Migration and Remittances in Senegal: Effects on Labor Supply and Human Capital of Households Members Left Behind

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Outline of discussion

- **Motivation**

- **The literature**

- **This paper**

- **Methodology**

- **Results**

- **Policy implications**

Motivation

- The phenomenon of international migration in Senegal has received increased attention from the government and development partners.

- Several migration-related institutions were created: Ministry for Senegalese living oversea, Directorate-General for Senegalese living oversea, *Fonds d'Appui à l'Investissement des Sénégalais de l'Extérieur*, *Bureau d'Accueil, d'Orientation et de Suivi des Emigrés*, and *Haut Conseil des Sénégalais de l'Extérieur*.

- The main concern of the government is to protect migrants and promote remittances with a view to design relevant policies for a better contribution of migration and remittances flows for development, in terms of making remittances more oriented towards productive investment and the development of entrepreneurship.

- Some estimates indicate indeed that in Senegal only 11% of families benefiting from remittances have used these resources to fund productive investments (African Development Bank, 2008).

Motivation (Cont'd)

- Senegal is among the top ten remittance-receiving countries in sub-Saharan Africa: the country is placed third in absolute terms (Gupta et al., 2007).

- In the CFA Franc Zone, Senegal is placed first recipient country of remittances in absolute terms (Ndiaye, 2010).

- Remittances in 2013 contributed about 11.2% of Senegal's GDP, equivalent to $1,652 million (World Bank, 2014).

- International migration in Senegal is mainly motivated by the widespread need to address the unemployment problem and by the search for better living conditions (Goldsmith et al., 2004).

- Migration thus appears to be one alternative for many young members of the Senegalese households who are faced with the problem of unemployment (Diène, 2012).

Motivation (Cont'd)

- Remittances are indeed seen as an important source of revenues for migrants' families left behind (Mohapatra and Ratha, 2001)…

- … particularly as a useful and effective way of reducing poverty and income inequality (Gupta et al., 2007; Chami et al., 2008; Roth and Tiberti, 2016) and of increasing consumption (Diagne and Diane, 2008; Bèye, 2009; Daffé, 2009).

- Therefore, migration and remittances could potentially play a role in labor market participation and human capital development.

- On a negative side, migration and remittances, as a non-labor source of revenue, could generate a state of dependence, thereby reducing the labor market participation of households left behind (Harris and Todaro, 1970; Borjas, 2006; Berker, 2011; Schumann, 2013; Ruhs and Vargas-Silva, 2014).

Motivation (End)

- On a positive side, remittances could contribute to improve human capital of the left-behind for instance by helping them to have access to education and health services (Guilmoto and Sandron, 2003; Taylor and Mora, 2006; Özden and Schiff, 2006; Ben Mim and Mabrouk, 2011).

- **Main message:** This paper intends to understand how migration and remittances influence labor market participation, and the implications of remittances for human capital development in Senegal.

- **Why?** Depending on whether the migrants living abroad have or not a job, the left-behind households' members with migrants may thus receive no remittances or receive small or high levels. Due to this uncertainty in the connection between migration and remittances, it is important to investigate the effect of both migration and remittances on labor market participation of the left-behind members.

The literature

The effects of migration and remittances on labor market participation

•The impact of migration and remittances on labor market participation in the literature is mitigated, and empirical results were found to be conditional on gender issues, education, age, and labor market locations.

•**Gender issues:** some studies found that migration reduces women labor market participation (Lokshin and Glinskaya, 2009; Démurger, 2015), while others found that migration increases labor market participation for women (Dermendzhieva, 2010; Binzel and Assaad, 2011). The labor supply response of women to increases in remittances were found to be positive (Amuedo-Dorantes and Pozo, 2012), but negative (Amuedo-Dorantes and Pozo, 2006; Lokshin and Glinskaya, 2009; Dermendzhieva, 2010).

•**Education issues:** Schumann (2013) showed that the link between remittances and employment depends on the level of schooling: more highly educated individuals are more likely to be self-employed when they receive remittances. He found no evidence for the labor supply responses of lower educated individuals.

The literature (Cont'd)

- **Age issues:** Petreski et al. (2014) found that youth in households receiving remittances have considerably larger probability of establishing their own business, compared to their non-youth non-receiving counterparts. Chen (2013) found that, when the father migrates without his family, children spend more time in household production, while mothers spend less time in both household production and income-generating activities.

- **Labor market locations:** migration induces a decrease in wage work in rural and urban areas (Binzel and Assaad, 2011). Démurger and Li (2013) showed that in rural China, at the individual level, migration favors off-farm work, whereas at the family level, migration drives the left-behinds to farming rather than to off-farm activities. Madon (2008) found that, in urban labor market in Senegal, migrants couldn't have an employment in the formal public sector and the formal private enterprises. Most of them can only enter into the informal sector for non-qualified employments.

The literature (End)

The effect of remittances on human capital

•Several studies have found a positive impact of remittances on human capital...

•... for Latin American countries (Kanaiaupuni and Donato, 1999; Cox-Edwards and Ureta, 2003; Hanson and Woodruff, 2003; Lopez-Cordova, 2005; Hildebrandt and McKenzie, 2005; Amuedo-Dorantes and Pozo, 2006; Amuedo-Dorantes et al., 2007; Adams and Cuecuecha, 2010; Acosta, 2011)...

•... for Asian countries (Yang and Martinez, 2006; Görlich et al., 2007; Yang, 2008; Bansak and Chezum, 2009; Painduri and Thangavelu, 2011)...

•... for sub-Saharan African countries (Brockerhoff, 1990; Kifle, 2007; Gubert, 2009; Démurger, 2015)...

•... and for a wider panel data (Gupta et al., 2007; Drabo and Ebeke, 2010; Ben Mim and Mabrouk, 2011; Zhunio et al., 2012).

•Few empirical papers have found a negative effect of remittances on human capital (McKenzie, 2006 for Mexico; Painduri and Thangavelu, 2011 for Indonesia; Cattaneo, 2012 for Albania).

This paper

- The effect of international migration on local labor supply has not been investigated for Senegal (Fall and Cissé, 2007). Also, only Schumann (2013) has explored the impact of remittances on labor supply for Senegal.

- But Schuman (2013) used only a binary specification of labor market participation with a control for endogeneity and sample selection bias, whereas our study employs a set of econometric models.

- In exploring the effect of remittances on labor market, past studies did not disaggregate the level of remittances.

- This paper uses various levels of remittances in order to explore whether the labor market effect of remittances depends on the level of remittances and not only the status of receiving or not remittances.

- This paper uses a rich household and individual survey data to analyze whether both migration and remittances generate positive or negative externalities in terms of labor market participation in Senegal.

This paper (Cont'd)

- A systematic econometric analysis of the effect of remittances on human capital in Senegal, specifically on education and health, has not been undertaken.

- While previous studies focused on total consumption expenditures of households (Diagne and Diané, 2008), we assess the differential effect of remittances on health and education expenditures.

- Also, to estimate the effect of remittances on human capital, past studies did not consider segmentation by level of remittances.

- This paper considers both this decomposition and the status of receiving or not remittances.

Model 1: *Effect of migration on labor market participation*

- **Simple probit model:**

$$E_i^* = \alpha_0 + \alpha_1 M_i + X_i \ \alpha_2 + \varepsilon_i \hspace{3cm} (01)$$

$$M_i^* = \beta_0 + X_i \ \beta_1 + Z_i \ \beta_2 + u_i \hspace{3cm} (02)$$

$$\text{With } E_i = \begin{cases} 1 & \text{if } E_i^* > 0 \\ 0 & \text{otherwise} \end{cases} \hspace{2cm} (03)$$

- Ei: observed variable indicating whether individual i is employed (waged or self-employed) or not in the labor market. Mi: explanatory variable of interest, takes a value of 1 if the individual i lives in a household with migrant. Ei* and Mi*: corresponding latent variables for employment and migration respectively.

- Xi is a set of control variables including observable individual and household characteristics such as household size, sex, age, marital status, education, ethnicity, number of elderly, proprietary status, geographical location (region, and urban versus rural location).

Model 1: *Effect of migration on labor market participation (Cont'd)*

- Z_i: potential covariates for selection adjustment (instruments), and ε_i and u_i are the error terms.

- According to Roth and Tiberti (2016), the literature on migration considers migration networks as one of the influential unobservable variables (for example Taylor et al., 2003).

- Z_i is thus the migration networks. Following Roth and Tiberti (2016), we use the percent share of migrants to the total population in the district as a proxy for migration networks to address potential unobservable indicators.

- This network variable is computed using the Senegalese Migration and Remittances Household Survey 2009 (World Bank, 2009).

Model 1: *Effect of migration on labor market participation (Cont'd)*

- **Endogenous Switching Probit model (ESP):** As both the dependent variable (labor market participation) and the main independent variable of interest (migration) are dummy variables, the ESP is then more suitable, and it also simultaneously corrects for the endogeneity and selection biases.

- The model considers the behavior of an agent with two binary outcome equations (participate in labour (with migrant/without migrant)) and a criterion function Ti that determines which regime the agent faces (with migrant/without migrant).

- Ti indicates which regime the agent faces (with migrant / without migrant).

Model 1: *Effect of migration on labor market participation* (Cont'd)

- Ti can be interpreted as a treatment.

$$T_i=1 \qquad \text{if} \quad Z_i\gamma + u_i > 0 \qquad (04)$$

$$T_i=0 \qquad \text{if} \quad Z_i\gamma + u_i \leq 0 \qquad (05)$$

$$\text{Regime } 1 : y_{1i}^* = X_{1i}\beta_1 +: \epsilon_{1i} \qquad \text{and} \quad y_{1i}=I[y_{1i}^* \geq 0] \qquad (06)$$

$$\text{Regime } 0 : y_{0i}^* = X_{0i}\beta_0 +: \epsilon_{0i} \qquad \text{and} \quad y_{0i}=I[y_{0i}^* \geq 0] \qquad (07)$$

- Where y_{1i*} and y_{0i*} are the latent variables of a given binary outcome. We assume that the three residuals (u_i, ϵ_{1i} et ϵ_{0i}) are normally distributed, with a mean-zero vector and a covariance matrix:

$$\Omega = \begin{bmatrix} 1 & \rho_0 & \rho_1 \\ \rho_0 & 1 & \rho_{0,1} \\ \rho_1 & \rho_{0,1} & 1 \end{bmatrix} \qquad (08)$$

- Where $\rho_l=Cov(u, \epsilon_l)$ *and* $l \in (0,1)$. We assume that $\rho_{0,1}=1$. The estimation can be done by the full specification of a maximum likelihood model.

Model 1: *Effect of migration on labor market participation* (End)

- **Propensity score matching approach (PSM):** The outcome is the probability of participating to the labor market and the treatment is that of migrating. The impact of treatment on the outcome is assessed as follows:

$$\tau\big|_{D=1} = E\big[Y_{i,1}|T=1\big] - E\big[Y_{i,0}|T=1\big] \tag{09}$$

- Where $Y_{i,T}$ denotes the outcome of the individual i and T is equal to 1 if the unit is treated and 0 otherwise. The component $E(Y_{i,0}|T=1)$ is what is not observed.

- The PSM aims to construct a counterfactual group starting from the non-treated group. This counterfactual group is assumed to be a random sample of the effective treated group.

Model 2: *Effect of remittances on labor market participation*

- **Simple Probit model:**

$$E_i = \partial_0 + \partial_1 R_i + X_i \ \partial_2 + \varepsilon_i \qquad (10)$$

- Where Ei is an observed variable indicating whether individual i is employed (waged or self-employed) or not, Ri is log of per capita remittances. Indeed, we find that log (per capita remittances) follows a normal distribution.

- We consider various levels of remittances and we generate different dummy variables: (dummy_0) the household receives no remittances, (dummy_1) the household receives more than CFAF 100,000 in remittances, (dummy_2) the household receives more than CFAF 200,000 in remittances, and (dummy_3) the household receives more than CFAF 300,000 in remittances.

Model 2: *Effect of remittances on labor market participation (End)*

- **IV probit model:** addresses endogeneity problems, then is more suitable in the case where some non-observed factors can jointly affect labor supply and remittances .

$$E_i = \gamma_0 + \gamma_1 R_i + X_i \ \gamma_2 + \varepsilon_i \qquad (11)$$

$$R_i = \delta_0 + X_i' \delta_1 + Z_i' \delta_2 + u_i \qquad (12)$$

- Where Zi are instrumental variables. Zi includes the migration networks that are one of the influential unobservable variables (Taylor et al., 2003) and we use the percent share of migrants to the total population in the district as a proxy for migration networks (Roth and Tiberti, 2016).

- **Propensity score matching method (PSM):** The outcome is the probability of participating to the labor market and the treatment is that of receiving remittances. The impact of treatment on the outcome is assessed as above (equation 09).

Model 3: *Effect of remittances on human capital*

- **Ordinary Least Squares (OLS) method:**

$$\text{Expend}_i = \varphi_0 + \varphi_1 R_i + X_i \ \varphi_2 + \varepsilon_i \qquad (13)$$

- Where Expendi is, in turn, per capita expenditures on education and per capita expenditures on health of household i and Ri is per capita remittances.

- **Propensity score matching method (PSM):** the outcome is the level of spending on education and on health and the treatment is that of receiving remittances.

Descriptive results

	Household with migrants		Household without migrants		Participating in labor market		Not participating in labor market	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Participate in labor market	**0.524**	0.499	**0.58**	0.494				
Live in household with migrants					0.552	0.497	0.607	0.488
Per capita expenditures	**12002.18**	14645.93	**13254.35**	21700.88	13949.61	21592.2	14005.35	16940.8
Per capita remittances	4945.452	9840.38	0	0	2372.412	7428.021	3622.446	9381.927
Per capita expenditures on education	**663.5362**	2048.899	**529.4105**	1142.396	608.7029	1777.931	740.4203	1918.599
Per capita expenditures on health	**434.801**	1058.288	**385.765**	1280.706	404.5134	982.8361	577.1058	1822.683
Household size	13.998	7.256	10.773	5.182	11.958	6.624	12.129	6.383
Squared household size	248.602	271.934	142.903	171.205	186.857	231.727	187.861	224.619
Bachelor diploma (d)	0.012	0.111	0.022	0.146	0.027	0.163	0.029	0.169
Education years	2.021	3.591	2.248	3.801	2.532	4.125	3.769	4.584
Male (d)	0.458	0.498	0.491	0.5	0.609	0.488	0.253	0.435
Age	22.663	18.79	23.044	18.222	34.268	13.02	28.263	13.155
Squared age	866.636	1298.563	863.02	1216.556	1343.75	992.175	971.814	960.666
Married (d)	0.209	0.407	0.249	0.432	0.441	0.497	0.315	0.464
Number of elderly	0.558	0.685	0.323	0.582	0.403	0.615	0.438	0.624
Urban area (d)	0.378	0.485	0.488	0.5	0.428	0.495	0.564	0.496
Migration networks	84.687	9.787	84.695	6.883	84.405	8.542	84.959	7.821
Dependency ratio	1.051	0.726	0.908	0.631	0.823	0.602	0.764	0.602
Total participating other members	5.264	3.95	3.121	2.278	4.623	3.84	3.533	2.579
Diourbel (d)	0.139	0.346	0.036	0.187	0.066	0.248	0.113	0.317
Fatick (d)	0.062	0.24	0.049	0.215	0.055	0.228	0.038	0.192
Kaolack (d)	0.157	0.364	0.131	0.337	0.172	0.377	0.09	0.286
Kolda (d)	0.047	0.211	0.071	0.257	0.058	0.234	0.034	0.18
Louga (d)	0.089	0.285	0.021	0.144	0.068	0.252	0.046	0.21
Matam (d)	0.075	0.264	0.115	0.32	0.056	0.23	0.109	0.312
Saint-Louis (d)	0.045	0.207	0.036	0.187	0.039	0.194	0.044	0.206
Tambacounda (d)	0.037	0.19	0.044	0.206	0.05	0.217	0.027	0.163
Thies (d)	0.168	0.374	0.153	0.36	0.168	0.374	0.165	0.371
Ziguinchor (d)	0.014	0.119	0.023	0.151	0.017	0.128	0.028	0.165

Descriptive results (Cont'd)

- Households with migrants are less likely to participate in the labor market than households without migrants.

- Households with migrants have smaller total per capita expenditures than households without migrants, suggesting that households with migrants are basically poor.

- However, households with migrants spend more on education and health than households without migrants.

Econometric results

Migration and labor market participation in Senegal

	Probit models and marginal effects			Endogenous switching probit model			Propensity score matching (PSM) approach		
	Labor market participation	*Marginal effect*	Household with migrants	Migration	Labor market participation *With migrant*	Labor market participation *Without migrant*	*Treatment effect on the Treated*	*Treatment effect on the Untreated*	*TOTAL*
Households with migrants (d)	-0.242***	**-0.0943*****							
Migration networks			0.0281***	0.0300***					
Nearest Neighbor (5)							**0.00516**	**-0.0424****	**-0.0102**
Radius [caliper (0.01)]							**-0.0146**	**-0.0594****	**-0.0291**
Individual characteristics									
Household size	-0.0577***	-0.0226***	0.0137**	0.0887***	-0.0417***	-0.0341**			
Squared Household size				-0.00138***	0.000834**	0.000599**			
Male (d)	1.356***	0.488***	-0.108*	-0.121**	1.218***	1.379***			
Age	0.180***	0.0704***	-0.0162	-0.0225*	0.160***	0.163***			
Squared age	-0.00210***	-0.000821***	0.000237	0.000310**	-0.00189***	-0.00186***			
Married (d)	0.125*	0.0488*	0.0499	0.0631	0.146**	0.140			
Bachelor diploma (d)	0.109	0.0423	-0.432**	-0.413**	-0.00830	0.301			
Education years	-0.0407***	-0.0159***	0.0166*	0.0159**	-0.0526***	-0.0330**			
Total participating other members	0.160***	0.0628***	0.125***						
Urban area (d)	-0.379***	-0.148***	-0.0730	-0.0417	-0.433***	-0.340***			
Region									
Diourbel (d)	-0.0999	-0.0394	0.329**	0.286**	-0.552***	-0.305			
Fatick (d)	0.203	0.0776	0.0210	0.0271	0.154	0.201			
Kaolack (d)	0.349**	0.132**	-0.0578	-0.129	0.403***	0.217			
Kolda (d)	0.425**	0.157**	-0.140	-0.196	0.0567	0.680***			
Louga (d)	0.134	0.0520	0.108	0.128	-0.0523	0.252			
Matam (d)	-0.371**	-0.147**	0.428***	0.186	-0.837***	-0.490**			
Saint-louis (d)	0.115	0.0445	-0.130	-0.202*	0.00531	-0.0524			
Tambacounda (d)	0.0223	0.00872	-0.0373	-0.0682	-0.120	0.440			
Thies (d)	0.162	0.0626	0.0462	-0.0165	0.123	0.134			
Ziguinchor (d)	-0.238	-0.0946	-0.439*	-0.543***	-0.721***	-0.168			
Ethnic									
Bambara (d)			-0.241	-0.156					
Diola (d)			1.310***	1.242***					
Mancagne (d)			0.764	0.780					
Mandingue (d)			0.798*	0.693**					
Manjaque (d)			1.139***	1.177***					
Pular (d)			0.0666	0.0327					
Sarakhole (d)			0.385*	0.441**					
Serer (d)			-0.205*	-0.229***					
Balante (d)			2.608***	2.128***					

Econometric results (Cont'd)

Migration and labor market participation in Senegal (continued)

	Probit models and marginal effects			Endogenous switching probit model			Propensity score matching (PSM) approach		
	Labor market participation	*Marginal effect*	Household with migrants	Migration	Labor market participation *With migrant*	Labor market participation *Without migrant*	*Treatment effect on the Treated*	*Treatment effect on the Untreated*	*TOTAL*
Proprietary status									
Own agricultural land at present (d)			-0.364[***]	-0.290[***]					
Own non-agricultural land at present (d)			0.206[**]	0.357[***]					
Own house at present (d)			0.374[***]	0.323[***]					
Own other buildings at present (d)			0.304[*]	0.365[***]					
Number of elderly			0.129[**]	0.165[***]					
Constant				-2.256[***]	-2.327[***]	-2.935[***]			
Observations	10233	10233	10233	10233					
Pseudo R^2	0.290	0.290	0.254						
Rho 1				-0.321[***]					
Rho 0				-0.0148					

* p < 0.1, ** p < 0.05, *** p < 0.01

Wald test of indep. eqns. (rho1=rho0=0):chi2 (2) = 11.31 Prob > chi2 = 0.0035

Remittances and labor market participation in Senegal

	Probit models and marginal effects					IV Probit models and marginal effects			Propensity score matching (PSM) method			
	M1	M2	M3	M4	M5	Labor market participation	Remittances	Marginal effects	M1	M2	M3	M4
PeCapRe												
> 0	*-0.0776****											
> 100000		-0.0553										
> 200000			-0.0706									
> 300000				-0.175**								
LPeCapRe					-0.00749***	-0.0728**		-0.0286**				
DisMigRat							0.0405***					
TEfTreat									0.0130	-0.0112	-0.0843	-0.193**
									(0.0244)	(0.0411)	(0.0652)	(0.0823)
TEfUtreat									-0.0531**	-0.0621**	-0.0689**	-0.137***
									(0.0221)	(0.0286)	(0.0314)	(0.0420)
All									-0.0200	-0.0557**	-0.0700**	-0.139***
									(0.0168)	(0.0259)	(0.0300)	(0.0410)
IndCharac												
HHS	-0.0300***	-0.0307***	-0.0308***	-0.0309***	-0.0303***	-0.0736***	-0.0233	-0.0289***				
SqHHS	0.000235	0.000260*	0.000265*	0.000241*	0.000248*	0.000676*	0.000950	0.000265*				
Male (d)	0.488***	0.490***	0.490***	0.491***	0.487***	1.270***	-0.607***	0.462***				
Age	0.0705***	0.0705***	0.0705***	0.0708***	0.0705***	0.173***	-0.0119	0.0680***				
Sq age	-0.000824***	-0.000824***	-0.000825***	-0.000828***	-0.000824***	-0.00202***	0.000101	-0.000795***				
Married	0.0508*	0.0488*	0.0484*	0.0482*	0.0504*	0.131*	0.151	0.0513*				
Bach Dipl	0.0486	0.0550	0.0550	0.0523	0.0479	0.0757	-0.856	0.0295				
Educat	-0.0165***	-0.0170***	-0.0168***	-0.0165***	-0.0164***	-0.0360***	0.0729**	-0.0141***				
TPOM	0.0619***	0.0584***	0.0578***	0.0584***	0.0617***	0.175***	0.391***	0.0687***				
Urban	-0.150***	-0.150***	-0.152***	-0.154***	-0.149***	-0.368***	-0.746**	-0.144***				
Region												
Diourb	-0.0390	-0.0648	-0.0633	-0.0548	-0.0352	0.213	4.212***	0.0818				
Fatick (d)	0.0692	0.0625	0.0651	0.0653	0.0667	0.160	1.263**	0.0618				
Kaolac	0.133***	0.118**	0.121**	0.121**	0.130**	0.392***	1.359***	0.147***				
Kolda (d)	0.151**	0.148**	0.151**	0.151**	0.148**	0.329*	-0.807	0.124*				
Louga (d)	0.0357	0.0182	0.0195	0.0214	0.0376	0.255	3.115***	0.0970				
Mata (d)	-0.150**	-0.157**	-0.156**	-0.153**	-0.153**	-0.385**	0.476	-0.152**				
St Louis	0.0439	0.0302	0.0323	0.0361	0.0445	0.192	1.505***	0.0739				
Tamba	-0.00153	-0.00441	-0.00265	-0.000140	-0.00403	-0.0561	0.0207	-0.0221				
Thies (d)	0.0558	0.0519	0.0539	0.0550	0.0547	0.156	1.102***	0.0605				
Ziguin	-0.115	-0.114	-0.112	-0.112	-0.118	-0.342	-1.680***	-0.136				

Econometric results (Cont'd)

Remittances and labor market participation in Senegal (continued)

	Probit models and marginal effects					IV Probit models and marginal effects			Propensity score matching (PSM) method			
	M1	M2	M3	M4	M5	Labor market participation	Remittances	*Marginal effects*	M1	M2	M3	M4
Ethnic												
Bambara							0.272					
Diola							2.012***					
Manca							1.539					
Manding							-1.400					
Manjaque							-2.593***					
Pular							-0.338					
Sarakho							0.662					
Serer							-1.154***					
Balante							0.121					
Pro status												
OAglan							-1.790***					
ONAglan							0.157					
Ohouse							1.643***					
OOBuil							1.318***					
Nelderly							1.184***					
Observ	10233	10233	10233	10233	10233	10233		10233	10232	10232	10232	10232
Pseudo R^2	0.289	0.287	0.287	0.288	0.289							
Rho						**0.25669****						
Sigma						4.3924***						

$p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Standard errors in parentheses

Wald test of exogeneity (/athrho = 0): chi2 (1) = 3.73 Prob > chi2 = 0.0535

Econometric results (Cont'd)

Remittances and expenditures on education and health in Senegal

	Ordinary least squares		Propensity score matching (PSM), education				Propensity score matching (PSM), health			
	Expenditures		Remittances				Remittances			
	Education	Health	> 0	> 100000	> 200000	> 300000	> 0	> 100000	> 200000	> 300000
Per capita remittances	**0.0159**[***]	**0.0142**[***]								
Migration networks	24.29[**]	-4.876								
Treatment effect on the Treated			-101.0	1,679	3,211**	7,767**	-878.1	2,582*	4,588*	-592.3
			(915.5)	(1,743)	(1,584)	(3,068)	(1,192)	(1,547)	(2,559)	(3,598)
Treatment effect on the Untreated			1,537***	3,289***	4,739***	5,025***	2,874***	3,683***	5,345***	5,928***
			(420.4)	(561.2)	(963.5)	(1,550)	(692.7)	(820.0)	(1,547)	(1,706)
All			717.5	3,086***	4,636***	5,108***	996.3	3,544***	5,294***	5,730***
			(476.3)	(502.5)	(916.8)	(1,510)	(719.5)	(765.1)	(1,493)	(1,669)
Individual characteristics										
Household size	18.87	-268.6[***]								
Squared Household size	-0.439	4.913[***]								
Male	48.84	21.16								
Age	-30.20[**]	-16.93								
Squared age	0.462[*]	0.361								
Married	160.9	182.9								
Bachelor diploma	1127.0	-842.5								
Education years	268.4[***]	169.8[**]								
Total participating other members	-85.52[***]	-55.03								
Urban area	2047.3[***]	1420.6[***]								
Region										
Diourbel	-2089.1[***]	-1510.7[***]								
Fatick	67.13	-749.6[*]								
Kaolack	-1538.2[**]	-558.0								
Kolda	-921.4[***]	-603.7								
Louga	-2181.9[***]	-261.4								
Matam	-1086.6[***]	128.8								
Saint-Louis	-2035.3[***]	4888.9[*]								
Tambacounda	-1024.7[***]	2252.0[**]								
Thies	-1499.6[***]	-978.3[***]								
Ziguinchor	672.5	-2029.4[***]								

Econometric results (Cont'd)

Remittances and expenditures on education and health in Senegal (continued)

	Ordinary least squares		Propensity score matching (PSM), education				Propensity score matching (PSM), health			
	Expenditures		Remittances				Remittances			
	Education	Health	> 0	> 100000	> 200000	> 300000	> 0	> 100000	> 200000	> 300000
Ethnic										
Bambara	-1813.1***	1535.3								
Biola	1928.6**	-995.5								
Mancagne	-1039.2	-1021.6								
Mandingue	352.4	-2220.9***								
Manjaque	1619.7	-3462.1***								
Pular	-481.2**	-870.4*								
Sarakhole	556.6	-1818.3**								
Serer	-359.4	-742.0**								
Balante	2013.7***	-1524.6***								
Proprietary status										
Own agricultural land at present	537.7*	-269.2								
Own non-agricultural land at present	275.9	219.1								
Own house at present	-12.57	-546.7								
Own other buildings at present	344.0	897.3								
Number of elderly	-20.14	860.9***								
Dependency ratio	-371.3***	-565.8***								
Observations	17871	17871	10232	10232	10232	10232	10232	10232	10232	10232
R^2	0.145	0.068								

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Econometric results (End)

- First, migration decreases labor market participation of household members left behind.

- Second, remittances, which are non-labor income, reduce the incentive of the left-behind to participate in the labor market.

- Third, remittances contribute to increase human capital of the left-behind. Labor market participation and human capital formation depend on both the status and the level of remittances.

Policy implications

- The fact that migration and remittances reduce labor market participation of left-behind members but improve their human capital development suggests that the government would need to rethink migration policies.

- These results imply indeed that migration and remittances may not be viable alternatives for unemployment for poor household members left behind.

- Migration and remittances need therefore to be promoted in a way to motivate households with migrants to do business and participate more in the labor market.

Policy implications (Cont'd)

- For that, the government would need to put into place policies aiming at creating economic opportunities and at raising public awareness of the importance of re-allocating remittance flows more towards productive circuits in order to motivate households with migrants to develop entrepreneurship.

- Moreover, as migration and remittances may not be viable solutions for poor households members left behind for the long term, another relevant policy for the government may be to provide social protection for these households.

END

THANK YOU FOR YOUR ATTENTION