

Determinants of Migration: A Case Study of Nang Rong, Thailand

Montira Mahinchai

Professor Frank A. Sloan, Faculty Advisor

*Honors thesis submitted in partial fulfillment of the requirements for Graduation with
Distinction in Economics in Trinity College of Duke University.*

Duke University
Durham, North Carolina
2010

Acknowledgements

First and foremost, I would like to sincerely thank Professor Frank A. Sloan for his guidance, patience, and support. I am also grateful for the year-long constructive feedbacks provided by Professor Kent Kimbrough and my fellow classmates in ECON 198S and 199S throughout the process; Professor Charles M. Becker who provided helpful initiative comments and ideas; Professor Martin Piotrowski (Department of Sociology, University of Oklahoma) who provided valuable suggestions for the Nang Rong data set navigation; and finally, Dr. Joel Herndon who greatly helped with STATA programming. This paper would not have been possible without these individuals' contribution, time, and generosity.

Abstract

The increasing flows of internal migrants resulted from urbanization in developing countries is of great interest to policy makers. This study examines the individual-level and household-level social surveys the Nang Rong Project in 1994-1995 and 2000-2001. Individual characteristics such as gender, age, and years of schooling, and household characteristic such as family size are, significantly and consistently with the human capital model and previous empirical studies, shown to be determinants of a migration decisions. Moreover, migration selectivity differs significantly by migrant destinations. These findings indicate that policy makers should also consider different destination choice of migration, as well as the migrants' characteristics, when they try to influence migration patterns and flows.

I. Introduction

When it comes to economic development, internal migration in developing countries has become one of the most important issues in urbanization process. Structural changes such as a shift from an agricultural-based economy to a more industrialized one embrace displacement of labor out of an agricultural sector in rural areas to industrial sites in urban settings (Kuznets, 1979).

During the past few decades, migration has been and still continues to be considerable in scale in a number of developing countries even though migration rates appear to have slowed down in some countries. Migration from rural areas accounted for at least half of all urban growth in Africa during the 1960s and 1970s and about 25% of urban growth in the 1980s and 1990s (Brockerhoff, 1995). In Brazil, it is estimated that over 20 million people moved from rural to urban areas between the 1950s and the 1970s at the peak of its urbanization process. In comparison, 20.5 million people in India, which accounted for 30% of national urban growth, moved from rural to urban areas in the 1990s (Census of India, 2005). These figures are a clear indication of how rural-urban migration can fuel urbanization, especially in developing countries.

Given the general importance of internal migration to urbanization and development, it is also important to observe determinants of this migration decision. Since migration is a selective process, individual and family characteristics of those who choose to migrate and those who stay behind are different. For example, migration mainly involves young adults who are more likely to have a positive net expected return on migration due to their longer remaining life expectancy, or because social norms require that young adults migrate in search of a better life (De Haan and Rogally, 2002). As a result, family strategies

can involve sending young adults to the city, and investing in a potentially remitting child (Lucas and Stark, 1985). Also, in some cases, human capital theory might predict that educated people have a higher propensity to migrate than less educated people. However, this would be the case only if schooling makes workers relatively more productive at a place of destination than at home or if costs of migration are lower for the more educated workers.

Understanding determinants and selectivity of migration is important for a number of reasons. Migrants' individual and household characteristics can shape migrants' success at their destinations and effects on their families at home, such as distribution of migration's potential benefits through remittances. Those characteristics can also determine which individuals bear the cost of loss in human capital through the migration process. Therefore, knowing nature of migrants' characteristics and migration selectivity patterns can provide guidance for policy interventions to influence migration and its impacts on migrants' families (Lall, Selod, and Shalizi, 2006). Example of such policies include the Job Search and Relocation Assistance program implemented by the U.S. Department of Labor to offer information on out-of-area jobs, job-search grant funds and relocation grants, and China's regional programs to match urban jobs and rural migrants (Lall et. al., 2006).

A well-developed body of theoretical and empirical research in the past has mainly examined either determinants of internal migration in developed countries such as in the U.S., and European countries or international migration of people from developing countries to more developed ones such as Mexico-U.S. Yet, there have been more recent studies in developing countries such as in Africa, Venezuela, Brazil, India, Vietnam, the Philippines, and China, the pool of literature in this topic of determinants of internal migration is not as big as the literature in the first two groups due to difficulty and high cost of data collection.

However, these more recent studies tend to focus on a cross-sectional survey given out during a specific period of time in an aggregate level of data from certain regions of the countries. The questions of those studies also involve the effects of internal migration on migrants or migrants' families through remittances, income inequality, but not so much on the complex migration selectivity and determinants of migration decisions.

The present study contains two novel extensions of past empirical migration research. First, it incorporates three rich and detailed sets of survey data collected over an extended period of time for the district of Nang Rong, Thailand. These data allow me to capture the rapid change occurred in the area during the time of economic growth. Second, the study includes both individual and family characteristic variables, which can potentially reflect insights from the New Economics of Labor Migration (NELM) theory that migration decisions take place within larger social units, that is, households.

I employ logit regressions and data from the Nang Rong project social survey to model the selectivity and determinants of internal migration. The Nang Rong project is unique in providing detailed socio-demographic and economic information on rural households in Thailand. Migration data, which is respondents' status during the time of interview, was gathered for all household members. Similar to other developing countries, Thailand has also faced with the same situation – a large flow of rural residents migrating to large urban settings especially the capital city, Bangkok, every year. From 1985 to 1990, the national rate of net migration increased rapidly due to the 1980s economic boom, changes in the labor market, and widening income gaps (Sussangkarn, 1995).

Because of the availability of data and the areas' characteristics, which are good fits for my research goal, I have chosen the Nang Rong data set done in Nang Rong district,

Buriram province, Thailand. According to the statistics of Buriram from National Statistical Office (NSO), in 1990 and 2000, there were 4.4 and 2.0 percent of population who migrated within the previous five years, respectively. Moreover, 9.8 and 12.1 percent of the same population were not living in a province of birth in 1990 and 2000, respectively. This number is worth noting compared to the 6.3 percent rate of internal migration over the country in the same period (year 2000). Most of migrants from Nang Rong have low skills and are from low-income families who make their living from agriculture. According to NSO, 88.6 and 84.0 percent of population aged 15 and over were in the agricultural sector in 1990 and 2000, respectively. Therefore, possible push effects from low job opportunities or low income in rural areas and pull effects from wider labor market and possible higher earnings and better job-matching in urban areas can fuel Nang Rong residents' decisions to migrate.

In terms of economic studies done in Thailand on migration, there have been a very few and most of the existing ones are from sociology [Chiswick (1977), Teilhet-Waldorf and Waldrof (1983), Sussangkarn (1995), Van Wey (2003), Van Wey (2005), Piotrowski (2006), Piotrowski (2008)]. Hence, incentives for migration situation in Thailand, which might involve poverty, income or wage differentials, expected costs and returns to migration, and characteristics of those who decide to migrate are not yet fully understood. The goal of this study is to contribute to the literature of migration analysis in developing countries and to fill the gap of Thailand's migration literature by analyzing determinants of migration using the distinct survey data from the Nang Rong Project, which would contribute not only to a pool of studies about Thailand development but also to empirical analysis of other developing countries in Asia and around the world.

In this paper, I analyze migration of residents in Nang Rong areas; here I define migration as a movement, either temporary or permanent, of residents from their original homes and villages, which could include both internal and international, though the latter case is very rare – only 0.8% and 0.7% of the residents went to another country in 1994 and 2000, respectively. The analysis will be based on the 3 sets of social survey data in the year 1984, 1994, and 2000 done in Nang Rong, a district in Buriram province in the northeast region of Thailand. More details about the area and the data set are discussed in the Data section.

The key hypotheses about determinants of migration in this paper are based on residents' human capital – individual and household characteristics; migration is highly selective among individuals and families and this selectivity differ significantly by migrant destinations.

In the following sections, I describe relevant studies in section II - Literature Review. In section III - Theoretical Framework, I discuss relevant economic theory, which is the human capital theory. Then, I introduce more specific details about the data set from Nang Rong Project in section IV - Data. I discuss about the empirical model, variables and their definitions, along with the results and discussion in section V - Empirical Specification, and lastly conclude my findings in section VI – Conclusion.

II. Literature Review

In general, there is a large body of literature on human migration. Most of early studies of migration are theoretical, which present neo-classical models for individual's decision to migrate. One renowned research paper is Sjaastad (1962); the author develops popular general hypotheses regarding the causes of human migration. Sjaastad's micro-economic theory of migration is often referred to as human capital theory or the theory of investment in man. He treats migration decision as an investment one involving costs and returns (both private and social) distributed over time. In deciding to move, the migrants seek to maximize their net real life span incomes.¹

While Sjaastad's human capital theory applies to the issue of migration in a more general case – interregional and international migration in both developed, developing, and less developed countries, another two theoretical papers Todaro (1969) and Harris and Todaro (1970) base their models on a similar neoclassical framework but with greater focus on human migration in developing countries. In fact, the Harris-Todaro model is one of the most well-known models in the field of development and welfare economics. The authors provide an important concept of returns to migration, which gives an additional assumption to Sjaastad's hypotheses – migration results from differences in rural-urban expected earnings not necessarily wage differentials. The important implication of this model is that despite a high urban unemployment rate, migration still occurs as long as migrants expect higher urban income than the one they receive in rural areas.

Besides theoretical studies, there has also been a lot of early empirical research done on the topic of human migration in developing countries such as Brigg (1973), Carynyk-

¹ Larry A. Sjaastad. 1962. "The Costs and Returns of Human Migration." *Journal of Political Economy*. 70 (5): 87.

Sinclair (1974), Byerlee (1974), Yap (1975 and 1977), and Connell et al. (1976). On the basis of these studies, some generalizations regarding the characteristics of migrants and determinants of migration have been made. In this way, these studies are closely related to my research since they have examined what determine a resident's decision to migrate.

1. Characteristics of Migrants

Various studies in Africa and Asia (Connell et. al., 1976) indicate that mostly young, single males between the ages of 15-25 tend to migrate. However, married men, mostly accompanied by the families and single women now dominate the migration streams in Latin America (Brigg, 1973; Herrick, 1971; Nelson 1974). There exists a positive relationship between levels of education and propensity to migrate (Barnum and Sabot, 1975; Ducoff, 1963 in case of migrants from San Salvador and Connell et. al., 1976 in case of migrants from India). Those studies found that educational selectivity existed at both ends of the scale; large proportion among people with very little or no education and among those with high educational levels tended to migrate. Also, most studies suggest that migrants tend to come from relatively large families – those in which both need and earning capacity have expanded relative to local earning opportunities (Connell et. al., 1976).

Regarding the economic characteristics of migrants, the general observation is that poor, landless and unskilled individuals dominate the over-all migration streams. However, it has been revealed later on that both very rich (educated) and very poor (illiterate, landless) tend to migrate from rural areas (Connell et. al., 1976).

2. Causes of Migration

In the 1960s and 1970s, many works tried to explain the flows of internal migration using aggregate data. The general conclusion of almost all migration studies is that migration

is primarily for economic reasons. The greater the difference in economic opportunities between rural and urban areas, the greater will be the rural-to-urban movement. Economic reasons include push factors in the rural areas and pull factors of urban areas. However, the validity of push-pull distinction is doubtful; it has been considered illegitimate to separate a single act of preference of destinations over origins (Connell et. al., 1976, p. 198). One approach researchers employed during those periods was the “modified gravity models” of migration inspired by Newton's law of gravitation. The models characterized migrating flows as directly related to size of populations at origin and destination, including effects of push and pull factors in both areas, and inversely related to distance. However, this approach has been replaced by more advanced econometric methods because it can only describe population movements (Lall et. al., 2006).

A more sophisticated method to test if economic reasons fuel migration decisions was to examine rural-urban wage differentials. Almost all the econometric studies covered by Todaro’s review (1976) reveal that where income levels are considered as separate variables, migration is positively related to urban and negatively related to rural wages. Where rural-urban differentials are taken together as a single variable, there is a positive correlation between migration rate and the size of differentials.

In addition to the above primary economic motives, other causes of migration have been suggested: (a) to improve their educational or skill level; (b) to escape social and cultural imprisonment in homogeneous rural areas; (c) to escape from rural violence and political instability; (d) to join family and friends (Todaro, 1976); and (e) to search for better entertainment or “bright city lights,” however, a few studies support this last hypothesis (Findley, 1977).

Besides early empirical research mentioned previously, there have been some more recent studies, related to my topic of interest, which specifically examines determinants of migration. One study is done by Root and Jong (1991), the authors investigated family characteristics and strategies, which could lead to migration decisions in a developing country based on a case of the Philippines. The authors use the model that combines social structural, and socio-economic resources, as well as behavioral and interactional aspects of the family to predict a propensity of family migration.²

There is also a lot of research done in China about determinants of migration; one example is Zhao (1999). The author uses micro data from Sichuan province to analyze what determines a migration decision and found that land management is one of the most important determinants of labor migration. He also investigates if migration decisions are permanent or not based on the management of land that an individual owns.

Another important and relevant empirical work, Mendola (2005), explores migration situation in Bangladesh. The author studies the interrelationship between determinants of migration (as a family strategy) and migrant household members who are left behind. One of the results is that richer families tend to engage more in high-return international migration (i.e. international migration) and achieve higher productivity. However, poorer families can only afford low-return domestic migration, which might serve as a poverty-trap exacerbating families' financial problems.

One can see from the above examples of literature, theoretical and empirical, early and more recent, that studies in determinants of migration can be approached from a lot of angles. However, decisions to which angle is worth investigating, especially in empirical

² Brenda Davis Root, and Gordon F. De Jong. 1991. "Family Migration in a Developing Country." *Political Studies* 45 (2): 232.

studies, and by which theoretical models should be employed is utterly dependent on a nature of areas and samples of people in question, as well as data available at hand. The effects of possible factors influencing migration decision could vary depending on, for example, types of migration – rural-rural or rural-urban, types of residents' occupation, environmental and geographical characteristics of the areas, empirical methodology used in a study, etc.

In summary, the literature on migration, especially with regards to determinants of internal migration, does not seem to have reached a decisive conclusion. Regarding the relationship between migration decision and an individual's demographic characteristic – sex, marital status, or level of education, and household characteristics – number of family members, amount of land owned, or family income, the literature has still yielded varying results. Therefore the original contribution of my research is to examine which sets of characteristics, both individual and household ones, of a resident in rural areas have a significant impact on his or her probability of becoming a migrant, using the rich and distinct data set of Nang Rong project. In a context of what have been done, I would also compare the results to those of earlier studies that have the most similar conditions to mine, in terms of nature of data set, samples, and empirical methodology; and ultimately, what the results have for policy implications.

III. Theoretical Framework

Based on Sjaastad's Human Capital Theory, when making a decision to migrate, migrants are believed to maximize their net real life span incomes. Thus, a rational individual would migrate if the present value of the expected income gain exceeds the cost of relocation, or

$$(1) V = \sum_{t=1}^n \frac{Yu(t) - Yr(t)}{(1+i)^t} > C$$

where, V = the present value of the gain in net real income;

$Yu(t)$ = expected urban income in period t ;

$Yr(t)$ = expected rural income in period t ;

i = the interest rate used to discount future income;

n = the number of periods in the individual's planning horizon; and

C = the cost of relocation in the urban area.

Thus, the human capital model suggests certain hypotheses with regard to the probability of migration. The probability of migration, P , is directly related to the present value of the expected income gain and inversely related to the cost of relocation. Further specifying $V = g(Yu(t), Yr(t), n, i)$, the direction of the effects of various factors on a probability of migration can be shown in equation (2).

$$(2) P = f[g(Yu(t), Yr(t), n, i), C]$$

$$\frac{\partial P}{\partial Yu(t)} > 0; \frac{\partial P}{\partial Yr(t)} < 0; \frac{\partial P}{\partial n} > 0; \frac{\partial P}{\partial i} < 0; \frac{\partial P}{\partial C} < 0.$$

In words, the probability of migration is positively correlated to the level of expected urban income and the length of the planning horizon and inversely related to the level of rural income, the cost of relocation and the discount rate. Human capital model helps explaining the direction of migration and the characteristics of migrants. Because of urban-rural wage

differentials, it correctly predicts that migration takes place from low-income rural areas to higher-income urban areas.

The implications of human capital approach regarding the characteristics of migrants are the following: (i) Younger people migrate, n is larger for the young since they can expect a longer life horizon over which they can earn higher urban income. It is also suggested that age has correlative influences: young people are poorer which makes Y_r smaller; they have less place attachment and less seniority rights invested in a job, which makes C lower. Younger people are also less risk averse which lowers i (David (1973, p.56); (ii) Migrants are mostly single because C is lower when other family members or possessions are not to be moved; (iii) Migrants are comparatively more educated than the non-migrants because the “cross-rate” of return of a joint decision to invest in education and migration is higher than the ordinary rate of return to either investment alone; (iv) The majority of the migrants to larger cities have relatives or friends already living there. This lowers C in both money and psychic terms (Yotopoulos and Nugent, 1976, p.227).

As shown above, the human capital theory seems to offer some predictions and implications on a contribution of migrants’ demographic characteristic to a probability of migration. However, the theory is somewhat inconclusive since expected costs and returns are not limited to what are included in the theory (equation (1) and (2)). There could be more explanatory variables affecting migration decision such as gender and occupation. This human capital theory only considers characteristics of an individual and not those of a household such as household size and wealth. Also, the effects of those factors predicted by this theory might differ significantly by migration destinations.

Therefore, based on the above testable predictions of the effects of migrants' characteristics regarding migration decision from this theory and from other previous results from relevant empirical studies (see Appendix), the empirical questions remained to be answered are: 1) Which demographic and household characteristics of Nang Rong residents could be determinants of their migration decisions? (the list of those characteristics, which serve as explanatory variables, can be found in Section V); 2) Are those effects consistent with the predictions from the human capital theory and other previous empirical studies?; and 3) Does migration selectivity in Nang Rong differ across groups of migrants who moved to different destinations (rural-to-rural vs. rural-to-urban)?.

IV. Data

This study is based on the social survey data set of Nang Rong project. The Nang Rong project belongs to the Carolina Population Center, UNC, in cooperation with the Institute for Population and Social Research, Mahidol University, Salaya, Thailand. Nang Rong district in Buriram province is one of the rural areas in northeast Thailand.³ The northeast is the poorest and least developed region in the country. It historically and presently serves as the largest internal migrant sending region in Thailand.

The area has been populated through migration and high rates of natural increase in the 1950s and 1960s. This region is known for its undulating landscape, a tropical dry forest and woodlands. Deforestation has always been a problem because farmers convert lowland forest to paddies for rain fed rice cultivation and cassava, due to the change in Europe import regulations in the late 1960s, through the 1970s. Nang Rong is located approximately five hours' drive northeast of Bangkok.

The agriculture in Nang Rong is primarily rain-fed paddy rice, either for consumption or for sale, with some large-scale cultivation of cassava or other upland dry crops for export primarily to Europe. Rain is in the form of a single monsoon, allowing only one rice crop per year. Small-scale vegetable gardens and fruit trees serve to supplement the villagers' diet and income. Nang Rong was sparsely settled until the middle of this 20th century, when it became a frontier region and attracted larger numbers of settlers.

In terms of economic conditions, an average annual income per capita (using a present exchange rate) of residents in Buriram in the year 1996 was \$649, which was ranked

³ See the map of Thailand and the location of Buriram province and Nang Rong district in the Appendix 1.

the 12th of the northeastern region and the 68th of the country (out of 76 provinces in total).⁴ A majority of population make a living by employing agricultural activities. Since agricultural products and their prices are seasonal, and the area is close to Bangkok and other surrounding provinces, during the past few decades, Nang Rong experiences substantial out migration of young adults during the period after rice harvest is finished.

Household-level and community-level survey data were collected from more than 30,000 individuals who live in the 51 study villages in 1994, and 2000. Information was collected on all permanent members of each household. Linking data on individuals in 1994 to data on the same individuals in 2000 through detailed identification information gives a prospective look at the lives of these individuals over almost a decade. The inclusion of household members who were not present at the time of the interview minimizes potential selectivity bias.

A migrant follow-up surveys were conducted for a probability sample of 22 of the original 51 villages in 1995 and 2001. Members of households interviewed in 1994 (both individual migrants and members of entire households who moved) were tracked to the four most frequently reported destinations in the 1995 and 2001 waves of data collection. Interviews with these migrants were attempted in four top migration destinations, including Bangkok, Eastern Seaboard, Buriram provincial capital and Korat provincial capital, and in the home villages during common return periods (holidays, including Western New Year, Chinese New Year, and Thai New Year).

Numbers of migrant samples are: in year 1994 – around 18 percent for the overall migration and 5 percent for the rural-to-urban migration; in year 2000 – around 20 percent

⁴ Information about Buriram Province.

“http://www.mapculture.org/mambo/index.php?option=com_content&task=view&id=34&Itemid=49.”

for the overall migration, 5 percent for the rural-to-urban migration, and 3 percent for the rural-to-urban migration (see Table 1 below). The actual number of migrants who moved to specific destinations (rural-to-urban and rural-to-urban) are expected to be higher than those figures since the follow-up surveys only track those who originally lived in the sample 22 villages out of the total 51 villages.

Table 1: Incidence of Migration among Nang Rong Residents

| Types of Migration | Years of Survey | | | |
|--------------------|-----------------|---------|-----------|---------|
| | 1994-1995 | | 2000-2001 | |
| | Freq. | Percent | Freq | Percent |
| No migration | 40,959 | 76.84 | 44,405 | 71.66 |
| All migration | 9,591 | 17.99 | 12,281 | 19.82 |
| Rural-to-Urban | 2,755 | 5.17 | 3,181 | 5.13 |
| Rural-to-Rural | N/A | N/A | 2,097 | 3.38 |
| Total | 53,305 | 100 | 61,964 | 100 |

Some weaknesses of this data set are that sets of questions and how detailed some questions are in each wave of surveys differ; some variables are not available in both years. Thus, this makes it difficult to compare among set of regressions across waves. For example, the data regarding amount of land owned by each household is structure differently and with different levels of details; data on household debt is only available in 1994 survey. Another major weakness is that this survey data does not provide any information about individual or household income. As shown in Section III under the human capital theory, data on income level at both origins and destinations could provide a very important additional factor regarding expected returns to migration. This lack of income data in Nang Rong survey could come from the fact that a vast majority of residents have agriculture-related occupations, so their income is very unstable. However, proxies for household wealth or economy are created, instead, by using the Factor Analysis and Principle Component Analysis to assign wealth index for each household based on sets of household conditions and assets. Then, each

household are categorized into different groups based on the wealth distribution of the entire samples. The summary statistics of the explanatory variables and variable means by migrant destinations are shown in Table 2 and Table 3 in the Appendix.

V. Empirical Specification

Similar to a simple approach of the binary-choice model used in Mendola (2005), the following model is a multilogit regression for the individual, household, and migrant follow-up surveys in 1994-1995 and 2000-2001. I used the samples that include the observations of both male and female who are ages 11 years old (including those observations that are missing)⁵. The multilogit regression I tested is the following:

Y: Pr (a respondent becoming one type of migrant)

= f (respondent's demographic and household characteristics)

$\equiv F (\beta_0 + \beta_1 Male + \beta_2 Age + \beta_3 HH_Head + \beta_4 Married + \beta_5 Edu + \beta_6 Agri_Occ + \beta_7 Family_size + \beta_8 Language + \beta_9 HH_Wealth^*)$

The dependent variables (Y) are defined differently in each survey as the following:

| Y | 1994-1995 | 2000-2001 |
|-----|--|--|
| = 0 | Still living in this house/moved out less than 2 months ago/moved to another house in this village/living in this house and listed as a new member since 1984. | Still living in this house/moved out less than 2 months ago/moved to another house in this village/living in this house and listed as a new member since 1984 or 1994. |
| = 1 | Moved out of this village 2 or more months ago (at the time of interview). | |
| = 2 | Living in one of the following target destinations: Bangkok, Eastern Seaboard, Buriram provincial capital or Korat provincial capital (Rural-to-Urban). | Living in one of the following target destinations: Bangkok, Eastern Seaboard, Buriram provincial capital or Korat provincial capital (Rural-to-Urban). |
| = 3 | N/A ⁶ | Living in another village within Buriram Province but not including the provincial capital (Rural-to-Rural). |

⁵ I limited the samples to those who are ≥ 11 years old because the question regarding occupation was asked only those who are 11 years old and up.

⁶ Not available due to the structure of the migrant follow-up survey in 1995, which only tracks individuals who moved to one of those four urban settings.

The definitions of the explanatory variables, which are respondent's demographic characteristics, are the following: *Male* is a dummy variable which is equal to one if a respondent is a male; *Age* is respondents' age in years; *HH_Head* is a dummy variable which is equal to one if a respondent is a HH head, omitted groups are spouse, child, father – mother, sibling, in-law, other relative, friend, and other; *Married* is a dummy variable which is equal to one if a respondent is married, omitted groups are single, married, widowed, and divorced/separated; *Edu* is respondent's actual number of years of schooling. I excluded Religious Study and General Equivalency Degree because they are coded 94 and 95, respectively; *Agri_Occ* is a dummy variable which is equal to one if a respondent has an agricultural occupation. See the list of those occupations and omitted groups of all dummy variables in the Appendix #6.

Respondent's household characteristic variables are the following: *Family_Size* represents number of family members of a respondent; *Language* =1 if a language spoken in household is either Thai Korat or Central Thai, omitted groups are Khmer, Lao/Northeastern Thai/Thai Isan, Suaie, and other.; *Household_Wealth* is a set of three dummy variables indicating which portion ($\leq 33^{\text{th}}$ percentile, $> 33^{\text{th}}$ and $\leq 67^{\text{th}}$ percentile, and $> 67^{\text{th}}$ percentile) in the income distribution of the whole samples a respondent's family's "wealth" falls into. However, in order to avoid a problem of multicollinearity, $>67^{\text{th}}$ percentile group is omitted. This "household wealth" is calculated from the Factor Analysis and Principal Component Analysis, which incorporate household's conditions and assets. See the details regarding the method and the example of the list of included household conditions and assets in the Appendix 7, along with Table 7 and Table 8.

Results and Discussion

Analyzing the Determinants

Table 4 and Table 5 report the econometric results for those who moved out the village for 2 or more months ago, which represents general or “All Migration,” and those who moved to specific destinations in the 1994-1995 and 2000-2001 surveys including Rural-to-Urban migration and Rural-to-Rural migration, hereafter R2U and R2R, respectively. The tables include both the coefficients, t-statistics of each variable in different category of migration. Because the estimated coefficients are difficult to interpret quantitatively, the relative risk ratio (hereafter, RRR) is also included.

By definition, RRR represents the probability that an alternative outcome j is chosen relative to a base outcome 0, when x increases by one unit (or change from 0 to 1 for dummy

variables). Mathematically, $RRR = \exp(B_j) = \frac{p_j'}{p_0'}$ where $\frac{p_j'}{p_0'} = \exp((x_j + 1)\beta_j)$ and B_j stands for a coefficient

of a variable of interest which falls into alternative outcome j ; p_j stands for a probability that outcome j is chosen, and $p_0 =$ probability that a base outcome is chosen. A simpler interpretation of RRR is that a variable x increases (decreases) the probability that alternative outcome j is chosen instead of the base outcome if RRR is greater than (less than) 1.

Therefore, in order to first focus on the comparison between probability of staying in village (base outcome) and probability of out migrating to see the determinants of migration in Nang Rong in general, one can examine the RRR values of each variable that is significant in Table 4 and in Table 5 and find that there exist the same trends of RRR values in the two tables. Those trends are that RRR of gender (male), age, years of schooling, family size, and

household wealth belong to the lowest group are greater than 1, whereas RRR of age², HH head, and agricultural occupation are lower than 1.

In addition, it is worth noting that although HH head has a negative effect on general migration in 1994, HH head has a really high RRR in the R2U case. This result appears in the 2000 survey, as well. This result could be the case if one assumes that HH head has the highest education, experience, or other human capital properties that would yield the highest returns to migrating, exceeding the cost of moving to the urban settings. However, in 1994, the variable Language also has an incredibly high RRR in R2U but the result is opposite in 2000 survey, therefore, this is not decisive. Regardless of those two variables HH head and Language, other variables in the R2U outcome category in both tables also show a relatively similar trend in terms of an increases or decreases in the probability that alternative outcome *j* is chosen instead of the base outcome.

As for R2R migration, it's worth noting how RRR of some variables are not significant at all. For gender and age variables, this could imply that because moving within the province incurs low cost. Therefore, being a male or female, or how old a resident is do not matter much or have significant effects. For language, it could be explained by the fact that residents who speak the same language (especially those that are not Thai Korat or Central Thai) tend to cluster in the same area, therefore for with-in-province move, language might not matter.

After the results from both surveys have been proved to be similar with some trends of the signs, when one compares those trends to the predicted signs of that corresponding variable in Table 6⁷, he or she could find that, on average, the signs of variables gender, age,

⁷ The details about those past empirical studies in terms of their data set, method, number of observations, and definition of migrants can be found in Table 9 in the Appendix.

years of schooling, and family size which are (+), and of age² and HH head which are (-) are consistent with the theoretical and empirical predictions. This fact serves as an answer for the question number one this study tries to discover, as mentioned in Section III – the variables gender, age, years of schooling, and family size could be considered determinants of migration decision for Nang Rong residents.

The sign of marital status shows inconsistency both in the predictions and in the results of this study, in 1994 being (+) and in 2000 being (-). As for the rest three variables: language – there is a lack in the previous predictions; poor – the result is inconsistent with the prediction even though the effect is significant in the case of this study and Piotrowski (2008) employed the same dataset. This could have come from the fact that the wealth index is calculated differently, including different sets of assets etc.

Analyzing the difference in Migration Selectivity across Destination Choice

The RRR values presented in the previous tables can only reflect a comparison between the alternative outcome and the base outcome. Therefore, by definition of RRR, one cannot directly compare the magnitude of RRR of the two alternative outcomes. In order to solve this problem and to answer the third question, which is whether or not migration selectivity differ across different destinations, or to see how each variable affects migration decision differently when destinations are different, the “odd ratio plot” are analyzed instead.

The interpretation of this odd ratio plot is that: 1) if an alternative outcome j is located on the right of base outcome 0 implies compared to base outcome, there is a higher probability for j to be chosen if x increases by one unit (or change from $0 \rightarrow 1$ if x is a dummy variable); and 2) The distance of how far the two alternative outcomes are located away from the base outcome measures different magnitude of the effect of the same x variable. The odd

ratio plots of the results from 2000-2001 surveys are presented in Figure 1 and Figure 2 in the Appendix. Number 0 represents the base outcome; 1 represents the all migration; 2 represents R2U migration; and 3 represents the R2R migration.

The analysis in this section, therefore, focuses on the distance between 2 and 0, compared to that of 3 and 0 in the plots. These plots show that being a household head, having agricultural occupation, and household wealth falls in to the middle group in village wealth distribution have significantly different effects at 10% level on migration decision (in terms of direction and magnitude) depending on migrants' destination. Being a household head has significant positive effects on both rural-to-urban and rural-to-rural migration. However, the magnitude of those effects is higher in the former case. This could be explained by the fact that a household head tends to possess the highest human capital, which leads to the highest returns from this migration decision, after taken into account migration cost to the urban settings. Another difference in migration selectivity occurs when a migrant employs agricultural occupation – it has a significant negative effect on rural-to-urban migration but positive effect on rural-to-rural migration. Since agricultural occupation usually yields low income, migrants might not be able to overcome the cost of moving to the cities.

Since this type of comparison, between rural-to-urban and rural-to-rural, has not been done much in the literature, the results could be compared to those of the study done by Mora and Taylor (2005) that analyzed migration selectivity of internal vs. international migration. However, only one variable, which is household head, is matched with their set of explanatory variables; their results also show that the effect of being a household head on migration decision is significantly different between internal and international migration.

Table 4: Multinomial Logit Model of Becoming a General Migrant and a Rural-to-Urban Migrant of Nang Rong Samples in 1994-1995 Surveys

| Variable | All Migration | | | Rural-to-Urban Migration | | |
|-----------------------------------|---------------|--------------|----------|--------------------------|--------------|-----------|
| | Coeff. | t-statistics | RRR | Coeff. | t-statistics | RRR |
| <i>Individual Characteristics</i> | | | | | | |
| Gender (Male) | 0.478*** | 16.28 | 1.613*** | -0.413*** | -4.20 | 0.662*** |
| Age | 0.352*** | 41.10 | 1.422*** | 0.289*** | 9.72 | 1.335*** |
| Age Squared | -0.00547*** | -39.33 | 0.995*** | -0.00635*** | -13.12 | 0.994*** |
| Household Head | -2.234*** | -24.47 | 0.107*** | 3.380*** | 26.86 | 29.361*** |
| Marital Status | -0.255*** | -6.56 | 0.775*** | -1.224*** | -9.89 | 0.294*** |
| Years of Schooling | 0.0153* | 2.47 | 1.015** | -0.0225 | -1.24 | 0.978 |
| Agricultural Occupation | -1.913*** | -54.73 | 0.148*** | -5.198*** | -22.90 | 0.006*** |
| <i>Household Characteristics</i> | | | | | | |
| Family Size | 0.211*** | 42.57 | 1.235*** | -0.629*** | -23.56 | 0.533*** |
| Language | 0.0288 | 0.38 | 1.029 | 3.698*** | 28.19 | 40.373*** |
| Household Wealth: | | | | | | |
| ≤ 33th percentile | 0.546*** | 15.18 | 1.726*** | 0.969*** | 7.96 | 2.636*** |
| > 33th and ≤ 66th percentile | 0.424*** | 10.24 | 1.528*** | 1.200*** | 8.07 | 3.320*** |
| Constant | -6.798*** | -53.07 | | -3.550*** | -8.65 | |
| N | 38,897 | | | 38,897 | | |
| Pseudo R2 = 0.4153 | | | | | | |

1) The base outcome represents Nang Rong residents staying in the same village. 2) * p<0.05, ** p<0.01, *** p<0.001. 3) RRR represents relative risk ratio; it is sometimes interpreted as equivalent or similar to odds ratio, though they are not mathematically equivalent. RRR is equal to exp(coeff.), which is the probability that selecting a given level of the predictor increases or decreases the probability that the dependent=1) relative to selecting the baseline level. More details of RRR could be found in the Appendix.

Table 5: Multinomial Logit Model of Becoming a General Migrant, a Rural-to-Urban Migrant, and a Rural-to-Rural Migrant in 2000-2001.

| Variable | All Migration | | Rural-to-Urban Migration | | Rural-to-Rural Migration | |
|--|-------------------------|----------|--------------------------|----------|--------------------------|----------|
| | Coeff. and t-statistics | RRR | Coeff. and t-statistics | RRR | Coeff. and t-statistics | RRR |
| Gender (Male) | 0.731*** (25.21) | 2.078*** | -0.153 (-1.80) | 0.858* | -0.0928 (-0.93) | 0.911 |
| Age | 0.337*** (46.40) | 1.400*** | 0.385*** (17.48) | 1.469*** | 0.0300 (1.61) | 1.030 |
| Age Squared | -0.00476*** (-45.11) | 0.995*** | -0.00605*** (-18.88) | 0.994*** | -0.000688** (-3.11) | 0.999*** |
| Household Head | -2.994*** (-33.34) | 0.050*** | 1.441*** (14.10) | 4.223*** | 0.785*** (6.51) | 2.193*** |
| Marital Status | 0.230*** (6.07) | 1.259*** | -0.445*** (-4.08) | 0.641*** | -0.385** (-2.82) | 0.680*** |
| Years of Schooling | 0.0224*** (4.38) | 1.023*** | 0.0470*** (3.58) | 1.048*** | 0.0521** (2.60) | 1.053*** |
| Agricultural Occupation | -2.104*** (-60.09) | 0.122*** | -4.753*** (-29.43) | 0.009*** | 0.290* (2.08) | 1.336** |
| Family Size | 0.169*** (35.47) | 1.184*** | -1.259*** (-42.06) | 0.284*** | -1.235*** (-35.81) | 0.291*** |
| Language | -0.366*** (-11.40) | 0.694*** | -3.209*** (-30.90) | 0.040*** | -38.39 (-0.00) | 0.000 |
| Household Wealth: ≤ 33th percentile | 0.0528 (1.46) | 1.054*** | 0.845*** (7.49) | 2.329*** | 0.174 (1.23) | 1.191 |
| > 33th and ≤ 66th percentile | 0.0827* (2.40) | 1.086** | 0.420*** (4.08) | 1.522*** | -0.353** (-2.66) | 0.703*** |
| Constant | -6.507*** (-54.97) | | -1.179*** (-3.64) | | 2.297*** (7.19) | |
| N | 42,403 | | 42,403 | | 42,403 | |
| Pseudo R2 | = 0.4841 | | | | | |

1) The base outcome represents Nang Rong residents staying in the same village. 2) * p<0.05, ** p<0.01, *** p<0.001. 3) Same explanation of RRR as in Table 4.

Table 6: The Signs of Explanatory Variables from the Past Relevant Studies⁸

| Variable | Mora and Taylor (2005) | Van Wey (2005) I ⁹ | Van Wey (2005) II | Sindi and Kirimi (2006) | Piotrowski (2008) |
|--|------------------------|-------------------------------|-------------------|-------------------------|-------------------|
| <i>Individual Characteristics</i> | | | | | |
| Gender (Male)..... | + | N/A | N/A | N/A | + |
| Age..... | + | + | - | N/A | - |
| Age Squared..... | - | - | + | N/A | N/A |
| Household Head..... | - | N/A | N/A | N/A | N/A |
| Marital Status..... | + | - | + | N/A | + |
| Years of Schooling... | + | + | - | N/A | + |
| Agricultural Occupation | N/A | N/A | N/A | N/A | - |
| <i>Household Characteristics</i> | | | | | |
| Family Size..... | + ¹⁰ | N/A | N/A | + | N/A |
| Language..... | N/A | N/A | N/A | N/A | N/A |
| Household Wealth: | | | | | |
| ≤ 33th percentile..... | N/A | N/A | N/A | N/A | - ¹¹ |
| > 33th and ≤ 67 th percentile | N/A | N/A | N/A | N/A | N/A |

8 There are also a several other studies which are very relevant to this paper but those studies employed their analyses using each unit of a household, rather than an individual, as a sample.

9 There are two sets of data studied in Van Wey (2005), see details in the Appendix.

10 This is assumed from the positive signs of the variables “Number of males over 15 years in the family” and “Number of females over 15 years in the family.”

11 The actual variable in this paper is called “Bottom third of wealth distribution.”

Figure 1: The Odd Ratio Plot of the 2000-2001 survey results
 (Number 0 represents the base outcome; 1 represents the all migration; 2 represents R2U migration; and 3 represents the R2R migration.)

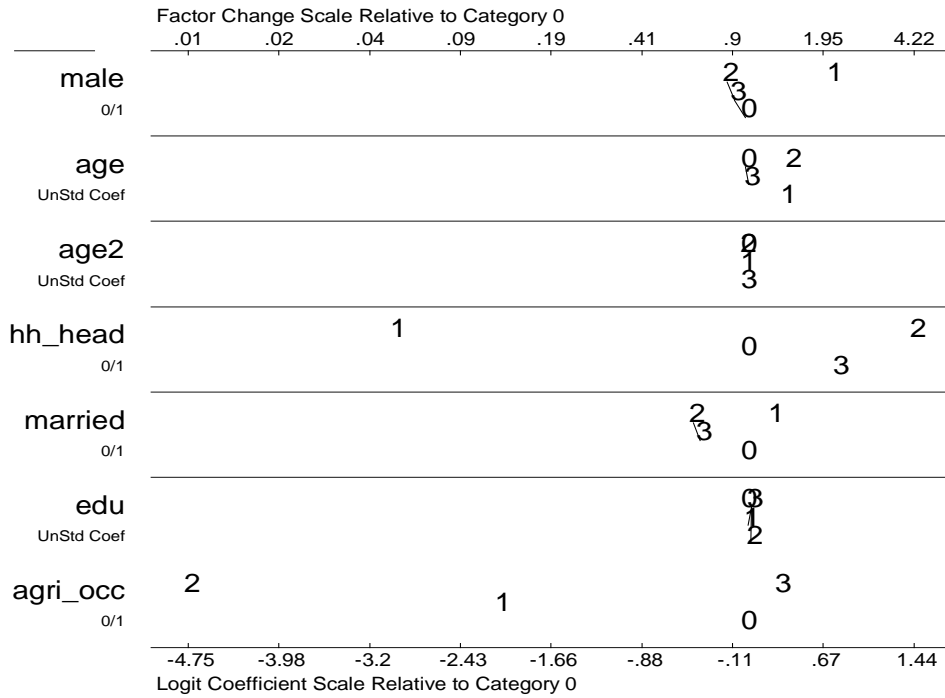
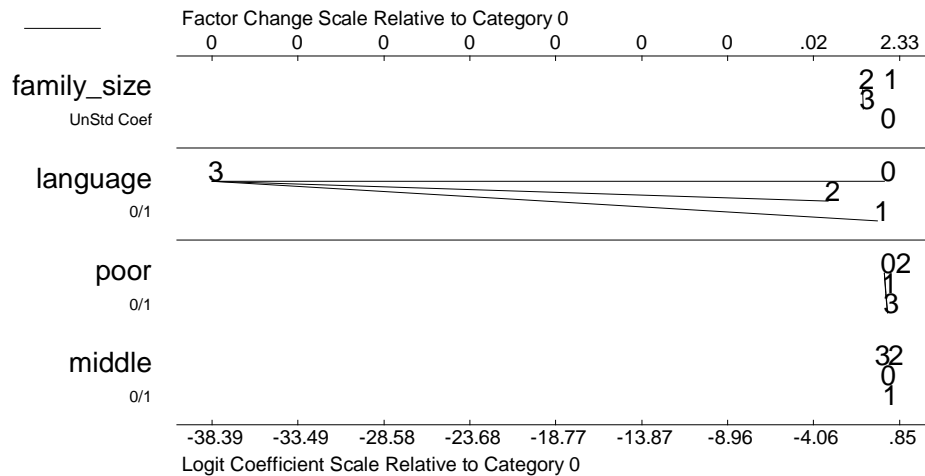


Figure 2: The Odd Ratio Plot of the 2000-2001 survey results (continued)



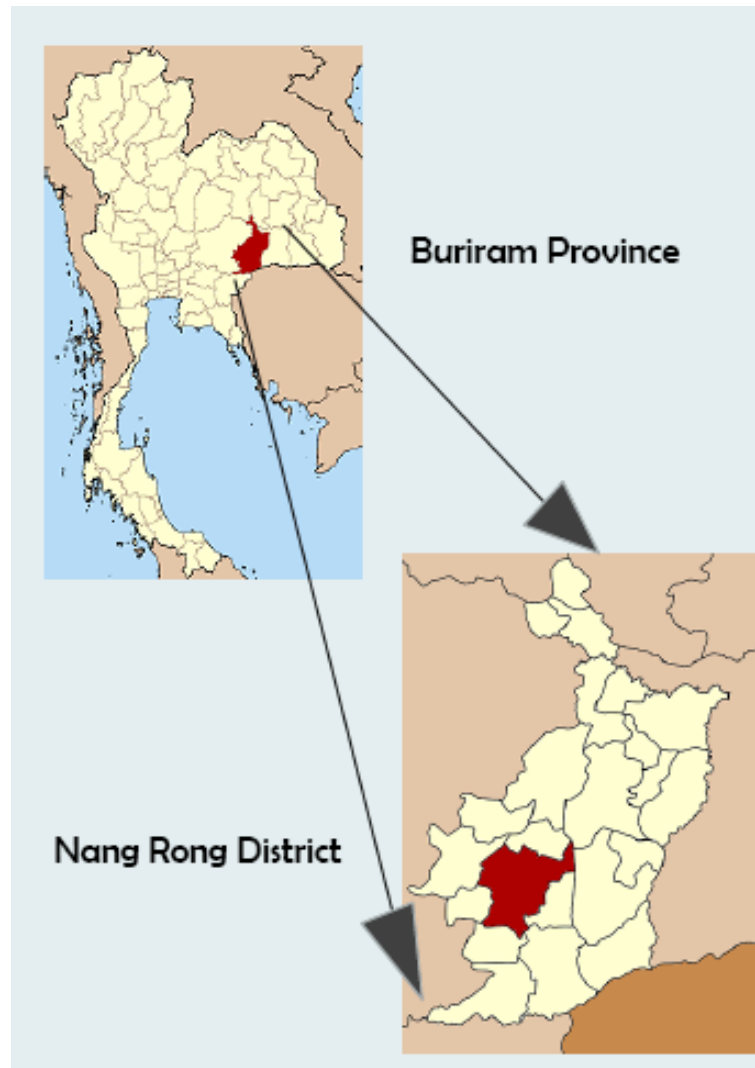
VI. Conclusion

The results presented in this study indicate that migration is a selective process based on demographic and household characteristics of migrants. Firstly, most of the results regarding effects of demographic and household characteristics are in line with the human capital theory and previous empirical papers. The variables gender, age, years of schooling, and family size could be considered determinants of migration decision in the case of Nang Rong residents. Secondly, migration selectivity differs significantly by migrant destination. For example, being a household head has significant positive effects on both rural-to-urban and rural-to-rural migration. However, the magnitude of those effects is higher in the former case. This could be explained by the fact that a household head tends to possess the highest human capital, which leads to the highest returns from this migration decision, after taken into account migration cost to the urban settings.

The findings imply that policy interventions to influence migration patterns and flows have to take into account destination choice of migration, as well. Future research on this topic could try to capture more characteristics of individuals or households such as: years of experience, community characteristics, amount of land owned, expected returns to migration, and social network. In addition, further investigation on selectivity of different sectors of employment is also suggested.

Appendix

1. Map of Thailand, showing the location of Buriram province and Nang Rong district



2. Table 2: Summary Statistics of Variables (Demographic and Household Characteristics) of Nang Rong Residents

| Variables | | 1994-1995 | 2000-2001 |
|--|------|-----------|-----------|
| Gender ^a | Obs. | 54,711 | 53,795 |
| | Mean | 0.42 | 0.5 |
| | SD | 0.50 | 0.5 |
| Age (years) | Obs. | 38,990 | 44,655 |
| | Mean | 32.21 | 34.35 |
| | SD | 15.94 | 16.14 |
| | Min | 11 | 11 |
| | Max | 80 | 97 |
| Household Head ^b | Obs. | 54,711 | 64,715 |
| | Mean | 0.16 | 0.16 |
| | SD | 0.37 | 0.37 |
| Marital Status ^c | Obs. | 54,711 | 64,715 |
| | Mean | 0.41 | 0.43 |
| | SD | 0.49 | 0.50 |
| Years of Schooling (years) | Obs. | 41,437 | 46,442 |
| | Mean | 5.16 | 5.64 |
| | SD | 2.63 | 3.18 |
| | Min | 0 | 0 |
| | Max | 20 | 20 |
| Agricultural Occupation ^d | Obs. | 54,711 | 64,715 |
| | Mean | 0.41 | 0.34 |
| | SD | 0.49 | 0.47 |
| Family Size (number of members) | Obs. | 54,711 | 64,715 |
| | Mean | 6.21 | 6.12 |
| | SD | 3.52 | 3.77 |
| | Min | 0 | 0 |
| | Max | 21 | 20 |
| Language Spoken in HH ^e | Obs. | 54,711 | 64,715 |
| | Mean | 0.21 | 0.61 |
| | SD | 0.41 | 0.49 |
| Household Wealth ^f ≤ 33th percentile | Obs. | 54,711 | 64,715 |
| | Mean | 0.49 | 0.29 |
| | SD | 0.5 | 0.46 |
| > 33th and ≤ 67th percentile | Obs. | 54,711 | 64,715 |
| | Mean | 0.22 | 0.36 |
| | SD | 0.42 | 0.48 |
| > 67 th percentile | Obs. | 54,711 | 64,715 |
| | Mean | 0.28 | 0.34 |
| | SD | 0.45 | 0.48 |

^aDummy variable = 1 if a respondent is a male. ^bDummy variable = 1 if a respondent is a household head; omitted groups are spouse, child, father – mother, sibling, in-law, other relative, friend, and other. ^cDummy variable = 1 if a respondent is married; omitted groups are single, married, widowed, and divorced/separated. ^d Dummy variable = 1 if a respondents have agriculture-related occupation. See the list and omitted groups below (Appendix #6). ^eDummy variable = 1 if a respondent's family usually speak Thai-Korat or Central Thai; omitted groups are Khmer, Lao/Northeastern Thai/Thai Isan, Suaie, and other. ^fDummy variables represent where each household's wealth index lies in the wealth distribution of the samples; the wealth index consists of some major conditions of the house and household assets constructed by using Factor Analysis and Principal Component Analysis. See details of the methods below.

3. Table 3: Variable Means by Migrant Destinations^g

| Variable | Migration Type | | | | | | |
|-----------------------------------|----------------|-----------|---------------|-----------|----------------|-----------|----------------|
| | Non-Migration | | All Migration | | Rural-to-Urban | | Rural-to-Rural |
| | 1994-1995 | 2000-2001 | 1994-1995 | 2000-2001 | 1994-1995 | 2000-2001 | 2000-2001 |
| <i>Individual Characteristics</i> | | | | | | | |
| Gender (Male) | 0.41 | 0.48 | 0.56 | 0.56 | 0.33 | 0.49 | 0.51 |
| Age (years) | 34.94 | 37.24 | 25.76 | 28.84 | 24.51 | 27.54 | 33.37 |
| Household Head | 0.18 | 0.19 | 0.02 | 0.01 | 0.51 | 0.43 | 0.17 |
| Marital Status | 0.42 | 0.42 | 0.49 | 0.58 | 0.25 | 0.52 | 0.36 |
| Years of Schooling (years) | 4.75 | 5.14 | 6.18 | 6.85 | 6.53 | 6.87 | 4.37 |
| Agricultural Occupation | 0.46 | 0.40 | 0.36 | 0.28 | 0.01 | 0.02 | 0.32 |
| <i>Household Characteristics</i> | | | | | | | |
| Family Size (number of members) | 5.85 | 5.86 | 8.52 | 8.69 | 2.59 | 1.45 | 0.93 |
| Language | 0.23 | 0.63 | 0.03 | 0.71 | 0.59 | 0.20 | 0.01 |
| Household Wealth: | 0.50 | 0.30 | 0.48 | 0.32 | 0.47 | 0.18 | 0.09 |
| ≤ 33th percentile | | | | | | | |
| > 33th and ≤ 66th percentile | 0.22 | 0.38 | 0.24 | 0.38 | 0.19 | 0.20 | 0.10 |
| > 67 th percentile | 0.28 | 0.32 | 0.28 | 0.30 | 0.34 | 0.62 | 0.80 |

^gSame explanations and omitted groups for variables as those in Table 2.

4. To deal with the problem of variable bias due to the values, such as 9, 99, or 999, assigned to Missing/Don't know and N/A variables in 1994 survey, I replaced the value of those variables with [.]. Definitions of Missing/Don't know and N/A answers are the following: "Missing/Don't know" = "the respondent did not know the answer to the question or when the question was skipped during the interview;" "N/A," = "the question is skipped according to the logic in the questionnaire" (Nang Rong Projects Codebook). However, in the 2000 survey, N/A observations are already coded by [.] instead of numerical values.

5. The number of such answers in the 1994 survey data are the following: Age, Age² – Missing/Don't know observations (coded 99) = 3; Marital status dummy – Missing/Don't know observations (originally coded 9) = 3; Number of years of education – Missing/Don't know (coded 99) observations = 18 and 1 additional observation is excluded since it falls into the Non-formal education/adult education category (coded 95); Primary occupation dummy – Missing/Don't know observations (originally coded 99) = 55; N/A observations (originally coded 99) = 5, and 1 additional observation (coded 95) is omitted because the code is not defined in the Occupation Appendix for 1994 Codebooks.

For 2000 survey data: Male (coded 0) = 10,920; Age, Age² (coded 99) = 20,060; Marital status dummy – Missing/Don't know observations (originally coded 9) = .; Number of years of education – Missing/Don't know (coded 99) observations = 29. Additional numbers of [.] replaced observations are: 16 from Religious Study (coded 94), 627 from General Equivalency Degree or Non-formal education (coded 95), 2 from Kindergarten (coded 97), and 5 possibly from N/A (coded [.]); Primary occupation dummy – Missing/Don't know observations (originally coded 999) = 90. N/A observations (originally coded [.]) = 6; Don't know/never thought about occupation/no answer (coded 995) = 23.

6. Agricultural occupations include paddy farmer/orchard grower/field crop farmer, livestock farmer/mulberry tree cultivator/raise ducks-chickens/raise shrimp, agricultural laborer (hired to work in agriculture sector, professional ocean fisherman, professional hunter/collect items in the forest to sell, salt paddy operator, collect wood/make charcoal, and professional freshwater fisherman. Omitted groups for Agricultural Occupation variable are no occupation, professional/technical vocations and related working persons, administration/business/management, office work vocations, commercial sales, service vocations, commercial transport and transportation related occupation, skilled laborers or production processes and manual laborers, and other.

7. In obtaining the household wealth indices, I first used Factor analysis to get a small set of household conditions or assets from a large set of those variables in each category, which measures facets of household wealth. Then, based on those representative household conditions or assets, I employed the Principal Component analysis to assign scoring factors to each household condition or asset. Then, I constructed proxy indicators of household wealth or socio-economic status (the first principal component) using the linear combination of representative household conditions or assets weighted by scoring factors.

Table 7: Example Results of a Principal Component Analysis in 2000 survey

| Variable Description | Mean | Std. Dev. | Scoring Factor |
|---|-------|-----------|----------------|
| Type of windows of the house: window frames but no panes | 1.957 | 0.202 | 0.174 |
| Running water delivered into the house | 1.331 | 0.471 | -0.426 |
| Type of fuel used in preparing food on a day-to-day basis: Charcoal | 1.665 | 0.472 | 0.418 |
| Refrigerator 1-door | 0.566 | 0.588 | 0.442 |
| Color TV (17" or larger) | 0.461 | 0.546 | 0.419 |
| Microwave | 0.010 | 0.100 | 0.224 |
| Itan (multi-purpose agricultural vehicle) | 0.056 | 0.231 | -0.251 |
| Motorcycle (110 cc or larger) | 0.417 | 0.810 | 0.211 |
| Car | 0.035 | 0.211 | 0.252 |
| Truck (6-wheel or more) | 0.009 | 0.095 | 0.002 |
| Pick-up truck (4-wheel) | 0.080 | 0.281 | 0.147 |

Later on, I calculated cut-off points using the first, second, and third quartiles of wealth index to assign each household into different groups in the wealth distribution of the entire samples.

Table 8: Wealth Distribution of the Samples

| Wealth index of a respondent's household is: | 1994-1995 | | 2000-2001 | |
|--|-----------|---------|-----------|---------|
| | Obs. | Percent | Obs. | Percent |
| ≤ 33th percentile | 27,072 | 49.48 | 18,957 | 29.29 |
| > 33th and ≤ 67th percentile | 12,163 | 22.23 | 23,448 | 36.23 |
| > 67th percentile | 15,476 | 28.29 | 22,310 | 34.48 |
| Total | 54,711 | 100 | 64,715 | 100 |

Table 9: Summarized Background Information about the Past Empirical Studies

| Studies Topics | Mora and Taylor (2005) | Van Wey (2005) I | Van Wey (2005) II | Sindi and Kirimi (2006) | Piotroski (2008) |
|------------------------------|---|--|--|---|---|
| Data Source and Samples | 2003 Mexico National Rural HH Survey | Nang Rong Project (1984-1994), studied men aged 18-35 in 1994 | Mexican Migration Project (1987-1995), studied male household heads aged 18-35 at time of interview | Household surveyed conducted by the Tegemeo Institute in Kenya in 1997, 2000, and 2004 | Nang Rong Project (1994-2000), studied men aged 18-35 |
| Number of observations | 7,298 | 9,239 ¹² | 2,168 ¹³ | 4,333 ¹⁴ | 4,898 |
| Definition of a “migrant” | Individual who lived outside the household longer than 3 months in 2002 | Individuals who have migrated out of the village at time of interview | Individuals who have migrated out of the village at time of interview | A household member who has been away from home for at least one month | Individuals listed on the 1984 panel who were living away from the village in 1994 two or more consecutive months. |
| Type of Models | Multinomial logit | Discrete time event history analysis | Discrete time event history analysis | Simultaneous- equation methods using a recursive system | Multinomial Probit |

¹² This includes repeated migration events experienced by individuals within the ten-year windows, not the number of individuals themselves, which is 1,483.

¹³ This includes repeated migration events experienced by individuals within the ten-year windows, not the number of individuals themselves, which is 308.

¹⁴ Number of households

References

- Barnum, H.N., and Sabot, R.H. (1975). Education, Employment Probabilities and Rural-Urban Migration in Tanzania. Paper presented at the 1975 World Congress of the Econometric Society, Toronto.
- Bhattacharyya, Bharati. (1985). The Role of Family Decision in Internal Migration, the Case of India. *Journal of Development Economics*, 18, 51-66.
- Brigg, P. (1971). Migration to Urban Areas. World Bank Staff Working Paper No. 107. Washington, D.C. Retrieved from <http://go.worldbank.org/WD5M6LBVT0>.
- Brockerhoff, Martin. (1995). The Labor-Market in Africa – Lachaud, JP. *Population and Development Review*, 21(2), 433.
- Byerlee, D. (1974). Rural-Urban Migration in Africa: Theory, Policy and Research Implications. *International Migration Review*, 543-66.
- Carynnyk-Sinclair, N. (1974). Rural to Urban Migration in Developing Countries, 1950-1970: A Survey of the Literature. Geneva, ILO.
- Chiswick, C.U. (1977). On Estimating Earnings Functions for LDCs. *Journal of Development Economics* 4, 67-78.
- Connell, J., Dasgupta, B., Laishley, R., & Lipton, M. (1976). Migration from Rural Areas: The Evidence from Village Studies. Delhi, Oxford University Press.
- David, P.A. (1973). Fortune, Risk and Microeconomics of Migration, in P.A. David and M.W. Reder (eds.), Nations and Households in Economic Growth: Essays in Honor of Moses Abramovitz. New York: Academic Press: 21-88.
- Ducoff, L. (1963). The Migrant Population of a Metropolitan Area in a Developing Country: A Preliminary Report on a Case Study of San Salvador. London, UNESCO.
- Fields, G. (1974). Rural-Urban Migration, Urban Unemployment and Underemployment, and Job-Search Activity in LDCs. *Journal of Development Economic*, June, 165-87.
- Findley, S. (1977). Planning for Internal Migration: A Review of Issues and Policies in Developing Countries. Washington, DC, U.S. Department of Commerce, Bureau of Census.
- Harris, John R., and Michale P. Todaro. (1970). Migration, Unemployment and Development: A Two-Sector Analysis. *American Economic Review* 60 (1), 126-142.
- Herrick, B.H. (1971). Urbanization and Urban Migration in Latin America: An Economist's View, in F. Rabinovitz and F. Trueblood (eds. 1971). Latin American Urban Research, Vol. 1; Beverly Hills, Calif, Sage Publication.
- Kuznets, Simon Smith. (1979). Growth, Population, and Income Distribution: Selected Essays. New York: W. W. Norton & Company Inc.
- Lall, Somik V., Harris Selod, and Zmarak Shalizi. (2006). Rural-Urban Migration in Developing Countries: A Survey of Theoretical Predictions and Empirical Findings. World Bank Policy Research Working Paper 3915. Washington, D.C.
- Lipton, M. (1982). Migration from Rural Areas of Poor Countries: The Impact on Rural Productivity and Income Distribution, in R.H. Sabot (ed.) (1982): Migration and the Labor Market in Developing Countries. Colorado, Westview Press: 191-228.
- Lucas, Robert E.B. (1997). Internal Migration in Developing Countries. Handbook of Population and Family Economics. Volume 1B, edited by Mark R. Rosenzweig and Oded Stark. Amsterdam; New York: Elsevier.

- Massey, D.S. *et al.* (1993). Theories of International Migration: A Review and Appraisal. *Population and Development Review*. 19(3), 431-466.
- McKenzie D. (2005). Beyond Remittances: the Effects of Migration on Mexican Households. *International Migration, Remittances and the Brain Drain*, Ozden and Schiff eds., the World Bank and Palgrave Macmillan, 123-47.
- Mendola, Mariapia. (2005). Migration and Technological Change in Rural Households: Complements or Substitutes?. *Journal of Development Economics* 85 (1-2), 150-75.
- Nelson, J. (1974). Sojourners Vs. New Urbanites: Causes and Consequences of Temporary Vs. Permanent Cityward Migration in Developing Countries. Cambridge, Massachusetts, Harvard University Press.
- Phan, Diep, and Ian Coxhead. (2009). Inter-Provincial Migration and Inequality during Vietnam's Transition. *Journal of Development Economics* (July) in Press, Corrected Proof.
- Piotrowski, Martin. (2006). The Effect of Social Networks at Origin Communities on Migrant Remittances: Evidence from Nang Rong District. *European Journal of Population* 22, 67-94.
- _____. (2008). Migrant Remittances and Household Division: The Case of Nang Rong, Thailand. *Journal of Marriage and Family* 70 (November), 1074-87.
- Preston, D.A. (1969). Rural Emigration in Andean America. *Human Organization*. 28(4).
- Rochin, R.I. (1972). Inter-Relationships Between Farm Environment, Off-Farm Migration and Rates of Adoption: Dwarf Wheats on Irrigated Small-Holdings in Pakistan. Paper presented at the Workshop on Empirical Studies of Small Farm Agriculture in Developing Nations, Purdue University, Indiana, November.
- Root, Brenda Davis, and Gordon F. De Jong. (1991). Family Migration in a Developing Country. *Political Studies* 45 (2), 221-33.
- Rozelle, Scott, J. Edward Taylor, and Alan Debrauw. (1999). Migration, Remittances, and Agricultural Productivity in China. *American Economic Review* 89 (2), 287-91.
- Sahota, G.S. (1968). An Economic Analysis of Internal Migration in Brazil. *Journal of Political Economy*. March-April: 218-45
- Schultz, T.P. (1975). The Determinants of Internal Migration in Venezuela: An Application of the Poltomous Logistic Model. Paper presented at the World Congress of the Econometric Society. Toronto.
- Sindi, Kirimi, and Lilian Kirimi. (2006). A Test of the New Economics of Labor Migration; Hypothesis: Evidence from Rural Kenya. Selected Paper prepared for presentation at the American Agricultural Economics Association Annual Meeting, Long Beach, CA July 23-26, 2006.
- Sjaastad, Larry A. (1962). The Costs and Returns of Human Migration. *Journal of Political Economy* 70 (5), 80-93.
- Standing, G. and Sukdeo, F. (1977). Labor Migration and Development in Guyana. *International Labor Review*. November-December, 303-13.
- Stark, Oded. (1984). Discontinuity and the Theory of International Migration. *Kyklos*, 37(2), 206-222.
- _____. (1991). *The Migration of Labor*. Cambridge, MA: Basil Blackwell.
- Stark, Oded, and David E. Bloom. (1985). The New Economics of Labor Migration. *American Economic Review*, 75 (2), 173-78.

- Sussangkarn, Chalongphob. (1995). Labour Market Adjustments and Migration in Thailand. *ASEAN Economic Bulletin*, 12 (2), 237-54.
- Taylor, J.E. (1987). Undocumented Mexico-U.S. Migration and the Returns to Households in Rural Mexico. *American Journal Agricultural Economics*. 69: 616-638.
- Taylor, J. E., Scott Rozelle, and Alan de Brauw. (2003). Migration and Incomes in Source Communities: A New Economics of Migration Perspective from China. *Economic Development and Cultural Change*, 52, 75-101.
- Taylor, J. E., and Jorge Mora. (2005). Determinants of Migration, Destination, and Sector Choice: Disentangling Individual, Household, and Community Effects. In Ça-glar özden and Maurice Schiff, Eds., *International Migration, Remittances, and the Brain Drain*. New York: Palgrave Macmillan.
- Teilhet-Waldorf, S. and W.H. Waldrof. (1983). Earnings of Self Employed in and Informal Sector: a Case Study of Bangkok. *Economic Development and Cultural Change*, 31, 587 - 607.
- Todaro, Michale P. (1969). A Model of Labor Migration and Urban Unemployment in Less Developed Countries. *American Economic Review*, 59 (1), 138-48.
- _____. (1976). Urban Job Expansion Induced Migration and Rising Unemployment – Formulation and Simplified Empirical Test of LDCs. *Journal of Development Economics*, 3 (3), 211-225.
- VanWey and Leah K. (2003). Land Ownership as a Determinant of Temporary Migration in Nang Rong, Thailand. *European Journal of Population*, 19, 121–145.
- _____. (2005). Land Ownership as a Determinant of International and Internal Migration in Mexico and Internal Migration in Thailand. *International Migration Review*, 39 (1), 141-72.
- World Bank. (2008). *World Development Indicators*. Washington, DC: World Bank.
- Woodruff C. and R. Zenteno. (2001). Remittances and microenterprises in Mexico. Working Paper of University of California San Diego, and Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM).
- Yap., L.Y. (1975). Internal Migration in Less Developed Countries: A Survey of the Literature. Washington, DC: World Bank.
- Yotopoulos, P.A. and Nugent, J.B. (1976). Economics of Development: Empirical Investigations. New York Harper and Row.
- Zhao, Yaohui. (1999). Leaving the Countryside: Rural-to-Urban Migration Decisions in China. *American Economic Review*, 89 (2), 281-86.

Data Sources

The Nang Rong Projects, Carolina Population Center, University of North Carolina at Chapel Hill. <http://www.cpc.unc.edu/projects/nangrong/>

TNSO, National Statistical Office of Thailand. <http://web.nso.go.th/index.htm>.

Information about Buriram Province

http://www.mapculture.org/mambo/index.php?option=com_content&task=view&id=34&Itemid=49).