



Do more educated workers migrate more? Findings from the Korean Labor and Income Panel Study

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ABSTRACT

This paper examines the relationship of migration between capital regions and non-capital regions and the level of human capital in Korea using the method of multinomial logistic regression. This paper aims to show whether the high level of human capital of migrants who move to capital regions statistically differs from the other migrants. For analysis, this paper uses the 2006, 2008, 2010 and 2012 panel data from Korean Labor and Income Panel Study (KLIPS). The analysis is divided into two parts of migration based on the region of origin: the migration of individuals who live in non-capital regions and the migration of individuals who live in capital region. In this paper, we consider personal characteristics such as educational attainment and occupations as an indicator of human capital of individual, gender, age, and marriage status as explanatory variables. Our empirical finding is that the educational attainment of individual representing a level of human capital significantly affects the migration behavior moving from non-capital regions to capital regions. According to analysis of migration from Gyeonggi and Incheon to Seoul, the migration within capital regions, individuals who engage in occupation with high skilled and non-manual are more likely to move to Seoul capital regions where favorable conditions for workers in terms of higher wage and better job opportunities can provide. Those results can be understood in the context of human capital theory to maximize personal socioeconomic utilities by migrating to capital regions.

1. Introduction

Over the several decades there has been a significant growth in interest among regional economists and policy makers regarding the relationship between human capital and migration. Following the recent regional studies and regional policies, human capital is regarded as an engine of regional development and economic growth. The accumulation of human capital in a region plays a fundamental role in regional development in economic growth (Lucas, 1988; Romer, 1990; Krugman, 1991; Camagni, 1995). Rauch (1993) and Simon (1998) also revealed that a high level of human capital in a region is more likely to induce regional economic growth. Based on these studies, regional strategies for attracting more highly skilled individuals into the region have been increasingly highlighted. For these reasons, research on migration of human capital across regions sheds light on the establishment of regional policy.

The migration process, and especially the highly skilled or educated, can lead to regional inequality. Regional inequality may worsen because individuals who have a high level of human capital tend to be geographically clustered within a few core regions (Ritsilä and Ovaskainen, 2001). This migration process may cause regional reallocation of human capital through a motion of brain drain and brain

gain. This trend is due to the fact that human capital is likely to migrate from where it is scarce to where it is abundant (Lucas, 1988). Furthermore, highly qualified individuals expect more educational, cultural, and recreational opportunities as well as occupational opportunities for choosing residential location to maximize their and their family utility. In this case, the accumulation of high levels of human capital supports themselves by creating a self-feeding agglomeration process (Myrdal, 1957; Hansen, 1992; Ritsilä and Ovaskainen, 2001).

In the particular case of Korea, Korea has suffered from excessive population concentration in capital regions through a period of rapid urbanization. According to Statistics 2005 in Korea, the proportion of population in capital regions in Korea has been increased from 39.1 percent in 1985 to 48.2 percent in 2005. The proportion of population in capital regions was already overwhelmed that of population in capital regions. In the same manner, individuals with high levels of human capital are also likely to concentrate on capital regions in Korea. The most serious issue is that human capital strongly migrates to capital regions where various opportunities are provided over time. From the perspective of utility maximize theory and potential migrants, capital regions where desirable socioeconomic environment and a better condition of labor market seem to be more attractive place for individuals rather than non-capital regions and have a positive effect on

individual decisions to stay. Consequently, as a concentration of human capital in capital regions occurs, human capital differential between capital regions and non-capital regions increasingly widens.

In this context, this paper focuses on the micro level migratory behavior, and on the impact of the level of individual's human capital regarding educational attainment on migration. This paper also examines the factors behind migratory behavior at the individual level. The analysis is divided into two regional parts such as capital regions and non-capital regions because our paper assumes that the mechanisms of migration may work differently in different regions. To reveal whether individual with high levels of human capital is statistically related to the decision to migrate to capital regions or non-capital regions, this paper employs a multinomial logistic regression model using the 2006, 2008, 2010 and 2012 panel data from Korean Labor and Income Panel Study (KLIPS). The rest of the paper is structured as follows. Section 2 reviews the theoretical literature on migration, especially highly educated individuals, and the individual characteristics of migration. Section 3 describes the data, variables that we used and also introduces our empirical model. Section 4 reports the empirical results of analysis. Finally, Section 5 presents the conclusions.

2. Literature review

2.1 Migration decisions and human capital redistribution

Economists have used to build the individual migration model from the context of individual utility maximization. One of the main approaches is based on the human capital theory, which considers migration as an investment in human capital (Sjaastad, 1962; Weiss, 1971; Seater, 1977; Molho, 1986). Although previous many studies on migration have had a thin base of theoretical supports, human capital theory for explaining migration provides a concrete theoretical approach based on microeconomic theory. According to the human capital model of migration, individuals are likely to decide to migrate toward an increase in present value of potential moves from their region to another region under the utility maximization process. Thus, individuals are willing to migrate to another region where higher expected returns to their human capital investments are provided.

For many decades the urbanization led to the concentration of population in capital regions whereas population in non-capital regions decreased. This is due to the fact that capital regions relatively possess well-equipped amenities in the region and provide educational, cultural and recreational opportunities than non-capital regions. Individuals with high levels of human capital, in particular, expect to maximize their potential utilities and to bring higher expected returns of their educational attainment by moving to capital regions (Sjaastad, 1962; Faggian and McCann, 2009). As the concentration of human capital individuals in capital regions continues, the high skilled, professionals and high value added enterprises are increasingly accumulated in the region. As a result of the spatial concentration of human capital in a specific region, the benefits from agglomeration can be generated. In the agglomeration benefits, human capital often migrates from the region where it is scarce to another region where it is abundant (Lucas, 1988; Ritsilä and Ovaskainen, 2001).

Recently, human capital in Korea has highlighted as it is considered as the core factor of regional development and economic growth. Thus, government policies have aims to foster the retention of human capital within regions for regional economic development. However, highly educated and highly skilled individuals increasingly tend to move to

capital regions in Korea over time. This is due to the facts that individuals as rational actors are likely to seek to improve their utilities by migrating to capital regions where the expected reward of their labor will be higher. The continued migration of individual with high levels of human capital from non-capital regions to capital regions has led to an excess population growth of capital regions and has resulted in the intensification of regional inequality between capital regions and the rest of regions (Lim and Chang, 1997; Kwon, 2001). Although regional policies for balance of regional development have continuously conducted, the accumulated growth of capital regions persists. Therefore, these regional issues discussed at the more extended national level approaches, not just at the confined partial areas.

2.2 Factors of migration

The characteristics of region as well as individual play an important role in individual's migration decision. In this paper, we focus on micro level factors that may affect the decision to migrate. Studies of the determinants of individual migration have commonly considered individual's life cycle factors, such as age, marriage, divorce, entry into the labor force, birth and aging of their children (Greenwood, 1985). These determinants affect the likelihood of individual's or family's migration. According to the studies on migration, as an individual has high levels of educational attainment, he/she is positively correlated with the likelihood of migration (Molho, 1987; Hughes and McCormick, 1989; Owen and Green, 1992; Ghatak et al., 1996; Ritsilä and Ovaskainen, 2001; Kwon, 2005; Choi, 2008). In domestic studies, Kwon (2005) reported that individuals with highly educated are more likely to migrate to capital regions rather than non-capital regions.

From the perspective of gender, the expected outcome of gender in relation to the propensity to migrate remains ambiguous (Ritsilä and Tervo, 1999), but recent some studies empirically show that male is more likely to move compared to female in a developing countries (Newbold, 2010). Another interesting factor that affects individual migration between regions is whether an individual is a householder or not. It indicates that a householder tends to support their family so that the likelihood of migration may work differently according to whether an individual is a householder or not. Age also describe the migrant's personal characteristics that affect the decision to migrate. There is the assumption that older people are less likely to migrate, this is because the benefits from moving tend to decrease with a growing age and location ties formed in their region increase with age (Antolin and Bover, 1997; Ritsilä and Tervo, 1999; Ritsilä and Ovaskainen, 2001). Individual migration behavior can also be affected by marital status as reported in previous studies. The underlying assumption is that a married person may be influenced by a greater range of factors than a single, such as livable environment for their family and educational opportunities for their children. Furthermore, occupational approach is crucial to understand the migration patterns of individuals. The expected effect of person who engages in occupation with high skilled and high educated on the propensity to migrate is positive, it is suitable to apply if individuals who migrate from non-capital regions to capital regions. In addition to occupational approach, migration factors related to industry may be closely correlated with the decision to migrate. The underlying assumption is that the decision to migrate to capital regions is easier for individuals who engages in tertiary industry and over than for individuals who engages in primary industry or secondary industry. This is because individuals with highly skilled in tertiary industry have higher likelihood of migration to maximize their returns of their skills and educational investment.

3. Data, variables and empirical model

3.1 Data and variables

We use the KLIPS data set, which is a longitudinal study of a representative sample of Korean households and individuals living in urban regions. The KLIPS has been conducted annually to track 5,000 households and individuals aged 15 and over in those households in order to observe the characteristics of households and individuals. The KLIPS data set contains data on the characteristics of households as well as individuals' economic activities, dwelling and family conditions, job status, labor movement, income, expenditures, education and job training since 1998. This paper uses the KLIPS data in 2006 (the 9th wave), 2008 (the 11th wave), 2010 (the 13th wave), 2012 (the 15th wave) and focuses on individual level migration. To examine the patterns of individual migration between capital regions and non-capital regions in Korea, we conduct the analysis targeting wage and salary workers who are aged 25 and over, and set the spatial unit as two parts: capital regions (Seoul, Gyeonggi, Incheon) and non-capital regions (the rest of those regions).

The dependent variable is whether individual migrates between two years from the base year, which can be estimated a change of the province of domicile. The most important individual characteristic of our analysis is human capital, and its impact on the individual level migratory decisions. As aforementioned hypothesis which is supported many previous studies, we assume that high levels of human capital of an individual correlates positively with the likelihood of migration to capital regions where more desirable opportunities offer (Molho, 1987; Owen and Green, 1992; Ghatak et al., 1996; Ritsilä and Ovaskainen, 2001). However, these previous studies often suggested proxy variables differently to represent human capital of an individual. The exact variable which can be reflected human capital still remains unclear; thus, we need to discuss how to define human capital and how to set a proxy variable reasonably to capture the level of human capital in this paper.

In our empirical model, the level of human capital is measured by educational attainments. In general, human capital can be considered as a heterogeneous asset which results from formal schooling, on-the-job training, and experience (Ritsilä and Ovaskainen, 2001). Therefore, individuals with high levels of human capital are often regarded as individuals with highly skilled, highly educated and high-paying job. However, occupational approach seems to be inappropriate because human capital indicates the individuals' skills which have embodied through education, training, experience for a long term. Moreover, there is a basic assumption that individuals with high levels of human capital correlate positively with the likelihood of high wage, that is, the level of human capital of an individual is measured by the level of individual wage. However, the level of individual wage can be determined by other external factors (e.g., job characteristics, policy, institution, labor market characteristics) as well as human capital. Thus, we employ a key explanatory variable 'educational attainment' as a measure of the level of human capital.

In addition to educational attainment, this paper includes a number of other independent variables describing the individual characteristics to control the effect of other variables on individual migration in our empirical modeling. In our individual migration behavior equations we employ a range of independent variables that, theoretically, ought to contribute to an individual migration. From the perspective of rational decision making process, our independent variables that affect individual migration include individual characteristics such as gender, age, educational attainment, marital status, householder, occupation, industry as shown in Table 1. As we discussed in Section 2.2 supported by many studies, we include the gender (MALE) dummy, householder (HOUSEH) dummy, age in each year (AGE), and marital status (MARRIAGE) dummy to control as independent variables.

Furthermore, we use the occupation variables in this empirical model by including two dummy variables. The first dummy variable with (HIGH OCCU), which indicates whether an individual works in the field required high skills. In order to capture the effect of the characteristics

Table 1: Variable description

| Variable | Scale | Description | Operational definition |
|----------------------|--------------------------|--|---|
| Dependent variable | | | |
| MIGRATION | Discrete, Dummy | Whether an individual changes the province of domicile between two years | 1 = migration 0 = non-migration |
| Independent variable | | | |
| EDU | Continuous, Proportional | Educational level of an individual in base year | Educational attainment (years) |
| MALE | Discrete, Dummy | Whether an individual is male | 1 = male 0 = female |
| HOUSEH | Discrete, Dummy | Whether an individual is a householder | 1 = householder 0 = other |
| AGE | Continuous, Proportional | Age of an individual in base year | Age (years) |
| MARRIAGE | Discrete, Dummy | Whether an individual married | 1 = married 0 = other |
| HIGH OCCU | Discrete, Dummy | Whether an individual engages in the occupation with high-skilled and non-manual | 1 = an individual engages in this occupation 0 = other |
| INDUSTRY3 | Discrete, Dummy | Whether an individual engages in tertiary industry | 1 = an individual engages in tertiary industry 0 = other |
| WORKTYPE | Discrete, Dummy | Whether an individual is a permanent worker | 1 = permanent worker 0 = temporary worker |
| WAGE | Continuous, Proportional | Personal monthly wage | Wage (1,000,000 KRW) |

Table 2: ISCO major groups

| ISCO major group | Broad occupation group |
|--|-----------------------------|
| Managers | High-skilled and non-manual |
| Professionals | |
| Technicians and associate professionals | |
| Clerical support workers | Low-skilled and non-manual |
| Service and sales workers | |
| Skilled agricultural and fishery workers | |
| Craft and related trades workers | Skilled manual |
| Plant and machine operators and assemblers | Unskilled |
| Elementary occupations | |

of occupation on migration, jobs are classified by occupation with respect to the type of work performed based on the normative measure of occupational skills categories from the International Standard Classification of Occupations (ISCO). These occupations are further categorized into the following four occupational groups according to the broad occupation group as shown in Table 2: (i) unskilled, (ii) skilled manual, (iii) low-skilled and non-manual, (iv) high-skilled and non-manual. In this paper, the occupation dummy (HIGHOCU) gets the value of 1, if an individual is in occupation with high-skilled and non-manual, and vice versa. The second dummy (WORKTYPE) indicates that an individual is a permanent worker not a temporary worker. As shown in Table 1, this dummy variable (WORKTYPE) has the value of 1 if an individual is a permanent worker. Under the assumption, an individual who is a temporary worker tends to migrate to another region to lessen employment instability. The wage variable (WAGE) measures personal monthly wage. The assumption is that the likelihood of migration decreases as personal income affected person's economic welfare increases.

In our empirical model, another factor affecting individual's migratory behavior is the type of industry where an individual works. Industry variable is defined by one dummy variable (INDUSTRY3) representing the tertiary industry including the service sector. The definition of this industry follows the Korean Standard Industrial Classification (KSIC) at the first-digit. For example, if an individual engages in the tertiary industry not in the primary industry or secondary industry, this dummy gets the value of 1. The impact of the tertiary industry that an individual works in on the likelihood of migration to desirable regions considered capital regions is assumed to be positive.

3.2 Empirical model

The analysis of this paper focuses on the individual level decision making of a migrant within and between capital regions and non-capital regions in Korea. The econometric modelling is based on the human capital approach, which discussed in Section 2. To capture the detailed mechanisms of individuals' migration, we divide empirical analysis into two parts. The first analysis of migration is about individuals who live in capital regions in each base year (2006, 2008, and 2010), and the other analysis deals with the migration of individual who live in non-capital regions in each base year (2006, 2008, and 2010) during the period

2006-2012. We organize data set as cross-sectional data by combining four years' panel data into a larger data set to enlarge total sample size. As shown in Table 3, for residents in non-capital regions, the empirical analysis is conducted as following mutually exclusive migration cases based on the region of origin: non-migration (base group), migration 1 (non-capital regions to another non-capital regions), migration 2 (non-capital regions to capital regions). In this context, for residents in capital regions from 2002 to 2008, the migration cases are divided as following: non-migration (base group), migration 3 (capital regions to non-capital regions), and migration 4 within capital regions (Gyeonggi and Incheon to Seoul).

Methodologically, this analysis is based on multinomial logistic regression using the 2006, 2008, 2010, and 2012 panel data from KLIPS. Multinomial logistic regression is used to predict the probabilities of different possible outcomes of categorically distributed dependent variable, given a set of multiple independent variables in a model. According to the underlying assumption of multinomial logistic regression, such as the assumption of independence among the dependent variable choice, this regression model seems to be suitable for our empirical analysis because our empirical model involves the multiple discrete dependent variables on migration patterns. The equations of the empirical model are as follows:

$$\text{logit}(Y_j) = \beta_0 + \beta_1 \text{EDU} + \beta_2 \text{MALE} + \beta_3 \text{HOUSEH} + \beta_4 \text{AGE} + \beta_5 \text{MARRIAGE} + \beta_6 \text{HIGHOCU} + \beta_7 \text{INDUSTRY3} + \beta_8 \text{WORKTYPE} + \beta_9 \text{WAGE} + \varepsilon$$

$$\text{Prob}(Y = j) = \frac{1}{1 + \sum_{j=1}^{J-1} e^{\sum_{k=1}^K \beta_{jk} X_k}} = \frac{1}{1 + \sum_{j=1}^{J-1} Y_j}$$

where Y_j is the dependent variable, migration, whether an individual changes the province of domicile between two years, such as 2006-2008, 2008-2010, and 2010-2012 and X_k is the k th independent variable that may affect migration at the individual level based on previous studies as mentioned in Section 3.2.

4. Empirical results

4.1 Descriptive statistics

Table 3: Organization of dependent variable for analysis

| Classification | Description |
|--------------------|--|
| Dependent variable | Non-migration (base group) |
| | Analysis 1 : residents in non-capital regions in base year |
| | Non-capital regions to another non-capital regions |
| | Non-capital regions to capital regions |
| Dependent variable | Non-migration (base group) |
| | Analysis 2 : residents in capital regions in base year |
| | Capital regions to non-capital regions |
| | Within capital regions (Gyeonggi and Incheon to Seoul) |

Table 4: Frequency of migration

| | From 2006 to 2008 | | From 2008 to 2010 | | From 2010 to 2012 | | Total | | |
|------------------------------------|-------------------|-------|-------------------|-------|-------------------|-------|-----------|-------|------|
| | Frequency | % | Frequency | % | Frequency | % | Frequency | % | |
| Analysis 1: Non-capital regions | Non-migration | 1,607 | 93.4 | 1,649 | 96.2 | 2,178 | 96.3 | 5,434 | 95.4 |
| | Migration1 | 37 | 2.2 | 45 | 2.6 | 65 | 2.9 | 147 | 2.6 |
| | Migration2 | 76 | 4.4 | 20 | 1.2 | 18 | 0.8 | 114 | 2.0 |
| | Total | 1,720 | 100 | 1,714 | 100 | 2,261 | 100 | 5,695 | 100 |
| Analysis 2: Capital regions | Non-migration | 1,248 | 98.0 | 1,197 | 97.2 | 1,425 | 96.7 | 3,870 | 97.3 |
| | Migration3 | 8 | 0.6 | 25 | 2.0 | 26 | 1.8 | 59 | 1.5 |
| | Migration4 | 18 | 1.4 | 10 | 0.8 | 22 | 1.5 | 50 | 1.2 |
| | Total | 1,274 | 100 | 1,232 | 100 | 1,473 | 100 | 3,979 | 100 |

This paper considers migration as the changes in individual's residence during the period 2006-2008, 2008-2010, and 2010-2012. In this paper, residential regions in Korea are divided into two parts: non-capital regions and capital regions. We use 5,695 individuals in

analysis 1 and 3,979 individuals in analysis 2 in this paper by combining two-year data sets with migration. To capture the characteristics of individual's migratory behavior, we suggest the frequency of migration between regions (Table 4) and basic statistics on variables for residents

Table 5: Descriptive statistics for residents in non-capital regions

| Dependent variable | Variable | N | Min | Max | Mean | sd |
|--|-----------|-------|------|-----|-------|-------|
| Non-migration (base group) | EDU | 5,434 | 0 | 22 | 12.23 | 3.53 |
| | MALE | 5,434 | 0 | 1 | 0.62 | 0.48 |
| | HOUSEH | 5,434 | 0 | 1 | 0.99 | 0.11 |
| | AGE | 5,434 | 25 | 82 | 42.83 | 11.54 |
| | MARRIAGE | 5,434 | 0 | 1 | 0.74 | 0.43 |
| | HIGHOCCU | 5,434 | 0 | 1 | 0.21 | 0.40 |
| | INDUSTRY3 | 5,434 | 0 | 1 | 0.60 | 0.49 |
| | WORKTYPE | 5,434 | 0 | 1 | 0.34 | 0.47 |
| | WAGE | 5,434 | 0.04 | 18 | 1.85 | 1.21 |
| Non-capital regions to another non-capital regions (Migration 1) | EDU | 147 | 6 | 22 | 13.67 | 2.90 |
| | MALE | 147 | 0 | 1 | 0.69 | 0.46 |
| | HOUSEH | 147 | 0 | 1 | 0.66 | 0.47 |
| | AGE | 147 | 25 | 83 | 36.04 | 10.25 |
| | MARRIAGE | 147 | 0 | 1 | 0.58 | 0.49 |
| | HIGHOCCU | 147 | 0 | 1 | 0.53 | 0.50 |
| | INDUSTRY3 | 147 | 0 | 1 | 0.23 | 0.42 |
| | WORKTYPE | 147 | 0 | 1 | 0.31 | 0.46 |
| | WAGE | 147 | 0.20 | 6 | 2.12 | 1.08 |
| Non-capital regions to capital regions (Migration 2) | EDU | 114 | 6 | 20 | 14.50 | 2.87 |
| | MALE | 114 | 0 | 1 | 0.76 | 0.42 |
| | HOUSEH | 114 | 0 | 1 | 0.62 | 0.49 |
| | AGE | 114 | 25 | 69 | 33.65 | 8.82 |
| | MARRIAGE | 114 | 0 | 1 | 0.50 | 0.50 |
| | HIGHOCCU | 114 | 0 | 1 | 0.56 | 0.50 |
| | INDUSTRY3 | 114 | 0 | 1 | 0.38 | 0.49 |
| | WORKTYPE | 114 | 0 | 1 | 0.20 | 0.40 |
| | WAGE | 114 | 0.42 | 5 | 1.98 | 0.98 |

Table 6: Descriptive statistics for residents in capital regions

| Dependent variable | Variable | N | Min | Max | Mean | sd |
|---|-----------|-------|------|-----|-------|-------|
| Non-migration (base group) | EDU | 3,870 | 0 | 22 | 12.77 | 3.45 |
| | MALE | 3,870 | 0 | 1 | 0.61 | 0.48 |
| | HOUSEH | 3,870 | 0 | 1 | 0.59 | 0.49 |
| | AGE | 3,870 | 25 | 81 | 42.15 | 11.11 |
| | MARRIAGE | 3,870 | 0 | 1 | 0.72 | 0.44 |
| | HIGHOCCU | 3,870 | 0 | 1 | 0.29 | 0.45 |
| | INDUSTRY3 | 3,870 | 0 | 1 | 0.67 | 0.46 |
| | WORKTYPE | 3,870 | 0 | 1 | 0.34 | 0.47 |
| | WAGE | 3,870 | 0.08 | 50 | 1.98 | 1.51 |
| Capital regions to non-capital regions (Migration 3) | EDU | 59 | 6 | 20 | 13.86 | 2.86 |
| | MALE | 59 | 0 | 1 | 0.92 | 0.27 |
| | HOUSEH | 59 | 0 | 1 | 0.82 | 0.38 |
| | AGE | 59 | 26 | 68 | 36.24 | 9.38 |
| | MARRIAGE | 59 | 0 | 1 | 0.58 | 0.49 |
| | HIGHOCCU | 59 | 0 | 1 | 0.22 | 0.41 |
| | INDUSTRY3 | 59 | 0 | 1 | 0.44 | 0.50 |
| | WORKTYPE | 59 | 0 | 1 | 0.26 | 0.44 |
| | WAGE | 59 | 0.50 | 5.2 | 2.40 | 1.14 |
| Within capital regions (from Gyeonggi and Incheon to Seoul) (Migration 4) | EDU | 50 | 9 | 18 | 14.13 | 2.28 |
| | MALE | 50 | 0 | 1 | 0.66 | 0.47 |
| | HOUSEH | 50 | 0 | 1 | 0.66 | 0.47 |
| | AGE | 50 | 25 | 71 | 38.87 | 9.70 |
| | MARRIAGE | 50 | 0 | 1 | 1 | 0 |
| | HIGHOCCU | 50 | 0 | 1 | 0.79 | 0.40 |
| | INDUSTRY3 | 50 | 0 | 1 | 0.51 | 0.50 |
| | WORKTYPE | 50 | 0 | 1 | 0.19 | 0.39 |
| | WAGE | 50 | 0.25 | 7 | 2.63 | 1.49 |

in both regions (Table 5 and Table 6). As shown in Table 4, analysis 1 and analysis 2 represent the frequency and percentage of individual's migration during the period 2006-2008, 2008-2010, and 2010-2012. Most of migratory patterns of individuals belong to 'non-migration' in both cases. Table 5 and Table 6 show that individual-level educational attainment as a measure of human capital in migration 2 is highest among four types of migration, followed by migration 4 which is from Gyeonggi and Incheon to Seoul. Therefore, individuals with high level of human capital are likely to migrate to capital regions in this paper. Personal monthly wage also tends to be higher in such capital regions than non-capital regions as shown in Table 5 and Table 6.

4.2 Migration of residents in non-capital regions

The empirical results of analysis of migration in non-capital regions are as shown in Table 7. The case of migration 1, which refers to the migration from one non-capital regions to another non-capital regions, shows that educational attainment (EDU) variable is not statistically significant in this analysis. Instead, householder (HOUSEH), employment status (WORKTYPE), and monthly wage (WAGE)

variables are positive and statistically significant. Moreover, age (AGE), and marital status (MARRIAGE) variables have negative coefficients and statistically significant. This analytical result means that an individual who is a householder, lives alone, younger, a single, a permanent worker and earns higher wage is more likely to migrate to another non-capital regions.

In an analysis of migration 2, the level of educational attainment (EDU) has a significantly positive effect on individual's migration from non-capital regions to capital regions. Such interesting result indicates that well-educated individuals in non-capital regions increase the likelihood of migration to capital regions. Capital regions are often considered as desirable regions with high-quality educational and cultural amenities and various career opportunities for individuals. Thus, the inclination to leave for capital regions seems to be clear for the highly educated who are seeking the best regions for migration to maximize their utility (Ritsilä and Haapanen, 2003). Among the other variables in this model, both AGE variable and MARRIAGE variable have a significantly negative impact on this type of migratory behavior. This result means that if an individual is a highly educated or younger

Table 7: Empirical results of analysis of migration residents in non-capital regions

| Classification | Variable | Coefficient | SE | Wald | Exp(B) |
|--|-------------|-------------|-------|--------|--------|
| Non-migration (base group) | | | | | |
| Migration 1 | | | | | |
| | Constant | -2.304 *** | 0.881 | 6.845 | |
| | EDU | 0.073 | 0.047 | 2.425 | 1.076 |
| | MALE | -0.183 | 0.264 | 0.481 | 0.833 |
| | HOUSEH | 0.637 ** | 0.254 | 6.289 | 1.891 |
| Non-capital regions to another non-capital regions | AGE | -0.063 *** | 0.014 | 21.504 | 0.939 |
| | MARRIAGE | -0.606 *** | 0.216 | 7.839 | 0.546 |
| | HIGHOCCU | -0.312 | 0.253 | 1.521 | 0.732 |
| | INDUSTRY3 | -0.306 | 0.210 | 2.116 | 0.736 |
| | WORKTYPE | 0.461 ** | 0.224 | 4.228 | 1.586 |
| | WAGE | 0.002 ** | 0.001 | 4.925 | 1.002 |
| | Migration 2 | | | | |
| | Constant | -3.832 *** | 1.307 | 8.602 | |
| | EDU | 0.164 ** | 0.073 | 5.083 | 1.178 |
| | MALE | 0.544 | 0.383 | 2.023 | 1.723 |
| | HOUSEH | 0.426 | 0.353 | 1.459 | 1.532 |
| Non-capital regions to capital regions | AGE | -0.073 *** | 0.022 | 10.897 | 0.930 |
| | MARRIAGE | -0.663 ** | 0.324 | 4.176 | 0.516 |
| | HIGHOCCU | 0.306 | 0.318 | 0.928 | 1.358 |
| | INDUSTRY3 | -0.266 | 0.298 | 0.796 | 0.766 |
| | WORKTYPE | -0.052 | 0.360 | 0.020 | 0.950 |
| | WAGE | -0.001 | 0.002 | 0.301 | 0.999 |

Note: * = significant at the 10% level; ** = significant at the 5% level; *** = significant at the 1% level.

or single, the likelihood of migration away from non-capital regions increases.

4.3 Migration of residents in capital regions

The results of the empirical analysis of migration of residents in capital regions are reported in Table 8. In this analysis, the base group is the case of non-migration between two different regions. The variables with a statistically significant coefficient are gender (MALE), householder (HOUSEH), age (AGE), marital status (MARRIAGE) and the tertiary industry (INDUSTRY3). These results show that an individual who is male, a householder, younger, a single, lives alone, or does not engage in tertiary industry is more likely to move from capital regions to non-capital regions.

Another case of migration within capital regions (migration 4), which is from Gyeonggi and Incheon to Seoul capital regions, shows that marriage dummy variable (MARRIAGE) and the occupational dummy variable (HIGHOCCU) have only statistically significant coefficients in explaining migration behavior. The significant coefficient of HIGHOCCU variable indicates that highly skilled labor is more likely to move to Seoul capital region which is one of the most central business hubs of Korea. The analysis of migration 4 sheds light on the relationship between migration and occupational level. According to migration 4, individuals who engage in occupation with high skilled and non-manual are more likely to move from Gyeonggi and Incheon to Seoul capital regions which indicates a densely populated core and a social, economic, and political central hub city of Korea. This result can be understood in the context of the human capital theory as aforementioned in this paper. To maximize personal utility, workers tend to move a better region considered as capital regions, especially Seoul, in terms of provision of higher wage and better job opportunities. This result highlights the

effect of the level of skills on migration based on human capital theory. Thus, the outcomes of variables in migration 3 and 4 are in line with our theoretical assumptions and previous studies on migration.

5.0 Conclusion

This paper examined the relationship between migration and the level of human capital in Korea using the method of multinomial logistic regression. In this study, we consider personal characteristics such as educational attainment and occupations as an indicator of level of human capital of individual. For detailed analysis, we divided migration into two parts of analysis based on the region of origin. Our empirical model analyzed the individual factors at the micro level affecting the likelihood of migration between non-capital regions and capital regions during the each period 2006-2008, 2008-2010 and 2010-2012.

Our empirical finding is that the educational attainment of individual representing a level of human capital significantly affects the migration behavior moving from non-capital regions to capital regions. Furthermore, according to analysis of migration from Gyeonggi and Incheon to Seoul, the migration within capital regions, individuals who engage in occupation with high skilled and non-manual are more likely to move to Seoul capital regions where favorable conditions for workers in terms of higher wage and better job opportunities can provide. Those results can be understood in the context of human capital theory to maximize personal socioeconomic utilities by migrating to capital regions. In addition, the results revealed that some of individual factors that may have influence on migration, such as gender, householder, age, marital status, status of occupation and industry, are also statistically significant coefficient as reported in previous studies.

Table 8: Empirical results of analysis of migration residents in capital regions

| Classification | Variable | Coefficient | SE | Wald | Exp(B) |
|--------------------------------|-----------|-------------|-----|-------|--------|
| Non-migration (base group) | | | | | |
| Migration 3 | | | | | |
| | Constant | -3.712 | *** | 1.330 | 7.788 |
| | EDU | 0.056 | | 0.066 | 0.711 |
| | MALE | 1.362 | ** | 0.548 | 6.170 |
| | HOUSEH | 1.082 | *** | 0.409 | 6.982 |
| Capital regions | AGE | -0.064 | *** | 0.020 | 9.909 |
| to non-capital regions | MARRIAGE | -0.587 | * | 0.331 | 3.143 |
| | HIGHOCCU | -0.451 | | 0.362 | 1.549 |
| | INDUSTRY3 | -0.797 | *** | 0.296 | 7.238 |
| | WORKTYPE | -0.206 | | 0.363 | 0.322 |
| | WAGE | 0.000 | | 0.001 | 0.328 |
| Migration 4 | | | | | |
| | Constant | -4.940 | *** | 1.100 | 20.183 |
| | EDU | 0.037 | | 0.057 | 0.409 |
| | MALE | -0.080 | | 0.338 | 0.056 |
| | HOUSEH | 0.483 | | 0.340 | 2.024 |
| Within capital regions (From | AGE | -0.009 | | 0.016 | 0.328 |
| Gyeonggi and Incheon to Seoul) | MARRIAGE | -0.682 | ** | 0.308 | 4.910 |
| | HIGHOCCU | 0.568 | * | 0.320 | 3.145 |
| | INDUSTRY3 | 0.466 | | 0.351 | 1.763 |
| | WORKTYPE | -0.499 | | 0.372 | 1.801 |
| | WAGE | 0.001 | | 0.000 | 1.922 |

In this paper, we set the regions of origin as well as destination, which are non-capital regions and capital regions, to figure out the effects of the determinants of individual migration such as educational attainment, occupations, etc. Through the empirical analysis, we can obtain more detailed information on the mechanisms of migration between those regions. Furthermore, this paper can contribute to establishing regional policies for regional economic growth as well as regional strategies to lessen the socioeconomic gaps arising from the uneven distribution of population between non-capital regions and capital regions in Korea.

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