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The effects of migration on children's activities in households at origin: Evidence from Senegal

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The effects of migration on children's activities in households at origin: Evidence from Senegal[*]

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Abstract:

This paper examines the repercussions of international migration on children's time allocation in households at origin. We focus on children of age 7 to 12 and distinguish three activities: market work, French school attendance, and enrollment in Medersa (Arab/Islamic traditional school). In our analysis, we account for heterogeneities in migration constraints considering differences in migration destinations and the number of migrants within households. We instrument for migration using policy and governance facets in destination countries, precisely France, Spain, and Italy. Results show that – after controlling for endogeneity – migration has a positive and significant impact on enrollment in French curriculum school. However, once we account for the destination of the migrant, this positive and significant impact is only verified in households with migrants in Europe. We also note that when the number of migrants within a household increases, children of age 7 to 12 are less likely to attend French school and they are more likely to be involved in paid work activities. We draw evidence from the 2009 Senegalese household survey on migration and remittances (Enquête Ménage sur la Migration et les Transferts de Fonds).

JEL Classification: F22, J13, J22, O15, O55

Keywords: International migration, Child labor, Education, Time allocation, Left-behind, Senegal

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1. Introduction

The importance of migration as a survival strategy to prevent or cope with economic hardship is well known. Yet, in 1956, Tiebout indicated that people "vote with their feet" to find the community that provides them with better opportunities. In Tiebout's prediction, whenever individuals encounter a deficit of wellbeing in their communities, they will move or migrate to areas that could allow them to better secure their livelihood as well as that of their family. Thereby, an interesting, but relatively little examined, question concerns the repercussions of people's migration on the communities they left behind.

The issue of migration's impact on the sending communities has been stressed by the New Economics of Labor Migration (NELM) pioneered by Stark (1978) and Stark and Levhari (1982). According to the NELM theory, the migrant is part of a spatially extended household that acts collectively to lessen idiosyncratic risks by keeping cooperation over long distances. Thus, for a household, having a migrant member working elsewhere is a strategy to manage uncertainty, diversify the income portfolio and alleviate liquidity constraints through remittances (Stark, 1991). Remittances sent by migrants or inheritance left at origin represent potential means to smooth consumption (Rosenzweig and Stark, 1989) and overcome credit or risk constraints for sending households (Lucas, 1987; Stark, 1991). However, migration might also induce perverse effects in sending households. These include loss of labor force and human capital, and several opportunity costs for missing working capital, skills, and income (Stark, 1991). For instance, adults' absence because of migration may translate into less schooling for children as they are needed to undertake housework or market work to help meet short-term labor and cash shortages. Conversely, remittances could also increase the reservation wage of remaining household members, and so affect their labor participation and supply decisions.

In sub-Saharan African, how migration affects those left behind remains not fully understood. There is a relative lack of systematic and quantitative studies – that go beyond anecdotes - about migration's repercussions on the sending communities. Yet, knowing these repercussions is of crucial interest for most African countries as they are experiencing greater than ever internal and international movements of people. This paper contributes to shedding light on the impact of migration in sending countries in Africa by exploring the effects of having a migrant in the household on children's activities. We draw evidence from Senegal, taking advantage of the rich dataset from the 2009 Senegalese household survey on migration and remittances (Enquête Ménages sur la Migration et les Transferts de Fonds).

Senegal counts among the prominent emigration countries in sub-Saharan Africa. One Senegalese household out of ten counts at least one emigrant among its members (Daffé, 2008). Emigrants represented 4.9 percent of the Senegalese population in 2010, compared to 2.5% for sub-Saharan Africa as a whole (World Bank, 2011). Noticeably, numbers of these emigrants are highly skilled. In 2010, about

18 percent of the tertiary-educated Senegalese were abroad. Among them, medical staff represents a significant proportion. About 51.4% of physicians born in Senegal have emigrated based on data from 2000 (Clemens and Pettersson, 2006). Else, Bhargava, Docquier, and Moullan (2010) reckon that there are 2.9% of physicians trained in Senegal who are outside the country in the same period. World Bank data also indicates that approximately 27% of nurses born in the country had emigrated in 2000 (World Bank, 2011). Conversely, Senegal figures among the top remittance recipients in sub-Saharan Africa; in 2010, the country ranked fourth, behind Nigeria, Sudan, and Kenya. An estimated US$ 1.2 billion was sent into the country in the form of remittances in 2010, which represents about 9 percent of 2009 GDP. For comparison, in 2008, the net foreign direct investments (FDI) received by the country were US$ 0.7 billion, while the net official development aid (ODA) was at US$ 1.1 billion (World Bank, 2011).

Various factors explain the Senegalese population's readiness to migrate. Indeed, the main factor, which is largely demonstrated in the literature, is the long economic crisis that occurred in the mid-1970s and exacerbated in the 1990s. However, a significant driving factor is also the social representation of migration and migrants. In the Senegalese common sense, international mobility reflects social advancement. In the social discourse on migration, a series of linguistic expressions shows how the social imagination structures such a representation. For instance, maxims from the Haalpular and the Wolof say: "*The Haalpulaar know where they were born but not where they will be buried."; "If you have a son, let him go; one day he will come back with either money or knowledge, or both."; "It is better to suffer abroad than to remain poor at home."; "It is better to be poor and suffer abroad than to stay wretched at home."; " He who does not travel will never know where it is best to live."; " He who returns from a trip and turns bad was not nice in the country where he lived."* (Tandian, 2010).

This widespread readiness and desire to travel or migrate and the sizable magnitude of migration and remittances flows make Senegal an interesting setting for investigating migration's effects on those left behind in sub-Saharan Africa. This paper focuses on the repercussions on children's time use distinguishing between market work, household chores, and school attendance. In our analysis, we account for heterogeneities in migration constraints looking at differences in migration destinations. Descriptive evidence - from the survey mentioned above - indicates that Europe is the preferred destination for Senegalese international migrants. More than 50 percent have gone to Europe, where Italy, Spain, and France are the most important countries of destination. The second important destination region is Africa, which attracts 24 percent of the emigrants. These differences in the migration destinations likely reflect different selection processes, and thereby may result in different effects on those left behind. Failure to account for variety in destinations could therefore lead to serious bias. Furthermore, we also account for differences in the number of migrants within migrant-households. Data indicate a large variability – across migrant-households - in the number of household members who are

abroad. The number of migrants in a household varies from one to twelve. This variability in the number of migrants might also reflect differences in migration selection processes. There are more opportunities to migrate as a result of the now well established and cumulative number of household members who have gone before. Therefore, the number of migrants in a given household should be considered as an important factor that might affect those left behind.

This paper contributes to the literature in two ways. First, for school attendance, we clearly distinguish between French curriculum school and Arab/Islamic school (usually called Daara or Medersa). Treating school attendance uniformly, irrespective of whether a child is going to a French curriculum school or attending a Medersa, could leads to false results when the determinants of these two types of school attendance systematically differ. We consider a model of simultaneous choice between three occupations: market work, French curriculum school, and Medersa, controlling for all potential channels through which migration may affect children's time use. Our focus is on children aged 6 to 12 years old. Our second contribution is related to the identification strategy we use to address a potential endogeneity of the migration variable. We rely on policy and governance facets in the destination countries to instrument for migration. More precisely, we use two variables for identification: *i)* the right-wing dimension of governments in Italy, Spain, and France (the preferred destination countries of Senegalese emigrants) between 1990 and 2010; *ii)* the second instrument is related to policies that have been implemented in these countries and that might facilitate or impede migration decisions to these countries.

The remainder of this paper is organized as follows. The related literature of the study is presented in section 2. Section 3 describes the empirical estimation approach. The data we use is presented in section 4 where some descriptive statistics are discussed. We then present and comment on the estimation results in section 5. The last section concludes.

2. Related literature

Several papers have studied the effect of migration or remittances on child labor, schooling, or educational attainment in developing countries. However, the results seem mixed and even contradictory across countries and also within the same country. Results vary according to the context. In Mexico, Hanson and Woodruff (2003) estimate the overall impact of migration on educational attainment. They found that migration is positively associated with educational attainment for girls in rural communities and whose mothers have three years or less of education. For boys and for girls whose mothers are more educated, migration does not seem to have an effect. However, Borraz (2005) found that the positive effect reported by Hanson and Woodruff prevails only in villages with small populations (less than 2500 residents). In larger villages, he did not notice a significant effect of migration on child schooling.

Other studies contradict Hanson and Woodruff's finding and suggest the presence of negative effects of migration on schooling in rural Mexico. Evidence from McKenzie and Rapoport (2006) indicates that migration depresses educational attainment for the majority of children in Mexico's rural communities. Using state historical migration rates to instrument for migration, McKenzie and Rapoport (2006) found a significant and negative effect of migration on schooling attendance and attainment for older children in rural Mexico. Besides, Antman (2010) found that the short run effect of a father's migration in Mexico is a reduction of the younger children's study hours and participation in school, while the older boys (12-15 years old) increase their work hours and work participation outside the home.

Conversely, Cox-Edwards and Ureta, (2003) and Acosta (2006) studied the effects of migrant remittances on schooling in El Salvador, and both found that remittances promote schooling among children within migrant sending households. Cox-Edwards and Ureta (2003) provide evidence that remittances reduced school dropout rates, while Acosta (2006) reports that children in migrant households are more likely to be enrolled in school, compared with children in households without migrants. In Pakistan, Mansuri (2006) reports a significant positive effect of migration on school attainment and child labor market activity in rural areas. Her results show that children in migrant households are not only more likely to attend school; they are also more likely to stay in school and accumulate more years of schooling in comparison to their counterparts in non-migrant households in the same village. They are also less likely to be involved in economic work and report working for substantially fewer hours. She also finds large gender differentials in the gains from migration to the benefits of girls.

What all these studies have in common is their focus on the econometric challenges of estimating the effect of migration on the left-behind. As migration is a non-random selective process, assessing its impact requires controlling for the decision to migrate. Otherwise, the estimation results could be biased. The econometric problems related to controlling for the migration decision mainly refer to selection bias and endogeneity (omitted variables bias, reverse causation, etc) issues.

Various approaches are used to address these issues. These approaches include using panel data analysis, difference-in-difference estimation, pre-post difference estimation, a propensity score matching approach, OLS methods, instrumental variable techniques, and experimental studies. In an interesting study, McKenzie, Gibson, and Stillman (2006) assess the performance of these different methods adopting as a benchmark an experimental study, which uses a migration lottery program in New Zealand as a natural experiment. Their conclusion is that in the absence of an experimental measure, the instrumental variable technique performs best, conditional upon selection of a good instrument.

In the literature, a wide range of instruments are used to address the econometric problems of migration estimation. This includes historic migration data (Hanson and Woodruff, 2003; Hildebrand and McKenzie, 2005; McKenzie and Rapoport, 2006; Alcaraz, Chiquiar, and Salcedo, 2010), local weather

(Munshi, 2003), geography (Borraz, 2005), pre-migration distance (McKenzie, Gibson, and Stillman, 2006), social networks (Acosta, 2006; Karamba, Quiñones, and Winters, 2011), cultural and sociological factors (Mansuri, 2006); visa lottery experiment (McKenzie, Gibson, and Stillman, 2006; Gibson, McKenzie, and Stillman, 2011), and economic conditions at destination countries (Yang, 2008; Antman, 2010).

In what follows, we use governance conditions and migration policies at the destination countries for migration identification. We test two types of instruments. The first instrument is the right-wing dimension of governments in Italy, Spain, and France (the preferred destination countries of Senegalese emigrants) between 1990 and 2010. The second instrument is related to policies that have been implemented in these countries (during the above mentioned period), and that might facilitate or impede migration decisions to these countries. The intuition behind the choice of these variables is that they will act to limit migration possibilities from Africa to these countries.

Immigration, and related issues such as integration, exclusion, and multiculturalism, dominates much of the debate concerning European politics. The subject matter is often contentious and controversial: from violent attacks on ethnic minorities, to the arrival of illegal immigrants off the shores of Italy and Spain, to the electoral success of anti-immigrant radical right populist parties in Austria, Denmark, France, Italy, and Netherlands. Since the mid-1980s, radical right-wing populist parties have experience substantial gains in electoral support, allowing them to enter into coalition governments in Austria, the Netherlands, Italy, Switzerland, and Denmark. Other successful radical right-wing populist parties remain part of the opposition (Flemish Interest in Belgium or the National Front in France).

The most popular item in the radical right's political agenda concerns its opposition to immigrants. And the way in which radical right-wing populist parties across Europe have fostered and capitalized on this topic poses important challenges for mainstream right and right-center parties. Within these parties, there exists tension between cultural conservatives who call for stricter immigration controls and employers who demand more immigrants. European right and right-center parties are now mostly in electoral dilemma. They must deal with tensions among supporters of right-wing populist parties that want to limit immigration, public fears concerning immigration and crime, and their traditional business constituency who realize that they require immigrant labor (Zaslove, 2006). This puts right and right-center parties in strategic behaviors toward radical right populist parties in order to maximize their control over government cabinet, policy, and votes (de Lange, 2008). In some countries (e.g. France and Italy), right and right-center parties deal with the pressure from radical right populist parties by adopting an increasingly tough stance on immigration (Guibernau, 2010). For instance in Italy, in the last fifteen years or so, a series of immigration laws has been passed in order to tighten immigration control and deterrence measures (Martelli Law, 1990; Turco-Napolitano Law, 1998; and Bossi-Fini Law, 2002). At the

European Union (EU) level also, common legislations have been established for regulating the flows of migrants from outside the EU (for instance the Schengen single external border convention).

Using this new stance of right and right-center parties on immigration in Europe, we generate our instrumental variables for migration identification. To construct these variables, we use the information on the left-right dimension of governments in the main Senegalese emigrants' destination countries in Europe (Italy, Spain, and France - ISF) at the time they move. Our focus on these three countries is based on the implicit assumption these are the preferred destinations for Senegalese emigrants. Therefore, other destinations are chosen only if migrants fail to make it to ISF. The implication is that policies that impede or favor migration to ISF also affect the choice for other destinations. We build our instrumental variables as follows. We consider three dummy variables indicating right-wing dominance of governments in ISF at the period of migration. The variable takes one if the migrant moves at a time when cabinets in ISF are right-wing oriented, zero otherwise. For those who have not yet migrated, the variable also takes one. We also consider a fourth variable, which indicates whether first migration occurred before the 'Schengen single external border convention' or not.

3. Estimation strategy

The allocation decision of child's time is often addressed using a multinomial logit model wherein child occupational status is sorted according to the different possible outcomes. One potential problem of this approach lies in the "Independence of Irrelevant Alternatives" assumption which implies the relative likelihoods of any two alternative occupations are not influenced by the existence of other alternatives. Because of computational difficulties and data limits, multivariate probit models have not yet been widely applied in the analysis of child occupational status (Cigno and Rosati, 2005; Kis-Katos, 2007). In what follows, we use multivariate probit models to jointly estimate the occupation choice between market work/French curriculum school/Medersa for children in Senegal. To estimate the parameters of the models, we apply simulated maximum likelihood procedures using the mvprobit, mvnp and mdraws routines developed by Cappellari and Jenkins (2003, 2006).

We consider three dependent variables of interest (market work/French curriculum school/Medersa), defined as binary indicator variables that indicate whether a child participates in a given activity. Then we use the trivariate probit model to estimate the determinants of child's time allocation between these three occupations. In this estimation, we account for the possibility that unobserved characteristics of households playing a role in child's time allocation also influence household migration status.

The empirical analysis estimates simultaneously the three participation decisions in market work, French school and Medersa resulting from parents' optimal decisions. The three latent variables (market

work L^*, French school F^*, and Medersa D^*) depend on a vector of explanatory variables X, three unknown vectors of parameters $\beta_L, \beta_F, \beta_D$, and the normally distributed error terms ξ_L, ξ_F, ξ_D.

As the three choices are conflicting alternatives of children's time use, and are determined simultaneously by the same decision making process, the same X vector of explanatory variables is included in all three equations.

$$\begin{cases} L^* = X'\beta_L + \xi_L \\ F^* = X'\beta_F + \xi_F \\ D^* = X'\beta_D + \xi_D \end{cases} \qquad (1)$$

The three equations from (1) are then mapped into three binary variables $Y_j\left(j = L, F, D\right)$ that take one if the child engages in a given occupation, and zero otherwise.

$$Y_j = 1\left(X'\beta_j + \xi_j > 0\right) \quad j = L, F, D \qquad (2)$$

The estimation methodology is as follows. First, we decompose the vector of explanatory variables *X* into an endogenous migration variable *M* and a vector of exogenous variables Z_1. Then, we test for the endogeneity of the migration variable using a procedure suggested in Rivers and Vuong (1988). This procedure consists of a two-stage approach where the estimated error from the first-stage regression is added as an explanatory variable in the second-stage regression to obtain consistent estimates. Rivers and Vuong indicate that the coefficient of the error term will constitute a test for endogeneity (see also Smith and Blundell, 1986). Using this procedure, the migration variable *M* is first regressed on a set of exogenous explanatory variables Z_1 and a set of instruments Z_2. Then, the residuals $\hat{v}$ from the first stage are included as another regressor in each occupation equation.

We estimate the following model:

$$M = Z_1'\delta_1 + Z_2'\delta_2 + v \qquad (3)$$

$$Y_j = 1\left(Z_1'\beta_{1j} + \alpha_j M + \theta_j \hat{v} + \psi_j > 0\right) \quad j = L, F, D \qquad (4)$$

The error terms in (3) and (4) are jointly normal. Note that the error term in (4) is decomposed into two error components $\theta_j \hat{v}$ and ψ_j.

The joint estimation of the three participation equations (4) involves evaluating the log-likelihood over $i = 1, ..., N$ observations, based on a joint trivariate probability:

$$\ln L = \sum_{i=1}^{N} \Phi_3\left(k_{Li} Z_i'\gamma_L, k_{Fi} Z_i'\gamma_F, k_{Di} Z_i'\gamma_D, k_{Li} k_{Fi} \rho_{LF}, k_{Li} k_{Di} \rho_{LD}, k_{Fi} k_{Di} \rho_{FD}\right) \qquad (5)$$

Where:

- Φ_3 is the trivariate normal cumulative density function,
- $Z_i'\gamma_j = Z_1\beta_{1j} + \alpha_j M + \theta_j \hat{v}$ $(j = L, F, D)$ are the combinations of explanatory variables and coefficients as in (4),
- $\rho_{LF}, \rho_{LD}, \rho_{FD}$ are the three correlation coefficients of the error terms between the equation (Cappellari and Jenkins, 2003; 2006), and
- $k_{L,F,D}$ are the matching sign variables which equal to one if a child engages in a given occupation, and minus one otherwise (Greene 2003; Wooldridge, 2002).

Next, we estimate the impact of the number of migrants within households on children's activities. Using as always, the Rivers and Vuong procedure, we replace the binary variable *M* (equation 3) with *N*, which is the number of migrants per household. The variable *N* is assumed to follow a count process and we estimate it using the negative binomial model to account for any over-dispersion. A nice facet of the negative binomial model is that the Poisson model is nested within it. The negative binomial probability distribution of *N* is given by:

$$Pr(N = n|\mu, \alpha) = \frac{\Gamma(\alpha^{-1} + n)}{\Gamma(\alpha^{-1})\Gamma(n+1)} \left(\frac{\alpha^{-1}}{\alpha^{-1} + \mu}\right)^{\alpha^{-1}} \left(\frac{\mu}{\mu + \alpha^{-1}}\right)^{n}$$

where $\Gamma(\bullet)$ is the gamma function. The mean of the negative binomial distribution (like the Poisson) is μ but the variance is $\mu(1 + \alpha\mu)$, where α is called the dispersion parameter of the gamma distribution. The negative binomial model is a more general model than the Poisson, because it accommodates over-dispersion and it reduces to the Poisson model as $\alpha \to 0$ (for further details see: Cameron and Trivedi, 1998 and Greene, 2008).

4. Data and descriptive analysis

We use data from the survey "Enquête Ménages sur la Migration et les Transferts de Fonds." This survey was conducted in 2009 by the Consortium pour la Recherche Economique et Sociale (CRES) of the University of Dakar in partnership with the World Bank. The dataset contains rich information about migration and remittances at household level in Senegal. The household questionnaire consists of ten different books, which collect information about households and individuals' characteristics, education, employment, dwelling characteristics, migration, remittances and transfers, return migrants, migration destinations, remittance channels, financial services utilizations, household expenditures and assets, etc.

The dataset contains information on the educational profile and the main socio-economic activities of all household members aged 4 years old and above. However, the survey did not collect information on the amount of time devoted to these activities. Therefore, the variables on individuals'

activities will be defined as binary indicators, which show whether an individual participates in a given activity or not. Note that the information collected focuses only on the main activity, so that one will not be able to consider cases where individuals combine different activities.

In our study sample, we only consider households with at least one child between the ages 6 and 12 (2857 children). We target this age group because decisions about child schooling in Senegal are often made at around age 7, and this age class allows us to account for late entry to school. We model the activity of only the children of this age group in each household. A child is defined as working if his/her main activity is in the form of market work. Market work comprises all productive activities targeting the market regardless of whether they are performed within or outside of the household. Market work includes paid work (in cash or in kind) and unpaid work on family farms or businesses. Children are classified as students in French curriculum school or in Medersa if their main activity is attending one of these forms of school at the time of the survey.

Table 1 shows the proportion of children per activity and by migration status of the household. About 70 percent of children in our sample report attending French curriculum school and 6 percent attend Medersa. At the same time, only 4 percent of children of the full sample report being involved in paid work. We note that the distribution shows some differences between children's activities depending on household migration status and the destination of the migrants. The proportion of children going to French school is a bit higher for children living in households with migrants, particularly with migrants who are in Europe (77 percent). And there are fewer children in households with migrants in Europe who are attending Medersa (4 percent). In contrast, children living in households with migrants in Africa are going less to French school (65 percent) and attend the Medersa more (9 percent). Furthermore, a large number of children are reported as idle (around 20 percent). This is a phenomenon quite common to surveys conducted in developing countries. It has been argued to result from both the under-reporting of child work, and the low productivity of child labor (Cigno and Rosati, 2005).

Table 2 provides the descriptive statistics of the variables used in the estimations.

5. Results

The presentation of the results is organized as follows. First, we present some diagnostic tests showing whether our instruments are good or not (relevance and validity). In a second step, we present and discuss the estimation results, considering only whether children are living in households with international migrants or not. Next, we account for emigrants' destinations, distinguishing between Europe and Africa. Finally, we present the results wherein we estimate the impact of the number of migrants within a household.

5.1 Instruments

We check the strength of the proposed instruments using estimates from the univariate IV-probit regressions of our three dependent variables. Table 3 reports the results from the first-stage regressions of the IV-probit estimations and a number of diagnostics tests. We use the STATA command '*rivtest*' to test the over-identification restriction and the strength of our instruments. The strength of the instruments is tested against the null hypothesis of weak instruments, as suggested in Stock and Yogo (2002). Results indicate that the joint test of the instruments' relevance (*F*-tests) is highly significant. In all three specifications, the *F*-statistic of joint significance of the instruments exceeds 10, which is the threshold recommended by Staiger and Stock (1997). This implies that the instruments are relevant. Besides, we also find that the weak instrument problem is not present in our estimations using the Anderson-Rubin (AR) and Conditional Likelihood Ratio (Moreira's CLR) (Moreira, 2003) tests. The CLR p-values indicates that migrations estimates are highly significant (at the 1% level), regardless of the definition of the instrumental variables, except for Medersa. The AR tests also report p-values indicating high significance, at least at the 5% level, except also for Medersa.

Moreover, the test of over-identification restrictions supports the validity of the instruments. The null hypothesis is not rejected in all three equations.

5.2 The impact of international migration

Table 4 reports the results from the multivariate probit model wherein we control for the household migration status. The first panel of the table gives the estimates of the migration variable from the regression, ignoring potential endogeneity of the variable. Results show that the migration effect is positive and significant (at the 10 % level) for French school attendance, negative and significant (at the 10 % level) for paid work, and negative but non-significant for Medersa attendance. This suggests that children in households with international migrants are not only more likely to enroll in French curriculum school; they are also less prone to be involved in paid work activities or to enroll in Medersa. Once we instrument for migration, the sign of its effect on the different activities remains the same but with a larger size. However, the negative impact loses significance for paid work activity, while the significance level increases for the positive effect on French school attendance. In contrast, the impact on Medersa attendance remains non significant.

Results also show that the residual from the first stage regression is negative and significant for French schooling, and positive and non significant for both paid work and Medersa. As the coefficient of the residual is significant (at least for French school) we can reject the null hypothesis of no endogeneity of the migration variable. Then, not correcting for endogeneity of migration would underestimate its

effect on children's activities. Also, a negative residual coefficient suggests that among migrant household, there exist some characteristics that make children less likely to attend French school.

The bottom panel of table 4 gives the estimates of the correlation coefficients between our three activities. A correlation coefficient between two activities summarizes the association between unobservable child-specific factors determining the likelihood of a child's involvement in one activity and those determining its engagement in the other activity. Results show a significant exclusion between attending French school and involvement in any of the two remaining activities (paid work or Medersa). The correlation coefficients between French school attendance and paid work or Medersa are -0.65 and -0.76 respectively. This means that children who are engaged in paid work activity or who are enrolled in Medersa have unobserved characteristics that make them less likely to enroll in French school. In contrast, the coefficient correlation between paid work and Medersa is positive and significant albeit small, suggesting commonalities between the unobserved characteristics determining a child's enrollment in Medersa or engagement in paid work activities.

Conversely, we note a significant impact of the living arrangements on children's activities. Most notably, the number of children under five years of age and the number of older persons (65 years old and more) negatively and significantly affects the propensity of children of age 7 to 12 to attend school.

5.3 Does destination matter?

To look at the impact of emigrants' destinations, we only focus on two destinations: Europe and Africa. In our sample, we drop households with migrants in other regions. Table 5 shows the results of our estimations. The migration variable, when exogenous, has a positive and significant impact on French school attendance whatever the destination. It also has negative and significant effects in both destinations for paid work. The impact on Medersa attendance is negative in both destinations but insignificant. However, once we instrument for the migration variables, the significance, the size, and the sign of the effects change. After controlling for endogeneity, the variable designating having migrants in Africa loses the significance of its positive impact on French school enrollment while its negative impact on paid work become stronger with a higher level of significance. In contrast, the variable 'having a migrant in Europe' picks up a stronger positive impact on French school attendance. At the same time its impact on paid work losses significance and becomes positive. This finding suggests that the positive and significant impact of migration on French school in table 4 is likely mainly attributable to households with migrants in Europe.

5.4 Number of migrants

Table 6 reports the parameter estimates of the multivariate probit model of children's activities, controlling for the number of migrants within households. The first panel of the table gives the estimates

the variable ‘number of migrants’ taking it as exogenous. The results show a negative and significant impact on French schooling, a positive and significant impact on paid work activity, and a negative but very small and insignificant effect on Medersa attendance. Once we control for the endogeneity of the variable, the significance level and the size of the impact increase for all three activity equations, the sign remaining the same. These result suggest that when the number of migrants a given household increase, children of age 7 to 12 in this household are less likely to attend French school or Medersa and they are more likely to engage in paid work activities. This result contrasts with our previous finding, which indicates that children in households with migrants have higher propensities to enroll in French school and are less likely to work. This would suggest then that the positive effect of migration on French school attendance is conditioned on a threshold number of migrants beyond which migration has a depleting effect.

6. Conclusion

This paper focuses on the repercussions of international migration on children’s time allocation in households at origin. We focus on children of age 7 to 12 and distinguish between three activities: market work, French school attendance, and enrollment in Medersa. In our analysis, we account for heterogeneities in migration constraints, considering differences in migration destinations and the number of migrants within households. We instrument for migration using policy and governance facets in destination countries, precisely France, Spain, and Italy. Results show that – after controlling for endogeneity – migration has a positive and significant impact on enrollment in French curriculum school. However, once we account for the destination of the migrant, this positive and significant impact is only verified in households within migrants in Europe. We also note that when the number of migrants with a household increases, children of age 7 to 12 are less likely to attend French school and they are more likely to be involved in paid work activities.

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Table 1: Activities of Children aged 6 -12 by migration status of the household (%)

	Activities								
	Works		Attends French school		Attends Medersa		No occupation		Number of children aged 6 - 12
	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	
Overall sample	0.04	0.19	0.71	0.45	0.06	0.25	0.19	0.39	2857
Non-migrant household	0.05	0.21	0.69	0.46	0.07	0.26	0.19	0.39	1644
Migrant household	0.02	0.15	0.73	0.44	0.06	0.24	0.18	0.39	1213
Europe Migrant household	0.02	0.14	0.77	0.41	0.04	0.20	0.16	0.37	694
Africa Migrant household	0.03	0.16	0.65	0.47	0.09	0.29	0.22	0.42	463

Table 2: Descriptive statistics

	Type of households					
	Overall sample		With migrant		Without migrant	
Variables	mean	Std. dev.	mean	Std. dev.	mean	Std. dev.
household head is male	0.70	0.46	0.59	0.49	0.76	0.42
Age of the household head	52.70	14.27	54.22	15.29	51.72	13.50
Household head is self-employed	0.57	0.49	0.50	0.50	0.61	0.49
Household head ever attended school	1.69	0.46	1.68	0.47	1.70	0.46
Proportion of rural households	0.43	0.49	0.42	0.49	0.44	0.50
Proportion of households in Dakar	0.19	0.39	0.24	0.42	0.16	0.37
Proportion of households in other cities	0.38	0.48	0.34	0.48	0.40	0.49
Household size	10.85	5.74	12.20	6.56	9.99	4.96
Proportion of households owning agricultural lands	0.47	0.50	0.46	0.50	0.48	0.50
Number of children aged 0-5	1.90	1.84	2.17	2.04	1.73	1.69
Number of children aged 6-12	2.41	1.71	2.59	1.91	2.29	1.55
Number of children aged 13-16	1.01	1.10	1.14	1.21	0.92	1.01
Number of children aged 17-20	1.04	1.14	1.21	1.26	0.93	1.04
Number of members aged 65 and +	0.42	0.63	0.54	0.70	0.34	0.58
Female literacy rate	0.12	0.27	0.15	0.28	0.11	0.26
Male literacy rate	0.22	0.37	0.26	0.38	0.20	0.36
Proportion of households with a landline	0.19	0.39	0.28	0.45	0.13	0.33
Number of migrants	0.97	1.29	1.69	1.29	0	0
Number of households	1313		511		802	

Table 3: Univariate IV-probit estimations and diagnostic tests

First-stage regressions

	Dependent variable: Migrant household	
Variables	Coeff.	Std. dev.
Schengen unified visa system	0.18***	0.03
Right-wing government in France	-0.25***	0.02
Right-wing government in Italy	-0.18***	0.02
Right-wing government in Spain	-0.30***	0.02
Migrant is a male (ref: female)	0.02	0.02
Migrant age	0.01	0.00
Rural	-0.05**	0.02
Female literacy rate	0.013**	0.04
-		
Constant	0.55***	0.06

Second-stage regressions

	Dependent variables					
	French School		Paid work		Medersa	
	Coeff.	Std. dev.	Coeff.	Std. dev.	Coeff.	Std. dev.
Migrant household	0.649***	0.133	-0.845***	0.234	-0.155	0.189
Diagnostic tests						
First-stage F-statistics			59.81***			
Exogeneity test (p-value)	0.0000		0.0003		0.4099	
Over-identification test (p-value)	0.1919		0.6053		0.1515	
AR Wald Chi^2 (p-value)	0.0000		0.0046		0.2013	
CLR (p-value)	0.0000		0.0003		0.4100	
CLR confidence set	[0.402, 0.918]		[-1.300,-0.391]		[-0.523, 0.211]	
Number of observations			2826			

* p<0.05, ** p<0.01, *** p<0.001

Table 4: The impact of migration on children's activities

	Schooling	Paid work	Medersa
Migrant household (exogenous)	0.179*	0.278*	0.032
	(0.100)	(0.148)	(0.114)
Migrant household (endogenous)	0.934***	-0.465	-0.017
	(0.320)	(0.672)	(0.330)
Child is a boy (ref: girl)	-0.223***	0.247*	0.475***
	(0.075)	(0.139)	(0.116)
Child age	0.202***	-0.006	-0.040
	(0.021)	(0.037)	(0.025)
Head of household is self-employed	-0.053	0.259	0.475***
	(0.123)	(0.211)	(0.177)
Head of household ever went to school	-0.201	0.071	0.400**
	(0.162)	(0.279)	(0.200)
Rural	-0.263**	0.514**	0.157
	(0.123)	(0.237)	(0.178)
Agricultural land	-0.268**	-0.058	0.523***
	(0.124)	(0.228)	(0.178)
Number of children less than 5	-0.051*	0.051	0.076**
	(0.029)	(0.051)	(0.035)
Number of children 6-12 yrs-old	-0.032	0.016	-0.065**
	(0.031)	(0.046)	(0.030)
Number of children 13-16 yrs-old	0.043	0.066	-0.044
	(0.042)	(0.062)	(0.050)
Number of children 17-20 yrs-old	-0.036	-0.030	-0.013
	(0.044)	(0.079)	(0.054)
Number of older persons, 65 and more	-0.199**	0.151	0.098
	(0.079)	(0.104)	(0.098)
Female literacy rate	0.602	-17.744***	-0.136
	(0.395)	(5.291)	(0.493)
Male literacy rate	0.496***	-0.107	-0.752**
	(0.189)	(0.465)	(0.369)
Fitted residual of migration equation	-0.107***	0.048	0.018
	(0.038)	(0.076)	(0.038)
Constant	-0.541	-2.759***	-2.954***
	(0.395)	(0.885)	(0.532)
rho21	-0.647***		
rho31	-0.756***		
rho32	0.187***		
chi2_c	249.757***		
N	1704.000		

* p<0.10, ** p<0.05, *** p<0.01

Table 5: The impact of migration destinations on children's activities

	Schooling	Paid work	Medersa
Migrant destination, Africa (exogenous)	0.179**	-0.326**	-0.055
	(0.081)	(0.136)	(0.108)
Migrant destination, Europe (exogenous)	0.220***	-0.257*	-0.172
	(0.080)	(0.143)	(0.124)
Migrant destination, Africa (endogenous)	0.272	-1.509***	-0.293
	(0.189)	(0.403)	(0.261)
Migrant destination, Europe (endogenous)	0.713***	0.047	-0.398
	(0.152)	(0.302)	(0.245)
Child is a boy (ref: girl)	-0.222***	0.271***	0.350***
	(0.058)	(0.098)	(0.085)
Child age	0.184***	0.016	-0.014
	(0.016)	(0.022)	(0.019)
Head of household is self-employed	-0.087	0.251*	0.348***
	(0.069)	(0.133)	(0.109)
Head of household went to school	-0.270***	0.511***	0.378***
	(0.083)	(0.171)	(0.139)
Rural	-0.239***	0.529***	0.185*
	(0.073)	(0.130)	(0.110)
Agricultural land	-0.432***	0.170	0.486***
	(0.073)	(0.129)	(0.115)
Number of children less than 5	-0.041***	0.030	0.063***
	(0.015)	(0.024)	(0.020)
Number of children 6-12 yrs-old	-0.026*	-0.015	-0.049**
	(0.014)	(0.023)	(0.019)
Number of children 13-16 yrs-old	0.041*	0.032	-0.021
	(0.023)	(0.044)	(0.037)
Number of children 17-20 yrs-old	-0.049**	-0.024	-0.025
	(0.023)	(0.041)	(0.039)
Number of older persons, 65 and more	-0.198***	-0.035	0.131**
	(0.044)	(0.077)	(0.063)
Female literacy rate	0.631**	-18.331***	-0.200
	(0.254)	(2.046)	(0.369)
Male literacy rate	0.572***	-0.167	-0.646**
	(0.145)	(0.274)	(0.309)
Fitted residual of Africa destination	-0.032	0.154***	0.045
	(0.021)	(0.041)	(0.028)
Fitted residual of Europe destination	-0.079***	0.005	0.046
	(0.017)	(0.038)	(0.029)
Constant	0.005	-3.387***	-2.786***
	(0.222)	(0.447)	(0.352)
rho21		-0.644***	
rho31		-0.710***	
rho32		0.206***	
chi2_c		395.050***	
N		2477.000	

* p<0.10, ** p<0.05, *** p<0.01

Table 6: The impact of the number of migrants on children's activities

	Schooling	Paid work	Medersa
Number of migrants (exogenous)	-0.059***	0.051*	-0.003
	(0.018)	(0.031)	(0.021)
Number of migrants (endogenous)	-0.085***	0.096**	-0.078*
	(0.029)	(0.048)	(0.041)
Child is a boy (ref: girl)	-0.233***	0.245*	0.450***
	(0.071)	(0.140)	(0.105)
Child age	0.203***	-0.003	-0.051**
	(0.020)	(0.032)	(0.024)
Head of household is self-employed	-0.021	0.228	0.409***
	(0.078)	(0.161)	(0.121)
Head of household ever went to school	-0.287***	0.091	0.427**
	(0.098)	(0.223)	(0.168)
Rural	-0.284***	0.546***	0.161
	(0.086)	(0.190)	(0.134)
Agricultural land	-0.305***	-0.029	0.474***
	(0.089)	(0.172)	(0.154)
Female literacy rate	0.714**	-16.288***	-0.057
	(0.296)	(1.432)	(0.426)
Male literacy rate	0.631***	-0.125	-0.851**
	(0.146)	(0.352)	(0.335)
Fitted residual of number of migrants	0.073	-0.150	0.214**
	(0.066)	(0.131)	(0.103)
Constant	-0.120	-2.882***	-2.690***
	(0.274)	(0.738)	(0.433)
rho21		-0.639***	
rho31		-0.763***	
rho32		0.183***	
chi2_c		253.240***	
N		1704.000	

* p<0.10, ** p<0.05, *** p<0.01

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