Exploration of Interstate College and Post-Graduation Migration in the United States

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ABSTRACT

Using national data, the present study first investigated interstate college migration. Unlike existing studies of interstate college migration, this study also tracked students to college graduation to explore their post-graduation migration, such as leaving to other states after graduating from in-state institutions and returning to home states after graduating from out-of-state institutions. While a single equation approach has been widely used in migration research, this study used multi-level logistic regression that is rather new in the area of institutional research. In addition to state‟s economic conditions, certain institutional characteristics were found to influence differently depending of types of migration. .

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College-educated individuals have much to contribute to a state in where they reside. Lifetime earnings are estimated to be 2.1 million dollars for college graduates, about twice the amount of earnings for a worker with a high school diploma (U.S. Census, 2002). Therefore, a state‟s revenue is increased by collecting higher state income taxes from college educated individuals. In addition to economic benefits, higher education in our country has been serving as the engine to enhance citizenship. Pascarella and Terenzini (2005) report a body of studies that support moral development during college. Given such benefits incurred by college-educated individuals, phenomena known as student migration has been a recurring issue in educational research.

College student migration behavior is generally investigated at two different points in time. Interstate college migration is referred to as first-time college freshman students leaving their home states and attending institutions in other states. The overall out-migration rate was 17.1% rate in 1996 (the National Center for Education Statistics [NCES], 1998), while the percent of state residents attending out-of-state institutions noticeably varies across states. Northeast states, such as Connecticut and Vermont had higher rates of 44.3% and 43.9%. However, Connecticut and Vermont also had large numbers of first-time freshmen from other states to attend in-state institutions. Out-of-state students comprised about 34% and 60% of first-time freshman student body in these states.

When one state receives college-educated individuals from another state, these students are known as in-migrants, while out-migrants refer to college-educated workers who move to

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another state. The difference between the numbers of in- and out-migrants is referred to as net migration. Net migration rates also vary considerably across U.S. regions and states. Between 1995 and 2000, the Northeast region lost 39.0 percent of single, college-educated adults aged between 25 to 39 years old, while the West region had an 86.1 percent increase of the same population. North Dakota's net migration rate decreased by 282 percent, followed by a 220 percent decrease in the net migration rate for Iowa between 1995 and 2000. In the same period, Nevada gained 281 percent of young, single college-educated adults (Census Bureau, 2003). Given such a wide range of migration rates, a rising negative net-migration rate is a serious concern for policymakers in a state who expects college-educated workers to contribute to its economic and citizenship development. Additionally, "the fact that college graduates from one state may locate in other states after graduation affects states" incentives to invest higher education" (Groen & White, 2004, p. 1795). Strathman (1994) further suggests that a one-percentage point increase in out-migration results in an approximate $100 reduction in state appropriations per student.

Prompted by the importance of retaining college-educated individuals within a state, the current study explores student migration behavior using nationally represented data. Are there any particular characteristics that promote in-state residences to enroll in colleges in other states? States, such Connecticut and Vermont, educate a large number of out-of-state students, but do they stay in these states after graduation? What type of students would return to their home states after graduating from out-of-state institutions? One limitation of pervious research was the focus on either college or post-college migration. The present study is unique in that it measures both interstate college and post-college migration using the same data

collected longitudinally. Thus, the current study allows us to interpret results more comprehensively and gain a better understanding of student migration behavior.

Factors Affecting Student Migration

Prior research has investigated student migration from the economic perspective, such as per-capita income, unemployment rates, and family income. State's economic conditions were found to be associated with out-migration (Hsing & Mixon, 1996; Kyung, 1996; McHugh & Morgan, 1984; Orsuwan & Heck, 2009; Western Interstate Commission for Higher Education, 2005). Hsing and Mixon (1996) provided evidence that per-capita income promoted student to move to other states to attend college. Kyung (1996) found that the number of interstate out-migrants was increased by 2.31% when a state improved its per capita income by 1%. Using the data that include economic factors for both origin and destination states, McHugh and Morgan (1984) found that per-capita income in the home state was positively related to interstate out-migration while unemployment did not show any significant effect on migration. Student's choice of in-state or out-of-state institution also depends on family income. In an earlier study by Tuckman (1970), it was suggested that students from higher income families were less sensitive to higher cost for attending out-of-state institutions. Minority and students from lower incomes are known to be more sensitive to the cost of college attendance than their counterparts (Paulsen & St. John, 2002). Furthermore, Tuckman (1970) found that higher in-state tuition promoted students to move to another state to attend a college.

The college cost is an important factor for many students to determine whether to attend a college. As the cost of attending in-state institutions increases, issues such access to college

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and enrollment size at state institutions become the center of public discussion. As a result, each state has offered a number of financial aid programs to lower the cost for attending home-state institutions. Using institutional data from a large state institution, Singell and Stone (2002) found that non-need based aid promoted state residents to attend in-state intuitions, instead of attending institutions in other states. Although every state is generally interested in increasing college enrollment at state institutions, the level of financial aid support greatly varies across states. According to the 2008-09 report by the National Association of State Student Grant and Aid Programs [NASSGP] (2009), the state grant amount per student aged between 18 and 24 was $729 in South Carolina, while Wyoming offering the lowest amount of $3. Orsuwan and Heck (2009) suggest that funding disparities across states are associated with underlying policy value and cost at each state.

State‟s need-based financial aid was designed to strengthen access to higher education, while non-need-based aid was to retain talented students within a state by supporting them to attend in-state institutions. Non-need-based financial aid known as the Helping Outstanding Pupils Educationally (HOPE) program in Georgia increased student enrollment in four-year state public and private institutions by about 9% and 14% (Cornwell, Mustard, & Sridhar, 2006). While non-need-based scholarships are found to be effective in retaining talented students within a state during college, non-need-based aid recipients are generally not required to remain in their home states to contribute to its workforce after college graduation. Despite a paucity of empirical evidence on how state-based financial aid affects student migration after college, Groen (2004) found that that a $1,000 increase in scholarship led to 100 additional students attending in-state institutions. However, no more than 10 of these students would remain in their home states after college.

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In addition to economic and financial context, prior research suggests that distance influences migration patterns (Abbott & Schmid, 1975; Baryla & Dotterweich, 2001; Greenwood, 1975; McHugh & Morgan, 1984). Greenwood (1975) argued that migration decreases as the distance between the origin and destination states becomes greater. Baryla and Dotterweich (2001) discovered that students were less likely to migrate longer distances to attend a college. Using the actual straight-line distance between population centers in home and destination states, McHugh and Morgan (1984) found similar findings on the effect of distance on interstate student migration.

A number of studies investigated the effects of institutional characteristics on student migration. Abbott and Schmid (1975) found that institutional prestige had greater influence on attracting students when other characters such as institutional control and regions were included in the analysis. Baryla and Dotterweich (2001) also discovered that institutions with higher selectivity are more likely to attract students from other states. Furthermore, Baryla and Dotterweich (2001) discussed that institutional control was an influential factor in interstate college migration. They found that private institutions enrolled more out-of-state students than public did. However, how such institutional characteristics would affect the student''s post-graduate migration decision is unclear in these studies.

With respect to post-graduate migration, the impact of economic conditions, such as per-capita income, job growth rates and unemployment were addressed as determinants of student migration (DaVanzo, 1978; Greenwood, 1985; Greenwood, & Hunt, 1989; Kodrzycki, 2001). DaVanzo (1978) found that unemployed individuals were more likely to move to another state and suggested that unemployment rates had an effect on out-migration. Using a nationally representative sample of 1,000 college graduates, Kodrzycki (2001), however, found an effect

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of a higher unemployment rate on out-migration to be statistically insignificant after a number of amenities factors taken into account.

Researchers tested population size as a proxy for economic development in their migration studies (Kodrzycki, 2001; Tornatzky, Gray, Tarant, & Zimmer, 2001). Kodrzycki (2001) found that students who attended a college located in a state with a larger population were more likely to remain in the same state after college graduation. Pervious research also investigated effects of state"s amenities and college characteristics on post-graduate migration (Graves, 1979; Greenwood & Hunt, 1989; Greenwood, Hunt, Rickman, & Treyz, 1991; Kodrzycki, 2001; Porell, 1982; Tornatzky, Gray, Tarant, & Zimmer, 2001). Kodrzycki (2001) examined the effects of various state amenities on out-migration behavior, such as average maximum wind speed, average number of clear days, and a state being on a seacoast. While a number of amenities factors were considered in previous migration studies, the definition of amenities is mainly subject to individuals" preferences. In addition to possibly a large scope of different amenities that exist among individuals, it is reasonable to believe that some individuals find certain amenities attractive, while others may find the same amenities less attractive. For example, seacoast states may not be an ideal location for someone who enjoys winter sports.

The current study is built on the economic and financial measures previously used in student migration research as a theoretical base. Additionally, individual and institutional characteristics, such as parental educational attainment and institutional selectivity are included in the analysis. Multilevel logistic regression is chosen as an analytical approach for more robust estimates over single-equation regression. Given factors from different levels such as individual, institutional, and state underlying the student migration decision, the

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multilevel modeling technique is more appropriate than the singe-equation modeling technique, which was typically used in previous migration research.

Data and Analytical Approach

Main data sources

The study sample was drawn from the National Educational Longitudinal Study (NELS: 88/2000) and Postsecondary Education Transcript Study: 2000 (PETS: 2000), provided by the NCES. The PETS: 2000 dataset is supplemental data that include detailed information on institutions from where the NELS survey participants graduated. Due to the nature of the analytical techniques used in the study, institutions that had less than four respondents were deleted. States that had less than ten participants were also deleted from the sample. These deleted states include Delaware, New Hampshire, South Dakota, Wyoming, Alaska and Hawaii. District of Columbia was also excluded from the sample because it lacks public institutions within the district.

The total sample size resulted in 3,940 first-time freshmen who completed a bachelor's degree or higher before the year 2000. Table 1 provides detailed information on time of college matriculation and graduation for the study sample. Approximately, 98% of the sample

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Insert Table 1 about here

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began their postsecondary education between 1992 and 1993. About 77% of the sample graduated from college between 1996 and 1997 with the average time to degree being 4.6 years. The average time from college graduation to 2000 was estimated to be 3.2 years.

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Migration patterns in the study sample

Three analyses included in the current study are illustrated in Figure 1. In Model 1, out-migration of attending an institution in another state was examined. Out of 3,940 students, 2,893 decided to remain in their home states to attend in-state institutions (73%). Out of 1,047 students who moved to others states, 600 students attended an institution in another state within the same census region, while the reaming moved to states outside of their origin census regions (*n* = 447).

Insert Figure 1 about here

Over a period of nine years, Kodrzycki (2001) observed that about 39% of college graduates lived in different states from where they attended college. However, she also found that about 15% of college graduates moved to another state one year after graduation. The number of out-migrants rose to about 30% by year five. Using a subsample of those who attended in-state institutions, post-graduate migration behavior was investigated in Model 2. In Model 2, the proportion of the out-migrants who decided to move to other states after completion of their bachelor"s program was about 23%, which was believed to be comparable to the findings by Kodrzycki above.

Approximately 39% of interstate college migrants returned to their home states after college graduation. The current study also examined characteristics of these students who returned to their origin states after receiving postsecondary education in other states in Model 3.

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Explanatory variables in the study

The dependent variables in the study were dichotomous variables indicating out-migrants, which was coded as „1"in each model. A descriptive summary of all the explanatory variables included in the study are listed in Table 2.

The study sample contained 56.0% females and 11.4%, 6.1%, 6.5%, and 76.0% were Asian, Black, Hispanic, and Caucasian college graduates, respectively. Native Americans were excluded due to their smaller representation in the sample (<1%). Both parents were

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Insert Table 2 about here

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college graduates in approximately 32% of the sample while in 45% of the sample, neither parent had graduated from college. Effects of family income on migration were also examined using quartile dummy variables.

Previous research suggests that unobserved heterogeneity among individual students has an impact on their migration decisions (Kodrzycki, 2001; Morgan 1983). Morgan (1983) suggests that certain students are more likely to choose a college in the state where they consider as their permanent residence. Thus, it is logical to assume that such students would be less likely to apply for college in other states when they already considered their home states to be their permanent residence. Groen (2004) concurred with Morgan, and included a variable specifying if a student applied for out-of-state institutions in his migration study. Based on Groen"s approach to control unobserved heterogeneity in the migration decision, dummy variables were developed to detail student"s application behavior in this study. In Model 2, a group of students who applied for both in- and out-state-intuitions was included

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with a group of students who only applied for in-state institutions as a reference group. In a similar vein, a dummy variable containing students who applied for both in- and out-state-intuitions was included in Model 3, whereas a group of students who only applied for out-state-intuitions served as a reference group.

Given that institutional characteristics such as control were found to be influential in one‟s post-graduate migration (Groen, 2004), three sets of institutional characteristics, institutional control, types, and selectivity were considered in Models 2 and 3. The study sample included 65.7% public institutions. The sample was also composed of 49.5% Research, 31.9% Doctoral, and 16.4% Baccalaureate institutions. Based on admission rates and entrance exams, 66.3% of the institutions were identified as non-selective while 8.3% were highly selective.

Although the effect of state funded financial aid on student migration is a salient issue in state policy circles, the NELS: 88/2000 dataset did not offer reliable measures of financial aid. Approximately 26% of the sample had missing values in financial aid variables. Additionally, the study dataset did not specify if students received state- or federal-based financial aid. Alternatively, the current study used need- and non-need based financial aid amounts per college-aged student by state (NASSGP, 1994) to measure how the level of state financial aid funding would affect student migration.

As for other state level variables, regional effects were examined using the U.S. Census Region classification. Appendix includes a list of states by U.S. Census Region. State‟s unemployment rates were collected from U.S. Census Bureau‟s website. Bureau of Economic Analysis releases gross state product (GSP) data by state, and the year 2000 data were used in the study. Unlike the previous migration studies that included individual amenities, this study

used 2000 Most Livable State (MLS) rankings, published by Morgan Quitno Press. This particular ranking is based on each state‟s rankings for 43 factors, such as crime rate, average temperature, cost of living, and percent of college-graduate residents. Table 3 presents descriptive summary of states‟ GSP per capita, unemployment rates, state livable scale, as well as need- and non-need based financial aid amounts by U.S. Census Region.

Insert Table 3 about here

Analytical approach

Previous studies on migration behavior typically employed single-equation molding as a main analytical approach. Given the nested nature of study data often used in migration research, inclusion of both student and state characteristics in a single regression equation would fail to take the homogeneity of state characteristics for those who resided in the same state into account. This would result in spurious standard error estimation (Raudenbush & Bryk, 2002). In other words, the size of standard errors for statistics becomes smaller, which leads to increasing the chance of making Type I error. Instead, multilevel regression is more appropriate to analyze such nested data. Furthermore, the correlation between the intercept and coefficients across groups is reduced when grand mean centering is used. This results in suppressing level-2 estimation problems mainly caused by multicollinearity (Hofmann & Gavin, 1998).

Interstate college migration behavior was examined using multinomial 2-level logistic regression in Model 1. In this analysis, individual characteristics were estimated at level-1, and characteristics of states in where students graduated from high school were grouped in

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level-2. Given the importance of distance between high school and college states in one"s

migration decision (e.g., Greenwood, 1975), two dependent variables that indicated whether a

college state was located within the same region or not were included in Model 1. State

residents who decided to remain in their home states to attend in-state institutions served as a

reference groups for out-migrants in this analysis.

Three-level logistic regression was used in Models 2 and 3. Individual, institutional, and

state characteristics were grouped in levels 1, 2, and 3. Post-graduate migration behavior for

students who attended in-state institutions was estimated in Model 2, in which in-state college

graduates who decided to remain in their home states served as a reference group. Model 3

examined student behavior of retuning to home states after graduating from out-of-state

institutions. State characteristics in Model 3 were conditions associated with students" college

states. Variance inflation factors (VIF) were estimated with 3.03 being the highest VIF. As for

weighting, the appropriate NELS survey weights were adjusted as dividing each weight score

by the weight mean in each model. Grand-mean centering was used in all the three models.

Results

Interstate college migration

Table 4 reports interstate college migration results. In addition to regression coefficients

and standard errors, relative risks were also computed as $\exp(b) - 1$. A positive sign in relative

risk indicates a positive effect on out-migration behavior, while a negative sign indicates an

effect on remaining in a home state. Students from higher income families were more likely to

move to other states to attend college. Compared to students from the lowest family income

quartile, students from the highest family income quartile were about 91% more likely to

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move to another state in the same region, and about 1.5 times more like to migrate to states outside of their home region.

Parental educational attainment showed significant effects on out-migration, and a higher level of parental education was found to increase the probability of students moving farther for their postsecondary education. Students with both college-educated parents were 73% more likely than first-generation students to leave their home states to pursue their higher education. The likelihood of moving to states outside of their home region was even higher as the level of parent''s education increased. Students with both college-educated parents were about 1.1 times more likely to move to states in other regions to attend a college. In comparison to males who remained in their origin states to attend college, females were about 26% less likely to move farther for their postsecondary education.

The result suggest that need-based financial aid had a significant positive effect on keeping students from moving to other states in the same region at the 0.10 level ($t = -1.67$). All else equal, every 10-dollar increase in state need-based grant per student need- and non-need based state financial reduced the likelihood of out-migration by 5% on average.

With respect to GSP per capita, the study findings were consistent with the earlier study findings of higher per-capita income promoting out-migration. Point estimates in the study suggest that every 1,000-dollar increase in GSP per capita resulted in increasing the likelihood of college migration by 7% for students who moved to another state within the same region, and by about 6% for those who moved to states located outside of their home regions. A one

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standard deviation increase in unemployment rate led to reducing the likelihood of migration by about 28% for students who moved outside of their home region.

Post-college migration

Table 5 includes findings for post-college migration behavior. Among those students who attended in-state institutions, Hispanic students were about 55% less likely than Caucasians to move to another state after college graduation in Model 2. Similar to the findings from the interstate college migration analysis in Model 1, students with both parents

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Insert Table 5 about here

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being college-educated were more prone to departing their origin states after college. They were approximately 35% more likely to move another state than first-generation students.

Noteworthy findings related to students graduating from in-state institutions include the effects of institutional types and selectivity. In comparison to students who graduated from research institutions, students that attended doctoral institutions were 36% less likely to leave their home states after college graduation. Students who graduated from highly selective in-state institutions were 1.8 times more likely to leave their home states, while those who attended selective institutions were 54% more likely to do so

The current study did not present any significant evidence supporting that a higher level of state"s financial aid funding would reduce out-migration of in-state college graduates ($t = 1.00$ for both need- and non-need based state aid). As for other state characteristics, students in the Northeast region were about 109% more likely to leave their states after college than

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college graduates in the West region. GSP showed significant influence on reducing the likelihood of out-migration. The rate of departure was lowered by 8% for every $1,000 increase in GSP per capita. Interestingly, the state livable scale representing aggregated state amenities, showed a positive effect on out-migration.

Turning to Model 3, the study results indicate that Black students were about 1.6 times more likely to return to their home states than their Caucasian counterparts after graduating from an out-of-state college. Students from the highest income quartile were more likely to attend out-of-state institutions in Model 1, while they were also about 105% more likely to return to their home states than their lowest income quartile counterparts. All of the out-of-state institutional characteristics did not show any significant effect on influencing students'' decisions to return to their states of origin.

With respect to the census regions, students who migrated to the Northeast, Midwest, or South region to attend college were about 1.9, 1.2 times or 46% more likely to move back to their states of origin after college graduation, respectively. The finding indicates that the likelihood of college graduates returning to their home states was reduced by 8% when a college state increased its GSP per capita by $1,000. The state livable scale was not found to have a significant effect on retaining out-of- state college graduates in Model 3.

A total variance associated with all the explanatory variables in the study was estimated to be 0.153 for Model 2 and 0.111 for Model3. Thus, about 15% of out-migration behavior and 11% of student behavior of returning to the origin state were explainable by the set of independent variables included in the study.

The current study had several limitations. To begin with, migration patterns explored in the present study were limited to moving to another state for college, leaving home states after

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college graduation, and returning to origin states after graduating from out-of-state institutions. However, there are other migration patterns, such as interstate migration for out-of-state freshman students, which were not addressed in this study.

Using the need- and non-need based state financial aid amounts per student, the study assessed the effects of financial aid on student migration at the state level. However, this study was not able to explore the effects of such state financial aid on the migration decision at the individual level.

Survey respondents graduated from college at various points in time in the study sample, and the location of residence was determined based on students" residency in 2000. Thus, it is feasible that some students might have graduated from in-state institutions in 1998 and moved to another state after 2000, or graduated from out-of-state institutions in 1999 and returned to their home states in 2001.

In- and out-state institution attendances were coded using the institutions from which students received their bachelor"s degrees. This did not reveal detailed enrollment patterns across institutions while students were completing their four-year degrees. Therefore, it is possible that students who graduated from out-of-state institutions might have attended in-state institutions for a certain period of time.

Although inclusion of institutional characteristics in Model 1 might have potentially provided us with profound findings, characteristics of out-of-state institutions were unable to be incorporated into the model due to the nature of the analytical approach of the study.

Summary

The current study explored student migration behavior using a nationally represented sample. The analysis of migration for attending out-of-state institutions revealed less obvious information. The literature already suggests that migrants are less likely to move longer distances. But the present study further elucidates that this phenomenon is more prominent for females. Additionally, a finding from the present study suggests that Hispanic students are more likely to remain in their home states after college, whereas Black students are likely to return to their high school states after graduating from out-of-state institutions.

Students from families with lower incomes are known to be more sensitive to the cost of attending a college, while students from families with higher incomes are less sensitive because they can afford higher costs for attending out-of-state institutions (Paulsen & St. John, 2002; Tuckman, 1970). Therefore, higher family income influences student"s decision to attend out-of-state college (Western Interstate Commission for Higher Education, 2005). Family income also had significant effects on one"s decision to attend institutions located outside of his/her home state in this study. This trend was stronger when students apply for out-of-state institutions in different census regions. Interestingly, well-to-do students were more likely to return to their home states after graduating from out-of-state institutions.

While higher per capita income is known to positively influence one"s interstate college migration decision (Kyung, 1996; McHugh & Morgan, 1984), the findings from the present study show unique effects of GSP per capita on student migration. GSP per capita had a stronger effect on students moving to other states within their home regions as in the earlier study findings. However, GSP also showed negative effects on out-migration after college. Thus, a higher level of GSP per capita increases the odds of both in-state and out-of-state

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students remaining in a college state after graduation. Point estimates suggest that every

$1,000 increase in GSP per capita increases the likelihood of state residents moving to others

states for college by 6% to 7%, whereas it simultaneously increases the likelihood of retaining

out-of-state students in the state by 8% after college graduation. Therefore, it is imperative to

discuss the effect of state‟s economic conditions in the context of both interstate college and

post-graduate migration.

States in the West region such as Nevada, California, Colorado, and Oregon have more

college educated individuals moving to than leaving their states (Census Bureau, 2003). The

study results for post-graduate migration also show that students who moved to states in the

West region were least likely to move back to their home states after college graduation.

While out-of-state students attending in-state institutions have short-term economic benefits to

states, out-of-state students attending institutions in the Midwest and South regions are more

likely to leave their college states after college graduation even after controlling for

institutional and individual characteristics. Thus, instead of counting on out-of-state students

graduating from in-state institutions to remain in the state, states in the Midwest and South

regions may focus more on increasing the size of state residents enrolling in and graduating

from in-state doctoral institutions to enhance the future workforce of young, college-educated

individuals.

States in the Northeast region had higher out-migration rates for in-state college

graduates and out-of-state students graduating from state institutions. However, states such as

Connecticut has the highest GSP per capita of $46.77, followed by $44.88, $43.15, and $42.12

for Massachusetts, New Jersey, and New York, whereas the mean of $ 35.50 across all the

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states in the study data. Hence, the higher out-migration rates for such states may be leveled off as their higher GSPs per capita increase

After the success of Georgia's HOPE program to increase enrollment of most able students at in-state institutions (Cornwell, Mustard, & Sridhar, 2006), other states have adopted broad and merit-based scholarship programs, and spending to support these programs has been growing in these states (Heller & Marin, 2004). According to the study by Singell, Waddell, and Curs (2006), the HOPE program increased enrollment at Georgia's selective institutions. However, the current study found that college graduates from selective or highly selective home-state institutions were most likely to move to other states. Moreover, this finding was based on the sample of students who began their postsecondary education prior to the expansion of broad and merit-based scholarship programs such as HOPE.

The HOPE program does not impose strict family income restrictions on those who apply. Therefore, more academically and financially able students decided to attend in-state institutions who might otherwise had attended out-of-state institutions (Singell, Waddell, & Curs, 2006). The study finding indicated that in-state college graduates who had applied for admission to out-of-state institutions had a higher propensity to leave their home states after college. These are alarming to state policy makers who project an increase of college-educated workers by supporting state's merit-based scholarship programs. Additionally, the study findings do not provide us with any evidence that bright and talented students who graduated from out-of-state selective or highly selective institutions are more likely to return to their home states.

While the context of financial aid variables in the study was limited, neither need- nor non-need based financial aid was found to have a significant effect on retaining in-state

college graduates. In a future migration study, nationally represented data including detailed state financial aid types will shed more light on development of state merit-based scholarships, which are effective in not only promoting talented students to attend in-state institutions, but also retaining them after college graduation. Perhaps the addition of certain conditions may be considered when broad-based state scholarship programs have relaxed income restrictions. For instance, residents with a cumulative high school GPA of 3.0 or above in Maryland are eligible for Maryland Science and Technology Scholarship. However, aid recipients must repay the scholarship unless they work full-time in Maryland one year for each year they received financial aid (Groen, 2004).

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TABLE 1
Matriculation and Graduation Summary

Beginning Year	Frequency	Percentage in Sample
Earlier than 1992	24	0.6%
1992	3748	95.1%
1993	128	3.2%
Later than 1993	40	1.0%

Graduation Year		
Earlier than 1996	96	2.4%
1996	1956	49.6%
1997	1068	27.1%
1998	438	11.1%
Later than 1998	382	9.7%

	Mean	Standard Deviation
Time to Graduate	4.56	1.09
Time after Graduatio	3.24	1.13

TABLE 2

Sample Descriptive Summary

Variable	Label	Percentage in Sample		
Level 1: Individual Characteristics				
Gender	Female	56.0%		
	Male *	44.0%		
Race	Asian	11.4%		
	Black	6.1%		
	Hispanic	6.5%		
	Caucasian *	76.0%		
Parent's Education	First-generation *	44.8%		
	One parent with BA	23.3%		
	Two parents with BA	31.9%		
Family Income	Less than $35k *	23.3%		
	$35k - $50k	17.4%		
	$50k - $75k	21.8%		
	Higher than $75k	24.5%		
	Unknown	13.0%		
Level 2: Institutional Characteristics				
Control	Public	65.7%		
	Private *	34.3%		
Type	Research *	49.5%		
	Doctoral	31.9%		
	Baccalaureate	16.4%		
	Profit and other types	2.2%		
Selectivity	Highly selective	8.3%		
	Selective	25.4%		
	Non-selective *	66.3%		
Level 3: State Characteristics		Percentage in Sample	Mean	Standard Deviation
Census Region (native state)	Northeast	24.8%		
	Midwest	27.4%		
	South	30.7%		
	West *	17.1%		
GSP Per Capita (in 1,000)	Continuous		35.50	5.06
State Unemployment Rate	Continuous		5.73	0.95
State Livable Scale	Continuous		25.07	3.29
State Need-Based Grant Per Student	Continuous		95.45	94.50
State Non-Need-Based Grant Per Student	Continuous		9.04	13.50

Sample size = 3,940

* = reference group in multi-level analyses

TABLE 3

State Characteristics by U.S. Census Region

	Northeast	Midwest	South	West
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
GSP Per Capita (in 1,000)	40.11 (5.01)	33.58 (2.53)	32.40 (4.08)	37.47 (3.94)
State Unemployment Rate	5.96 (0.93)	5.09 (0.72)	5.67 (0.81)	6.54 (0.77)
State Livable Scale	25.077 (2.74)	27.39 (3.07)	23.43 (3.11)	24.31 (2.43)
State Need-Based Grant Per Student	202.98 (108.57)	102.00 (65.33)	24.87 (13.46)	55.98 (25.00)
State Non-Need-Based Grant Per Student	2.95 (3.87)	9.85 (9.86)	17.14 (18.37)	1.96 (7.69)

TABLE 4
Interstate College Migration Results

Variable	Label	Students Moved to Another State in the Same Region to Attend College				Students Moved to Another State in Different Region to Attend College			
		b	SE	Relative Risk	Sig.	*b*	SE	Relative Risk	Sig.
Level 1: Individual Characteristics		Model 1							
Intercept		-2.033			***	-2.584			***
Gender	Female	-0.104	0.127			-0.296	0.117	-0.256	***
Race	Asian	-0.469	0.305			0.345	0.225		
	Black	0.176	0.374			0.078	0.361		
	Hispanic	-0.002	0.383			-0.126	0.169		
Parent's Education	One parent with BA	0.249	0.167			0.571	0.161	0.769	***
	Two parents with BA	0.550	0.140	0.734	***	0.759	0.158	1.137	***
Family Income	$35k - $50k	-0.051	0.204			-0.180	0.226		
	$50k - $75k	0.129	0.171			0.324	0.149	0.383	**
	Higher than $75k	0.648	0.172	0.911	***	0.916	0.185	1.499	***
Level 2: State Characteristics									
Census Region	Northeast	1.180	0.744			0.401	0.409		
	Midwest	0.203	0.522			-0.339	0.423		
	South	-0.206	0.421			-0.415	0.396		
GSP per Capita	Continuous	0.064	0.029	0.067	**	0.054	0.021	0.056	**
State Unemployment Rate (z score)	Continuous	-0.069	0.155			-0.327	0.135	-0.279	**
State Need-Based Grant Per Student	Continuous	-0.005	0.003	-0.005	*	0.000	0.001		
State Non-Need-Based Grant Per Student	Continuous	-0.003	0.009			-0.010	0.009		

NOTE:*** = $p < .01$, ** = $p < .05$, * = $p < .10$

TABLE 5
Post-College Out-Migration and In-Migration Results

Variable	Label	In-State Graduates who Left their Home States				Out-State Graduates who Returned to their Home States			
		b	SE	Relative Risk	Sig.	*b*	SE	Relative Risk	Sig.
Level 1: Individual Characteristics		Model 2				Model 3			
Intercept		-1.516			***	-1.107			***
Gender	Female	-0.080	0.109			0.143	0.178		
Race	Asian	-0.140	0.166			-0.143	0.343		
	Black	-0.269	0.270			0.936	0.330	1.550	***
	Hispanic	-0.795	0.291	-0.548	***	0.077	0.408		
Parent's Education	One parent with BA	0.039	0.112			-0.119	0.281		
	Two parents with BA	0.298	0.130	0.347	**	-0.349	0.258		
Family Income	$35k - $50k	0.164	0.168			0.363	0.350		
	$50k - $75k	0.194	0.157			0.362	0.280		
	Higher than $75k	0.209	0.190			0.719	0.249	1.053	***
College Application	Multiple applications	0.378	0.139	0.459	***	-0.187	0.157		
Level 2: Institutional Characteristics									
Control	Public	-0.056	0.122			-0.199	0.269		
Type	Doctoral	-0.443	0.144	-0.358	***	0.029	0.330		
	Baccalaureate	-0.162	0.154			-0.220	0.409		
	Profit & Other types	-1.092	0.552	-0.664	**	-0.421	0.441		
Selectivity	Highly selective	1.029	0.229	1.798	***	-0.033	0.355		
	Selective	0.433	0.136	0.542	***	0.123	0.214		
Level 3: State Characteristics									
Census Region	Northeast	0.735	0.313	1.085	**	1.079	0.150	1.940	***
	Midwest	0.350	0.218			0.767	0.221	1.152	***
	South	0.100	0.248			0.375	0.187	0.455	**
GSP Per Capita	Continuous	-0.086	0.020	-0.082	***	-0.081	0.018	-0.078	***
State Unemployment Rate (z score)	Continuous	0.025	0.121			0.171	0.116		
State Livable Scale (z score)	Continuous	0.179	0.088	0.196	**	0.214	0.131		
State Need-Based Grant Per Student	Continuous	0.001	0.001						
State Non-Need-Based Grant Per Student	Continuous	0.004	0.004						

NOTE:*** = *p* < .01, ** = *p* < .05, * = *p* < .10

APPENDIX
States by Region

Northeast	Midwest	South	West
Connecticut	Illinois	Alabama	Arizona
Maine	Indiana	Arkansas	California
Massachusetts	Iowa	Florida	Colorado
New Jersey	Kansas	Georgia	Idaho
New York	Michigan	Kentucky	Montana
Pennsylvania	Minnesota	Louisiana	Nevada
Rhode Island	Missouri	Maryland	New Mexico
Vermont	Nebraska	Mississippi	Oregon
	North Dakota	North Carolina	Utah
	Ohio	Oklahoma	Washington
	Wisconsin	South Carolina	
		Tennessee	
		Texas	
		Virginia	
		West Virginia	