

Do Remittances Affect Poverty and Inequality? Evidence from Mali

(work in progress)

Flore Gubert, IRD, DIAL and PSE
Thomas Lassourd, EHESS and PSE
Sandrine Mesplé-Soms, IRD, DIAL

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Motivations

- Remittances have increased over the last years, to reach \$305 billion in 2008 = 2 x Foreign aid.
- Yet little is known about the impact of remittances on recipient countries, especially in Sub-Saharan Africa
 - Burkina Faso (Wouterse and Taylor, 2006; Lachaud, 1999)
 - Ghana (Adams et al., 2008)
 - Mali (Gubert, 2002, Azam and Gubert, 2005)

Objectives

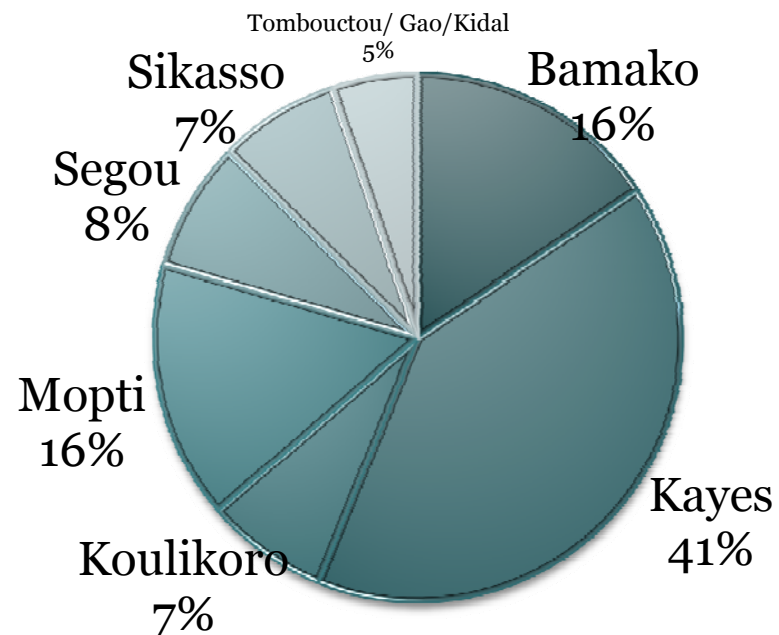
- Our aim is to investigate the poverty and inequality impact of migration and remittances in Mali
- We compare the current levels of poverty and inequality with the levels of poverty and inequality that would prevail in a scenario without migration and without remittances.

Data

- Data from the "*Enquête Légère Intégrée auprès des Ménages*" (ELIM), conducted in Mali in 2006.
 - Detailed information on consumption, income including intra-country transfers and remittances from abroad, assets, household members' characteristics, etc.
 - Nationally representative sample of 4,494 households (40,810 individuals).
- Census microdata (RGPH, 1998)
 - Information on ethnic composition of districts (214 districts)

Summary statistics (I)

- Remittances from abroad in Mali: FCFA 90 billion for year 2005-2006 (3.7% of GDP) = \$ 217 million
- Distribution of remittances by region



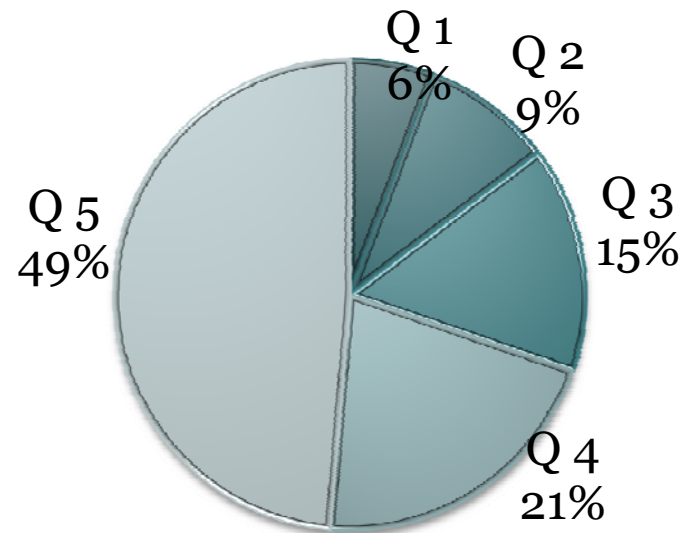
Summary statistics (II)

- Percentage of remittances-recipient households and amount of remittances by region, 2006

	Percentage of individuals living in remittances-recipient households	Remittances as a share of total consumption (%)	
		Sub-sample of remittances-recipient households	All sample
National	22.7	18.0	4.0
Urban	19.4	21.3	4.1
Rural	24.0	16.7	3.9
Bamako	19.0	17.1	3.1
Kayes	42.7	26.3	10.8
Koulikoro	18.4	12.7	2.3
Mopti	35.7	13.3	4.7
Segou	8.7	26.9	2.2
Sikasso	12.7	15.3	1.9
Tomb/Gao/Kidal	21.2	14.9	3.1

Summary statistics (III)

- Distribution of remittances by quintile of consumption



Mean share of remittances in total consumption by quintile of consumption p.c. (%), 2006.

Quintile	Q1	Q2	Q3	Q4	Q5	Total
Mean share of remittances in total consumption (%)	3.0	2.8	4.6	3.7	4.7	4.0

Empirical Strategy (I)

- We estimate the following model:

Income equation (reduced-form)

$$\log Y_i = \alpha + \gamma \log H_i + \beta X_i + \mu_i \quad (1)$$

"Non-remittance selection rule"

$$M_i^* = \alpha_m + \gamma_m \log H_i + \beta_m X_i + \omega Z_i + \mu_i \quad (2)$$

where:

$$M_i = \begin{cases} 1 & \text{if } M_i^* > 0 \\ 0 & \text{if } M_i^* \leq 0 \end{cases}$$

Empirical Strategy (II)

Non remittances-recipient households:

$$E[\log Y_{0i} | H_i, X_i; M_i^* > 0] = \alpha_0 + \gamma_0 \log H_i + \beta_0 X_i + \theta_0 \lambda_{0i} + \epsilon_{0i} \quad (3)$$

Remittances-recipient households:

$$E[\log Y_{1i} | H_i, X_i; M_i^* \leq 0] = \alpha_1 + \gamma_1 \log H_i + \beta_1 X_i + \theta_1 \lambda_{1i} + \epsilon_{1i} \quad (4)$$

with

$$\lambda_{0i} = \frac{\phi(\alpha_m + \gamma_m \log H_i + \beta_m X_i + \omega Z_i)}{\Phi(\alpha_m + \gamma_m \log H_i + \beta_m X_i + \omega Z_i)}$$

and

$$\lambda_{1i} = \frac{-\phi(\alpha_m + \gamma_m \log H_i + \beta_m X_i + \omega Z_i)}{1 - \Phi(\alpha_m + \gamma_m \log H_i + \beta_m X_i + \omega Z_i)}$$

Empirical Strategy (III)

- We finally use the efficient coefficients of equation (3) to impute the counterfactual income of remittances-recipient households.
- Problem: this counterfactual income has an artificially small variance, since it is computed from observable household characteristics only.
- Barham and Boucher (1998) and others: add to the predicted income a random error component drawn from a distribution with the same mean and variance as the estimated error of equation (3)

Empirical Strategy (IV)

- What we want to do is to use the information contained in the residuals of equation (4) when imputing the counterfactual income of migrant households.
- That is, we would like to draw an ϵ_0^* which would not have the same properties as the residuals estimated from equation (3) but that would keep the information in $\hat{\epsilon}_1$
- From the estimated $\hat{\epsilon}_1$, we obtain a measure of $\hat{\mu}$, through :

$$\frac{\hat{\mu}}{\sigma_{\mu}} = \rho_1 \left(\frac{\hat{\epsilon}_1}{\sigma_{\epsilon_1}} \right) + v \text{ where } v \sim N \left(0, \sqrt{1 - \rho_1^2} \right).$$

Empirical Strategy (V)

- With the same procedure, we obtain the desired

$$\epsilon_0^*: \frac{\epsilon_0^*}{\sigma_{\epsilon_0^*}} = \rho_0 \left(\frac{\hat{\mu}}{\sigma_{\mu}} \right) + v' \text{ where } v' \sim N\left(0, \sqrt{1 - \rho_0^2}\right).$$

- The counterfactual income of remittances-recipient households is then given by:

$$E[\log Y_{0i}^* | H_i, X_i; M_i^* \leq 0] = \hat{\alpha}_0^{OLS} + \hat{\gamma}_0^{OLS} \log H_i + \hat{\beta}_0^{OLS} X_i + \epsilon_{0i}^* \quad (5)$$

Regression results (I)

	Rural nonmigrant households (n=2,340)		Urban nonmigrant households (n=1,290)	
	E(logC/M* >0)	P(M* >0)	E(logC/M* >0)	P(M* >0)
Area of land owned by HH(log)	-0.007 (1.00)	-0.089 (4.73)***		
Asset score (log)	0.372 (7.14)***	-0.048 (0.39)	0.613 (9.90)***	-0.365 (2.16)**
Number of HH members aged...				
... 60 or more (log)	0.070 (1.10)	-0.098 (0.71)	0.109 (1.19)	-0.130 (0.64)
... between 25 and 60 (log)	0.328 (11.71)***	-0.007 (0.11)	0.271 (7.66)***	-0.088 (1.02)
... between 15 and 25 (log)	0.214 (8.83)***	-0.095 (1.73)*	0.110 (3.71)***	-0.054 (0.71)
...less than 15 years (log)	0.253 (12.06)***	0.043 (0.87)	0.222 (8.67)***	-0.038 (0.57)
Total education in household (log)	0.038 (3.17)***	-0.019 (0.67)	0.111 (7.78)***	-0.017 (0.44)
Polygamous household	0.059 (2.04)**	-0.114 (1.72)*	0.079 (1.93)*	-0.019 (0.19)
Household head is a female	-0.218 (3.74)***	0.197 (1.33)	-0.063 (1.28)	-0.163 (1.37)
HH head in the formal sector	0.132 (2.45)***	0.188 (1.30)	0.056 (1.71)*	0.222 (2.46)**
Age of household head	-0.012 (2.38)**	-0.006 (0.52)	0.010 (1.44)	0.003 (0.17)
Age square of household head	0.000 (2.36)**	0.000 (0.34)	0.000 (1.13)	0.000 (0.73)
Regional dummies	(included but not shown)			

Regression results (II)

	Rural nonmigrant households (n=2,340)		Urban nonmigrant households (n=1,290)	
	E(logC/M* >0)	P(M* >0)	E(logC/M* >0)	P(M* >0)
Instruments				
% of ... in district				
... Maraka or Soninke		-0.021 (8.43)***		-0.043 (5.22)***
... Sonrai or Djerma		-0.008 (2.02)**		0.001 (0.18)
... Bambara or Malinke		-0.003 (1.67)*		-0.012 (2.23)**
... Peul or Foulfoube		-0.003 (1.27)		-0.016 (2.18)**
Intercept	13.047 (97.33)***	1.733 (5.25)***	12.633 (70.29)***	2.478 (4.51)***
Lambda	0.482 (0.022)***		0.361 (0.0469)***	
Log likelihood	-2,981.8		-1,549.2	

Poverty and Inequality Impact (I)

- Three counterfactual scenarii under which migrants had not migrated and would be still living with their families:
 1. Counterfactual 1 or “naïve”: we simply subtract remittances from total consumption for remittances-recipient households;
 2. Counterfactual 2: we impute the consumption of remittances-recipient households using the same methodology as the one adopted by Barham and Boucher (1998) and Acosta *et al.* (2007);
 3. Counterfactual 3: we impute the consumption of remittances-recipient households using the same methodology as the one adopted by Barham and Boucher (1998), but innovating in the way we deal with residuals.

Poverty and Inequality Impact (II)

	Observed	CF 1 "naïve"	CF 2 Barham and Boucher	CF 3 Barham and Boucher "modified"
Poverty rate (%)				
National	46.4 [43.6 - 49.3]	51.4 [48.7 - 54.1]	51.2 [50.4 - 51.8]	48.8 [47.9 - 49.7]
Urban	27.3 [23.1 - 31.5]	32.2 [27.7 - 36.8]	30.7 [29.6 - 32.0]	30.0 [28.9 - 31.2]
Rural	55.3 [51.4 - 59.3]	60.4 [56.9 - 63.9]	60.7 [59.4 - 61.7]	57.7 [56.5 - 59.0]
Bamako	12.4 [7.4 - 17.4]	16.2 [10.6 - 21.8]	15.0 [12.7 - 16.9]	15.7 [13.6 - 18.0]
Kayes	40.6 [33.7 - 47.5]	53.4 [47.4 - 59.4]	54.0 [51.2 - 57.0]	43.3 [41.0 - 45.9]
Koulikoro	40.5 [34.7 - 46.2]	43.7 [39.0 - 49.4]	43.2 [41.4 - 44.8]	42.2 [40.4 - 43.6]
Mopti	45.6 [35.6 - 55.7]	53.4 [44.4 - 62.3]	55.4 [51.3 - 58.2]	52.0 [48.8 - 55.5]
Segou	49.2 [44.2 - 54.1]	51.1 [45.8 - 56.4]	50.0 [48.7 - 51.2]	49.3 [48.5 - 50.5]
Sikasso	81.8 [76.6 - 87.1]	83.0 [77.8 - 88.2]	82.2 [81.1 - 83.1]	81.5 [80.5 - 82.5]
Tombouctou	22.8 [17.0 - 28.5]	28.2 [21.8 - 34.6]	25.7 [23.6 - 28.1]	26.6 [24.7 - 29.1]

Poverty and Inequality Impact (III)

	Observed	CF1 "naïve"	CF2 Barham and Boucher	CF3 Barham and Boucher "modified"
Consumption per capita (1,000 FCFA)				
Mean	174	162	163 [161 – 164]	175 [172 – 180]
Quintile				
Q1	66	63	62 [60 – 63]	61 [60 – 63]
Q2	109	104	103 [103 – 104]	104 [103 – 105]
Q3	151	141	144 [143 – 146]	147 [145 – 148]
Q4	214	200	206 [204 – 209]	212 [210 – 214]
Q5	446	407	421 [417 – 428]	462 [452 – 486]
Gini index				
National	37.6 [36.2 – 41.0]	38.1 [36.1 – 40.8]	37.8 [37.4 – 38.2]	39.3 [38.5 – 40.5]
Urban	33.9 [30.9 – 39.8]	34.4 [31.3 – 38.4]	33.4 [32.9 – 34.0]	36.2 [35.3 – 37.7]
Rural	33.5 [31.1 – 36.1]	34.2 [32.5 – 36.6]	34.0 [33.4 – 34.5]	36.3 [35.3 – 37.7]

Conclusion (I)

- Main findings
 - Remittances significantly decrease the number of poor in Mali.
 - Inequality is reduced thanks to migrants' transfers.
 - The estimated impact is bigger when we adopt Bahram and Boucher's methodology than when we make use of all the information contained in the residuals.

Conclusion (II)

- **Limits**

1. More information are needed to build counterfactual scenarii:
 - One, two or more remitters per household?
 - Human capital level of remitters?
 - Income aggregate
 - ...
2. Only selection in the migration choice but not in labor force participation.
3. Living standard impact but not investment impact analysis (human capital, private productive assets, local public goods,...)
4. None general equilibrium consequences are tacking into account.

Conclusion (III)

- Further research requires more specific database
 - A panel database, following both households and migrants over the years, with all the needed characteristics on migrants: age, sex, marital status, education, work experience, former and current wages, country(ies) of destination, intent to return, etc.
 - Household surveys should at least include a migration module.

Table 3: Summary statistics

	Remittances-recipient households (n = 843)		Nonmigrant households (n= 3 631)		All households (n= 4 474)	
	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
Regressors						
Consumption per capita (1,000 Fcfa)	208	179	193	182	196	182
Household consumption (1,000 F CFA)	1,876	2,106	1,426	1,888	1,514	1,940
Household size	10.13	6.95	8.36	5.28	8.70	5.68
Owned hectares of cultivated land	4.36	6.07	3.82	9.46	3.92	8.90
Asset score	1.65	0.62	1.61	0.65	1.61	0.65
Number of household members...						
aged 60 years old or more	0.56	0.75	0.37	0.65	0.41	0.68
aged 25 to 60 years old	3.02	2.30	2.47	1.54	2.58	1.73
aged 15 to 25 years old	1.92	2.06	1.46	1.57	1.55	1.69
aged 15 or less	2.60	2.51	2.29	2.12	2.35	2.20
Aggregated years of education per household	8.22	14.31	7.64	12.76	7.75	13.08
Household head works in the formal sector (dummy)	0.10	0.30	0.17	0.37	0.15	0.36
Household head is a female (dummy)	0.09	0.29	0.08	0.27	0.08	0.28
Polygamous household (dummy)	0.33	0.47	0.25	0.43	0.26	0.44
Age of household head	52.00	14.94	48.10	13.63	48.86	13.98
Household lives in Kayes (dummy)	0.25	0.43	0.10	0.30	0.13	0.33
Household lives in Koulikoro (dummy)	0.12	0.32	0.15	0.36	0.14	0.35
Household lives in Sikasso (dummy)	0.09	0.28	0.17	0.37	0.15	0.36
Household lives in Segou (dummy)	0.06	0.24	0.20	0.40	0.17	0.37
Household lives in Mopti (dummy)	0.26	0.44	0.15	0.36	0.17	0.38
Household lives in Tombouctou/Gao/Kidal (dummy)	0.12	0.32	0.11	0.31	0.11	0.31
Household lives in Bamako(dummy)	0.10	0.30	0.13	0.33	0.12	0.33
Instruments	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
Fraction of the population in the district(*) having...						
Maraka or Soninké as mother tongue language	7.58	17.45	5.36	14.51	5.92	15.57
Sonrhai or Djerma as mother tongue language	6.95	16.53	6.26	15.76	6.20	15.70
Bambara or Malinké as mother tongue language	35.29	31.49	36.0	31.26	35.71	31.27
Peul or Foulfoubé as mother tongue language	9.01	13.79	8.28	13.26	8.25	13.20

Source: ELIM 2006, RGP 1998, authors' computations. (*) Households in the sample are located in 214 districts. in the sample.