How do Institutional and Student Cohort Characteristics Affect Retention Rates at 4-Year, Private Baccalaureate Colleges?

Alisen Hinton
Linfield Department of Economics • Spring 2016

Abstract

Retention rates are crucial for colleges and universities to consider, both in an effort to maintain their student body, as well as to compete in higher education ranking systems. This research aims to use data provided by The Integrated Postsecondary Education Data System to estimate the factors that affect the retention rates of private, four-year colleges classified by the Carnegie Classification of Institutions of Higher Education as Baccalaureate, both Arts and Sciences and Diverse Fields, using a time series cross-sectional model. Results indicated that five factors, out of the fifteen considered, were robust in determining retention rates. These were the 50th percentile ACT score of the student cohort, the student-to-faculty ratio of the college, the percentage of students receiving some form of grant aid, and if the school was an arts and sciences institution.

Data

Panel data set including 140 private, four-year higher-education institutions classified by the Carnegie Classification of Institutions of Higher Education as Baccalaureate, both Arts and Sciences and Diverse Fields; data collected for academic years 2010-2011, 2011-2012, and 2012-2013.

Data Source: The Integrated Postsecondary Education Data System [https://nces.ed.gov/ipeds/datacenter] Data Limitations and Challenges:

- Student Engagement – Student engagement, such as involvement in collegiate athletics or holding a work-study job, was not controlled for; data was unavailable
- Distance from Home – Whether or not the student was from out-of-state or a foreign country was not controlled for; data on these variables was inconsistent and unreliable
- Unobserved Heterogeneity – The sample included many colleges with unique missions, such as all-black colleges, all-male or all-female colleges; this could create difficulties in predicting the effect of variables such as race or sex

Empirical Model & Variables

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\text{Retention Rate (RET_t)} = \beta_0 + \beta_1 \text{MALE}_{it} + \beta_2 \text{WHITE}_{it} + \beta_3 \text{PELL}_{it} + \beta_4 \text{NETPRICE}_{it} + \beta_5 \text{STUDENT}_{it} + \beta_6 \text{INSTR}_{it} + \beta_7 \text{SSST}_{it} + \beta_8 \text{RURAL}_{it} + \beta_9 \text{TOWN}_{it} + \beta_{10} \text{SUBURB}_{it} + \epsilon_{it}
\]

\[
\text{Regression} 1: \text{RET}_t = \beta_0 + \beta_1 \text{MALE}_{it} + \beta_2 \text{WHITE}_{it} + \beta_3 \text{PELL}_{it} + \beta_4 \text{NETPRICE}_{it} + \beta_5 \text{STUDENT}_{it} + \beta_6 \text{INSTR}_{it} + \beta_7 \text{SSST}_{it} + \epsilon_{it}
\]

\[
\text{Regression} 2: \text{RET}_t = \beta_0 + \beta_1 \text{MALE}_{it} + \beta_2 \text{WHITE}_{it} + \beta_3 \text{PELL}_{it} + \beta_4 \text{NETPRICE}_{it} + \beta_5 \text{STUDENT}_{it} + \beta_6 \text{INSTR}_{it} + \beta_7 \text{SSST}_{it} + \beta_8 \text{RURAL}_{it} + \beta_9 \text{TOWN}_{it} + \beta_{10} \text{SUBURB}_{it} + \epsilon_{it}
\]

Conclusions & Implications

- Model Performance - The adjusted R² increased after the removal of insignificant variables, strengthening confidence that the removed variables were irrelevant; the model performed well, the dummy variables are as follows:
  - The derivation of the final model incorporated two regression estimations. The initial model explained approximately 78.9% of the variation in the retention rate, while the second model explained approximately 79.9%.
  - Significant Results - Five variables were found to be significant in the initial regression; they retained their significance in the second regression, after removing insignificant variables, thus are concluded to be robust. The results were as follows:
    - A decrease in the student/faculty ratio by one student per faculty is estimated to raise the retention rate by 0.34%.
    - An increase in instructional expenditures by $1,000 per student raises retention by 0.17%.
    - A 1 point increase in the average ACT score of the student cohort increases retention by 2.06%.
    - Being classified as an Arts and Sciences institution increases retention by 4.4%.
    - A 1 point increase in the average ACT score of the student cohort increases retention by 2.06%.
- Implications - Our results suggest that colleges and universities have the incentive to gear their own efforts towards increasing their student body size, decreasing their student to faculty ratio, and spending more per student on instruction. In recruiting their students, they should take efforts to enroll those who scored highest on the ACT.