Network Effects in Migrant Remittances: Evidence From Household, Sibling, and Village Ties in Nang Rong, Thailand

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Abstract

Migrant remittances comprise an important capital source for developing countries. Research connects migrants' remittance behavior to altruism, exchange, insurance, and investment motives or to a desire to maintain options available through origin communities. This study provides an alternative "network" perspective: Remittance behavior may depend on the remitting patterns of those in one's social ties—(a) to members of the origin household; (b) to members of "sibling" households, where a member of the ego household has a sibling; and (c) to members of the origin village. We use censuses from 51 villages in Nang Rong, where one in four residents migrated to internal destinations in either 1994 or 2000, and about one in two migrants remitted to their origin households. We observe network effects: Migrants' likelihood of remitting increases with the number of remitters in the household and with the share of remitters in the village, net of village and year fixed effects, and other potential confounders. We link the former pattern to inheritance-seeking behavior in the household, and the latter to shared norms in the village.

Remittances, funds and goods sent by migrants to origin households and communities, are critical to understanding economic outcomes in developing countries. Remittances

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extend household budgets, diversify risks in volatile economies (Lauby & Stark, 1988), and often lead to productive investments, allowing recipient households to develop small businesses, give better education to their children, and accumulate assets (Edwards & Ureta, 2003; Massey & Parrado, 1994). These flows shape trends in poverty and distribution of income and wealth in receiving countries (Adams & Page, 2005; Garip, 2012b).

Studies offer several explanations for why migrants remit. Migrants remit to improve their household's welfare according to the *altruistic* explanation (Banerjee, 1984), while they remit to buy services or secure inheritances from households based on the *exchange* view (Cox, 1987). Migrants remit as part of a mutual risk diversification arrangement with the household in the *insurance* explanation (Stark & Levhari, 1982), and to repay past loans in the *investment* view (Stark & Bloom, 1985).

Each of these explanations assumes the unit of analysis (individual or household) to be independent from the larger social structure. Roberts and Morris (2003) challenged this assumption with their *option* theory, which asserted that migrants remit to retain membership in their community, and thus, to access information on employment opportunities in new destinations. Piotrowski (2006) found support for this theory among internal migrants in Thailand, who were less likely to remit to households that were not well connected, and thus, not privy to information about different migrant destinations.

Building on this work, our study offers a general perspective on social interdependencies in remittance behavior. There is abounding evidence on how a wide range of individual behaviors, including migration, is associated with the prevalence of those behaviors in social groups. We argue that remittances are also subject to such network effects.

Competing Accounts of Remittance Behavior

Research provides four competing models that relate remittance behavior to altruistic, exchange, insurance or investment motives. Table 1 lists the predictions of each, along with the corresponding indicators from the study data.[1]

The altruistic model suggests a migrant remits to improve the household's welfare, equating that to her own (Banerjee, 1984). Empirical work tested two predictions from this model: Remittances increase with migrant's income in destination, and household's economic needs in origin (Funkhouser, 1995). In our data, these predictions imply remittance propensities will be higher for migrants (a) with higher income, (b) from households with dependents, (c) from villages with water shortage (which implies risks to farm earnings), but lower for those (d) from households with assets, members in nonagricultural work and in diverse economic activities and (e) with multiple migrants.

The exchange model argues migrants remit to buy services, secure inheritance from household, or integrate easily on return (Cox, 1987). This model predicts that remittance probability is higher for migrants (a) who are potential heirs, or from households with (b) inheritable assets or (c) multiple migrants, where remittances are used to

Table 1. Empirical Predictions of Remittance Theories.[a]

Variables (measures in Nang Rong data)	Expected relationship by theory					
	Altruism	Exchange	Insurance	Investment	Option	Network
Migrant's education (advanced > secondary > primary)		−		+		
Migrant's heir status (youngest daughter > older daughter > son)		+				
Migrant's income (factory > service > construction occupation)	+	+		+		
Risks to migrant's income (unemployment rate in occupation)			+			
Dependents in household (number of children and seniors)	+	+				
Number of migrants from household (current migrants excluding index migrant)	−	+				
Household assets (land and cattle)		+				
Household income (land, cattle, number of economic activities)	−					
Risks to household subsistence or income (months of water shortage)	+		+	+		
Investment opportunities in community (school and years since electrification)				+		
Sibling networks (number and density of ties)					+	
(isolates in village)					−	
Remittance behavior in networks (number of remitters in household, sibling ties and village)						+

[a]Expected relationships for altruism, exchange, insurance, and investment theories are taken from Rapoport and Docquier (2006, p. 1163).

compete for inheritance (Hoddinott, 1994). The model implies that remittance propensity is higher for migrants (d) with higher income and (e) with dependents in origin, where remittances can serve as a payment for dependents' care (Lee, Parish, & Willis, 1994). The model also makes a distinctive prediction that remittance propensity will be lower for migrants (f) with high education, who are less likely to return home, and thus to expect household favors.

In the insurance model, remittances are a part of a mutual risk diversification arrangement between the migrant and household (Stark & Levhari, 1982). The migrant often works in a different region or sector, and her wages provide a hedge against the risks to origin earnings. The model implies remittances increase with risks to (a) migrant's earnings in destination or (b) household's earnings in origin.

In the investment model, remittances are a repayment for household's investment in the migrant, for example, loans to cover education or migration costs. Predictions include higher remittances from migrants who require more investment, for example, those who (a) are more educated, (b) are in a farther away destination, and (c) earn higher incomes (Hoddinott, 1994). The model also expects higher remittances to (d) households that face greater risks to origin earnings.

A Network Explanation for Remittance Behavior

The prominent explanations focus on economic incentives alone, overlooking the social structure that might help generate or sustain remittance flows. Few studies have considered how social ties in origin or destination shape remittance propensities. Massey and Basem (1992) found that Mexican migrants with family members in the United States are more likely to remit home, linking this pattern to resources those family members can offer such as finding better-paying jobs or providing safe channels to send remittances. Roberts and Morris (2003) observed that Mexican migrants are more likely to remit if they find their employment through social ties or if their origin community members are dispersed to diverse locations in the United States. Migrants, the authors conjectured, remit to affirm membership in their origin community networks, which gives them the option to access information on job opportunities in different destinations.

Piotrowski (2006) provided evidence for this so-called option theory from Thai internal migration, where urban migrants remit less to their rural households that are isolates (unconnected nodes) in village rice-harvesting networks. Such households, the author argued, are less likely to access information about opportunities in migrant destinations, and hence, to receive remittances from option-seeking migrants.

These studies suggest how migrants' remittance behavior may depend on certain qualities of their social group, for example, the ability to control resources of information, but do not explore network effects, as we understand them, where remittance behavior may depend on the prevalence of that behavior in one's social group. This gap is surprising given the plethora of research establishing how migration behavior is often conditioned on prior migrants in one's family or community (Garip, 2008; Massey & García-España, 1987).

This study argues that migrants' likelihood of remitting will depend on the remittance behavior in their household, among kin, and in their community, the three social groups that our data measure. The mechanisms generating the network effects, however, will be different for each social group.

In the household, two factors—household's economic needs and migrant's heir status—generate network effects in remitting behavior. If remittances are directed to meet household needs without any future expectations on the part of the migrant, as in the altruistic explanation, then the presence of other remitting migrants to household implies a diffusion of responsibility, deterring a migrant from remitting herself. In this case, a migrant's propensity to remit declines with the number of remitters in the household, and the decline is steepest for wealthier households, who need the remittances least. If, on the other hand, remittances are meant to secure future inheritance, as in the exchange view, the presence of other remitting migrants might create a competition in the household to send more remittances. Then, a migrant's propensity to remit increases with the number of remitters in the household, and the rate of increase is higher for potential heirs, who are most likely to inherit.

Among kin and village members, we envision two mechanisms for interrelated remitting behavior. The first mechanism—relative deprivation—derives from the insight that households send migrants not only to increase absolute income, but also to reduce relative deprivation with respect to some reference group (Stark & Taylor, 1989), which implies cascading remittance behavior. Imagine household H sends a migrant to Bangkok and starts receiving remittances. Now households connected to H feel relatively deprived, and some of them decide to send migrants and collect remittances as well. This further increases deprivation of others, inducing them to send migrants, and expect remittances, and so on. This mechanism implies two hypotheses. First, a migrant's propensity to remit increases with the share of remitters in her social group (kin and village members). Second, the rate of increase is highest for the poorest households, who are the most deprived.

Another mechanism is migrant social capital—information or assistance from prior migrants—which increases the likelihood of migrating. Studies show that these resources affect remittance behavior directly. We argue the resources can also impact remittance behavior indirectly. Imagine, again, household H sends a migrant to Bangkok, who brings information about jobs back to the village. Now other households connected to H learn about these jobs and some of them can also send migrants. Those new migrants supply more information through their networks, propelling more individuals to migrate. Returning to the migrant from household H, if she wants to access information about new jobs through her origin village, she should retain ties to her household. One way to achieve that is to send remittances, the option theory suggests. We argue that the migrant will be more likely to use remittances as a way of retaining ties if others in her social group are also doing so. Specifically, we expect that a migrant's propensity to remit increases with the share of migrants or remitters in her social group (kin and village), and the rate of increase is lowest for migrants in (highest-paying) factory work, who need origin networks the least.

A final mechanism for network effects is shared norms. We argue that migrants are more likely to respond to remitting behavior of those occupying similar social categories. In Thailand, gender and birth order are critical dimensions determining an individual's role within the household. Research shows that daughters remit more than sons, and older daughters more than the younger due to Buddhist tradition assigning religious merit to women supporting their families and to inheritance norms that favor daughters, the youngest daughters in particular, who often receive the homestead and a larger portion of the land in return for caring for elderly parents (VanWey, 2004). The shared-norm mechanism implies that a migrant's propensity to remit increases with the share of remitters in her social category (youngest daughter, older daughter, son or other), not with the share of remitters in other categories.

Data and Methods

The data come from Nang Rong, a poor district of the Buriram Province in Northeastern Thailand.[2] Internal migrant streams from this region proliferated in the mid-1980s, when Thailand's annual economic growth averaged 9%, creating demand for migrant labor in urban destinations. Economic growth slowed in the mid-1990s, and came to halt with the 1997 Asian financial crisis, tempering the rate of rural–urban migration. Our data cover 1994 and 2000, roughly the boom and bust periods of the economy, respectively.

Nang Rong surveys were collected in three waves: 1984, 1994, and 2000. Each wave included a census of 51 villages with questions on migration histories, household economic activities, and village institutions. The 1994 (2000) census contains information on 40,846 (46,722) individuals in 7,331 (8,638) households. The surveys also contain complete social network data across sibling relations. Sibling ties link each household to other households in the village, where a sibling of a member of the ego household lives.[3] Figure 1 shows the variation in the structure of sibling networks in three villages in 1994 and 2000. Nodes (circles) indicate households, and edges (lines) a sibling relation between any two members of the ego and alter households. Isolates are not shown. Sibling networks in Villages A and C have several components (sets of connected nodes), while Village B sibling network has few. The density of ties (ratio of existing to all possible ties) is highest in Village B (0.022) followed by Village A (0.013) and Village C (0.010). In all three villages, the structure of sibling ties changes from 1994 and 2000; the average degree and density increases, while isolates decline.

The option theory suggests remittance behavior depends on the structure of social ties, predicting migrants are less likely to remit to households that are less connected, to which information about employment opportunities flows less freely. We test this prediction with sibling network indicators at the village level: (a) the average degree (number of ties) across households, (b) the density of ties and (c) the number of isolates. We expect remittance propensity to increase with average degree and density, but to decline with the number of isolates.

Our dependent variable is a binary indicator for remittance behavior among migrants—individuals who were members of their households in 1984 (1994), but
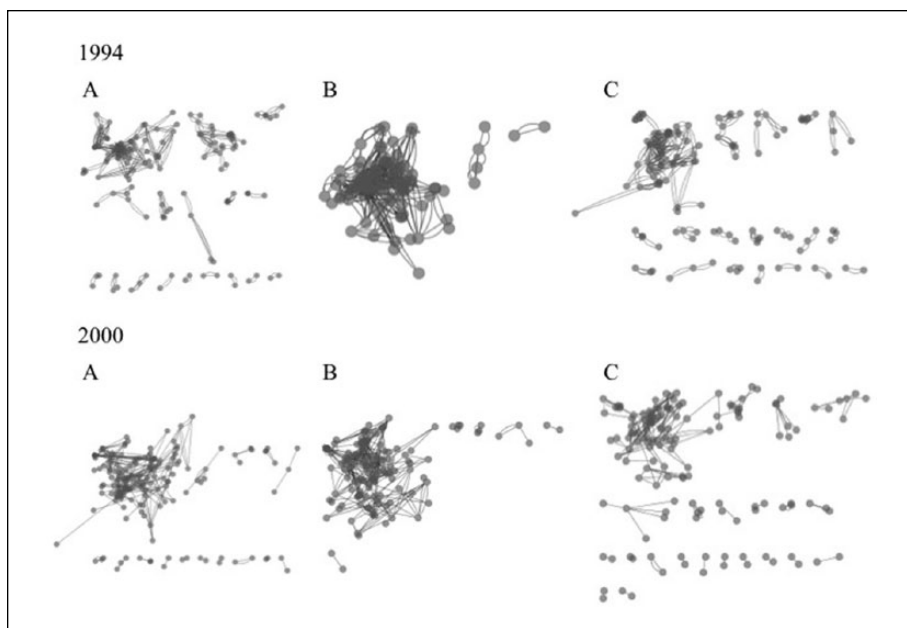
Figure 1. The structure of sibling networks in three selected villages in 1994 and 2000.

moved out of the village 2 months or more prior to the 1994 (2000) survey. Remitters are migrants who sent money or goods to their households during the 12 months preceding the survey (as reported by the origin household members).

We measure education using three indicators (primary, middle, and high school or more) and heir status with indicators for whether the person is the youngest daughter, older daughter, or son, ordered in descending likelihood of receiving remittances. We include dummies for factory, service or construction worker, which, in descending order, proxy migrant's income in destination. The total number of children (of women younger than 30 years) and number of seniors (older than 64 years) measure household dependents. The number of migrants (excluding the individual) captures potential competition in household for future inheritance, or the alternative economic resources available to the household. Three land categories (1-14 rai, 14-31 rai, 31 rai or higher; 1 rai = 0.4 acre) and logarithm of cattle owned represent major household assets. The number of household members in a nonagricultural occupation and the number of economic activities (silk weaving, silk worm raising, other cloth weaving, charcoal making), also proxy household income. The months of water shortage in year capture droughts, which can be detrimental to household subsistence or income. The presence of a school and the years since electrification measure village development level. The number of remitters in household, the proportion of remitters in the sibling network and village capture the prevalence of remitting behavior in household, among kin and village members, respectively, all expected to be positively related to an individual's

remittance propensity. Age, marital status, household size and logarithm of village size are added as controls.

We exclude 11,064 (5,276) individuals who live in households with no information on sibling networks in 1994 (2000) and 3,616 (376) individuals who have missing data on demographic or socioeconomic characteristics in 1994 (2000). Our final sample contains 32,042 (30,006) individuals in 6,293 (5,932) households in 51 villages in 1994 (2000).

Table 2 summarizes the means for all variables for the overall sample (62,048 person-years), subset of migrants (15,304) and subset of remitters (8,439) along with results from clustered difference-of-means tests that compare migrants with nonmigrants and remitters with nonremitters, while accounting for multiple observations at the individual level.

Our main analysis employs a bivariate probit specification that accounts for censoring in remittance behavior, which is observed only among migrants, not the entire population. This specification requires a variable (instrument) that influences migration, but does not directly affect remittances, nor is it correlated with the unobservables affecting remittances. We use the distance to district center, to which migrants need to travel to reach urban destinations, as an instrument. Individuals who live in a village far from the district face higher travel costs, and thus may have lower propensities to migrate, especially if their families have limited financial resources. Garip (2012a) evaluates the validity of this instrument in the Nang Rong data. We correct our standard errors for clustering at the household level and include village and year dummies to capture the regional or temporal variation not captured by our indicators.

Results

Table 3 presents the marginal effect of each indicator on the conditional probability of remitting given migration, when other indicators are kept at their mean (for continuous) or mode (for binary). The propensity to remit increases with education, although not linearly, and is higher for daughters compared to other members of the household, consistent with the investment and exchange models, respectively. The propensity to remit is highest for migrants in factory jobs, who tend to earn more, in line with altruistic, exchange and investment models. The likelihood of remitting declines with the unemployment rate in migrant's occupation, defying a pattern expected in the insurance model, but increases with the number of seniors in household, confirming a pattern implied in the altruistic and exchange models. The probability of remitting declines with the number of migrants in the household, and also with the number members in a nonagricultural occupation, confirming patterns in the altruistic view. The propensity to remit does not vary by the structure of sibling networks, counter to the option theory, but increases with the number of remitters in the household, and the proportion of remitters in the village, consistent with the network model. The likelihood of remitting does not respond to the proportion of remitters in the sibling network, suggesting household and village as the main social foci for the transmission of remittance behavior.

Table 2. Characteristics of the Overall Sample, Subset of Migrants and Subset of Remitters in 51 Villages (Nang Rong Survey, 1994 and 2000 Waves).

Variable	All	Migrants[a]	Remitters[b]
Education			
Less than primary school	0.57	0.32	0.29
Primary school	0.31	0.49	0.52
Middle school	0.06	0.07	0.07
High school or higher	0.06	0.12	0.12
Heir status			
Youngest daughter	0.13	0.13	0.17
Older daughter	0.11	0.21	0.27
Son	0.24	0.43	0.42
Other	0.52	0.22	0.14
Destination income (migrants only)			
Factory worker		0.20	0.27
Service worker		0.21	0.24
Construction worker		0.10	0.10
Other		0.50	0.39
Risks to destination income (migrants only)			
Unemployment rate in occupation (%)		1.68	1.77
Dependents in household			
Number of children (of women <30 years old)	1.24	1.27	1.19
Number of seniors (>64 years old)	0.35	0.40	0.38
Migrants in household			
Number of migrants (excluding index individual)	1.65	2.48	2.37
Household assets			
No land	0.08	0.06	0.05
Low land (1-14 rai)	0.38	0.37	0.37
Medium land (14-31 rai)	0.32	0.33	0.34
High land (>31 rai)	0.22	0.24	0.24
Log of cattle owned	0.94	0.95	0.98
Household income			
Members in a nonagricultural occupation	2.13	2.60	2.54
Number of economic activities (0-3)	0.90	0.94	0.95
Risks to household subsistence or income			
Months of water shortage	1.70	1.63	1.71
Investment opportunities in community			
Primary or secondary school in village	0.41	0.40	0.40
Years since electrification	11.56	11.59	11.50
Sibling networks[c]			
Number of ties	1.72	1.32	1.29
Density of ties (ratio of existing to all possible ties)	0.01	0.01	0.01
Number of isolates in village	38.00	38.31	39.19

(continued)

Table 2. (continued)

Variable	All	Migrants[a]	Remitters[b]
Remittance behavior in networks (migrants only)			
Number of remitters in household (excluding index individual)		2.79	3.18
Proportion of remitters in the sibling network (excluding index household)		0.14	0.13
Proportion of remitters in the village		0.39	0.39
Controls			
Age	31.96	27.34	26.72
Married	0.54	0.55	0.51
Household size	6.63	7.90	7.75
Log of village size	6.28	6.28	6.28
Average education in household	4.79	4.89	4.88
Average education in sibling network	3.22	2.89	2.89
Average education in village	4.67	4.67	4.67
Average land in household	20.38	21.50	21.69
Average land in sibling network	12.69	11.15	10.98
Average land in village	19.63	19.67	19.79
Proportion of households with migrants	0.53	0.54	0.54
Instruments for the migration model			
Distance to district (in km)	16.56	16.71	16.24
N (person-years)	62,048	15,304	8,439

[a]Means for migrants and nonmigrants (not shown) differ significantly ($p < .05$) for all variables except for the indicators for the youngest daughter, log of cattle owned by household, average education, and land in village. Difference-of-means test accounts for clustering at the individual level. [b]Means for remitter and nonremitter migrants (not shown) differ significantly ($p < .05$) for all variables except the indicators for middle or high school education, construction worker, low or high land, number of economic activities in household, school in village, proportion of remitters in sibling network, log of village size, average education in household, sibling network and village, and average land and sibling network. [c]Sibling networks include households as nodes and sibling ties as edges. A sibling tie exists if a member of the ego household has a sibling in the alter household.

Table 4 starts with two models testing potential mechanisms—household's economic needs and migrant's heir status—underlying network effects in the household. The former suggests a negative association between other remitting migrants in the household and a migrant's likelihood of remitting that would be larger for wealthy households. The latter mechanism implies a positive association between other remitters in household and a migrant's propensity to remit that would be higher for potential heirs. Model 1 introduces interaction terms between the number of household remitters and household land, which are not statistically significant, thus provide no support for the former mechanism. Model 2 introduces interaction terms between the number of household remitters and indicators for heir status. Consistent with the latter mechanism, the results show that a migrant's propensity to remit increases with the number

Table 3. Estimated Marginal Effects of Individual, Household, and Village Characteristics on the Propensity to Remit.

Variable	Marginal effect	Standard error
Education		
[*Reference*: Less than primary]		
Primary school	0.027	(0.005)**
Middle school	0.012	(0.006)*
High school or higher	0.037	(0.008)**
Heir status		
[*Reference*: Head, spouse, or other relative]		
Youngest daughter	0.183	(0.035)**
Older daughter	0.207	(0.025)**
Son	0.104	(0.011)**
Destination income		
[*Reference*: Student, unemployed, or farmer]		
Factory worker	0.132	(0.047)**
Service worker	0.061	(0.022)**
Construction worker	0.092	(0.033)**
Risks to destination income		
Unemployment rate in occupation	−0.030	(0.011)**
Dependents in household		
Number of children (of women < 30 years old) (/100)	−0.012	(0.102)
Number of seniors (> 64 years old)	0.005	(0.002)*
Migrants in household		
Number of migrants (excluding index individual)	−0.007	(0.004)*
Household assets		
[*Reference*: No land]		
Low land (1-14 rai)	0.006	(0.006)
Medium land (14-31 rai)	0.007	(0.006)
High land (>31 rai)	−0.005	(0.007)
Log of cattle owned	−0.002	(0.001)
Household income		
Members in a nonagricultural occupation	−0.004	(0.001)**
Number of economic activities (0-3)	0.004	(0.002)
Risks to household subsistence or income		
Months of water shortage	0.001	(0.001)
Investment opportunities in community		
Primary or secondary school in village	−0.005	(0.004)
Years since electrification	0.001	(0.001)
Sibling networks		
Number of ties	−0.001	(0.001)
Density of ties	0.577	(1.160)
Number of isolates in village	0.0002	(0.0002)

Table 3. (continued)

Variable	Marginal effect	Standard error
Remittance behavior in networks		
Number of remitters in household	0.015	(0.005)**
Proportion of remitters in the sibling network	–0.001	(0.004)
Proportion of remitters in the village	0.388	(0.146)**
Controls		
Age (/100)	0.048	(0.028)
Married (/100)	0.019	(0.621)
Household size	0.001	(0.001)
Log of village size	0.004	(0.005)
Average education in household	–0.003	(0.001)*
Average education in sibling network	0.001	(0.001)
Average education in village	–0.003	(0.008)
Average land in household (/100)	0.002	(0.006)
Average land in sibling network (/100)	–0.006	(0.005)
Average land in village (/100)	0.022	(0.061)
Proportion of households with migrants	–0.254	(0.115)*
Year fixed effects	Yes	
Village fixed effects	Yes	
ρ	0.458	(0.121)**
N (all)	62,048	
N (censored: nonmigrants)	46,744	
N (uncensored: migrants)	15,304	

Note. Table shows the marginal effect of each variable on the conditional probability of remitting given migration, when other variables are kept at their mean (for continuous) or mode (for binary). Sibling networks include households as nodes and sibling ties as edges. A sibling tie exists if a member of the ego household has a sibling in the alter household.
*$p < .05$. **$p < .01$.

of other remitters in the household, and is highest for the youngest daughters, the most likely heirs.

Models 3 and 4 test the relative deprivation and migrant social capital mechanisms for linked remittance behavior in sibling networks. Both imply a positive association between the share of remitters among siblings and a migrant's odds of remitting. The former mechanism expects the association to be higher in poor (and more relatively deprived) households, while the latter posits it to be lower for migrants in factory jobs (who are in less need of information through origin networks). The interaction terms in Models 3 and 4, all statistically insignificant, defy these expectations.

In Table 5, Models 5 and 6 test if the same mechanisms could underlie village-level network effects. While the share of remitters in village significantly increases a migrant's chances of remitting, the effect does not vary by household wealth or type of

Table 4. Estimated Marginal Effects of Remittance Behavior in Household and Sibling Networks on the Propensity to Remit.

Variable	Model 1	Model 2	Model 3	Model 4
No. of remitters in household	0.035 (0.046)	0.012 (0.006)*		
× Low land	−0.002 (0.010)			
× Medium land	0.002 (0.009)			
× High land	0.003 (0.009)			
× Youngest daughter		0.009 (0.003)*		
× Older daughter		0.006 (0.002)*		
× Son		0.005 (0.002)*		
Proportion of remitters in the sibling network			−0.030 (0.020)	−0.002 (0.005)
× Low land			0.031 (0.022)	
× Medium land			0.031 (0.021)	
× High land			0.034 (0.023)	
× Factory worker				0.009 (0.011)

Note. Table shows the marginal effect of each variable on the conditional probability of remitting given migration, when other variables are kept at their mean (for continuous) or mode (for binary). Sibling networks include households as nodes and sibling ties as edges. A sibling tie exists if a member of the ego household has a sibling in the alter household.
*$p < .05$. **$p < .01$.

job migrant holds, suggesting no support for the relative deprivation or migration social capital mechanisms.

Model 7 considers a third village-level mechanism—shared norms—which implies a migrant's propensity to remit increases with the share of remitters in her own social category (determined by gender and birth order), and not with the share of remitters in other categories. The model introduces indicators for the share of village remitters in each social category, which are interacted with a dummy for that category. The results are consistent with the shared norm hypotheses: Each category only responds to the prevalence of remitting behavior in their own category, not to that in the other categories.

Discussion

Our results establish an association between an individual's remittance behavior, and that of those in her social group, but do not provide a causal link. In Manski's (1993) terminology, our hypotheses posit *endogenous* effects, which arise if remittance behavior varies with the average remittance behavior in the social group, creating positive feedbacks over time. But these effects are difficult to separate from *contextual* or *correlated* effects, which imply no such feedbacks. Contextual effects arise when remittance behavior varies with the exogenous attributes (e.g., average education) of the social group, while correlated effects occur when remittance behavior varies with personal or environmental factors shared by group members.

Table 5. Estimated Marginal Effects of Remittance Behavior in Village Networks on the Propensity to Remit.

Variable	Model 5		Model 6		Model 7	
Proportion of remitters in the village	0.458	(0.176)**	0.391	(0.147)**		
× Low land	0.026	(0.108)				
× Medium land	0.140	(0.149)				
× High land	0.128	(0.145)				
× Factory worker			−0.0002	(0.001)		
Proportion of remitters among youngest daughters in village					0.025	(0.054)
× Youngest daughter					0.272	(0.108)**
Proportion of remitters among older daughters in village					0.033	(0.042)
× Older daughter					0.284	(0.108)**
Proportion of remitters among sons					0.158	(0.082)
× Son					0.349	(0.132)**
Proportion of remitters among other (head, spouse, etc.)					0.065	(0.169)
× Other					1.396	(0.491)**

Note. Table shows the marginal effect of each variable on the conditional probability of remitting given migration, when other variables are kept at their mean (for continuous) or mode (for binary).
*$p < .05$. **$p < .01$.

The village and year dummies in our models capture time-invariant environmental confounders that may lead to correlated effects, while the comprehensive set of time-varying controls at the individual, household, and village levels account for possible trends in those confounders, which may have changed at different rates in different subsamples. The indicators for the average background characteristics also capture potential contextual effects.

The proper identification of endogenous effects, however, is still complicated by the potential simultaneity of remittance behaviors. We considered this issue with a time-lag model, where an individual's propensity to remit in 2000 is a function of past remittance behaviors in her social group in 1994. The results remained similar. We also accounted for the possibility that a household might receive remittances from sibling households by excluding from the sample individuals whose siblings report remitting to other households than their own. The results, again, were similar.

Conclusion

This study investigated the social interactions in remittance behavior. Research offers competing explanations that relate remittance behavior to various economic incentives, such as altruism, exchange, insurance, or investment, or to options available to

migrants through origin communities. These models vary in their unit of analysis, but not in their treatment of that unit as an isolated entity independent from the social context. This runs counter to evidence demonstrating how various individual behaviors, including migration, are conditioned on the prevalence of those behaviors in social groups.

This study attempted to identify similar network effects in remittance behavior. We employed two waves (1994 and 2000) of the Nang Rong surveys with complete data on more than 30,000 individuals in 51 rural Thai villages, where about a fourth of individuals have migrated internally, and about half of migrants sent remittances to their origin households. Our key indicators measured the prevalence of remittance behavior (a) in the household, (b) among other households where a sibling of an ego household member lives, and (c) in the village. We fit a censored bivariate probit specification, linking various indicators to migrants' propensity to remit, while accounting for migrant selectivity.

We found that, net of alternative explanations, the number of remitters in the household and the share of remitters in the village both increase the propensity that a migrant remits, while the share of remitters in the sibling network has no impact, reflecting the importance of the nuclear family and community—but not the kin—in the transmission of remittance behavior in Thailand.

We also considered several mechanisms producing the network effects. We found that inheritance seeking, where potential heirs compete for future inheritances, might explain the positive effect of household remitters on one's propensity to remit. We also suggested that shared village norms, where each social category (defined by gender and birth order) responds to the remitting behavior of those in her own category, to be the most likely explanation for the positively linked remittance behaviors at the village level. We found no support for alternative mechanisms—relative deprivation or migrant social capital—which, respectively, imply household's wealth status and resources available through other migrants as the main anchors of network effects in remittance behaviors among kin or village members.

Despite our strategies to address identification issues, the results still provide suggestive associations, not causal links, among remittance behaviors of related individuals. Future work could better tackle identification problems with more detailed longitudinal data with exact time stamps of remittance receipts. Our analysis also relied on simple definitions of social groups (households, sibling ties, village members) measured in the origin setting alone; future work could consider other kinds of social groups captured in both the origin and destination settings.

Declaration of Conflicting Interests

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Notes

1. This table is based on Rapoport and Docquier (2006).
2. http://www.cpc.unc.edu/projects/nangrong/
3. The survey question is, "Does this person have other siblings besides the ones [living in the household] that are living? If so, record their location." For each sibling not in the household, the current location identified a specific household if that household was in the village or a specific village or district otherwise.

References

Adams, R., & Page, J. (2005). Do international migration and remittances reduce poverty in developing countries. *World Development*, *33*, 1654-1669.

Banerjee, B. (1984). The probability, size and uses of remittances from urban to rural areas in India. *Journal of Development Economics*, *16*, 293-311.

Cox, D. (1987). Motives for private income transfers. *Journal of Political Economy*, *95*, 508-546.

Edwards, A. C., & Ureta, M. (2003). International migration, remittances, and schooling: Evidence from El Salvador. *Journal of Development Economics*, *72*, 429-461.

Funkhouser, E. (1995). Remittances from international migration: A comparison of El Salvador and Nicaragua. *Review of Economics and Statistics*, *77*, 137-146.

Garip, F. (2008). Social capital and migration: How do similar resources lead to divergent outcomes? *Demography*, *45*, 591-617.

Garip, F. (2012a). An integrated analysis of migration and remittances: Modeling migration as a mechanism for selection. *Population Research and Policy Review*, *31*, 637-663.

Garip, F. (2012b). Repeat migration and remittances as mechanisms for wealth inequality in 119 communities from the Mexican Migration Project Data. *Demography*, *49*, 1335-1360.

Hoddinott, J. (1994). A model of migration and remittances applied to western Kenya. *Oxford Economic Papers*, *46*, 459-476.

Lauby, J., & Stark, O. (1988). Individual migration as a family strategy: Young women in the Philippines. *Population Studies*, *42*, 473-486.

Lee, Y.-J., Parish, W. L., & Willis, R. J. (1994). Sons, daughters, and intergenerational support in Taiwan. *American Journal of Sociology*, *99*, 1010-1041.

Manski, C. F. (1993). Identification of endogenous social effects: The reflection problem. *Review of Economic Studies*, *60*, 531-542.

Massey, D. S., & Basem, L. C. (1992). Determinants of savings, remittances, and spending patterns among U.S. migrants in four Mexican communities. *Sociological Inquiry*, *62*, 185-207.

Massey, D. S., & García-España, F. (1987). The social process of international migration. *Science*, *237*, 733-738.

Massey, D. S., & Parrado, E. (1994). Migradollars: The remittances and savings of Mexican migrants to the USA. *Population Research and Policy Review*, *13*, 3-30.

Piotrowski, M. (2006). The effect of social networks at origin communities on migrant remittances: Evidence from Nang Rong District. *European Journal of Population*, *22*, 67-94.

Rapoport, H., & Docquier, F. (2006). The economics of migrants' remittances. In J. Mercier-Ythier & S. C. Kolm (Eds.), *Handbook of the economics of giving, reciprocity and altruism* (Vol. 2, pp. 1135-1198). Amsterdam, Netherlands: North-Holland/Elsevier.

Roberts, K. D., & Morris, M. D. (2003). Fortune, risk, and remittances: An application of option theory to participation in village-based migration networks. *International Migration Review*, *37*, 1252-1281.

Stark, O., & Bloom, D. E. (1985). The new economics of labor migration. *American Economic Review*, *75*, 173-178.

Stark, O., & Levhari, D. (1982). On migration and risk in LDCs. *Economic Development and Cultural Change*, *31*, 191-196.

Stark, O., & Taylor, J. E. (1989). Relative deprivation and international migration. *Demography*, *26*, 1-14.

VanWey, L. K. (2004). Altruistic and contractual remittances between male and female migrants and households in rural Thailand. *Demography*, *41*, 739-756.

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