Leaving or Staying: Inter-Provincial Migration in Vietnam

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Internal migration has several policy implications for economic growth and development for developing countries in general and for the fast growing low-income country of Vietnam in particular. Little research has been done, however, on inter-provincial migration in Vietnam. This study makes two major contributions to the migration and development literature in terms of the datasets and policy-relevant estimation approach. It is the first paper to use the annual survey data on migration published by Vietnam's General Statistics Office. This study also adopts a functional form to accommodate the flexibility of income's elasticity. Income, together with urban unemployment rates, are endogenously estimated with instruments that prove to be strong and valid. The inclusion of policy-relevant variables provides empirical findings that can make migration policy in Vietnam better-informed. Specifically, Vietnamese migrants are influenced primarily by moving costs, expected income differentials, disparity in the quality of public services offered by provinces, and the demographic composition at destination and source. This paper's findings provide new insight for migration policy options, and suggest that the government adopt a holistic policy approach to maximize the benefits and minimize the costs associated with internal migration.

Introduction

Internal migration has several policy implications for economic growth and development for developing countries. This is particularly true of Vietnam – a fast-growing, low-income country. Inter-provincial migration has been an important trend in Vietnam since the adoption of the economic reform or *Doi Moi* in 1986. According to the 1999 Census, nearly 4.5 million people,

or 6.5 percent of the population over five years of age, changed their place of residence between 1994 and 1999 (Dang et al., 2003: i).[1] Although research on internal migration in both developing and developed countries is huge, there have been only two quantitative studies on internal migration in Vietnam (Dang et al., 1997; Phan and Coxhead, 2010).[2] This paper aims to fill the gap in the literature with the following two principal contributions. First, while the two quantitative studies on Vietnam's migration noted above employed decennial Census data, this is the first paper that used the annual survey data released by the General Statistics Office of Vietnam (GSO). While censuses are conducted every ten years, data from annual surveys can help see migration trends for between-Census years. The second contribution is that this paper presents an estimation approach with three distinct features. First, it has a flexible functional form that allows migration's income elasticity to vary as income increases. Second, we treated both income and unemployment rates as potentially endogenous variables in the model. Third, in contrast to Phan and Coxhead (2010), who included dummy variables to control for provincial characteristics, our model incorporated policy-relevant variables, thus providing empirical findings that can be used to develop a better-informed migration policy in Vietnam. Policy relevant variables such as costs of moving, differentials in expected income, quality of public services, and demographic characteristics between source and destination areas all have significant impacts on migration flows.

The paper proceeds as follows: a brief overview of migration trends since the country's reunification in 1975; the development of a modeling framework on inter-provincial migration flows; a description of data and measures used for econometric estimations; interpretation and discussions of regression results; policy implications; and concludes with reflections on the study's contributions.

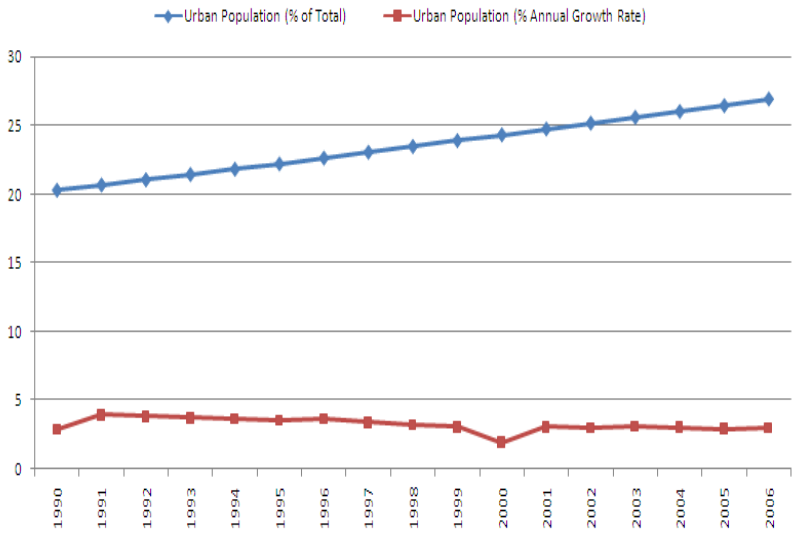
Overview of Migration Trends

As of 2006, the estimated population of Vietnam was 84,155,800 million people (GSO, 2007). This figure represents approximately a 10.3 percent increase from over 76 million people in the 1999 Census. The share of males and females in the total population has been quite steady at about 49 and

[1] The trend would be larger because the numbers did not include short-term migration.

[2] We did not include other qualitative and descriptive papers (Dang et al., 2003; Desbarats, 1987; Zhang et al., 2006) and other migration-related studies (White et al., 2001).

FIGURE 1
URBANIZATION IN VIETNAM BETWEEN 1990 AND 2006



SOURCE: World Development Indicators

51 percent, respectively, over the past decade. Figure 1 indicates that the percentage of people living in urban areas has steadily increased since 1990. Although the increase in the average population density from 194 persons/km^2 in 1989 to 231 persons/km^2 in 1999 (Dang et al., 2003) to 254 persons/km^2 in 2006 places Vietnam among the countries of highest densities in the Asia-Pacific region, population density varies significantly from one area to another. For example, Ho Chi Minh City was 83 times more densely populated in 2006 than the mountainous province of Lai Chau.

The current population distribution reflects a long history of migration. As a matter of fact, Vietnam's four-thousand-year-long history with numerous wars familiarized the Vietnamese people with migration. Since an overview of such a long history is beyond the scope of this paper, we focused more on inter-provincial migration after the country's reunification in 1975.[3] The government encouraged large-scale internal movements after

[3] *See* Dang et al. (1997) for a description of migration in earlier periods.

1975 and in the early 1980s. The government ambitiously aimed at redistributing approximately one-fifth of the total population by the end of the century (Desbarats, 1987). The resettlements during this period were driven by both security and economic reasons. First, shortly after the reunification of the country, Vietnam was involved in Cambodia's affairs in the south and fought against China in the north. Second, resettlements were also aimed at releasing population pressures in urban centers and densely populated river deltas. While population pressure was very high in the north, population density was much lower in the south and the Central Highlands. The government repatriated southern people back into their native villages in the wake of reunification in 1975 and encouraged the massive migration of people into resettlement sites (often known as the New Economic Zones, or NEZs) in rural areas. An individual could volunteer to work on a state farm or forestry enterprise in the NEZs (Hardy, 2000). In general, the government's land-based relocation policy in the 1980s focused primarily on rural-to-rural and urban-to-rural migration (Dang et al., 2003:2).

Direct government intervention in migration policy was not particularly successful. The substantial decline in migration flows sprang from the incompatibility between migration objectives and the development of the NEZs, the high costs of building new social infrastructure, and the growing shortage of readily cleared lands for cultivation (Dang et al., 2003). Not only did fewer people move to NEZs, but existing residents started to leave. As many as half of the migrants to the NEZs moved again or returned to their place of origin soon after they arrived (Desbarats, 1987). Lack of physical and social infrastructure, poor health services and food insecurity were among the factors that boosted the outflows. Recognizing the shortcoming of early resettlement programs, the government attempted to supplement subsequent migration policies with socio-economic development investments, such as reforestation programs. However, lack of financial resources and other administrative problems considerably slowed down the pace of resettlement (Phan and Coxhead, 2010).

By 1987, these organized migration policies had been completely abandoned. Migration since then is best characterized as spontaneous internal migration flows (Déry, 2000). Unlike the previous patterns of rural-to-rural and urban-to-rural migration, spontaneous migration in recent years is mostly from rural to urban areas. Such migration has been facilitated by three principal factors. First, the household registration system has been greatly relaxed, allowing migrants some access to essential goods, residence, and employment in major cities. People no longer have to depend on government subsidies and rationing for their daily necessities in urban places (Dang et al., 2003). Second, government policies not originally designed to influence migration have nonetheless substantially influenced

TABLE 1
REGISTERED FDI CAPITAL IN THE PERIOD 1986-2006 BY REGION AND THE TWO LARGEST CITIES (MILLION USD)

Regions and cities	Average[a]	Total[a]
Regions		
Red River Delta	767.96	7679.60
North East	222.29	2445.20
North West	28.85	115.40
North Central Coast	245.45	1472.70
South Central Coast	879.30	5275.80
Central Highlands	208.26	1041.30
South East	3491.64	24441.50
Mekong River Delta	178.10	2315.30
Two largest cities		
Ha Noi	12561.6	
Ho Chi Minh City	17895.6	

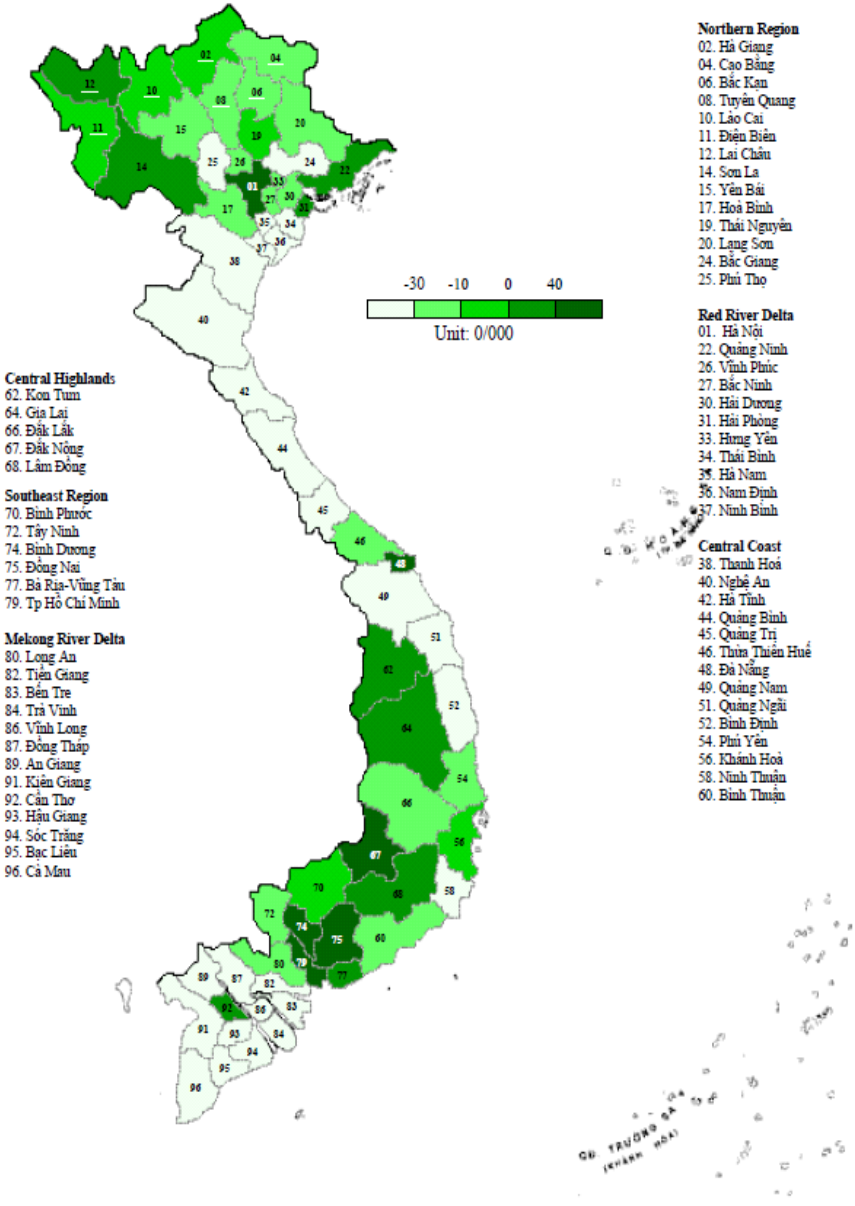
SOURCE: General Statistics Office
NOTE: [a] The figures do not include those of the two largest cities.

migration flows. For example, the 1988 Resolution 10, in which cooperative land was redistributed directly to households, stimulated agricultural capacity to the fullest. This was followed by the 1993 Land Law, whereby households were given a certificate verifying their long-term rights to transfer, exchange, mortgage, lease and inherit their land plots to others (Scott, 2000). Land ownership enabled people to "sell (and therefore *leave*) and buy (and therefore *arrive*)" (Hardy and Turner, 2000). In addition, the market-driven economy initiated by *Doi Moi* in 1986 has attracted considerable foreign direct investment (FDI) inflows which were distributed unequally throughout the country. Table 1 shows that Ho Chi Minh City received 155 times more in FDI than provinces in the Northwest region. Such huge inter-provincial disparities in FDI flows, and thus economic growth, underlie the impetus for internal migration for better economic opportunities.

Figure 2 provides an overall pattern of inter-provincial migration during the five years prior to the 2009 Census using net migration ratios that are defined as [((in-migrants – out-migrants)/total potential migrants)* 1,000].[4] This figure shows that economically advantaged and more urban

[4] Potential migrants are defined as those who are five years of age or older.

FIGURE 2
PROVINCES' NET MIGRATION RATIOS DURING THE FIVE YEARS BEFORE 2009



SOURCE: Central Census Steering Committee (2010)

provinces, such as Binh Duong, Ho Chi Minh City, Da Nang, Dong Nai and Ha Noi, have the highest positive net migration ratios. More specifically, Binh Duong's net migration ratio of 340 percent indicates that one in five people living in this province in 2009 migrated from elsewhere during the earlier five years (Central Census Steering Committee, 2010). By contrast, most of the provinces in the Mekong River Delta and Central Coast have more out-migrants than in-migrants. More specifically, the provinces with the highest negative migration ratios of over -60 percent are Thanh Hoa, Ben Tre and Ha Tinh (Central Census Steering Committee, 2010).

Modeling Inter-provincial Migration

Modeling migration decisions have a long history in development economics (Harris and Todaro, 1970; Todaro, 1969). Stillwell (2008) provides an overview of inter-regional migration modeling. He describes two core approaches in the literature a micro approach based on understanding decisions made by individuals or households, and a macro approach that considers aggregate population flows. This study is based on the macro view, where the unit of analysis is a province at a given point in time.[5]

Our empirical estimation is based on the modified version of the 'gravity model' commonly used in the migration literature (Greenwood, 1997). The original gravity model is similar to Newton's law of universal gravity. Migration is related positively to the size of relevant origin and destination populations, and negatively to distance. In other words, where

$$m_{ijt} = k \times \frac{POP_{ijt}^{\alpha}}{D_{ij}^{\varphi}} \qquad (1)$$

k is a constant, m_{ij} is the number of people that migrate from a province of origin, i, to another province of destination, j, at time t. While POP_{ij} represents the population sizes[6] of the host and source provinces, respectively, D_{ij} indicates the distance between two provinces in equation (1). Migration is related positively to the size of relevant origin and destination

[5] We adopted this macro view partly because Phan and Coxhead (2010) used a method similar to the one adopted in this study. There is an interest in keeping the methods similar since the context of the two studies is the same.

[6] The concern over the possible endogeneity of population on migration is not warranted because the proportion of migrants in the total population is still very small in Vietnam. Also, none of the internal migration studies we reviewed treated total population as endogenous.

populations, and negatively to distance. More densely populated areas attract more in-migrants and stimulate more out-migrants. Since potential migrants have to weigh the costs and benefits associated with moving from one province to another, distance (D_{ij}) is often used as a proxy for the moving costs between the source and host provinces.[7] Distance that plays an important role in many types of migration such as primary, repeat, return, retirement, job transfer, and job search (Cushing and Poot, 2004) is expected to have a negative impact on migration flows. The farther the provinces are from each other, the lower the migration flows between them. The negative effect of distance on migration flows could also reflect either diminishing information on job opportunities or increasing psychic costs (Schwartz, 1973).

We transformed the original gravity model into a logarithmic form as in equation (2).

$$\ln m_{ijt} = \ln (k) + \alpha \ln POP_{ijt} - \varphi \ln D_{ij} \qquad (2)$$

The log specification has several advantages (Wooldridge, 2003) and was commonly used in previous migration studies.[8] It controls for possible heteroskedasticity and the coefficients of continuous variables can be interpreted as elasticities. Many versions of the gravity model specify as a constant. However, to investigate how factors other than population and distance affect migration flows, we specify ln(*k)* as a function of relevant shifters that change the gravity force between the two provinces.

$$\ln k = \gamma + \lambda \ln Y_{ijt} + \eta (\ln Y_{ijt})^2 + \theta (\ln) U_{ijt} + \delta (\ln) X_{ijt} \quad (3)$$

where γ is a constant. X_{ijt} represents control variables. Income in the private sector (Y_{ijt}) measured by the average monthly income, and urban unemployment rates (U_{ijt}) at origin and destination at time *t* are the two key

[7] Since the key variable, distance, does not vary across time, the model does not include provincial fixed effects. Also, since the migration data are taken in two consecutive years, other time-dependent factors could present very little changes to have a significant effect on the dependent variable. As will be shown later, we will employ an instrumental variable for the key variable to address the possible endogeneity of the independent variables with the provinces' unobserved time-invariant heterogeneity.

[8] White and Lindstrom (2005) specify a log-linear functional form for estimating the probability of moving at the individual level. Our use of the log-log (or double-log) specification is more common when using data sets containing geographically aggregated variables (Fan, 2005; Juarez, 2000; Shen, 1999).

variables in this model extension. The inclusion of the two variables follows Todaro's (1976) model in which he modified his original migration model by including urban unemployment rates together with income. One of the main motives for migration is the income/wage differentials between origin and destination. Economically rational people will choose to live in a place where they can maximize their income-generating ability. The addition of the squared term of the log of income $(\ln Y_{ijt})^2$, indicates that the effects of income on migration inflows and outflows are potentially nonlinear.[9] If an increase in income at the destination is not large enough to cover substantial fixed costs of moving, migration then becomes unappealing to potential migrants. Once income differential goes beyond a certain threshold, greater income is expected to stimulate greater in-migration flows.

By the same token, an increase in real wages in the origin province might have two opposing effects. On the one hand, the push effect indicates that the poorer the people at the origin relative to the destination, the stronger the incentive to migrate. On the other hand, poorer people are less able to have access to information about the destination and/or to withstand the cash flow shocks associated with migration. As a result, migration can be constrained by the availability of financial resources needed to invest in the move (Hatton and Williamson, 2003). This is commonly known as the liquidity constraint effect. While the liquidity constraint effect is hypothesized to dominate the push effect at lower levels of income, the push effect is dominant at higher income levels (Feder, 1982). Overall, the quadratic specification of the logged income is intended to test the expected nonlinear effects of income on both in-migration and out-migration.

However, people take into consideration not only income but also the probability of finding a job represented by urban unemployment rates (U_{ijt}). The rates are theoretically predicted to attract smaller migration inflows at destination and to send more out-migrants at origin. The parentheses before (U_{ijt}) indicate that we employ both specifications, with and without logarithmic transformation, of urban unemployment rates. While the log of the unemployment rates makes them functionally consistent with other variables, we want to see if a specification without the log transforma-

[9] The squared log specification allows us to estimate the elasticity of income to change as a function of migration flows. As noted in Greene (2002) and Wooldridge (2003), this specification is widely used in econometric studies. It is also used in internal migration studies (Andrienko and Guriev, 2004; Aslund, 2005), education research (Duncombe and Yinger, 2005, 2007) with cost per pupil being a function of the log of enrollment and its squared value, and in other social science research (Oliver, 1999).

tion of unemployment rates and other control percentage variables in vector X would produce the same results.[10]

Substituting equation (3) into equation (2) produces

$$\ln m_{ijt} = \gamma + \alpha \ln POP_{ijt} - \varphi \ln D_{ij} + \lambda \ln Y_{ijt} + \eta (\ln Y_{it})^2 + \theta (\ln) U_{ijt} + \delta (\ln) X_{ijt} \quad (4)$$

Based on equation (4), equation (5) is specified for empirical estimation.

$$\ln m_{ijt} = \gamma + \alpha \ln POP_{ijt} - \varphi \ln D_{ij} + \lambda \ln Y_{ijt} + \eta (\ln Y_{it})^2 + \theta (\ln) U_{ijt} + \delta (\ln) X_{ijt} + \mu_t + \varepsilon \quad (5)$$

where ε is the error term, and μ_t is the time dummy equal to 1 for 2005 and 0 for 2004 to control for macroeconomic temporal shocks affecting all provinces. Except for distance, the squared income at origin, and the time dummy, all other variables in equation (5) that will be explained at great lengths in the following paragraphs are entered in pairs of the host and source provinces. The model reflects the fact that people migrate in response to differential economic opportunities, location-specific amenities and demographic characteristics.

Econometric issues arise in the estimation of variables representing income and unemployment rates. Income and unemployment rates may endogenously respond to migration. These problems require treating variables of income and employment rates endogenous in equation (5) (Blanchard et al., 1992; Treyz et al., 1993). To eliminate the endogeneity bias of the income variables and unemployment rates, we employed the Fuller-k estimator (k=4) (Fuller, 1977) with instrumental variables (IVs).[11] The methodological difficulty is to find valid and strong IVs. Their validity and strength must pass several tests. First, they should have a conceptual link with the endogenous explanatory variables. The instruments for urban unemployment rates are the intergovernmental transfers from the central government to provinces and measures of provincial efforts in labor training. Conceptually, they are highly correlated with unemployment.[12] The

[10] One might wonder why instead of percentages, we did not directly use the absolute numbers, or the numerators of the proportions. As a matter of fact, neither of these options would have made any difference because we have already controlled for total population, thus the denominator, in equation (5).

[11] Andrews and Stock (2007)demonstrate that relative to the two-stage-least-squares (2SLS) estimation, the Fuller-k estimator is less subject to the bias associated with weak instruments. In fact, our strong instruments make our 2SLS results almost the same as those with the Fuller-k estimation.

[12] Pearl (2000) showed that the causal direction between the endogenous and an IV is irrelevant in examining the validity of the IV.

instrument for the average monthly private income is the average monthly income in the government sector. The two variables are conceptually correlated for two reasons. First, government employees are mobile and can work in the private sector. Therefore, government bodies need to offer salaries relatively comparable to private sector wages to attract and retain their employees. Second, the so-called "Baumol effect" posits that salaries in sectors with productivity gains (usually private sector) cause increases in the government sector (Baumol and Bowen, 1966).

The second test is that the instruments should be correlated with the endogenous variables but not with the error term ε. In other words, they are not explanatory variables in the estimation equation (5). The instrument of income can be considered as exogenous when the large majority of migrants are driven more by income in the private, rather than the public sector. Theoretically, intergovernmental transfers, as one of the two instruments for unemployment rates, are not likely to have a discernible direct impact on migration for two reasons.[13] First, migrants are responsive to public expenditures that depend on provinces' revenues, including transfers. As long as we control directly for provinces' public expenditures in equation (5), the IV is still independent of the error term.[14] Second, the case for the exogeneity of intergovernmental transfers is even stronger in Vietnam where information about them is not easily accessible and is only available online. Also, there is a two-year lag to get the published information. All in all, migrants, the majority of whom are farmers, are highly unlikely to be directly driven by the transfers. Given the exogeneity of the first instrument, we conducted over-identifying tests on the second instrument. Hansen's J statistic in the over-identification test of the two instruments with robust errors is not statistically significant; put differently, the instruments are believed to be valid.

Finally, the IVs must be put to the third test for their strength. Although the Fuller-k estimation is less subject to weak instruments, stronger IVs are better. The *F*-statistics for the first stage of the regressions range between 40 and 120. The values are statistically significant under all weak-instrument tests reported by Stata.

Following Fields' (1976) argument that the unemployment rate is an imperfect indicator of provincial labor market opportunities, several other

[13] Our confidence in the exogeneity of this IV is strengthened as it was already used in Andrienko and Guriev (2004).

[14] *See* Pearl (2000) for further discussions.

variables need to be incorporated and represented by vector X in equation (5). The first group of these variables represents the size of the urban population, industrial and agricultural sector structures. Controlling for urban unemployment rates, provinces with a larger urban population can draw more in-migrants (Dang et al., 1997; Vogler and Rotte, 2000). There could, however, be a possible endogeneity caused by the reverse effect of migration flows on the urban population. The endogeneity may be more serious if urban population growth comes mostly from migration flows rather than natural growth (Zhang and Song, 2003). This is, however, not the case for Vietnam in the sample years when annual migration accounts maximally for only two and 0.4 percent of provinces' urban population and total population, respectively. Plus, models without the share of urban population produce trivially different results and are thus not reported.

A sizeable industrial sector at the destination boosts the chances for migrants to find nonfarm employment. Industrial firms provide not only work for educated and skilled people but also jobs for unskilled rural laborers, at least on a short-term basis (Dang et al., 1997:325). Measures of industrial development include industrial output per capita, and the share of population working in industrial firms. The inclusion of the latter is justified on the grounds that individuals are likely to move to provinces where internal labor markets are dynamic at the firm level, regardless of high unemployment (Hamalainen and Bockerman, 2004). All else being equal, the higher the values of the two variables, the greater the migration inflows and the smaller the migration outflows.

The second group of variables includes proxies for the level of infrastructure development measured by the number of landline telephones per thousand people, and for the quality of public services offered by provinces. In the local public finance literature, people 'vote with their feet' to choose the community that provides the optimal bundle of taxes and public services (Tiebout, 1956). It is noteworthy that provincial governments in Vietnam do not have autonomy over tax rates or base. Accordingly, there is no difference in payable taxes that migrants need to take into their migration consideration. The second component in the bundle that matters more to migrants in Vietnam is public services. Migrants are likely to be attracted more to provinces that offer public services of higher quality. In other words, provinces with public services of superior quality attract more in-migrants and generate less out-migration. Following this line of argument, we included provinces' total public expenditures per capita and two proxies for the quality of public education and health care – the two most important public services that migrants usually take into migration consideration.

The third group of variables consists of local-specific demographic characteristics that may significantly influence migration flows. They are the shares of college graduates, senior citizens, school-aged people and ethnic minority people. Since the Kinh[15] compose the largest of the 54 ethnic groups in Vietnam, the last variable indicates the percentage of those belonging to the other 53 ethnic minorities.

Finally, the hypotheses in equation (5) are tested with robust standard errors because given considerable diversity among provinces in Vietnam, there could be substantial heterogeneity at the provincial level even with the of the log-log functional form.

Data and Measures

The main dependent variable is taken from the Surveys on Changes in Population, Labor and Family Planning conducted by the General Statistics Office of Vietnam (GSO) in 2004 and 2005 (*see* Table 2 for descriptive statistics). The survey's sampling method combines systematic and stratified sampling approaches. Each province or city has a sample size of around 26,000 households scattered around 60 survey areas. The nationwide sample which includes 1.6 million people (or two percent of the total population) is then extrapolated for the whole population with sophisticated weighting techniques.[16] The surveys define a migrant to be a person whose permanent place of residence twelve months before the survey interview was in a different province.

The characteristics of the regions are used as regressors to predict the migration flows between provinces. Distance between provinces is measured as the bus distance in kilometers between receiving and sending provinces.[17] In addition, the provinces differ in economic dimensions in ways that may influence migration flows. The websites of the GSO supply data on industrial and agricultural production, FDI inflows, labor forces in

[15] The national language of Vietnamese is that of the Kinh ethnic group.

[16] Lucas (1997) indicates that the mobility data at hand is unable to address the issue of circular migration and inner-provincial mobility. However, while inner-provincial mobility is not of interest to the current paper, we can reasonably assume that circular migration does not create any major bias in the data. One might be concerned about possible measurement errors of this dependent variable caused by the data-processing procedures. The major problem with the dependent variable's measurement errors is larger error variances than when no error occurs. However, as long as the measurement error is uncorrelated with the independent variables, there will be no estimation bias (Wooldridge, 2003).

[17] We are highly appreciative of Diep Phan for sharing the data. The same data were also used in Phan and Coxhead (2010).

TABLE 2
DESCRIPTIVE STATISTICS, POOLED CROSS-SECTIONS 2004-2005

Variables	Mean	Std. Deviation	Min	Max
Log of migration flows	4.7852	1.3203	1.3863	9.6043
Log of distance (km)	5.9341	1.1318	2.9957	8.3102
Log of total population	13.9639	0.6132	12.5951	15.5924
Log of average monthly income	7.0447	0.1793	6.5586	7.5783
Squared log of average income	49.6598	2.5384	43.0155	57.4306
Urban unemployment rates (%)	5.3232	0.7859	3.3800	7.1200
Shares of urban population	25.50	0.1875	0.0722	0.8622
Log of production output per capita	-3.9141	1.1598	-6.6581	-1.2468
Shares of population in industrial firms	7.0237	9.4940	1.1434	47.5062
Log of agricultural output per capita	-6.5527	0.6492	-8.2836	-5.3555
Log of total public expenditures per capita (in VND millions)	0.3826	0.4348	-0.3642	1.7230
Student performance index	92.4263	5.4667	74.8750	99.8350
Log of medical staff per thousand people	-11.6648	0.6477	-13.0653	-10.5731
Log of telephone sets per thousand people	-9.3201	0.6115	-10.3799	-7.7662
Percent of ethnic minority people	19.6538	26.8393	0.0408	95.2539
Percent of college graduates	2.4449	2.5971	0.5552	15.8194
Percent of senior citizens	8.6879	2.2369	3.1260	13.1602
Percent of students	0.0825	0.0182	0.0338	0.1270
Instruments for income				
Log of average monthly income in the public sector	6.0738	0.3504	5.3739	7.0603
Squared log of average monthly income in the public sector	37.0142	4.3675	28.8787	49.8479
Instruments for urban unemployment rates				
Log of intergovernmental transfers per capita	-0.8099	1.0414	-3.3005	1.1242
Squared log of intergovernmental transfers per capita	1.7400	2.7188	0.0006	10.8936
Indexes for provincial efforts in labor training	5.3336	1.4060	1.9900	9.6000
Squared indexes for provincial efforts in labor training	30.4235	16.2098	3.9601	92.1600
Number of observations		3676		

industrial firms, urban unemployment rates, and average monthly income in the private sector (together with its instrument of the average monthly income in the public sector). The provinces can differ in population size, which is akin to 'mass' in the original gravity model, and also may differ in terms of where the population is concentrated within each province, which is measured using data on urban population. The characteristics of the population in the respective provinces may influence migration flows; the 1999 Census offers data on the share of college graduates and the percent of ethnic minority people in the provinces. The Ministry of Labor, Invalids, and Social Affairs (2006) provides data on the shares of population pursuing educational degrees of all levels and of senior citizens aged 65 and above.

Social services and infrastructure may influence migration flows, for which we use graduation rates, prevalence of medical staff, and number of landline telephones. The student performance index is the average graduation rates of lower and upper secondary school levels.[18] Data on public expenditures are retrieved from the websites of the Ministry of Finance. They provide data on provinces' total public expenditures[19] as a proxy for location-specific spending on public services,[20] and intergovernmental transfers used as the first instrument for unemployment rates. The transfers that are intended to compensate for inter-provincial disparity in fiscal capacity come into two categories. The first type is conditional or targeted transfers. These transfers are made for the implementation of national targeted programs in areas like poverty reduction, housing, and vaccination. Provinces also receive this type of transfers in cases of unexpected national disasters or adverse socio-economic event (Martinez-Vazquez and Gomez, 2005). The second type is unconditional "balancing" transfers. These transfers are supposed to balance between expenditure needs and locally generated revenue, thus generating greater horizontal fiscal equity. The instrument employs the sum of the two categories of transfers.

The second instrument, a measure of provincial efforts in labor training, is derived from the Vietnam Provincial Competiveness Index (PCI) (Viet-

[18] We did not include primary graduation rates because there is very little variation in the rates across provinces.

[19] The measure does not include intra-provincial transfers from higher to lower levels of governments. Note that Vietnam is characterized by four levels of government: central, provinces, districts and communes.

[20] Data are not available for the detailed composition of expenditures. Some studies use disaggregated expenditure data to see the degree to which migrants respond to how governments sectorally spend rather than about the total expenditures themselves (Day and Winer, 2006).

nam Competitiveness Initiative, 2005; 2006). The indexes are intended to assess "efforts to help overcome skills shortages at the provincial level" (VNCI, 2006:3).[21] The 2004 PCI surveyed 42 provinces while the 2005 PCI surveyed all 64 provinces in Vietnam. Since the PCI was not computed until 2004, the missing data for 2004 take the values of the 2005 survey. This sensible, though imperfect, extrapolation procedure provides a relatively accurate measure of provincial governments' efforts in labor training. Small changes in the index are observed across provinces between the 2004 and 2005 survey. Two years is a considerably short time period for provinces to substantially progress or decline.

Overall, in our regressions, we attempted to reveal patterns on how migration flows between provinces are influenced by the following: differences in the characteristics of the economies in the respective provinces; differences in the population profile of the respective provinces; differences in the public services characterizing the respective provinces; and to determine to what extent all these influences are mediated by the physical distance between provinces that is fundamental to the gravity model approach to migration studies.

Results and Discussions

Table 3 presents regression results from two models where the dependent variable captures migration flows between provinces for the years 2004 and 2005. While Model 1 is estimated with all variables in log transformation, percentage variables in Model 2 are left untransformed. The results of both models are quite similar. The major message conveyed by Table 3 is that moving costs, differentials in expected income and in the quality of public services delivered by provincial governments are what Vietnamese migrants take into consideration when making migration decisions. Plus, demographic factors are found to be determinants of migration patterns.

The first panel of the table reports the significant impact of the two "gravity" factors of distance and population on migration patterns. Specifically, distance as a major proxy of moving costs has a highly negative and significant effect on migration flows. A 1.0 percent increase in bus distance leads to an approximately 0.29 percent decrease in migration flows. This elasticity is bigger in absolute terms than the 0.12 estimated in Dang et al. (1997) but smaller than the 0.43 elasticity reported in Phan and Coxhead (2010). Our estimation in general indicates that Vietnamese migrants are much less sensitive to distance relative to migrants in both developed and

[21] Provinces are ranked from 1 to 10 with 10 as the best on this index.

developing countries of smaller or similar size.[22] The elasticity of distance is still smaller compared to studies in larger countries such as Canada, Russia or China.[23]

Population size also has highly significant effects on migration inflows and outflows. While people tend to migrate to more populous provinces, these provinces send more out-migrants too. What should be noted is that the effect of population on in-migration is larger than on out-migration. Particularly, the 1.0 percent increase in population results in a rise of 0.46 and 0.70 percent in migration inflow in Models 1 and 2, respectively; in contrast, a 1.0 increase in population results in an increase of about 0.3 percent in migration outflow in both of the models.

As documented in Panel 2 of Table 3, the variables modeling the differential expected income show that as in China (Lin et al., 2004), income is a significant driver of migration flows in Vietnam. Notably, the estimation result from the quadratic specification of income is very much in line with theoretical predictions. Income has a U-shaped relationship with both in-migration and out-migration. The marginal effects of income are smaller at origin than at destination in both models, leading to the smaller minimum income thresholds[24] at origin of VND 545 or 448 thousand (relative to VND 558 or 591 thousand at destination) in Models 1 and 2 respectively.[25] Put differently, the income at destination is predicted to exert its migration-pulling effect after these thresholds. Similarly, while the liquidity constraint effect at origin dominates before these income thresholds and restrains out-migration, the push effect prevails after the threshold and stimulates greater migration outflow.

Urban unemployment rates as a proxy for the probability of finding employment are found to have sizable effects on migration flows. Higher unemployment is predicted to generate more out-migrants. According to Model 2, a 1.0 percentage point increase in the urban unemployment rate is

[22] The elasticity of distance found in migration studies for countries with similar size as Vietnam is, in order of magnitude, -0.69 for the United Kingdom (Wall, 2001), -0.99 for Sweden (Westerlund, 1998), -1.7 for Poland (Ghatak et al., 2008), and -3.1 for the Philippines (Cruz et al.,1988).

[23] The elasticity is -0.55 for Canada (Day and Winer, 2006), -0.87 for Russia (Andrienko and Guriev, 2004), and -1.2 for China (Shen, 1999).

[24] For instance, the minimum income threshold is computed by exp.

[25] The average exchange rates in 2004 and 2005 were between VND 15,740 and 15,859 to a US dollar, respectively (Economist Intelligence Unit, 2006). Thus, VND 545,000 is, for instance, about USD 34.6

TABLE 3
MIGRATION RESULTS ESTIMATED WITH 2SLS AND ROBUST STANDARD ERRORS
POOLED CROSS-SECTIONS 2004-2005
DEPENDENT VARIABLE: LOG OF MIGRATION FLOWS

	Model 1		Model 2	
	Coefficients	t-statistics	Coefficients	t-statistics
"Gravity" variables				
Log of distance (km)	-0.2890	-11.57 ***	-0.2939	-12.49 ***
Log of total population at origin *i*	0.3334	1.74 *	0.3093	3.76 ***
Log of total population at destination *j*	0.4629	3.25 ***	0.7016	7.79 ***
Expected income differential variables				
Log of average monthly income *i*	-26.0786	-2.32 **	-20.1864	-1.65 *
Squared log of average income *i*	2.0693	2.47 **	1.6529	1.82 *
Log of average monthly income *j*	-39.0723	-4.62 ***	-33.9913	-3.62 ***
Squared log of average income *j*	3.0890	4.84 ***	2.6628	3.74 ***
Urban unemployment rates (%) *i*	1.2913	2.06 **	0.2594	2.01 **
Urban unemployment rates (%) *j*	1.0597	2.11 **	0.2457	2.32 **
(Log of) shares of urban population *i*	-0.7568	-2.87 ***	-0.0130	-1.22
(Log of) shares of urban population *j*	-0.3717	-1.60	0.0155	1.98 *
Log of industrial output per capita *i*	-0.0352	-0.38	-0.0670	-0.56
Log of industrial output per capita *j*	0.0499	0.76	0.0059	0.07
(Log of) shares of population in industrial firms *i*	0.0939	1.56	0.0077	1.34
(Log of) shares of population in industrial firms *i*	0.1769	3.14 ***	0.0334	6.21 ***
Log of agricultural output per capita *i*	0.4107	2.92 ***	0.3589	1.92 *
Log of agricultural output per capita *j*	0.7603	6.20 ***	0.8362	5.66 ***
"Tiebout" variables				
Log of total public expenditures per capita *i*	0.0317	0.18	0.0880	0.34
Log of total public expenditures per capita *j*	-0.0930	-0.75	-0.0025	-0.01
(Log of) student performance index *i*	-1.1533	-2.27 **	-0.0059	-1.16
(Log of) student performance index *j*	-0.4926	-0.90	0.0069	1.14
Log of medical staff per thousand people *i*	-0.8524	-3.60 ***	-0.3059	-2.48 **
Log of medical staff per thousand people *j*	-0.7210	-0.27	-0.1072	-0.89
Log of telephone sets per thousand people *i*	0.0685	0.34	-0.1152	-0.58

TABLE 3 continuation
MIGRATION RESULTS ESTIMATED WITH 2SLS AND ROBUST STANDARD ERRORS
POOLED CROSS-SECTIONS 2004-2005
DEPENDENT VARIABLE: LOG OF MIGRATION FLOWS

	Model 1		Model 2	
	Coefficients	t-statistics	Coefficients	t-statistics
Log of telephone sets per thousand people *j*	0.3122	2.05 **	0.1558	1.03
Demographic variables				
(Log of) percent of ethnic minority people *i*	-0.0129	-0.47	-0.0011	-0.33
(Log of) percent of ethnic minority people *j*	-0.0660	-3.11 ***	-0.0125	-5.19 ***
(Log of) percent of college graduates *i*	0.0871	1.14	0.0211	1.00
(Log of) percent of college graduates *j*	0.3261	4.69 ***	0.0209	1.09
(Log of) percent of senior citizens *i*	-0.0914	-0.66	-0.0031	-0.21
(Log of) percent of senior citizens *j*	-0.3699	-2.50 **	-0.0428	-2.61 ***
(Log of) percent of students *i*	0.2714	1.55	0.0490	3.03 ***
(Log of) percent of students *j*	0.3388	2.11 **	0.0497	2.90 ***
Others				
Time dummy (=1 if 2005)	-0.2207	-2.51	-0.1574	-2.21
Constant	197.1020	4.07	161.4254	3.07
Adjusted R-squared	0.40		0.41	
Hansen's J statistic (overidentification test of all instruments)	5.3		2.3	

NOTES: * p<0.10, ** p<0.05, *** p<0.01
Model 1 is estimated with all variables in logarithmic specification. In Model 2, variables in percentage terms were not log-transformed. Variables in italics were treated as endogenous in the estimation model. The instruments for the income variables in logarithmic terms are the logged average monthly income of government agencies and their squared values in places of origin and destination. The instruments used for unemployment rates were the log of intergovernmental transfers per capita and the indexes of government efforts in labor training.

associated with a rise of 26 percent in out-migration, which indicates that Vietnamese migrants are quite sensitive to unemployment at home. The unemployment rates also have a significant effect on migration inflows. Higher unemployment at destination attracts more in-migrants. Although contrary to theoretical predictions, this positive effect is reinforced by findings from other studies and has a set of potential explanations. First, the positive effect of unemployment rates at destination on in-migration was found in earlier migration studies (Greenwood, 1969; Wadycki, 1974). Second, there exists a popular perception among Vietnamese people of better life in cities than in rural areas. This mindset is suggested by sayings such as "It is better to be poor in the city than rich in the countryside" (*Giau nha que khong bang ngoi le thanh pho*) (White et al., 2001). Third, migrants may base their moving decision on lagged information and limited feedback. Therefore, they migrate to a place that has low unemployment and this leads to higher unemployment in the current periods. All these reasons indicate the interaction between unemployment and migration flows, which justifies our use of the specifications with instruments for unemployment rates in the first place, though further research could help provide more insight into this result.

In addition to income and unemployment, several of the variables modeling the probability of getting a job have substantial impact on in-migration and out-migration. Since highly urbanized provinces increase migrants' chances to find employment in the modern sector, migrants are attracted to, and show an inclination to stay in, more urbanized provinces. However, urbanization is only significant at origin in Model 1 and at destination in Model 2. Also, although the magnitude of the industrial sector measured in its total output per capita has no significant impact on in-migration, provinces with a higher share of population working in industrial firms attract more in-migrants. Specifically, a 1.0 percentage point rise in this population share is predicted to lead to a 3.34 percent decline in out-migration. Combining this finding with the previous insignificant result of the industrial output on in-migration, it seems that while migrants seem to be indifferent to provinces with multiple high-tech labor-saving firms, they prove to be more attracted to destinations with a high concentration of labor–intensive firms. This migration pattern indicates that the large majority of in-migrants are rural laborers. These laborers possess the skill levels better-suited for more labor-intensive than knowledge-intensive jobs (Li, 1996).

Provinces with a relatively larger agricultural sector can also send more out-migrants. Again, this finding supports the hypothesis that the majority of the migrants are rural laborers. Those provinces are also a draw of in-migrants. This can be explained on two counts. First, in the initial stage of

their moving,[26] migrants tend to spend a certain period of time in either the "urban traditional" sector or their familiar sector of agriculture. Second, some migrants may want to leave for a different province for other reasons than economic purposes. In these cases, they would be as happy about farming in the new province as they are about farming in their home town.

We also find some empirical evidence for the Tiebout hypothesis in which people "vote with their feet," shopping around for provinces that offer higher-quality public services and infrastructure. Better education outputs are expected to stimulate more in-migration and discourage out-migration. While better student performance does not appear to be a strong factor attracting in-migration in the empirical results, the higher quality of public education at home proves to be an important factor for people to stay in Model 1. Health care infrastructure is found to be a substantial retainer of potential migrants. Having an additional one percent of medical staff per thousand people can lead to a 0.85 or 0.31 percent reduction in out-migrants in Models 1 and 2, respectively. Additonally, we find evidence that the differential in the quality of infrastructure represented by the number of telephone sets per thousand population proves to be more of a significant incentive for people to migrate than to stay.

The demographic characteristics of provinces are found to influence migration flows. For instance, provinces with a higher concentration of ethnic minority people and senior citizens have lower in-migration. A 1.25 or 4.3 percent decline in in-migration flows is associated with a one-percentage point increase in ethnic minority people or senior citizens, respectively. This may well be indicative of the fact that while Vietnamese is the country's official language, it is spoken mostly by the Kinh ethnic group. A small share of the other 53 ethnic groups can speak Vietnamese. Language and other potential cultural differences can be attributed to the negative and significant relationship between the share of the non-Kinh population and in-migration.

Policy Implications

Vietnam was not successful in its policy to directly affect migration. It is currently experiencing rapid migration without policies specifically encouraging it. To the extent that the government wants to influence the flow of people, this study provides new insight into possible policy options. Like

[26] Todaro (1969:139) describes migration as a two-stage process where in the second stage the migrant lands a more permanent job in the industrial or service sectors.

many social phenomena, internal migration has both benefits and costs. Migration can help poorer rural people find employment that they would never have otherwise. However, it has also been argued that migration will generally lead to an inefficient allocation of labor across provinces (Boadway and Flatters, 1982) and create negative externalities such as congestion, pollution, and overcrowded housing in major cities (Schroeder and Smoke, 2003). In that light, the government should come up with a coordinated intervention plan on migration that will take full advantage of its benefits and minimize its associated costs.

The paper's econometric results provide evidence that can be used by policymakers to influence migration. While noting that migrants are in fact a highly heterogeneous group with different reasons and incentives to leave or stay, our estimation results reveal broad patterns in the incentive structure facing migrants. The findings that both sending and receiving provinces' characteristics matter in determining the flow of migrants between them indicate the need to implement multiple policies at sending and receiving provinces simultaneously. The study's empirical findings suggest that it is critical to reduce unemployment in source regions if out-migration is to be reduced. Integrated rural development can be vital in reducing unemployment. More investment in job creation in source provinces can increase surplus rural laborers' chances to earn extra payment, thus motivating them to stay. Investing more in rural infrastructure and public services is key to a rise in overall income of the rural population (Fan and Zhang, 2004), thus reducing out-migration. Inter-provincial disparity in the provision of public services can be narrowed with more equalization transfers to deprived areas, thus yielding efficiency gains in reduced negative externalities in urban areas (Shroeder and Smoke, 2003). More specifically, improvements in health care and education services are likely to cause potential rural migrants to stay put.

At destination, the government has to strike a balance between ensuring migrants' access to basic services and protecting their fundamental rights, and refraining from sending misleading signals that may promote in-migration. More importantly, whether enacted in destination or source provinces, all of the policies should be carried out in a coordinated way. Dang et al. (2003) noted the lack of coordination among different ministerial agencies, departments and other institutions currently responsible for one or more aspects of migration in the implementation of migration-related policies.

Conclusions

This paper makes two major contributions to the migration literature in terms of the datasets and policy-relevant estimation approach. The paper

was the first to use the annual survey data on migration published by the General Statistics Office of Vietnam. It also adopted a functional form to accommodate the flexibility of income's elasticity. Income, together with urban unemployment rates, were endogenously estimated with instruments that proved to be strong and valid. The inclusion of policy-relevant variables provided empirical findings that can make migration policy in Vietnam better-informed.

Our estimation model provided strong evidence on several important factors influencing inter-provincial migration flows in Vietnam. They are determined primarily by moving costs, expected income differentials, disparity in the quality of public services offered by provinces, and the demographic composition at destination and source. Contrary to migrants in other countries, Vietnamese people were much less sensitive to distance. While an increase in provinces' expected income can stimulate in-migration and discourage out-migration, this mechanism did not occur linearly. The rise in income is expected to reach certain thresholds, at both origin and destination, for migrants to make a move. Unlike other countries, migrants were found to be more sensitive to unemployment at home than at destination. They were also more attracted to places offering public services and infrastructure of better quality. In general, relative to internal migrants in other countries, inter-provincial migrants in Vietnam exhibited both similar and dissimilar behavioral responses to those factors in their decision to stay or to move.

This paper's findings provide new insights for migration policy options and suggest that the government adopts a holistic policy approach to maximize the benefits and minimize the costs associated with internal migration. While the paper looked into inter-provincial migration, future research into intra-provincial migration, data permitting, is warranted.

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