, similarly, these fathers will seek improved educational opportunities for their daughters, which involves schooling in urban areas. In contrast, a father's education may discourage marriage arrangements in which daughters need to migrate to rural areas, where the returns on education are likely to be lower.[27]

Our models also suggest that better living conditions during childhood, measured by the dwelling asset index, are associated with the higher likelihood of migrating to urban areas while decreasing the likelihood of migrating to rural areas; however, the latter effect is not statistically significant.[28] The asset index does not have a differentiated effect by gender. The result might suggest that young women and men who grew up in asset-poor households are less able to afford the costs of migration to urban areas. We also tested whether there was a differentiated effect of the asset index by rural or urban origin. A better-off asset position of the household in a rural origin decreases the likelihood of migrating to either a rural or an urban area. Interestingly, this effect is statistically significant for men and not for women, suggesting that male migration might be deterred by better economic opportunities in rural areas, which are probably associated with agricultural activities (see Table A-4 in the Appendix).

The multinomial regressions in Table 3 include information on the demographic makeup of households when the individuals were 10 years old. The results indicate that

[25] We corroborate these results by estimating the same multinomial models, and instead of parents' highest education, we include dummy variables for whether each parent has some level of education. Results are available upon request.

[26] The effect of the father's education on young males is significant only at 10%, and it is not robust to the specification of a father's literacy dummy variable.

[27] Empirical studies in African countries have shown that father's education, rather than mother's education, increases the education of both boys and girls (Tansel 1997), and in some cases, paternal education can favor education for girls more than boys (Glick and Sahn 2000).

[28] This result is consistent with the fact that the asset distribution for migrants going to urban areas, first order, dominates the asset distribution for migrants going to rural areas.

a higher number of younger siblings increases the probability of migrating to a rural area, while a higher number of older siblings does not have any effect on the probability of migrating to either an urban or a rural area. Looking at the models by gender, the results show that the marginal effect of having younger siblings is still statistically significant for women, and this effect is positive and significant only in the case of women moving to rural areas. One possible explanation is that women with a higher number of younger sisters are more likely to migrate because their young female siblings act as substitutes in home production (Smith and Thomas 1998; Quisumbing and McNiven 2006). Indeed, we further examine the sex and birth order composition of the siblings in terms of the likelihood of migration. We estimate the multinomial models, including younger and older brothers and sisters (see Table 4). We find that having younger sisters increases the odds of moving to a rural area, and this effect is significant for women but not for men.

Table 4: Average marginal effects including siblings' gender and age composition

	Panel A		Panel B		Panel C	
	ALL		MEN		WOMEN	
	Rural	Urban	Rural	Urban	Rural	Urban
Father's education	–0.018***	0.012***	–0.017*	0.006	–0.023**	0.018***
	(0.007)	(0.004)	(0.009)	(0.006)	(0.009)	(0.005)
Mother's education	–0.005	0.004	0.006	–0.006	–0.011	0.008
	(0.010)	(0.006)	(0.013)	(0.009)	(0.014)	(0.007)
No. older brothers	0.003	0.006	–0.014	–0.000	0.017*	0.013+
	(0.006)	(0.006)	(0.010)	(0.008)	(0.009)	(0.008)
No. older sisters	–0.007	–0.013*	–0.005	–0.013	–0.010	–0.015+
	(0.007)	(0.007)	(0.011)	(0.010)	(0.010)	(0.009)
No. younger brothers	0.005	–0.002	–0.001	0.001	0.010	–0.007
	(0.005)	(0.006)	(0.007)	(0.008)	(0.008)	(0.008)
No. younger sisters	0.013**	0.002	0.007	0.007	0.016**	–0.002
	(0.006)	(0.006)	(0.008)	(0.008)	(0.008)	(0.008)
Asset index (z-score)	–0.007	0.029**	–0.021	0.033*	–0.000	0.022
	(0.012)	(0.012)	(0.018)	(0.019)	(0.017)	(0.016)
Loss of parent(s)	0.070***	0.038	0.064+	0.064	0.078**	0.021
	(0.027)	(0.030)	(0.042)	(0.051)	(0.036)	(0.038)

Notes: *** p < 0.01, ** p < 0.05, * p < 0.1, + p < 0.15. Standard errors are calculated using the delta method. All models include individual and community variables as well as regional dummies for childhood place at age 10. Number of observations: all: 2,401; men: 1,035; women: 1,366.

In addition, we account for whether the individual has lost either their father or mother to death, or both parents, by age 10. Our results indicate that the marginal effect of the loss of a parent during childhood increases by 7% the probability of migrating to a rural area but does not affect the likelihood of moving to an urban area. Looking at gender, we find that loss of a parent affects only female and not male migration, and this

effect is significant only for those women going to rural areas. Young people who have lost one or both parents are also more likely to migrate, presumably reflecting weaker ties to their childhood places of residence.

4.3 Community characteristics

The availability of social infrastructure, such as schools and hospitals, in the community where the individual lives as a child, influences the probability of moving. Access to a primary school within 5 kilometers decreases the likelihood of moving to urban areas by 17.5%, but it does not affect the probability of moving to rural areas. This marginal effect is of a similar magnitude for both men and women. We also investigate whether the nearest primary school has a differentiated effect on the likelihood to migrate based on whether the individual lived in a rural or urban area as a child. To do so, we estimate models that include an interaction between the urban dummy and the nearest primary school. We find that proximity to a primary school decreases the probability of migrating to urban areas only if the early childhood residence is in a rural area. Results are available upon request.

Access to secondary school does not affect the decision to migrate in the aggregate sample. However, when we examine the gender-disaggregated models, we find that a secondary school within 5 kilometers actually increases the female probability of migration to an urban area by 10%. We think this effect is mediated by the fact that access to secondary schools exposes girls and their families to the greater opportunities associated with education and increases their openness to migration in search of opportunity, whether in the labor market or through education. Proximity to a nearby hospital decreases the odds of migrating to a rural area, but again, this is only the case for potential women migrants.

In general terms, our results indicate that better access to social infrastructure during childhood, particularly primary schools and hospitals, deters later youth migration, which is consistent with other empirical evidence in developing countries (Katz 2000). However, potential countervailing forces could contribute to better social infrastructure, thereby encouraging migration. That is, easier access to schools can also trigger migration if individuals who accumulate more human capital in the presence of nearby schools migrate to other places to look for higher returns on their capital accumulation. In fact, we find that women with access to secondary school when they are 10 years of age are likelier to migrate to urban areas.

Finally, the dummy variable for whether the childhood residence was rural or urban corroborates the migration patterns described earlier: When the childhood residence is

rural, the likelihood of migrating to another rural area increases by 15%; when the residence is urban, the likelihood of migrating to an urban area increases by 7%.

5. Discussion and conclusions

Our goal in this paper is to highlight the importance and magnitude of internal migration in Senegal and to analyze the socioeconomic determinants of the decisions of young people to migrate internally. We also examine whether these factors differ by gender. We focus on the role of household and community characteristics during childhood, in the years prior migration, using household survey data from Senegal that include retrospective information from the time when individuals were 10 years old. Our multinomial logit model allows for individuals between 21 and 35 years to choose between not migrating and moving to a rural or urban area in Senegal.

We find that more than one-third of the individuals in our sample are migrants, and their median age of departure is 20. Furthermore, we find that more than half of the total internal youth migration is temporary and rural to rural or urban to urban, in contrast with the more widely studied rural-to-urban permanent migration. Indeed, this finding highlights prior evidence documenting the relevance of these mobility patterns in francophone West Africa (Beauchemin and Bocquier 2004; Beauchemin 2011).

Our findings suggest that the determinants of internal migration in Senegal are heterogeneous by gender and differ for those leaving the childhood residence for an urban or rural destination. Similar to Chort, De Vreyer, and Zuber (2017), we find that Senegalese women are more likely to migrate for reasons related to marriage, something that has been documented in other sub-Saharan African countries (Kudo 2015). We also find that childhood socioeconomic conditions, such as father's education, the demographic composition of the household, and access to educational opportunities where individuals grew up, can shape later youth migration differently for women and men. For example, father's education has a particularly important role in women's migration choices: The more educated the father, the more likely are daughters to move to urban areas and the less likely are they to move to rural areas. In our sample, 72% of the female migrants are married. This result could suggest that a father's education is influential in marriage arrangements and in the probability that a daughter will marry and leave the childhood residence with her new husband in search of greater economic opportunity in an urban area. These results are similar to those found by Quisumbing and McNiven (2006) in the Philippines, where a father's education increases the probability of a daughter moving from the village and, interestingly, a mother's education has the opposite effect. However, this is only conjecture, as we do not have sufficient information to disentangle the role of marriage and economic opportunities in the decision to migrate.

Furthermore, our findings suggest that the presence of younger siblings during childhood is associated with female migration. For instance, women with younger sisters (but not brothers) are more likely to migrate, suggesting that younger female siblings may act as substitutes in household responsibilities. However, it could also be that older sisters migrate because they feel more pressure to marry. Unfortunately, we lack data to disentangle these two possibilities. We also find that those who lived in households with a higher asset index when they were 10 years old are more likely to migrate to urban areas. This may be because these young women and men are able to finance the costs of migrating to urban areas and can reap the benefits of better employment opportunities in the cities.

The characteristics of the community in which children reside also shape youth migration. Proximity to better social infrastructure during childhood, particularly primary schools and hospitals, is generally associated with a lower probability of migrating. The one clear exception is access to secondary schools, which in fact increases the probability of migration to urban areas for young women. While proximity to secondary schools may mitigate the need to migrate in search of more education, such accessibility is likely associated with higher schooling attainment, especially when parents are reluctant to send their daughters to boarding schools and/or to reside with relatives to raise school attainment. These human capital investments may subsequently encourage migration of young women to urban areas in search of employment opportunities that utilize their human capital and education. Although we are not able to test this empirically, it is plausible that access to secondary school is more relevant for women than men, because education has a larger effect on female than male migration. Indeed, Chort, De Vreyer, and Zuber (2017) show that years of schooling increase the likelihood of migrating to an urban area, especially for women, suggesting that education can be a channel to promoting women's migration, independent of the usual reasons for migrating: family and marriage.

Our findings motivate further research on the expected consequences of internal youth migration for individuals, their households, and their communities. Even though migration can expand labor market opportunities, some research has pointed out that young people are vulnerable to negative migration experiences (Tienda, Taylor, and Moghan 2007; Heckert 2015). Furthermore, while young migrants can provide benefits to their households by sending remittances, the high costs of financing migration and family disruptions could also negatively affect those households.[29] Similarly, while remittances can improve the economic conditions of communities of origin, migration can also be detrimental if young, educated people leave their communities ("brain drain"). Whether the benefits outweigh the costs of migration on individuals, households,

[29] The literature on the effects of remittances on household welfare in developing countries is vast. For instance, see Binci and Gianelli (2018) for a review of the effects of remittances on education and child labor.

and communities remains an empirical question and cannot be answered generally. However, future research can build on our findings by collecting long-term, longitudinal data, before and after migration, thus allowing researchers to track the welfare consequences of internal migration on young individuals, their households, and communities. This research can identify patterns and circumstances that may enable policymakers to intervene to ensure that the benefits of migration outweigh its possible negative consequences.

While there is still much to be learned about the internal migration of young people in Senegal, and in other developing countries more generally, recognition of the high degree of mobility and of certain factors that contribute to these population movements is important knowledge for policymakers, in terms of both affecting and planning for widespread migration. While there remain many questions about the determinants of migration and how to cope with the stresses on communities and households affected by these population movements, there is every reason to expect that they will only accelerate in years to come. Indeed, in a country such as Senegal, where the young population will have doubled by 2035 and where more than half of the population lives in rural areas, factors such as increasing land pressure, the adverse effects of climate change, and rapid structural transformation to a more industrialized and service-oriented economy can be expected to increase internal youth mobility in the country (de Brauw, Mueller, and Lee 2014; Ba and Diop 2017).

Although our analysis sheds light on whether childhood conditions influence later youth mobility, it does not establish *causality* between the socioeconomic factors present when young migrants were 10 years old and their subsequent internal mobility in Senegal. Furthermore, we lack detailed information to disentangle whether the young migrants in our sample move alone or with family members. In combination, these limitations make it difficult to provide such causal interpretation of our models and highlight the importance of future research that employs experimental methods, an emerging methodology in migration research (McKenzie 2015), to study specific policy instruments for managing internal migration.

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Appendix

Table A-1: Average marginal effects – main results excluding the youngest migrants

	ALL	
	Rural	Urban
Individual characteristics		
Gender	–0.071***	–0.012
	(0.015)	(0.015)
Age	0.077***	–0.022
	(0.024)	(0.024)
Age squared	–0.001***	0.001
	(0.000)	(0.000)
Household characteristics		
Father's education	–0.014**	0.010***
	(0.006)	(0.004)
Mother's education	–0.006	0.004
	(0.010)	(0.006)
Asset index (z-score)	–0.004	0.028**
	(0.012)	(0.012)
Older siblings	–0.001	–0.001
	(0.004)	(0.004)
Younger siblings	0.008**	0.001
	(0.003)	(0.003)
Loss of parent(s)	0.063**	0.047*
	(0.027)	(0.029)
Community characteristics		
Primary school	–0.029	–0.149***
	(0.024)	(0.037)
Secondary school	0.006	0.017
	(0.026)	(0.028)
Hospital	–0.078***	0.044
	(0.020)	(0.034)
Rural at 10 years old	0.156***	–0.065**
	(0.031)	(0.028)

Notes: *** p < 0.01, ** p < 0.05, * p < 0.1, + p < 0.15. Standard errors are calculated using the delta method. All models include regional dummies for childhood place at age 10. Number of observations: 2,274.

Table A-2: Average marginal effects – main results excluding temporary migrants

	ALL	
	Rural	Urban
Gender	–0.026**	–0.008
	(0.012)	(0.014)
Age	0.048**	–0.022
	(0.020)	(0.023)
Age squared	–0.001**	0.000
	(0.000)	(0.000)
Household characteristics		
Father's education	–0.007+	0.009**
	(0.004)	(0.004)
Mother's education	–0.002	0.001
	(0.006)	(0.006)
Asset index	–0.006	0.042***
	(0.010)	(0.012)
No. older siblings	–0.004	–0.002
	(0.003)	(0.003)
No. younger siblings	0.001	–0.005+
	(0.003)	(0.004)
Loss of parent(s)	0.037*	0.057**
	(0.020)	(0.027)
Community characteristics		
Primary school	–0.019	–0.165***
	(0.022)	(0.034)
Secondary school	0.012	0.030
	(0.020)	(0.027)
Hospital	–0.013	0.027
	(0.018)	(0.032)
Rural at 10 years	0.054**	–0.001
	(0.024)	(0.028)

Notes: *** p < 0.01, ** p < 0.05, * p < 0.1, + p < 0.15. Standard errors are calculated using the delta method. All models include ethnicity dummies and regional dummies for childhood place at age 10. Number of observations: 1,897.

Table A-3: Average marginal effects – main results including individual's education

	Panel A		Panel B		Panel C	
	ALL		MEN		WOMEN	
	Rural	Urban	Rural	Urban	Rural	Urban
Individual characteristics						
Gender	–0.075***	–0.014				
	(0.016)	(0.015)				
Age	0.088***	–0.051**	0.074**	–0.034	0.096***	–0.054*
	(0.024)	(0.024)	(0.034)	(0.037)	(0.034)	(0.031)
Age squared	–0.001***	0.001**	–0.001*	0.001	–0.002***	0.001*
	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Years of education	0.002	0.003+	0.008***	0.005**	–0.006*	0.001
	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)
Household characteristics						
Father's education	–0.017**	0.010**	–0.019**	0.003	–0.016*	0.017***
	(0.007)	(0.004)	(0.009)	(0.006)	(0.010)	(0.005)
Mother's education	–0.011	0.004	0.004	–0.007	–0.020	0.009
	(0.011)	(0.006)	(0.013)	(0.009)	(0.016)	(0.008)
Asset index (z-score)	–0.007	0.026**	–0.025	0.029+	0.006	0.019
	(0.012)	(0.012)	(0.018)	(0.019)	(0.017)	(0.016)
No. older siblings	–0.001	–0.004	–0.011*	–0.008	0.006	–0.001
	(0.004)	(0.004)	(0.006)	(0.006)	(0.006)	(0.005)
No. younger siblings	0.008**	0.001	0.002	0.005	0.013**	–0.003
	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)
Loss of parent(s)	0.067**	0.044+	0.074*	0.075	0.067*	0.025
	(0.027)	(0.031)	(0.042)	(0.052)	(0.036)	(0.038)
Community characteristics						
Primary school	–0.027	–0.174***	0.014	–0.192***	–0.058*	–0.167***
	(0.024)	(0.038)	(0.033)	(0.062)	(0.034)	(0.048)
Secondary school	–0.003	0.025	0.029	–0.049	–0.035	0.098**
	(0.026)	(0.029)	(0.033)	(0.041)	(0.038)	(0.041)
Hospital	–0.073***	0.044	–0.044+	0.080+	–0.089***	0.017
	(0.020)	(0.035)	(0.027)	(0.055)	(0.028)	(0.045)
Rural at 10 years	0.159***	–0.074**	0.171***	–0.124***	0.122***	–0.031
	(0.031)	(0.030)	(0.042)	(0.043)	(0.044)	(0.040)

Notes: *** p < 0.01, ** p < 0.05, * p < 0.1, + p < 0.15. Standard errors are calculated using the delta method. All models include regional dummies for childhood place at age 10. Number of observations: all 2,401; men: 1,035; women: 1,366.

Table A-4: Main results including interaction between asset index and rural origin

	Panel A		Panel B		Panel C	
	ALL		MEN		WOMEN	
	Rural	Urban	Rural	Urban	Rural	Urban
Father's education	–0.018***	0.012***	–0.016*	0.006	–0.022**	0.018***
	(0.007)	(0.004)	(0.009)	(0.006)	(0.009)	(0.005)
Mother's education	–0.006	0.004	0.006	–0.006	–0.012	0.008
	(0.010)	(0.006)	(0.012)	(0.009)	(0.014)	(0.007)
Older siblings	–0.002	–0.002	–0.010*	–0.006	0.004	–0.000
	(0.004)	(0.004)	(0.006)	(0.005)	(0.006)	(0.005)
Younger siblings	0.009**	0.000	0.003	0.005	0.013**	–0.004
	(0.003)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)
Asset index	0.029+	0.033**	0.032	0.044**	0.027	0.020
	(0.020)	(0.014)	(0.032)	(0.021)	(0.027)	(0.019)
Rural at 10 years	0.148***	–0.080***	0.165***	–0.164***	0.126***	–0.022
	(0.030)	(0.031)	(0.047)	(0.049)	(0.045)	(0.040)
Rural asset	–0.056**	–0.022	–0.079**	–0.068*	–0.042	0.001
	(0.024)	(0.024)	(0.038)	(0.040)	(0.033)	(0.031)
Loss of parent(s)	0.069***	0.034	0.070*	0.059	0.075**	0.020
	(0.027)	(0.030)	(0.041)	(0.051)	(0.036)	(0.038)

Notes: *** p < 0.01, ** p < 0.05, * p < 0.1, + p < 0.15. Standard errors are calculated using the delta method. All models include individual and community variables as well as regional dummies for childhood place at age 10. Number of observations: all: 2,401; men: 1,035; women: 1,366.