A SPATIAL ANALYSIS OF STUDENT MIGRATION, TUITION, AND ENROLLMENT PATTERNS AT U.S. FLAGSHIP UNIVERSITIES

Cartography by Emma Conroy
GIS 102 | Advanced GIS | Fall 2017
Projection:
North American Albers Equal Area Conic
Data:
National Center for Education Statistics, nces.com

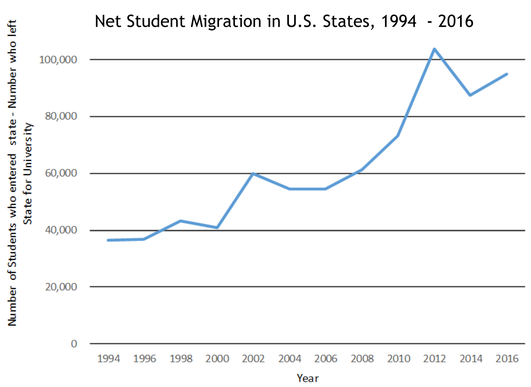
Tufts UNIVERSITY

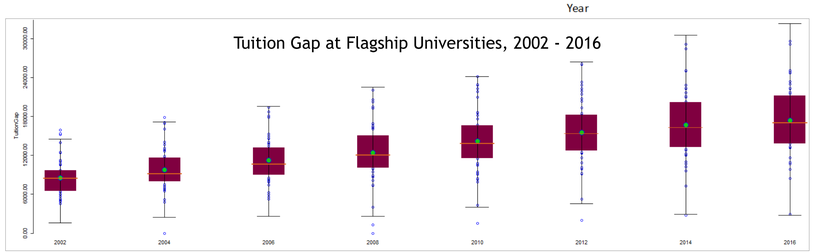
INTRODUCTION

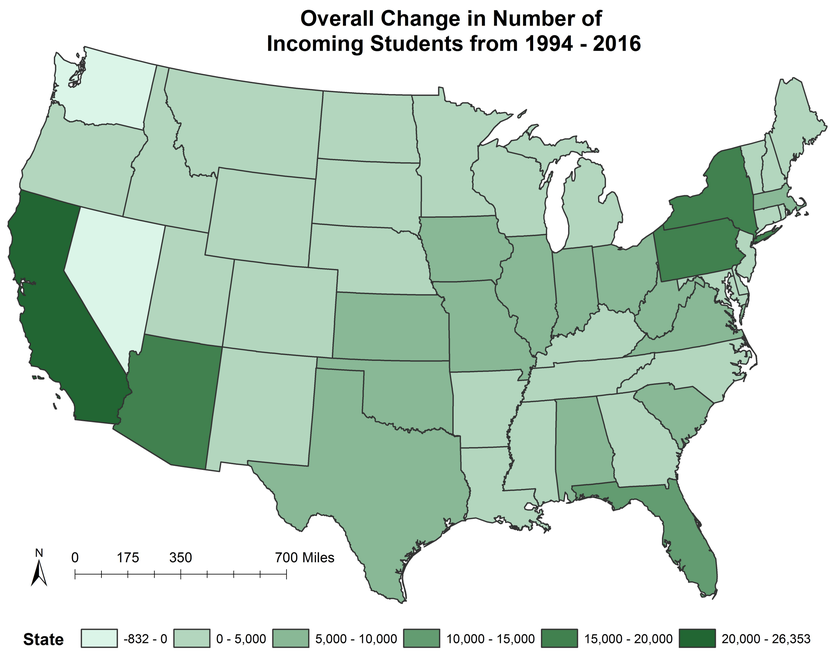
More U.S. high school seniors are leaving their home states to go to college than ever before, a trend that is consistent in both public and private universities. The first part of this analysis examines the migration patterns of these students, taking a spatial look at where high school seniors choose to stay in-state and where they choose to leave, as well as where those who leave choose to go. A factor in their decision may be the fact that all state universities in the U.S. charge a higher tuition for out-of-state students. This creates an incentive for public universities to encourage the enrollment of out-of-state students over in-state students. Increased enrollment from out-of-state students can decrease the opportunities for in-state students to attend public higher education. At a lower cost, a lower-income student's home state university may be the only financially realistic option for them to achieve higher education. In addition, states have reduced their spending on public higher education while tuition has risen by 33%. (Saul) Increasing tuition will further reduce the opportunities for in-state students, especially those who are low income and minority students, groups whose admittance rates have decreased as out-of-state student admittance has increased. (Douglas-Gabriel) This is evidence of increasing inequality in American access to low-cost higher education. This poster attempts to take the first step in determining if that inequality is spatially distributed by examining student trends by state and at flagship universities. There is likely decreasing access to low-cost public higher education in a state in which more and more out-of-state students are entering the state, the state university has a low or decreasing percentage of in-state students, and high or increasing in-state tuition. The analysis in this project aims to figure out if and where this trend is happening, and to examine larger trends in student migration at the university and state levels.

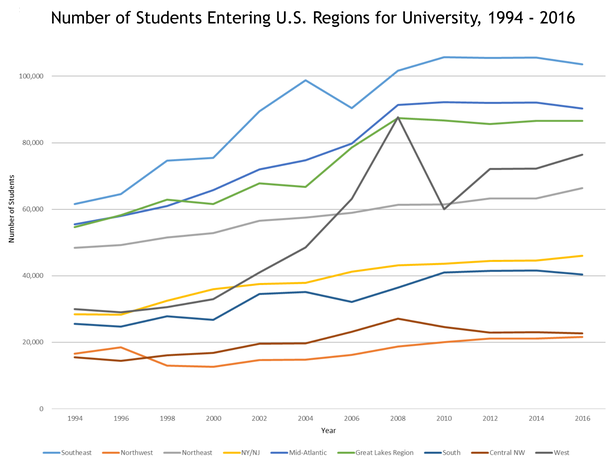
METHODS

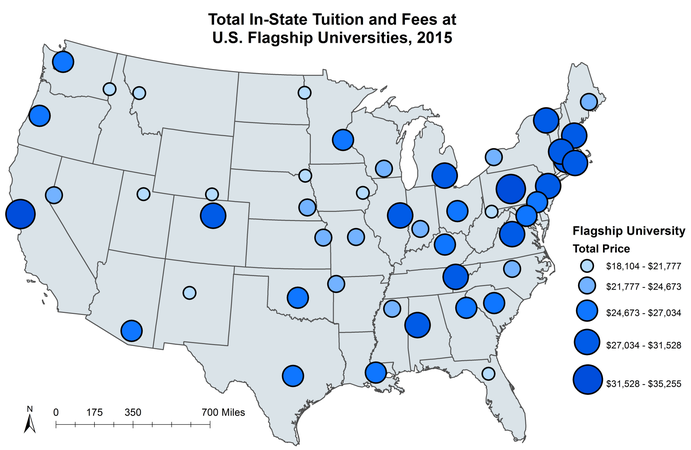
All state- and university-level data was downloaded from the National Center for Education Statistics. At the state level, migration numbers were examined in Excel to determine migration trends by state and region over time. Line graphs were created using Excel, while time-series box plots were generated using the time editor tool in GeoDa.
Flagship universities were mapped into ArcMap using geographic coordinates, while a U.S. Bureau state shapefile provided a layer for state data to join to once it was projected. Global and Local Moran's I's were run to demonstrate spatial clustering in the data. OLS regressions run in GeoDa exhibited correlations between variables such as the cost of in-state tuition and the percentage of university students that were in-state. Finally, space-time emerging hotspot analysis in ArcMap was used at the university level to determine migration patterns over time.

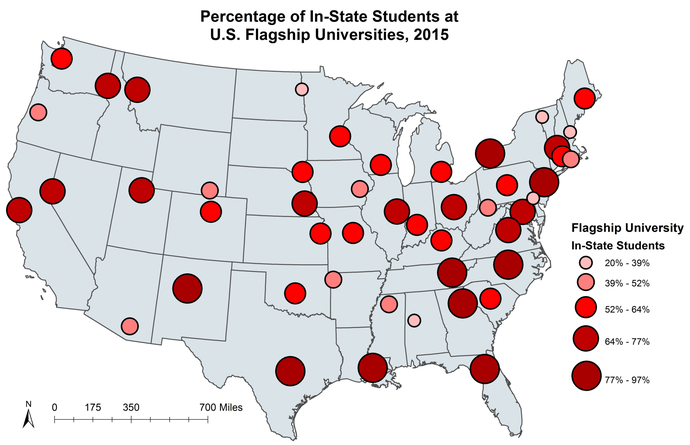












RESULTS

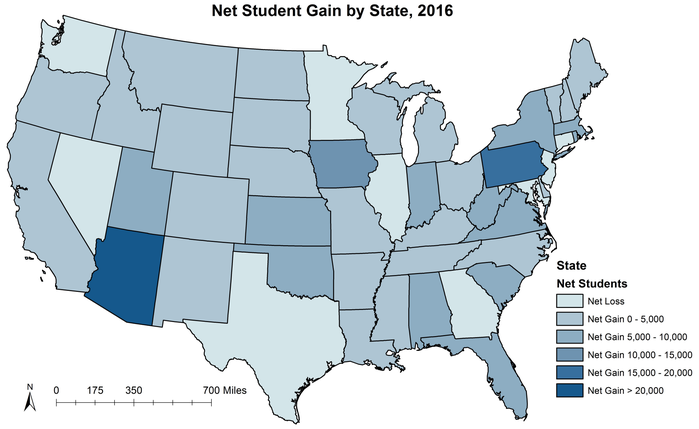
Aggregated net migration in the U.S. confirms that an increasing number of students are leaving their home states for their first year of university. Box plots of tuition data over time revealed that both in-state and out-of-state tuition at flagship universities have been increasing, and that the gap between them is growing. This is significant because a higher tuition gap creates more of an incentive for universities to recruit out-of-state students. A global Moran's I on in-state tuition demonstrated high levels of clustering, with clusters of high in-state tuition in the Northeast and on the West coast. Mapping the percentages of in-state students at flagship universities showed less spatial clustering, with low percentages in states like Arizona, Alabama, New Hampshire, and Vermont. From 1994 to 2016, large and increasing numbers of students traveled to California, Arizona, Florida, New York, and Pennsylvania for college. By region, students have increasingly migrated to the West and Southeastern U.S., while the most people travel to the Southeast, Mid-Atlantic, and Great Lakes Regions overall. A larger number of students entered the states Arizona and Pennsylvania for university in 2016 than left them, while more students left Illinois and New Jersey than entered them. OLS regression results showed some statistically significant correlations. In-state tuition, the number of in-state students at the university level, and a proxy for state student population (number of primary and secondary students in the state) are all correlated with the percentage of in-state students as a dependent variable. In-state tuition and the percent of in-state students are negatively correlated, while the number of in-state students and number of primary and secondary students in the state are positively correlated with the percentage of in-state students.

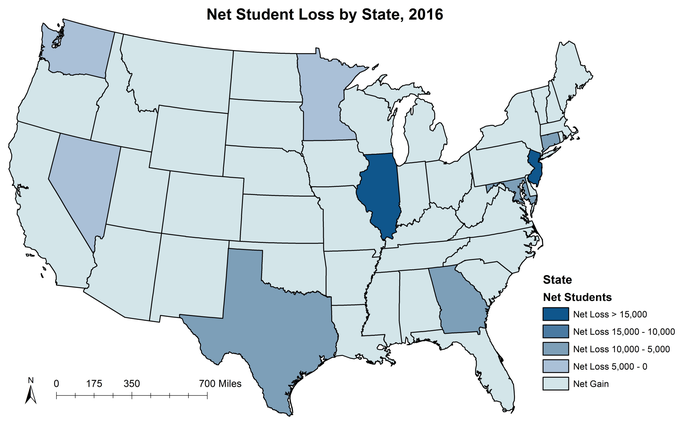
Dependent Variable: Percentage of In-State Students		
Independent Variable	**Coefficient**	**Probability**
In-state tuition	-0.0017	0.0025*
Tuition Gap (in-state – out-of-state tuition)	-0.0003	0.4512
Number of in-state students	0.0042	0.0110*
Number of primary and secondary students in the state	$4.812e^{-06}$	0.0025*

Dependent Variable: In-state Tuition		
Independent Variable	**Coefficient**	**Probability**
Percent of in-state students	-108.49	0.0025*
Tuition Gap 2015 (in-state – out-of-state tuition)	0.1313	0.1992
Number of in-state students	0.8365	0.0800
Number of primary and secondary students in the state	0.0009	0.0652

*statistically significant at the 5% level

Source: www.huffingtonpost.com





CONCLUSION

While this analysis has not revealed strong evidence of decreased access to low-cost post-secondary education for low-income or minority students in the U.S., it takes the first step towards determining what factors may contribute to high or low levels of opportunity, as well as where the states with the highest current areas of concern are located. An increasing gap overall between in state and out-of-state tuition is not necessarily cause for concern on its own. Although the correlation between the tuition gap and the percentage of in-state students was not statistically significant, it was negative, which if significant would support the idea that schools aim to enroll more out-of-state students as their tuition grows higher than in-state tuition. I suspect that this trend will increase as more time passes, signaling higher competition for in-state students. Based upon the results stated, the states that seem to have the largest risk of decreasing access to low-cost public postsecondary education are Arizona, Alabama, Florida, California, Pennsylvania, and possibly Massachusetts. However, this analysis faced a number of limitations. University-level data looked only at flagship universities and not every public university in the state. State numbers included student migration for every university in the state, public and private. The regressions were unable to take into account every independent variable and may have been incorrect. Finally, the analysis did not include demographic data such as income or race. The results suggest that further analysis with demographic data would be beneficial to further a conclusion. Regardless of the conclusion, access to low-cost postsecondary education in the U.S. is an issue that should continue to be monitored, especially in Arizona and Alabama.

References: Douglas-Gabriel, Danielle. "Top Public Universities Are Shutting Out Poor Students, Report Says." Washington Post, 2017

Saul, Stephanie. "Public Colleges Chase Out-Of-State Students, And Tuition." New York Times, 2017