Predictors of Sophomore Retention, 2010-2019 Cohorts

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April 19, 2021

Executive Summary

This report describes an analysis of sophomore retention of first-time college students who matriculated at Carleton College in the fall terms between 2010 and 2019 (the last 10 years for which data are available). For this group, the overall rate of sophomore retention was 96.2%. The goal of the analysis was to estimate the unique contribution of six variables to sophomore retention: three ethnic categories (Asian, Black, and Hispanic), International vs. Domestic status, Gender, First Generation, Financial Need (expressed as the percentage of the cost of attendance that is not met by Expected Family Contribution), and mean SAT score (the average of a student's Math and Reading/Writing score, converting from ACT when SAT scores are unavailable). This estimation was accomplished using a logistic regression model[1] that identified five statistically significant effects:

1. First generation students had a sophomore retention rate that was 2.2% lower than non-first generation students,
2. Black students had a sophomore retention rate that was 1.8% lower than students who did not identify as Black,
3. Male students had a sophomore retention rate that was 1.2% lower than female students,
4. Students with high financial need showed *higher* retention than students with low financial need, but this relation was not described by a straight line (see Figure 2),
5. For every 100 points on the 800-point scale of the math or reading/writing portion of the SAT, the sophomore retention rate increased about 2%.

The estimated effects listed above are not derived from simple comparisons of groups of students, who likely differ in many ways besides the variable in question, but rather from

[1] The model included all two-way interactions that did not cross ethnic categories (because of small cell sizes) as well as three-way interactions between gender, ethnicity, and first-generation status. Continuous variables (financial need and mean SAT) were modeled using 3rd-order orthogonal polynomial contrasts. The model was optimized using forward and backward stepwise selection that maximized the Akaike Information Criterion (AIC). Estimated effects are obtained by varying the variable of interest (e.g., setting First Generation to TRUE and to FALSE, generating an estimate for each) while setting all other variables to their mean value.

the statistical model that estimates the unique, independent contribution of each factor *while holding other variables constant.*

Estimated Unique Effects

First-Generation, Black or African American, and Male

Figure 1 below shows the estimated effect of first-generation, Black or African American ethnicity, and male gender on sophomore retention rates.

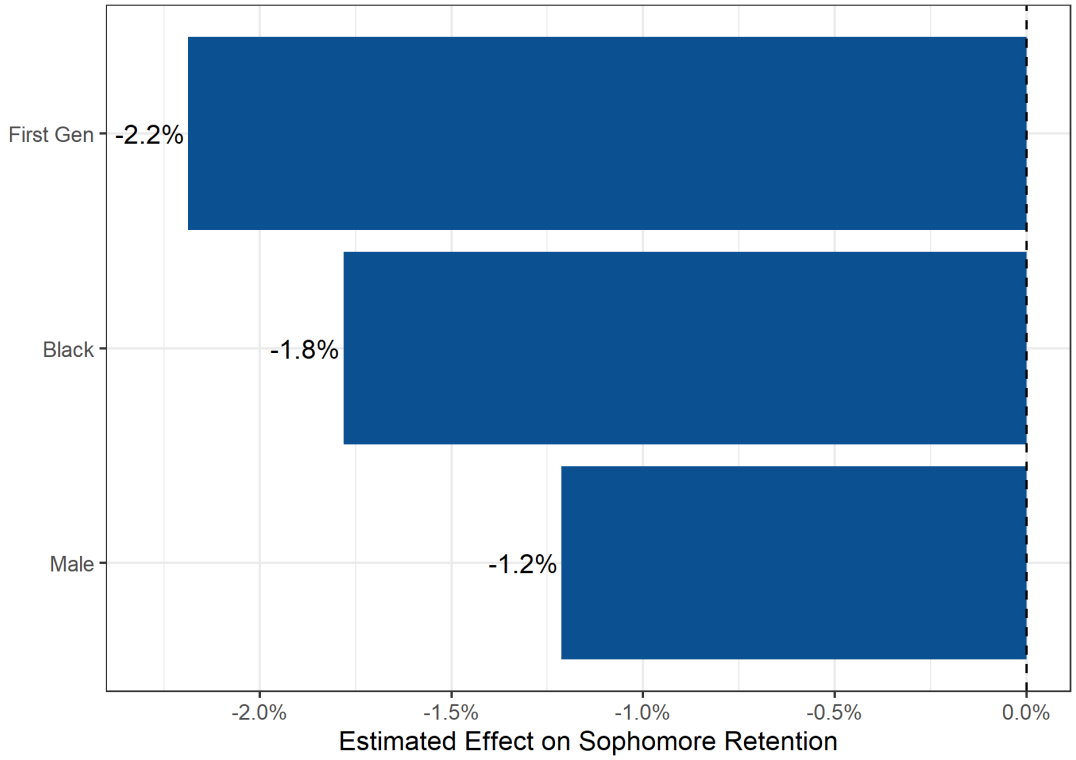

Figure 1: Unique Effects of First Gen, Ethnicity, and Gender on Sophomore Retention

Financial Need

Figure 2 below shows the estimated relation between financial need, defined as the percentage of the cost of attendance that is not covered by a student's Expected Family Contribution, and sophomore retention.

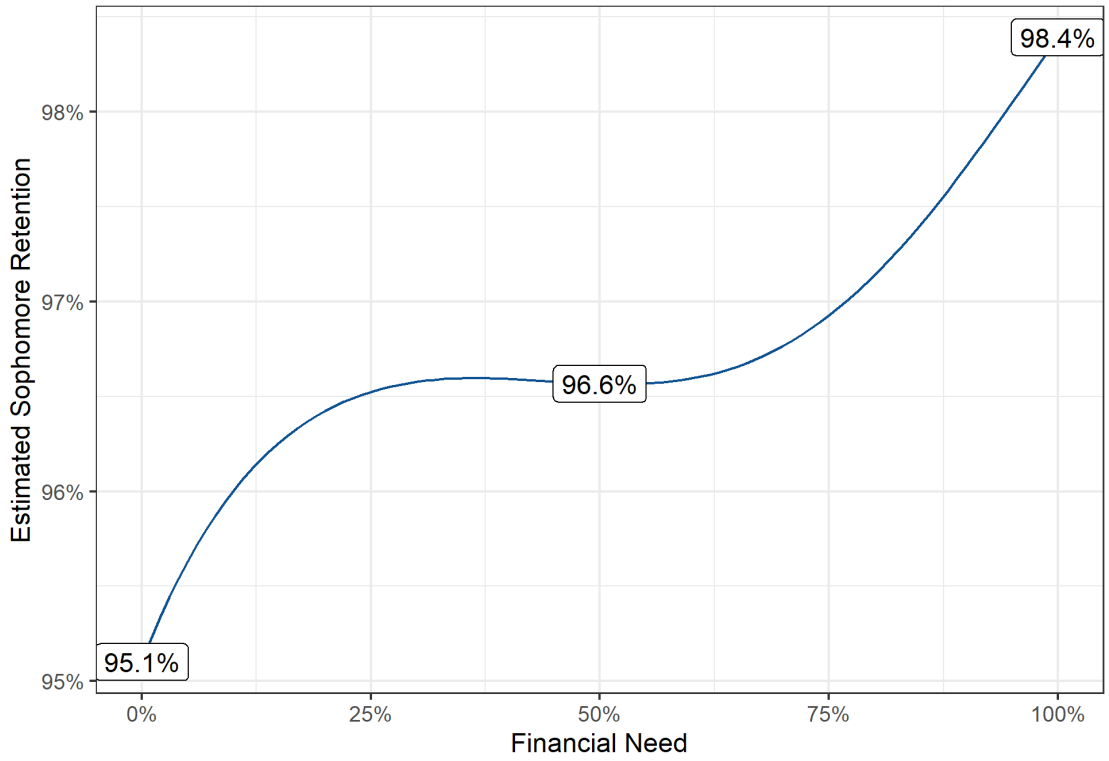

Figure 2: Unique Effect of Financial Need on Sophomore Retention

Figure 2 shows that low levels of need are associated with *lower* levels of retention, that there is a plateau in the relationship between financial need levels of 25% and 67%, and that high levels of need are associated with *higher* levels of retention. Note that this relation is obtained after statistically controlling for other variables such as first generation and Black/African American ethnicity that have higher values at higher levels of need and that are negatively related to sophomore retention (see Figure 1). Thus, although financial need is positively related to sophomore retention when considered by itself, it is not necessarily the case that students with high levels of need (and also a greater likelihood of being first generation and Black or African America) will have higher retention rates.

Standardized Test Scores

Figure 3 shows the estimated relation between mean SAT (the average of verbal and reading/writing SAT scores) and sophomore retention.

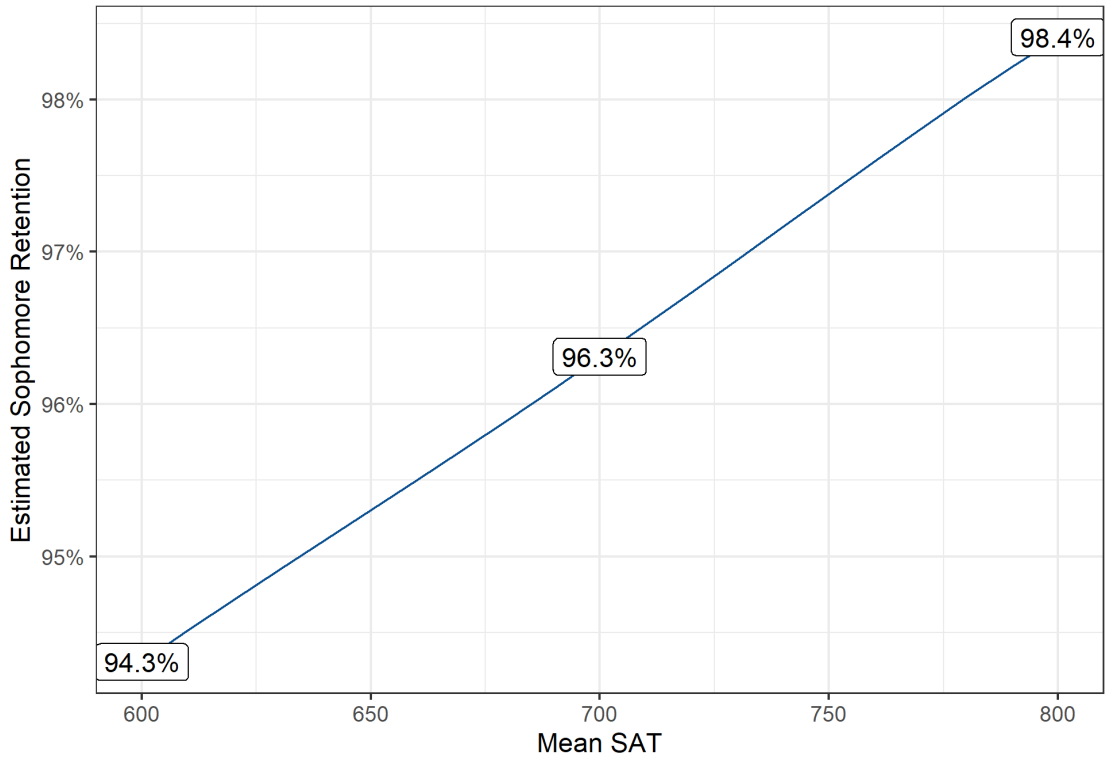

Figure 3: Unique Effect of Mean SAT on Sophomore Retention

Unlike Figure 2, the pattern in Figure 3 is a straightforward linear relation in which every 100 points of mean SAT on the 400-800 point scale corresponds to a 2% increase in retention probability.