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OUTMIGRATION

# **State Merit Based Scholarship Programs Influence on Outmigration\***

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**Abstract:**

In the past two decades, over a dozen US states have enacted state merit based scholarship programs for students enrolling in higher education. Students are eligible to receive this award based on academic credentials, and must utilize these awards within their home state. This study aims to address how these state merit based scholarship programs affect out-of-state migration. We find that the presence of these awards influence resident migration when controlling for a variety of state based variables.

## **Problem, Context, and Background**

Migration of college bound students has been a persistent area of interest for colleges/universities and states. Institutions of higher education have continually attempted to attract and yield talented individuals to meet its desired student population objectives, including students from certain geographic origins, through tuition pricing and financial aid (Heller, 2002). In some instances, institutions of higher education designed financial aid policies to incentivize students from various regions to create regional diversity or balance the ratio of in-state and out-of-state students. More recently, many states indicated concerns about the economic effects of losing high school graduates to other states. Some researchers argued that retaining these students will benefit the states' universities and economy once they graduate (Ionescu & Polgreen, 2008).

Financial aid as a policy initiative to yield talented individuals evolved over time. Historically, financial aid in higher education was typically awarded based on financial need or other non-merit based criterion (Heller, 2002). Since the early 1990's, financial aid in the form of merit-based aid awards became a more prevalent tool for institutions and states to attract and yield their desired student population (Hossler, Braxton, & Coopersmith, 1989). More recently, some states have enacted state-wide merit based award initiatives. Yet, as state appropriations toward higher education declined, institutions sought other means to subsidize a student's cost of education, primarily through higher tuition prices (Heller, 2006). Therefore, an array of policy initiatives related to tuition pricing and financial aid initiatives influenced student enrollment patterns (Hearn et al 1996). Although financial considerations are critical considerations during the college choice process, other aspects may influence students' decisions to attend college. Prior research indicated student decisions to attend college in another state were influenced by higher education funding levels, personal income status, family preferences, entrance

requirements, prestige, and other aspects (Brewer et al. 2002). Even with these economic and student related factors, certain states enacted policy aiming to incentivize academically talented high school students to stay within their home state for higher education.

A specific policy employed by numerous states were merit based award programs. Specifically, states stipulated that these merit based awards must be utilized at institutions located in the student's home state, in an effort to incentivize talented students to stay within their home state for higher education. The first such program was the Georgia Hope Scholarship Program, which initially awarded students with full tuition to Georgia public institutions if they met certain high school GPA requirements. Fourteen other states have enacted similar policies since 1993, offering tuition discounts based on academic credentials (Orsuwan & Heck, 2009).

More recent state merit based scholarship programs enacted since the Georgia Hope Scholarship Program varied in funding source, award criteria, and award amount. While most state programs were funded through lottery revenues, other states utilized one time litigation settlement agreements to fund scholarship programs (Orsuwan & Heck, 2009). Furthermore, each state had distinct criteria regarding award criteria: GPA, SAT, ACT, class rank, state tests, or any combination of these account for the measures used to allocate awards. The award amounts were just as varied as the award criteria: full tuition and fees for four years or a one-time award of \$1,000 were two extremes. Regardless of the funding source, criteria, and award amount, prior research depicted the influence of state merit based scholarship programs on students' enrollment within their home state for higher education (Orsuwan & Heck, 2009).

The objective to retain residents in their home state for college was the short-term objective of state merit based aid programs. The long-term goal of some the state merit based aid policy initiative was to keep college graduates in state. Given a state's investment, retaining its college graduates was critical to a state's economic development. Strathman (2004) found

that college graduates leaving their state upon graduation negatively impacted state appropriations for higher education. Further, social benefits associated with college graduates—lower unemployment, higher tax revenues, and voter participation—were often cited as valuable assets for states (Baum & Ma, 2007). Recent findings indicated that students receiving state merit based scholarships were 74% more inclined to leave that state upon college graduation (Ishitani, 2011). This troubling finding suggested that state merit based scholarship programs, regardless of their influence on high school student migration, may lead to unintended consequences such as outmigration of college graduates. Although this study will focus on migration of high school graduates, understanding students' mobility post-college is an aspect that cannot be ignored and is a subject requiring additional research.

### **Purpose of the Study**

Previous research delved into various issues related to student migration following high school. In many instances, studies conducted extensive state level analysis aiming to address how specific policies at a single state affect student enrollment patterns. For example, Groen (2003) studied migration effects in Georgia given the goals of the Hope Scholarship Program. However, he primarily focuses on migration of Georgia Hope recipients once graduating from college. In addition, Hickman (2009) aimed to study how Florida's Bright Futures Program related to student migration out of state. These studies were valuable at the state level, and they have indicated a need for a national study of state merit based scholarship programs. Orsuwan & Heck (2009) recently studied how state scholarship dollars and pre-paid tuition plans affected migration.

Often studies taking into account multiple states and student migration focused on tuition price, state factors such as income and appropriations, and prestige as motivators of student migration (Tuckman, 1970; Mixon, 1992; McHugh & Morgan, 1984; Zhang, 2007). However,

models that use only a metric of gross tuition price without accounting for financial aid were not measuring the actual net price to students, which could be a significant determinant in relation to student migration. We intend to address how some additional financial indicators, more specifically state non-need based aid awards, influence student enrollment patterns. Utilizing a panel data set across 48 states, we will analyze how the presence of various merit aid programs and average non-need based award amounts influence students migrating out-of-state for higher education.

### **Theoretical Framework and Conceptual Model**

The human capital theory serves as a guiding principle of individual motivations for seeking higher education and society's investment in building an educated population. Paulsen (2001) noted that students' decision process in whether or not to attend an institution of higher education was in part based on the net benefits they will receive from additional education. State and federal governments often invest in higher education to enhance the human capital or workforce within their region. Previous studies on student migration utilized this framework (Baryla & Dotterweich, 2001). However, the basic elements of human capital theory in conjunction with an input-process-output (IPO) conceptual model more accurately inform our assessment of how state characteristics and policy influence student migration (shown in Figure 1). It was assumed in this IPO model that the inputs may influence both the process and output. In this model, inputs included controlling variables (e.g. per capita income, state appropriations per capita, etc), process incorporated state-level financial aid policies, and the output was student enrollment patterns (e.g. resident outmigration). [Insert Figure 1 Here].

### **Research Design**

**Research Question:** How do state-level merit or other need and non-need based aid programs influence resident outmigration of first-time, full-time undergraduate students?

**Description of the Data:** The National Center for Education Statistics (NCES) Integrated Postsecondary Education Data System (IPEDS) Enrollment Survey measured state migration patterns for first-time, full-time fall freshman students every year since 2000, but survey submission was only required of institutions in even years (prior collection was every other year). The IPEDS Institutional Characteristics Survey gathered data on average tuition for undergraduates and other institution specific information every year. The National Association of State Student Grant and Aid Programs (NASSGAP) Annual Surveys track state financial aid awards, including those with need and merit based criteria. Grapevine provided data on annual state appropriations to higher education.

**Variables and Sources:** The dependent or outcome variable used in this study is the percentage of first-time, full-time residents leaving their home state for higher education.<sup>i</sup> Independent variables included the following: state higher education appropriations per full-time equivalent (FTE) enrollment in IHEs; state per capita income; state non-need based financial aid award amounts per FTE enrollment in IHEs; state need based financial aid award amounts per FTE enrollment in IHEs; number of state residents eighteen to twenty-four years of age; presence of state merit based scholarship program; and average in-state two-year and four-year tuition prices at public IHEs. [Insert Table 1 Here].

### **Quantitative Method:**

A cross-sectional, time series dataset was constructed for 48 states using the variables referenced above from even years during 1992-2006. We removed Hawaii and Alaska from the panel dataset because of their substantial distance from other states, which could influence migration patterns. Other researchers have similarly excluded these states or added dichotomous variables to capture how migration patterns may be different for students in these non-contiguous

states (Mak & Monkur, 2004). Since we have continuous variables with different units of measure, we took the natural logarithm of all non-dichotomous variables to convert the continuous variables into percentages. This normalization of variables allowed for interpreting the results through percentage changes.<sup>ii</sup> Typically, a dataset such as this would be analyzed with some iteration of a fixed- or random-effects regression model to account for unobservable aspects within a unit (e.g. state) and then estimate the influence of the independent variables on the dependent variable over time (Volkwein & Tandberg, 2008; Zhang, 2007). Initially, we sought to use a fixed- or random-effects regression model to address our research question. A Hausman test comparing a fixed- and random-effects regression models determined that a fixed-effects model was more appropriate. In addition, we employed other post-estimation tests that included a Modified Wald test for heteroskedasticity, Pesaran's test of cross sectional independence, and Wooldridge test for autocorrelation in panel data. The results of these post-estimation tests indicated there is potential for biased results due to heteroskedasticity and serial correlation across years (See Appendix Tables 1 and Technical Notes).

Consequently, we have utilized linear regression with a Prais-Winsten panel-corrected standard error (PCSE) estimate to assess how the presence of state merit based scholarship programs and average amount of state-level financial aid influences resident outmigration of first-time, full-time freshmen while controlling for state-level higher education appropriations per capita, two- and four-year public institution tuition prices, state per capita income, and population of eighteen to twenty-four year old individuals. This technique accounted for the presence of heteroskedasticity and cross-sectional correlation across panels. In addition, we adjusted the model to account for first-order autocorrelation. Our model is represented as:

$$y_{outit} = \beta_0 + \beta_1 x_{stateit} + \beta_2 x_{aidit} + \beta_3 x_{meritit} + \epsilon_{it}$$

where  $y_{out}$  was the number of first-time college students leaving their home state  $i$  in a given year  $t$ ,  $\beta_0$  was the intercept coefficient,  $X_{state}$  represents the series of input variables such as per capita income, population of eighteen to twenty-four year old individuals in state  $i$  for year  $t$  (see Table 1 for full list of state inputs addressed in this model),  $X_{aid}$  represented the state-level financial aid variables in state  $i$  for year  $t$ ,  $X_{merit}$  was a dummy variable to account for when a state  $i$  initiated a merit-aid program in year  $t$  and continued to record the presence of the merit aid program through year  $t+1$ , and  $\epsilon$  represented the error term with adjustments for heteroskedasticity and autocorrelation. The  $\beta$ s referred to the coefficients calculated in the Prais-Winsten regression model with panel-corrected standard errors.

The PSCE model was similar to the time series generalized least squares (GLS) model in that both account for heteroskedasticity and first-order autocorrelation. We explored which of these models was best suited to analyze our panel data. The GLS model might be a more efficient estimator for panel data with a large number of years (Beck & Katz, 1995). However, given that our data spans eight observed years for 48 states, the PCSE model was a more appropriate technique to account for our panel data, which had more observations than years.

### **Limitations:**

In studying student migration patterns, there were certain limitations that arose with lack of data on other potential influences of student enrollment patterns. A first limitation was being able to measure the supply of in-state and out-of-state undergraduate enrollment in each state. For instance, we were unable to account for the number of seats available each year, in a given state, for first-time, full-time freshman. This was an institution specific variable which has the potential to vary each year, which was not captured within our study. A variable capturing enrollment supply could also then account for any state-level mandates or guidelines on public institution enrollment levels of in-state and out-of-state, where there were restrictions on the

number of out-of-state students. Extending our research to this level of data collection was unattainable in our research study.

A second limitation was how we accounted for the presence of state merit based scholarship programs. Since this was a binary variable, we could only account for whether or not states had a state merit based scholarship program. However, more appropriate ways of measuring the presence of these merit programs could include the percentage of in-state tuition the award covers or the proportion of high school graduates that were eligible to receive the merit awards in a given state. These would be continuous variables, which could indicate the effects of funding levels and proportion of eligible residents allowed to participate in the award programs. Since the binary variable in our study was unable to account for the variation in award levels, frequency of awards, or the number years a program has operated in a given state, it was difficult to differentiate the relative effectiveness of one state's merit scholarship program over another state's program. Further, this variable did not account for potential effects over time for a state merit scholarship program. In addition, previous research has found evidence that the each consecutive year of a state merit scholarship program has an impact on migration (Orsuwan & Heck, 2009).

A third limitation was the neglect to account for student migration to nearby states. In some instances, students may live in an area in which neighboring states have similar levels of tuition or live in closer proximity to a college in another state. It may be worthwhile for students to migrate to a nearby state if the out-of-state tuition was of comparable value to their in-state tuition amount. Factoring in neighboring states nonresident tuition may impact our dependent variable, and can therefore be considered a limitation within our study. Similarly, reciprocity was not considered in our model. Minnesota, Wisconsin, and other states had agreements with one another which allow students to attend institutions in neighboring states at lower tuition rates

than the typical out-of-state tuition price. These reciprocity agreements may have allowed students to migrate to certain states without being influenced by tuition differences across state lines.

A fourth limitation was the lack of state-wide data on any institutional level scholarship programs, which were designed to attract talented residents to seek higher education within a state. Many institutions have instituted scholarship programs to attract academically talented residents. The funding source of these awards may come from university foundations or other institution specific funds, which were not counted in the NASSGAP data on state-level awards.

### **Results:**

The results of the Prais-Winsten panel-corrected standard error regression model were reported in Table 2. The independent variables were grouped according to the conceptual framework with controlling variables listed as input variables and explanatory variables listed as process variables. This table showed the beta coefficients and panel-corrected standard errors for all the variables utilized in the analysis. Beta coefficients indicated the direction and effect size of the independent variables. Since most of the independent and dependent variables were natural logarithms of their original values, the results were interpreted as percentage increases or decreases.

The overall Prais-Winsten PCSE regression model explained a large proportion of the variance associated with outmigration with a  $R^2$  of 0.99 ( $p < 0.001$ ). Five of the eight independent variables were significant ( $p < 0.05$ ). All the state-level input or controlling variables presented significant findings except for average price of tuition at two- and four-year public institutions. With the exception of average need based financial aid per FTE, the process or explanatory variables were significant in the model. The differing direction of the beta coefficients emphasize the push and pull influences of various state characteristics on student

outmigration. However, the effect size of each of the independent variables was relatively small.

[Insert Table 2 Here].

The presence of a state-level merit-based aid program indicated a lower outmigration of residents seeking higher education as first-time, full-time students. This was a binary variable coded as one for each year a merit based aid program was present in a given state. Thus, when holding all the other variables constant, the presence of a merit-based aid program accounted for a 8.7% decrease in residents leaving their home state as first-time college entrants ( $p < 0.01$ ). Similarly, state-level increases in non-need based aid presented the likelihood of decreased outmigration of first-time colleges students. A ten percent increase in non-need based aid per FTE was associated with a one-tenth of percent decrease in out-of-state migration ( $\beta = -0.013$ ,  $p < 0.05$ ). As such, a 100% increase in non-need based aid per FTE only related to 1.3% decrease in resident outmigration.

The state-level input or controlling variables demonstrated some positive and negative relationships with resident outmigration. State appropriations per capita was the only controlling variable to represent a decrease in resident outmigration of first-time college students. For instance, a ten percent increase in state appropriations per capita related to a 3.7% decrease in out-of-state migration ( $\beta = -0.370$ ,  $p < 0.001$ ). The other controlling variables demonstrated positive relationships with resident outmigration. A ten percent increase in per capita income was associated with 8.6% increase in out-of-state migration when holding all other variable constant ( $\beta = 0.862$ ,  $p < 0.001$ ). Likewise, a ten percent increase in the population of 18 to 24 year olds accounted for a 6.7% increase outmigration ( $\beta = 0.665$ ,  $p < 0.001$ ).

### **Conclusions:**

The proposed analysis and results indicated a host of conclusions. First, our analysis clearly shows that the presence of a state merit based scholarship program affected resident

migration of first-time college students. As stated earlier, a critical goal of state merit based scholarship programs was to retain academically talented students. While we can assume that these awards were targeted toward talented students, through competitive, academic requirements, our research question was designed to examine outmigration patterns without controlling for student achievement. There might be a relationship between state merit aid program and retaining academically talented students, but in this study we could not test any such relationship. Prior research on student migration suggested such a relationship exists in single state studies, but it is difficult to model such a relationship in a multi-state or national study (Cornwell et. al 2004).

Secondly, within our analysis, we were unable to account for the total net price in our model. The amount of need and non-need based aid per FTE only partially explained total net price since it did not include institutional level financial aid. The results indicated that an increase in non-need based aid accounted for an extremely small decrease in outmigration. Further, our results illustrated that public two- and four-year in-state tuition prices were not significant ( $p > 0.05$ , respectively) in the model. Prior research showed mixed results in regards to tuition and the varying impact tuition levels have on migration. Strathman (2004) found that an increase in tuition did not correlate to outmigration amongst students. Differently, Mak & Moncur (2003) indicated that states with lower tuition charges tend to retain a larger percentage of resident students. Thus, our findings must be taken into consideration with the various examples found within previous studies.

Third, higher per capita income levels contributed to resident outmigration. Similarly to findings in previous literature (Mak & Moncur, 2004), students with lower income levels tended to stay within state for higher education. A recent study by Zhang (2007), reported that a 1% increase in median household income accounts for a 1.51% increase in out-of-state migration.

Our results showed a similar relationship in that a 1% increase in per capita income was associated with a 0.89% increase in out-of-state migration for higher education. Therefore, this result was comparative to findings in previous research.

**Implications for Policy:**

The findings of our research demonstrate the presence of state merit based scholarship programs influencing residents to stay in their home state for higher education. This finding only partially affirms what policy makers intended to influence with the enactment of programs such as the Georgia Hope Scholarship (Zhang & Ness, 2010). Given that our study is based on a cross-sectional, time series dataset that spans before the promulgation of the statewide merit based aid, we can account for how the advent and continuation of a state merit based scholarship program influenced resident outmigration over the past sixteen years. However, the overall effect size of the presence of such a program was relatively small. Our research did not isolate the funding levels specific to each of these awards, so we cannot infer if states with large quantities or funding levels in specific award programs had greater influence on retaining residents for higher education. Further, we weren't able to determine if academically talented students are staying in state for college. Thus, even though, the presence of a state merit based aid program reduces outmigration, this policy initiative may not directly impact the intended population of academically talented students.

Even though we could not isolate the precise funding levels of each state merit based scholarship programs, we assessed the state-level non-need based aid to measure its influence on resident outmigration. The amount of non-need based aid serves a proxy to the merit aid funding levels since the dollar amounts of any specific state merit based scholarship program should be summed in this variable with any other potential non-need based aid programs. Thus, states

investing an increased amount of funding in higher education through merit or other non-need based aid award programs have the potential to yield more resident students.

Our study also poses some interesting questions for how policy makers interpret research findings on tuition pricing and outmigration. Given the insignificant findings of tuition prices at two- and four-year public institutions, further research is needed to more acutely measure tuition net-price, which accounts for tuition less any financial aid. Our study urges future policy makers to address the notion of net-price of tuition by creating better national data collection on the net-price, which would improve research examining student migration patterns. The recent National Center for Education Statistics (NCES) initiative to collect more robust data on institutional net-price has potential to more accurately derive metrics of tuition net-price for future research.

Another consideration for policy is that our results illustrate that state appropriations have influence in decreasing outmigration. Our research shows that as state appropriations increased, out-of-state migration decreased. This result is important to consider for state legislators as they reflect on the future of state merit based scholarship programs. Additionally, assessing the effectiveness of these programs is important during turbulent budget years, as many costly programs are discontinued or phased out.

Our study does not analyze migration of college graduates. As noted earlier, recent literature suggests that a majority of students receiving state merit based scholarship programs leave their state post college graduation (Ishitani, 2011). Most state programs do not have provisions requiring college graduates to stay within their home state following graduation.

However, a program in Maryland, the Science and Technology Scholarship, requires recipients to work in the state of Maryland for each year they received the award (Groen, 2004). This recently phased out Maryland program should be analyzed along with other similar scholarships that require graduates to work within their state. In addition to informing policy implications,

our study addressed how future research on outmigration can build a more robust panel dataset that includes variables such as net-price, student quality, and enrollment supply. As with building a more robust dataset, we suggested that future research use a more robust regression model. Even though methods used in this study provided unbiased results, there are more efficient estimation techniques available, such as instrument variable regression models, which would provide the opportunity to account for the potential endogenous variables. A model such as this would more precisely estimate what we articulated in our input-process-output conceptual framework. A multi-level model including both state and institutional level data poses an additional opportunity in future research to more accurately account for unobserved state and institution specific effects.

**Tables and Figures:**

TABLE 1  
Descriptive Statistics

	Mean	Std. Deviation	Range
<i>Dependent Variable:</i>			
Out-of-state migration	7191.9	6667.3	1049-34494
<i>Independent Variables:</i>			
State higher education appropriations per capita	0.201	0.059	0.066-0.505
State per capita income	26853.9	6468.277	14559 -51600
State non-need-based aid per full-time equivalent undergraduate enrollment	82.6	210.4	0-1546
Population of 18 to 24 year olds	554150	598602.8	44926-3784128
In-state public four-year tuition	3729.4	1660.2	1265-9774
In-state public two-year tuition	1783.5	799.5	208-5593
State-level merit award program	0.148	0.355	0-1

TABLE 2  
Prais-Winsten Regression with Panel-Corrected Standard Errors

Independent Variables	Beta coefficients	Panel-Corrected Standard Errors
State per capita income	0.862 ***	0.131
State higher education appropriations per capita	-0.370 ***	0.082
State non-need-based aid per full-time equivalent undergraduate enrollment	-0.013 *	0.006
State need-based aid per full-time equivalent undergraduate enrollment	0.010	0.005
Population of 18 to 24 year olds	0.665 ***	0.033
In-state public four-year tuition	0.049	0.053
In-state public two-year tuition	0.048	0.046
State-level merit award program	-0.087 **	0.033
Intercept (Constant)	-7.409 ***	1.145

\*p < 0.05, \*\*p < 0.01, \*\*\*p < 0.001

**Appendix:**

FIGURE A1: Conceptual Model

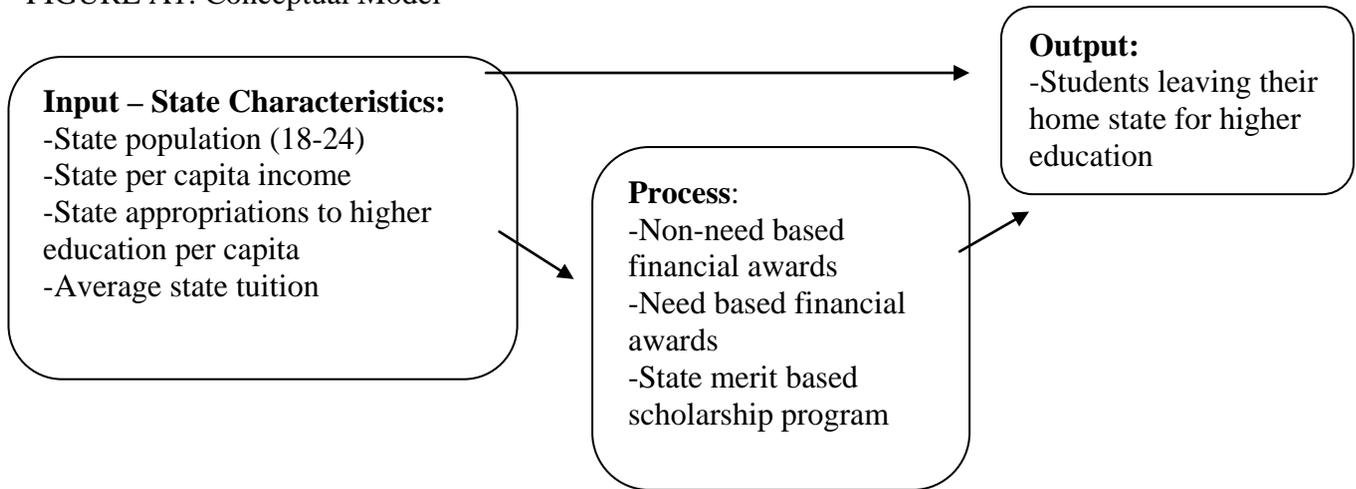


TABLE A1:  
Variable Names, Definitions, and Sources

Variable Name	Definition	Source
Outmigration	Number of students leaving their home state for higher education.	IPEDS Enrollment Survey
Per capita income	State per capita income	US Census Bureau Population Survey
State appropriations per capita	State appropriations to higher education per capita	Grapevine Survey of State Higher Education Tax Appropriations
Non-need based awards per FTE	State non-need based financial aid award amounts averaged per full-time equivalent student	NAASGAP Annual Surveys
Population 18 to 24 year olds	Population of 18-24 year olds within a state	US Census Bureau Population Survey
In-state public four-year tuition	Average tuition for public four-year institutions	IPEDS Institutional Characteristics Survey
In-state public two-year tuition	Average tuition for public two-year institutions	IPEDS Institutional Characteristics Survey
Merit scholarship program	Binary variable; 1=state has merit based scholarship program; 2=state does not have merit based scholarship program	Orsuwan, M. & Heck, R. <i>Merit-Based Student Aid and Freshman Interstate College Migration</i> . (2008).

TABLE A2

## Hausman Test of Fixed and Random Effects Models

	Fixed Effects (FE)	Random Effects (RE)	Difference between FE and RE
State per capita income	0.217	0.315	-0.098
State higher education appropriations per capita	0.034	-0.092	0.125
State non-need-based aid per full- time equivalent undergraduate enrollment	-0.006	-0.006	<-0.001
State need-based aid per full-time equivalent undergraduate enrollment	0.004	0.006	-0.002
Population of 18 to 24 year olds	0.408	0.604	-0.196
In-state public four-year tuition	0.219	0.185	0.034
In-state public two-year tuition	0.016	0.012	0.004
State-level merit award program	-0.059	-0.065	0.006

Chi-squared= -522.32

FE= consistent under Ho and Ha; obtained from xtreg

RE= inconsistent under Ha, efficient under Ho; obtained from xtreg

TABLE A3

## Fixed Effects Post-Estimation Tests

Test	Value	Probability (p-value)
1. Pesaran's test of cross sectional independence	1.703	0.08
2. Modified Wald test for groupwise heteroskedasticity in fixed effect regression model	Chi-sq=8906.61	0.00
3. Wooldridge Test for Autocorrelation	F-stat=18.850	0.00

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<sup>i</sup> The percentage of outmigration was calculated by taking the natural logarithm of the number of residents who leave their home state to enroll as a first-time, full-time student in higher education.

<sup>ii</sup> In calculating the natural log of state-level non-need based, we added one dollar to all values to account for some states that did not award non-need based aid in some of the years.