

DISCUSSION PAPER SERIES NO. 2018-54

# Migrant Networks in the Context of Temporary Labor Migration

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December 2018

## **Abstract**

Understanding migration behavior is crucial in designing policy interventions for influencing migrants' behavior. An aspect of international migration that lacks scholarly inquiry is temporary labor migration. This paper examines migration behavior of households from a labor-sending rural village in the Philippines. It specifically looks at the role of migrant networks in the perpetuation of labor migration. This study found that not all types of migrant networks matter for international labor migration. While the standard job search model would find weaker ties more useful in the search for jobs, we found empirical evidence that strong ties matter more in international labor migration from a developing country context. Notwithstanding the limitations of the study and based on the sample that was used, we found that international migration in the Philippines is an intergenerational phenomenon.

Keywords: Labor migration, temporary migration, migrant networks, Philippine migration

# Migrant Networks in the Context of Temporary Labor Migration<sup>1</sup>

Aubrey D. Tabuga<sup>2</sup>

## Introduction

To be able to influence migrants' behavior through policy, it is crucial that one understands the reasons why people migrate (Massey 2012). It is therefore important to examine determinants of migration. The literature on migrant networks is lacking when it comes to the case of temporary labor migration. In fact, there is a dearth of theories that explain temporary labor migration itself. The huge body of knowledge has sprung mainly from explanations of the permanent movement of people. Some scholars may argue that there is not much difference between permanent and temporary types of migration. But while peoples' aspirations for a decent life is universal, there are fundamental differences that require some distinction. The migration flow that involves permanent settlement is usually towards more liberal destinations where migrants are given a set of comparable rights compared to the natives. In contrast, much of the global flow of temporary labor migration is associated with destinations that do not usually provide comparable rights to migrants vis-à-vis the natives. This difference in context matters a lot in terms of individual decision-making.

This paper is a part of a series of studies on the social economics of international labor migration as a contribution to the literature on temporary labor migration. In Tabuga (2018a), several hypotheses were generated out of the analysis of how migration behavior has diffused through households through time. While that analysis successfully illustrated how migration has perpetuated through the network channel, it could not control for the influence of other factors. This paper therefore extends that analysis by formally testing the hypotheses through econometric analyses. The key research questions this study intends to investigate are - How does one household's network position in an origin village with high migration prevalence influence its migration behavior? Does having an influential position lead to better

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<sup>1</sup> This paper has not been peer-reviewed. It is part of a series of papers that looked into the social economics of temporary labor migration. Some of the sections in this report have been lifted from or are based on the author's PhD dissertation published at the National University of Singapore (NUS). Detailed discussion about the survey conducted for this series of studies is found in Tabuga (2018b). Other parts of this series can be found at the PIDS official website at [www.pids.gov.ph](http://www.pids.gov.ph).

<sup>2</sup> Research Fellow, Philippine Institute for Development Studies (PIDS). All errors are on the account of the author. The usual disclaimer applies.

capitalization of the migration-related social capital embedded in that position and therefore increases one's migration likelihood? Does being directly linked to pioneer migrants affect one's own current migration likelihood, holding human capital, migration history, and wealth constant? Does strength of ties with migrant networks matter in explaining variation in migration behavior? The subsequent section discusses briefly the relevant literature. This is followed by the data and methodology, and then the results of the empirical analysis. The last section provides the concluding remarks.

## **Review of Literature**

A robust but geographically limited set of empirical studies shows that social networks are powerful forces that propagate migration flows.<sup>3</sup> It is argued that once the magnitude of network ties in the origin reaches a certain threshold, "migration becomes self-perpetuating because migration itself creates the social structure to sustain it" (Massey 1990). However, scholars criticize the fact that network theory is unable to explain why some moves of pioneer migrants result to the expansion of migrant networks while others do not. Perhaps this is due to the unidimensional approaches being implemented in the analysis of migrant network effects. The migration network literature is dominated by network size and access approaches without much regard on meso-level context that accounts for relative position in the network, connectedness to important network members such as pioneer migrants, and tie strength. Moreover, social capital varies not only in tie strength but also in the resource endowments embedded in the social capital.

The use of networks to gain access to different activities has been established widely in the literature. In job search, early works by (Granovetter 1973) show the significance of social contacts in obtaining jobs. Many other studies provide similar estimate for a variety of socio-economic backgrounds, occupation, and skills level (Calvo-Armengol and Jackson citing Montgomery 1991). The likelihood to use networks is higher for people with lower amount of resources (see Elliot, 1999). Therefore, people use their personal networks to augment their resource endowments – an idea proposed by social capital theorists. In migration, networks play a key role in facilitating movements because migration has significant costs and risks and networks operate to bring down these costs and risks.<sup>4</sup> Because of this, networks have such a

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<sup>3</sup> See Massey et al., (1998) for an exhaustive review of the migration network literature.

<sup>4</sup> Because resources are fungible, those who are relatively well-off do not rely much on their personal networks. Indeed, network use is less prevalent among the high-skilled than low-skilled workers.

significant impact on the perpetuation of migration.<sup>5</sup> A robust set of network studies found the following stylized facts – 1) having a social tie to a current or former migrant dramatically increases the odds of emigration (Massey et al. 1987; Massey and Espana, 1987; Massey and Espinosa, 1997); 2) the size of the effect varies with the strength of the tie and the closeness of the relationship (Espinosa and Massey, 1997); 3) Networks and the social capital they produce are fundamental to the cumulative causation of migration (Massey et al. 1994; Massey and Zenteno, 1999); 4) the network effects differ by gender (Kanaiaupuni, 2000; Cerrutti and Massey, 2001; Curran and Fuentes, 2003; Massey et al. 2004); and 5) the power of network ties to promote migration is a real causal effect and not spurious or attributable to unmeasured heterogeneity (Palloni et al, 2001; Munshi, 2003).

This part of the migration literature however has been criticized for its being limited to the Mexican-US migration stream (see Fussell, 2010). The generalizability of these studies notwithstanding their robustness is often questioned. This is because the Mexico-US migration system is unique in many aspects. Hence, as Massey et al (1998) argued – “Far too much of the research is centered in Mexico, which because of its unique relationship to the USA may be unrepresentative of broader patterns and trends.” Analyses based on different contexts will broaden our understanding of the relationship between migrant networks and migration.

Moreover, most studies of migrant network effects often relied on unidimensional measures of networks and therefore the understanding that we have of these effects are not nuanced enough. The most common measure of network access<sup>6</sup> in the literature is a dummy variable that takes a value of one (1) when the migrant has access to networks such as migrant family members, friends, relatives, and other contacts who are living/working in the destination area; without such access, the value is zero (0). The problem with such dichotomous measures is that networks are taken as homogenous. One is in fact assuming that the value of social capital that one gets from a family member is similar to that which can be obtained from a friend or distant relative or acquaintance. But the literature already notes that these different contacts differ not

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Similarly, high skilled ones generally rely less on networks in their migration activities, “are less geographically concentrated (Epstein 2008), will have less social and cultural adjustment problems, will find (formal) employment more easily...” (Haas, 2010: 37).

<sup>5</sup> See Boyd (1989); Massey (1990); Massey and Espinosa (1997); Massey and Zenteno (1999); Palloni et al. (2001); Phillips and Massey (2000); Taylor (1986); Winters, de Janvry, and Sadoulet (2001)

<sup>6</sup> See Chort, 2013; Bentolila et al., 2010; Goel and Lang, 2009; Dustmann et al., 2015

only in the nature of the relationship they have with the migrant but also that these have different sets of information and resources to share (Toma, 2012; De Haas, 2010).

Another measure of migrant network commonly used is migration incidence<sup>7</sup> in the community where the migrant comes from. Operationally, this is the proportion of all individuals, of some determined age category, in a given community who have ever migrated (see Massey, Goldring and Durand, 1994). In Munshi (2003), migrant's network pertains to the proportion of sampled individuals from the origin community who are located at the host country for a certain period. The popular interpretation of a positive effect of this measure that proxies 'network size' is that the larger the size, the more likely an individual will migrate. The mechanism is that migration behavior diffuses through the community where the people are assumed to have similar access to the social capital as they probably know one another. This is rather too strong an assumption especially in the absence of information regarding how social relations in the community are structured.

It is possible that social networks within a community exhibit some clustering (where links are mediated mostly by strong ties; weaker ties that extend the group to other groups are few) that tends to include members but exclude non-members. Social ties do vary in strength and intensity (Sampson, 2004). Family networks as opposed to community networks have larger role in migration likelihood of Mexican illegal migrants and this is through provision of information about jobs at the destination as well as credit (Dolfin & Genicot, 2006). On the other hand, the probability of migrating should rise with the closeness or degree of relationship (Massey, et al., 2006:56). Hence, scholars noted that empirical models should not equate migrant network strength to network size and that migrants do not necessarily support one another; strong ties can also exclude others particularly those outside their group (De Haas, 2011). Furthermore, using aggregate village-level migration incidence does not enable one to determine the clear pathways of information and resource flow (Liu, 2013). Hence, there is a need to incorporate more detailed network structure into the analysis of migrant network and migration relationship (Munshi, 2014).

Structural analyses of migrant networks are rare. In fact, I have not seen a single study that has accounted for the network structure of an entire migrant-sending community in examining the

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<sup>7</sup> See Curran et al. 2005; Cerrutti and Massey, 2001; Espinosa and Massey, 1999

perpetuation of migration activities in the area. The literature on general network theory puts emphasis on the importance of network structure in the spread of things or events such as diseases or adoption of drugs where greater connectivity is associated with faster rate of infection or adoption. In migration, the effect of network structure on migration flow was empirically analyzed by Anjos and Campos (2010) and found that network centrality of agents is important property in the growth of networks. However, their approach is different from what is being proposed in this study. Although they used real microdata and implemented Multi-Agent System to model the flow of migrants in social networks, the social network of the individuals in their study is simulated.

In the analysis of tie strength, this study is closest in its approach with that by Liu (2013) in the case of Senegal migrants to Europe. Using data from retrospective surveys that contain migration histories and kinship as well as friendship data, Liu employed a discrete-time hazard model and found that the influence of network is gendered, and that weak ties are important in migration of men. Furthermore, having more resources due to strong ties negatively influence migration but having more resources because of weaker ties enhance migration among men.

In Tabuga (2018b), we found that recent migrants in the origin village with high migration prevalence hold relatively more central network positions and are directly linked to pioneer migrants via strong ties. We extend that analysis in this paper by estimating likelihood to migrate using formal regression techniques. The estimation includes as explanatory variables of interest– network structure parameters of connectivity and centrality, the presence of direct ties with pioneer and other earlier migrants, and tie strength by incorporating migrant networks of varying types or degree. By incorporating social structure attributes, the approach becomes multi-perspective in that not only individual person and/or household attributes matter but also the configuration of relationships among actors. Likewise, this analysis controls for other factors like human capital, migration experience, household migration norms, and wealth, among others, that explain variation in migration behavior because as noted in Fussell (2010) – “In and of itself...this infrastructure of migration-based social capital does not provide sufficient motivation to uproot community members and take them to strange and foreign lands” (p. 163).

Through this, this study aims to contribute to the empirical literature on migration networks and to the theory that explains perpetuation of migration as well as to the broader theory on

how structure of relations shape human behavior. While the scholarship is currently limited to mostly migration behaviors motivated by permanent settlement, this presents a rare opportunity to understand network dynamics involving largely temporary and cyclical migration activities. Furthermore, by analyzing the Philippines case which has a context that varies from the Mexican migration experience, I augment the geographically-limited body of knowledge on migration networks.

To summarize, the objectives of this paper are to examine the factors that influence migration behavior at the household level. Holding economic factors constant, it specifically analyzes the role of social networks in the perpetuation of international labor migration in a high-migration rural village in the Philippines.

### **Data and Methodology**

The survey data utilized in this study is discussed in more details in Tabuga (2018a). The Camachile Migration Survey, conducted in 2016 in Barangay Camachile, Orion, Bataan, collected information about migration behavior and history as well migration intentions, socio-economic profile, and social networks through face-to-face interviews with more than 300 households using a survey questionnaire. Camachile is a rural, fishing village. Based on its Community-based Monitoring System (CBMS) database, it has one of the highest migration incidence among the villages in the municipality of Orion. The most common type of outmigration activities is the temporary labor migration type which makes it a good case for this study. In addition to the survey data, the CBMS, owned by the municipality of Orion provides prior socio-economic characteristics of the households in the area, including Camachile, that can be used in the empirical analysis of migration behavior. The elements of this paper's methodology is described in the sub-sections below.

#### **Unit of Analysis**

The relevant unit of analysis is household since migration network is herein defined and measured at the household level. In other words, the variable of interest is inter-household migration network. The New Economics of Labor Migration argues that international migration is a resource diversification strategy employed by the household and therefore a great part of the decision-making for migration is done collectively at the level of the household. Moreover, this paper argues, especially in the Philippines context, that the household plays a

major role in the decision-making because migration activities have implications that alter the household dynamics such as in terms of child care and daily household operations.

#### Dependent Variable

To estimate current migration behavior, the dependent variable is a binary variable with a value of one (1) for having at least one member engaging in international labor migration in 2015-2016, and zero (0) otherwise. One-third of the 365 households in the sample participated in international migration in 2015-2016.

#### Social networks in migration

This paper uses various measures of migrant networks (see Table 1 for the description of variables). One of these is the number of individuals who were considered migrant workers (MW) in the five years prior to the study (i.e. 2010-2014) belonging to households living in the village who are related to the household of interest by:

- a. first degree of consanguinity or affinity (variable #16),
- b. second degree (17),
- c. third degree (18),
- d. fourth degree (19),
- e. other familial relations (20),
- f. close friendship (21), and
- g. other friendship ties (22).

Because the migrant networks are disaggregated as such, one can examine if there is any differentiation in the influence of migrant networks by type of social ties. The Camachile Migration Survey provides data on kinship and friendship ties. When these ties are counted, we found that 4,452 social ties exist during the survey period. Of this number, 73 percent are familial relations and 27 percent are friendship ties. We are interested in the effect of the lagged migrant network on the current migration behavior. Note that the above set of migration networks is obtained indirectly from the responses of households (alters) to which the household of interest, the ego, is related. For instance, since X is related to Y by some degree, the migrant members in X form part of the migrant networks of Y.

The abovementioned network variables so far pertain only to within-village migrant networks. There may be some other migrant networks, not necessarily located within the village, which may influence migration behavior. To account for this, the numbers of migrant networks as

well as the exact relations the households have with these contacts regardless of location were collected from the households. Unlike the lagged migrant network variables, this set of variables is a more direct measure of migrant network since the information came directly from the households. It presents that which they can actually draw social capital from when needed since they can identify them with confidence during a candid survey. These current migrant network variables (# 23 to 27 in Table 1) are labeled as household-affirmed migrant networks (HAMN) so as not to confuse it with lagged migrant network. Obtaining such is a mechanism for triangulating the influence of networks that have varying quality or tie strength.<sup>8</sup>

Aside from the abovementioned variables, key network parameters such as within-village degree and other network centrality measures (i.e. variables #8 to 11) are also included to determine whether the position of a household within the web of social relations affect migration likelihood. Lastly, the influence of proximity to pioneer migrants is also examined. This is operationalized into the number of pioneer migrant households which the ego is directly linked to via very close ties (i.e. first- and second-degree relations, #12 in Table 1), other familial relations (#13), close friendship (#14), and other friendship (#15).

#### Other explanatory variables

Household demographic factors such as household size, mean years of schooling of adult members, asset index and relative income are controlled for in the estimation of household migration participation. The household asset index that controls for wealth was constructed based on the 2012 CBMS data of Camachile households. The use of prior wealth data lessens the chance that there is simultaneity in the association between wealth and migration behavior (see Appendices for the construction of the wealth index).

Moreover, since current migration behavior partially depends on the household's capacity to meet monetary costs which may have been enhanced by prior migration history, it is important to control for the prior migration activities of the household. Hence, the household's migration history represented by the number of years since the household first participated in international labor migration. The number of members with prior migration experience other than those referred to in the dependent variable is also included in the estimation.

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<sup>8</sup> The within-village, lagged migrant network variables are not a subset of the household-affirmed migrant network (HAMN) since the latter include only those mentioned by the households which reflects only the relations they choose and associate more often.

Table 1. Description of variables for estimating migration likelihood

Variable	Description
<i>Household Characteristics</i>	
1 Household size	Number of household members
2 Asset index (PC1)	Asset index (PC1 from principal components analysis of assets), 2012
3 Asset index (PC1), squared	Asset index (PC1 from principal components analysis of assets), 2012 (squared)
4 Relative income	Proportion of 2012 per capita income to village's average per capita income
5 Mean years of schooling	Mean years of schooling of adult members
6 Years since first migration	Number of years since household's first migration activity
7 Members with migration experience excluding those sent in 2015-2016	Number of members with migration experience other than the members sent overseas in 2015-2016
<i>Network connectedness</i>	
8 Degree	Measure of connectedness/connectivity Number of direct links, regardless of degree/strength of ties
9 Eigenvector	A measure that shows the importance of being an important household's friend or kin; it considers the centrality or influence of all the friends and relatives that one household is connected to
10 Betweenness	An index that denotes the extent to which an individual connects or brokers indirect connections between all other individuals in a network
11 Closeness	An index that captures the ease of reaching other nodes in the network
<i>Direct links to pioneer migrants</i>	
12 Close family	Number of migrant pioneer households with whom a household is directly connected to Close family only
13 Other family	Other family only
14 Close friends	Close friends only
15 Other friends	Other friends only
<i>Lagged migrant network, indirect</i>	
16 1st degree	Within-village, lagged size of migration network (2010-2004), indirectly measured from social network analysis First-degree family only
17 2nd degree	Second-degree family only
18 3rd degree	Third-degree family only
19 4th degree	Fourth-degree family only
20 Other family	Other family only
21 Close friends	Close friends only
22 Other friends	Other friends only
<i>Household-affirmed migrant network (HAMN), direct</i>	
23 1st degree	Current migration networks/contacts identified by the household (irrespective of location), number of individuals HAMN, first-degree ties only (i.e. parent-child)
24 2nd degree	HAMN, second-degree ties only (e.g. siblings, parents/child-in-law)
25 3rd degree	HAMN, third-degree ties only (e.g. aunt/uncle, niece/nephew)
26 4th degree	HAMN, fourth-degree ties only (e.g. cousins, aunt/uncle-in-law)
27 Other family	HAMN, other family

Table 2. Summary statistics for the household-level migration behavior analyses

	Variable	Obs	Mean	Std. Dev.	Min	Max
	<i><u>Dependent Variable</u></i>					
	Migration participation dummy in 2015/2016	365	0.332	0.471	0.000	1.000
	<i><u>Household Characteristics</u></i>					
1	Household size	354	4.316	1.587	1.000	10.000
2	Asset index (PC1)	297	3.961	2.188	0.814	9.849
3	Asset index (PC1), squared	297	20.464	21.816	0.662	97.009
4	Relative income	337	1.002	1.260	0.053	15.883
5	Mean years of schooling	353	10.421	2.309	2.500	14.333
6	Years since first migration	354	13.904	13.817	0.000	51.000
7	Members with migration experience excluding those sent in 2015-2016	354	0.492	0.640	0.000	3.000
	<i><u>Network connectedness</u></i>					
8	Degree	354	12.158	7.643	0.000	46.000
9	Eigenvector	354	0.029	0.044	0.000	0.244
10	Betweenness	354	341.479	420.162	0.000	3240.659
11	Closeness	354	0.344	0.039	0.125	0.453
	<i><u>Direct links to pioneer migrants</u></i>					
12	Close family	364	0.676	0.859	0.000	4.000
13	Other family	364	1.654	1.910	0.000	10.000
14	Close friends	364	0.802	1.173	0.000	8.000
15	Other friends	364	0.063	0.255	0.000	2.000
	<i><u>Lagged migrant network, indirect</u></i>					
16	1st degree	343	0.353	0.697	0.000	3.000
17	2nd degree	343	1.076	1.355	0.000	7.000
18	3rd degree	343	1.446	1.639	0.000	8.000
19	4th degree	343	1.644	2.071	0.000	11.000
20	Other family	343	0.741	1.593	0.000	11.000
21	Close friends	343	2.026	2.192	0.000	12.000
22	Other friends	343	0.087	0.469	0.000	6.000
	<i><u>Household-affirmed migrant network (HAMN), direct</u></i>					
23	1st degree	354	0.139	0.407	0.000	3.000
24	2nd degree	354	1.024	1.390	0.000	7.000
25	3rd degree	354	1.289	1.575	0.000	8.000
26	4th degree	354	0.727	1.332	0.000	9.000
27	Other family	354	0.093	0.407	0.000	4.000

## Hypotheses

One's relative position in the social network in a context of high migration prevalence influences the ability to extract migration-related social capital. The more strategic, more central the position, the greater the social capital, holding other factors constant. Second, the presence of direct and closer/stronger connection to pioneer and other earlier migrants or returnees increases one's chance of being influenced to participate in migration either through greater awareness of the benefits of migration or improved capacity to migrate. Lastly, strong and weak ties differ in their migration-related resource endowments and thus have varying influence on migration likelihood. In the context of migration of people from rural areas and

with high migration costs, the stronger the tie, the greater the social influence on migration likelihood, *ceteris paribus*. Notwithstanding the well-documented influence of social networks, their function is known to be largely facilitative. Therefore, economic factors as primary motivating forces, as well as other complementary explanations of international migration must be controlled in estimating migration likelihood.

This study tests the following hypotheses:

H1: The larger the migration network size taking into account strength of ties, the greater the tendency to engage in international migration, holding other factors constant.

H2. In a context where migration activities are widespread, those who are better-connected/more central are more likely to also participate in labor migration since they are well-positioned to gain information and be influenced by the migration of others.

H3. The more direct links with pioneer migrants via close social relation that one has, the greater the likelihood to participate in migration, all else being equal.

Regression model

The basic regression model for analyzing migration participation is:

$$Y = \alpha N + \beta X + \varepsilon \quad (\text{Eq. 1})$$

Where household-level  $Y$  is a binary variable denoting recent engagement in migration activities (i.e. reference period is 2015-2016).  $N$  refers to a vector of migrant network variables, the effects of which are represented in  $\alpha$ , the network effect.  $X$  is a set of other explanatory variables that influence the individual's migration activity including individual and household demographic and economic attributes, while  $\varepsilon$  is the usual error term. To obtain the explanatory variables' effects on the likelihood to migrate, Eq. 1 is estimated via logit regression.

### **Results of analysis of migration behavior**

Several iterations of the logit model were estimated using the different measures of migration network noted earlier and different network parameters. This approach provides a way to

examine effects of networks based on strength/degree and the extent of a household's connectedness. Moreover, the network parameters were included in the estimation one at a time because of their very high correlations with one another. There are also high correlation coefficients between direct links to pioneer migrants and centrality measures that go as high as 0.76. Pioneer migrants are shown to occupy strategic positions within the web of social relations (i.e. they have high centrality parameters) (Tabuga, *The Structure of Origin-based Social Network and Its Influence on Migration Diffusion: The Case of a Migrant-Sending Village in the Philippines*, 2018). Including both the direct links to pioneer migrants and network centrality measures in an equation may lead to problems of multicollinearity. The likelihood of households to engage in international migration is estimated via Logit regression technique using the robust error routine. The estimation results, reported as odds ratios, are shown in Table 3.<sup>9</sup>

### **Demographic factors**

Consistent with expectations, household size significantly and positively correlates with the likelihood to send member overseas, holding economic conditions and migrant networks, among others, constant. A unit increase in the number of household members increases the odds of participating in migration by 55 to 59 percent.

Although the basic model (see H1 in Table 3) shows that asset index is positive and significant, this loses its significance when household's migration history and migrant networks are held constant as shown in columns H2 to H9. The lagged relative income or per capita income of the household as a proportion of the village's average also does not significantly explain variation in migration behavior which is contrary to the prediction of New Economics of Labor Migration. These results may indicate that 2012 wealth or assets are partly determined by the household's migration history. It also indicates that wealth is insignificant as long as there are networks to whom people rely on which attests to the cost-reducing function of migrant networks.

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<sup>9</sup> For purposes for improving the estimates, the bootstrap method is also used, and its results, which are consistent with the standard logit regression's findings, are shown only in the Appendices.

Meanwhile, the estimation results for education are not consistently significant throughout the different estimations. This is partly attributed to the way the variable is operationalized which is merely the average of the years of schooling of adult household members. While the person who the household sends may be well-educated, the other members may be not as educated and may not have gainful employment - hence the need to send the educated person for overseas work in the first place. The average schooling will be rather low. In contrast, if most household members are educated, there may be no urgent need to participate in labor migration as the members are more likely to be employed locally. However, because the anticipated benefit of labor migration is larger for educated members, the household may choose to send its members. These contrasting effects may cancel out and result to an insignificant outcome.

Table 3. Results of logit regression, odds ratios (using robust errors)

Variable	H1	H2	H3	H4	H5	H6	H7	H8	H9
1 Household size	1.55 ***	1.57 ***	1.57 ***	1.57 ***	1.57 ***	1.57 ***	1.57 ***	1.56 ***	1.59 ***
2 Asset index (PC1)	1.94 **	1.49	1.44	1.48	1.45	1.41	1.43	1.33	1.36
3 Asset index (PC1), squared	0.96	0.97	0.98	0.97	0.97	0.98	0.98	0.98	0.98
4 Relative income	1.11	1.16	1.13	1.15	1.13	1.13	1.17	1.13	1.11
5 Mean years of schooling	1.13 *	1.13	1.16 *	1.14	1.15 *	1.16 *	1.14	1.19 *	1.12
6 Years since first migration		1.12 ***	1.12 ***	1.12 ***	1.12 ***	1.11 ***	1.12 ***	1.12 ***	1.11 ***
Members with migration experience other than those sent in 2015-2016		0.07 ***	0.07 ***	0.07 ***	0.07 ***	0.07 ***	0.06 ***	0.06 ***	0.08 ***
<i>Network connectedness</i>									
8 Degree			1.03						
9 Eigenvector				15.37					
10 Betweenness					1.00				
11 Closeness						2846.79 *			
<i>Direct links to pioneer (number of households)</i>									
12 Close family							1.51 **		
13 Other family							0.96		
14 Close friends							1.02		
15 Other friends							0.34		
<i>Lagged migrant network, indirect</i>									
16 1st degree								1.71 **	
17 2nd degree								1.12	
18 3rd degree								0.90	
19 4th degree								1.12	
20 Other family								1.15	
21 Close friends								0.99	
22 Other friends								0.60	
<i>Household-affirmed migrant network, direct</i>									
23 1st degree									1.70
24 2nd degree									1.03
25 3rd degree									1.08
26 4th degree									1.35 **
27 Other family									0.91
Constant	0.0029 ***	0.0037 ***	0.0024 ***	0.0032 ***	0.0030 ***	0.0002 ***	0.0032 ***	0.0021 ***	0.0031 ***
Pseudo R2	0.165	0.3118	0.3166	0.3135	0.3154	0.32	0.3312	0.3352	0.3341
N	297	297	297	297	297	297	297	282	297

legend: \* p<.1; \*\*p<.05; \*\*\* p<.01

### **Household migration norm**

Migration history significantly and positively correlates with current migration behavior holding the other factors constant. Adding such information nearly doubles the explanatory power of the model. The estimations show that a unit increase in the number of years since first migration improves the odds of migrating by around 11 to 12 percent. The positive and significant result is consistent to different iterations of the model. The earlier the household had participated in international migration, the greater the tendency to participate in current migration, all else being equal. Households which have been exposed to migration earlier may have accumulated some expertise, say, in dealing with recruiters and other aspects of the migration process. They are also more likely to have developed a migration culture - a preference for migration as a viable livelihood alternative.

The result for the number of household members with prior migration experience other than those referred to in the dependent variable is likewise consistently significant but takes a negative sign (or an odds ratio below 1) which suggests that households do not need to send so many members abroad. This is in line with the NELM's framework that households engage in international migration as a resource diversification strategy.

### **Within-village, lagged migrant networks**

The study found evidence in favor of hypothesis #1 – that strength of ties matters in international migration. Among the lagged migrant network variables, only variable #16 (i.e. migrant networks in first-degree relation) significantly explains variation in migration behavior even after controlling for the household migration history, wealth, and human capital characteristics. Having more migration networks of such type or degree is positively associated with the odds of migrating, *ceteris paribus*. A likelihood-ratio test that assumes H2 is nested within H8 affirms the need to incorporate the network variables in the model because the p-value for the test is 0.0172.

The significance of very close blood relations suggests that migration is a costly endeavor and people often rely on their networks that have greater altruistic motives to provide support to the migration decision. The findings likewise indicate that individuals rely on their own immediate migration network who could pass on information on jobs and strategies that they can trust. In migration decision-making, the source of information is important “since some sources are trusted more than others” (Gurak and Caces, 1987: 156). The abovementioned

findings are consistent with the observation that the more common sources of migration-related support in one's migration journey are close family members which is evident from the findings in a recent survey-based study (see (Tabuga, A Probe into the Filipino Migration Culture: What is There to Learn for Policy Intervention?, 2018).

Lastly, the significance of within-village migrant network indicates the relative importance of physical proximity since this measure accounts for the households' migrant networks within the village where they reside. Indeed, Burt (1987, p.) noted that "Physical proximity alone has some capacity to cause social contagion. The closer the physical contact is between ego and alter, the more likely that alter's adoption will trigger ego's. Merely witnessing alter's adoption can transmit significant information to ego. He not only becomes aware of the innovation, he also has the benefit of a vicarious trial use, witnessing the consequences adoption has for alter" (1987, p.1288-1289).

### **Network position**

On the contrary, how the household is situated within the web of social relations (i.e. Hypothesis #2) even in a village with a high migration incidence like Camachile, is not significant in the estimation of current migration behavior. None of the parameters is significant at 5%.

In Tabuga (2018a), migrant households are shown to be more central and have higher connectivity compared to non-migrant households. The insignificance of most network parameters in this analysis perhaps indicate that people obtain their migration-related support from their migrant kin and friends rather than from their general social circle denoted by the network parameters degree, eigenvector, and betweenness. Also, in this era of social media and in a country where Internet penetration is rising, the presence of modern modes of communication allows people to interact with others and obtain their informational needs without necessarily getting from people they know or meet physically.

On the other hand, this result may be reflective of the limitation of the empirical analysis in capturing the real network of households since the scope of analysis is limited only within the village. Some households may be connected to other influential households or other sources of information and other resources beyond the geographic boundary of the village. Such networks, whether with migration experience or not, which are not captured in this analysis

may be influencing migration behavior of the household. How such can be incorporated is a fruitful area of inquiry in the future.

### **Links to pioneer migrants**

The estimation did find some evidence for hypothesis #3. In particular, the number of pioneer migrant households (MH) which the household has direct and close relations (see variable #12 in Table 3) to significantly explains variation in household migration behavior, holding other factors constant. Migrant relations of this type is positively associated with higher probability of participating in migration. The significance of closer ties with pioneers illustrates the intergenerational tendency of international migration which is consistent with the findings for lagged migrant network.

The relatively weaker links with pioneer migrants are not significant in explaining current migration behavior. However, the word ‘current’ should be emphasized; it does not necessarily mean that pioneer migrants did not have a role in past migration. In general, weaker ties are argued to have a bridging function, spreading novel information. Yet information possessed by pioneers may not be that useful to current migration anymore.

### **Household-affirmed migration networks**

Notably, among the household-affirmed migrant networks (HAMN), only the fourth-degree blood relations are significant for household labor migration suggesting that relatively weaker ties also tend to enhance migration likelihood. In Tabuga (2018b), it is shown that weaker ties also provide job information/recommendations and other types of migration-related support. Note that the HAMN variables reflect relations that are active since these are the ones they can readily mention in a spontaneous survey.

Note that using the total number instead of these disaggregated ones does not reveal such dynamics. If total network size is used and no significant effect is found, one may arrive at the wrong conclusion that migrant networks do not have significant influence on migration likelihood. This exercise illustrates that obtaining nuances surrounding the network-migration relationship is therefore important.

This finding also presents an evidence that origin-based migrant networks of individuals may encompass other areas too, not just the village of origin, as noted earlier. Moreover, in

contrary to variable #16 to 22 which refers to a lagged set of migrant contacts, the HAMN refers to the current set of migrant networks. The significant finding, with all else being equal, therefore indicates that current migrant networks matter in the current migration activities of the households because being current means that the potential social capital that can be extracted from such networks is more readily available (e.g. remittances, up-to-date information) as opposed to migration-related social capital from ties with past migration experience.

### **Concluding Remarks**

Notwithstanding the limitations, the above findings suggest that migration is perpetuated by households with migration norm as their past migration engagement is significantly correlated with their current migration behavior, all else being equal. There is no doubt that at least, in this context of interest, international migration is an intergenerational phenomenon.

More importantly, this analysis shows that not all types of migrant networks matter for international labor migration. Research works that rely on general network size such as migration incidence in an area and found positive effect may get the impression that social networks, regardless of the type and strength/degree of ties, do enhance migration probability and may mistakenly accord to all migrant networks the power to perpetuate migration.

We found some empirical evidence that strength of ties matters as shown by the significance of very close ties with pioneer and other more recent migrants. The mechanism by which closer migrant relations enhance migration likelihood is through their provision of not only financial resources but also migration-related information and job referrals. These results reflect that in international migration, people need accessible monetary and informational resources not to mention trustworthy and customized information and such needs are not sufficiently met by market institutions and other sources but primarily by their inner social circles.

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## Appendices

### **Appendix 1. Constructing the wealth index through Principal Component Analysis (PCA)**

The wealth index is constructed from asset and household infrastructure data from the 2012 CBMS database of Brgy. Camachile, the most recent dataset available.<sup>10</sup> For households that have missing 2012 data (around 20), their 2009 CBMS information were used instead. For variables like total income, the 2009 data were inflated to 2012 prices using the change in the GDP deflator from 2009 to 2012 (i.e. 0.105479).

The advantage of using asset data over income to indicate the socioeconomic condition is noted in McKenzie (2005) which says that information about ownership of assets and quality of housing, for instance, does not face the same measurement problems as that on income. However, it is necessary to reduce the number of asset ownership variables into an index to avoid having too many explanatory variables in the econometric model. Therefore, the method used to construct the index is the principal component analysis (PCA). The PCA is one of the most commonly-used method of reducing the number of variables into a smaller number that captures the variation in the dimensions represented by the variables. Vyas and Kumaranayake (2006) narrated some important criteria in choosing the variables that go into the socioeconomic index. It is said that PCA works best when the chosen variables are correlated. Also, the distribution of the variables across observations should vary. McKenzie (2005) notes that the variables which are more unequally distributed across the observations are given more weight in PCA. For instance, an asset like television which is owned by almost all households would exhibit no variation and therefore does not contribute much in differentiating the socioeconomic condition of households. Therefore, the 'key is to include... variables that capture inequality between households' (Vyas and Kumaranayake, 2006:461).

Applying these criteria, several assets that do not exhibit variation were excluded from the PCA. These are ones that have either very high ownership rate such as television (96 percent), cellular phone (90 percent), and electric fan (96 percent) as well as those with very low rate such as fishing boat (12 percent), karaoke (13 percent), and landline phone (7 percent). Appendix 1.1 shows the summary statistics of the asset and infrastructure variables

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<sup>10</sup> Two outliers have also been dropped from the sample owing to their extremely high number of assets (e.g. one of them has 15 units of computer; another is household headed by a US citizen) which appears to have huge influences on the results of the analysis.

that were selected for PCA while Appendix 1.2 shows the correlation coefficients. The standard deviations show that there is considerable amount of variation in the variables.

#### Appendix 1.1. Summary statistics of PCA variables

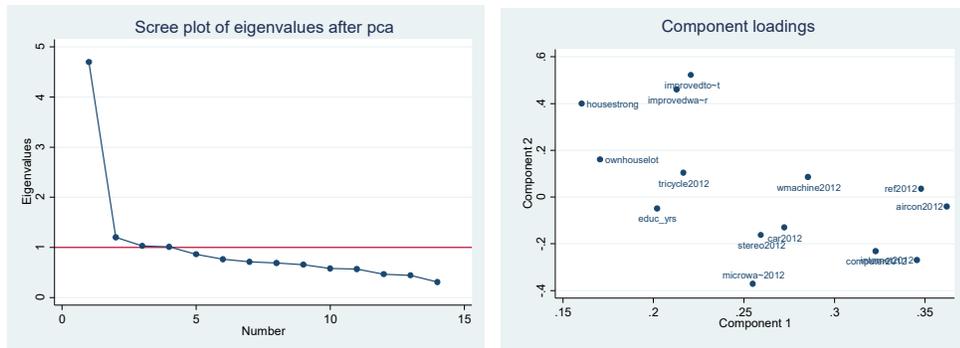
Variable	Obs	Mean	Std. Dev.	Min	Max
Education of household head (years)	358	9.1145	3.0192	0	14
Improved water source (Piped water into dwelling, plot or yard)	360	0.5389	0.4992	0	1
Improved toilet facility (Water-sealed flush to sewer/septic tank, own, not shared)	360	0.3806	0.4862	0	1
House's wall and roof are made of strong materials	360	0.8000	0.4006	0	1
Owner, owner-like possession of house and lot	360	0.6417	0.4802	0	1
<u>Number of units owned</u>					
Refrigerator	347	0.5677	0.5668	0	3
Washing Machine	347	0.7032	0.5168	0	2
Stereo	347	0.4121	0.5842	0	5
Microwave oven	347	0.2334	0.4565	0	3
Computer	347	0.4524	0.7449	0	6
Internet	325	0.2215	0.4305	0	2
Air-conditioning unit	347	0.3401	0.5886	0	3
Car	347	0.1787	0.4056	0	2
Tricycle	325	0.4462	0.6244	0	3

Appendix 1.2. Correlation coefficients of PCA variables

	improved water	improved toilet	housestrong	ref	wmachine	stereo	microwave	computer	internet	aircon	car	tricycle	education years	own houselot
improved water	1.0000													
improved toilet	0.3133	1.0000												
housestrong	0.1842	0.2496	1.0000											
ref	0.3238	0.3183	0.2551	1.0000										
wmachine	0.3183	0.2216	0.2000	0.4431	1.0000									
stereo	0.1384	0.1962	0.1575	0.4015	0.3127	1.0000								
microwave	0.0968	0.0944	0.1511	0.3915	0.2692	0.3508	1.0000							
computer	0.2297	0.2269	0.1365	0.4702	0.3231	0.2892	0.3769	1.0000						
internet	0.2255	0.1822	0.1680	0.4833	0.3668	0.3703	0.3765	0.5803	1.0000					
aircon	0.3022	0.3876	0.2119	0.5358	0.4151	0.3802	0.4207	0.4903	0.6110	1.0000				
car	0.2339	0.1999	0.1181	0.3451	0.3296	0.2458	0.2824	0.3844	0.4404	0.4219	1.0000			
tricycle	0.1236	0.2579	0.1800	0.3063	0.2429	0.2390	0.2255	0.2560	0.2956	0.3034	0.1534	1.0000		
education years	0.1958	0.2200	0.0723	0.2512	0.2301	0.1869	0.1304	0.3540	0.3443	0.2407	0.2063	0.1391	1.0000	
ownhouselot	0.1851	0.1647	0.0467	0.2970	0.1833	0.1533	0.0916	0.2029	0.1992	0.2566	0.2282	0.1627	0.0167	1.0000

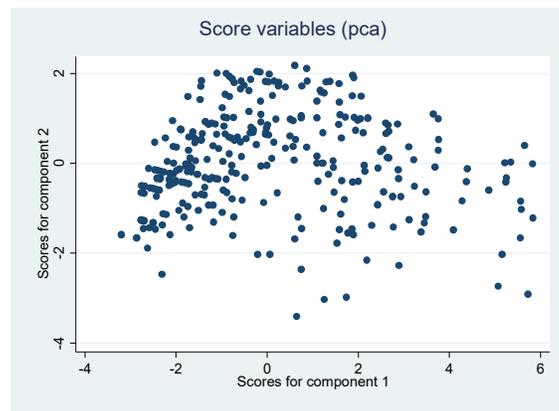


computer and internet connection, and improved water and toilet facilities. To check out how the component loadings correlate with the initial variable, the eigenventors with loadings above 0.3 were tabulated. The results are shown in Appendix 1.5 below.



a) Scree plot

b) Loading plot



c. Score plot

Appendix 1.4. Scree plot, loading plot, and score plot of the PCA results

Appendix 1.5 indicates that component 1 has a relatively high correlation with assets like computer, internet connection, air-conditioning unit and refrigerator while component 2 has relatively high loadings for household infrastructures like water source, type of sanitation facility and materials of the dwelling unit. Component 3 is much like component 2 but is also correlated with ownership of tricycle and years of education of the head. Finally, component 4 has high loadings for house ownership, materials of the house and years of education of the head. From these results, it is plausible to concentrate on components 1 and 2 as these may be capturing two different dimensions – the latter is a good candidate for explaining the long term socioeconomic status of a household (i.e. these are the ones with strong materials of dwelling units and have decent sanitation facilities and water sources) while the former seems to explain assets that are relatively more reflective of short-term status symbols, if not necessity for many, like ownership

of computer and being connected to the internet. Both components may be used as explanatory variables in the migration intention analysis.

### Appendix 1.5. Correlation between the components and initial variables

Principal components (eigenvectors) (blanks are abs(loading)<.3)

Variable	Comp1	Comp2	Comp3	Comp4	Unexplained
improvedwa~r		0.4606	-0.3089		.4239
improvedto~t		0.5221			.4247
housetrong		0.3994	0.3832	0.3628	.4021
ref2012	0.3479				.4152
wmachine2012					.6079
stereo2012					.5593
microwa~2012		-0.3710	0.3250		.4115
computer2012	0.3228				.4042
internet2012	0.3455				.3379
aircon2012	0.3620				.3795
car2012					.5354
tricycle2012			0.3674		.6148
educ_yrs			-0.5673	0.4200	.2945
ownhouselot				-0.7585	.2447

Meanwhile, the Kaiser-Meyer-Olkin measure of sampling adequacy shows a result 0.8916, way above the 0.5 mark, which justifies the use of PCA. It is said that the degree of common variance at this level is 'meritorious.' PCA therefore is a good way to reduce the number of variables and yet capture the variation in these variables across observations.

### Appendix 1.6. Results of Kaiser-Meyer-Olkin measure of sampling adequacy

Variable	kmo
improved water	0.8815
improved toilet	0.7939
housetrong	0.8773
ref	0.9209
wmachine	0.9266
stereo	0.9275
microwave	0.8858
computer	0.9046
internet	0.8635
aircon	0.8866
car	0.9322
tricycle	0.919
education years	0.8529
ownhouselot	0.8558
Overall	0.8916

## Appendix 2. Constructing the satisfaction and perception indices through Principal Component Analysis (PCA)

To obtain the self-reported satisfaction with household's living condition, three survey questions were used to ascertain the level of satisfaction. These questions involve approval with one's household current overall living condition, household earnings, and whether there was an improvement in the household's economic situation within the last five years. The distribution of responses, shown in Appendix 2.1, suggests that there is enough variation in the responses which is essential in creating an index through PCA. Moreover, the correlation coefficients among these variables are as low as 0.3944 and as high as 0.6091 indicating that the variables are highly correlated with one another and we argue that they are all measuring satisfaction levels.

The result of the PCA is shown in Appendix 2.2. Note that the loadings show strong correlation between the first component and all three satisfaction variables and therefore, it is the best candidate for the satisfaction index. Moreover, the Kaiser-Meyer-Olkin measure of sampling adequacy shows an overall result of 0.6531 and this justifies the use of PCA for constructing the satisfaction index.

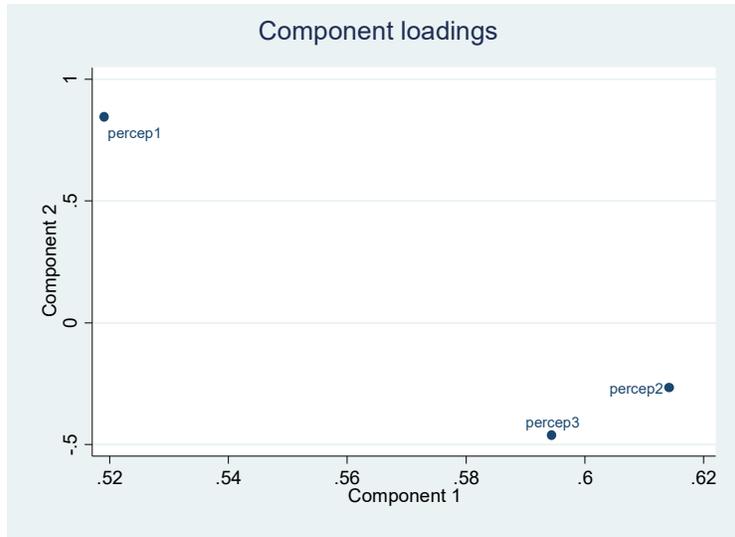
Appendix 2.1. Frequency distribution of responses in self-reported satisfaction with household's living condition

Survey question/variable	Are you satisfied with your current living condition?	Are you satisfied with your current household earnings?	Do you believe that your household's economic situation has improved in the last 5 years?
Absolutely yes	44.57	38.59	48.01
Somewhat	20.29	19.57	19.20
Cannot say/not sure	3.08	2.90	9.24
Not quite	19.20	25.18	6.52
Absolutely not	12.86	13.77	17.03

Appendix 2.2. PCA results for satisfaction level







Appendix 2.6. Loadings plot for PCA of perception variables