The effects of internal migration on first labor market outcomes from college graduates: Focused on non-SMA and SMA

By

CHOI, Da Hee

THESIS

Submitted to

KDI School of Public Policy and Management

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ABSTRACT

THE EFFECT OF INTERNAL MIGRATION ON FIRST LABOR MARKET OUTCOMES FROM COLLEGE GRADUATES : FOCUSED ON NON-SMA AND SMA

By

CHOI, Dahee

Half of Korea's population has been concentrated in the Seoul metropolitan area since 2020 with an earlier concentration of young people and this phenomenon is expected to continue. In this paper, I analyze the effect of internal migration from college graduates on their first labor market outcomes in terms of job status, being employed in a large-sized company, and average monthly income by using five-year Graduates Occupational Mobility Survey. The results show that migration has positive impact on labor outcomes even after matching samples using propensity scores to reduce selection bias issues. However, the estimates on being workers in large-sized companies do not present statistically significant. The results from sub-groups analysis show that labor outcomes from migration may vary depending on the direction of movement. This study suggests that youth outflow could continue if locals fail to clarify reasons of migration from youth and create decent jobs with residential policies.

Keywords: youth migration, population concentration, SMA and non-SMA, the first job market, decent jobs, odds ratio, propensity score matching, Korea

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And most of all, my gratitude goes to my family members: My father, Sungmook Choi; my mother, Yangmi Lee; my younger sister, Dayeon Choi. As always, my family have been there, providing endless support.

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1. Introduction

A sense of crisis over the population decline and demographic changes emerged as a severe issue in the Republic of Korea (hereinafter Korea). Statistic Korea (2019) predicted that the future population for the next 50 years (from 2017 to 2067) is mostly like to undergo a negative growth from 2029. Similarly, Kim (2019) presented a rather dark outlook that Korea's population decline could begin much faster and predicted the decline to appear in the early 2020s. Many scholars (Yim, 2019; Choi, 2020; Kim et al., 2020; Park et al., 2020) have showed their concern about this serious population issues happening in Korea. Moreover, most recent evidence from Statistic Korea (2020) revealed that in year 2020, the total population in the Seoul metropolitan area (hereinafter SMA) which consists of Seoul special city, Gyeonggi province, and Incheon metropolitan city exceeded the population of the remaining Korea combined. Especially, it showed that people in their 20s have continued to move to SMA over the past 20 years (Statistics Korea, 2020). The current trend signifies that Korea has failed to resolve its population issues and its concentration problem in terms of regional development strategy. Kim et al. (2020) also criticized local governments' incapacity to solve their own population problems while pointing out the prolonged matter the central government has not been able to resolve.

The transition of population has been changed not only by birth and death, but also by population migration. Among the three factors (i.e., birth, death, and population migration) that affect the changes of population structures, population migration has the fastest ripple effect (Kim, 2019). In order to develop a region and improve the quality of life of local residents, people in the region are essential (Rye, 2015), and a large number of literatures particularly assert the importance of young people (Rye, 2015; Kang, 2019; Kim et al., 2020; Moon et al., 2020). In line with the growing problem of the imbalance of population concentration in Korea, there have been relatively

active studies (Kim et al., 2003; Lee et al., 2016; Moon et al., 2017; Kim 2018; Um et al., 2018; Kang, 2019; Kim et al., 2020) which analyzed the phenomenon of population migration of young people.

The studies on youth migration can be summarized in two parts. On part is the studies on determinant factors affecting migration (Kim et al., 2003; Park, 2009; Kwon et al., 2012; Koo, 2018; Moon et al., 2020), and the other part is benefits gained from migration (Park, 2005; Shim et al., 2012; Kang et al., 2015; Hong et al., 2020). In particular, many studies (Kim et al., 2003; Park, 2009; Kwon et al., 2012; Koo, 2018; Moon et al., 2020) have analyzed the influential factors in population migration from youth related to college entrance, which considering the situation in Korea, has a high college entrance rate compared to other countries (OECD, 2020). Other literature (Park, 2005; Shim et al., 2012; Kang et al., 2015; Hong et al., 2020) conducted empirical analysis on the benefits of migration in terms of labor performance considering the characteristics of the transition from school to work in relation to the life cycle of young people. It is meaningful that preceding studies looked at the effect of migration on labor performance, but there is a lack of literature (Park, 2005; Lee et al., 2015) on how population migration gives benefits to labor performance in various aspects together.

The main purpose of this study is to identify whether the migration of young people to other areas really gave benefits to their first job behaviors by using up the recent five-years (2014-2018) Graduates Occupational Mobility Survey [GOMS] longitudinal data and pooled cross-sectional data from Korea Employment Information Service [KEIS]. By considering the existing literature on the migration of young people based on college entrance, this study also investigates how the migration of college graduates, which represent young Koreans, affects their first job labor performances. Throughout the analysis, the study is expected to contribute a multilateral

understanding of what bi-directional migration (i.e., both from SMA to non-SMA and from non-SMA to SMA) of young people brings advantages on their first job performances. My research questions are as follows:

i. What factors influence the migration of college graduates? And also how these migrations affect their first labor market outcomes in terms of job status, being employed in a large-sized company, and average monthly income?

ii. If migration affects the labor market outcomes of college graduates, how do these impacts appear in sub-groups (e.g., the migration groups from college graduates in non-SMA and the migration groups from college graduates in SMA) ?

iii. How the impact of migration has been changed with respect to each year graduates cohort and sub-groups?

After fully exploring those questions in this study, distinct features of college graduates related to the labor market can be found and contributed to make relevant policies especially for regions that wish to attract young people or make them stay in their regions. The remainder of study is organized as follows. Section Two provides classic approaches to population migration and the current trend of population concentration issues of Korea and SMA, and Section Three reviews the relevant literature focusing on youth migration and the impacts on their labor performances, which is the main interest of this study; Section Four defines data and illustrates matching results using propensity score; Section Five presents the empirical methodology and analysis model; Section Six shows the results of the main analysis; and the last Section Seven discusses the findings and draws conclusions.

2. Background

2.1. Definition of migration and its classic approaches

At the outset, defining key terminology ‘population migration (or population movement) is an imperative step to carry out this research. Migration entails domestic migration as well as international migration called immigration (International Organization for Migration [IOM] UN Migration, 2015; Choi et al., 2017; Park, 2017). IOM UN Migration (2015) articulates the very basic definition of migration and defines it as the movement of individuals away from their place of birth or original residences into other countries or other regions. Similarly, Statistics Korea (2020) defines migration as the event of a change of residence beyond the boundary of regions.

Population migration is a very complex phenomenon because it is a matter of individual choices based on individual preferences; however, it is also affected by social, economic, political, and environmental factors. Studies that explain the reasons for population migration have been accumulated over a long time, and those analysis have various perspectives. For instance, Ravenstein (1885) emphasized the demographic aspect and presented the gravity model. In his gravity model, population migration is made in proportion to the size of the population between regions and inversely proportional to distance. He explains population migration well with simple formula and key elements. On the contrary, Stouffer (1940) claimed that distance has no necessary relationship with mobility whereas, some scholars (Lee, 2010; Yun, 2015; Min et al., 2017) support Ravenstein’s (1885) model as a very classic theory of population migration. From the economic perspective (Lewis, 1954; Todaro, 1969), income factors are indispensable in the studies of population movement. Lewis (1954) and Todaro (1969), the two eminent scholars in development policy, had a general agreement that economic differences between regions are core factors to population migration. But Lewis (1954) identified the differences in absolute income as the major

causes of migration while Todaro (1969) attributed the differences in expected income to the main causes of migration. Additionally, there was an attempt to link public goods and services with population migration in policy aspects. Tiebout (1956) argued that if every individual had full information about each local government, he or she would choose a specific region that matched his or her preferences.

As in micro approaches, population migration can be explained by the cost and benefit disparities between regions based on individual preferences, and there are bound to be a wide range of related studies. Since the spatial scope of this study is limited to Korea, Korean cases on population migration are examined instead in the next chapter in an effort to substitute for the relevant literature of such extensive field of study.

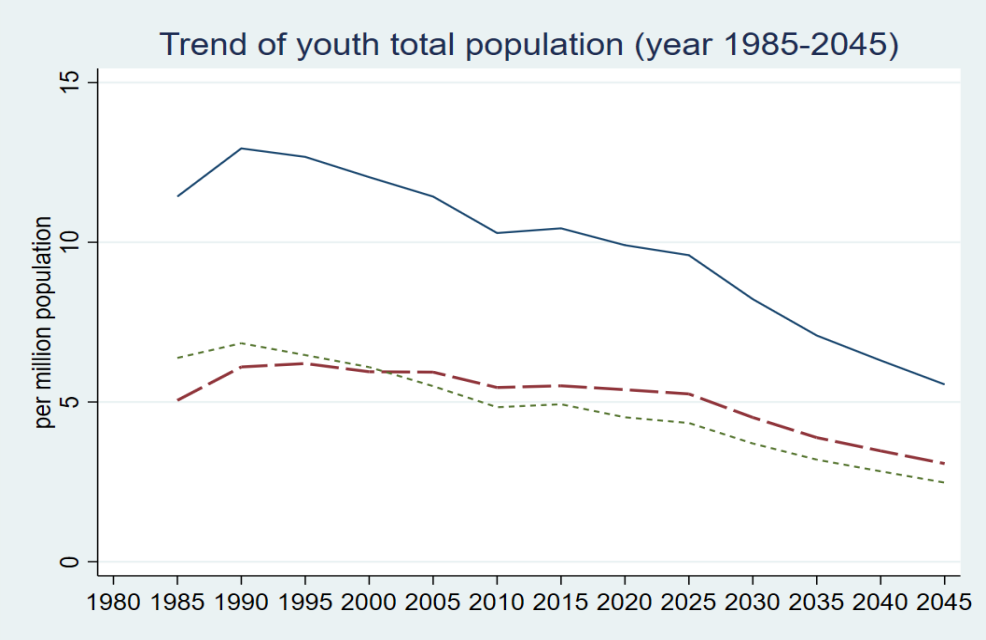
2.2. Trend of youth population concentration in Korea

Statistics Korea (2020) estimated the total population form 2025 onwards assuming a scenario having median birth-rate, median life-expectancy, and median international net movement. According to this scenario, Korea's population decline is expected to begin around 2025, and the predicted population at that point is about 51 million. One noteworthy point here is that while the total population is decreasing, the population concentration issue in SMA is expected to intensify. Evidence shows that the total population of SMA reached 25.96 million in year 2020, surpassing the population of non-SMA which was 25.82 million.

Before looking at the youth population concentration issues in SMA, it is necessary to clarify what ages belong to youth or young people (or generation) in this paper. The term 'youth,' 'young generation,' and 'young people' are defined in diverse ways abroad and in Korea. ILO

(2016) defines youth persons aged 15 to 24, and the Basic Youth Law in Korea (The National Law Information Center, 2020), which took effect in 2020, defines those aged 19 to 34 as youth. Particularly, Gyeonggi province part of SMA sets the age range between 15 to 29 for those who wish to get the promotion of youth employment benefits (Oh, 2020). In Korea, college admission normally begins at the age of 20 after finishing the mandatory high school curriculum, and I used GOMS data in this paper covering college graduates which represents Korean youth. In these aspects, I shall set the age range from 20 to 34 as young people.

FIGURE 1 -TREND OF YOUTH TOTAL POPULATION



Source: The data is from 'summary of census population' for 1985 to 2010 reported every five years, 'resident population by city, county, and district' for 2015 to 2020 annually reported, and 'projected population by age group' for 2025 to 2045 annually projected by Statistics Korea (KOSIS). Figure 1 was made by the author using STATA.

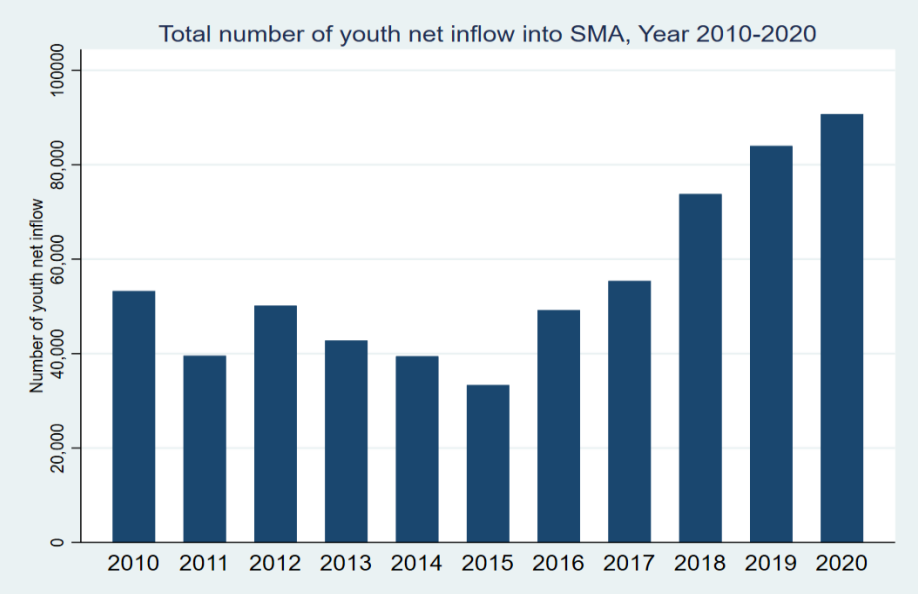
Notes. This figure shows the trend of the total youth (age from 20 to 34) population per million in Korea, SMA and non-SMA from 1985 to 2045. The top straight line indicates the total youth population, the long-dashed line indicates the youth total population in SMA, and the short-dashed line indicates the youth total population in non-SMA.

Figure 1 displays the trend of the youth total population in Korea, SMA and non-SMA from 1985 to 2045. This figure helps us see at a glance how the population concentration of young people in SMA has changed. Since 2000, more than half of Korea's youth has already surpassed

half of the non-SMA and the intersection of the long-dashed line (SMA) and short-dashed line (non-SMA) between 2000 to 2005 proves that the population concentration among young people is noticeable like the total population concentration issue.

Figure 2 indicates that young people have been actively moving to SMA over the past decade and the amount of new inflow has been increasing since 2016. Young population settled down in SMA which accounts for only 12% of Korea's entire land and the rest of the country, which has failed to capture the population, would face problems in many places especially along with a decline in young people who are the key productive population. Therefore, it is needed to reveal why young people keep moving to SMA and what they need in connection with their life cycle based on national and regional development strategies.

FIGURE 2 – NET MIGRATION INTO SMA OVER THE PAST 10 YEARS (2010-2020)



Source: The data is from 'number of internal migrants by sex and five-year age groups for province' for 2010 to 2020 monthly reported by Statistics Korea (KOSIS). Figure 2 was made by the author using STATA.

Notes. This figure shows the change of net inflow from youth (age from 20 to 34) to SMA. Net inflow in each area (i.e., Seoul special city, Gyeonggi province, and Incheon metropolitan city) is covered (see Appendix A).

3. Literature review

3.1. Studies on population migration in Korea

Studies related to population migration can be subdivided by what factors to focus on (Lee, 2010; Cheon et al., 2014; Lee et al., 2016; Choi et al., 2017; Park, 2017; Kim et al., 2018; Kim, 2019), what regions to focus on (Choi et al., 2017; see also Lim, 2011; Chae et al., 2014; Oh et al., 2016), and what age groups to focus on (Yoon et al., 2009; Lee et al., 2010; Choi et al., 2013; Lee et al., 2016; Lee, 2018).

One of the things that has been drawn attention to in previous studies (Lee, 2010; see also Choi et al., 2017; Kim et al., 2018) is the relationship between population migration and income level. Lee's (2010) study gives convincing answers to wage effects of migration. He pointed out that regional migration gives real wage benefits, but the effect of the increase varies greatly from level to level of education. Great attention (Cheon et al., 2014; Lee et al., 2016; Park, 2017; Kim 2019) has been shown to housing market price factors in relation to population migration. Cheon et al. (2014) proved that effects of housing prices vary among regions, and other studies (Lee et al., 2016; Park, 2017; Kim, 2019) proved that housing rental prices and housing supply rates significantly affect population migration. Lee at al. (2016) specified that people migrated to areas with high rental prices in the early and mid-2000s due to the lack of awareness of costs in moving between SMA and non-SMA, but in the late 2000s, the direction of migration has changed as the cost's issues came to the surface. Their study suggests that even the same factors affecting migration can have different impacts with times.

As half of the Korean population is concentrated in SMA (also call Sudokwon in Korean), which consists of Seoul special city, Gyeonggi province, and Incheon metropolitan city (Statistics

Korea, 2020), a growing body of literature (Kwon, 2005; Lee, 2010a, Lee, 2010b, Choi et al., 2017; Kim, 2019; Jung, 2020) has attempted to find and explore the reasons of the inflow into SMA from other regions. The research from Choi et al. (2017) is interesting as they divided Gyeonggi province, which is part of SMA, depending on the characteristics of population migration patterns. This paper noted the problem that could be neglected due to the common issues of being in the same area. Furthermore, Lee (2010a) used age, school age, marital status, gender, and occupation as variables in polynomial logistic regression and concluded that the biggest impact variables on the inflow to SMA are age and occupation. Kim (2019) also addressed the question of housing factor influence and established three different space ranges (Inter migration group in Seoul, Seoul-Gyeonggi province, and Seoul-Sudokwon) based on Seoul. Kim's study proved that the main factors are population and distance between regions which corresponds with Ravenstein's (1885) gravity model. In detail, the differences in the number of businesses, the number of childcare facilities, the degree of financial independence, the price of housing market, and so on for each group have been shown to affect migration. Authors (Choi et al., 2017; see also Kwon, 2005; Lee, 2010a, Lee 2010b, Lim, 2011, Chat et al., 2014; Oh et al., 2016; Kim, 2018; Jung, 2020) of the studies link population migration with regional characteristics in line with population policy in selected regions from the regional movement perspective.

Population migration occurs within the life cycle of different ages, and a large number of studies (Yoon et al., 2009; Lee et al., 2010; Choi et al., 2013; Lee et al., 2016; Lee, 2018) have paid attention to different age characteristics. On the side of the pattern of elderly population migration, Yoon et al. (2009) and Lee et al. (2010) looked through the realities of the rapidly aging population of Korea using relevant statistics and Geographic Information System. It could be expected that the migration of elderly population will occur frequently based on the compiled

resident registration records from 2000 to 2006 according to the research conducted by Yoon et al. (2009). The preceding studies of population migration among young people will be dealt with in more detail in the next parts.

Throughout the review of overall migration cases of Korea, a common theme was observed: The population migration is closely related to preferences of individuals and households, and changes of social and political issues. In other words, this indicates that the phenomenon of population migration is vastly complex and cannot be seen only as a personal choice.

3.2. Studies on youth migration in Korea

3.2.1. Determinants of migration

Population migration among young people can happen due to two main reasons. One is the migration due to college entrance, and the other is the migration for employment. Many scholars (Ryu, 2015; Moon et al., 2017; Cho, 2020; Moon et al., 2020) made mention of these two big streams of migration, but Ryu (2003) and Kim et al. (2003) particularly mentioned that migration caused by college transfer is another noticeable factor that determines youth migration. Kim (2019) attempted to make approaches to the migration along with youth life cycle and stated that the first migration occurs at 20 to 24 years due to college entrance, the second migration occurs at 25 to 29 years due to the first employment, and the third migration occurs at 30 to 34 years due to the adaptation period after the first job.

As the outflow of young people into SMA involves imbalanced population issues, many (Rye, 2015; Moon et al., 2017; Park, 2017; Kim et al., 2020) have focused their views on the migration of young people between SMA and non-SMA. Kwon et al. (2012) emphasized that the

age group of the 20s plays a crucial role in the concentration of population in SMA by migration, and most of their migrations are closely related to college admissions. On the outflow into SMA in relation with college entrance, Ryu (2015) had a general agreement with Moon et al. (2020) that high school students with high household income brought the outflow of youth, but Rye (2015) additionally pointed out that the effect of father's educational background gives positive impacts on the outflows into SMA.

Underlying the little research on the regional labor market differences in the context of the second outflow of youth, Moon et al. (2017) revealed that young people with college degrees or higher are more likely to move to SMA because there are higher chances of being employed in large-sized companies and full-time employment status premiums. Moon et al. (2017) suggest that quality jobs in regions can reduce the outflow of young people into SMA.

Park (2017) follows the same youth life pattern approaches as Kim (2019) and adopted the multilinear regression model to figure out the impact of the housing market in SMA on the migration of the youth. Based on the results, Park (2019) evinced that the youth migration into SMA was influenced by the changes of housing supply and verified young people's struggles with housing prices.

Interestingly, a research (Kim et al., 2020) on the return of local young people could be found. They focused on the local young people who had been leaked to colleges in SMA, and the results showed that college graduates from the same metropolitan area were more likely to return to the same metropolitan area than college graduates from other metropolitan areas; this means geographical proximity is closely related to return migration. This study confirms that distance is also influential not only for outflow but also for return.

On the other hand, Moon et al. (2020) narrowed down their study to the Southeast areas (Busan, Ulsan, and Gyeongnam) and analyzed factors make young people leave the areas based on two streams of outflows (i.e., outflow due to college entrance and outflow due to employment). They found that the most influential factors were high school types, household income level in terms of outflow due to college entrance, size of companies, and wage level in terms of outflow due to employment. They looked at how these determinants of outflow change over five years together and expressed their concern about human resources outflow which has a negative impact on local economies by reducing aggregate demand. This study was limited to the Southeast areas where manufacturing industries account for a large portion, but the approaches to analyze the youth migration could be extended to other areas considering the regional characteristics.

3.2.2. Impact of migration on labor performances

As youth population migration is divided into the movement due to college entrance and the movement due to employment, results from these migration on labor performance should be dealt with different ways. The latter effect can be measured by comparing the group who moved to other regions to get jobs after college graduation with the group who did not move to other regions and instead settled down in their current places for jobs after college graduation. However, benefits from the first migration on youth employment behaviors appear when they enter the labor market after college graduation.

The typical way to see the impacts on labor performance outcomes between people who have moved to SMA for college entrance and people who have not is the comparison of labor outcomes after college graduation. The majority of studies (Lee et al., 2008; Hong, 2012; Kang et

al., 2015; Youn et al., 2015; Choi et al., 2018) found that groups who moved to SMA benefited from the labor market rather than those who did not. Although it could be assumed that simply moving to SMA comes with labor market advantages, studies have shown different effects of moving into SMA.

For instance, Lee et al. (2008) found no effect on the employment status of those who graduated from college in Seoul special city while a positive impact was observed on the employment status of those who graduated from college in SMA which adds Gyeonggi province and Incheon metropolitan city including Seoul special city, compared to non-SMA college graduates among a sample of 4-year college students. Hong (2012) focused on non-SMA female graduates who often experience disadvantages in the labor market and revealed that the variable of college location in SMA was not statistically significant in terms of success of getting jobs, but it was statistically significant in terms of quality of employment.

Youn et al. (2015) asserted that previous studies neglected the point that differences of labor market performances between SMA and non-SMA graduates may have been attributed to differences in personal attributes before entering college. For this reason, prior to the analysis, they employed propensity score matching to minimize selection bias and analyzed students with similar attributes in their model. Even though they matched students with similar characteristics, the results showed that SMA graduates have a higher premium in terms of corporate size and income level than non-SMA graduates.

Kang et al. (2015)'s study is meaningful as they analyzed the economic effects of migration to SMA due to college entrance. They demonstrated the linkage of migration motivation for college education purposes and the economic rewards after graduating from SMA colleges. In their study, the migration was seen as a long-term process, and they revealed that migration to SMA

creates economic effects not only for individual's annual income level but also for households' net assets.

Also, there are studies (Kang et al., 2015; Kim et al., 2019) which argued that college location is not influential in the outcome of labor performances. Kang et al. (2015) used the Kaplan-Meier model (1958) using Graduates Occupational Mobility Survey [GOMS] for college graduates between 2009 and 2011 to investigate the trend of employment rate. According to their results, college graduates from Gyeonggi province had a higher employment rate than college graduates from Seoul, but they concluded that it was not statistically significant. Rather, they found that marital status and human capital factors affect the employment rate.

Kim et al. (2019) looked at the employment outcome of college graduates based on whether they got a job matching with their majors in college or not. They also adopted propensity score matching before the main analysis as Youn et al. (2015) did in their study to reduce selection bias. Kim et al. (2019) concluded that in the case of the first job area, only Daegu/Gyeongbuk area was statistically significant on major-matching jobs, but they did not explain the reasons of the results as to why the location of college does not have any impact on well-matching jobs.

The differences in labor market performances from migration were mainly studied focusing on the primary outflow due to college entrance (Moon et al., 2017), and relatively little research (Choi et al., 2018; Kang, 2019) were conducted on the side of youth second outflow due to employment.

Choi et al. (2018) analyzed the effect of youth migration on wages when they transfer to their second job from their first job using Difference in differences [DID] methodology. The results showed that non-SMA college graduates who got their second jobs in SMA had an increase in

wages, but SMA college graduates who got their second jobs in non-SMA did not have an income premium. This study confirmed that as long as there is a wage premium in moving to SMA, the outflow of local youth from non-SMA is highly likely to continue, and more active place-based economic efforts for young generation are required to minimize the outflow of youth.

In line with the characteristics of youth migration, Kang (2019) asserted that the spatial scope of the daily labor market for young Koreans does not seem to cross the boundary of metropolitan cities, but demand and supply of young labor in SMA are interdependent between regions, forming a single labor market. Since 2000, the mobility of young people has been further strengthened, and the increased mobility in their late 20s is believed to be related to college entrance and cause a delay in entering the labor market.

The recent study of Cho (2020) is worth noticing because it is the first attempt to analyze the migration of young people in relation with their life cycles (e.g., high school, college, and workplace) on their wage level. In his study, samples from 4-year colleges were divided into 8 types based on the migration throughout youth life using information about their residence at high school, college, and first job workplace. He analyzed that wage levels vary depending on the types of movement, and the non-SMA high school, non-SMA college, and non-SMA workplace group had the lowest income level. They study concluded that providing quality and decent jobs to young people in the local labor market would reduce the issues of youth outflow along with existing prior studies.

The purpose of this study is analyzing the impact of migration between SMA and non-SMA college graduates, who are represented as Korean youth, on their first labor market outcomes. As other prior studies focused on the migration between non-SMA and SMA, this study considers the same moving directions as well, but Choi et al. (2018) suggest that the effects of migration into

SMA could offset the effects into non-SMA without considering the direction of migration. Based on the advice from Choi et al. (2018)'s study, I also subdivide the migration into sub-groups analysis (e.g., migration from non-SMA college graduates to SMA for their jobs vs. migration from SMA college graduates to non-SMA for their jobs) to estimate the different impacts from moving directions. If youth migration to non-SMA does not bring them better benefits compared to migration to SMA in labor markets, we can predict that the concentration of youth into SMA will be intensified as they would pursue decent job conditions in their first job markets.

4. Data and summary statistics

4.1. Data

In this study, recent five years (2018GOMS, 2017GOMS, 2016GOMS, 2015GOMS and 2014GOMS) of Graduates Occupational Mobility Survey [GOMS] data collected by the Korea Employment Information Service [KEIS] were used to analyze the impact of college graduates' migration on their first job employment behaviors. The GOMS data covers for college or higher education graduates, and the most recent data offered by KEIS is 2018GOMS answered by graduates between August 2017 and February 2018. The aim of the GOMS is to analyze the transition of college graduates from school to the labor market by investigating graduates' college education process, economic activities/status, job-seeking training, family-level background, and so on (KEIS, 2021). The specific reasons of using GOMS data area as follows. First, the purpose of this study is based on college graduates, who can be seen as representatives of Korean young generation, and GOMS is the largest cohort survey of college graduates (Youn et al., 2015) with a large number of samples (Ryu, 2015). Second, the GOMS provides locations of colleges and the

first job workplaces of the samples, which can help to track the migration of Korean youth along with their life cycle.

Also, the reason for analyzing the impact on youth first labor market outcomes is because it holds a significant meaning of the first job. For college graduates, their first job means economic independence (Chung, 2021), and it could be a gateway to finding suitable jobs through shifts from their first jobs (Moon et al., 2017). Although it has not been agreed on how the first job working experience affects future labor market outcomes, existing studies (Park et al., 2011; Hwang et al., 2012; Moon et al., 2017; Chung, 2021) emphasize the importance of the first job.

As the aim of this study is to investigate the impact of college graduates' migration on their first job labor outcomes in terms of job status, being employed in a large-sized company, and average monthly income, samples who are younger than 20 or older than 34, samples who did not get the first job after college graduation, samples who transferred from the first jobs, and samples who are non-wage workers were excluded from the analysis. In addition, 2-3year colleges and educational colleges were excluded because labor market outcomes may vary because of specificities of these schools. Prior studies (Lee, 2008; Youn et al., 2015; Cho, 2020; Hong et al., 2020) also pointed out different characteristics among 2-3year colleges, educational colleges, and 4-year colleges.

4.2. Propensity score matching

Labor performances related to migration from college graduates are influenced not only by migration itself but also by other attributes individuals had before migration, therefore controlling these are necessary to reduce selection bias issues (Youn et al., 2015; Choi et al., 2018; Kim et al.,

2019). In this study, the propensity score matching through a variable-based model that can affect migration was used and then matched treatment (i.e., migration group) and control (i.e. non-migration group) groups similarly using radius matching. Although matched samples using radius matching were mainly used in this paper, analysis using matched samples by 1:1 nearest neighbor matching with replacement and kernel matching were also used to check the results for robustness.

For matching, demographic factors (e.g., sex and age), socioeconomic factors (e.g., parents' educational background and parents' current income), college-related factors (e.g., major, average GPA, having work goals at college, and satisfaction on college), job-related factors (e.g., types of jobs and personal thoughts on job matching), pre-employment factors (e.g., having work training and having exams on civil service or public institutions), cost-related factors (e.g., living with parents, having student loans, supporting family, and receiving support from family), and geographical factors (e.g., administration of college and whether high school and college are in the same are) were included.

Demographic and socioeconomic factors are primary variables that affect migration (Kwon, 2005; Ryu, 2015; Moon et al., 2020). In demographic and socioeconomic factors, sex was defined as a binary variable with a male as a reference group and age was used as a continuous variable from 20 to 34. Parent's educational background was rescaled into continuous variables from categorical variables according to average educational years of schooling offered by Korean Women's Development Institute [KWDI] (2017) and parents' current income was used as a categorical variable with no income as a base group.

Major having humanities as a reference level, average GPA converted into percentage, a dichotomous variable of having work goals at college, and a categorical variable of satisfaction on college were added in college-related factors. The value of 1 was given if college graduates had

goals while they were in college and satisfaction on college has greater the value if they have higher the satisfaction with the college.

Also, variables of types of jobs and personal thoughts on job matching in job-related aspects were included to control the selection bias problems. A variable of types of jobs offers information on what types of jobs an individual is working for and it were defined as a categorical variable with domestic and foreign private companies operated by Koreans as a reference. Personal thoughts on job matching is a categorical variable and it has the higher value if individuals think the job matches well with the level of function they have.

As a number of variables in pre-employment factors affecting labor market outcomes are also used in main analysis, only two variables (i.e., having work training and having exams on civil service or public institutes) were used in propensity scores matching to avoid issue of multicollinearity with main analysis. Both variables were defined as binary variables and they were given value 1 if youth had the corresponding experiences.

In cost-related factors, living with parents, having student loans, supporting family, and receiving support from family were included and given value of 1 and 0 depending on whether individuals were applicable or not. Especially, the variable of living with parents were added as a proxy of housing based on literature (Park; 2017) claiming the relationship between youth migration and housing pressures.

Lastly, geographical factors related to distance were added with reference to prior research (Ravenstein, 1885; Lee, 2010; Yun, 2015; Min et al., 2017) asserting the relationship with mobility and distance. The variable of administration of college was added to check whether geographical proximity affects migration and its reference level is Seoul special city. Also, the variable of

whether high school and college are in the same area was added as a binary variable and it was given value of 1 if high school and college are in same area and given 0 if they are not.

Table 1 presents the estimated coefficients from results of propensity scores matching using radius matching methodology on five-year (2018GOMS, 2017GOMS, 2016GOMS, 2015GOMS and 2014GOMS hereinafter 2018GOMS-2014GOMS) pooled cross-sectional data and results of each wave is covered (see Appendix B).

TABLE 1 – ESTIMATED COEFFICIENTS FROM THE RESULTS OF PROPENSITY SCORE MATCHING

Variables	(1) All		(2) non-SMA		(3) SMA	
	Outcome variable: migration (=1) or not (=0)					
A. Demographic factors						
Sex	-0.7397	***	0.1117	***	-0.3259	***
Age	-0.0206	***	-0.0019		-0.0159	
B. Socioeconomic factors						
Parents' educational background	0.0041	**	0.01	***	-0.0012	
Parents' current income	0.0074		-0.0046		0.0295	***
C. College-related factors						
Major (=ref. humanities)						
social studies	0.021		0.0083		0.0078	
education	0.1071	**	0.0687		0.1852	*
engineering	0.0873	***	-0.0092		0.307	***
natural science	0.0379		-0.1132	***	0.2979	***
medicine	0.2293	***	0.1103	**	0.0277	
arts and physical education	0.1576	***	0.2177	***	0.0881	
Average GPA	0.2766	***	0.3522	***	0.2692	
Having work goals at collage (=1)	0.0248		0.1493	***	-0.1741	***
Satisfaction on college	-0.024	**	-0.0649	***	0.082	***
D. Job-related factors						
Types of job businesses (ref. private company)						
foreign company	0.0564		0.2723	***	-0.0773	
public institutes	0.777	**	-0.5921	***	1.0089	***
incorporation	-0.2333	***	-0.3929	***	0.1344	
government officials	0.041		-0.5738	***	1.0251	***
educational institutes	-0.662	***	-0.9829	***	-0.051	
research institutes	-0.3718	***	-0.9654	***	0.5744	***
Job matching	0.0522	***	0.0984	***	-0.019	
E. Pre-employment factors						
Having work training (=1)	0.0399	*	0.0107		0.1468	***
Having experiences on public exam (=1)	-0.1973		-0.0322		0.0518	
F. Cost-related factors						
Living with parents (=1)	-0.4559	***	-0.5567	***	0.5795	***
Having student loans (=1)	0.055	***	0.0436	*	0.0175	
Supporting family (=1)	0.0612	***	0.1034	***	-0.0244	
Receiving support from family (=1)	0.0528		0.1852	***	-0.3065	***
G. Geographical factors						
Administrations of college (ref. Seoul)						
Gyeonggi	0.4111	***	-		0.0406	
Chungchung	1.0972	***	-0.2382		-	
Gyeongsang	0.4395	***	-0.6126	***	-	
Jeolla	0.5816	***	-0.4488	***	-	
High school and college location (=1)	-1.0304	***	-1.3332	***	-0.5199	
constant	-0.1443		0.6219	**	-0.8106	**

Notes. The table indicates the estimated coefficients from results of propensity score matching using radius matching on five-year (2018GOMS-2014GOMS) pooled cross-sectional data. Column (1) represents all samples, both non-SMA and SMA college graduates, column (2) represents non-SMA college graduates, and column (3) represents SMA college graduates. ***, **, and * indicate significance at the 1%, 5%, and 10% level respectively. Results of each year's score matching is covered (see Appendix B).

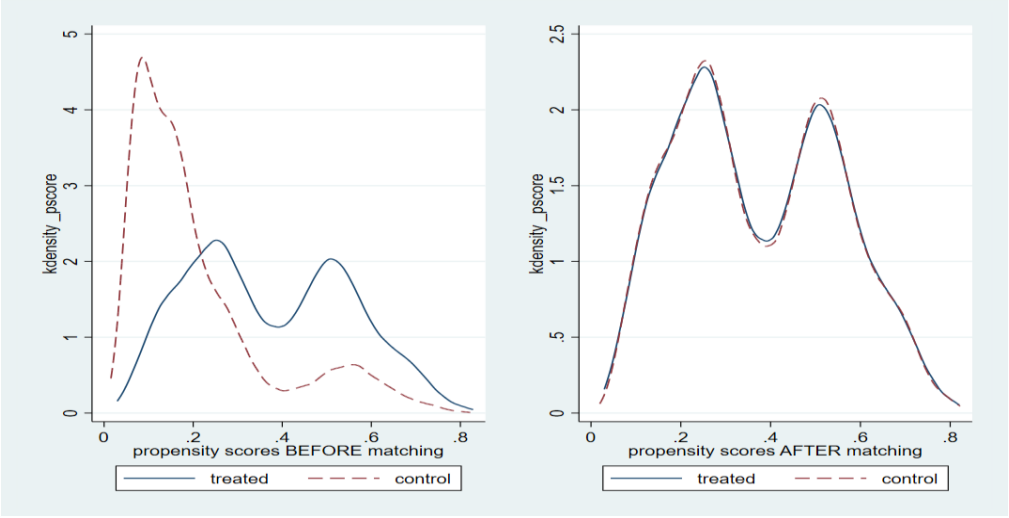
Through the overall results from all samples, column (1), college graduates with having parents' higher educational backgrounds, with major of medicine or arts and physical education, with higher GPA, with a well-matched job, having student loans, and supporting family are highly likely to migrate and college graduates who are female and older are less likely to migrate for employment. Moreover, working in incorporation, educational institutes, research institutes, and living with parents have negative impact on youth migration. It appears to reflect the government's policy of promoting public institutes to spread seems to be working. Also, it seems to show that it is difficult for young people who do not economic independence to move to other areas.

When it comes to college graduates in non-SMA, column (2), female graduates are more likely to migrate than male, and college graduates having parents with higher educational backgrounds, majoring in arts and physical education, and having higher GPA are more likely to migrate to SMA for employment. Interestingly, if non-SMA college graduates had working goals while attending college, they are more likely to migrate, and if college graduates have high overall satisfaction on college, they are less likely to migrate. Types of jobs have also influenced the possibility of migration to SMA, and when non-SMA college graduates belonged to public institutes, educational institutes, and research institutes, the less likely to move to SMA, and the results are statistically significant at the 1% significance level. In cost-related aspects, living with parents lowers the possibility of migration but college graduates having with student loans, supporting family, and receiving support from family are likely to move into SMA. Similar to Gravity model from Ravenstein (1885) asserting the relationship between distance and migration, college graduates in Gyeongsang and Jeolla administrative, which are relatively far from SMA than Chungchung administrative, are less likely to move to SMA than college graduates in Chungchung.

Based on results from SMA college graduates, column (3), unlike college graduates in non-SMA, male college graduates are more likely to move to non-SMA for employment. In addition, college graduates majoring in engineering and natural science, having higher satisfaction on college, and having work training experience are more likely to migrate. In terms of types of jobs, when graduates belong to public institutes, government officials, and research institutes, they are highly likely to move to non-SMA and they are statistically significant at the 1% significance level. This result is in line with the results from non-SMA, column (2), proving that the government's policy of decentralizing public institutions to prevent population concentration (Park et al., 2017) is effective for young people. Also, living with parents rather increases migration to non-SMA and receiving support from family decreases migration.

Figure 3 shows the distribution of propensity scores using radius matching before and after on five-year (2018GOMS-2014GOMS) pooled cross-sectional data and its samples contain all college graduates in non-SMA and SMA.

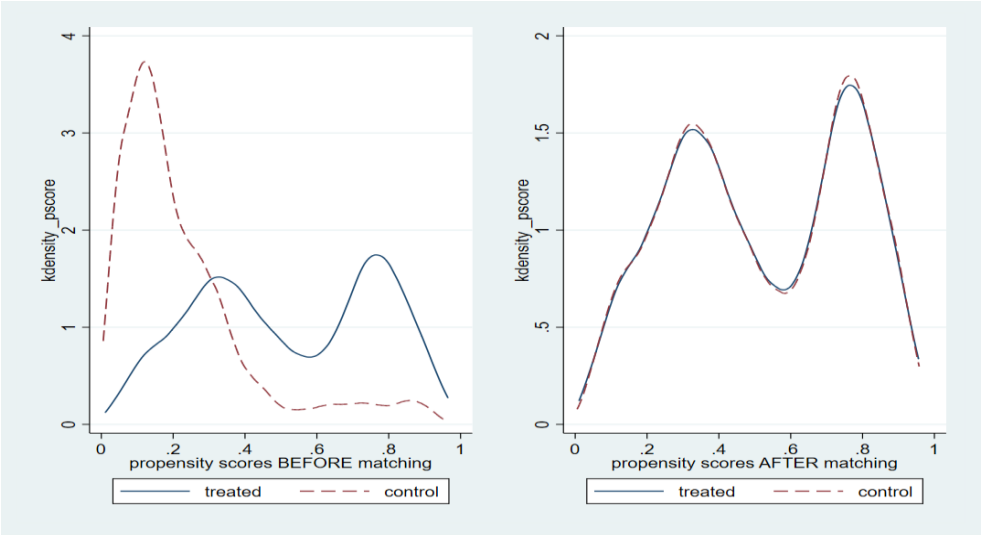
FIGURE 3 – DISTRIBUTION OF PROPENSITY SCORES (ALL COLLEGE GRADUATES)



Notes. The figure represents the distribution of propensity scores before matching and after matching using radius matching on five-year (2018GOMS-2014GOMS) pooled cross-sectional data and it contains all samples (i.e., non-SMA college graduates and SMA college graduates). Left part shows the propensity scores before matching and right part shows the propensity score after matching. In both parts, straight line indicates the treated group (i.e., migration group) and dashed line indicates the control group (i.e., non-migration group). Figures of matching results for each year are available upon author.

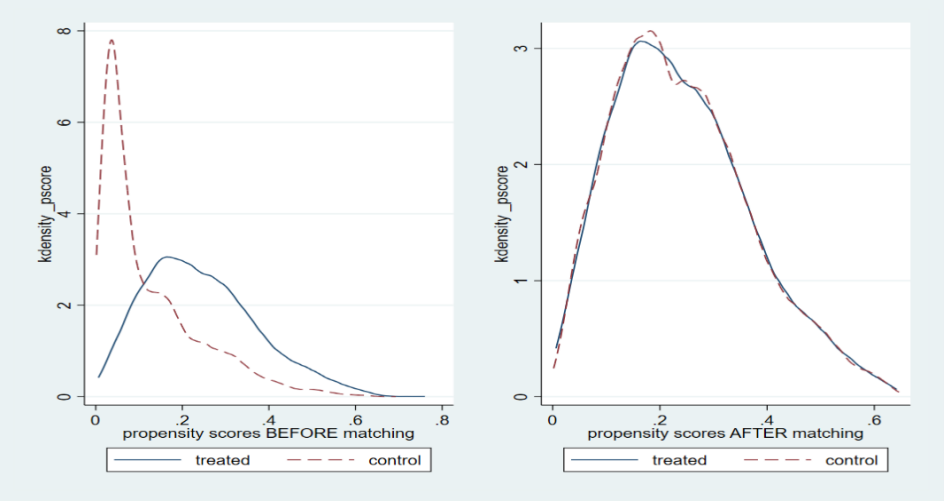
Figure 4 and 5 compare the distribution of propensity scores before and after matching using radius matching on five-year (2018GOMS-2014GOMS) and each figure represents samples in non-SMA college graduates and SMA college graduates respectively.

FIGURE 4 – DISTRIBUTION OF PROPENSITY SCORES (NON-SMA COLLEGE GRADUATES)



Notes. The figure represents the distribution of propensity scores matching before and after on non-SMA college graduates from five-year (2018GOMS-2014GOMS) pooled cross-sectional data. Left part shows the propensity scores before matching and right part shows the propensity score after matching. In both parts, straight line indicates the treated group (i.e., migration group) and dash-ed line indicates the control group (i.e., non-migration group). Figures of matching results for each year are available upon author.

FIGURE 5 – DISTRIBUTION OF PROPENSITY SCORES (SMA COLLEGE GRADUATES)



Notes. The figure represents the distribution of propensity scores matching before and after on SMA college graduates from five-year (2018GOMS-2014GOMS) pooled cross-sectional data. Left part shows the propensity scores before matching and right part shows the propensity score after matching. In both parts, straight line indicates the treated group (i.e., migration group) and dash-ed line indicates the control group (i.e., non-migration group). Figures of matching results for each year are available upon author.

Table 2 presents the results of mean differences of treatment group (i.e., migration) and control group (i.e., non-migration) from five-year (2018GOMS-2014GOMS) pooled cross-sectional data before propensity score matching. Column (1) to (3) represent samples from all college graduates, non-SMA college graduates, and SMA college graduates in regular sequence.

TABLE 2 – MEAN COMPARISON TEST BEFORE PROPENSITY SCORE MATCHING

Variables	(1) Main	(2) non-SMA	(3) SMA
Sex	0.057***	0.003	0.186***
	(8.59)	(0.41)	(14.11)
Age	0.078**	-0.030	-0.123*
	(3.07)	(-1.03)	(-2.45)
Parents' educational background	0.086	-0.429***	0.072
	(1.32)	(-5.63)	(0.55)
Parents' current income	-0.025	-0.041	-0.132*
	(-1.02)	(-1.45)	(-2.53)
Major (=ref. humanities)	-0.224***	-0.209***	-0.051
	(-9.68)	(-7.74)	(-1.09)
Average GPA	0.001	0.001	-0.004
	(0.45)	(0.87)	(-1.50)
Having work goals at collage (=1)	-0.002	-0.042***	0.044**
	(-0.26)	(-5.21)	(3.29)
Satisfaction on college	0.074***	0.136***	-0.190***
	(6.33)	(10.00)	(-8.00)
Types of job businesses (ref. private company)	0.339***	0.803***	-0.747***
	(12.74)	(25.31)	(-14.63)
Job matching	-0.055***	-0.068***	-0.005
	(-6.30)	(-6.64)	(-0.27)
Having work training (=1)	-0.002	-0.011	-0.048***
	(-0.26)	(-1.58)	(-4.00)
Having experiences on public exam (=1)	0.033***	0.077***	-0.102***
	(6.36)	(12.84)	(-9.79)
Living with parents (=1)	0.154***	0.071***	0.354***
	(22.90)	(8.87)	(27.09)
Having student loans (=1)	-0.025***	-0.057***	0.033**
	(-4.16)	(-8.14)	(2.72)
Supporting family (=1)	-0.011	-0.053***	0.043***
	(-1.86)	(-7.88)	(3.51)
Receiving support from family (=1)	0.010**	-0.002	0.028***
	(3.28)	(-0.54)	(4.24)
Administrations of college (ref. Seoul)	-0.174***	0.520***	0.037**
	(-9.38)	(39.36)	(2.90)
High school and college location (=1)	0.354***	0.422***	0.259***
	(65.37)	(70.57)	(22.27)

Notes. The table shows the results of mean comparison between migration group and non-migration group before propensity score matching on five-year (2018GOMS-2014GOMS) pooled cross-sectional data. Column (1) represents all college graduates, column (2) and (3) represent non-SMA and SMA college graduates respectively. Standard errors are shown in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level respectively. Results of comparison tests are covered (see Appendix C).

Table 3 presents the results of mean comparison between migration and non-migration groups from five-year (208GOMS-2014GOMS) pooled cross-sectional data after propensity score matching using radius matching. Column (1) to (3) represents all college graduates, non-SMA and SMA college graduates in sequentially.

TABLE 3 – MEAN COMPARISON TEST AFTER PROPENSITY SCORE MATCHING

Variables	(1) Main	(2) non-SMA	(3) SMA
Sex	0.015**	0.046***	-0.012
	(0.007)	(0.011)	(0.013)
Age	-0.088***	0.019	-0.072
	(0.029)	(0.042)	(0.055)
Parents' educational background	-0.094	-0.057	0.004
	(0.076)	(0.107)	(0.141)
Parents' current income	0.012	-0.018	0.062
	(0.029)	(0.040)	(0.055)
Major (=ref. humanities)	0.070***	-0.047	-0.012
	(0.027)	(0.038)	(0.044)
Average GPA	-0.001	-0.002	0.000
	(0.002)	(0.002)	(0.003)
Having work goals at collage (=1)	0.000	0.002	-0.009
	(0.008)	(0.011)	(0.015)
Satisfaction on college	-0.066***	-0.054***	0.015
	(0.014)	(0.020)	(0.024)
Types of job businesses (ref. private company)	-0.203***	-0.474***	0.114*
	(0.030)	(0.044)	(0.059)
Job matching	0.015	-0.003	-0.006
	(0.010)	(0.014)	(0.019)
Having work training (=1)	0.005	0.008	0.016
	(0.007)	(0.010)	(0.013)
Having experiences on public exam (=1)	-0.012**	-0.004	0.017
	(0.006)	(0.007)	(0.013)
Living with parents (=1)	0.158***	0.215***	0.035***
	(0.007)	(0.009)	(0.011)
Having student loans (=1)	0.015**	0.010	-0.006
	(0.007)	(0.010)	(0.013)
Supporting family (=1)	0.027***	0.031***	0.004
	(0.007)	(0.010)	(0.012)
Receiving support from family (=1)	-0.013***	-0.010*	-0.008
	(0.004)	(0.006)	(0.006)
Administrations of college (ref. Seoul)	0.105***	-0.071***	0.011
	(0.021)	(0.021)	(0.013)
High school and college location (=1)	-0.021***	-0.009	0.025*
	(0.008)	(0.011)	(0.014)

Notes. The table shows the results of mean comparison between migration and non-migration after propensity score matching on five-year (2018GOMS-2014GOMS) pooled cross-sectional data. Column (1) represents all college graduates, column (2) and (3) represent non-SMA college graduates and SMA college graduates respectively. Standard errors are shown in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level respectively. Results of mean comparison tests after propensity score are covered (see Appendix C).

As a result, an average of about 5,700 samples were selected from each wave, and 28,714 samples were contained for main analysis from the five-year pooled (2018GOMS-2014GOMS) cross-sectional data after propensity score using radius matching method.

4.3. Summary statistics

There are three outcome variables: job status, which is being hired as a regular worker or not, being hired in a large-sized company with more than 300 employees, and average monthly income. All outcome variables were recorded based on the codebooks from KEIS. In terms of whether a worker is a regular employee or not, a value of 1 was given if the questionnaire respondent answered that he or she is a regular worker, and a value of 0 was given if otherwise. Regarding being employed in a large-sized company, the number of employees in the business was used instead of the number of enterprises to reduce the missing values, following the strategy of Cho (2020). A value 1 was given if the worker is being employed in a company with more than 300 employees, and value 0 was given when the company has fewer employees than that. The average monthly income is pre-tax payment, including bonuses based on the answers from questionnaires, and it was taken in a logarithmic form.

The key independent variable 'migration' used in this paper was earlier defined as the movement between SMA and non-SMA after college graduation. This variable contains both directions (i.e., from SMA to non-SMA or from non-SMA to SMA) and has a value 1 if movement occurs between the two areas. Conversely, value 0 was given if movement does not occur between the two areas. In the main analysis, both directions were treated as the same migration with value 1, but in the sub-groups' analysis, the movement of SMA college graduates and the movement of

non-SMA college graduates separately examined to figure out the effects of migration on their first job working conditions.

Table 4 describes the descriptive statistics for the three outcome variables to analyze the impacts of college graduates' migration on their first job labor market outcomes. The total sample contains paid workers who graduated from 4-year college between 20 to 34 years old in SMA or non-SMA. As this paper focuses on the first job of college graduates, samples were contained as those who have first jobs after college graduation.

TABLE 4 – DESCRIPTIVE STATISTICS OF OUTCOME VARIABLES

Variables	(1) Pooled CS **Mean** (S.D.)	(2) 2018 **Mean** (S.D.)	(3) 2017 **Mean** (S.D.)	(4) 2016 **Mean** (S.D.)	(5) 2015 **Mean** (S.D.)	(6) 2014 **Mean** (S.D.)
Regular worker or not	**0.82**	**0.82**	**0.832**	**0.793**	**0.827**	**0.834**
	(0.384)	(0.384)	(0.374)	(0.405)	(0.379)	(0.372)
Company with more than 300 employees	**0.319**	**0.308**	**0.31**	**0.339**	**0.318**	**0.327**
	(0.466)	(0.462)	(0.463)	(0.473)	(0.466)	(0.469)
ln(average monthly income)	**5.405**	**5.468**	**5.438**	**5.397**	**5.35**	**5.367**
	(0.402)	(0.394)	(0.383)	(0.414)	(0.407)	(0.404)
Observation	28,714	6,059	5,797	5,856	5,531	5,387

Notes. The sample contains paid workers who graduated from 4-year college between 20 to 34 years old and who had first job after college graduation. The detailed information of the outcome variables and primary independent variables are available upon author.

For control variables, demographic characteristics (e.g., sex and age), socioeconomic characteristics (e.g., parents' educational background and parent's current income), college-related characteristics (e.g., major, average GPA, having work goals at college, having work experiences at college, and reservation income at college), and pre-employment characteristics (e.g., having experiences abroad, having work training, having qualification, and having English scores) were included.

Sex and age are key variables affecting labor market outcomes (Youn et al. 2015; Cho, 2020). Sex was defined as a dummy variable that places a male as a reference and age is a continuous variable, consisting of 20 to 34 years, considering the time of admission to Korean colleges and scope of this study is young people.

Parents' socio-economic status is a factor that affects the labor market performance of their children's generation beyond their generation (Shin, 2010). In this regard, parent's educational background and parent's current income variables were added as to control their impacts on youth first job behaviors. Parents' educational backgrounds were originally investigated as graduation from elementary, middle, high, 2-3 year colleges, 4-year colleges, and graduates schools, and they were converted into average educational years of each school provided by KWDI (2017) and parent's current income variables were defined as categorical variable with no income as a reference group.

In College-related characteristics, major variables were added with humanities as a reference, average GPA calculated as a percentage from each school's GPA system and total score, having work goals at college as a binary variable, working experiences at college as a dummy variable, and log of reservation income at colleges. Reservation income variable was added to control the possibility that young people with limited information or experience in the labor market may have a higher level of expectation (Kim et al., 2016) and this individuals' subjective job expectations affect youth future wages (Lee at al., 2015).

The variables of pre-employment factors to improve labor market results were added based on existing literatures (Lim et al., 2014; Lee et al., 2015; Kim, 2018, Jo, 2021). Each study showed different effects from employment activities, but generally agreed that employment activities affect labor performances. Having experiences abroad, having working training, having

qualification, and having English scores, which were given value of 1 and 0 depending on whether individuals are applicable or not.

Table 5 presents the descriptive statistics of control variables.

TABLE 5 – DESCRIPTIVE STATISTICS OF CONTROL VARIABLES

Variables	(1) Pooled cs **Mean** (S.D.)	(2) 2018 **Mean** (S.D.)	(3) 2017 **Mean** (S.D.)	(4) 2016 **Mean** (S.D.)	(5) 2015 **Mean** (S.D.)	(6) 2014 **Mean** (S.D.)
A. Demographic characteristics						
Sex	**0.351** (0.477)	**0.356** (0.479)	**0.353** (0.478)	**0.347** (0.476)	**0.36** (0.48)	**0.339** (0.473)
Age	**26.538** (1.836)	**26.567** (1.811)	**26.55** (1.794)	**26.532** (1.776)	**26.479** (1.865)	**26.534** (1.913)
B. Socioeconomic characteristics						
Parents' educational background	**26.652** (4.823)	**27.245** (4.663)	**26.885** (4.846)	**26.693** (4.928)	**26.347** (4.656)	**26.027** (4.954)
Parents' current income	**4.559** (1.831)	**4.685** (1.907)	**4.687** (1.895)	**4.633** (1.849)	**4.446** (1.717)	**4.341** (1.721)
C. College-related characteristics						
Major	**2.812** (1.69)	**2.802** (1.683)	**2.727** (1.672)	**2.822** (1.666)	**2.818** (1.692)	**2.934** (1.708)
GPA at college	**0.81** (0.098)	**0.81** (0.093)	**0.808** (0.088)	**0.817** (0.087)	**0.801** (0.133)	**0.815** (0.086)
Having a double/minor major (=1)	**0.161** (0.367)	**0.177** (0.381)	**0.163** (0.369)	**0.165** (0.372)	**0.142** (0.349)	**0.152** (0.359)
Having work goals at college (=1)	**0.496** (0.5)	**0.484** (0.5)	**0.523** (0.5)	**0.544** (0.498)	**0.421** (0.494)	**0.509** (0.5)
Reservation income at college	**7.932** (0.266)	**7.989** (0.246)	**7.974** (0.251)	**7.94** (0.259)	**7.884** (0.252)	**7.868** (0.295)
Having work experiences (=1)	**0.65** (0.477)	**0.638** (0.481)	**0.684** (0.465)	**0.661** (0.473)	**0.612** (0.487)	**0.652** (0.476)
F. Pre-employment characteristics						
Having experiences abroad (=1)	**0.126** (0.332)	**0.109** (0.312)	**0.128** (0.334)	**0.133** (0.34)	**0.136** (0.343)	**0.124** (0.329)
Having work training (=1)	**0.254** (0.436)	**0.284** (0.451)	**0.349** (0.477)	**0.3** (0.458)	**0.165** (0.371)	**0.165** (0.372)
Having qualification (=1)	**0.565** (0.496)	**0.55** (0.498)	**0.544** (0.498)	**0.575** (0.494)	**0.549** (0.498)	**0.61** (0.488)
Having English scores (=1)	**0.45** (0.497)	**0.41** (0.492)	**0.431** (0.495)	**0.423** (0.494)	**0.559** (0.497)	**0.439** (0.496)
Observation	28,714	6,059	5,797	5,856	5,531	5,387

Notes. The sample contains paid workers who graduated from 4-year college between 20 to 34 years old and who had first job after college graduation. The detailed information of the control variables are available upon author.

5. Methodology

The main purpose of this study is to estimate the effect of migration of college graduates on their first job labor outcomes. Since the outcomes of interest in this paper include both binary variables (i.e., being hired as a regular worker or not and being hired in a large-sized company or not) and continuous variable (log of average monthly income), different estimation methodologies were used according to the types of the outcome variables.

For the outcome variables of job status (a regular worker or not) and working in a large-sized company, logistic regression estimation was adopted, and OLS regression with robust standard errors was used to estimate the impact of migration on the log of average monthly income.

5.1. Logistic regression model

$$Logit(\mathrm{P}\ (Y_i)) = log\left(\frac{\mathrm{P}\ (Y_i)}{1-\mathrm{P}\ (Y_i)}\right) = \beta_0 + \beta_1 migration_i + \beta_2 X_i + \varepsilon_i \quad \cdots \ (1)$$

$$Odds = \frac{\mathrm{P}\ (Y_i)}{1-\mathrm{P}(Y_i)} \quad \cdots \ (2)$$

In the case of dichotomous outcome variables such as working status (being hired as a regular worker or not) and working in a large-sized company with more than 300 employees, binary logistic model was adopted to estimate the impact of migration on the labor outcomes. An even is presented as Y_i in above equation (1) and (2), and events mean working as a regular worker and working in a large-sized company in this research paper. Therefore, P (Y_i) represents the probability of being hired as a regular worker and the probability of being hired in a large-sized company. $migration_i$ is the main independent variable in this model formed as a binary variable,

and it takes value 1 when a college graduates from non-SMA or SMA moved to SMA or non-SMA for first employment and it takes 0 when a college graduate did not move. X_i represents control variables, and demographic, socioeconomic, college-related, and pre-employment characteristics were sequentially added to measure the impact of the migration of college graduates' first labor performances. ε_i is an error term.

As the coefficients of the logistic regression are not simple to interpret when migration occurs, the odds ratio was calculated from equation (2), and its result tables are attached in the next chapter to observe the impacts of migration on labor performances from year 2014 to 2018 with pooled data. An odds ratio is the ratio of odds between two groups, and it was used to calculate the relative odds for the occurrence of the outcome of interest (i.e., working as a regular worker and working in a large-sized company), given the exposure to the variables of interest (migration to other areas for jobs). If the odds ratio has value 1, the migration does not affect the odds of an event. If the odds ratio is smaller than 1, the migration is associated with lower odds of the event, and if the odds ratio is bigger than one, the migration is associated with higher odds of the event.

5.2. OLS regression with robust standard errors

$$\log(wage) = \beta_0 + \beta_1 migration_i + \beta_2 X_i + \varepsilon_i \quad \cdots \quad (3)$$

One of the outcome variables, average monthly income of young people who graduated from 4-year college, was taken in a logarithmic form. In equation (3), our main interest coefficient is β_1 which explains the impact of $migration_i$ on youth average monthly income from their first jobs. $migration_i$ was given 1 if college graduates from SMA moved to non-SMA for work or college graduates from non-SMA moved to SMA for work and given 0 if otherwise. X_i represents

control variables, and demographic, socioeconomic, college-related, and pre-employment related variables were added sequentially to examine how the primary independent variable, $migration_i$ estimates the effect when the model specification is modified by adding regressors. ε_i is an error term.

6. Results

6.1. Main estimation

The goal of this study is to estimate the effect of college graduates' migration on their first labor market behaviors. The labor outcomes consist of three types in this paper: working job status as a regular worker, being employed in a large-sized company with more than 300 employees, and the average monthly income.

6.1.1. Job status

Table 6 presents the results of the odds ratio from the logistic regression model from equation (1) and (2) which estimate the impact of college graduates' migration on their first job status, being hired as regular workers or not. Column (1) concerns the migration effect on job status from the five-year pooled cross-sectional data, and it shows that college graduates who moved to SMA or non-SMA had higher changes to be regular workers (odds ratio: 1.47) than college graduates who did not move to other areas. Similar to the pooled cross-sectional data, columns (2) to (6) show that total samples of college graduates who moved to other areas got a higher probability of working as regular workers than graduates who did not move and all

estimates are statistically significant at the 1% significance level. The odd ratios have been growing over each year-wave since 2016. This change can be interpreted as meaning that the probability of being regular workers increases over each graduates' cohorts when college graduates move to other areas.

TABLE 6 – EFFECT ON JOB STATUS (ODDS RATIO)

Variables	ALL					
	(1) Pooled CS	(2) 2018	(3) 2017	(4) 2016	(5) 2015	(6) 2014
	Outcome variable: regular worker (=1) or not (=0)					
Migration	**1.47*** (0.06)**	**1.54*** (0.14)**	**1.49*** (0.15)**	**1.34*** (0.13)**	**1.46*** (0.15)**	**1.47*** (0.15)**
Control variables	YES	YES	YES	YES	YES	YES
Observations	28,714	6,059	5,797	5,856	5,531	5,387
Pseudo R-squared	0.0618	0.0793	0.0778	0.0696	0.0656	0.0519

Notes. The table indicates the odds ratio from the logistic regression of migration to other areas (from SMA to non-SMA or from non-SMA to SMA) on the youth first job working status, which indicates whether they work as regular workers or not using five years of GOMS (2018GOMS-2014GOMS) and pooled cross-sectional data. All estimation include control variables and standard errors are shown in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level respectively.

6.1.2. Being hired in a large-sized company

Table 7 shows the odds ratios from the logistic model from equation (1) and (2) to estimate the impact of college graduates' migration on being hired in large-sized companies with more than 300 employees.

TABLE 7 – EFFECT ON BEING EMPLOYED IN A LARGE-SIZED COMPANY (ODDS RATIO)

	ALL					
Variables	(1) Pooled CS	(2) 2018	(3) 2017	(4) 2016	(5) 2015	(6) 2014
	Outcome variable: large-sized company worker (=1) or not (=0)					
Migration	**1.01**	**1.11**	**0.98**	**0.98**	**1.06**	**0.91**
	(0.04)	**(0.09)**	**(0.08)**	**(0.08)**	**(0.09)**	**(0.07)**
Control variables	YES	YES	YES	YES	YES	YES
Observations	28,714	6,059	5,797	5,856	5,531	5,387
Pseudo R-squared	0.105	0.120	0.123	0.124	0.105	0.0922

Notes. The table indicates the odds ratio from the logistic regression of migration to other areas (from SMA to non-SMA or from non-SMA to SMA) on the youth first job working status, which indicates whether they work in companies with more than 300 employees using five years of GOMS (2018GOMS- 2014GOMS) and pooled cross-sectional data. All estimation include control variables and standard errors are shown in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level respectively.

The odds ratio in column (1) shows the effect of migration from the five-year pooled cross sectional-data and it explains that college graduate's migration brought higher probability to be workers in large-sized companies (odds ratio: 1.01), but the result is not statistically significant. Among all year waves used in analysis, odds ratio from 2017 and 2016 graduates' cohorts show less than 1 which means migration makes less likely to be workers in big-sized companies. However, both estimates are statistically in significant.

6.1.3. Average monthly income

Table 8 presents the impact of migration on college graduates' average monthly income transformed in a logarithmic form and coefficients were from OLS regression with robust standard errors.

TABLE 8 – EFFECT ON AVERAGE MONTHLY INCOME

	ALL					
Variables	(1) Pooled CS	(2) 2018	(3) 2017	(4) 2016	(5) 2015	(6) 2014
	Outcome variable: log of average monthly income					
Migration	**0.03*** (0.01)**	**0.02* (0.01)**	**0.02* (0.01)**	**0.03*** (0.01)**	**0.05*** (0.01)**	**0.02* (0.01)**
Control variables	YES	YES	YES	YES	YES	YES
Observations	28,714	6,059	5,797	5,856	5,531	5,387
Adjusted R-squared	0.23	0.22	0.24	0.24	0.24	0.21

Notes. The table indicates regression coefficients with robust standard errors of migration to other areas (from SMA to non-SMA or from non-SMA to SMA) on the youth first job log of average monthly income using five years of GOMS (2018GOMS- 2014GOMS) and pooled cross-sectional data. All estimation include control variables and standard errors are shown in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level respectively.

The results show that migration to other areas give higher average monthly income, and its effect in all samples shows statistically significant in all year waves and five-year pooled cross-sectional data. Column (5), year 2015, the coefficient is the highest among all year waves. Since then, the coefficient from migration has been slightly decreased to 0.03 in year 2006, column (4), and the wage premium from migration continues at a similar level till recent year 2018 which appears in column (2).

6.2. Sub-groups analysis

Reflecting the problems that may arise as Choi et al. (2018) pointed out, if migration is examined without directional consideration, the effects of migration from non-SMA into SMA could offset the effects from SMA into non-SMA. To minimize this potential problem, this study proceeded with a sub-group analysis to analyze the different meanings of migration of non-SMA college graduates and SMA college graduates.

Table 9 describes the descriptive statistics of the three outcome variables by sub-groups.

TABLE 9 – DESCRIPTIVE STATISTICS OF OUTCOME VARIABLES BY SUB-GROUPS

	(1)	(2)	(3)	(4)	(5)	(6)
	CS	2018	2017	2016	2015	2014
Variables	**Mean**	**Mean**	**Mean**	**Mean**	**Mean**	**Mean**
	(S.D.)	(S.D.)	(S.D.)	(S.D.)	(S.D.)	(S.D.)
Sub-group A. Non-SMA college graduates						
Regular worker or not	**0.805**	**0.791**	**0.818**	**0.778**	**0.817**	**0.812**
	(0.396)	(0.407)	(0.386)	(0.416)	(0.387)	(0.391)
Company with	**0.261**	**0.237**	**0.241**	**0.278**	**0.255**	**0.289**
more than 300 employees	(0.439)	(0.425)	(0.427)	(0.448)	(0.436)	(0.453)
ln(average monthly income)	**5.359**	**5.42**	**5.398**	**5.364**	**5.307**	**5.313**
	(0.383)	(0.381)	(0.35)	(0.373)	(0.384)	(0.411)
Observation	17,430	3,485	3,432	3,517	3,511	3,308
Sub-group B. SMA college graduates						
Regular worker or not	**0.831**	**0.823**	**0.841**	**0.816**	**0.838**	**0.842**
	(0.375)	(0.382)	(0.365)	(0.387)	(0.369)	(0.365)
Company with	**0.476**	**0.465**	**0.463**	**0.502**	**0.486**	**0.469**
more than 300 employees	(0.499)	(0.499)	(0.499)	(0.5)	(0.5)	(0.499)
ln(average monthly income)	**5.496**	**5.527**	**5.513**	**5.487**	**5.457**	**5.473**
	(0.445)	(0.433)	(0.442)	(0.478)	(0.43)	(0.413)
Observation	11,291	2,517	2,280	2,305	1,939	2,095

Notes. The sample contains paid workers who graduated from 4-year college between 20 to 34 years old and who had first job after college graduation. Sub-group A represents college graduates in non-SMA and sub-group B represent college graduates in SMA. The detailed information of the control variables is not included in this table, but available upon author.

6.2.1. Job status by sub-groups

Table 10 presents the results of the odds ratio from the logistic regression models to estimate the impact of non-SMA and SMA college graduates' migration on their first job status, being hired as a regular worker or not.

TABLE 10 – EFFECT ON JOB STATUS BY SUB-GROUPS (ODDS RATIO)

Variables	(1) Pooled	(2) 2018	(3) 2017	(4) 2016	(5) 2015	(6) 2014
	Sub-group A. Non-SMA college graduates					
Migration	**1.70*** (0.10)**	**2.09*** (0.27)**	**1.78*** (0.26)**	**1.48*** (0.20)**	**1.58*** (0.23)**	**1.82*** (0.24)**
Control variables	YES	YES	YES	YES	YES	YES
Observations	17,430	3,485	3,432	3,517	3,511	3,308
Pseudo R-squared	0.0540	0.0807	0.0662	0.0480	0.0729	0.0790
	Sub-group B. SMA college graduates					
Migration	**1.39*** (0.12)**	**1.48** (0.28)**	**1.49* (0.31)**	**1.36 (0.26)**	**1.45* (0.32)**	**1.61** (0.36)**
Control variables	YES	YES	YES	YES	YES	YES
Observations	11,291	2,517	2,280	2,305	1,939	2,095
Pseudo R-squared	0.143	0.207	0.162	0.215	0.156	0.136

Notes. The table indicates the odds ratio from the logistic regression of migration to other areas (from SMA to non-SMA or from non-SMA to SMA) on the youth first job working status, which indicates whether they work as regular workers or not, by sub-groups using five years of GOMS (2018GOMS-2014GOMS) and pooled cross-sectional data. All estimation include control variables and standard errors are shown in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level respectively.

In non-SMA college graduates' groups, the odds ratios are bigger than 1 in all columns, which means college graduates who moved to SMA experienced positive impacts and they are statistically significant at the 1% significance level in all year waves and pooled cross-sectional data. Especially, when it comes to odds ratio from year 2018 and 2017, column (2) and (3), the odds ratios are almost double, they show that the migrants had much higher probability to be

regular workers than non-migrants when they moved to SMA for their first jobs. The trend of impact from migration on youth job status has been quite consistent over the five years in each college graduate's cohort. For the group of SMA college graduates, the odds ratio also statistically significant in most year waves except year 2016 and pooled cross-sectional data. This result table shows that college graduates in SMA are also more likely to become regular workers when they move to non-SMA.

6.2.2. Being hired in a large-sized company by sub-groups

Table 11 reports the odds ratio of migration from the logistic regression model by sub-groups on being hired in a large-sized company with more than 300 employees.

TABLE 11 – EFFECT ON BEING EMPLOYED IN A LARGE-SIZED COMPANY BY SUB-GROUPS (ODDS RATIO)

Variables	(1) Pooled	(2) 2018	(3) 2017	(4) 2016	(5) 2015	(6) 2014
	Sub-group A. Non-SMA college graduates					
Migration	**0.98** **(0.06)**	**1.13** **(0.15)**	**1.16** **(0.17)**	**0.90** **(0.12)**	**1.09** **(0.14)**	**0.83** **(0.10)**
Control variables	YES	YES	YES	YES	YES	YES
Observations	17,430	3,485	3,432	3,517	3,511	3,308
Pseudo R-squared	0.0867	0.125	0.120	0.0992	0.115	0.0668
	Sub-group B. SMA college graduates					
Migration	**1.22***** **(0.08)**	**1.41**** **(0.19)**	**0.89** **(0.13)**	**1.14** **(0.16)**	**1.58***** **(0.26)**	**1.08** **(0.17)**
Control variables	YES	YES	YES	YES	YES	YES
Observations	11,291	2,517	2,280	2,305	1,939	2,095
Pseudo R-squared	0.0842	0.0881	0.105	0.0873	0.0944	0.126

Notes. The table indicates the odds ratio from the logistic regression of migration to other areas (from SMA to non-SMA or from non-SMA to SMA) on the youth first job working status, which indicates whether they work as regular workers or not, by sub-groups using five years of GOMS (2018GOMS-2014GOMS) and pooled cross-sectional data. All estimation include control variables and standard errors are shown in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level respectively.

The impact of the migration on employment at large-sized companies is contrary to the impact of the migration on the employment status (i.e., regular worker or not) looked at just before. Compared to main analysis, when the samples were divided into sub-groups, the different impacts from migration after college graduation were analyzed, and it is revealed that impacts from SMA college graduates who moved to non-SMA for their first jobs drive the effect from migration on being workers in large-sized companies.

In non-SMA college graduates' groups, the odds ratio of being employed in a large-sized company varies among year waves. Even though they are not statistically significant, moving to SMA in five-year pooled cross-sectional data, year 2016 and 2015 rather lowers employment chances at large-sized companies. If college graduates from SMA move to non-SMA, the chances of getting a job at a large-sized company are higher than when they remain in SMA. In five-year pooled cross-sectional data, column (1), and the odds ratio is 1.22 and it is statistically significant at the 1% level. These results show that migration to SMA does not necessarily increase the probability of employment in large-sized companies for non-SMA college graduates and college graduates who are represented as young people would be willing to move if there are opportunities of getting decent jobs in non-SMA.

6.2.3. Average monthly income by sub-groups

Lastly, Table 12 shows the coefficients from the OLS regression models with robust standard errors by sub-groups. The migration affects positively on college graduates' average monthly income from their first job both in non-SMA college graduates' groups and SMA college graduates' groups and the almost all estimates have statistically significant except in year 2016

graduates' wave in non-SMA college graduates and year 2017 graduates' wave in SMA college graduates. The impact of migration on their first job's income has varied over the past five years in both groups This results show that there is income premium for moving to other areas for youth first jobs.

TABLE 12 – EFFECT ON AVERAGE MONTHLY INCOME BY SUB-GROUPS

Variables	(1) Pooled	(2) 2018	(3) 2017	(4) 2016	(5) 2015	(6) 2014
	Sub-group A. Non-SMA college graduates					
Migration	**0.04*** (0.01)**	**0.05*** (0.02)**	**0.05*** (0.02)**	**0.01 (0.02)**	**0.06*** (0.02)**	**0.05** (0.02)**
Control variables	YES	YES	YES	YES	YES	YES
Observations	17,430	3,485	3,432	3,517	3,511	3,308
Adjusted R-squared	0.21	0.19	0.21	0.23	0.24	0.18
	Sub-group B. SMA college graduates					
Migration	**0.06*** (0.01)**	**0.05** (0.02)**	**0.03 (0.03)**	**0.09*** (0.03)**	**0.08*** (0.03)**	**0.11*** (0.03)**
Control variables	YES	YES	YES	YES	YES	YES
Observations	11,291	2,517	2,280	2,305	1,939	2,095
Adjusted R-squared	0.23	0.27	0.22	0.29	0.25	0.20

Notes. The table indicates the odds ratio from the logistic regression of migration to other areas (from SMA to non-SMA or from non-SMA to SMA) on the youth first job working status, which indicates whether they work as regular workers or not, by sub-groups using four years of GOMS (2018GOMS-2014GOMS) and pooled cross-sectional data. All estimation include control variables and standard errors are shown in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level respectively.

Based on these results, it can be predicted that it would be better for non-SMA graduates and SMA college graduates to move to SMA or non-SMA in order to increase wages.

7. Conclusion and discussion

In this study, I analyzed the impact of migration from college graduates on their first job outcomes in terms of job status (a regular worker or not), being employed in a large-sized company with more than 300 employees, and average monthly income after conducting propensity score matching to minimize selection bias. The results of the logistic regression and OLS regression demonstrate that the migration to other areas by non-SMA college graduates to SMA or SMA college graduates to non-SMA lead to benefits in labor performances.

Regular job position, working in a large-sized company, and income level are typical indicators as to measure decent jobs (Nam et al., 2021). The migration gives higher probability of being employed as a regular worker, higher probability of being employed in a large-sized company and income premiums for college graduates. However, the estimates on being workers in large-sized companies do not present statistically significant.

The results from the sub-group analysis demonstrate that the impact of the migration varies among sub-groups; non-SMA college graduates to SMA for first jobs and SMA college graduates to non-SMA for their first jobs. When college graduates from non-SMA moved to SMA for their employment, they got higher changes being employed as regular workers, and they got income premiums as well. However, when college graduates from SMA moved to non-SMA for their jobs, they got higher changes of being hired in large-sized companies. This shows that both college graduates in non-SMA and SMA could gain benefits from their migration but its impacts are different.

Young people have higher mobility in population movement than those of other age groups. Much of studies have been conducted in moving direction from non-SMA to SMA in line with the

reality that the population is concentrated in SMA. However, this current research has shown that SMA college graduates who moved to non-SMA also enjoy benefits in getting employment at large-sized companies, which can represent one aspect of a decent job. The government is driving for balanced national development policies, yet policies regarding population concentration in SMA have changed differently depending on the economic situation in Korea (Seo, 2020). This requires local government as well as central government to take a comprehensive view of young people's needs. Based on the results from the propensity score matching, the employment in public institutes, government complex and research institutes has been shown to reduce outflow to SMA. In this context, current policies moving government complexes to Sejong city and dispersing public institutions to provincial areas can help ease the concentration of young people. In addition, it is not easy for young people to solve the problem of housing which involves lots of costs. Public housing or single-person based housing policies could be attractive policies for young people. Stakeholders should consider policies linked to local businesses reflecting on regional characteristics.

There are two main limitations in this study. Firstly, due to the restriction of the data use, it was unable to track the movement of young people throughout their life paths. If it is established as panel data later, it will provide researchers in the field with more opportunities beyond the effects that bring to the first jobs of young people. Secondly, propensity sore matching was adopted to reduce selection bias to measure the impacts on job performances considering that migration is a highly active process. Techniques of various methods have been used to show stable results (see Appendix D and E), but still, it is not possible to distinguish whether a person who intended to move had positive labor outcomes or migration mainly resulted in labor outcomes for migrants. These limitations are to be answered for future research projects.

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APPENDICS

Appendix A – Net migration into SMA, Seoul special city, Gyeonggi province, and Incheon metropolitan city over the past 10 years (2010-2020)

Figure A.1 – Net inflow into SMA by age group (2010-2020)

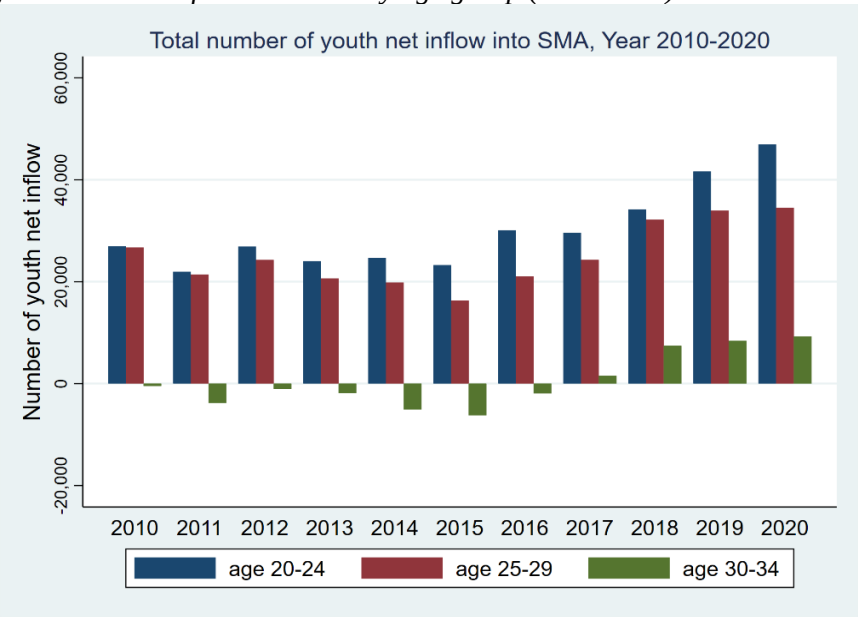


Figure A. 2 – Net inflow into Seoul special city by age group (2010-2020)

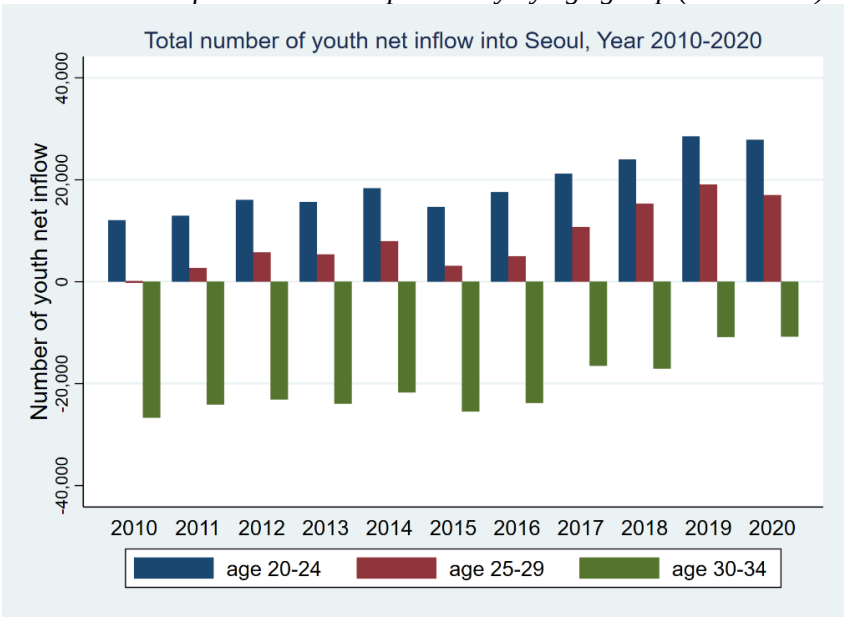


Figure A. 2 – Net inflow into Gyeonggi province by age group (2010-2020)

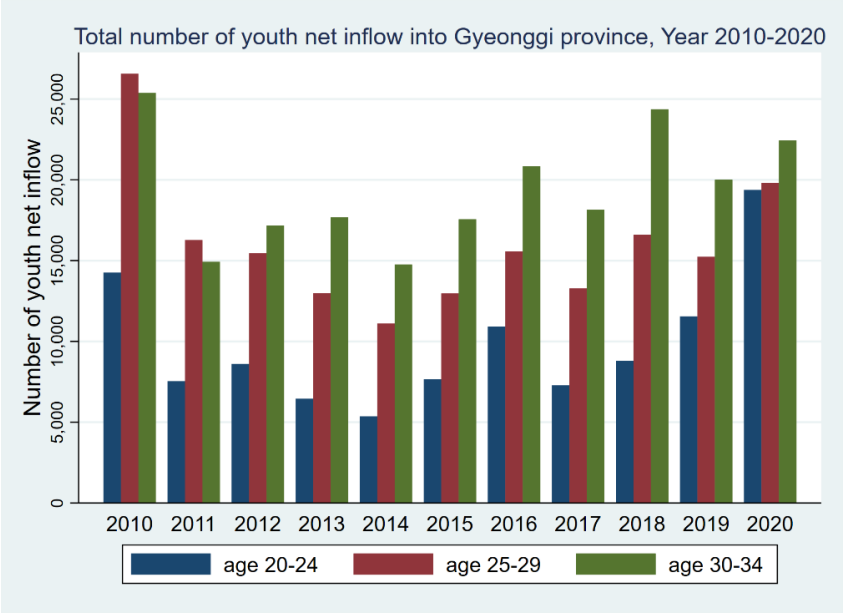
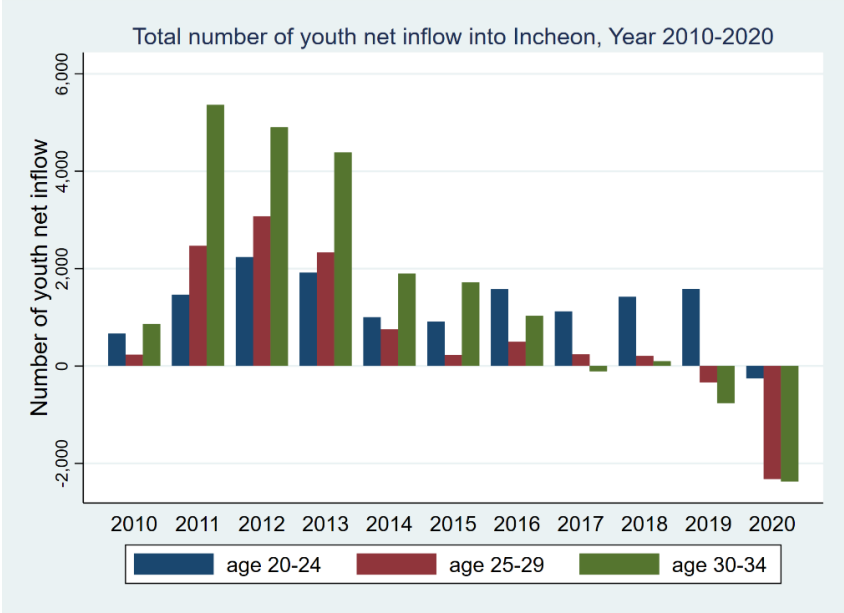


Figure A. 4 – Net inflow into Incheon by age group (2010-2020)



Appendix B – Estimated coefficients from results of propensity score matching using radius matching

TABLE B.1 – Results from five-year pooled-cross sectional data

Variables	(1) All		(2) non-SMA		(3) SMA	
	Outcome variable: migration (=1) or not (=0)					
A. Demographic factors						
Sex	-0.7397	**	0.1117	***	-0.3259	***
Age	-0.0206	**	-0.0019		-0.0159	
B. Socioeconomic factors						
Parents' educational background	0.0041	*	0.01	***	-0.0012	
Parents' current income	0.0074		-0.0046		0.0295	**
C. College-related factors						
Major (=ref. humanities)						
social studies	0.021		0.0083		0.0078	
education	0.1071	*	0.0687		0.1852	
engineering	0.0873	**	-0.0092		0.307	***
natural science	0.0379		-0.1132	**	0.2979	***
medicine	0.2293	***	0.1103		0.0277	
arts and physical education	0.1576	***	0.2177	***	0.0881	
Average GPA	0.2766	**	0.3522	**	0.2692	
Having work goals at collage (=1)	0.0248		0.1493	***	-0.1741	***
Satisfaction on college	-0.024	*	-0.0649	***	0.082	***
D. Job-related factors						
Types of job businesses (ref. private company)						
foreign company	0.0564		0.2723	***	-0.0773	
public institutes	0.777	*	-0.5921	***	1.0089	***
incorporation	-0.2333	***	-0.3929	***	0.1344	
government officials	0.041		-0.5738	***	1.0251	***
educational institutes	-0.662	***	-0.9829	***	-0.051	
research institutes	-0.3718	***	-0.9654	***	0.5744	***
Job matching	0.0522	***	0.0984	***	-0.019	
E. Pre-employment factors						
Having work training (=1)	0.0399		0.0107		0.1468	***
Having experiences on public exam (=1)	-0.1973		-0.0322		0.0518	
F. Cost-related factors						
Living with parents (=1)	-0.4559	***	-0.5567	***	0.5795	****
Having student loans (=1)	0.055	**	0.0436		0.0175	
Supporting family (=1)	0.0612	**	0.1034	***	-0.0244	
Receiving support from family (=1)	0.0528		0.1852	**	-0.3065	***
G. Geographical factors						
Administrations of college (ref. Seoul)						
Gyeonggi	0.4111	***	-		0.0406	
Chungchung	1.0972	***	-0.2382		-	
Gyeongsang	0.4395	***	-0.6126	***	-	
Jeolla	0.5816	***	-0.4488	***	-	
High school and college location (=1)	-1.0304	***	-1.3332	***	-0.5199	***
constant	-0.1443		0.6219		-0.8106	*

Notes. Column (1) represents all samples, both non-SMA and SMA college graduates, column (2) represents non-SMA college graduates, and column (3) represents SMA college graduates. ***, **, and * indicate significance at the 1%, 5%, and 10% level respectively.

TABLE B.2 – Results from 2018GOMS

Variables	(1) All		(2) non-SMA		(3) SMA	
	Outcome variable: migration (=1) or not (=0)					
A. Demographic factors						
Sex	-0.0287		0.1784	***	-0.3398	***
Age	-0.0159		-0.0153		-0.011	
B. Socioeconomic factors						
Parents' educational background	0.0076	*	0.0083		0.0072	
Parents' current income	0.0102		-0.0014		0.0245	
C. College-related factors						
Major (=ref. humanities)						
social studies	0.0812		0.1248		0.0047	
education	0.2058	*	0.2333	*	0.3713	*
engineering	0.117		0.0553		0.2602	**
natural science	0.0928		-0.1461		0.4831	***
medicine	0.3344	***	0.313	**	-0.1788	
arts and physical education	0.186	**	0.2979	**	0.2593	
Average GPA	0.4202	**	0.7286	***	-0.4749	
Having work goals at collage (=1)	0.0062		0.168	***	-0.2187	***
Satisfaction on college	-0.0118		-0.0555	*	0.0856	**
D. Job-related factors						
Types of job businesses (ref. private company)						
foreign company	0.1174	*	0.3024	**	0.108	
public institutes	0.0652		-0.6162	***	0.9531	***
incorporation	-0.2329	***	-0.4399	***	0.1493	
government officials	0.0108		-0.7461	***	1.1499	***
educational institutes	-0.5917	***	-0.9544	***	0.0991	
research institutes	-0.5234	***	-1.2457	***	0.7257	**
Job matching	0.0835	***	0.1285	***	0.0464	
E. Pre-employment factors						
Having work training (=1)	-0.0386		-0.1856	***	0.2778	***
Having experiences on public exam (=1)	0.0549		-0.0416		0.2811	***
F. Cost-related factors						
Living with parents (=1)	-0.4178	***	-0.4851	***	-0.6683	***
Having student loans (=1)	0.1012	**	0.1081	*	-0.002	
Supporting family (=1)	-0.0164		-0.0155		0.0154	
Receiving support from family (=1)	0.1109		0.1504		-0.041	
G. Geographical factors						
Administrations of college (ref. Seoul)						
Gyeonggi	0.3917	***	-		0.1311	*
Chungchung	1.079	***	0.0282		-	***
Gyeongsang	0.4464	***	-0.5088	***	-	
Jeolla	0.5977	***	-0.3787	***	-	
High school and college location (=1)	-0.9951	***	-1.3106	***	-0.4811	
constant	-0.6232		0.5357		-0.8806	

Notes. Column (1) represents all samples, both non-SMA and SMA college graduates, column (2) represents non-SMA college graduates, and column (3) represents SMA college graduates. ***, **, and * indicate significance at the 1%, 5%, and 10% level respectively.

TABLE B.3 – Results from 2017GOMS

Variables	(1) All		(2) non-SMA		(3) SMA	
	Outcome variable: migration (=1) or not (=0)					
A. Demographic factors						
Sex	-0.0432		0.2313	***	-0.4637	***
Age	-0.0181		0.0089		-0.009	
B. Socioeconomic factors						
Parents' educational background	-0.0009		0.0054		-0.0016	
Parents' current income	0.0193	*	0.0071		0.0633	***
C. College-related factors						
Major (=ref. humanities)						
social studies	0.0875		0.0858		0.0615	
education	0.213	*	0.2266		-0.2258	
engineering	0.1723	*	0.1016		0.3386	***
natural science	0.0486		-0.1059		0.3275	**
medicine	0.2227	**	0.185		0.0293	
arts and physical education	0.2535	***	0.3352	**	0.1316	
Average GPA	0.165		0.1768		0.8653	*
Having work goals at collage (=1)	0.0412		0.2128	***	-0.3269	***
Satisfaction on college	-0.0434	*	-0.0585	**	0.0318	
D. Job-related factors						
Types of job businesses (ref. private company)						
foreign company	0.0403		0.2508		-0.1069	
public institutes	0.2076	***	-0.6311	***	1.3812	***
incorporation	-0.2858	***	-0.6407	***	0.497	***
government officials	0.0335		-0.5949	***	1.182	***
educational institutes	-0.6361	***	-1.0492	***	0.2219	
research institutes	-0.2425		-1.2898	***	0.7697	***
Job matching	0.0108		0.0603		-0.0717	
E. Pre-employment factors						
Having work training (=1)	0.0447		0.0697		0.05922	
Having experiences on public exam (=1)	-0.0389		0.0797		-0.2262	**
F. Cost-related factors						
Living with parents (=1)	-0.4169	***	-0.5755	***	-0.4706	***
Having student loans (=1)	0.0988	**	0.0827		0.1621	*
Supporting family (=1)	0.058		0.1461	**	-0.0616	
Receiving support from family (=1)	0.0372		0.3281	***	-0.7337	***
G. Geographical factors						
Administrations of college (ref. Seoul)						
Gyeonggi	0.3768	***	-		-0.0515	
Chungchung	1.0901	***	0.0081		-	
Gyeongsang	0.4602	***	-0.5577	***	-	
Jeolla	0.6244	***	-0.3758	***	-	
High school and college location (=1)	-1.0772	***	-1.3811	***	-0.6543	***
constant	0.026		0.4388		-1.2593	

Notes. Column (1) represents all samples, both non-SMA and SMA college graduates, column (2) represents non-SMA college graduates, and column (3) represents SMA college graduates. ***, **, and * indicate significance at the 1%, 5%, and 10% level respectively.

TABLE B.4 – Results from 2016GOMS

Variables	(1) All		(2) non-SMA		(3) SMA	
	Outcome variable: migration (=1) or not (=0)					
A. Demographic factors						
Sex	-0.0921	*	0.0392		-0.1841	**
Age	-0.0256	*	-0.0229		0.0124	
B. Socioeconomic factors						
Parents' educational background	0.0012		0.0103	*	-0.0099	
Parents' current income	-0.0159		-0.0323	**	0.0159	
C. College-related factors						
Major (=ref. humanities)						
social studies	-0.0893		-0.1135		-0.1112	
education	0.0041		-0.0473		0.0937	
engineering	-0.0067		-0.1226		0.3304	
natural science	0.0099		-0.1084		0.2779	**
medicine	0.0941		-0.0459		-0.0425	
arts and physical education	0.1398		0.1741		0.0849	
Average GPA	0.7882	***	0.9921	***	0.6648	
Having work goals at collage (=1)	0.0488		0.1616	***	-0.0818	
Satisfaction on college	-0.0061		-0.0756	**	0.1393	***
D. Job-related factors						
Types of job businesses (ref. private company)						
foreign company	-0.1164		0.1727		-0.2049	
public institutes	0.0717		-0.6291	***	1.0694	***
incorporation	-0.2072	*	-0.4082	***	0.3122	*
government officials	0.0567		-0.6225	***	1.0321	***
educational institutes	-0.6588	***	-0.9539	***	-0.105	
research institutes	-0.1883		-0.6735	***	0.4428	*
Job matching	0.0592	*	0.1151	***	-0.0633	
E. Pre-employment factors						
Having work training (=1)	0.1261	***	0.1317	**	0.2029	**
Having experiences on public exam (=1)	-0.1045	*	-0.189	**	0.0468	
F. Cost-related factors						
Living with parents (=1)	-0.4478	***	-0.5708	***	-0.4997	***
Having student loans (=1)	-0.0245		0.001		-0.1315	
Supporting family (=1)	0.0771		0.1471	**	-0.094	
Receiving support from family (=1)	0.1755	*	0.3551	***	-0.2514	
G. Geographical factors						
Administrations of college (ref. Seoul)						
Gyeonggi	0.4133	***	-		0.0389	
Chungchung	0.976	***	-0.0586		-	
Gyeongsang	0.3573	***	-0.6009	***	-	
Jeolla	0.428	***	-0.5022	***	-	
High school and college location (=1)	-1.1004	***	-1.4406	***	-0.568	***
constant	-0.1425		0.8946		-1.6284	*

Notes. Column (1) represents all samples, both non-SMA and SMA college graduates, column (2) represents non-SMA college graduates, and column (3) represents SMA college graduates. ***, **, and * indicate significance at the 1%, 5%, and 10% level respectively.

TABLE B.5 – Results from 2015GOMS

Variables	(1) All		(2) non-SMA		(3) SMA	
	Outcome variable: migration (=1) or not (=0)					
A. Demographic factors						
Sex	-0.1125	**	0.0748		-0.4678	***
Age	-0.0201		0.0269		-0.0748	***
B. Socioeconomic factors						
Parents' educational background	0.011	**	0.0226	***	-0.0051	
Parents' current income	0.0083		-0.0031		0.0393	
C. College-related factors						
Major (=ref. humanities)						
social studies	-0.0641		-0.1229		0.0229	
education	-0.896		-0.0898		0.0015	
engineering	0.021		-0.0661		0.2004	
natural science	-0.0133		-0.203	*	0.145	
medicine	0.1744	*	0.0645		-0.232	
arts and physical education	-0.0011		0.1457		-0.4037	*
Average GPA	-0.08		-0.0996		0.1639	
Having work goals at collage (=1)	-0.0155		0.0746		-0.2003	**
Satisfaction on college	-0.0275		-0.0744	**	0.1186	**
D. Job-related factors						
Types of job businesses (ref. private company)						
foreign company	0.0102		0.2949		-0.2394	
public institutes	-0.0498		-0.565	***	0.812	***
incorporation	-0.2006		-0.2241	**	-0.126	
government officials	-0.0273		-0.03329	***	0.923	***
educational institutes	-0.884	***	-1.1934	***	-0.2972	**
research institutes	-0.9849	***	-2.221	***	0.7262	**
Job matching	0.0335		0.0851	**	-0.0681	
E. Pre-employment factors						
Having work training (=1)	-0.0221		-0.1125		0.1733	
Having experiences on public exam (=1)	0.0792		0.162	*	0.0151	
F. Cost-related factors						
Living with parents (=1)	-0.4527	***	-0.5947	***	-0.5415	***
Having student loans (=1)	0.0283		0.0035		0.0081	
Supporting family (=1)	0.0919	*	0.1368	**	-0.1186	
Receiving support from family (=1)	-0.0165		0.114		-0.6828	***
G. Geographical factors						
Administrations of college (ref. Seoul)						
Gyeonggi	0.3713	***	-		-0.1338	
Chungchung	1.0676	***	-0.0795		-	
Gyeongsang	0.4727	***	-0.5876	***	-	
Jeolla	0.621	***	-0.4212	***	-	
High school and college location (=1)	-1.0883	***	-1.4692	***	-0.4702	***
constant	0.1806		0.2192		1.1565	

Notes. Column (1) represents all samples, both non-SMA and SMA college graduates, column (2) represents non-SMA college graduates, and column (3) represents SMA college graduates. ***, **, and * indicate significance at the 1%, 5%, and 10% level respectively.

TABLE B.6 – Results from 2014GOMS

Variables	(1) All		(2) non-SMA		(3) SMA	
	Outcome variable: migration (=1) or not (=0)					
A. Demographic factors						
Sex	-0.1198	**	0.0124		-0.2839	***
Age	-0.0234	*	-0.0085		-0.0198	
B. Socioeconomic factors						
Parents' educational background	0.0008		0.0033		0.0007	
Parents' current income	0.0123		0.0081		0.0059	
C. College-related factors						
Major (=ref. humanities)						
social studies	0.0848		0.0738		0.0664	
education	0.1752		-0.0638		0.6132	***
engineering	0.1295		-0.013		0.3978	***
natural science	0.054		-0.0788		0.1101	
medicine	0.3744	***	0.1545		0.4037	
arts and physical education	0.2491	**	0.2071	*	0.2416	
Average GPA	0.5493	**	0.7817	**	0.2952	
Having work goals at collage (=1)	0.0456		0.1379	**	-0.0833	
Satisfaction on college	-0.0406		-0.056	*	0.0465	
D. Job-related factors						
Types of job businesses (ref. private company)						
foreign company	0.0688		0.1758		-0.0364	
public institutes	0.01		-0.6698	***	0.8162	***
incorporation	-0.2858	***	-0.3675	***	-0.407	
government officials	0.1557	**	-0.3685	***	0.8617	***
educational institutes	-0.6295	***	-0.8493	***	-0.3336	*
research institutes	-0.0916		-0.3396	*	0.3954	
Job matching	0.0838	**	0.1094	***	0.0462	
E. Pre-employment factors						
Having work training (=1)	0.0809		0.1652	**	-0.0527	
Having experiences on public exam (=1)	-0.1024		-0.1624	*	0.0512	
F. Cost-related factors						
Living with parents (=1)	-0.5386	***	-0.5477	***	-0.7945	***
Having student loans (=1)	0.0784	*	0.0687		0.0648	
Supporting family (=1)	0.0985	**	0.1007	*	0.1184	
Receiving support from family (=1)	-0.1639		-0.1071		-0.2711	
G. Geographical factors						
Administrations of college (ref. Seoul)						
Gyeonggi	0.5354	***	-		0.212	**
Chungchung	1.3293	***	0.0237		-	
Gyeongsang	0.4807	***	-0.7786	***	-	
Jeolla	0.6654	***	-0.5501	***	-	
High school and college location (=1)	-0.9122	***	-1.143	***	-0.4291	***
constant	-0.5012		0.3923		-0.844	

Notes. Column (1) represents all samples, both non-SMA and SMA college graduates, column (2) represents non-SMA college graduates, and column (3) represents SMA college graduates. ***, **, and * indicate significance at the 1%, 5%, and 10% level respectively.

Appendix C – Mean comparison test before and after propensity score matching

(Results from 2017GOMS, 2016GOMS, 2015GOMS, and 2014GOMS are available upon author.)

TABLE C.1- Before PSM from 2018GOMS

Variables	(1) Main	(2) non-SMA	(3) SMA
Sex	0.033*	-0.034*	0.175***
	(2.34)	(-2.01)	(6.50)
Age	0.076	-0.004	-0.243*
	(1.45)	(-0.06)	(-2.40)
Parents' educational background	-0.010	-0.421**	-0.344
	(-0.07)	(-2.60)	(-1.35)
Parents' current income	-0.073	-0.053	-0.113
	(-1.32)	(-0.82)	(-1.01)
Major (=ref. humanities)	-0.245***	-0.222***	-0.115
	(-4.97)	(-3.83)	(-1.17)
Average GPA	-0.001	-0.004	0.005
	(-0.43)	(-1.13)	(1.01)
Having work goals at collage (=1)	0.010	-0.033	0.051
	(0.67)	(-1.88)	(1.84)
Satisfaction on college	0.049	0.094**	-0.194***
	(1.95)	(3.13)	(-3.94)
Types of job businesses (ref. private company)	0.323***	0.933***	-0.929***
	(5.66)	(13.43)	(-8.99)
Job matching	-0.059**	-0.071**	0.010
	(-3.10)	(-3.13)	(0.26)
Having work training (=1)	0.017	0.042**	-0.091***
	(1.29)	(2.72)	(-3.54)
Having experiences on public exam (=1)	0.014	0.091***	-0.191***
	(1.22)	(6.78)	(-8.79)
Living with parents (=1)	0.138***	0.041*	0.334***
	(9.71)	(2.40)	(12.48)
Having student loans (=1)	-0.027*	-0.059***	0.030
	(-2.13)	(-3.85)	(1.21)
Supporting family (=1)	0.017	-0.003	0.023
	(1.39)	(-0.19)	(0.94)
Receiving support from family (=1)	0.006	-0.001	0.013
	(0.77)	(-0.09)	(0.85)
Administrations of college (ref. Seoul)	-0.245***	0.492***	0.022
	(-6.22)	(17.17)	(0.85)
High school and college location (=1)	0.341***	0.409***	0.252***
	(29.10)	(30.70)	(10.61)
Observations	***6,068***	***3,547***	***2,521***

Notes. Column (1) represents all samples, both non-SMA and SMA college graduates, column (2) represents non-SMA college graduates, and column (3) represents SMA college graduates. ***, **, and * indicate significance at the 1%, 5%, and 10% level respectively.

TABLE C.2- After PSM from 2018GOMS

Variables	(1) Main	(2) non-SMA	(3) SMA
Sex	0.027*	0.050**	-0.004
	(0.016)	(0.024)	(0.027)
Age	-0.080	0.052	-0.014
	(0.060)	(0.084)	(0.122)
Parents' educational background	-0.050	0.088	0.057
	(0.156)	(0.232)	(0.285)
Parents' current income	0.051	-0.021	0.088
	(0.063)	(0.094)	(0.126)
Major (=ref. humanities)	0.049	-0.025	-0.066
	(0.056)	(0.084)	(0.096)
Average GPA	-0.001	0.002	-0.002
	(0.003)	(0.005)	(0.006)
Having work goals at collage (=1)	0.004	0.001	-0.007
	(0.017)	(0.025)	(0.031)
Satisfaction on college	-0.051*	-0.048	0.002
	(0.029)	(0.044)	(0.053)
Types of job businesses (ref. private company)	-0.165***	-0.504***	0.095
	(0.064)	(0.100)	(0.127)
Job matching	0.016	0.001	-0.014
	(0.022)	(0.033)	(0.043)
Having work training (=1)	-0.002	-0.008	0.009
	(0.015)	(0.022)	(0.031)
Having experiences on public exam (=1)	-0.012	-0.012	0.022
	(0.013)	(0.017)	(0.030)
Living with parents (=1)	0.147***	0.209***	0.026
	(0.013)	(0.019)	(0.023)
Having student loans (=1)	0.015	-0.005	-0.004
	(0.015)	(0.024)	(0.027)
Supporting family (=1)	0.020	0.029	0.019
	(0.013)	(0.020)	(0.026)
Receiving support from family (=1)	-0.011	-0.020	-0.001
	(0.009)	(0.015)	(0.015)
Administrations of college (ref. Seoul)	0.093**	-0.013	-0.003
	(0.045)	(0.043)	(0.029)
High school and college location (=1)	-0.021	0.007	0.028
	(0.017)	(0.025)	(0.031)
Observations	***6,059***	***3,485***	***2,517***

Notes. Column (1) represents all samples, both non-SMA and SMA college graduates, column (2) represents non-SMA college graduates, and column (3) represents SMA college graduates. ***, **, and * indicate significance at the 1%, 5%, and 10% level respectively.

Appendix D – Results from matched samples from 1:1 nearest neighbor with replacement and kernel matching

TABLE D.1 – Results from 1:1 nearest neighbor matching on being a regular worker

Variables	ALL					
	(1) Pooled CS	(2) 2018	(3) 2017	(4) 2016	(5) 2015	(6) 2014
	Outcome variable: a regular worker (=1) or not (=0)					
Migration	1.43***	1.40***	1.56***	1.35***	1.43***	1.46***
	(0.07)	(0.15)	(0.18)	(0.15)	(0.17)	(0.17)
Control variables	YES	YES	YES	YES	YES	YES
Observations	12,012	2,712	2,443	2,324	2,262	2,290
Pseudo R-squared	0.0579	0.0681	0.0626	0.0651	0.0618	0.0438

TABLE D.2 – Results from kernel matching on being a regular worker

Variables	ALL					
	(1) Pooled CS	(2) 2018	(3) 2017	(4) 2016	(5) 2015	(6) 2014
	Outcome variable: a regular worker (=1) or not (=0)					
Migration	1.44***	1.50***	1.48***	1.32***	1.43***	1.45***
	(0.06)	(0.14)	(0.14)	(0.12)	(0.14)	(0.14)
Control variables	YES	YES	YES	YES	YES	YES
Observations	28,727	6,068	5,815	5,862	5,572	5,410
Pseudo R-squared	0.0597	0.0761	0.0769	0.0698	0.0637	0.0496

TABLE D.3 – Results from 1:1 nearest neighbor matching on being employed in a large-sized company

Variables	ALL					
	(1) Pooled CS	(2) 2018	(3) 2017	(4) 2016	(5) 2015	(6) 2014
	Outcome variable: being employed in a large-sized company (=1) or not (=0)					
Migration	1.03	1.11	0.98	1.02	1.06	0.92
	(0.04)	(0.10)	(0.10)	(0.10)	(0.11)	(0.09)
Control variables	YES	YES	YES	YES	YES	YES
Observations	12,012	2,712	2,443	2,324	2,262	2,290
Pseudo R-squared	0.110	0.130	0.120	0.123	0.106	0.0912

TABLE D.4 – Results from kernel matching on being employed in a large-sized company

Variables	ALL					
	(1) Pooled CS	(2) 2018	(3) 2017	(4) 2016	(5) 2015	(6) 2014
	Outcome variable: being employed in a large-sized company (=1) or not (=0)					
Migration	1.00	1.09	0.95	0.97	1.07	0.91
	(0.04)	(0.08)	(0.08)	(0.08)	(0.09)	(0.07)
Control variables	YES	YES	YES	YES	YES	YES
Observations	28,727	6,068	5,815	5,862	5,572	5,410
Pseudo R-squared	0.105	0.122	0.123	0.123	0.110	0.0921

TABLE D.5 – Results from 1:1 nearest neighbor matching on average monthly income

Variables	ALL					
	(1) Pooled CS	(2) 2018	(3) 2017	(4) 2016	(5) 2015	(6) 2014
	Outcome variable: log of average monthly income					
Migration	0.03***	0.01	0.02	0.03**	0.05***	0.03*
	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
Control variables	YES	YES	YES	YES	YES	YES
Observations	12,012	2,712	2,443	2,324	2,262	2,290
Adjusted R-squared	0.23	0.23	0.23	0.24	0.25	0.20

TABLE D. 6 – Results from kernel matching on average monthly income

Variables	ALL					
	(1) Pooled CS	(2) 2018	(3) 2017	(4) 2016	(5) 2015	(6) 2014
	Outcome variable: log of average monthly income					
Migration	0.03***	0.02*	0.02	0.03**	0.05***	0.02*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Control variables	YES	YES	YES	YES	YES	YES
Observations	28,727	6,068	5,815	5,862	5,572	5,410
Adjusted R-squared	0.24	0.22	0.24	0.25	0.25	0.21

Appendix E – Robustness check: linear probability model (LPM) , logit, and probit

TABLE E.1 – Coefficients from LPM on being a regular worker

Variables	ALL					
	(1) Pooled CS	(2) 2018	(3) 2017	(4) 2016	(5) 2015	(6) 2014
	Outcome variable: a regular worker (=1) or not (=0)					
Migration	0.05***	0.06***	0.05***	0.04***	0.05***	0.05***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Control variables	YES	YES	YES	YES	YES	YES
Observations	28,714	6,059	5,797	5,856	5,531	5,387
Adjusted R-squared	0.05	0.07	0.06	0.06	0.05	0.04

TABLE E.2 – Coefficients from logit on being a regular worker

Variables	ALL					
	(1) Pooled CS	(2) 2018	(3) 2017	(4) 2016	(5) 2015	(6) 2014
	Outcome variable: a regular worker (=1) or not (=0)					
Migration	0.39***	0.43***	0.40***	0.29***	0.38***	0.39***
	(0.04)	(0.09)	(0.10)	(0.09)	(0.10)	(0.10)
Control variables	YES	YES	YES	YES	YES	YES
Observations	28,714	6,059	5,797	5,856	5,531	5,387
Pseudo R-squared	0.0618	0.0793	0.0778	0.0696	0.0656	0.0519

TABLE E.3 – Coefficients from probit on being a regular worker

Variables	ALL					
	(1) Pooled CS	(2) 2018	(3) 2017	(4) 2016	(5) 2015	(6) 2014
	Outcome variable: a regular worker (=1) or not (=0)					
Migration	0.21***	0.24***	0.20***	0.16***	0.21***	0.22***
	(0.02)	(0.05)	(0.05)	(0.05)	(0.06)	(0.06)
Control variables	YES	YES	YES	YES	YES	YES
Observations	28,714	6,059	5,797	5,856	5,531	5,387
Pseudo R-squared	0.0612	0.0777	0.0761	0.0694	0.0654	0.0522

TABLE E.4 – Coefficients from LPM on being employed in a large-sized company

Variables	ALL					
	(1) Pooled CS	(2) 2018	(3) 2017	(4) 2016	(5) 2015	(6) 2014
	Outcome variable: being employed in a large-sized company (=1) or not (=0)					
Migration	-0.00	0.02	-0.01	-0.01	0.01	-0.02
	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)
Control variables	YES	YES	YES	YES	YES	YES
Observations	28,714	6,059	5,797	5,856	5,531	5,387
Adjusted R-squared	0.12	0.13	0.14	0.14	0.12	0.11

TABLE E. 5 – Coefficients from logit on being employed in a large-sized company

Variables	ALL					
	(1) Pooled CS	(2) 2018	(3) 2017	(4) 2016	(5) 2015	(6) 2014
	Outcome variable: being employed in a large-sized company (=1) or not (=0)					
Migration	0.01	0.10	-0.02	-0.02	0.06	-0.10
	(0.04)	(0.08)	(0.08)	(0.08)	(0.09)	(0.08)
Control variables	YES	YES	YES	YES	YES	YES
Observations	28,714	6,059	5,797	5,856	5,531	5,387
Pseudo R-squared	0.105	0.120	0.123	0.124	0.105	0.0922

TABLE E. 6 – Coefficients from probit on being employed in a large-sized company

Variables	ALL					
	(1) Pooled CS	(2) 2018	(3) 2017	(4) 2016	(5) 2015	(6) 2014
	Outcome variable: being employed in a large-sized company (=1) or not (=0)					
Migration	0.00	0.06	-0.02	-0.02	0.04	-0.06
	(0.02)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Control variables	YES	YES	YES	YES	YES	YES
Observations	28,714	6,059	5,797	5,856	5,531	5,387
Pseudo R-squared	0.103	0.118	0.122	0.123	0.104	0.0919