Social Networks and Employment Performances: Evidence from Rural – Urban Migration in Vietnam

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Abstract

This paper considers the effects of social networks on income and employment dynamics of rural-urban migrants in Vietnam. Estimation of a causal effect is challenging because unobserved factors affects both employment performances and social networks. I address this endogeneity problem by using instrumental variable method. The results suggest that social networks improve migrant's incomes and make wage earners willing to change their jobs.

Keywords: migration, social network, employment

JEL: D02, J61

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1. Introduction

Social networks are considered an important informal mechanism through which information about job opportunities is transmitted. By solving information and commitment problems in environments where markets are inefficient, social networks bridge the informational gap between the worker and the firm by providing information on both sides, therefore reducing uncertainty and improving the match (Munshi, 2011). Social networks are even more important to migrants from rural to urban regions who found it difficult to adapt to new environment, are typically lack of information about the host labor market and the characteristics of the jobs offered.

The significant role of social contacts in obtaining employment has long been recognized. However, what less understood is its possible effects on subsequent wages or the decision of workers to change their employment position by using such networks. While positive wage effects derived from social networks are reported by some studies, this is not universal. For instance, Delattre & Sabatier (2007) find that after correcting for selection bias on the wage equation, the effect of social network on wages is negative. One explanation is related to training costs (Pellizzari, 2010). Firms may want to spend extra effort to fill positions using formal rather than informal means when the posts require high training cost, which can result in high wages. A second explanation bases on the argument of job seekers' impatience. Those keen to find employment quickly may use informal contacts, sacrificing potentially higher wages from better matched positions for quicker entry into work (Bentolila et al., 2010). Given the ambiguous theoretical predictions about the impact of using informal contacts on subsequent wages, it is worthwhile to test the hypothesis empirically.

Empirical analyses on the effects of social networks also have been plagued by various conceptual and data problems. Many commonly used datasets lack information on the structure and composition of individuals' social networks. Analyses are further complicated by various endogeneity issues such as the refection problem and selection bias. A reflection problem arises when migrants and network migrants' outcomes are determined simultaneously, which inherently confounds the measure of the social network. Selection bias leads to a correlated unobservable problem when people tend to associate with others based in part on some unobserved group characteristics they favor. In such a case, an observed positive association between an individual's outcome and those of their associated network members

may not be causal but rather due to some unknown factors that affect both social links and individual's own labor market outcomes (see Munshi (2011) for a review).

The literature seeks to control for as much as possible the individual characteristics and economic conditions that could be correlated with networks and individuals' labor market outcomes. However, the obvious concern is that the unobserved variables remain unaccounted for. Observed individual characteristics such as age, education, and occupational experience may not capture traits such as initiative and diligence that play a critical role in determining the individual's market outcomes. Empirical studies on the effect of networks on labor market outcomes, for example, often use the number of friends or relatives in cities to measure the strength of the individual's network. If individuals with greater ability have a larger social networks also have better labor market outcomes, the relationship between networks and labor market outcomes could be driven by the unobserved ability effects. Studies using received help or the extent of social interaction to measure the network may suffer from potential selectivity bias, since we would expect more able individuals to receive more help or to be better connected and to do well in the labor market. Using fixed effects can fully capture constant unobservable individual characteristics which may affect both networks and labor market outcomes but may fail to account for unobserved factors that vary over time.

This study seeks to improve our knowledge about the relationship between social networks and labor market outcomes of rural to urban migrants in Vietnam using a novel source of internal migration data. Vietnamese labor market institution is full of uncertainty and frictions. Hence, individuals rely heavily on informal channels to get better paid jobs. As far as I am aware, this study could be the first empirical analysis investigating the importance of social networks in shaping migrants' income dynamics.

To explore the research questions, I use a question from the Vietnam Rural Urban Migration Survey to derive a novel proxy for social networks: the number of phone call that migrants made during the Lunar New Year in urban areas. The analysis is carried out using linear regression models. I find that people who made more phone calls are also getting better paid jobs. In addition, wage earners with extensive social networks exhibit more willingness to change from wage earners to become self-employed.

However, the positive correlations observed here may not be causal due to potential measurement errors or omitted variable problems discussed above. In order to address these

potential endogeneity, I use the historical weather disasters at rural sending regions as instruments for social networks. The inherent characteristics of weather disasters at the departure of migrants provide a basis for the instrument's exogeneity. Weather disasters at rural sending regions would affect the expected agricultural output of the households exposed to it, and thereby impacts on migration decisions of members of rural households. Therefore, it is unlikely that weather disasters could impact on migrant's income at the destination, other than through the social network.

The results from the instrumental variable (IV) approach suggest that the social network helps to improve labour incomes and make migrants be willing to change their jobs. To confirm the findings from IV approach, I carry out some sensitivity tests on the validity of instrumental variable. To address the concern of whether the exclusion restriction is satisfied, I perform a falsification test that examines the reduced form relationship between weather disasters and incomes. The results confirm that social networks estimated by the IV approach have positive effects on income dynamics.

I begin, in Section 2, by reviewing literature on the impact of social networks on incomes and describing the labor institutions faced by migrants in Vietnam. Section 3 documents the data used. The identification strategy employed is discussed in detail in section 4. It also reports the OLS estimates of the relationship between social networks and dynamics of income and employment. I then turn to the issues of causality OLS estimates that control for an extensive set of observable characteristics, as well as the IV estimates. Section 5 concludes.

2. Literature review and institutional background

2.1. Literature review

There are numerous studies on the relationship between the social networks and labor market outcomes (see Jackson (2010) for a comprehensive survey). Economists have highlighted the role of the social ties in transmitting information on vacancies to unemployed individuals and in producing job referrals to the employers. For example, Granovetter (1995) argues that many people find their jobs through social relations, not only through formal channels. Social networks allow individuals gathering better information about the availability of jobs as well as the characteristics of the job when looking for work.

However, there is no consensus on the possible effects of social networks on subsequent wages. While Granovetter confirms the positive effects of social networks on incomes and quality of job matching, other studies have not found the differences in incomes between those who seek jobs from formal channels and those through social networks (such as Lin, 1999; Mouwn, 2003; Franzen & Hangartner, 2006). In addition, one of the empirical challenges is that the network is not observed. Literature often approximates the social network by using information of particular groups which are known to be socially cohesive and clustered in certain areas (e.g., ethnic minority groups). However, these studies which use regression models to estimate the relationship between labor market outcomes and a proxy for the social network are likely to capture geographical or ethnic proximity of individuals rather than networks (Topa, 2001; Clark & Drinkwater, 2002; Munshi, 2003; Bayer, Ross & Topa, 2008; Patacchini & Zenou, 2008).

There are few studies that use direct measures of the network. Cappellari and Tatsiramos (2010) draw information on the employment status of one's friends using the British Household Panel Survey. They find that transitions from unemployment into employment are positively correlated with the number of employed friends. Calvò-Armengol, Patacchini & Zenou (2009) create a network variable based on schoolmates using the National Longitudinal Survey of Adolescent Health. They find that an individual's position in the network is strongly correlated with their school performance. Wahba & Zenou (2005), who use density of population to capture size of networks in Egypt, find that density is positively correlated with the probability of finding a job through the social networks. This is however happening up to a certain threshold, beyond which congestion effects exist and hence individuals in particularly dense areas are less likely to find a job through the social networks. Another study by Goel and Lang (2010) using data on recent arrivals to Canada find that the impact of obtaining jobs through the social networks on wages is decreasing on their measure of network strength. Giulietti et al. (2010) use a direct measure of social networks, which is self-reported of migrants on the number of greetings that they make during the Lunar New Year to urban people, to explore the effect of social ties on wages. They find that employed migrants with a larger network can get better incomes.

2.2. Institutional background

Over the past decade, the internal migration in Vietnam has been increased rapidly. During the period 2004-2009, there are about 6.7 million individuals or 8.6 percent of the population

aged five and older in Vietnam who has changed their places of residence (General Statistics Office (GSO), 2011). This figure is much higher than the one in the previous period with only about 6.5 percent of people at or above five years old migrated (GSO & UNDP, 2001).

However, Vietnam has not had any special policies focusing on internal migration. The role of internal migration in the policies of economic development has not been considered seriously. It partly stems from the fact that the issues of internal migrants are not under the jurisdiction of any specific government agencies. Only a few local provinces, such as the major cities that attract a large amount of migration, have a few policies to support and manage migrant workers (UNDP, 2010). Therefore, migrants are regarded as a vulnerable group.

A significant portion of migration workers have unstable jobs, particularly in the informal sector. Their basic incomes often do not meet the minimum living needs. They also have to pay higher price for basic social services (Oxfarm, 2015). Residence Law in 2007 had some reforms but household registration (*ho khau*) is still a requirement to get an access to public services and benefit programs. This creates substantial inconveniences for migrants because they normally do not have permanent residence and therefore have difficulties in accessing those services (ActionAid Vietnam, 2012).

3. Data Sources and Description

Data used are from the Vietnam Rural Urban Migration Survey (VRUMS) 2013. The VRUMS is conducted by the Central Institute for Economic Management of the Ministry of Planning and Investment, Vietnam under the technical support from Research School of Economics at the Australian National University. The objective of VRUMS is to gather sample information on rural-urban migration in Vietnam anchoring to 2012 Vietnam Household Living Standards Survey (VHLSS2012). The survey intends to help to understand the effects of large scale rural-urban migration in the process of economic development and to assist the government in formulating the right economic and social policies to facilitate the rural-urban migration and urbanization process.

The VRUMS collects information from 869 migrant households from rural areas of Vietnam to urban areas of Ha Noi and Hochiminh city and surrounding areas for work purpose. Migrant households are defined as households whether members must have family

relationship or relatives with migrants, live with migrants and share their incomes and expenditures at the time of interview. These households come from the rural households oberseved in the Vietnam Household Living Standard Survey 2012 (VHLSS2012) which is national representative survey undertaken biannually by the General Statistical Office of Vietnam (GSO).

The survey are carried out in four rounds corresponding to four rounds of the VHLSS2012. It covers both the migrants who are currently and those who used to be members of rural households but are currently in Hanoi or Hochiminh city. It captures both long-term (over 6 months) and short-term (6 months and shorter such as temporary and seasonal) migrants that have not been fully taken into account in other surveys.

Another novelity of the survey is that it includes questions asking about both the current incomes and the first job incomes that allow me to investigate the income dynamics of migrants. The survey also includes comprehensive information on household and personal characteristics, detailed health status, employment, training and education of adults and children, social networks, family and social relationships, life events, and mental health measures of the individuals.

To investigate the social network of migrants, I follow Giulietti et al. (2010) to take the number of phone calls to people living in urban areas that a migrant made during the Lunar New Year as a proxy for social networks. This information however is only provided by the respondent head of household, and hence only these individuals are included in the sample. The exact wording of the question is as follows: 'During the last Lunar New Year, how many people in total did you send your greetings. Among them, _____person(s) is (are) currently living in the city'.

To investigate the impact of social network on employment transition, I use information from the question asking about migrants who are currently wage earners and reported to be thinking to change to run their own business. The exact question is: 'Have you ever thought of running a business of your own?'. Respondents could either answer never; never seriously because it would be very difficult or yes, they have. I construct a measure that takes on the binary value of 0 and 1, where 0 corresponds to the response 'Never' and 'Never seriously' and 1 to the response 'Yes, I have'. I then estimate a linear probability model. Another

strategy is to estimate a logit model. As I discuss below, the estimates are qualitatively identical if I pursue this alternative strategy.

The summary statistics for migrant's household heads are presented in Table 1. On average, migrants have about ten years of education and they have left home more than eight years before the survey. The percentage of female is quite small because only household head, usually males, are considered in the sample under scrutiny. Current jobs of migrants have been better paid than their first job in the cities. There are more than one-third of current wage earners are willing to change their job and run their own business. Regarding the network measure, each migrant has on average nearly twelve contacts in urban areas. The variable of switching in job types measures whether the migrants change from their formal jobs (that means with working contracts) to informal jobs (without working contract). This variable will take value of 1 when they change from informal to formal jobs and of – 1 if they change from one informal job to another one. The data shows that migrants tend to switch from informal to formal jobs. The duration of staying in the cities of migrants is on average more than seven years. This figure may be substantial higher than that in other migration surveys because VRUMS covers both short- and long-term migrants.

4. Estimating equations and empirical results

4.1 OLS estimates

I begin by estimating the relationship between social network and employment dynamics using the following baseline model is:

$$Y_{ic} = \alpha + \beta Social\_network_i + X_i^{'}\Gamma + Z_i^{'}\Pi + \varepsilon_{ic} \qquad (1)$$

where i indexes individual, c original community in rural regions. Y_{ic} denotes the two outcome measures: income dynamics and wage earners wanting to become self-employed. $Social\_network_i$ represents the number of calls made to urban people during the Lunar New Year. β is the coefficient of interest as it indicates the relationship between the social network and change in the migrants' outcomes. I expect β to be positive and statistically significant. ε_{ic} is an exogenous labor demand shock, which reflects the idea that individual migrants from

given location could be endowed with specific skills that channel them into particular segments of the labor market even when networks are absent.

The vector $X_i^{'}$ controls a set of individual-level covariates, which includes age, age squared, years of education, a gender indicator, a dummy variable for people who are ethnic minorities and dummies for being employed in state or foreign sectors. The vector $Z_i^{'}$ consists of other variables, such as duration of staying in the cities and change in job types.

Given that the main explanatory variable, $Social\_network_i$, in Equation 1 may have similar effects on people coming from the same sending commune in rural areas, in all regression below, I clustered the standard errors for a potentially arbitrary correlation between individuals in the same original commune in rural areas.

Table 2 reports OLS estimates of the impacts of social networks on difference in migrant's incomes between the current and first job incomes. The income from the first job is adjusted for inflation to make the figures comparable across years because migrants arrived in the cities in various points of time. In Column 1, I estimate the relationship between the number of urban calls with migrant's income dynamics. The estimates show that the number of urban calls has a positive impact on change in migrant's incomes. This is consistent with the hypothesis that the social network positively affects individual's incomes. At the same time, the coefficient is statistically significant. Realizing that there are some outliers, that may drive the results (see Figure 1), in Column 2, I exclude migrants with more than 100 calls. The effect of social networks is three times higher. The result indicates that one more contact on average is associated with nearly one percent increase in income change.

Estimates of other variables are also consistent with the results from other studies and expectations. People working in the foreign sector have higher increase in incomes. While the age and age square variables both significantly influence change in wages at the 0.05 significance level, the directions of the two effects are different. This implies a diminishing marginal effect of the age.

Columns 3-5 of Table 2 report estimates of Equation 1 with the additional controls included. In Column 3, I control for duration of migrants in the cities. Network effects will depend on both their size and their duration, since migrants who have been in the cities longer are more

established and may have larger social networks. I also add the variables that measure the change in the job types of current and first job of migrants in the cities. I classify the jobs with contract as formal ones and code them as 1 and 0 otherwise. In the two last columns, I control for the interaction between the number of calls and different cohorts of duration of staying in the cities. The results indicate that the number of urban calls bring more benefits to more established migrants, especially to those who stay in the cities less than 3 years and from 5 to 8 years. Based on the estimates from Column 4, the point estimate for this cohort implies that one more contact on average is associated with a 0.9 percent increase in income changes, which is equal to 10.6 per cent of the sample average for log of migrant's current incomes.[2]

OLS estimates examining the relationship between the number of urban calls and willingness to run their own business are reported in Table 3[3]. The specification reported includes the similar control variables as in the income dynamics equation except I include log of current incomes which may affect the job decision of migrants. The estimates indicate a positive and statistically significant relationship between social networks and migrants' willingness to run their own business by current wage earners except the last column. Nonetheless, the coefficient of the number of urban calls in the last column has the same sign and magnitude with that in the first column. An increase in standard errors may reflect a loss of precision arising from significant attrition of observations when I add more control variables.

I also check for robustness to alternative estimation methods. Because the responses to willingness to own business question are restricted in range, they may not be normally distributed. To overcome this problem, I use a logit model instead. The results from the logit model in Appendix A.1 are qualitatively identical to our OLS estimates. The marginal effects are consistent with those estimated by OLS and statistically significant.

4.2 Identifying the causal relationship

To consistently estimate an OLS model, the explanatory variable of interest, the network size, should be uncorrelated with individual unobserved ability. This assumption, however, is very likely to be violated. These unobservable individual factors might be correlated with both incomes or willingness to run own business as well as the network size, leading

[2]The mean of log of migrant's current income is 8.44. The effect is calculated as 0.9/8.44=0.106 or 10.6 per cent of mean.
[3]The main reason to use OLS rather other estimators such as logit is that the coefficients estimated by OLS are easier to be interpreted.

to biased and inconsistent estimates. The direction and magnitude of this bias depend on the partial correlation of the omitted variable with the error term. For example, if more productive individuals are more likely to have a larger network, then the estimates of β will be biased upward. In addition, the wages and the network size may be mutually determined, leading to the simultaneity bias. For example, high income in the cities may provide an incentive for migrants to expand their network directly and/or may encourage more friends and relatives to migrate, hence enlarging their network indirectly. Another source of potential endogeneity to income dynamics is related to the timing of the survey. Respondents are typically required to give information on characteristics of their network that is specific to the time of the survey, but not to the period when individuals searched or obtained their job. To the extent that the size of networks is affected by labor market events, the estimated coefficient will be biased. Another problem with Equation 1 is related to the measurement error of the network. This would affect size of network, and has to do with the imperfect recall and with the round numbers of contacts. Measurement error is expected to generate downward bias in the estimates.

In this section, I try to assess whether the correlations documented to this point are causal by using an instrument for social networks. For the regression of interest, one would need to find an instrument which is correlated with network characteristics but have no direct impact on income dynamics or willingness to run own business[4]. Origin characteristics that generate exogenous variation in the size of the migrant network, but are uncorrelated with labor demand shocks at the destination, could be valid instruments. I exploit the intensity of weather disasters in the original location of migrants as an instrument. Under certain assumptions, the weather disasters can be seen as an exogenous shock to the size of outflow migrants from the rural regions because the occurrence and destructive power of weather in a certain areas are random.

There are numerous studies that found the relationship between migration behavior and natural disasters (see Belasen & Polachek (2011) for a review). The reasoning behind this result is also intuitive. For example, weather disasters would decrease the expected agricultural output of the households exposed to it, and thereby encourage members of these households to migrate. Consequently, being hit by natural hazards will trigger the outflow migration from rural regions. In other words, the higher the intensity of a natural disaster is, the more rural households are likely to move to urban areas.

Natural hazards are common in Vietnam. Rural households in Vietnam are exposed to many natural risks that could potentially threaten their livelihoods. In addition, since the majority of households in rural areas rely on agricultural activities, they will experience fluctuations in agriculturally derived income from exogenous natural shocks such as drought, floods, pest infestation and livestock disease (CIEM, DOE, ILSSA & IPSARD 2007). Here, I take rainfall variation as a proxy for the riskiness of natural environment. Literature indicates that the year-to-year rainfall variations capture the effects of hazardous natural environment such as floods, typhoons and storms in Vietnam reasonably well. For example, Benson (1997) shows that typhoons are typically associated with heavy rainfall and strong winds. Each typhoon accounts for about 10 to 15 per cent, and sometimes even more, of annual rainfall and causes flash floods and landslides. In addition, heavy rainfall causes rivers to fill and potentially results in flooding. Therefore, I expect the more typhoons and storms or natural disaster in general a region suffers from, the more rainfall volatility it has.

The data on rainfall variability are obtained from weather stations in 87 districts collected by the Institute of Meteorology and Hydrology.[4] These stations are allocated to capture the best variation of weather within regions. For the districts without stations, the weather conditions are assumed to be similar to districts sharing the same borders with them but have a weather station. The reason for this strategy is that stations are expected to gauge significant weather disasters in the same geographic locations but different administrative regions. Therefore, weather data from one station could be used to measure neighboring districts with similar conditions.

Monthly rainfall observations (from January to December) were available over 30 years for each station from 1975 to 2006. For each month, I calculated the standard deviation over the 30 years for each station, and obtained the average rainfall deviation of each station over 12 months to investigate year-to-year rainfall fluctuations. Specifically, consider rainfall variable x, station i, month m and year y, and define x_{imy} as the value of x in station i in month m in year y. For each month m, I compute the standard deviation of x_{imy} over all years (denoted s_{im}), which measures the month-specific variability of variable x in station i. To obtain a compound measure of year-to-year variability for station i I average s_{im} over the twelve months.

[4]On average, there are nearly 12 districts in one province. The area of each district ranges from 27.8 to 3677.4 square kilometres and the mean is 660 square kilometres. For the period 1975–2006, the data is taken from Thomas et al. 'Natural disasters and household welfare: evidence from Vietnam', Policy Research Working Paper, 2010, World Bank.

The reason to take weather disasters for a long time is twofold: (i) the migration data covers both long-term and short-term migrants with the longest duration of migrants in the cities about 48 years. Therefore, the reasons to migrate may originate from historical natural shocks rather than the present ones; (ii) long-term rainfall variation may closely relate with other bio-geographic conditions such as land quality and terrain ruggedness. All of these can have both direct and indirect effects on agricultural incomes and living conditions or rural people that create incentives for migration.

To be even more cautious about the exogeneity, the working assumptions are set up in such a way as to make the IV estimates as reasonable and cautious as possible: (i) Rainfall variation in the rural regions is assumed to not affect any labor market conditions at the destination; (ii) Unobserved individual heterogeneity such as ability, preferences and health conditions is assumed to be uncorrelated with the intensity of natural disasters. These assumptions are important to ensure that the relationship between social networks and outcome variables are indeed causal.

Table 4 reports the results of the first stage IV estimates. Because the distribution of the weather disasters is highly left skewed, with a small number of observations taking large values, I report estimates using the natural log of the weather disasters measure. All the coefficients have the expected sign. The larger weather disasters are, the higher the number of urban calls is. All weather disasters coefficients are statistically significant.

The F-test for an excluded instrument is also reported. The F-statistics in Table 4 range from 5.72 to 9.47, suggesting that for some specifications there may be a potential concern about weak instruments. If a proposed instrument is not strongly correlated with the endogenous variables then the instrumental variable two-stage least squares (IV-2SLS) estimates may be somewhat biased toward ordinary least squares (OLS) estimates (Bound, Jaeger & Baker, 1995; Staiger & Stock, 1997). For this reason I also use the LIML Fuller Instrumental variable estimation method that is a bias-corrected limited information maximum likelihood estimator and provides the better estimates for inference purposes when the instrument is potentially weak (Stock, Wright & Yogo, 2002). The regression results in Appendix A.2 provide similar estimates.

In the second stage, the estimated coefficients for social networks are significant and positive. The magnitude of the coefficient in the IV estimation does not change substantially if other controls are included, ranging from 0.072 to 0.089. The results in Column 4 of Table 5 show that the result is still significant when all other variables are controlled. The magnitude of the IV estimates is higher than those from the OLS estimates. One explanation for this is that the attenuation bias, resulting from measurement errors, leads OLS estimates to be biased towards zero, and IV results in an increase in the magnitude of the coefficient.

In addition, because the IV estimate mainly applies to the subgroup of individuals more affected by natural disasters, the IV estimate can be interpreted as a Local Average Treatment Effects (LATE) (Imbens & Angrist, 1994). If the IV estimate is to be interpreted as a class of LATE, we must raise the question about the mechanism that explains how natural disasters influence migration and why networks effects differ across individuals. One possible mechanism is that that less able people (in terms of earning ability at the destination) are more responsive to natural disasters since they have relatively lower ability to compensate for losses due to natural disasters. That is, people of lower earning ability are more likely to leave the rural regions due to natural hazards. If this is the case, the IV estimate can be interpreted as a weighted average network effect and the weight for less able migrants is relatively higher.

The IV results for the impacts of social network on willingness to run their own business by wage-earners are also consistent with the expectation. In Table 7, the result shows that one more contacts on average increases the probability of being become self-employed by around 0.04. In addition, all estimated coefficients for social network are significant, indicating that an increase in social network makes wage earners to be more willing to run their own business.

Sensitivity tests

The IV strategy employed in this paper rests on the assumptions that the weather disasters do not affect labor demand at destination and migrant's earning ability and preferences. The first assumption is likely to be satisfied. I have not found any literature that documents that weather disasters may create a mass migration from rural regions that have big impacts on labor market condition in the cities over the last 30 years. However, the second assumption may be violated. Some studies, such as Durante (2009); Dang (2012); Cameron (2015), show

that natural disasters may change individual behaviors. They find that people who live in places with higher frequency of natural disasters trust other people more. In addition, they tend to be more risk averse. If trustworthiness and risk attitudes correlate with migrant's incomes then the IV estimates will be biased and inconsistent. Natural conditions also may affect health conditions of migrants. To test all of these possibilities, I control for several variables including individual trust, risk preferences and health conditions. The results show that the results are almost identical (see Column 2 and 3, Table 5).

Another way to test this likelihood is to estimate the reduced form relationship between weather disasters and migrant's incomes. The estimation results are reported in Table 8. When I examine the reduced form, I find a strong positive and highly significant relationship between weather disasters and change in migrant's incomes. This correlation is consistent with the first-and-second stage IV estimates in Tables 4 and 5, individuals who migrate from more weather disaster regions tend to have more extensive social networks and this in turn help them find better jobs with higher incomes.

5. Conclusion

Despite the proliferation of research seeking to identify the mechanisms and measure the magnitude of internal migration, little emphasis has been placed on probing the direct causal effects of migrant networks on labor market outcomes at the destination. This paper explores the causal effects of the size of migrant networks on income and employment dynamics among migrants in Vietnam's major cities. It complements recent research on the effects of migrant networks on labor markets in other developing economies.

Controlling for the unobserved factors influencing migration decision, identification is achieved through instrumenting the network size by the intensity of weather disasters occurring in the sending commune of the migrants. The empirical results show that the size of the migrant network significantly improves the incomes of migrants and makes wage earners more willing to run their own business.

The results of this paper suggest that social networks help overcoming some of the frictions present in the labor market. On possible channel is that the social network helps to reduce the asymmetric information between the employer and the employee, therefore improving the job match. The results also show that although there is a stronger formalization of job

search channels in developing countries, for rural-urban migrants, personal contacts will still remain an important channel to obtain better paid jobs.

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Table 1. Summary Statistics

VARIABLES	Obs	Mean	Std. Dev.	Min	Max
Log of change in current and first job incomes	560	0.59	0.96	-4.94	6.42
Thought about running their own business	511	0.35		0	1
Switching from informal to formal job types	555	0.11	0.48	-1	1
Years of schooling	546	9.66	2.95	0	12
Age	560	29.67	8.28	16	66
Gender	560	0.69		0	1
Minority	560	0.03		0	1
Working in state sector	559	0.12		0	1
Working in foreign sector	559	0.19		0	1
Number of urban calls made	485	11.53	20.82	0	270
Duration of staying in the cities	558	7.1	5.2	0.2	35
Most people can be trusted	540	0.13		0	1
Level of risk preferences	540	5.25	1.79	0	10
Health condition of migrants	560	0.95		0	1

Table 2. OLS Estimates. Relationship between number of urban calls and income dynamics

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Log of change in current and first job incomes				
Number of calls to urban people	0.003*	0.009**	0.009**	0.009**	-0.010
	(0.002)	(0.004)	(0.004)	(0.004)	(0.008)
Years of schooling	-0.009	-0.014	-0.017	-0.016	-0.016
	(0.014)	(0.015)	(0.016)	(0.016)	(0.017)
Age	0.111***	0.106***	0.083**	0.082**	0.075**
	(0.031)	(0.031)	(0.036)	(0.036)	(0.035)
Age squared	-0.002***	-0.002***	-0.001***	-0.001***	-0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male:=1; w/o:=0	-0.089	-0.077	-0.071	-0.054	-0.054
	(0.094)	(0.094)	(0.095)	(0.098)	(0.100)
Minority:=1; w/o:=0	-0.377***	-0.393***	-0.401***	-0.377***	-0.395***
	(0.133)	(0.134)	(0.140)	(0.140)	(0.152)
State ownership:=1; o/w:=0	-0.118	-0.114	-0.105	-0.113	-0.136
	(0.113)	(0.112)	(0.113)	(0.114)	(0.116)
Foreign ownership:=1; o/w:=0	0.124	0.135	0.135	0.115	0.135
	(0.136)	(0.137)	(0.139)	(0.142)	(0.139)
Duration of staying in the cities			0.017	0.016	0.006
			(0.021)	(0.021)	(0.026)
Switching from informal to formal job types				0.107	0.088
				(0.094)	(0.096)
Number of urban calls X Less than 3 years staying in the cities					0.019**
					(0.007)
Number of urban calls X From 3 to less than 5 years staying in the cities					0.015
					(0.011)
Number of urban calls X From 5 to less than 8 years staying in the cities					0.028**
					(0.012)
Number of urban calls X From 8 to less than 12 years staying in the cities					0.023
					(0.014)
Constant	-0.994**	-0.928*	-0.584	-0.608	-0.417
	(0.478)	(0.473)	(0.544)	(0.546)	(0.515)
Observations	470	466	465	461	461
R-squared	0.047	0.053	0.060	0.061	0.074

Notes: ***, ** and * indicates significance level of 1%, 5% and 10% respectively against a two sided alternative. Clustered standard errors are in brackets.

Table 3. OLS Estimates. Relationship between number of urban calls and employment transition

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Wage earners want to run a business				
Number of calls to urban people	0.005***	0.005***	0.005**	0.004*	0.006
	(0.002)	(0.002)	(0.002)	(0.002)	(0.005)
Years of schooling	0.098**	0.099**	0.130***	0.103**	0.100**
	(0.040)	(0.040)	(0.045)	(0.047)	(0.047)
Age	0.009	0.006	0.007	0.001	0.001
	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)
Age squared	0.039***	0.025**	0.025*	0.020	0.021
	(0.012)	(0.013)	(0.014)	(0.013)	(0.014)
Male:=1; w/o:=0	-0.001***	-0.000**	-0.000**	-0.000*	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Minority:=1; w/o:=0	0.148	0.155	-0.013	-0.003	-0.012
	(0.123)	(0.123)	(0.127)	(0.129)	(0.127)
State ownership:=1; o/w:=0	-0.025	-0.039	-0.011	-0.041	-0.035
	(0.055)	(0.054)	(0.063)	(0.063)	(0.063)
Foreign ownership:=1; o/w:=0	-0.009	-0.015	-0.043	-0.056	-0.061
	(0.051)	(0.051)	(0.054)	(0.055)	(0.055)
Duration of staying in the cities		0.011***	0.011***	0.008**	0.007
		(0.004)	(0.004)	(0.004)	(0.005)
Switching from informal to formal job types			0.058	0.045	0.046
			(0.050)	(0.049)	(0.049)
Log of total income per month				0.159***	0.161***
				(0.055)	(0.055)
Number of urban calls X Less than 3 years staying in the cities					-0.004
					(0.006)
Number of urban calls X From 3 to less than 5 years staying in the cities					-0.002
					(0.005)
Number of urban calls X From 5 to less than 8 years staying in the cities					-0.004
					(0.006)
Number of urban calls X From 8 to less than 12 years staying in the cities					-0.000
					(0.007)
Constant	-0.500**	-0.274	-0.276	-1.416***	-1.450***
	(0.196)	(0.209)	(0.230)	(0.462)	(0.469)
Observations	607	604	504	502	502
R-squared	0.052	0.070	0.081	0.095	0.096

Notes: ***, ** and * indicates significance level of 1%, 5% and 10% respectively against a two sided alternative.

Clustered standard errors are in brackets.

Table 4. IV Estimates. Impacts of number of urban calls on income dynamics (First Stage)

	(1)	(2)	(3)	(4)
VARIABLES	Number of calls to urban people			
Log of rainfall variation	7.630***	6.825***	6.078**	6.078**
	(2.479)	(2.452)	(2.537)	(2.540)
Male:=1; w/o:=0	-0.842	-0.678	-1.275	-1.264
	(1.144)	(1.212)	(1.284)	(1.288)
Age	0.652**	0.178	0.145	0.150
	(0.299)	(0.327)	(0.352)	(0.348)
Age squared	-0.009**	-0.003	-0.003	-0.003
	(0.004)	(0.004)	(0.005)	(0.005)
Minority:=1; w/o:=0	1.840	1.547	1.184	1.119
	(3.810)	(3.477)	(3.554)	(3.484)
Years of schooling	0.949***	0.863***	0.861***	0.860***
	(0.144)	(0.146)	(0.148)	(0.148)
State ownership:=1; o/w:=0		0.548	0.915	0.987
		(1.971)	(2.004)	(2.005)
Private ownership:=1; o/w:=0		-0.567	-0.835	-0.767
		(1.230)	(1.294)	(1.295)
Duration of staying in the cities		0.288**	0.263**	0.265**
		(0.111)	(0.125)	(0.125)
Level of risk preferences			0.588*	0.594*
			(0.350)	(0.352)
Most people can be trusted:=1			1.905	1.928
			(1.529)	(1.528)
Health condition of migrants				-0.928
				(2.236)
Constant	-55.309***	-42.789***	-40.463**	-39.690**
	(15.633)	(15.858)	(16.284)	(16.309)
Observations	467	465	447	447
F-test for excluded instrument	9.47	9.06	5.74	5.72

Notes: ***, ** and * indicates significance level of 1%, 5% and 10% respectively against a two sided alternative. Clustered standard errors are in brackets.

Table 5. IV Estimates. Impacts of number of urban calls on income dynamics (Second Stage)

	(1)	(2)	(3)	(4)
VARIABLES	Log of change in current and first job incomes			
Number of calls to urban people	0.072**	0.077**	0.089*	0.089*
	(0.035)	(0.039)	(0.047)	(0.047)
Male:=1; w/o:=0	-0.034	-0.017	0.065	0.064
	(0.120)	(0.128)	(0.151)	(0.151)
Age	0.067	0.071*	0.068	0.067
	(0.043)	(0.043)	(0.041)	(0.041)
Age squared	-0.001*	-0.001*	-0.001**	-0.001**
	(0.001)	(0.001)	(0.001)	(0.001)
Minority:=1; w/o:=0	-0.460	-0.488	-0.553	-0.543
	(0.287)	(0.305)	(0.361)	(0.355)
Years of schooling	-0.077**	-0.076**	-0.095**	-0.095**
	(0.036)	(0.037)	(0.043)	(0.043)
State ownership:=1; o/w:=0		-0.289	-0.379	-0.390*
		(0.215)	(0.232)	(0.235)
Private ownership:=1; o/w:=0		-0.098	-0.167	-0.177
		(0.164)	(0.163)	(0.164)
Duration of staying in the cities		-0.005	0.013	0.012
		(0.024)	(0.021)	(0.021)
Level of risk preferences			-0.039	-0.040
			(0.050)	(0.050)
Most people can be trusted:=1			0.007	0.004
			(0.202)	(0.203)
Health condition of migrants				0.133
				(0.266)
Constant	-0.273	-0.299	0.011	-0.100
	(0.678)	(0.730)	(0.748)	(0.772)
Observations	467	465	447	447

Notes: ***, ** and * indicates significance level of 1%, 5% and 10% respectively against a two sided alternative. Clustered standard errors are in brackets.

Table 6. IV Estimates. Impacts of number of urban calls on employment transition (First Stage)

	(1)	(2)	(3)
VARIABLES	Number of calls to urban people		
Log of rainfall variation	8.911***	9.162***	8.775***
	(1.994)	(2.092)	(2.100)
Years of schooling	0.775***	0.666***	0.693***
	(0.123)	(0.129)	(0.131)
Male:=1; w/o:=0	-0.569	-1.124	-1.116
	(0.979)	(0.972)	(0.970)
Age	0.592**	0.279	0.270
	(0.259)	(0.299)	(0.301)
Age squared	-0.008**	-0.005	-0.005
	(0.004)	(0.004)	(0.004)
Minority:=1; w/o:=0	-2.424	-2.247	-2.388
	(2.172)	(2.120)	(2.148)
State ownership:=1; o/w:=0	0.882	0.677	0.808
	(1.814)	(1.922)	(1.924)
Private ownership:=1; o/w:=0	-0.762	-1.029	-1.043
	(0.961)	(1.020)	(1.021)
Duration of staying in the cities		0.201**	0.207**
		(0.086)	(0.086)
Level of risk preferences		0.238	0.227
		(0.252)	(0.253)
Almost people can be trusted:=1			1.679
			(1.188)
Constant	-59.772***	-56.493***	-54.509***
	(13.061)	(13.615)	(13.641)
Observations	607	568	568
F-test for excluded instrument	19.98	19.17	17.47

Notes: ***, ** and * indicates significance level of 1%, 5% and 10% respectively against a two sided alternative. Clustered standard errors are in brackets.

Table 7. IV Estimates. Impacts of number of urban calls on employment transition (Second Stage)

	(1)	(2)	(3)
VARIABLES	Wage-earners want to run a business		
Number of calls to urban people	0.046***	0.043***	0.041***
	(0.013)	(0.013)	(0.014)
Years of schooling	-0.022*	-0.020	-0.017
	(0.013)	(0.012)	(0.013)
Male:=1; w/o:=0	0.125**	0.146**	0.144**
	(0.057)	(0.059)	(0.058)
Age	0.015	0.012	0.012
	(0.016)	(0.017)	(0.017)
Age squared	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)
Minority:=1; w/o:=0	0.249*	0.225*	0.214
	(0.131)	(0.131)	(0.131)
State ownership:=1; o/w:=0	-0.046	-0.085	-0.077
	(0.093)	(0.094)	(0.092)
Private ownership:=1; o/w:=0	0.043	0.018	0.015
	(0.060)	(0.063)	(0.062)
Duration of staying in the cities		0.007	0.007
		(0.006)	(0.006)
Level of risk preferences		0.009	0.009
		(0.015)	(0.014)
Most people can be trusted:=1			0.080
			(0.085)
Constant	-0.243	-0.227	-0.246
	(0.278)	(0.286)	(0.281)
Observations	607	568	568

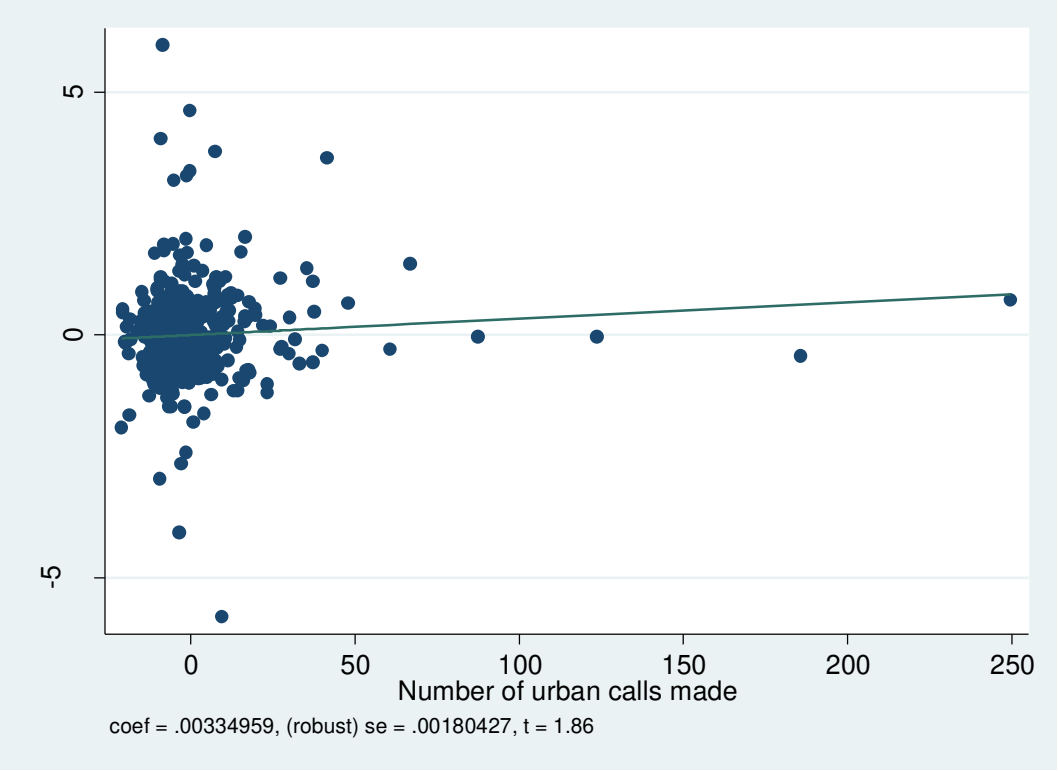
Notes: ***, ** and * indicates significance level of 1%, 5% and 10% respectively against a two sided alternative. Clustered standard errors are in brackets.

Table 8. Reduced form. Relationship between weather disasters and migrant's incomes

	(1)	(2)	(3)	(4)
VARIABLES	Log of change in current and first job incomes			
Log of rainfall variation	0.549**	0.526**	0.540**	0.540**
	(0.261)	(0.250)	(0.266)	(0.266)
Years of schooling	-0.008	-0.009	-0.018	-0.018
	(0.014)	(0.016)	(0.015)	(0.015)
Age	0.114***	0.085**	0.081**	0.081**
	(0.031)	(0.035)	(0.031)	(0.031)
Age squared	-0.002***	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Male:=1; w/o:=0	-0.094	-0.070	-0.048	-0.049
	(0.091)	(0.096)	(0.094)	(0.094)
Minority:=1; w/o:=0	-0.328***	-0.369***	-0.447***	-0.444***
	(0.124)	(0.128)	(0.129)	(0.130)
State ownership:=1; o/w:=0		-0.246	-0.298*	-0.302*
		(0.161)	(0.153)	(0.155)
Private ownership:=1; o/w:=0		-0.142	-0.242**	-0.245**
		(0.139)	(0.117)	(0.119)
Duration of staying in the cities		0.018	0.036***	0.036***
		(0.021)	(0.013)	(0.013)
Level of risk preferences			0.013	0.013
			(0.025)	(0.025)
Most people can be trusted:=1			0.176	0.175
			(0.113)	(0.114)
Health condition of migrants				0.051
				(0.168)
Constant	-4.252***	-3.596**	-3.584**	-3.627**
	(1.621)	(1.476)	(1.581)	(1.600)
Observations	467	465	447	447
R-squared	0.048	0.060	0.108	0.108

Notes: ***, ** and * indicates significance level of 1%, 5% and 10% respectively against a two sided alternative. Clustered standard errors are in brackets.

Figure 1. Relationship between income dynamics and number of urban calls



Appendix

A.1 Logistic regression

	(1)	(2)	(3)	(4)
VARIABLES	Wage-earners want to run a business			
Number of calls to urban people	0.017**	0.014*	0.033*	0.024
	(0.008)	(0.008)	(0.017)	(0.021)
Male:=1; w/o:=0	0.500**	0.378*	0.371	0.531**
	(0.219)	(0.227)	(0.228)	(0.249)
Years of schooling	0.034	0.003	0.004	0.009
	(0.041)	(0.040)	(0.041)	(0.041)
Age	0.206**	0.169*	0.182*	0.167*
	(0.103)	(0.099)	(0.101)	(0.099)
Age squared	-0.003**	-0.003**	-0.003**	-0.003**
	(0.002)	(0.001)	(0.002)	(0.001)
Minority:=1; w/o:=0	0.716	0.795	0.742	-0.079
	(0.533)	(0.543)	(0.549)	(0.680)
State ownership:=1; o/w:=0	-0.174	-0.313	-0.260	-0.143
	(0.265)	(0.274)	(0.278)	(0.299)
Foreign ownership:=1; o/w:=0	-0.085	-0.143	-0.169	-0.297
	(0.254)	(0.257)	(0.260)	(0.273)
Duration of staying in the cities	0.055***	0.041**	0.033	0.039*
	(0.019)	(0.018)	(0.021)	(0.024)
Log of total income per month		0.779***	0.810***	0.790***
		(0.250)	(0.256)	(0.286)
Switching from informal to formal job types				0.249
				(0.229)
Number of urban calls X Less than 3 years staying in the cities			-0.009	0.005
			(0.027)	(0.030)
Number of urban calls X From 3 to less than 5 years staying in the cities			-0.022	-0.013
			(0.025)	(0.028)
Number of urban calls X From 5 to less than 8 years staying in the cities			-0.021	-0.017
			(0.020)	(0.023)
Number of urban calls X From 8 to less than 12 years staying in the cities			-0.028	-0.017
			(0.020)	(0.024)
Constant	-4.89***	-10.32***	-10.74***	-10.40***
	(1.603)	(2.368)	(2.446)	(2.635)
Observations	605	601	601	503

Notes: ***, ** and * indicates significance level of 1%, 5% and 10% respectively against a two sided alternative. Clustered standard errors are in brackets.

A.2. LIML Fuller IV Estimates. Impacts of number of urban calls on income dynamics

	(1)	(2)	(3)	(4)
VARIABLES	Log of change in current and first job incomes			
Number of calls to urban people	0.072**	0.074**	0.089*	0.089*
	(0.035)	(0.036)	(0.047)	(0.047)
Male:=1; w/o:=0	-0.034	-0.024	0.065	0.064
	(0.120)	(0.125)	(0.151)	(0.151)
Age	0.067	0.065	0.068	0.067
	(0.043)	(0.043)	(0.041)	(0.041)
Age squared	-0.001*	-0.001*	-0.001**	-0.001**
	(0.001)	(0.001)	(0.001)	(0.001)
Minority:=1; w/o:=0	-0.460	-0.482	-0.553	-0.543
	(0.287)	(0.299)	(0.361)	(0.355)
Years of schooling	-0.077**	-0.075**	-0.095**	-0.095**
	(0.036)	(0.037)	(0.043)	(0.043)
State ownership:=1; o/w:=0		-0.282	-0.379	-0.390*
		(0.213)	(0.232)	(0.235)
Private ownership:=1; o/w:=0		-0.106	-0.167	-0.177
		(0.161)	(0.163)	(0.164)
Duration of staying in the cities			0.013	0.012
			(0.021)	(0.021)
Level of risk preferences			-0.039	-0.040
			(0.050)	(0.050)
Most people can be trusted:=1			0.007	0.004
			(0.202)	(0.203)
Health condition of migrants				0.133
				(0.266)
Constant	-0.273	-0.191	0.011	-0.100
	(0.678)	(0.714)	(0.748)	(0.772)
Observations	467	466	447	447

Notes: ***, ** and * indicates significance level of 1%, 5% and 10% respectively against a two sided alternative. Clustered standard errors are in brackets.