

Remittances and Poverty in Mexico: A Propensity Score Matching Approach

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Objective

- To study the effect of receiving remittances on the poverty condition of Mexican households.
- Relevant questions: Who are the migrants? Are they poor or are they just above the poverty line? If they are poor, are remittances enough to allow migrant's families to leave poverty or remittances only help to mitigate poverty?

Are the migrants poor? Not everyone thinks so ...

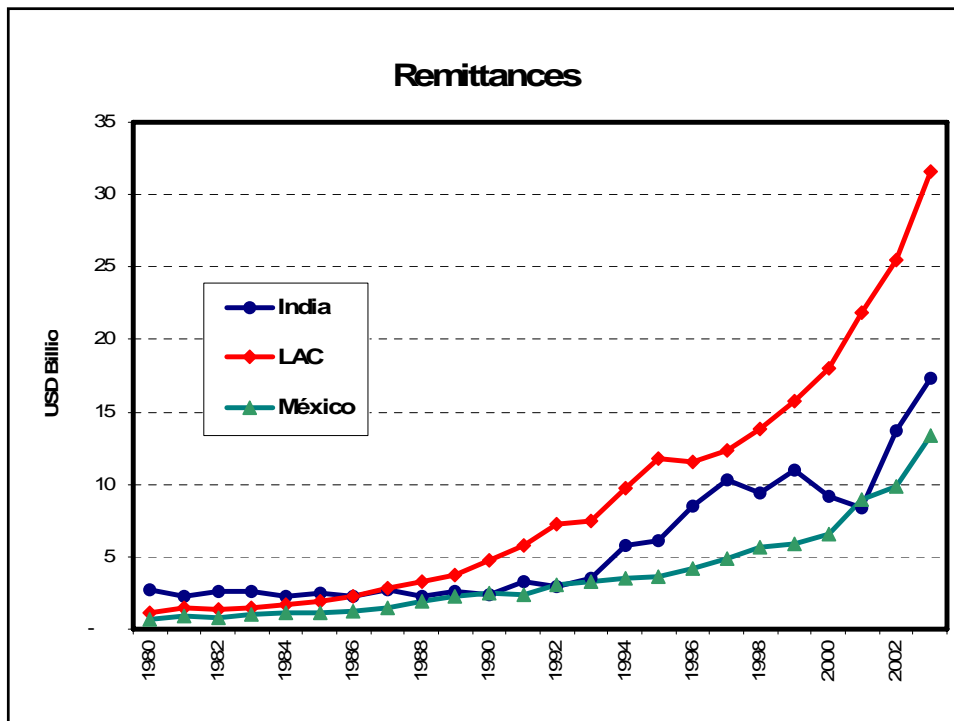
- Kapur (2004): "The fact that *migrants are not drawn from the poorest households* in their country of origin means that while remittances are poor-friendly, their direct effects on the poorest groups may be limited. Instead, the effects on structural poverty are likely to occur through substantial indirect effects ... "

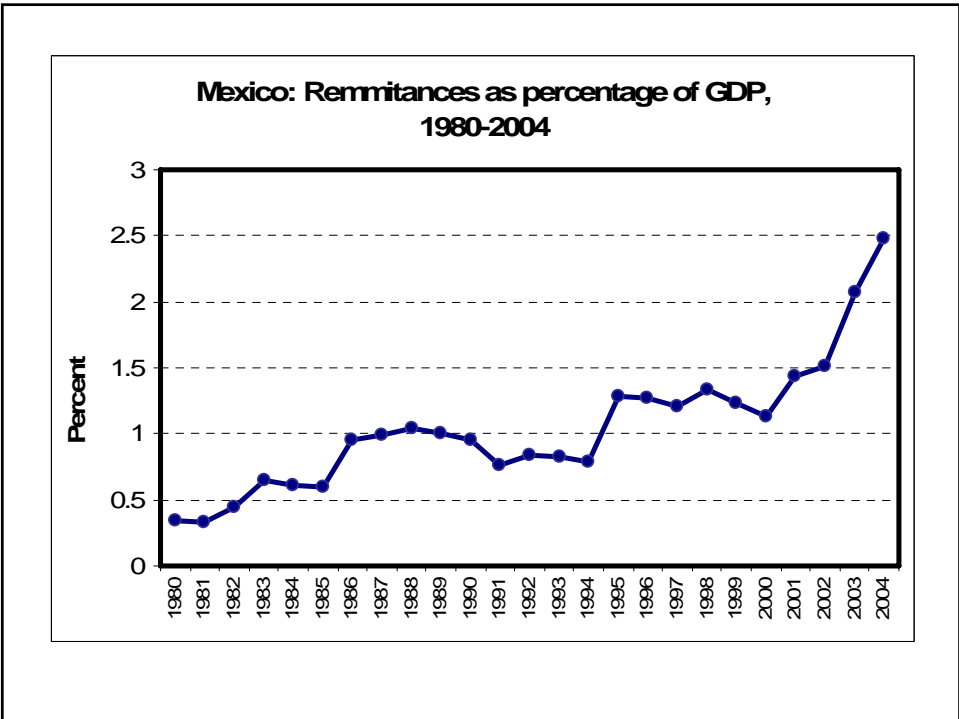
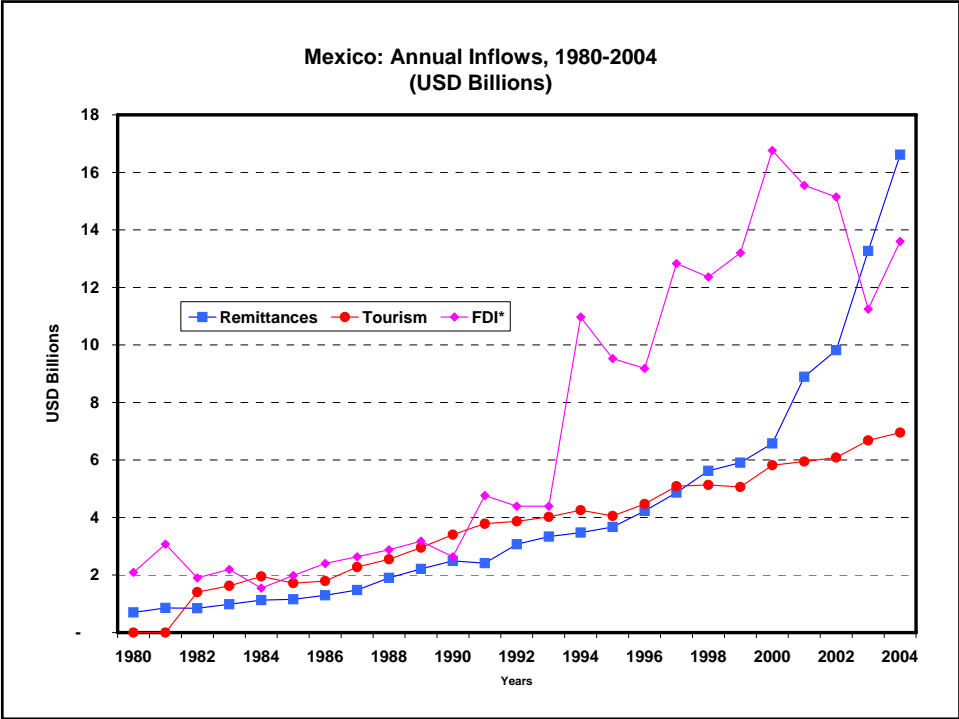
Are the migrants poor? Not everyone thinks so ...

- Adams and Rosen (2003) point out that "because of the considerable travel costs associated with international migration, *international migrants come from those income groups which are just above the poverty line* in middle-income developing countries".

Importance of remittances around the world

- Remittances have been steadily growing during the past 15 years.
- They are a very important source of external resources for many countries (second only to FDI)
- They may even be countercyclical.





Importance of remittances for Mexico

- Mexico is one of the largest recipient of remittances in the world (around USD\$ 20 billions in 2005)
- Remittances are now twice as large as tourism related inflows and for three consecutive years they have even been larger than total FDI.
- Remittances are equivalent to 2.5% of Mexican GDP.

Previous Literature

1. Adams and Page (2003): Cross-country study for 74 low and middle-income countries. They find a strong negative impact of remittances on the share of people living in poverty.
2. Lopez-Cordova (2005): Study on Mexico at the municipal level. He finds that increases in the fraction of households receiving international remittances is correlated with reductions in some dimensions of poverty.
3. Taylor, Mora and Adams (2005): Study on rural households in Mexico. They find that remittances are effective at reducing poverty. Problem: compare income before and after remittances, i. e., there is no counterfactual.
4. Adams (2004): Study on Guatemala. He finds that both internal and international remittances reduces the level, depth and severity of poverty. Counterfactual: imputed wages.

Data

- ENIGH 2002 (Nationally representative household survey)

- 17,167 households

- 72,602 individuals

Who receives remittances in Mexico?

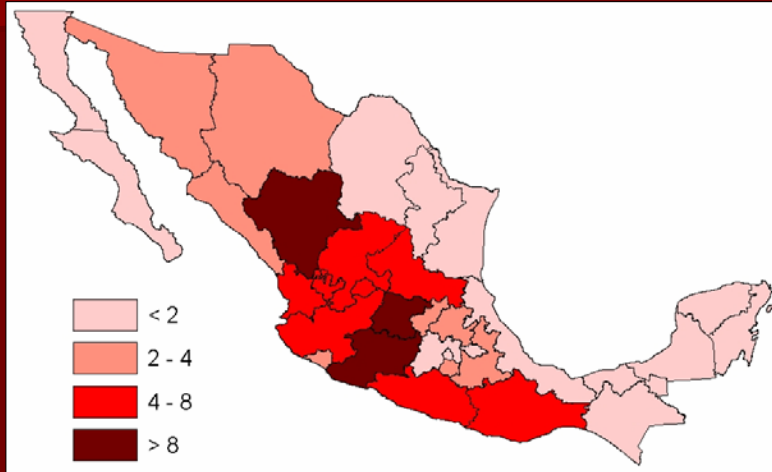
Share of households with remittances

	Total HH		Urban households		Rural households	
		%		%		%
R=0	23,248,183	94.31	15,172,730	96.87	8,075,453	89.85
R=1	1,401,986	5.69	489,998	3.13	911,988	10.15
Total	24,650,169	100	15,662,728	100	8,987,441	100

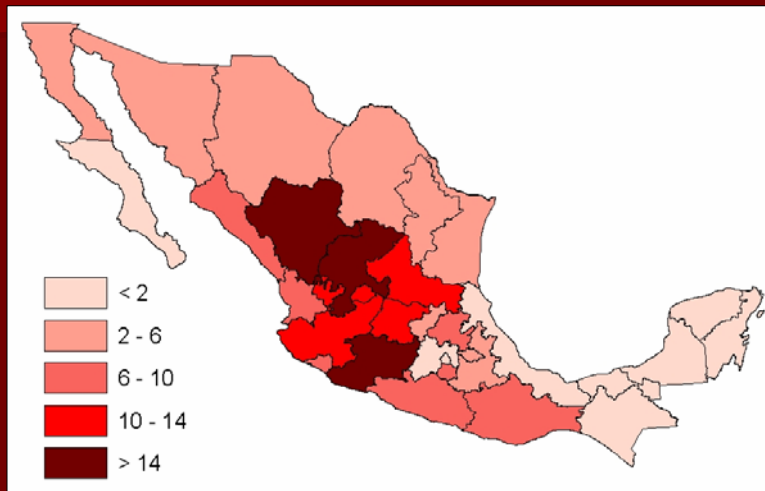
R=0: Households that do not receive remittances

R=1: Households that receive remittances

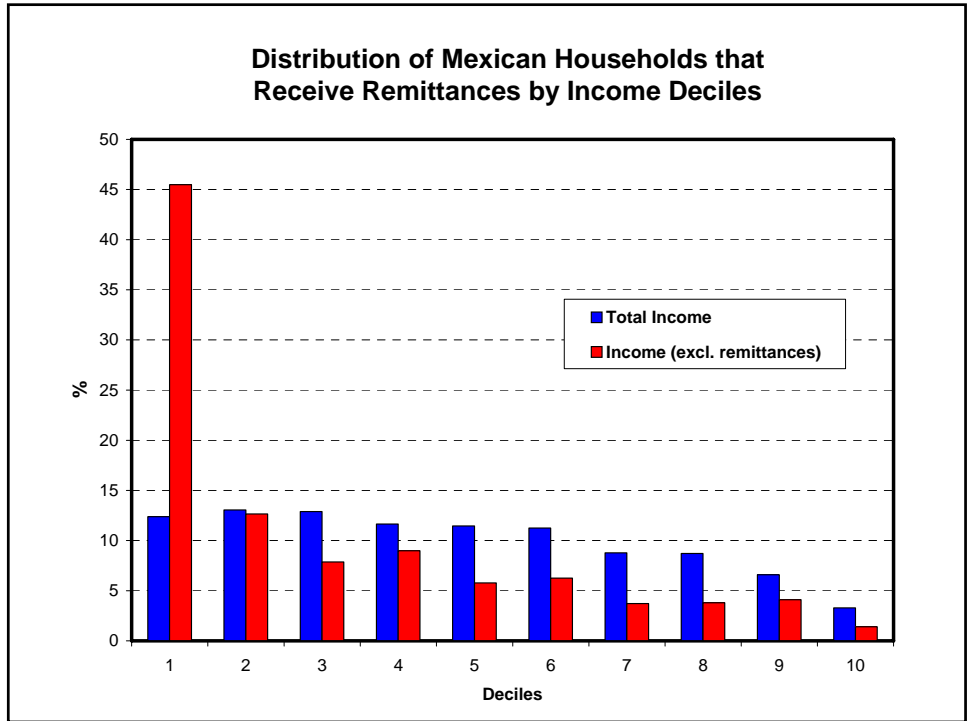
Distribution of Households Receiving Remittances by State
(as a percentage of total HRR)



Remittances receiving Households
(as a percentage of total households in the State)



Summary of mean household characteristics				
Variable	Sample		Population	
	R = 0	R = 1	R = 0	R = 1
N	16158	1009	23248183	1401986
Number of members in the house	4.2 (2.05)	4.09 (2.23)	4.12 (1.99)	3.98 (2.16)
Men	2.05 (1.3)	1.75 (1.35)	2.02 (1.27)	1.71 (1.33)
Women	2.15 (1.31)	2.33 (1.44)	2.1 (1.25)	2.27 (1.43)
Monthly monetary income	6036.932 (6955.52)	4594.556 (4120.52)	6846.277 (8071.22)	4463.68 (3806.025)
Monthly monetary income without remittances	6036.932 (6955.52)	2654.342 (3657.5)	6846.277 (8071.22)	2367.734 (3093.06)
Monthly net income	7058.452 (14031.22)	5241.878 (4399.85)	7998.681 (10283.96)	5149.693 (3883.95)
Monthly net income without remittances	7058.452 (14031.22)	3301.659 (3934.43)	7998.681 (10283.96)	3053.747 (3344.89)
Members younger than 5	0.43 (0.71)	0.44 (0.7)	0.39 (0.67)	0.4 (0.65)
Members younger than 10	1.25 (1.27)	1.37 (1.34)	1.14 (1.22)	1.31 (1.25)
Members older than 15	2.74 (1.31)	2.7 (1.25)	2.77 (1.32)	2.63 (1.22)
Members older than 15 without primary education	0.82 (1.03)	1.1 (0.99)	0.74 (0.99)	1.04 (0.97)
Members older than 15 with primary education	1.86 (1.33)	1.33 (1.26)	1.97 (1.35)	1.29 (1.22)
Members older than 15 with secondary education	1.23 (1.23)	0.71 (1.02)	1.36 (1.29)	0.64 (0.93)
Members older than 15 with high school education	0.5 (0.88)	0.19 (0.51)	0.59 (0.95)	0.17 (0.46)
Members older than 15 with bachelor's degree	0.14 (0.45)	0.043 (0.23)	0.17 (0.5)	0.031 (0.19)



Definitions of Poverty

■ Food-based poverty

- Income is not enough to cover basic food expenses (20 % of total population in 2002)
- Per capita income less than \$672 pesos if urban or less than \$495 pesos if rural.

■ Capabilities poverty

- Income is not enough to cover basic food, health, and education expenses (26.5% of total population in 2002).
- Per capita income less than \$793 pesos if urban or less than \$587 pesos if rural.

■ Assets-based poverty

- Income is not enough to cover basic food, health, education, dressing, home and public transportation expenses (50% of population in 2002).
- Per capita income less than \$1,367 pesos if urban or less than \$946 pesos if rural.

Problem

- We do not have data for the same households before and after receiving remittances.
- We do not have information about migrants' characteristics.
- At a given point in time we only observe households in one situation: they either receive remittances or do not, but we cannot observe both.

Approach

- We will consider receiving remittances as a "treatment".
- Households either receive a treatment or they don't.
- Problem: Self-selection.
- Identifying assumption: Treatment depends on observables.

Propensity Score Approach

- The propensity score is the probability of assignment to treatment conditional on pre-treatment variables:

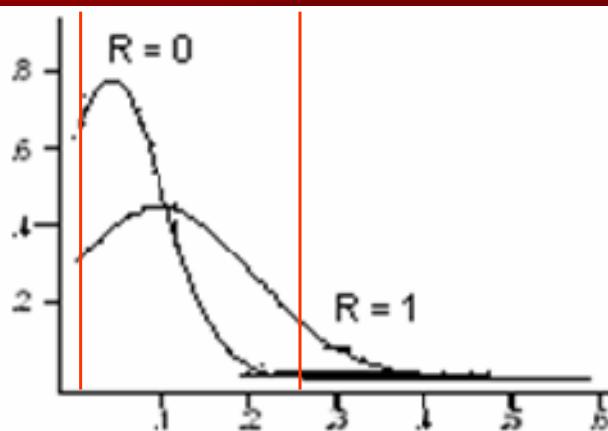
$$p(X) = \Pr[D = 1 | X] = E[D | X]$$

- We then use the propensity score to match households and to find the Average Treatment on the Treated effect (ATTE).

Four alternative ATT estimators

- Nearest-neighbor matching method (one-to one comparison)
- Radius matching method (one treated to many controls in a given radius)
- Kernel matching method (one treated to all controls)
- Stratification matching method (average treated to average controls within the same stratum)

Common Support: Example



Three Alternative Specifications

1. Whole Sample
2. Whole sample with a dummy for high-migration states
3. Restricted sample to households from high-migration states.

Estimación del DPROBIT							
Variable Dependiente: Dummy Hogares reciben remesas							
Muestra Completa. Primera Especificación							
Probit estimates				Number of obs = 15948			
				LR chi2(15) = 682.30			
				Prob > chi2 = 0.0000			
Log likelihood = -26.987.187				Pseudo R2 = 0.1122			
drem_hog	dF/dx	Std. Err.	z	P>z	x-bar	[95%	C.I.]
edad	0,008	0,001	6.81	0.000	472087,000	0,005	0,010
edad2	0,000	0,000	-4.80	0.000	2466,430	0,000	0,000
sexo	0,082	0,010	7.74	0.000	120379,000	0,062	0,103
edo_ci~d	0,016	0,004	3.68	0.000	0,742	0,009	0,024
rururb*	0,047	0,004	13.23	0.000	0,383	0,039	0,055
edu	0,033	0,007	4.89	0.000	465181,000	0,020	0,046
edu2	-0,001	0,000	-3.20	0.001	284529,000	-0,001	0,000
tam_hog	-0,006	0,001	-4.75	0.000	418015,000	-0,009	-0,004
mujeres	0,007	0,002	4.02	0.000	214597,000	0,004	0,010
eduedad	-0,001	0,000	-4.55	0.000	203898,000	-0,001	-0,001
edadsexo	-0,001	0,000	-5.25	0.000	579224,000	-0,001	-0,001
eduedad2	8,020	0,000	3.69	0.000	9840,400	0,000	0,000
e~_hijos	0,001	0,000	2.93	0.003	325727,000	0,000	0,002
banotipo	0,012	0,003	3.81	0.000	0,762	0,006	0,018
num_cua	0,007	0,001	7.03	0.000	284268,000	0,005	0,009

Efecto de las remesas en la pobreza de los hogares			
Muestra Completa. Primera Especificación			
	pobalim	pobcap	pobpatr
Nearest Neigh	-0.07	-0.06	-0.016
N. Tratados	755	755	755
No. Control	746	746	746
Error Estándar	0.02	0.02	0.027
t	-3.23	-2.49	-0.613
Error Est. Bootstrap	0.02	0.03	0.029
t	-2.73	-2.08	-0.573
Radius	-0.04	-0.03	-0.008
N. Tratados	753	753	753
No. Control	15033	15033	15033
Error Estándar	0.01	0.02	0.019
t	-2.95	-2.05	-0.443
Error Est. Bootstrap	0.01	0.02	0.017
t	-2.73	-1.86	-0.499
Kernel	-0.05	-0.04	-0.014
N. Tratados	755	755	755
No. Control	15040	15040	15040
Error Est. Bootstrap	0.01	0.02	0.017
t	-4.06	-2.64	-0.842
Strat	-0.06	-0.06	-0.029
N. Tratados	754	754	754
No. Control	51041	51041	51041
Error Estándar	0.01	0.02	0.019
t	-4.65	-3.68	-1.519
Error Est. Bootstrap	0.015	0.02	0.017
t	-4.341	-3.503	-1.765

Estimación del DPROBIT							
Variable Dependiente: Dummy Hogares reciben remesas							
Muestra Completa. Segunda Especificación							
Probit estimates		Number of obs		=	15948		
		LR chi2(15)		=	1044.85		
		Prob > chi2		=	0.0000		
Log likelihood = -25.174.445		Pseudo R2		=	0.1719		
drem_hog	dF/dx	Std. Err.	z	P>z	x-bar	[95%	C.I.]
edad	0,006	0,001	6,640	0,000	472087,000	0,004	0,008
edad2	0,000	0,000	-4,740	0,000	2466,430	0,000	0,000
sexo	0,063	0,008	7,410	0,000	120379,000	0,047	0,080
rururb*	0,025	0,005	5,550	0,000	0,383	0,015	0,034
edu	0,028	0,006	4,880	0,000	465181,000	0,017	0,039
edu2	-0,001	0,000	-3,910	0,000	284529,000	-0,001	0,000
tam_hog	-0,003	0,001	-3,520	0,000	418015,000	-0,005	-0,001
mujeres	0,006	0,001	3,960	0,000	214597,000	0,003	0,008
eduedad	-0,001	0,000	-4,160	0,000	203898,000	-0,001	0,000
edadsex	-0,001	0,000	-5,420	0,000	579224,000	-0,001	-0,001
eduedad	6,180	0,000	3,370	0,001	9840,400	0,000	0,000
sublrur	0,017	0,007	3,050	0,002	0,176	0,004	0,030
sub1*	0,042	0,004	10,630	0,000	0,398	0,034	0,051
banotip	0,011	0,003	3,930	0,000	0,762	0,006	0,016
num_cua	0,005	0,001	5,800	0,000	284268,000	0,003	0,006

Efecto de las remesas en la pobreza de los hogares			
Muestra Completa. Segunda Especificación			
	pobalim	pobcap	pobpatr
Nearest Neigh	-0.051	-0.048	-0.020
N. Tratados	755	755	755
No. Control	717	717	717
Error Estándar	0.02	0.02	0.027
t	-2.49	-2.09	-0.746
Error Est. Bootstrap	0.02	0.02	0.029
t	-2.22	-2.08	-0.711
Radius	-0.033	-0.025	-0.002
N. Tratados	754	754	754
No. Control	14565	14565	14565
Error Estándar	0.01	0.02	0.019
t	-2.50	-1.62	-0.101
Error Est. Bootstrap	0.01	0.02	0.019
t	-2.83	-1.60	-0.099
Kernel	-0.053	-0.046	-0.016
N. Tratados	755	755	755
No. Control	14565	14565	14565
Error Est. Bootstrap	0.01	0.01	0.016
t	-3.80	-3.42	-1.026
Strat	-0.065	-0.059	-0.031
N. Tratados	755	755	755
No. Control	14565	14565	14565
Error Estándar	0.01	0.02	0.017
t	-5.426	-3.667	-1.889
Error Est. Bootstrap			
t			

Estimación del DPROBIT							
Variable Dependiente: Dummy Hogares reciben remesas							
Submuestra							
Probit estimates		Number of obs		=	6343		
		LR chi2(15)		=	472.42		
		Prob > chi2		=	0.0000		
Log likelihood = -1722.14		Pseudo R2		=	0.1206		
drem_hog	dF/dx	Std. Err.	z	P>z	x-bar	[95% C.I.]	
edad	0,016	0,003	6,150	0,000	482831,000	0,011	0,021
edad2	0,000	0,000	-4,490	0,000	2583,790	0,000	0,000
sexo	0,160	0,026	6,130	0,000	121173,000	0,109	0,210
edo_ci~d*	0,030	0,010	2,780	0,005	0,742	0,010	0,049
rururb*	0,089	0,008	11,270	0,000	0,443	0,072	0,106
edu	0,071	0,015	4,540	0,000	435157,000	0,041	0,101
edu2	-0,002	0,001	-3,010	0,003	259666,000	-0,003	-0,001
tam_hog	-0,010	0,003	-3,360	0,001	426675,000	-0,016	-0,004
mujeres	0,012	0,004	3,170	0,002	221867,000	0,005	0,020
eduedad	-0,002	0,001	-4,060	0,000	192878,000	-0,003	-0,001
edadsexo	-0,002	0,000	-3,900	0,000	595685,000	-0,003	-0,001
eduedad2	0,000	0,000	3,230	0,001	9443,610	0,000	0,000
edociv~s	0,007	0,003	2,260	0,024	134495,000	0,001	0,014
banotipo*	0,033	0,007	4,340	0,000	0,734	0,019	0,046
num_cua	0,014	0,002	5,950	0,000	285953,000	0,009	0,018

Efecto de las remesas en la pobreza de los hogares			
Submuestra			
	pobalim	pobcap	pobpatr
Nearest Neigh	-0.080	-0.055	0.000
N. Tratados	588	588	588
No. Control	515	515	515
Error Estándar	0.03	0.03	0.032
t	-3.21	-2.02	-0.009
Error Est. Bootstrap	0.03	0.03	0.028
t	-2.82	-1.81	-0.01
Radius	-0.079	-0.070	-0.041
N. Tratados	583	583	583
No. Control	5692	5692	5692
Error Estándar	0.02	0.02	0.022
t	-5.02	-3.86	-1.859
Error Est. Bootstrap	0.02	0.02	0.026
t	-5.19	-3.39	-1.54
Kernel	-0.074	-0.063	-0.025
N. Tratados	588	588	588
No. Control	5693	5693	5693
Error Est. Bootstrap	0.01	0.02	0.023
t	-5.34	-3.56	-1.065
Strat	-0.077	-0.064	-0.022
N. Tratados	588	588	588
No. Control	5693	5693	5693
Error Estándar	0.02	0.02	0.023
t	-4.60	-3.37	-0.979
Error Est. Bootstrap	0.016	0.02	0.021
t	-4.708	-3.921	-1.043

Pscore versus simple LPM and Probit (first specification: whole sample)

Efecto de las Remesas en la pobreza de los hogares						
Muestra Completa. Primera Especificación						
			<i>Average Treatment Effect</i>			
	OLS	PROBIT	Nearest Neigh	Radius	Kernel	Strat
<i>Pobreza Alimentaria</i>						
Remesas	-0,067	-0,042	-0,07	-0,04	-0,05	-0,06
Error Estándar	0,012	0,008	0,02	0,01	0,01	0,015
<i>Pobreza de capacidades</i>						
Remesas	-0,062	-0,046	-0,06	-0,03	-0,04	-0,06
Error Estándar	0,013	0,011	0,03	0,02	0,02	0,02
<i>Pobreza de patrimonio</i>						
Remesas	-0.028*	-0.039*	-0,016	-0,008	-0,014	-0.0229*
Error Estándar	0,015	0,021	0,029	0,017	0,017	0,017

Pscore versus simple LPM and Probit (second specification: whole sample with dummy for high-migration states)

Efecto de las Remesas en la pobreza de los hogares						
Muestra Completa. Segunda Especificación						
	OLS	PROBIT	Average Treatment Effect			
			Nearest Neigh	Radius	Kernel	Strat
<i>Pobreza Alimentaria</i>						
Remesas	-0,074	-0,046	-0,051	-0,033	-0,053	-0,065
Error Estándar	0,012	0,007	0,02	0,01	0,01	0,01
sub1	0,017	0,02	0,61	0,61	0,61	0,61
Error Estándar	0,005	0,005	0,058	0,058	0,058	0,058
<i>Pobreza de capacidades</i>						
Remesas	-0,067	-0,05	-0,048	-0,025	-0,046	-0,059
Error Estándar	0,013	0,011	0,02	0,02	0,01	0,02
sub1	0,021	0,025	0,61	0,61	0,61	0,61
Error Estándar	0,005	0,006	0,058	0,058	0,058	0,058
<i>Pobreza de patrimonio</i>						
Remesas	-0,035	-0,052	0,02	-0,002	-0,016	-0,031
Error Estándar	0,015	0,02	0,029	0,019	0,016	0,017
sub1	0,049	0,074	0,61	0,61	0,61	0,61
Error Estándar	0,008	0,012	0,058	0,058	0,058	0,058

Pscore versus simple LPM and Probit (third specification: subsample)

Efecto de las Remesas en la pobreza de los hogares						
Submuestra 1						
	OLS	PROBIT	Nearest Neigh	Radius	Kernel	Strat
<i>Pobreza Alimentaria</i>						
Remesas	-0,084	-0,065	-0,08	-0,079	-0,074	-0,077
Error Estándar	0,015	0,011	0,03	0,02	0,01	0,016
<i>Pobreza de capacidades</i>						
Remesas	-0,072	-0,065	-0,055	-0,07	-0,063	-0,064
Error Estándar	0,016	0,016	0,03	0,02	0,02	0,02
<i>Pobreza de patrimonio</i>						
Remesas	-0,023	-0,039	0	-0,041	-0,025	-0,022
Error Estándar	0,018	0,025	0,028	0,026	0,023	0,021

Results

- We have found that remittances (regardless of the amount) reduce a household probability of being in poverty.
- This effect seems to be larger for extreme poverty, whereas is non existent for moderate poverty.
- Specifically, the effect of remittances on the probability of a household being in food-based poverty is of around -7.7% , whereas the effect of remittances in the probability of being in capabilities-based poverty is of only -6.3% .
- In other words, remittances help to mitigate the severity of poverty but do not help to get out of it.

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