An Integrated Analysis of Migration and Remittances: Modeling Migration as a Mechanism for Selection[1]

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Remittances to developing countries…

…amount to 126 billion US$ annually

…relax budget constraints of families, create investment opportunities in communities

…provide a pathway for **income redistribution** and poverty reduction

Question

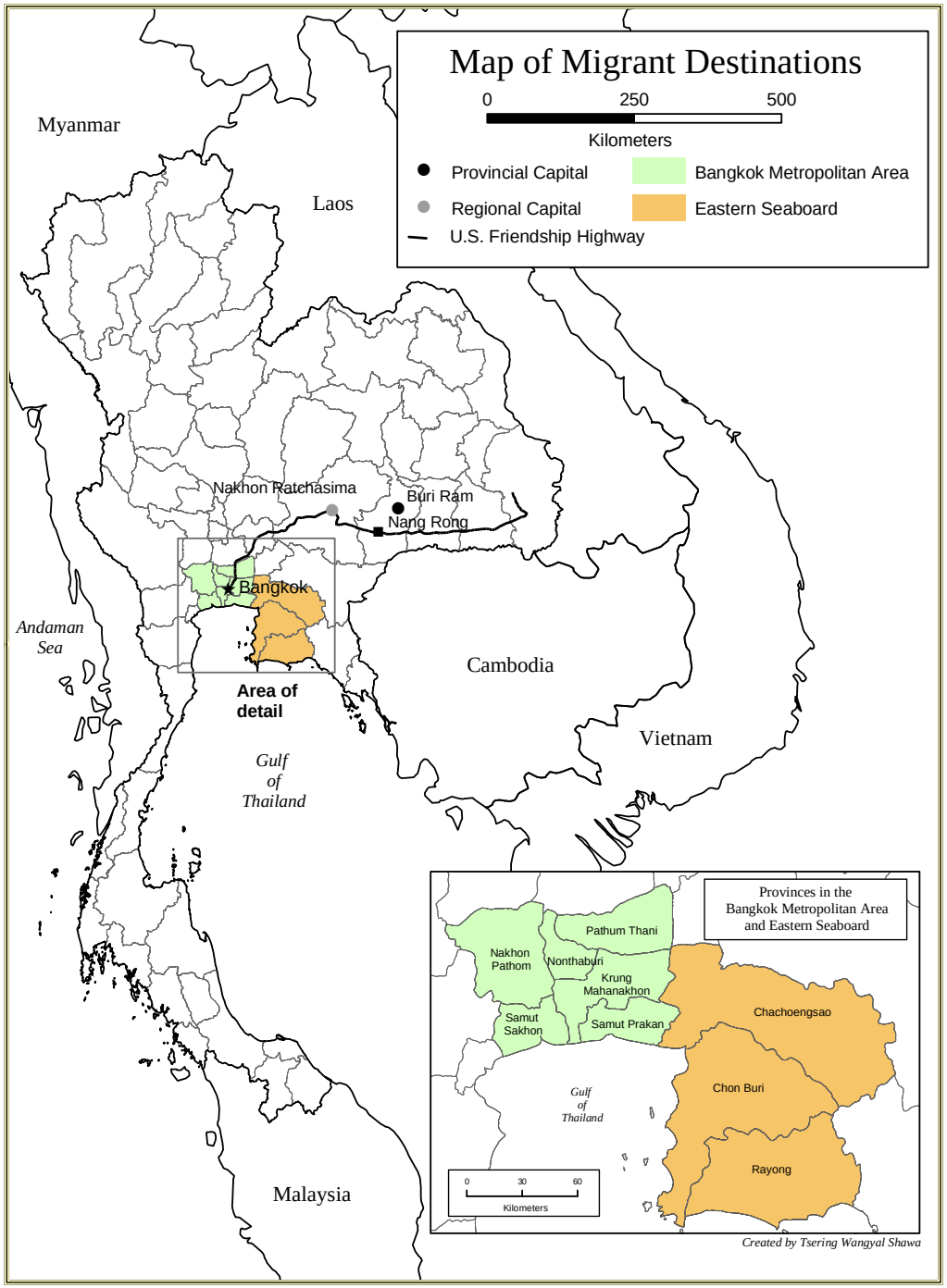
How do remittances affect **inequality** among households in origin communities?

Who migrates?

Who, among migrants, remits?

Prior work asked these questions **separately**, this study connects them.

Prior work relied on data from a few communities, this study exploits two of the largest data sets available.


Map of Migrant Destinations
0
250
500
Kilometers
Provincial Capital
Regional Capital
U.S. Friendship Highway
Bangkok Metropolitan Area
Eastern Seaboard
Myanmar
Laos
Nakhon Ratchasima
Buri Ram
Nang Rong
Bangkok
Andaman Sea
Area of detail
Cambodia
Vietnam
Gulf of Thailand
Malaysia
Provinces in the Bangkok Metropolitan Area and Eastern Seaboard
Pathum Thani
Nakhon Pathom
Nonthaburi
Krung Mahanakhon
Samut Sakhon
Samut Prakan
Chachoengsao
Chon Buri
Rayong
Gulf of Thailand
0
30
60
Kilometers
Created by Tsering Wangyal Shawa

My Argument

Migrants are not a random subset of the population, conclusions on remittances suffer from a **selection** effect.

Similar factors determine both migration and remittances, it is necessary to specify an **integrated model**.

This model leads to significantly **different conclusions** on remittances in two settings:

internal migration in Thailand (1994, 2000)

Mexico-U.S. migration in 1950-200

Study Setting: THAILAND

From mid-1980s to mid-1990s…

…economic growth averaged 9%

…economic base shifted from agriculture to exports

…rural-to-urban migration reached high levels

In 1997, Asian financial crisis hit Thailand, and led to…

…devaluation of the Thai currency, baht

…increasing unemployment

…decreasing rural-urban migration

Study Setting: MEXICO

Critical periods for migration to the United States…

1942-1964: Bracero program sponsored Mexican laborers

1965-1985: Era of undocumented migration

1986-2000: Post-IRCA (Immigration Reform and Control Act) period

Legalization of 2 million Mexican workers

Increasing chain migration

Who migrates?

Theory:	Characteristics that matter:
Microeconomics	Education, occupation
New Economics	Household wealth, income
Social Networks	Ties to prior migrants
Empirical Evidence:	
Micro-level	Age, sex, status within the family, number of children, family composition
Macro-level	Demand in destination, composition of population in origin, social norms in origin

Study Data

THAILAND: Nang Rong Surveys (22 Villages)

Household and village censuses (1984, 1994, 2000)

Migration histories of **all individuals** aged 13-41

Remittances to households (1994, 2000)

N ~ 12,000 individuals, 3000 migrants

MEXICO: Mexican Migration Project (118 Communities)

Random sample of ~200 hhs per community (1982-2006)

Migration histories of **household heads**

Remittances to households on the **last trip**

N ~ 18,000 individuals, 5000 migrants

Who migrates in THAILAND and MEXICO?

	Probit Coefficients	
	Thailand	Mexico
Household wealth		
Low land (<14 rai or 1 parcel)	0.37 **	0.02
Medium land (14-31 rai or 2 parcels)	0.31 **	0.12
High land (>31 rai or 3-4 parcels)	0.28 **	1.10 **
N	11945	17777

**p<0.01, *p<0.05.

“There are two points. The first point is that if you already have land, you shouldn’t migrate for work. You should stay at home and build a strong foundation…However, those who don’t have much land should migrate for work. It’s better to go ahead and take risks…[otherwise] your situation won’t improve. (Male migrant, 42)”

Who migrates in THAILAND and MEXICO?

	Probit Coefficients	
	Thailand	Mexico
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High land (>31 rai or 3-4 parcels)	0.28 **	1.10 **
Prior migration experience		
Trips by individual	0.42 **	-
Trips by household members	0.10 **	-
Trips by village members (per person)	0.85 **	-
Parents U.S. migrants?		0.41 **
Number of U.S.-migrant siblings		0.29 **
Proportion ever migrated in community		2.73 **
N	11945	17777

**p<0.01, *p<0.05.

“A lot of information is from prior migrants. They come home for a visit and recruit more people to work where they are working. I used to work in a factory. I recently changed jobs because I heard from my former co-factory worker, who resigned to work elsewhere, that the new job is better. So, I followed her there.” (Female migrant, 27)

“It is risky to go without help because we might end up not finding work at all.” (Male migrant, 22)

Who migrates in THAILAND and MEXICO?

	Probit Coefficients	
	Thailand	Mexico
Demographic characteristics		
Age	0.09 **	0.07 **
Age squared/100	-0.19 **	-0.10 **
Married	-0.35 **	0.03
Secondary education	0.26 **	-0.31 **
Advanced education	0.36 **	-0.73 **
Person is the youngest daughter?	0.38 **	-
Person is an elder daughter?	0.57 **	-
Person is a son?	0.52 **	-
Children in household	0.12 **	-0.01
N	11945	17777

**p<0.01, *p<0.05.

Who remits?

Underlying Motive:

Altruism

Contract involving…

…insurance

…past debts

…exchange

…inheritance

“I send remittances to my [younger] sister because she takes care of my parents.” (Female migrant, 32)

“They will always send because they left their children with me.” (Mother of a migrant, 80)

“If the children want to have high education, the parents have to borrow money with 20 percent interest. After the children graduate and work, they have to remit money to their mother to repay the debt.” (Mother of a migrant, 54)

“If I didn’t remit money to support the family, the family had to borrow money from others. I had to send money to support my family.” (Female migrant, 28)

MEXICO (Quotes from Suro et al., 2002)

“I send them the money because they count on it. Then afterwards I pay the bills, my rent, but the first thing I do is send it.” (Female migrant from Mexico)

“One part is for savings, the other part for the primary necessities like education. It depends on my wife and the priorities she has. So I go ahead and send the money, and it just goes where she uses it.” (Male migrant from Mexico)

Who remits?

Underlying Motive:	Characteristics that matter:
Altruism	(Lack of) contractual motives
Contract involving…	
…insurance	Risks that migrants face
…past debts	Costs of migration or education
…exchange	Provision of child-care by family
…inheritance	Wealth

Why does selectivity matter?

Remittances are observed for migrants, a non-random subset of the population, leading to **selection bias**.

Threat to external validity: Wrong conclusions about the distributional impact of remittances in the **overall population**

Threat to internal validity: Potentially wrong conclusions about the determinants of remittances even **among migrants**

An Integrated Model of Migration and Remittances

Let y_1^* and y_2^* be latent variables that measure migration and remittances respectively

$$y_1^* = x_1\beta_1 + \varepsilon_1$$
$$y_2^* = x_2\beta_2 + \varepsilon_2$$

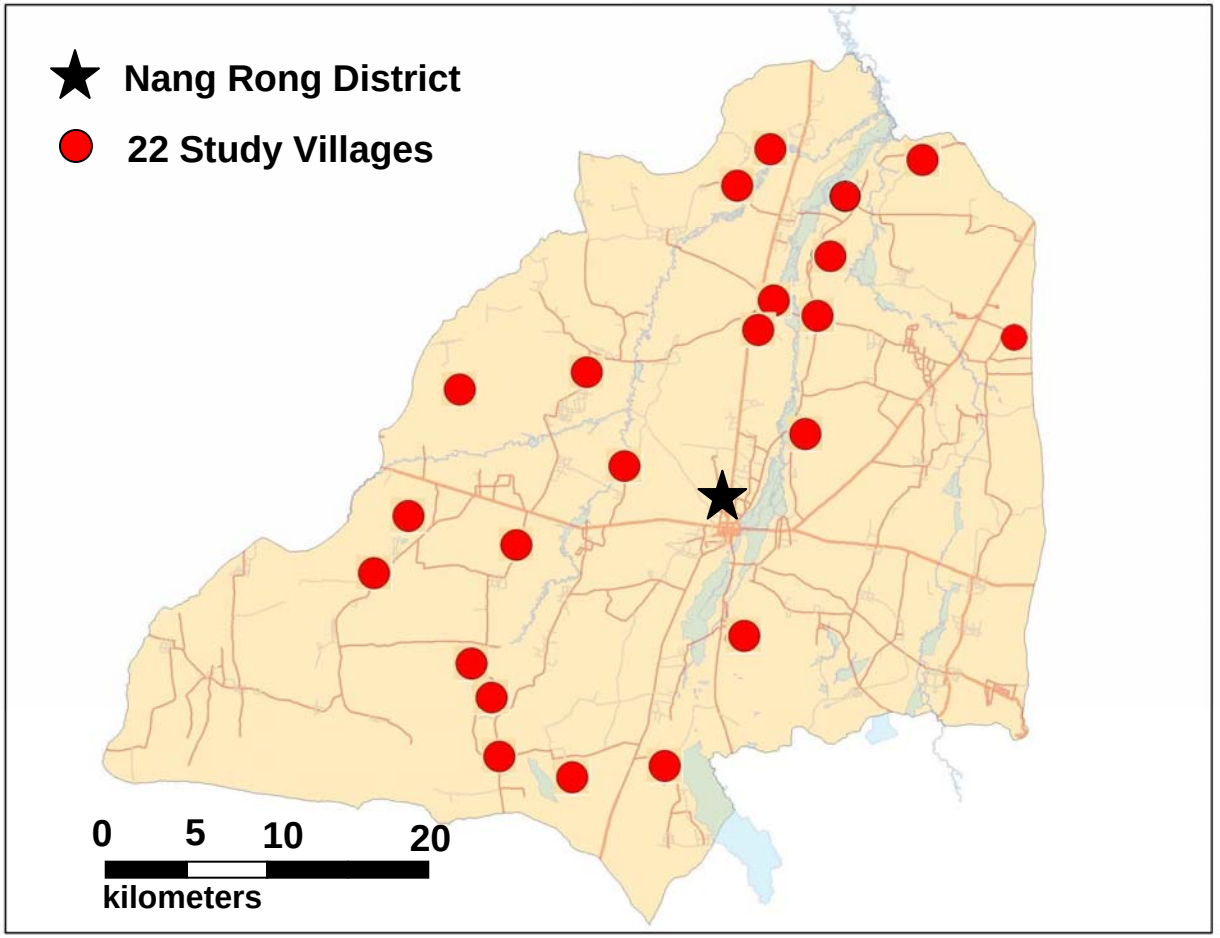
We observe their binary realizations, y_1 and y_2. Also, we only observe remittances, y_2 , if a person migrates, $y_{1i}^* > 0$

We can estimate separate probit models only if the error terms are uncorrelated, that is, $corr(\varepsilon_1, \varepsilon_2) = \rho = 0.$

To estimate ρ , instead of assuming it is zero a priori, we can use a variant of Heckman's two-step selection model, leading to a **censored bivariate probit** specification.

Geographic Variation as an Instrument for Selection

THAILAND



THAILAND: Does Distance Matter?

Variable	Migration			
	1		2	
Distance				
Time to district (hours)	2.63	**	1.59	**
	(0.56)		(0.52)	
Time to district squared	-1.77	**	-0.99	**
	(0.37)		(0.35)	
Household wealth, demographic characteristics, prior migration experience	no		yes	
N	11945		11945	
R^2	0.01		0.20	

**p<.01, *p<.05. Standard errors (in parentheses) are adjusted for household-level clustering.

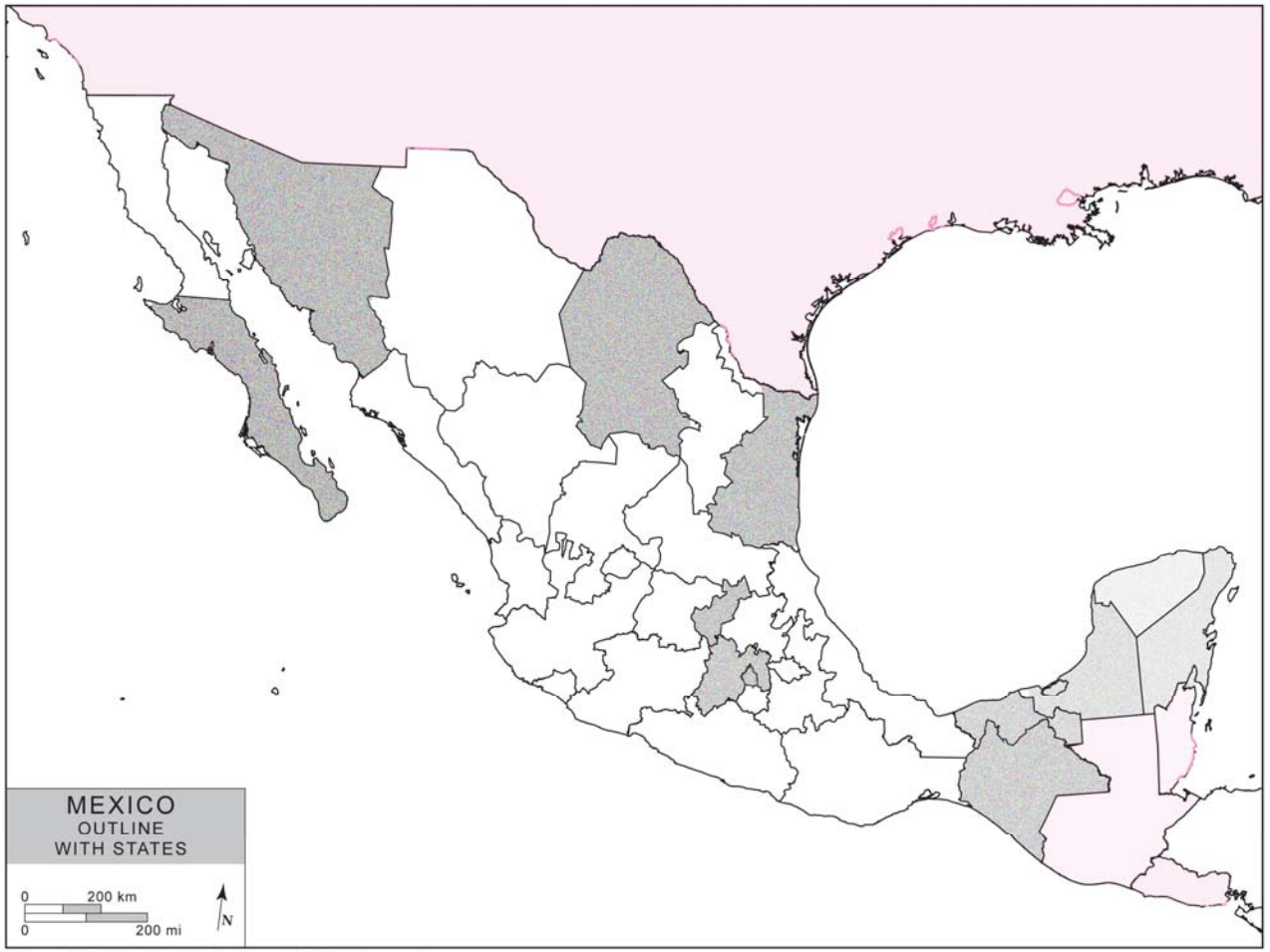
THAILAND: Does Distance Matter?

Variable	Migration		Remittances	
	1	2	3	4
Distance				
Time to district (hours)	2.63 **	1.59 **	0.95	0.75
	(0.56)	(0.52)	(1.16)	(1.24)
Time to district squared	-1.77 **	-0.99 **	-0.76	-0.58
	(0.37)	(0.35)	(0.80)	(0.86)
Household wealth, demographic characteristics, prior migration experience	no	yes	no	yes
N	11945	11945	2706	2706
R^2	0.01	0.20	0.00	0.05

**p<.01, *p<.05. Standard errors (in parentheses) are adjusted for household-level clustering.

Geographic Variation as an Instrument for Selection

MEXICO



MEXICO: Does Distance Matter?

Variable	Migration	
	1	**2**
Distance		
Kilometers to U.S. border	-0.29 **	-0.23 **
	(0.04)	(0.05)
Household wealth, demographic characteristics, prior migration experience	no	yes
N	17777	
R^2	0.03	0.25

**p<.01, *p<.05.

MEXICO: Does Distance Matter?

Variable	Migration		Remittances	
	1	2	3	4
Distance				
Kilometers to U.S. border	-0.29 **	-0.23 **	-0.08	-0.08
	(0.04)	(0.05)	(0.09)	(0.09)
Household wealth, demographic characteristics, prior migration experience	no	yes	no	yes
N	17777		5334	5334
R^2	0.03	0.25	0.02	0.08

**p<.01, *p<.05.

THAILAND: Wealth, Migration & Remittances

Variable	Migration (1)		Remittances (2)
Household wealth			
Land owned < 14 rai	0.37	**	0.17
	(0.08)		(0.11)
Land owned 14-31 rai	0.31	**	0.19
	(0.08)		(0.11)
Land owned >31 rai	0.28	**	0.09
	(0.08)		(0.11)
N	11945		2706
R^2	0.20		0.19

**p<0.01, *p<0.05. Standard errors are adjusted for household-level clustering.

Migration model includes indicators for demographic characteristics, and prior migration experience. Remittance models additionally include indicators of migrant's ties to origin household, occupation and destination.

THAILAND: Wealth, Migration & Remittances

Variable	Migration (1)		Remittances (2)	Remittances (3) Selection bias corrected	
Household wealth					
Land owned < 14 rai	0.37	**	0.17	0.31	**
	(0.08)		(0.11)	(0.11)	
Land owned 14-31 rai	0.31	**	0.19	0.30	**
	(0.08)		(0.11)	(0.10)	
Land owned >31 rai	0.28	**	0.09	0.21	*
	(0.08)		(0.11)	(0.11)	
				0.58	*
				(0.19)	
N	11945		2706	2706	
R^2	0.20		0.19	-	

**p<0.01, *p<0.05. Standard errors are adjusted for household-level clustering.

Migration model includes indicators for demographic characteristics, and prior migration experience. Remittance models additionally include indicators of migrant's ties to origin household, occupation and destination.

MEXICO: Wealth, Migration & Remittances

Variable	Migration (1)		Remittances (2)	
Household wealth				
Land owned: 1 parcel	0.02		0.20	*
	(0.04)		(0.08)	
Land owned: 2 parcels	0.12		0.41	*
	(0.08)		(0.17)	
Land owned: 3 or 4 parcels	1.10	**	-0.40	*
	(0.15)		(0.17)	
∀				
N	17777		5334	
R^2	0.25		0.13	

**p<0.01, *p<0.05. Standard errors are in parentheses.

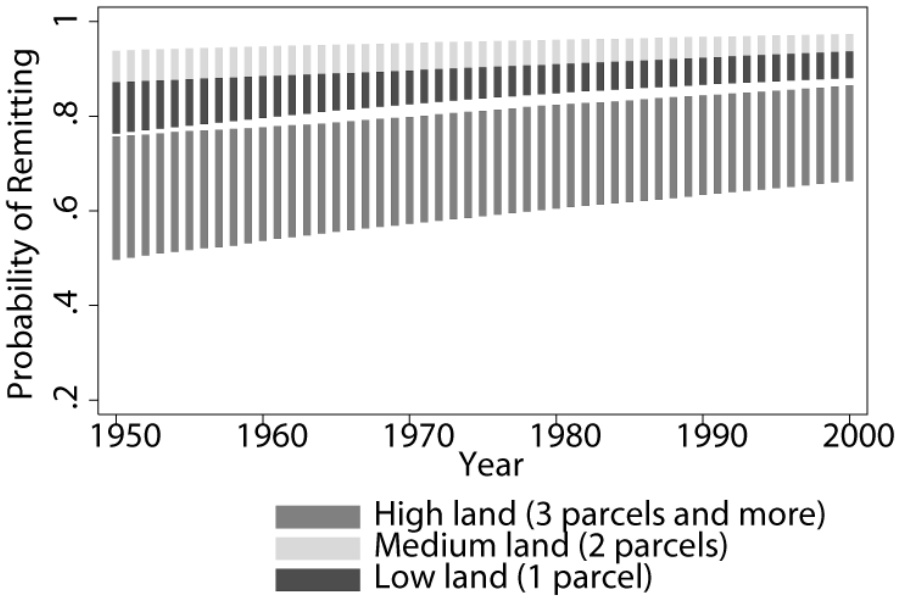
MEXICO: Wealth, Migration & Remittances

Variable	Migration		Remittances			
	(1)		(2)		(3) Selection bias corrected	
Household wealth						
Land owned: 1 parcel	0.02		0.20	*	0.20	*
	(0.04)		(0.08)		(0.08)	
Land owned: 2 parcels	0.12		0.41	*	0.43	*
	(0.08)		(0.17)		(0.17)	
Land owned: 3 or 4 parcels	1.10	**	-0.40	*	-0.29	
	(0.15)		(0.17)		(0.18)	
$\forall$					0.21	*
					(0.11)	
N	17777		5334		5334	
R^2	0.25		0.13		-	

**p<0.01, *p<0.05. Standard errors are in parentheses.

MEXICO: Changes in Conclusions?

Probability of Remitting by Year*



* Vertical bars indicate 95% confidence intervals.

MEXICO: Changes in Conclusions?

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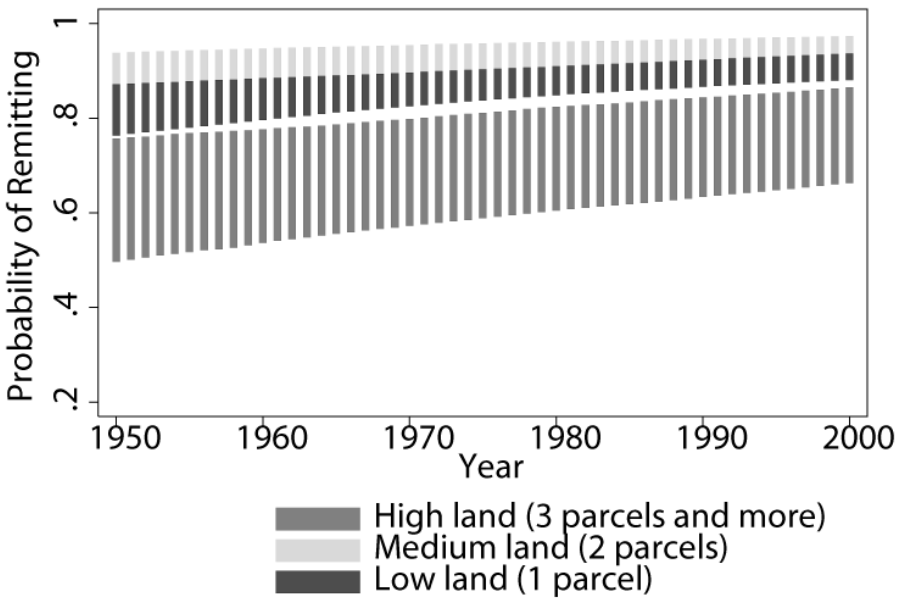

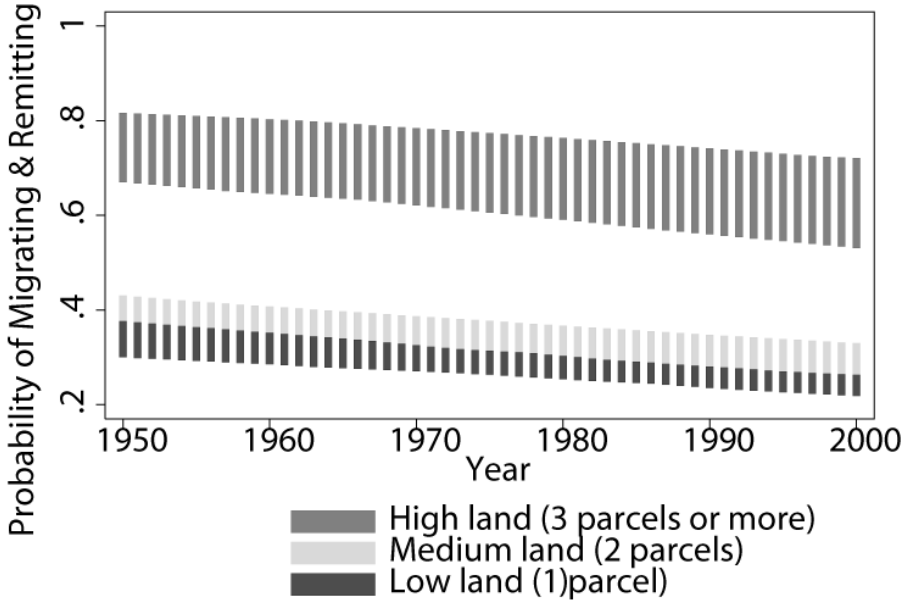

* Vertical bars indicate 95% confidence intervals.

Contributions

The study proposes an **integrated model** of migration and remittances, which takes into account selectivity.

The model is tested on two of the **largest migration data** sets available, representing two very different contexts for migration.

Empirical results from both settings show that our conclusions about the determinants and consequences of remittances **change dramatically** using the integrated model.