

Non-Economic Motivation for International Migration: A Decennial Investigation of Korean Family Migration to the United States¹

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<Abstract>

This study explored the impact of non-economic factors on Korean family migration to the U.S. Using 1990 and 2000 micro-level household data, it challenged the neoclassical theory's assumption that migration maximizes human capital. The findings revealed no significant link between the expected income gap and migration likelihood, suggesting that economic theories alone cannot fully explain Korea-to-U.S. migration. Instead, non-economic factors like network theory and family reunion play a crucial role. While focused on Korean migrants, the study can broaden Asian migration trends to North America and the E.U., emphasizing the need for urban and regional policy related to population and urban growth.

Keywords: International migration, Family migration, non-economic motivation, structural probit model; Heckman selection

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1. Introduction

International migration that contributes to significant demographic, economic, social, political, and cultural shifts in the destination countries plays a pivotal role in urban and regional policy, expediting population growth and urbanization (UN, 2017; Frey, 2025). Understanding international migration requires economic, social, and demographic backgrounds of immigrants due to the spatial and regulatory dimensions that have significantly influenced immigrants' experiences.

While international migration has been rigorously and theoretically discussed (Borjas, 1990; Greenwood and McDowell, 1991; Massey et al., 1994), it remains challenging to find empirical studies that explain why people migrate (Park et al., 2024). In particular, empirical analysis of the Asian-Pacific migration stream has been limited due to data accessibility, despite substantial recent migration from Asia to North America, including flow from South Korea (hereafter Korea) to the U.S.

In response to the dearth of empirical studies of this kind, this study first empirically tested whether neoclassical migration theory can be applied to the Asian-Pacific context for family migration, explaining that the expected income differentials can play a crucial role in affecting an individual's decision to migrate. Because Korea and the U.S. are geographically, culturally, and economically dissimilar, the main finding from the present study may contribute to understanding the migration motivation of people living in different circumstances. This study seeks to answer two questions: Can the traditional neoclassical migration theory explain the migration issues between Korea and the U.S.? If not, which factors, economic or non-economic, play a predominant role in migration decisions? Also, what are the implications of the U.S. migration policy based on the findings?

To reach this goal, the present study 1) combined two pairs of decennial micro-data sets for Korea and the U.S., 2) focused on family migration instead of individual migration, and 3) compared the two results of ‘Korea to the U.S.’ for 1990 and 2000.

This study makes three contributions. First, it empirically tests the applicability of neoclassical migration theory in the Asian-Pacific context by focusing on Korean family migration to the U.S. Second, it demonstrates the role of non-economic factors, such as family reunification and social networks, in shaping migration decisions. Third, by comparing micro-level data from 1990 and 2000, it captures how economic crises and policy shifts influenced migration motivations over time. In doing so, this study enriches existing literature by highlighting that even when traditional economic incentives do not fully explain migration patterns, non-economic factors such as social networks can play a crucial role, ultimately contributing to an improved quality of life. Stronger social ties enhance employment prospects, increase labor force participation by distributing childcare responsibilities, and positively affect children’s educational and economic outcomes, reinforcing the interconnected nature of social and economic migration factors. Methodologically, this study employed the Heckman (1979) model that corrects self-selection bias in family migration decisions and income estimation. By incorporating a structural probit model and using the inverse Mills ratio (IMR) to adjust for selection effects, we ensured that the estimated income differences between migrants and non-migrants are not biased, stemming from unobserved characteristics. This approach remains one of the most widely used methods in empirical research to correct selection bias (Puhani, 2000; Lim et al., 2024) ³.

³ This approach is particularly relevant for empirical migration cases because individual or household selection is likely to influence outcome variables such as income and birth (Koné et al., 2019). Given that migration decisions are often influenced by both observed and unobserved factors, failing to account for selection effects could lead to misleading conclusions about the economic effect of migration decisions. Despite concerns regarding its distributional assumptions (Lee, 2009; Honoré and Hu, 2020; 2024), the Heckman model remains a robust tool for addressing selection bias when exclusion restrictions are difficult to identify, as found in the recent study by Park et al. (2024).

The findings of this study indicate that the expected income gap of Korean families does not significantly influence the decision to migrate to the U.S. This suggests that traditional economic theories, which emphasize economic benefits, may not provide a complete explanation for Korean migration to the U.S. Consequently, the study underscores the significance of non-economic factors such as family reunification and social networks in comprehending migration patterns. While this paper primarily examines these determinants, it is also important to recognize broader cultural and policy contexts including the Korean Wave, urban and regional policy dimensions, and extended discussions on social networks that frame migration experiences. More detailed discussions of these supplementary perspectives are provided in Appendix A.

The remainder of this paper is organized as follows: Section 2 provides an overview of the theoretical framework and its limitations. Section 3 presents the research approach, data sources, and variables employed in this study. Section 4 details the proposed hypotheses. In Section 5, we introduce the structural probit model utilized to analyze the economic effects of international migration decisions. Section 6 offers an analysis of the estimation results accompanied by comprehensive discussions. Section 7 presents robustness checks, and Section 8 concludes the paper by summarizing the findings, implications, and discussions.

2. International Migration: Background and Limitations

The reason for international migration is a fundamental question in international migration theories. Despite their great diversity, all theories may not agree that the increasing income gap between origin and destination countries is the most fundamental factor (Massey et al., 1993; Castles, 2000; Georgiadis and Manning, 2013). This is a so-called neoclassical theory in international migration, which understands that migration decisions are positively correlated with the increased expected

income gap. Migration decisions will be ensured by the increased economic benefits in a designated country, including income, jobs, and quality of life (Borjas, 1990). Other international migration theories, including the new economics of migration, the dual labor market theory, and the world systems theory, understand that international migration stems from the change in economic conditions of where an individual is situated (Massey et al., 1993; Park et al., 2024).

However, non-economic conditions receive much attention in understanding international migration when considering non-equivalent conditions that the origin and destination countries may have. According to the network theory, migrant networks are the sets of interpersonal ties that connect migrants, former migrants, and stayers in both origin and designated countries via kinship, friendship, and shared communities of the country of origin (Massey, 1990a; 1990b; Garip and Asad, 2015). The expansion of networks accelerates international migration because costs and risks resulting from additional migration are reduced, once the number of migrants reaches a critical threshold.

Also, asymmetric information for the migrants in the job market of the destination country underestimates the ability of migrants who work with higher-level skills in their countries of origin (Katz and Stark, 1984; 1987; Stark, 1995; Monteiro, 2022). The wage increases of the higher-level skilled migrants are reduced compared to those of workers with lower-level skills because employees are paid along with their expected productivity in the designated labor markets. Considering many different labor environments, cultures, and languages between origin and destination countries, most highly skilled migrants are not adapted to the designated labor markets. They may seek jobs requiring lower-level skills that they would not have pursued in their countries. Several studies by Borjas (1987, 1994, 1999b, 2000) are consistent with these points. A more

significant relative skill differential in a lower-income country of origin would imply a smaller wage differential in the destination country for higher-level skilled workers.

However, despite the outstanding explanation of lower wage differentials with higher skill differentials, the asymmetric models do not necessarily imply that more skilled workers select migration negatively. This is because migrants may depart their countries of origin for many non-economic reasons, such as family reunions or better welfare policies in a destination country (Mincer, 1978; Chiswick, 1999). However, non-economic international migrants, including tied family members and refugees, generally result in higher unemployment rates and lower incomes than statistically comparable migrants motivated by economic reasons. Further, while some empirical studies have demonstrated that migration increases the welfare status of migrants (Enchautegui, 1997; Meyer, 2000), still other studies have not agreed that migration yields a welfare increase (Walker, 1994; Levine and Zimmerman, 1999). Although there is no unanimous agreement on the benefits of migration for better welfare systems of designated countries, Sana and Massey (2002) showed that the effective pension system of a destination country could be a possible alternative motivation for international migration. Therefore, although many welfare benefits obtained from the destination selected by migrants vary widely among countries, basically, migrants anticipate the accrual of their welfare at the destination country (Greenwood, 1995). This would be manifested in the case of family migration from a developing origin to a developed destination. Benefits afforded by better welfare systems may, in addition to a potentially positive future income gap, induce migration.

The impact of asymmetric information and skill transferability may vary across education levels, creating heterogeneous migration responses to economic incentives. Highly educated migrants often access broader information and anticipate long-term benefits, making them less

sensitive to short-term wage differentials (Chiswick, 1999). By contrast, less educated migrants rely more on observable wage gaps as primary signals of migration benefits. Thus, expected income differences are likely to influence migration decisions differently across educational groups.

Unfortunately, the allowance of international migration for low-skilled or low-educated individuals is minimal. Institutionally or systematically, origin and destination countries limit the stayers from migrating internationally (Greenwood, 1995). These sorted migration policies, particularly those of developing countries to developed countries, restrict free international migration, which is assumed by neoclassical and other economic theories. Also, the ramifications of restricted migration include the ‘brain drain’ from the countries of origin. Therefore, the sorting systems of countries of specific origin must also be considered, even though lower-level individuals may still acquire positive income increases once they migrate.

One of the major problems in investigating international migration is the difficulty of collecting individual-level data. Most migration studies report findings relating to individual-level migration behaviors based on the macro-level data from countries of origin (Greenwood and McDowell, 1991), inducing the ecological inference fallacy, as Robinson (1950) noticed earlier. There have been requests for more attention to Asian countries, such as China, India, Taiwan, and Korea, as these countries have been prominent sending countries during the 21st century (Massey et al., 1994; Massey, 1999; Lin, 2013; Borjas, 2019), preparing micro-level data sets for Asian countries, and a hosting country is a substantial base to analyze the current migration pattern.

The tremendous geographic and cultural separation between developed countries may also be a key factor affecting migratory behaviors because distance indicates moving costs, and the skill characteristics of migrants are dominant determinants of migratory behavior (Rosenzweig,

1995). The expected income gap is a key factor in deciding international migration between countries with similar economic and cultural circumstances using migration cases between Canada and the U.S. empirically demonstrated (Park et al., 2024), but it is still rare to find an empirical study that shows a similar result for countries between the E.U. member states or other cases. However, another important topic in an era of globalization is to understand why an individual migrates; although excellent geographic and cultural separation exists, do they decide on international migration because of the increased expected income? This study focused on the latter case with a decennial example of Korean migrants to the U.S.

Furthermore, while many empirical analyses have been conducted for individual-level migration, there has been a scarcity of studies focusing on family-level international migration. The influence of economic factors on international migration decisions, concentrating on individual-level migration recently been explored (Park et al., 2024). Their study, utilizing selectivity-corrected returns on immigrant and non-immigrant characteristics in the U.S. and Canada, unveiled a significant positive association between the expected income gap and migration decisions. Despite data collection challenges, their research offered valuable insights into migrants' economic motivations, particularly in countries with similar labor environments and cultural backgrounds. However, their analysis was confined to individual migration, excluding other forms, such as family migration.

Studies examining family-level international migration using empirical data are rare despite the significant impact of familial relationships on migratory decision-making (Cromartie and Stack, 1989; Johnson and Roseman, 1990; Lee and Roseman, 1997; Lee and Zhee, 2001; Roseman and Lee, 2004; Ferrie and Hatton, 2015; Campbell, 2019). If a family group that includes school children or multiple workers who might have lost their jobs after migration decides to

migrate, the assessment that the family should make becomes more complex. This study aimed to empirically analyze international migration at the family level.

3. Research Approach, Data Sources, and Variables

3.1. Research Approach and Data Sources

In this study, we define “Korean family migration” as household-level migration in which the household head and dependents (e.g., spouse, children, or other co-residing members) jointly relocate from Korea to the U.S. This approach distinguishes family migration from individual migration, such as temporary student or labor migration, and allows us to analyze decision-making at the household level.

To achieve this, we use data from the 1990 and 2000 U.S. Public Use Microdata Samples (PUMS A, 5 percent) and the 1989 and 2000 Korean Annual Report on Urban Household Income and Expenditure Survey (ARHIES). The rationale for using household data from 1990 and 2000 is threefold. First, after 2000, there has been a shift in the pattern of Korean migration, with a notable increase in non-economic reasons over economic gains. Specifically, to verify this, analysis of data from the U.S. National Survey of College Graduates (NSCG) provided by the National Science Foundation (see the source at <https://nces.nsf.gov/surveys/national-survey-college-graduates/2021>) reveals that Korean migrants increasingly cite 'educational opportunities' and 'family reasons' rather than 'job or economic reasons' for their migration decision (Figure 1 (a)). Therefore, analyzing the data from 1990 and 2000 with a focus on economic reasons is meaningful in assessing the validity of neoclassical economic theories.

Korea's rapid development over the last few decades suggests that long-term investigations

into international migration decisions may have broader applications, extending to migration cases between Asian countries and the U.S., as well as other Korean migration scenarios. Analyzing the years 1990 and 2000 is pivotal because these periods align with substantial economic shifts and social progressions in Korea. By comprehending the influence of these changes on migration decisions, this study can glean insights into the broader ramifications of migration patterns and policies domestically within Korea and internationally between Korea and other nations.

Figure 1 here

Second, between 1986 and 1999, there was a significant increase in the number of migrants in the U.S., primarily due to the expansion of the H-1B visa cap to accommodate more skilled workers. The U.S. underwent various changes in migration policies, which affected immigrant numbers from multiple countries. In 1986, the U.S. Congress passed the Migration Reform and Control Act, allowing migrants to gain legal status under specific conditions. The shortage of skilled labor, particularly in Information and Communications Technology (ICT), sparked debates in the U.S. as the supply of Science and Engineering (S&E) professionals was deemed insufficient (North, 1995; Teitelbaum, 2003). An increased skilled labor force was expected to contribute to economic growth (Borjas, 2019). To work legally in the U.S., foreign-born individuals must hold student or work visas, be lawful permanent residents (LPRs), or be citizens. The H-1B work visa, primarily targeting S&E professionals, saw its annual cap raised by Congress in 1999 to accommodate more skilled migrants. After quickly reaching the new cap, Congress further increased it in 2001, a level not reached until 2003. In 2004, the cap was returned to its pre-1999 level. Consequently, the number of migrants, including high-skilled individuals, in the U.S. soared after 1986 and 1999. Borjas (2019) noted a very high net migration rate between 1990 and 2000. The H-1B program increased STEM workers in the job sector, consequently increasing college

graduates' wages (Peri et al., 2015). Therefore, analyzing 1990 and 2000, characterized by significant migration growth, can provide meaningful insights.

Finally, economic shocks, such as the 1997 financial crisis in Korea, likely led to increased migration to the U.S. When financial crises occur, potential migrants often choose their destination based on regional economic conditions. For instance, during the Peso crisis in Mexico in 1995, many Mexicans considered the economic situation and migrated to the U.S. between 1990 and 2000 (Monas, 2020). Similarly, the 1997 financial crisis likely caused a significant net inflow of Korean migrants to the U.S. due to the economic shock within Korea. Examining the GDP growth rates, Korea experienced a sharp decline in 1997, and the GDP growth rate gap between Korea and the U.S. indicated that the U.S. had better local economic conditions. In summary, the changes in Korean migration patterns, the shifts in U.S. H-1B visa policies for foreign migrants, and Korea's financial crisis provide valid reasons to analyze the data of the years 1990 and 2000.

3.2. Data Processing Procedures and Independent Variables

Although there are Korean census data sets similar to those of the U.S., the Korean data sets are not used for this study because they do not include income variables. Household data are also gathered to analyze family migration from Korea to the U.S. The data processing for this study proceeds as follows.

3.2.1. Data Processing Procedures

Table 1 suggests the detailed procedures for data management to be applied for the structural probit model. The final data set for the decennial cases is prepared via the following three steps: random sampling, filtering, and restriction of the migration period. First, the random sampling

process is conducted for non-migrants to reduce the large group effect because the number of non-migrants is more significant than that of migrants. Second, filtering with several constraints refines the data. While it is recommended to estimate permanent income for income equations, because there are no properly similar variables for the estimation, we only apply the current incomes for Korea and the U.S. Finally, the migration period is restricted up to 15 years and highlighted in Table 1; the restriction of migration period can contribute to avoiding the predetermination that some variables may have in their characteristics.

Table 1 here

Household incomes are adjusted using PPP indices and regional CPI values to ensure comparability between countries and regions. Non-salary household incomes in Korea are estimated based on business expenditure ratios. The diverse household variables are selected based on migration theories and previous migration studies as suggested in Table 2. Because the present study requires two econometric equations, those variables are correspondingly classified into two categories used for income (Inc.) and migration (Mig.) equations. The analysis is conducted at the household level, and individual-level attributes such as age and gender are measured for the household head. This specification allows us to incorporate the characteristics of the household head while keeping the decision-making unit as the family. Although the datasets do not include direct measures of non-economic factors such as social networks or cultural integration, adopting the household as the unit of analysis enables us to partially capture family-based motivations beyond individual wage considerations. We include some cost variables such as family size (SIZE), entry-age (H_{AGE}), and its squared value (H_{AGE}^2) in the migration equation category. The following paragraphs provide further detailed explanations of why these variables are selected.

Table 2 here

3.2.2. Independent Variables

Age and gender variables are important for migration decisions and family income because they represent demographic characteristics that are usually not affected by the socioeconomic context in which people are involved. For example, because age represents the life cycle effect (Long, 1988), as people get older, their benefits stemming from migration become smaller (Robinson and Tomes, 1982; Molho, 1986; Islam, 1985; Islam and Choudhury, 1990; Newbold, 1996; Lee and Roseman, 1999; Lee et al., 2005). Hence, it is expected that the age variable (*AGE*) for Korean householders is positively associated with migration decisions, while its squared variable divided by 100 (AGE^2) is negatively correlated with the decision. These age variables are also applied to income estimation. Given other characteristics are controlled, males (*MALE*) may be more likely to move to the U.S. than females (Stark and Taylor, 1989). Also, on average, males earn more than females (Jones and Kodras, 1990; Ha and Lee, 2001), although fewer males in Korea want to move to the U.S. if more job opportunities are ensured in Korea due to cultural circumstances.

Generally, people invest in themselves through the accumulation of education and achieve highly skilled labor through occupation experiences; both education duration and occupation experiences not only influence the likelihood of migration that people may decide but also affect the economic income they may earn. Koreans usually acquire basic information on the U.S. primarily via mass media or informal, private connections such as family, friends and acquaintances. However, higher education can provide a more substantive opportunity to obtain information on the U.S., increase the likelihood of migration, and expect a higher income. As

Greenwood (1975) and Krieg (1993) argue earlier, long-distance migration may not matter for higher educated people because migration may increase the opportunity to earn more. Therefore, higher-educated Korean householders may be more likely to decide to migrate to the U.S. than less-educated Koreans. We code the education level as dummy variables (*SECONDARY*, *TERTIARY*, and *OTERS*) in the income equations and linear variables (*EDU* and *EDU*²) in the migration equation. In income equations, it is critical to measure the *sheepskin effects* on the economic achievements of migrants (Jaeger and Page, 1996; Myers and Lee, 1998), which can be measured by the dummy treatment. By sheepskin effects, we refer to the disproportionate increase in economic returns that occurs when individuals obtain a formal degree, such as a high school diploma or bachelor's degree, beyond the effect of additional years of schooling alone (Hungerford and Solon, 1987). In the migration context, this distinction matters because households may make decisions differently when the head possesses a recognized credential rather than nearly the same years of education without a degree.

Also, we categorize three occupation groups (*H_OCCUP1*, *H_OCCUP2*, and *H_OCCUP0*) based on the occupation of Korean householders; Generally, those who have professional/managerial jobs may have a higher potential to economically succeed than those who are engaged in non-white collar occupations (Alba and Logan, 1992). Still, consideration is necessary to determine whether or not the job status in Korea can be transferable to the U.S. job market. Therefore, high economic status in Korea is associated with variables such as net personal income, educational attainment, and job reputation, but the decision to move to the U.S. may depend upon the specific context in which each family is situated, requiring the consideration of the economic status of each Korean family.

Another key factor affecting migration decisions is family size because the increased

responsibility to elderly parents, school-aged children, and spouses working in the origin country is an expense of migration, and hence, may decrease the possibility of migration (Robinson and Tomes, 1982; Islam, 1985; Islam and Choudhury, 1990; Newbold, 1996; Axelsson and Westerlund, 1998; Lee and Roseman, 1999). It should be noted that because we restrict the age to 23 years or more and the migration period to 15 years or less, new-born family members after being moved to the U.S. are not included in the family size of Korean migrants. Hence, the family size variable is not included in the income equations.

Entry age (H_{AGE}) and its square divided by 100 (H_{AGE}^2) variables are associated with the cost of migration, demonstrating the migration propensity decreases with a marginal increase as age at entering the U.S. increases and significantly affecting migration decisions to the U.S. other than characteristics that migrants report when they arrive (Silva, 1997). Because most Korean males in Korea must mandatorily participate in military service for three years, their entry age will exceed that of the females by three years. However, due to the restriction of the migration period to 15 years, the entry-age variables are not entirely regarded in the U.S. job market; so, we do not include the variables in the income equations.

4. Research Hypothesis

Based on the international migration background and its limitations investigated in Introduction, this study tests the assumption of neoclassical theory to understand whether the economic conditions of Koreans affect the decision to migrate to the U.S. According to neoclassical theory if a Korean family expects a considerable increase in its total income after arriving in the U.S. compared to its total income without migration, the family accepts the future expected gain as a critical criterion in the decision to migrate.

However, two issues exist in the empirical application of the neoclassical theory to this study.

First, there is a self-selection problem in the data, which means that the increased income gap of the Korean family cannot be observed once they move. Hence, their economic advancement needs to be appropriately estimated. Second, the more fundamental question regarding applying traditional neoclassical migration theory is addressed. Although many other migration theories have explained the motivation for international migration in terms of non-economic factors, which are entirely different from traditional neoclassical theory, empirical studies are rarely reported. Even in a globalized world, a potential immigrant in their origin country, where significant differences from the destination country exist in language, cultural background, race, economic development, geographical distance, and so on, may find it challenging to obtain an entry visa. Similarly, other non-economic factors may significantly affect migration decisions, resulting in inconsistencies with neoclassical migration theory. Therefore, this study first accepts the assumption of neoclassical migration theory, which has been widely tested in migration models. After correcting the self-selectivity problem of various characteristics for migrants and non-migrants, the corrected incomes of migrants had they stayed, and non-migrants, if they had migrated, may affect their migration decisions.

Because the neoclassical migration theory assumes economic rationality, the research hypothesis that Koreans depend on their positive economic expectations to drive their increased migration decisions to the U.S. is suggested in equation (1).

$$\frac{\partial PM}{\partial IG} > 0 \quad (1)$$

Where PM refers to the probability of migration to the U.S. and IG refers to the difference in the present value of future incomes in Korea and the U.S.

The hypothesis defined in equation (1), as investigated in many empirical studies of interstate or domestic migration, would apply to the case where two countries have similar conditions to

domestic migration, with low migration costs such as a common language, a similar culture, short distance to move, 'free entry' visa status, and so on. However, can the traditional neoclassical migration theory apply to Korea's migration case to the U.S.?

Furthermore, while economic factors do play a role in migration decisions, their effects may differ among various educational groups. As discussed in Section 2 regarding the differences in information access and decision-making processes, we anticipate that highly educated Korean families will be less sensitive to expected income disparities compared to those with lower education levels. This is because they may prioritize non-economic factors, such as the quality of institutions and educational opportunities, which are not immediately reflected in income comparisons.

As described above, the significant differences between the two countries are more commonly observed. Hence, the decision of the Korean people to migrate to the U.S. may not align with the research hypothesis of neoclassical theory suggested in equation (1).

Based on critical differences between Korea and the U.S., several factors can help explain why the research hypothesis of equation (1) may not be sustained. First, better welfare systems or living conditions, as opposed to having more job opportunities in the U.S., may attract Koreans more. In the 1990s, Korea's welfare infrastructure was still underdeveloped, characterized by weak social safety nets and limited labor protections (Piper and Rother, 2022). In contrast, the United States provided institutionalized benefits such as pensions, healthcare, and educational opportunities for children. These disparities indicate that welfare and living conditions, rather than wage differentials alone, played a crucial role in migration decisions. Furthermore, migration research demonstrates that unequal access to education, healthcare services, and social protection significantly influences migration patterns beyond just income disparities (Mazzilli, Hagen-Zanker,

and Leon-Himmelstine, 2024).

Second, the migration policy of the destination affects the choice of migration. For example, because the U.S. adopted the migration policy on family reunification in 1965 and Korean people think the family's kinship is one of the most important values in their lives, kinship may effectively motivate migration from Korea to the U.S., regardless of the positive income gap. In fact, the U.S. immigration system allocates the largest share of green cards to family-based categories, reinforcing the role of kinship in migration decisions (Gelatt, 2024). This aligns with Korea's strong cultural emphasis on familial obligations, where social expectations often outweigh economic incentives (Kim and Okazaki, 2020). While family-based migration is common globally, the Korean case stands out for the degree to which kinship norms shape migration choices, even when income prospects are modest (Bendixsen and Näre, 2023).

Third, asymmetric information on Korean migrants in a designated job market, especially due to the difference in language and culture, may lead them to obtain lower incomes than the incomes they would have expected (Chiswick, 1991; Carnevale, Fry and Lowell, 2001; Alberto and Mora, 2016). Finally, the entry visas requested by the U.S. government may hinder Koreans, who have relatively lower-level socioeconomic conditions and wish to move to the U.S., from entering the U.S., even if those Koreans expect relatively large positive income gaps.

Unfortunately, because it is not possible to directly test these conditions, and indeed, family migration from Korea to the U.S. is likely to be explained by these non-economic conditions (Noland, 2003; Young, 2003), the research hypothesis suggested in equation (1) is tested and expected not to be retained. Furthermore, as explained in detail in the next section, the hypothesis in equation (1) is not directly tested from the reduced-form probit model; it is necessary to recompute the *IG* variable using optimally estimated coefficients via the reduced-form model. The

following section describes the method applied in this study.

5. Structural Probit Model

Self-selection and MLE models

According to the neoclassical theory, we test if a Korean immigrant would decide on family migration when the present value of future income in the U.S. is more significant than that in Korea, considering the maximization of the present value of the future income over his lifetime (Borjas, 1990). To do this, let E_{ij} be a lifetime income of individual i ($i = 1, \dots, N$) in origin place ($j = \text{Korea}$) and destination place ($j = \text{U.S.}$) (E_{iK} or E_{iU}). If a Korean considers additional costs stemming from traveling, lifestyle maintenance, adaptation, and the psychological damages to becoming accustomed to new language, culture, labor market, and human relationships, the present value of the migration costs from Korea to the U.S. which is defined as C_i may negatively affect migration decisions. The individual premium refers to income gaps, $E_{iU} - E_{iK}$. The individual will decide to migrate if the premium is greater than the migration cost. That is, the net benefits from migration are greater than zero. Therefore, migration decisions (Y_i) depend on equation (2).

$$Y_i = E_{iU} - E_{iK} - C_i > 0 \quad (2)$$

With a log-transformation and the unchanged incomes in equation (2), migration decisions criterion can be rewritten as:

$$Y_i \equiv \ln \left(\frac{E_{iU}}{E_{iK}(1 + P_i)} \right) \quad (3)$$

$$\approx \ln E_{iU} - \ln E_{iK} - P_i \quad (4)$$

where Y_i refers to migration decisions criterion, $P_i = \frac{C_i}{E_{iK}}$, and $\ln(1 + P_i) \approx P_i$, which is a first-order approximation of $\ln(1 + P_i)$, which is substituted for conveniently using the function form and for theoretically justifying the moving costs of migration to be in proportion to income (Robinson and Tomes, 1982).

One serious problem in the reduced equation (4) is that the income and the cost are not simultaneously observed by each Korean. This is because the income available in the U.S. is only observed for Koreans who have already chosen to move to the U.S., and the income available in Korea is only observed for Koreans who have stayed in Korea. Therefore, any direct income for migrants that a Korean i would have earned had he stayed or any direct income for non-migrants that a Korean i would have earned had he moved, cannot be simultaneously acquired. This requires addressing the selection problem for an adjusted procedure.

To do this, based on Heckman's (1979) technique, the first step is to set a semi-logarithmic form of each income regression to be consistent with equation (4). In equation (5), the simple OLS equation shows the income regression for migrants and non-migrants.

$$\ln E_{iK} = X_{iK}\beta_K + u_{iK}, \quad u_{iK} \sim N(0, \sigma_K) \quad (5)$$

where X_{iK} refers to independent variables to determine E_{iK} for an individual i ($i=1, \dots, N$), β_K indicates a vector of coefficients representing the characteristics of Korean migrants if $j = \text{Korea}$ or the non-migrants if $j = \text{U.S.}$, and u_{iK} represents the unobserved effects that are not specified in the variables vector X_{iK} , indicating the specific resources only available in Korea and the U.S. In addition, P_i in equation (4) could be estimated by equation (6).

$$P_i = Z_i\gamma + \varepsilon_i, \quad \varepsilon_i \sim N(0, \sigma_\varepsilon) \quad (6)$$

where Z_i refers to the vector of estimated cost variables of migration, γ represents the vector of coefficients of variable Z_i , and ε_i refers to the net costs of all other unobserved variables in Z_i .

In equation (5), unfortunately, because of omitted observation in each place σ_{UK} , which is the covariance of the samples in the two countries, such as σ_U and σ_K , could not be estimated despite the non-zero assumption for it (Green, 1995: 638). Therefore, we could not adjust the regression model using only equations (5) and (6). The omitted observations resulting from the self-selection to migration decisions may endogenously affect estimating individual incomes for each place (Nakosteen and Zimmer, 1982). The selectivity biases are inherent in equation (4), and the equation can be rewritten as,

$$E[\ln E_{iK} | X_{iK}, Y_i > 0] = X_{iK}\beta_K + E[u_{iK} | Y_i > 0] \quad (7)$$

The self-selectivity in migration decisions generally makes $E[u_{iK} | Y_i > 0]$ non-zero, producing biased estimators when applying the simple OLS approach.

The next step is to introduce a reduced form of probit model for migration decisions, and the parameters in income equation (4) are estimated with the correction of self-selectivity using the covariance and correlation. Let the ρ_U be the correction from the process of Appendix A.1. The income equations of Korean migrants and non-migrants are corrected as,

$$E[\ln E_{iU} | X_{iU}, Y_i > 0] = X_{iU}\beta_U + (\sigma_U\rho_U)\lambda_{iU} \quad (8)$$

$$E[\ln E_{iK} | X_{iK}, Y_i \leq 0] = X_{iK}\beta_K + (\sigma_K\rho_K)\lambda_{iK} \quad (9)$$

where the inverse Mill's Ratio (hereafter IMR) for migrants, $\lambda_{iU} = \left[\frac{\phi(\Omega, \tau)}{\Phi(\Omega, \tau)} \right] > 0$, and non-migrants $\lambda_{iK} = \left[\frac{\phi(\Omega, \tau)}{\Phi(\Omega, \tau)} \right] < 0$, and see Appendix A.1. for the detail process. Therefore, we can rewrite the income equation using the equations (8) and (9) as,

$$\ln E_{ij} = X_{ij}\beta_j + (\sigma_j\rho_j)\lambda_{ij} + \Gamma_{ij} \quad (10)$$

where $j = \text{Korea or U.S.}$ Regarding the distributions of Γ_{iK} and Γ_{iU} , the mean of $\bar{\Gamma}$ is still zero, but the $\bar{\Gamma}$ will have heteroscedasticity in variance because of the self-selection in migration. Furthermore, the λ_{ij} values in both income equations are unknown, and then by the definition of λ_{ij} (see Appendix A.1), we can calculate the IMR. However, since the estimators via Heckman's suggestion are not fully efficient despite their consistency, the Maximum Likelihood estimation (MLE) method can be applied to ensure efficiency. Based on the starting values obtained from Heckman's approach, we can re-estimate new income coefficients and IMR.

Income Gaps

To estimate the income gap variable, we introduce another probit model. This is done to test the research hypothesis that the income gap directly affects the decision to migrate to the U.S. Thus, the income gap ($\widehat{IG}_i$) could be written as,

$$\widehat{IG}_i = \ln \widehat{E}_{iU} - \ln \widehat{E}_{iK} \quad (11)$$

Based on equation (11), if the coefficient of ($\widehat{IG}_i$) is significantly positive, the research hypothesis will be accepted, indicating that the neoclassical economic theory in international migration does

not hold for the case of 'Korea to the U.S.' if the coefficient is insignificant or significantly negative. The test results are reported in the last column of each result table.

6. Results

Tables 4 and 5 suggest two regression results for Korea to the U.S. cases. Each table includes a reduced-form probit model, an OLS model correcting the self-selectivity of movers and stayers, migration choice and income models re-estimated by the MLE method, and a new probit model with the income difference. Also, we simulate how the expected income difference affects the probability of migration to the U.S. along with the education level change in Figure 2.

Regarding the interpretation with the selectivity terms, Table 3 summarizes the direction of the coefficients of $\hat{\lambda}_i$'s. Because the selectivity variables are calculated to correct the migration selection in the income equations, the significance of the coefficients implies the existence of heteroscedasticity in the income equations and the $\hat{\lambda}_i$ variable should be included to correct the selectivity bias, instead of analyzing only with the reduced-form probit model. Further, the direction implies how the invisible characteristics related to deciding migration affect the invisible characteristics of each family's income. For example, in the case that the coefficients of $\hat{\lambda}_{iU} > 0$, the Korean migrants who moved to the U.S. could earn more, *ceteris paribus*, in the U.S. than they would have earned in Korea if they had not migrated. If the coefficient of the $\hat{\lambda}_{iK} < 0$, *ceteris paribus*, the non-migrants could earn more in Korea than the income they could have earned in the U.S. if they had moved, because the $\hat{\lambda}_{iK}$ variable itself, as suggested in equations (10), already includes the negative direction.

Table 3 here

Based on the general direction discussed in Table 3, the estimated coefficients of $\hat{\lambda}_i$'s which are all statistically significant are suggested in Table 4. In the 1990 'Korea to the U.S.' case, *ceteris paribus*, migrants would earn more in the U.S. than they would have earned in Korea had they not moved, because of the positive coefficient of the $\hat{\lambda}_{iU}$. The strategy of Korean migrants satisfies their decision in terms of economic benefit. However, the estimated coefficient of the non-migrants, $\hat{\lambda}_{iK}$, is positive, indicating, *ceteris paribus*, the non-migrants would earn less in Korea than they would have earned had they migrated to the U.S. Based on the two estimated coefficients in the 1990 case, it implies that invisible characteristics of residents staying in Korea may be more attractive in the U.S. job market in 1990.

Contrary to the 1990 results, the selectivity variable for non-migrants in the 2000 case has a significantly negative coefficient, while that for migrants shows the same direction. This implies that the advanced economic development of Korea may be attractive for the Korean family to stay in Korea, because the invisible abilities of non-migrants in 1990 were attractive in the U.S., but at the turn in 2000, the abilities are also transferable to and useful within Korea. Therefore, the 2000 case suggests that the economic market of Korea is developed enough to support the non-migrant's incomes, and thus, international migration from Korea to the U.S. needs to be explained by other migration theories than the traditional neoclassical economic theory in migration.

Table 4 here

Tables 5 and 6 explain the regression results of 1990 and 2000 Korean migration cases respectively. In the income equations, instead of using individual income, the household income variable is used as the dependent variable. While all directions between the reduced form probit model and the new probit model with the income gap variable for the cases are the same, both models are not statistically different because the model-fit statistics of χ^2 's measured by negative twice Log Likelihood (-2LL) from the MLE approach are less than the critical value of 6.635 that the $\chi^2_{(1)}$ has. Consistently, the pseudo R^2 in the latter model is similar to the former model. This implies that, at least to Koreans, the income gap is not systematically affecting their migration decisions to the U.S. and other factors which are not specified in the migration equation need to be considered.

More specifically, in the corrected income equations in the MLE columns of the tables, most variables show the same direction of the estimated coefficients as expected. However, because educational achievement acquired in Korea is not directly transferable to the U.S. labor market and Koreans are more likely to be self-employed, the estimated coefficients of education variables may not be significant in the income equation for Korean migrants. Also, the gender variable is significant in the income equations, and it is especially meaningful considering that other types of economic variables do not significantly affect the income of migrants in 2000. Further, this indicates that Korean migrants who moved to the U.S. and are employed in jobs other than professional or self-employed reached a similar income level to those jobs.

Also, most variables in the migration equation show the exact directions as expected: age variables are significant with positive and negative directions, respectively; the coefficient of gender is negative, implying that even though the U.S. labor market is more attractive and open to all job seekers than Korea, many implicit obstacles such as language and culture differences, job

equity, race discrimination, and so on, could make Korean males less likely to migrate permanently to the U.S. than Korean females.

While macro-level explanations, such as cultural norms and structural inequalities, are certainly important, it is equally crucial to examine mechanisms at the household level, which serves as the unit of analysis in this study. Given that the data are derived from household heads, gender differences may also stem from household dynamics, including the gendered division of labor, varying participation in the labor market between male and female heads, and the distribution of caregiving and income-generating responsibilities within families. These individual and household-level mechanisms offer a more coherent interpretation of the gender coefficient and help align the data structure with the underlying theoretical framework.

The coefficients of total school years of the householder are not significant for the 1990 case, but they are for the 2000 case. It is difficult to argue whether or not the education acquired in Korea is necessarily relevant to migration to the U.S. in 1990, however, after ten years when Korea achieved great economic development despite the 1997 financial crisis, which can be found in Table 1, which compares the average income of non-migrants and that of migrants in 2000 where the former is higher than the latter. The estimated coefficients of the schooling variables in the 2000 case indicate that the more educated, the greater the likelihood of immigrating to the U.S. with decreasing marginal propensity. For both 1990 and 2000 cases, the professional-level householders are more likely to migrate to the U.S. probably because they may secure professional-level jobs in the U.S., and the U.S. migration policy provides lower barriers to the skilled professional migrants. Interestingly, the estimated coefficient of the self-employer variable is positive. This may stem from the occupation characteristic, which may not be pre-determined in Korea despite the restricted migration period to 15 years; many self-employed Koreans had not

been involved in the same job category before their migration. However, the job choice of self-employment is not unusual to Korean migrants because it does not require high levels of education and skill to succeed and a transferable duration to prove they have equivalent capabilities to other workers in the U.S. job market but ensures higher income than other reputed jobs.

The coefficient of the household size is negatively significant to the migration decisions of Korean people, as expected. Also, the coefficients of entry age and its square value are significant. These results of the household size and entry age variables satisfy the migration cases and theories discussed earlier. However, the coefficient of household size in 2000 showed a result that was opposite to the previous case. This can be explained at least with the following reasons: First, the birth control policy in Korea which had restricted family size for more than 30 years made the family nuclearized, contributing to the decrease in the family size. It allowed more families to migrate in 2000 than in 1990. Second, migration to the U.S. may stem from the unsatisfactory welfare and educational systems of Korea, which could greatly increase the migration of 2000, even though the family size increases, because their augmented demands associated with economic development can be satisfied through migration. Finally, the financial crisis in Korea may accelerate international migration to other Western countries, including the U.S., regardless of family size.

Tables 5 & 6 here

The results of the probit model with the income gap variable can confirm the above implications. In the 1990 case, the estimated coefficient of the income gap variable is negatively significant to migration decisions at the ten percent level, demonstrating that the expected income

gap negatively affects migration decisions to move from Korea to the U.S. This result cannot accept the research hypothesis that the neoclassical migration theory traditionally assumed. However, the result is not nonsensical and further provides an important empirical example in international migration research because it requires many other international migration theories. As discussed in the research hypothesis section, a family likely to migrate from a developing country (i.e., Korea) to a developed country (i.e., the U.S.) where different socioeconomic backgrounds and great geographic travels exist, requires something beyond just a positive expected income gap, such as more freedom, certainly improved welfare, better developed educational system, and family ties.

These findings closely align with the theoretical perspectives previously outlined. The limited influence of income differentials suggests that economic incentives alone cannot adequately account for Korean migration to the U.S. Rather, family-related factors and kinship networks play a pivotal role. Opportunities for family reunification and established migrant networks furnish vital information, lower migration costs, and foster obligations that shape household-level decisions (Thenmozhi and Mohan, 2024; Tilland, 2017). This connection between the empirical results and the theoretical framework emphasizes that non-economic factors are not merely peripheral but essential for understanding the migration patterns evident in this study.

The direction of the estimated coefficient for the 2000 case is not different, although it is insignificant, as shown in Table 7; this indicates that the research hypothesis still cannot be held, which is consistent with the result of the 1990 case.

Table 7 here

The research hypothesis is suggested with a new set of migration propensity, education, and

income variables, using the regressed results in Tables 5 and 6. While education positively correlates with migration propensity and income, in general (Lee and Roseman, 1997; 1999; Lee and Zhee, 2001; Park and Lee, 2011), the two cases in this simulation (see Figure 2) showed different results from the general relationship. These results are consistent with our theoretical expectation that highly educated migrants are less sensitive to income differentials, as discussed in Sections 2 and 4. The migration propensity to the U.S. by Korean people in both cases is positively associated with education; their migration tendency is low at the high school level, but it became higher as their educational level increased. However, the expected income difference decreases as the educational level increases. Apparently, these two graphs explain why the income gap variable in the probit model with the income gap is negatively associated with migration decisions for Koreans.

The positive correlation between migration propensity and education level can be understood by the more educated Korean people having better access, whether formal or informal, to the information on the U.S., making the expedition of their migration process easier than that for the less educated. Also, highly educated Korean people may place more emphasis on other benefits from the migration to the U.S., such as a better welfare system or more freedom, than the higher expected incomes they may obtain in the U.S. Therefore, the higher expected income is not the sole variable affecting the migration behavior that the highly educated Koreans may have. Especially for family migrants, the greater the opportunity to access an advanced educational system, the more it can offset the loss of the expected income. Further, the positive correlation may be affected by the migration policies of the U.S.; the migration policies may be positively associated with the probability of migration for the more educated. For example, some Korean residents may be inherently restricted from moving to the U.S. because of the discriminatory

migration laws of the U.S., which require extensive documents from individuals who consider migration and implicitly hinder them from accessing the migration information and process. Also, the entry visas requested by low-skilled workers are more often rejected than by high-skilled workers in Korea. In addition, through the H-1B visa policy, opportunities were provided for high-skilled migrants to work in the U.S., creating conditions for the more educated to enter.

Asymmetric information and language barriers may also influence migration propensity. According to the asymmetric information theory, high-skilled migrants, especially from a developing country to a developed country, are generally hired at lower wages until their true levels of capability are revealed (Katz and Stark, 1987). Similarly, Borjas (1999a) empirically demonstrated, using the 1977-1998 Current Population Surveys (CPS) data, that wage inequality may substantially widen in a salary system, but the income distribution of the self-employment sector is relatively stable between the high- and low-educated people. Furthermore, because the minimum wage of the U.S. sizably exceeded that of Korea, even the less-educated Korean people, once they migrated, could achieve a better economic status than in Korea. Especially, highly educated Korean migrants who cannot speak English fluently, are more likely to get a job in the lower-wage industry sectors in the U.S. than in Korea because their true labor skills are not presently revealed. The difference in culture, language, and socioeconomic structures hinders Korean migrants from acquiring the proper level of job positions and income levels when compared to the corresponding domestic workers. The decreasing pattern of income gap graphs as the education level of the household increases is the highlight that we have analyzed for those migration cases of 'Korea to the U.S.'

Figure 2 here

7. Robustness Check

Relying solely on economic expectations, as assumed in the neoclassical theory, can lead to overlooking other important reasons, such as social or personal motivations, in migration decisions. To ensure robust results, the previously used NSCG data was utilized to analyze the most and second most important motivation for immigrating to the United States (Figures 1 (a) (b)). Figure 1 (a) indicates that when Koreans migrate to the U.S., non-economic reasons prevail over economic gains. Specifically, non-economic reasons, particularly educational opportunities and family-related factors, outweigh economic motives. In 2003, education opportunities accounted for 41%, while family-related reasons accounted for 34%. Subsequently, it is evident that non-economic reasons have remained higher than economic reasons up to the present.

Figure 1 (b) examines the second most important reason among migrants who cited non-economic reasons as their primary motivation for migration. The analysis revealed that economic reasons were cited more frequently as the second most important reason compared to non-economic reasons. The primary motivation for migration is not financial. Additionally, the decline in the importance of economic reasons since 2003 indicates a rising trend in non-economic motivations. Therefore, the neoclassical economic theory does not hold when examining motivations using different data, demonstrating the robustness of the results presented in this paper.

8. Conclusions and Discussion

This study tried to empirically explain how non-economic factors can affect the decision of international migration based on a decennial investigation of Korean family migration to the U.S. Because of limitation in using proper variables to test the non-economic factors, we tested whether or not the decision of migration from Korea to the U.S. corresponds to an appropriate level of

economic consequence without any disparity; Neoclassical microeconomic theory, which explains that migration is a way to maximize human capital, is empirically tested based on 1990 and 2000 micro-level household data for Korea and the U.S. For the international migration study, collecting well-organized data sets from origin and destination countries is necessary because they should all be used for an advanced econometric model that corrects the self-selectivity for migrants and non-migrants. This study prepared and managed the U.S. Census and ARHIES data of Korea for 1990 and 2000. Analyzing data from 1990 to 2000 is justified due to shifts in Korean migration trends, changes in U.S. H-1B visa policies for foreign migrants, and the impact of Korea's financial crisis.

By estimating an 'opportunity income' that a family might earn, the incomes of Korean migrants had they stayed and of Korean residents had they migrated are subtracted, creating a new variable of the income gap. A probit model of migration decisions tested whether or not the income gap variable can affect migration decisions both *significantly* and *positively*. The key finding of this study is as follows: the expected income gap is neither positively nor significantly associated with the likelihood of migration to the U.S. for both cases.

Based on the results, the traditional migration theories emphasizing economic benefit may not apply to the migration case of 'Korea to the U.S.' Instead, it is necessary to introduce non-economic factors to explain the migration pattern, supported by other non-economic theories in migration decisions, including network theory, asymmetric information, family reunion, advanced welfare system, systematic inherent exclusion, etc. Because it is difficult to find an empirical study to demonstrate the non-economic factors in international migration decisions, even though the cases are only tested to the case of Korean migrants moved to the U.S., other similar migration cases such as 'China to the U.S.,' 'Korea to the E.U.' and so on, which contain very different context of culture, language, and economic development status can be similarly applied.

This study highlighted empirical evidence to reach a complete understanding of non-economic migration processes, conveying that an international migration study must not adhere to one discipline alone. Because migration decisions are a sophisticated approach that incorporates diverse contexts and motivations, the multifaceted nature of migratory behavior should be considered. This study also has limitations due to the inherently limited accessibility to data sources, which led to the omission of some relevant socio-economic variables required for more rigorous estimation. This study presents notable methodological limitations. Most importantly, our datasets do not include direct measures of the non-economic factors that we emphasize theoretically, such as social networks, family ties, and cultural motivations. Although we employ household-level analysis and interpret the insignificance of income gaps as indicative of non-economic influences, this interpretation is an indirect inference rather than a direct empirical verification. Future research, utilizing more comprehensive data on network structures, family connections, and migration motivations, is crucial to confirm these theoretical assertions. The temporal scope of our analysis, covering the years 1990 to 2000, serves as both a strength and a notable limitation. While this period encompasses significant economic transitions in Korea, migration patterns and motivations have likely evolved considerably over the past two decades. Advances in technology, communication, global mobility, and Korea's economic development may have shifted the balance between economic and non-economic factors in migration decisions. Consequently, our findings should be regarded as historically specific rather than universally applicable. Future research could enhance this analysis by integrating more recent datasets to explore the increasing significance of non-economic motivations in Korean family migration.

The findings suggest that the neoclassical economic theory, which emphasizes economic factors, is not applicable. According to the NSCG data, economic motivations for migration have

declined post-2000. However, in line with the research hypothesis, additional long-term empirical studies are required to conclusively determine that the assumptions of the neoclassical theory are no longer valid.

From the perspective of U.S. migration policy, these findings suggest that relying solely on economic factors is inadequate for comprehensively understanding migration patterns. The U.S. is home to migrants from diverse cultures and backgrounds, necessitating policymakers to consider this complexity when formulating migration policies. Further, policy approaches that incorporate non-economic factors can foster diversity and integration within U.S. society. Our results cautiously imply that incorporating non-economic factors such as family and social networks may help to foster diversity and integration. While such implications are exploratory given the scope and data limitations of this study, they indicate that future migration policy discussion could benefit from balancing economic and non-economic considerations.

This comprehensive approach becomes even more crucial when considering the importance of non-economic factors and the vulnerabilities of immigrants exposed during the COVID-19 crisis. During the initial phase of the pandemic, immigrants experienced higher unemployment rates (Borjas and Cassidy, 2020; 2023) and faced significant disadvantages in accessing healthcare services (Borjas, 2021). Given these vulnerabilities, U.S. immigration policy should adopt a more holistic approach beyond merely focusing on economic benefits. Specifically, U.S. immigration policy should include measures that ensure healthcare access and employment stability for immigrants during public health crises. Such a policy would encompass various elements, including educational opportunities, family reunification, and access to welfare systems, thereby promoting long-term adaptation and social integration of immigrants, while enhancing their resilience in future crises.

As policies for migrating to the U.S. are contentious political issues annually, continued research on policies for the Asian-Pacific migration stream is imperative. This study can be the first adventurer in the effort, paving the way for a more nuanced and comprehensive approach to immigration policy that addresses both economic and non-economic factors, as well as the unique challenges faced by immigrant communities during times of crisis, accelerating adaptive urban and regional policy measurements needed for rectifying injustices and inclusive place-making and empowering immigrants in asserting their “right to difference” (Piazzoni, 2024).

As regional science emphasizes the significance of spatial and policy-driven factors in migration patterns, international migration studies should be explicitly connected to urban and regional policy, where migration does not occur in isolation but rather within a complex network of social, economic, and spatial dynamics. By incorporating the dynamic, complex regional perspectives, policymakers can better navigate the global shift in local growth, with which the migration policies can be not only economically viable but also socially and spatially sustainable.

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Tables

Table 1. Data Preparation Procedures: migration from Korea to the U.S., 1990 and 2000

Korea to the U.S.							
	Procedures	1990			2000		
Step A	Delete Duplicated Observations; Randomly sampled from the number of observations in ARHIES for Korea	2,048			1,792		
	Korean Householders in 1990 PUMS A (5%) for USA	1,240			2,395		
	Appended Observation	3,288			4,187		
Step B	Data Filtering: Total Income>0 23=<AGE=<64	2,861			2,742		
Step C	0<Years of Migration of Korean <15; Total valid household type	2,826			2,645		
	Migrants to the U.S.	778			853		
	Non-migrants in KOREA	2,048			1,792		
		Migrants	Non-migrants	Total	Migrants	Non-migrants	Total
Average income		\$39,676.6	\$30,989.1	\$33,380.8	\$50,164.4	\$52,009.6	\$51,414.5
Modified Average income using PPP ¹ and regional CPI ²		\$39,489.6	\$31,101.9	\$33,411.1	\$49,755.3	\$53,173.9	\$52,071.4

Notes: 1. PPP indicates the relative price calculated as the ratio of the price in national currencies of the same good or service in different countries and is preferred when comparing each country's direct price (Paul and Francette, 2002). Refer to <http://www.oecd.org/dataoecd/61/56/1876133.xls> for the historical PPP.

2. See <http://www.bls.gov/cpi/> for the U.S. regional CPIs, and <http://kosis.nso.go.kr/> for the regional CPIs of Korea

Table 2. Variables Description

Variables	Explanation of Variables	Equation Category ¹
Dependent		
MIG	1= migrants, 0= otherwise	
LNTINC	Log of total household incomes modified with PPPs and regional CPIs	
Independent		
<i>Demographic</i>		
AGE	23=< Years in age of householder=<64	Inc, Mig
AGE ²	The square of age, (AGE × AGE)/100	Inc, Mig
MALE	1, if householder gender is male; 0, otherwise	Inc, Mig
SIZE	Household size (before migration for migrants)	Mig
<i>Economic</i>		
EDU	Total school years of household switched to years from education attainment level	Mig
EDU ²	The square of total school years, (EDU × EDU)/100	Mig
SECONDARY	High school =<level of schooling<bachelor's degree	Inc
TERTIARY	The level of schooling >=bachelor's degree	Inc
OTERS	Otherwise (Reference group)	
H_OCCUP1	Householder's occupation associated with managerial & professional jobs	Inc, Mig
H_OCCUP2	Householder's occupation self-employed	Inc, Mig
H_OCCUP0	Otherwise (Reference group)	
H _{AGE}	Householder's age - (his/her migration years since migration), if mig=1. Eage= EDU + 9, if mig=0 & male; and Eage= EDU + 6, if mig=0 & female	Mig
H _{AGE} ²	The square of householder's age, (H _{AGE} × H _{AGE})/100	Mig
IG	Income Gap (= $\ln \hat{E}_{iU} - \ln \hat{E}_{iK}$)	Mig

Note: 1. Inc=Income equation, Mig=Migration Equation.

Table 3. Expected Incomes and Migration Decisions: Possible Direction of Estimated Coefficients

on $\lambda_i (= \rho)$

	$Y_i=1$	$Y_i=0$
$\text{Exp}(\ln E_{iU}) > \text{Exp}(\ln E_{iK})$	+	+
$\text{Exp}(\ln E_{iU}) < \text{Exp}(\ln E_{iK})$	-	-

Table 4. Estimated Results of Direction of Estimated Coefficients on $\lambda_i (= \rho)$ from the Maximum Likelihood Estimation (MLE)

Korea->US: 1990	$Y_i=1$	$Y_i=0$
$\text{Exp}(\ln E_{iU}) > \text{Exp}(\ln E_{iK})$	+++	+++
$\text{Exp}(\ln E_{iU}) < \text{Exp}(\ln E_{iK})$		
Korea->US: 2000	$Y_i=1$	$Y_i=0$
$\text{Exp}(\ln E_{iU}) > \text{Exp}(\ln E_{iK})$	++	
$\text{Exp}(\ln E_{iU}) < \text{Exp}(\ln E_{iK})$		---

Note: *** p<.01, ** p<.05, * p<.10

Table 5. The Result of International Migration: Korea to U.S., 1990

Dep. Var.	Reduced Form		OLS with Selectivity				MLE					
	Probit		Migrants		Non-migrants		Migration		Migrants		Non-migrants	
	Y_i		$\ln E_{iU}$		$\ln E_{iK}$		Y_i		$\ln E_{iU}$		$\ln E_{iK}$	
Var.	coeff.	S.E.	coeff.	S.E.	coeff.	S.E.	coeff.	S.E.	coeff.	S.E.	coeff.	S.E.
<i>Intercept</i>	4.234 ***	1.422	6.118 ***	0.658	8.246 ***	0.263	4.273 **	1.769	6.240 ***	0.661	8.139 ***	0.269
<i>AGE</i>	0.330 ***	0.093	0.149 ***	0.030	0.064 ***	0.013	0.319 ***	0.117	0.144 ***	0.031	0.068 ***	0.013
<i>AGE</i> ²	-0.591 ***	0.138	-0.149 ***	0.035	-0.061 ***	0.015	-0.574 ***	0.181	-0.145 ***	0.036	-0.065 ***	0.016
<i>MALE</i>	-0.669 ***	0.137	0.478 ***	0.093	0.092 **	0.040	-0.633 ***	0.137	0.478 ***	0.100	0.100 ***	0.037
<i>EDU</i>	0.066	0.071	-	-	-	-	0.055	0.053	-	-	-	-
<i>EDU</i> ²	-0.314	0.289	-	-	-	-	-0.271	0.250	-	-	-	-
<i>SECONDARY</i>	-	-	0.010	0.110	0.268 ***	0.030	-	-	0.012	0.132	0.269 ***	0.031
<i>TERTIARY</i>	-	-	0.044	0.113	0.659 ***	0.042	-	-	0.042	0.135	0.647 ***	0.041
<i>H_OCCUP1</i>	0.551 ***	0.119	0.328 ***	0.079	0.216 ***	0.053	0.528 ***	0.112	0.326 ***	0.086	0.198 ***	0.052
<i>H_OCCUP2</i>	0.240 *	0.123	0.266 ***	0.084	0.104 ***	0.030	0.277 **	0.133	0.267 ***	0.097	0.102 ***	0.030
<i>SIZE</i>	-0.547 ***	0.043	-	-	-	-	-0.544 ***	0.034	-	-	-	-
<i>H_{AGE}</i>	-0.956 ***	0.104	-	-	-	-	-0.932 ***	0.084	-	-	-	-
<i>H_{AGE}</i> ²	2.701 ***	0.246	-	-	-	-	2.634 ***	0.220	-	-	-	-
λ	-	-	0.245 ***	0.071	0.243 ***	0.068	-	-	-	-	-	-
σ	-	-	-	-	-	-	-	-	0.897 ***	0.015	0.564 ***	0.007
ρ	-	-	-	-	-	-	-	-	0.242 ***	0.060	0.307 ***	0.084
χ^2	2327.2 ***											
-2LogL	998.8		2016.17		3416.98		6453.04					
N	2,826		778		2,048							
$\bar{R}^2$	0.6997		0.1109		0.1972							

Note: The adjusted $R^2(\bar{R}^2)$'s in probit equations indicate the pseudo R^2 's calculated from McFadden's approach, ***, $p < .01$; **, $p < .05$; *, $p < .10$. The pseudo R^2 is used in probit models because traditional R^2 , which measures goodness-of-fit in linear regression models, is not directly applicable to models estimated using maximum likelihood estimation (McFadden, 1974).

Table 6. The Result of International Migration: Korea to U.S., 2000

Dep. Var.	Reduced Form Probit		OLS with Selectivity				MLE					
			Migrants		Non-migrants		Migration		Migrants		Non-migrants	
	Y_i		$\ln E_{iU}$		$\ln E_{iK}$		Y_i		$\ln E_{iU}$		$\ln E_{iK}$	
Var.	coeff.	S.E.	coeff.	S.E.	coeff.	S.E.	coeff.	S.E.	coeff.	S.E.	coeff.	S.E.
<i>Intercept</i>	7.497 ***	2.154	8.832 ***	0.554	8.745 ***	0.244	6.730 ***	2.252	8.817 ***	0.579	8.589 ***	0.221
<i>AGE</i>	0.324 **	0.146	0.041	0.028	0.054 ***	0.011	0.243	0.171	0.042	0.030	0.059 ***	0.010
<i>AGE</i> ²	-0.716 ***	0.221	-0.031	0.033	-0.044 ***	0.012	-0.576 **	0.259	-0.031	0.037	-0.049 ***	0.012
<i>MALE</i>	-1.014 ***	0.182	0.286 ***	0.082	0.077 **	0.032	-0.960 ***	0.186	0.281 ***	0.083	0.080 ***	0.029
<i>EDU</i>	0.266 **	0.115	-	-	-	-	0.288 ***	0.101	-	-	-	-
<i>EDU</i> ²	-2.074 ***	0.474	-	-	-	-	-2.101 ***	0.406	-	-	-	-
<i>SECONDARY</i>	-	-	0.128	0.116	0.270 ***	0.033	-	-	0.128	0.119	0.274 ***	0.032
<i>TERTIARY</i>	-	-	0.221 *	0.126	0.488 ***	0.041	-	-	0.219	0.137	0.488 ***	0.042
<i>H_OCCUP1</i>	1.244 ***	0.172	0.114	0.090	0.117 *	0.064	1.042 ***	0.157	0.114	0.098	0.058	0.058
<i>H_OCCUP2</i>	0.160	0.167	0.118 ***	0.108	0.559 ***	0.027	0.175	0.165	0.116	0.110	0.557 ***	0.029
<i>SIZE</i>	0.336 ***	0.031	-	-	-	-	0.343 ***	0.033	-	-	-	-
<i>H_{AGE}</i>	-1.463 ***	0.179	-	-	-	-	-1.289 ***	0.175	-	-	-	-
<i>H_{AGE}</i> ²	4.104 ***	0.428	-	-	-	-	3.673 ***	0.422	-	-	-	-
λ	-	-	0.181 **	0.076	-0.246 **	0.102	-	-	-	-	-	-
σ	-	-	-	-	-	-	-	-	0.999 ***	0.018	0.510 ***	0.008
ρ	-	-	-	-	-	-	-	-	0.210 **	0.093	-0.758 ***	0.065
χ^2	2722.6 ***											
-2LogL	509.3		2290.81		2563.12				5365.18			
N	2,604		812		1,792							
$\bar{R}^2$	0.842		0.051		0.304							

Note: The adjusted $R^2(\bar{R}^2)$'s in probit equations indicate the pseudo R^2 's calculated from McFadden's approach, ***, $p < .01$; **, $p < .05$; *, $p < .10$. The pseudo R^2 is used in probit models because traditional R^2 , which measures goodness-of-fit in linear regression models, is not directly applicable to models estimated using maximum likelihood estimation (McFadden, 1974).

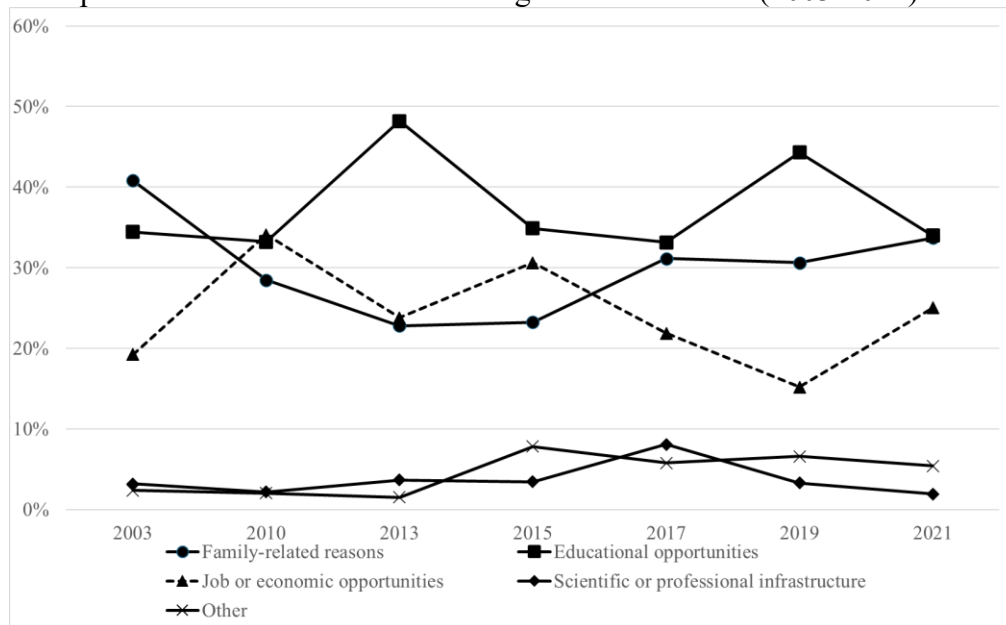
Table 7. Probit with Income Gap (1990 and 2000)

Year	1990		2000	
Dep. Var.	Y_i		Y_i	
Var.	coeff.	S.E.	coeff.	S.E.
<i>Intercept</i>	2.594	1.728	7.686***	2.174
<i>AGE</i>	0.391***	0.100	0.305**	0.148
<i>AGE</i> ²	-0.656***	0.144	-0.698***	0.223
<i>MALE</i>	-0.465**	0.182	-0.772**	0.301
<i>EDU</i>	0.061	0.072	0.239**	0.120
<i>EDU</i> ²	-0.461	0.304	-2.120***	0.483
<i>H_OCCUP1</i>	0.592***	0.121	1.298***	0.181
<i>H_OCCUP2</i>	0.340**	0.137	-0.471	0.647
<i>SIZE</i>	-0.551***	0.043	0.338***	0.031
<i>H_{AGE}</i>	-0.934***	0.106	-1.449***	0.182
<i>H_{AGE}</i> ²	2.673***	0.248	4.094***	0.433
<i>IG</i>	-0.652*	0.382	-1.431	1.417
χ^2	2330.1***		2723.60***	
-2LogL	995.9		508.3	
N	2,826		2,604	
$\bar{R}^2$	0.701		0.843	

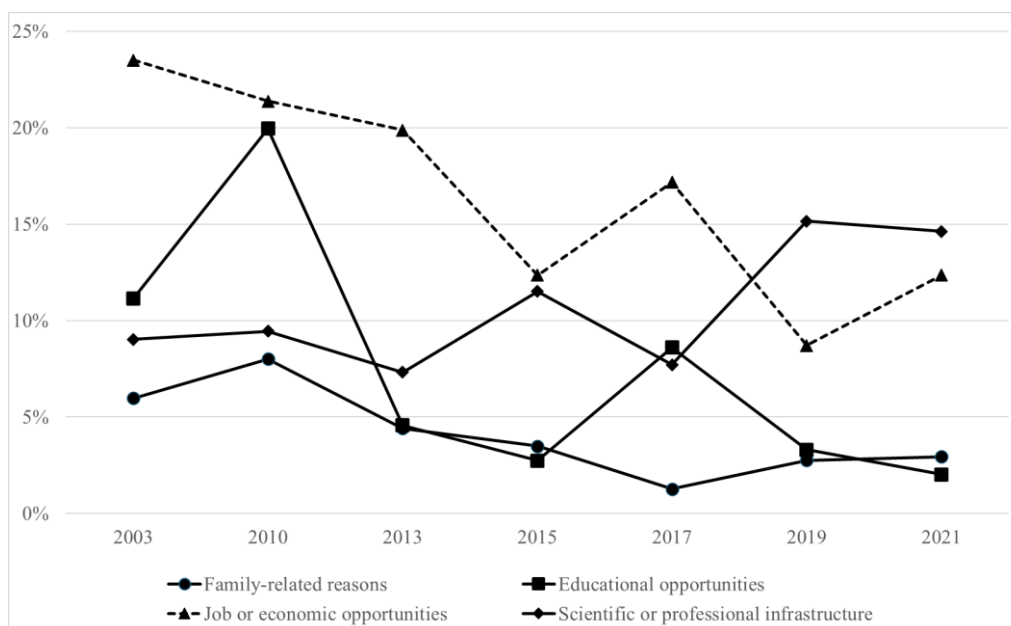
Note: *IG* refers to the income gap. The adjusted $R^2(\bar{R}^2)$'s in probit equations indicate the pseudo R^2 's calculated from McFadden's approach, ***, $p < .01$; **, $p < .05$; *, $p < .10$. The pseudo R^2 is used in probit models because traditional R^2 , which measures goodness-of-fit in linear regression models, is not directly applicable to models estimated using maximum likelihood estimation (McFadden, 1974).

Figures

Figure 1. Proportion of Reasons for Korean Migration to the U.S. (2003-2021)



(a) Most Important Reasons

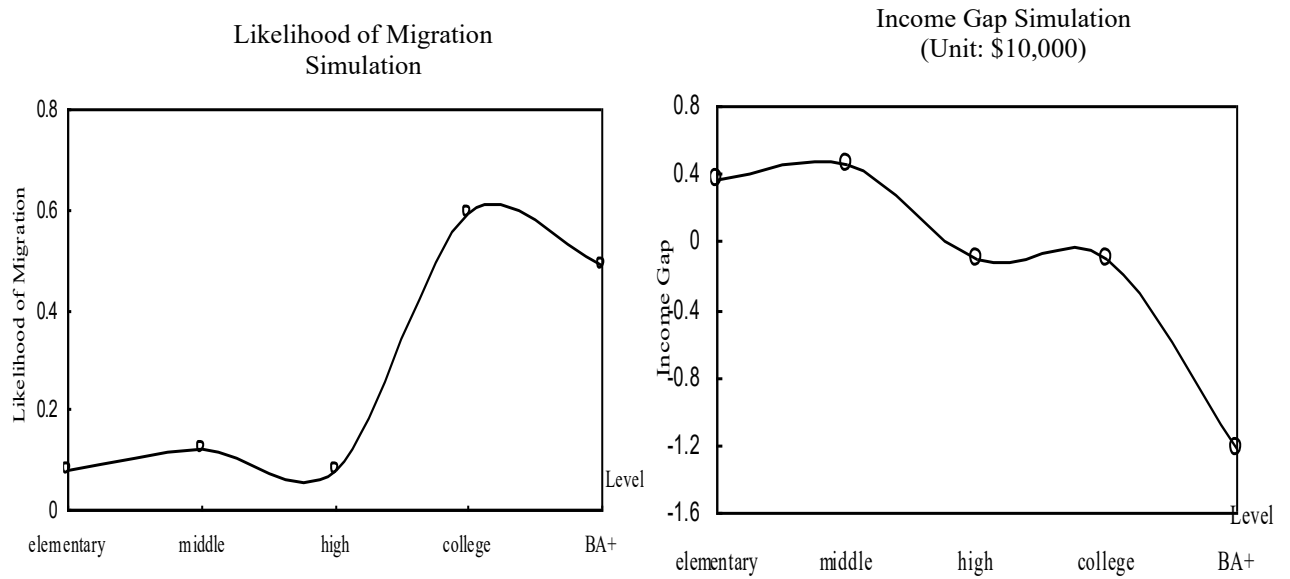


(b) Second Most Important Reasons

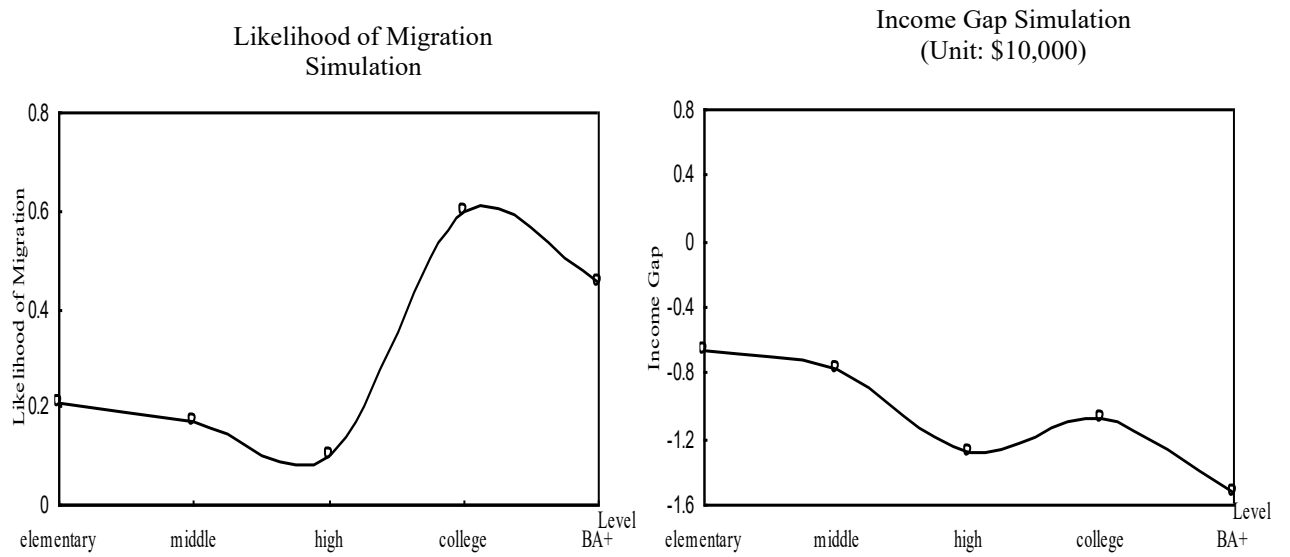
Source: NSCG data 2003, 2010, 2013, 2015, 2017, 2019, and 2021.

Note: The NSCG data, collected by the NSF every two years, surveys individuals who have graduated from college or higher. Since 2003, the NSCG data has been surveying the most important reasons (code: CMPRI) and the second reasons (code: CMSEC) for migrants coming to the U.S. Family-related reasons and the pursuit of educational opportunities are the most prominent, followed by economic and job-related reasons. This suggests that the pattern of migration has changed since the 2010s, with non-economic reasons becoming more prevalent compared to economic reasons. We use the survey weights provided NSCG data.

Figure 2. Simulation Results of Migration Propensity



A. Korea to U.S., 1990



B. Korea to U.S., 2000

Note: Level = Education Level

Appendix

A.1. Reduced Form of the Probit Model for Migration Decisions

The case of ‘Korea to the U.S.’ is suggested in equations (a.1).

$$Y_i = \ln E_{iU} - \ln E_{iK} - P_i \quad (\text{a.1})$$

$$= X_{iU}\beta_U - X_{iK}\beta_K - Z_i\gamma + u_{iU} - u_{iK} - \varepsilon_i \quad (\text{a.2})$$

$$= \Omega_i\tau + \varsigma_i, \quad \varsigma_i \sim N(0, \sigma_\varsigma) \quad (\text{a.3})$$

where, the transpose of τ , $\tau^T = [\beta_U, -\beta_K, -\gamma]$;

$$\Omega_i = [X_{iU}, X_{iK}, Z_i];$$

$$\varsigma_i = u_{iU} - u_{iK} - \varepsilon_i; \text{ and}$$

$$\sigma_\varsigma = \text{Var}(\varsigma_i).$$

Also, note that

$$\text{the correlation } \rho_U = \rho\left(\frac{u_{iU}}{\sigma_U}, \frac{\varsigma_i}{\sigma_\varsigma}\right) = \frac{\sigma_\varsigma}{\sigma_U\sigma_\varsigma}; \quad (\text{a.4})$$

$$\text{the covariance of } u_{iU} \text{ and } \varepsilon_i, \quad \sigma_{U\varsigma} = \sigma_U\sigma_\varsigma\rho_U; \text{ and} \quad (\text{a.5})$$

$$E(u_{iU}|\varsigma_i) = \sigma_{U\varsigma}\varsigma_i \text{ (Maddala, 1983)}. \quad (\text{a.6})$$

As Greene (1995) noted, σ_ς is used for normalization because it is omitted from the sample of non-migrants. Therefore, the parameters in income equation (5) are estimated with the correction of self-selectivity using the covariance and correlation which are shown in equations (a.4) - (a.6) in the reduced-form probit equation of (a.3). For example, the income of Korean migrants is corrected as,

$$X_{iU}\beta_U + E[u_{iU}|Y_i > 0] \quad (\text{a.7})$$

$$= X_{iU}\beta_U + E[u_{iU}|\varsigma_i > -\Omega_i\tau] \quad (\text{a.8})$$

$$= X_{iU}\beta_U + \sigma_{U\varsigma}E\left[\frac{\varsigma_i}{\sigma_\varsigma} \mid \frac{\varsigma_i}{\sigma_\varsigma} > \frac{-\Omega_i\tau}{\sigma_\varsigma}\right] \quad (\text{a.9})$$

$$= X_{iU}\beta_U + (\sigma_U\sigma_\varsigma\rho_U)\left[\Phi\left(\frac{-\Omega_i\tau}{\sigma_\varsigma}\right)/1 - \Phi\left(\frac{-\Omega_i\tau}{\sigma_\varsigma}\right)\right] \quad (\text{a.10})$$

$$= X_{iU}\beta_U + (\sigma_U\rho_U)\left[\frac{\Phi(\Omega_i\tau)}{\Phi(\Omega_i\tau)}\right] \quad (\text{a.11})$$

$$= X_{iU}\beta_U + (\sigma_U\rho_U)\lambda_{iU} \quad (\text{a.12})$$

where, the Inverse Mill's Ratio for migrants, $\lambda_{iU} = \frac{\phi(\Omega_i\tau)}{\Phi(\Omega_i\tau)} (>0)$;

$\Phi(*)$ is the standard normal cumulative density function; and

$\phi(*)$ is the standard normal probability density function of $\Phi(*)$.

Similarly to the process of equations (a.12), income equation for Korean non-migrants is corrected as,

$$X_{iK}\beta_K + E[u_{iK}|Y_i \leq 0] \quad (\text{a.13})$$

$$= X_{iK}\beta_K - \sigma_{K\zeta}E\left[-\frac{\zeta_i}{\sigma_\zeta} \mid -\frac{\zeta_i}{\sigma_\zeta} \geq \frac{\Omega_i\tau}{\sigma_\zeta}\right] \quad (\text{a.14})$$

$$= X_{iK}\beta_K + (\sigma_K\rho_K)\lambda_{iK} \quad (\text{a.15})$$

where, the Inverse Mill's Ratio for non-migrants $\lambda_{iK} = -\frac{-\phi(\Omega_i\tau)}{1-\Phi(\Omega_i\tau)} (<0)$.

Therefore, the simple income equation in equations (a.10) and (a.15) are re-written as,

$$\ln E_{ij} = X_{ij}\beta_j + (\sigma_j\rho_j)\lambda_{ij} + \lambda\Gamma_{ij} \quad (\text{a.16})$$

A.2. The Korean Wave, Social Networks, and Urban and Regional Policy Dimensions

Many Korean cultures have spread over other countries since the globalization strategy of South Korea (hereafter Korea) in 1994. Currently, it is not difficult to find Korean dramas, films, music, and other cultural products in different countries. A recent substantial introduction of Korean culture to foreign countries, called the “Korean Wave,” especially emphasizes the role of Korea as a cultural exporter (Cho, 2005). The presence of Korean culture, especially in terms of food and people, is strongly felt across various parts of the U.S. The Korean Wave has been accelerated by technological innovations in transportation, telecommunication, and mass media, making Korea more easily introduced to global audiences and shortening the process of cultural diffusion. However, the initial contribution of numerous Korean migrants who directly introduced diverse Korean cultures abroad and laid the foundation for the current wave is often neglected. Migrants played a key role in cultivating this cultural presence by directly communicating with residents in host countries. Without their efforts, the wave could not have evolved as it has.

The discussion of migration also extends to the urban and regional policy dimensions. Policy frameworks play an important role in integration by influencing access to both residential and non-residential areas through land use regulations (Harwood, 2022). International migration encourages culturally sensitive adaptations that address the diverse needs of destination societies, requiring planners to fill policy gaps and adapt to ongoing demographic shifts (Kim et al., 2018). These dimensions highlight that migration is not only an economic phenomenon but also a spatial and institutional process that shapes and is shaped by the regulatory environment.

Beyond economics and policy, social networks further complicate migration processes. The findings of this study indicate that the expected income gap of Korean families does not significantly influence the decision to migrate to the U.S. This suggests that traditional economic theories, which emphasize economic benefits, may not provide a complete explanation for Korean migration. Instead, non-economic factors such as social networks and family reunion play a decisive role. Migration decisions are often influenced not only by economic considerations but also by the presence of strong social ties, as highlighted in discussions of networks and their economic benefits (Becker, 1976). Analyzing migration patterns through the traditional economic lens reveals important insights, but extending the

analysis to the role of networks allows us to see how they facilitate employment opportunities, reduce childcare burdens, and improve long-term educational outcomes.

Social networks also shape migration decisions by distinguishing between explicit economic motivations, such as wage differentials and job prospects, and broader social or institutional considerations, such as legal security or family reunification. These networks provide direct support that often proves more valuable to migrants than the mere transfer of information (Blumenstock, Chi, and Tan, 2023). They significantly shape long-term location choices, meaning migration decisions are not solely based on immediate economic returns but also on enduring social linkages (Stuart and Taylor, 2021). The influence of peer effects further demonstrates how social capital plays a crucial role in household decision-making (Hiwatari, 2016).

Taking together, these perspectives enrich our understanding of migration by situating the economic, cultural, and institutional aspects of the process in a broader context. The Korean Wave highlights the cultural transmission role of migrants, urban and regional policy illustrates the institutional and spatial challenges of integration, and social networks underscore the non-economic dimensions that shape migration outcomes. While not central to the main empirical analysis of this study, these discussions provide supplementary insights that help to frame Korean family migration within its wider social, cultural, and policy environment.