

# RETENTION AND GRADUATION ANALYSIS

Prepared for Western Oregon University

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In the following report, Hanover Research examines the predictors of both one-year retention for freshmen and transfer students for the 2009-10 through 2015-16 academic years and five-year graduation among freshman students at Western Oregon University for the 2009-10 through 2017-18 academic years.

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# EXECUTIVE SUMMARY AND KEY FINDINGS

## INTRODUCTION

In this report, Hanover Research examines academic, financial aid, and demographic data of Western Oregon University students to identify factors that are predictive of retention for the 2009-10 through 2015-16 academic years and graduation for the 2009-10 through 2017-18 academic years.

This report comprises two sections:

- **Section I** provides an overview of the data through descriptive statistics of retention and graduation rates. It then covers available predictors of retention and graduation and describes the methodology for the subsequent regression analysis, which examines the influence of these predictors together.
- **Section II** presents the results of these regression models and discusses the factors that are predictive of retention and graduation.

## KEY FINDINGS

- **First-year GPA and credits earned are predictive of both the probability of retention and the probability of on-time graduation from WOU.**
  - Students who enter WOU as freshman who have a one-point increase in first-year GPA are 15 percentage points more likely to return for their second year at WOU. Transfer students who have a one-point increase in first-year GPA are 12 percentage points more likely to return for their second year.
  - Both freshman and transfer student who earn more credits in their first year at WOU are more likely to return. The predictive relationship was strongest for transfer students.
  - Freshman students who have a one-point increase above the cohort's average GPA are 20 percent more likely to graduate on time, while those who earn one more credit than average in the first year are 0.3 percent more likely to graduate on time.
- **Students with lower first math course grades or lower high school GPAs were less likely to graduate in five years, even after controlling for first-year GPA and credits earned.** However, neither first math course and writing course grades nor high school GPA are predictive of retention.
- **Students majoring in Pre-Professional Studies and students who have not declared a major are less likely to be retained to their second year and are less likely to graduate on time.** This finding holds true after controlling for first-year academics and other student characteristics.

- **Freshman students from Hawaii are more likely to be retained and more likely to graduate on time than freshman students from Oregon, while transfer students from California are more likely to be retained than transfer students from Oregon.**

## RECOMMENDATIONS

- **Western Oregon University should ensure that it is providing adequate support to students who achieve below-average first-year GPAs, as this is a key predictor of both retention rates and the likelihood of graduating on time.**
  - WOU should also provide continuing support to students who struggle in their first math course or who enter the University with marginal high school GPAs. While these factors do not provide additional predictive power for first-year retention first-year WOU GPA, students with lower high school GPAs and lower first math course grades are less likely to graduate on time than other students with similar first-year WOU GPAs.
- **WOU should conduct follow-up research on the Pre-Professional Studies major to determine whether there are improvements that could be made to better support these students.** This group was less likely to be retained after one year and was less likely to graduate within five years.
  - This follow-up research could include surveys or focus groups of students and faculty in this major.

## SECTION I: DATA AND METHODOLOGY

Hanover analyzed the predictors of retention and graduation for Western Oregon University. This analysis focuses on entrants from the 2009-10 academic year through the 2017-18 academic year. The following section describes the data construction and methodology behind the retention analysis for Western Oregon University.

### DATA OVERVIEW

To support this analysis, Western Oregon University (WOU) provided Hanover with student-level data for the 2009 through the 2017 academic years.<sup>1</sup> These data included enrollment information, course information, graduation information, and financial aid information for 8,400 students, of which 6,096 students were retained and 1,579 graduated on time.

### DEPENDENT VARIABLE (OUTCOME)

For the retention analysis, Hanover segmented the dataset into two distinct groups: those who were retained at WOU after one year of enrollment and those who were not. Figure 1.1 describes the enrollment rate among admitted students across the observed years (2009 through 2015), segmented by student type (freshman vs. transfer). The percentage of students who enroll per year is stable within each student type. Freshman entrants have slightly lower one-year retention rates when compared to transfer students.

Data were not available for transfer students in the 2009 and 2010 academic years. Similarly, WOU's dataset did not include academic and demographic information (including student demographics, first-year academic measures such as GPA and first writing and math grades, and pre-enrollment academic measures such as high school GPA) for freshman entrants in the 2015 academic year. As a result, overall retention rates are not comparable across cohorts because the 2015 cohort has a higher overall retention rate due to the absence of certain information on freshman entrants.

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<sup>1</sup> We denote academic years by the fall term year; e.g. the academic year spanning 2015-2016 is denoted as 2015.

**Figure 1.1: Retention Rate by Year and Student Type**

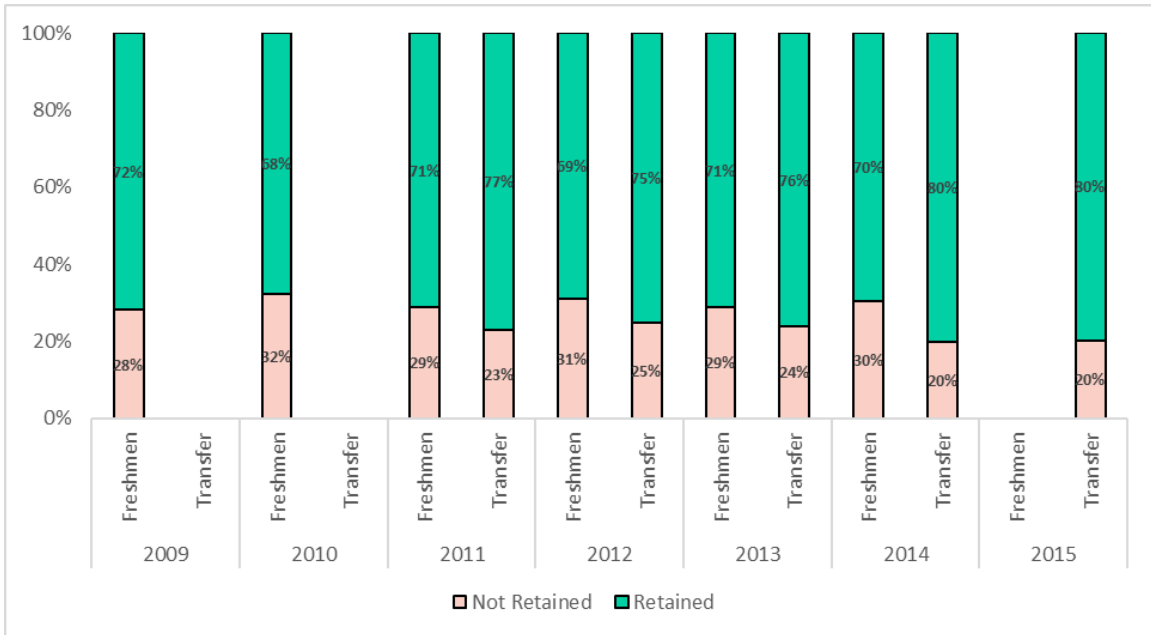


Figure 1.2 describes graduation rates among freshman students across the observed years (2009 through fall 2017). For the 2009 cohort through the 2012 cohort, between 16 and 20 percent of students graduated on time. An additional 17 to 20 percent of students from these cohorts graduate within five years.

On average over the years examined, roughly 16 percent of WOU students graduate in four years, and another 20 percent graduate in five years. Based on incomplete data available for the 2017 academic year (through fall 2017 only), 7 percent of the 2013 cohort graduated within five years, while 3 percent of the 2014 cohort graduated after four years. In both cases, at the completion of the 2017 academic year, WOU can expect graduation rates for these cohorts to increase.

Because WOU sees such a high percentage of students graduating in their fifth year (roughly as many as graduate in their fourth year), we use five years as our measure of “on-time” graduation in this analysis. This ensures that the analysis focuses on students who are at risk of not graduating or of taking significantly longer than four years to graduate, rather than those who are likely to graduate in their fifth year.

**Figure 1.2: Graduation Rate by Freshman Entrance Year Cohort**

| COHORT |       | GRADUATING YEAR |        |        |        |        |        |       |          |       |
|--------|-------|-----------------|--------|--------|--------|--------|--------|-------|----------|-------|
|        |       | 2011            | 2012   | 2013   | 2014   | 2015   | 2016   | 2017* | NON-GRAD | TOTAL |
| 2009   | Count | 7               | 185    | 162    | 56     | 13     | 7      | 0     | 503      | 933   |
|        | Pct   | 0.75%           | 19.83% | 17.36% | 6.00%  | 1.39%  | 0.75%  | 0.00% | 53.91%   | --    |
| 2010   | Count | 1               | 8      | 158    | 173    | 61     | 16     | 0     | 622      | 1,039 |
|        | Pct   | 0.10%           | 0.77%  | 15.21% | 16.65% | 5.87%  | 1.54%  | 0.00% | 59.87%   | --    |
| 2011   | Count | --              | 1      | 6      | 163    | 193    | 57     | 9     | 547      | 976   |
|        | Pct   | --              | 0.10%  | 0.61%  | 16.70% | 19.77% | 5.84%  | 0.92% | 56.05%   | --    |
| 2012   | Count | --              | --     | 3      | 5      | 151    | 170    | 36    | 632      | 997   |
|        | Pct   | --              | --     | 0.30%  | 0.50%  | 15.15% | 17.05% | 3.61% | 63.39%   | --    |
| 2013   | Count | --              | --     | --     | 1      | 10     | 152    | 61    | 602      | 826   |
|        | Pct   | --              | --     | --     | 0.12%  | 1.21%  | 18.40% | 7.38% | 72.88%   | --    |
| 2014   | Count | --              | --     | --     | --     | 1      | 12     | 11    | 810      | 834   |
|        | Pct   | --              | --     | --     | --     | 0.12%  | 1.44%  | 1.32% | 97.12%   | --    |
| Total  | Count | 8               | 194    | 329    | 398    | 429    | 414    | 117   | 3,716    | 5,605 |
|        | Pct   | 0.14%           | 3.46%  | 5.87%  | 7.10%  | 7.65%  | 7.39%  | 2.09% | 66.30%   | --    |

\* Note that graduation data for the 2017-18 academic year was only available for the fall 2017 term at the time data was collected for this report; 2017 graduate counts will likely increase significantly once spring 2018 graduates are included.

### INDEPENDENT VARIABLE (PREDICTORS)

To model variation in retention and graduation outcomes, we use independent variables that describe students’ academic information and demographic characteristics, including first-year academic performance, high school GPA, gender, race/ethnicity, state of residence, and first division/major at WOU.

The division/major variable grouped students’ majors by academic division to create groupings that each include a sufficient number of students to produce reliable conclusions.<sup>2</sup> The Pre-Professional Studies and Criminal Justice majors each included enough students to be examined separately from the respective academic divisions.

As Figures 1.3 through 1.5 below show, there are large differences between retained/graduated students and non-retained/graduated students in terms of credits earned, financial aid, GPA, and gender. This relationship holds regardless of student type (i.e., freshman entrant or transfer student). The regression models in the following sections explore these gaps in greater detail, examining which factors remain key predictors of retention and graduation when all predictors are examined together.

<sup>2</sup> Majors were grouped by academic division according to a crosswalk provided by WOU.

**Figure 1.3: Freshman Student Composition by Retention Status**

| VARIABLES                                 | NOT RETAINED | RETAINED  | TOTAL     |
|---|--------------|-----------|-----------|
| <b>Average Credits Earned</b>             |              |           |           |
| First Year - Fall Term                    | 10.84        | 11.64     | 11.40     |
| First Year - Winter Term                  | 13.70        | 14.60     | 14.38     |
| First Year - Spring Term                  | 13.37        | 14.54     | 14.29     |
| First Year - Summer Term                  | 10.00        | 9.89      | 9.92      |
| First Year - Total                        | 26.10        | 35.48     | 32.67     |
| <b>Average Financial Aid</b>              |              |           |           |
| First Year                                | \$ 9,465     | \$ 12,771 | \$ 11,779 |
| <b>Average GPA</b>                        |              |           |           |
| First Year                                | 2.16         | 2.95      | 2.72      |
| First Term                                | 2.33         | 3.04      | 2.83      |
| High School                               | 3.10         | 3.27      | 3.22      |
| <b>Gender</b>                             |              |           |           |
| Male                                      | 45.14%       | 37.30%    | 39.64%    |
| Female                                    | 54.86%       | 62.70%    | 60.36%    |
| <b>Race/Ethnicity</b>                     |              |           |           |
| American Indian or Alaska Native          | 0.00%        | 0.00%     | 0.00%     |
| Asian                                     | 3.88%        | 3.92%     | 3.91%     |
| Black or African American                 | 5.37%        | 4.20%     | 4.55%     |
| Hispanic                                  | 9.36%        | 12.40%    | 11.49%    |
| Native Hawaiian or Other Pacific Islander | 4.17%        | 2.98%     | 3.34%     |
| Two or More Races                         | 1.25%        | 1.09%     | 1.14%     |
| White                                     | 68.75%       | 68.18%    | 68.35%    |
| Unknown                                   | 2.50%        | 3.03%     | 2.87%     |
| <b>State of Residence</b>                 |              |           |           |
| California                                | 2.50%        | 2.93%     | 2.80%     |
| Hawaii                                    | 4.71%        | 4.86%     | 4.82%     |
| Oregon                                    | 81.51%       | 81.52%    | 81.52%    |
| Washington                                | 4.47%        | 4.96%     | 4.82%     |
| Other                                     | 6.80%        | 5.73%     | 6.05%     |
| <b>Division/Major</b>                     |              |           |           |
| Behavioral Sciences                       | 6.42%        | 6.17%     | 6.24%     |
| Business & Economics                      | 11.72%       | 8.97%     | 9.79%     |
| Computer Science                          | 2.97%        | 2.24%     | 2.46%     |
| Creative Arts                             | 4.34%        | 5.28%     | 5.00%     |
| Deaf & Professional Studies               | 1.67%        | 2.98%     | 2.59%     |
| Education and Leadership                  | 13.74%       | 18.14%    | 16.82%    |
| Health & Exercise Science                 | 3.33%        | 3.75%     | 3.62%     |
| Humanities                                | 2.62%        | 3.29%     | 3.09%     |
| Nat. Sci. & Math - Other                  | 5.59%        | 6.83%     | 6.46%     |
| Nat. Sci. & Math - Pre-Prof. Studies      | 14.10%       | 12.79%    | 13.18%    |
| Social Science - Criminal Justice         | 10.05%       | 9.71%     | 9.81%     |
| Social Science - Other                    | 4.40%        | 4.66%     | 4.59%     |
| Non-Departmental/Other                    | 0.83%        | 0.61%     | 0.68%     |
| Major Not Declared                        | 18.20%       | 14.58%    | 15.66%    |



**Figure 1.4: Transfer Student Composition by Retention Status**

| VARIABLES                                 | NOT RETAINED | RETAINED  | TOTAL     |
|---|--------------|-----------|-----------|
| <b>Average Credits Earned</b>             |              |           |           |
| First Year - Fall Term                    | 11.65        | 12.75     | 12.51     |
| First Year - Winter Term                  | 12.70        | 13.22     | 13.13     |
| First Year - Spring Term                  | 12.82        | 13.27     | 13.21     |
| First Year - Summer Term                  | --           | --        | --        |
| First Year - Total                        | 27.77        | 38.58     | 36.16     |
| <b>Average Financial Aid</b>              |              |           |           |
| First Year                                | \$ 9,376     | \$ 15,293 | \$ 13,966 |
| <b>Average GPA</b>                        |              |           |           |
| First Year                                | 2.43         | 3.18      | 3.01      |
| First Term                                | 2.51         | 3.17      | 3.03      |
| Transfer                                  | 3.05         | 3.19      | 3.16      |
| <b>Gender</b>                             |              |           |           |
| Male                                      | 43.86%       | 42.20%    | 42.58%    |
| Female                                    | 56.14%       | 57.80%    | 57.42%    |
| <b>Race/Ethnicity</b>                     |              |           |           |
| American Indian or Alaska Native          | 0.00%        | 0.00%     | 0.00%     |
| Asian                                     | 2.07%        | 2.40%     | 2.33%     |
| Black or African American                 | 2.87%        | 2.40%     | 2.50%     |
| Hispanic                                  | 5.58%        | 8.81%     | 8.09%     |
| Native Hawaiian or Other Pacific Islander | 1.91%        | 1.57%     | 1.65%     |
| Two or More Races                         | 0.00%        | 0.00%     | 0.00%     |
| White                                     | 62.68%       | 70.62%    | 68.84%    |
| Unknown                                   | 3.35%        | 4.47%     | 4.22%     |
| <b>State of Residence</b>                 |              |           |           |
| California                                | 4.15%        | 3.83%     | 3.90%     |
| Hawaii                                    | 0.80%        | 0.97%     | 0.93%     |
| Oregon                                    | 65.71%       | 77.77%    | 75.06%    |
| Washington                                | 6.38%        | 6.37%     | 6.37%     |
| Other                                     | 22.97%       | 11.07%    | 13.74%    |
| <b>Division/Major</b>                     |              |           |           |
| Behavioral Sciences                       | 7.18%        | 10.01%    | 9.37%     |
| Business & Economics                      | 17.70%       | 13.24%    | 14.24%    |
| Computer Science                          | 3.99%        | 5.54%     | 5.19%     |
| Creative Arts                             | 3.35%        | 6.23%     | 5.58%     |
| Deaf & Professional Studies               | 5.42%        | 5.44%     | 5.44%     |
| Education and Leadership                  | 13.56%       | 15.96%    | 15.42%    |
| Health & Exercise Science                 | 5.58%        | 5.40%     | 5.44%     |
| Humanities                                | 6.06%        | 4.29%     | 4.69%     |
| Nat. Sci. & Math - Other                  | 5.58%        | 5.07%     | 5.19%     |
| Nat. Sci. & Math - Pre-Prof. Studies      | 3.99%        | 2.68%     | 2.97%     |
| Social Science - Criminal Justice         | 6.22%        | 9.64%     | 8.87%     |
| Social Science - Other                    | 8.77%        | 7.33%     | 7.66%     |
| Non-Departmental/Other                    | 5.26%        | 4.66%     | 4.79%     |
| Major Not Declared                        | 7.34%        | 4.52%     | 5.15%     |

**Figure 1.5: Freshman Student Composition by Five-Year Graduation Status**

| VARIABLES                                 | DID NOT GRADUATE ON TIME | ON TIME GRADUATION | TOTAL     |
|---|--------------------------|--------------------|-----------|
| <b>Average Credits Earned</b>             |                          |                    |           |
| First Year - Total                        | 27.41                    | 35.27              | 30.46     |
| Second Year - Total                       | 35.40                    | 44.77              | 40.49     |
| Third Year - Total                        | 33.35                    | 46.11              | 41.88     |
| Fourth Year - Total                       | 34.37                    | 44.42              | 41.79     |
| <b>Average Financial Aid</b>              |                          |                    |           |
| First Year                                | \$ 11,126                | \$ 12,663          | \$ 11,723 |
| <b>Average GPA</b>                        |                          |                    |           |
| First Year                                | 2.43                     | 3.16               | 2.72      |
| First Term                                | 2.56                     | 3.24               | 2.82      |
| High School                               | 3.11                     | 3.42               | 3.23      |
| <b>Gender</b>                             |                          |                    |           |
| Male                                      | 44.31%                   | 30.15%             | 38.80%    |
| Female                                    | 55.69%                   | 69.85%             | 61.20%    |
| <b>Race/Ethnicity</b>                     |                          |                    |           |
| American Indian or Alaska Native          | 0.00%                    | 0.00%              | 0.00%     |
| Asian                                     | 3.46%                    | 3.61%              | 3.52%     |
| Black or African American                 | 5.39%                    | 2.72%              | 4.36%     |
| Hispanic                                  | 11.15%                   | 12.73%             | 11.76%    |
| Native Hawaiian or Other Pacific Islander | 3.14%                    | 2.60%              | 2.93%     |
| Two or More Races                         | 1.57%                    | 1.27%              | 1.45%     |
| White                                     | 68.97%                   | 71.31%             | 69.88%    |
| Unknown                                   | 2.33%                    | 2.53%              | 2.41%     |
| <b>State of Residence</b>                 |                          |                    |           |
| California                                | 2.49%                    | 2.66%              | 2.56%     |
| Hawaii                                    | 3.86%                    | 5.07%              | 4.33%     |
| Oregon                                    | 83.86%                   | 81.63%             | 83.00%    |
| Washington                                | 3.90%                    | 5.64%              | 4.58%     |
| Other                                     | 5.88%                    | 5.00%              | 5.54%     |
| <b>Division/Major</b>                     |                          |                    |           |
| Behavioral Sciences                       | 6.44%                    | 6.21%              | 6.35%     |
| Business & Economics                      | 9.94%                    | 8.68%              | 9.45%     |
| Computer Science                          | 2.33%                    | 1.77%              | 2.12%     |
| Creative Arts                             | 5.31%                    | 4.75%              | 5.09%     |
| Deaf & Professional Studies               | 1.57%                    | 3.80%              | 2.44%     |
| Education and Leadership                  | 15.25%                   | 21.53%             | 17.69%    |
| Health & Exercise Science                 | 3.14%                    | 3.74%              | 3.37%     |
| Humanities                                | 3.14%                    | 3.99%              | 3.47%     |
| Nat. Sci. & Math - Other                  | 6.08%                    | 6.08%              | 6.08%     |
| Nat. Sci. & Math - Pre-Prof. Studies      | 15.21%                   | 11.59%             | 13.80%    |
| Social Science - Criminal Justice         | 9.13%                    | 9.56%              | 9.30%     |
| Social Science - Other                    | 4.51%                    | 3.99%              | 4.31%     |
| Non-Departmental/Other                    | 0.68%                    | 0.32%              | 0.54%     |
| Major Not Declared                        | 17.26%                   | 14.00%             | 15.99%    |

## METHODOLOGY

To study the predictors of one-year retention for freshman entrants and transfer students as well as five-year graduation for freshman entrants, Hanover utilizes logistic regression techniques. While logistic regression models can show which factors are *associated* with enrollment when other observed characteristics are held constant, it is important to note that these models do not necessarily show causation.

When analyzing predictors of retention and graduation, we create three different logistic regression models to ensure results are consistent and robust. We first model one-year retention on almost all available predictors for freshmen entrants. In the second regression model, we segment by transfer students. Similarly, for the final regression, we model five-year graduation on most available variables.

Following the methodology described above, the results presented in this report are primarily based on each variable's "marginal effect at the mean" (MEM), which shows the effect of each variable for the average applicant. The MEMs methodology uses the logistic regression model's coefficients to calculate the instantaneous rate of change for a numeric predictor of enrollment for a student with an average value, essentially showing the effect of a one-point increase in the predictor for the average applicant. In the case of categorical explanatory variables, MEMs estimate the change in an applicant's predicted probability of enrollment for a given classification (e.g., male), compared to a reference category (e.g., female), while all other variables are held constant at their average.

## SECTION II: LOGISTIC REGRESSION RESULTS

### RESULTS AND INTERPRETATION

#### *RETENTION MODELS*

Below Hanover presents the MEMs for the two retention models discussed in the Methodology section. For each predictor, we present the estimated percentage point change in the likelihood of being retained for a one-point/one-unit change in the predictor (for numeric predictors) or the effect of moving from the reference category to the category in question (for categorical predictors like major). Key takeaways from Figure 2.1 include:

- **First-Year GPA and Course Grades** – The most predictive variable of student retention for freshmen entrants and transfer students is first-year GPA. For freshman entrants, a one-point increase over the cohort’s average GPA is associated with a 14.8 percentage point higher probability of returning for the second year at WOU. Similarly, transfer students are 11.6 percentage points more likely to return for a second year for each one-point increase in first-year GPA. Students’ first math and writing course grades do not appear to provide any additional predictive power beyond what is already provided by their first-year GPA.
- **First-Year Credits Earned** – Students who earn more credits during their first year are more likely to return for their second year, though the relationship is stronger for transfer students than for freshmen. Freshman students who earn one credit more than average during their first year are 0.1 percent more likely to return, while transfer students who earn one more credit than average are 1 percent more likely to return.
- **First-Year Academic Status** – First-year academic status is not predictive of retention after controlling for first-year GPA and credits earned. This is likely because GPA and credits earned capture all of the information provided by the warning or probation status, and knowing a student’s academic status does not provide any additional information if the other academic information is already known.
- **Academic Major** – When examining differences by academic major and division, we use majors in the Education and Leadership Division as a reference category because it is the major/division with the most students. In addition, freshman students majoring in Education and Leadership were among the most likely to be retained. Freshman students who did not declare a major were 6.0 percent less likely than Education and Leadership division majors to return for their second year. Among freshman students with declared majors, those enrolled in the Business & Economics division were 4.5 percent less likely to be retained, while those in Pre-Professional Studies were 7.3 percent less likely to continue at WOU. Transfer students who major in Pre-Professional Studies are 24.4 percentage points less likely to continue at WOU relative to Education and Leadership students, but this difference is not statistically significant.
- **Financial Aid** – Freshman entrants who received aid were more likely to return to WOU compared to those who did not receive aid, though the effect was minor for most students (i.e., 0.1 percentage point higher likelihood of retention for each \$1,000).

However, freshmen entrants who received Pell grants were 3.4 percentage points more likely to return for a second year, while transfer students with Pell grants were 11.9 percentage points more likely to return.

- **Legacy/First-Generation Status** – Both first-generation freshman students and students who have a relative who attended WOU are 2.3 percent and 3.7 percent less likely, respectively, to return for their second year than freshman students with no legacy or first-generation status.
- **State of Residence** – Freshman students from Hawaii are 5.3 percentage points more likely to return to WOU for a second year than freshman students from Oregon. Californian transfer students are 8.4 percentage points more likely to return for a second year than Oregon transfer students.
- **Athlete Status** – Enrolled freshman students who were athletes were 4.1 percentage points more likely to continue at WOU than freshman students who were not athletes.
- **On-Campus Housing** – Freshman students who lived in on-campus housing in their first year at WOU were 6.1 percentage points less likely to return for their second year.

**Figure 2.1: Predictors of One-Year Retention for Freshmen Entrants and Transfer Students**

|   | FRESHMEN  | TRANSFER |
|---|-----------|----------|
| <b>First-Year Academics</b>                             |           |          |
| First-Year Credits                                      | 0.001***  | 0.010*** |
| First-Year Academic Status - Warning or Probation       | 0.007     | -0.005   |
| First-Year GPA  | 0.148***  | 0.116*** |
| First Math Grade  | -0.008    | --       |
| First Writing Grade                                     | -0.006    | --       |
| <b>Pre-Admission Academics</b>                          |           |          |
| Transfer GPA  | --        | 0.028    |
| High School GPA   | -0.023    | -0.016   |
| <b>First Major/Division</b>                             |           |          |
| Behavioral Sciences                                     | -0.026    | 0.075    |
| Business & Economics                                    | -0.045*   | 0.035    |
| Computer Science  | -0.014    | 0.049    |
| Creative Arts   | 0.003     | 0.043    |
| Deaf & Professional Studies                             | -0.002    | -0.037   |
| Health & Exercise Science                               | -0.054    | 0.026    |
| Humanities  | -0.034    | -0.106   |
| Natural Science & Math - Pre-Prof. Studies              | -0.073*** | -0.244   |
| Natural Science & Math - Other                          | -0.003    | 0.038    |
| Social Science - Criminal Justice                       | -0.007    | 0.072    |
| Social Science – Other                                  | -0.017    | -0.006   |
| Non-Departmental/Other                                  | -0.079    | -0.040   |
| Major Not Declared                                      | -0.060*** | 0.045    |
| <b>Financial Aid</b>                                    |           |          |
| Pell Grant Recipient                                    | 0.034***  | 0.119*** |
| First-Year Financial Aid (effect of additional \$1,000) | 0.001*    | 0.000    |

|   | FRESHMEN     | TRANSFER   |
|---|--------------|------------|
| <b>Gender</b>                             |              |            |
| Male                                      | 0.005        | -0.029     |
| <b>Race/Ethnicity</b>                     |              |            |
| American Indian or Alaska Native          | -0.044       | -0.566***  |
| Asian                                     | -0.005       | -0.004     |
| Black or African American                 | -0.024       | 0.044      |
| Hispanic or Latino                        | 0.023        | -0.048     |
| Non-Resident Alien                        | -0.426*      | 0.079*     |
| Native Hawaiian or Other Pacific Islander | -0.035       | 0.059      |
| Two or More Races                         | -0.047       | --         |
| Unknown/Did Not Respond                   | 0.049**      | -0.031     |
| <b>Legacy/First-Generation Status</b>     |              |            |
| First Generation                          | -0.023*      | -0.044     |
| Relative is Alum                          | -0.037*      | -0.027     |
| <b>Home State</b>                         |              |            |
| California                                | 0.033        | 0.084**    |
| Hawaii                                    | 0.053***     | -0.079     |
| Washington                                | -0.057       | -0.017     |
| Other or Unknown                          | -0.043       | -0.091     |
| <b>Other Variables</b>                    |              |            |
| Athlete                                   | 0.041***     | 0.030      |
| On-Campus Housing in Freshman Year        | -0.061***    | -0.065     |
| <b>Observations</b>                       | <b>3,225</b> | <b>469</b> |

Note: Statistically significant variables and categories are color-coded. Coral color cells show statistical significance that are negatively predictive of student retention. Green color cells show statistical significance that are positively predictive of student retention. Statistically significant variables are denoted with \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

### GRADUATION MODEL

In Figure 2.2 below, Hanover presents the MEMs for the graduation model. For each predictor, we present the estimated percentage point change in the likelihood of graduating within five years.

- First-Year GPA and Course Grades** – First-year GPA is the strongest predictor of on-time graduation for freshmen entrants at WOU. Freshman students who have a one-point increase over the cohort’s average GPA are 20.6 percentage points more likely to graduate in five years. Unlike in the analysis of first-year retention, students’ first math course grades are predictive of five-year graduation, even after controlling for first-year GPA. Students with a one-point increase in their first math course grade were 5.1 percent more likely to graduate on time.
- First-Year Credits Earned** – This variable is positively associated with on-time graduation. More specifically, a one-unit increase from the mean in credits earned in a students’ first year will result in a 0.3 percent increase in the likelihood of a student graduating on time.
- High School GPA** – Even after controlling for students’ academic performance in their first year at WOU, pre-enrollment academics are still predictive of on-time graduation.

Freshmen entrants who achieved a high school GPA one-point higher than average were 15.7 percentage points more likely to graduate on time than students with similar academic performance at WOU who had average high school GPAs.

- **Academic Major** – Since the Education and Leadership division drew the largest share of freshman entrants, we use it as a baseline for comparing graduation rates across academic majors and divisions. In comparison, freshman students who are undeclared or who major in Pre-Professional Studies are less likely to graduate on time by 7.2 and 16.9 percentage points, respectively.
- **Gender** – Male freshman students are 6.2 percentage points less likely to graduate on time than female students with similar academic records and other characteristics.
- **State of Residence** – Freshman students from Hawaii are 19.1 percentage points more likely to graduate on time from WOU than students from Oregon.

**Figure 2.2: Predictors of Five-Year Graduation for Freshmen Entrants**

|   | FRESHMEN  |
|---|-----------|
| <b>First-Year Academics</b>                             |           |
| Credits Earned  | 0.003***  |
| First-Year GPA  | 0.206***  |
| First Math Grade  | 0.051***  |
| First Writing Grade                                     | 0.021     |
| <b>Pre-Admission Academics</b>                          |           |
| High School GPA   | 0.157***  |
| <b>First Major/Division</b>                             |           |
| Behavioral Sciences                                     | 0.015     |
| Business & Economics                                    | -0.019    |
| Computer Science  | -0.043    |
| Creative Arts   | -0.060    |
| Deaf & Professional Studies                             | 0.055     |
| Health & Exercise Science                               | -0.013    |
| Humanities  | 0.073     |
| Natural Science & Math - Pre-Prof. Studies              | -0.169*** |
| Natural Science & Math - Other                          | -0.085    |
| Social Science - Criminal Justice                       | 0.064     |
| Social Science - Other                                  | 0.017     |
| Non-Departmental/Other                                  | -0.055    |
| Major Not Declared                                      | -0.072*   |
| <b>Financial Aid</b>                                    |           |
| Pell Grant Recipient                                    | -0.013    |
| First-Year Financial Aid (effect of additional \$1,000) | 0.002     |
| <b>Gender</b>   |           |
| Male  | -0.062**  |
| <b>Race/Ethnicity</b>                                   |           |
| American Indian or Alaska Native                        | -0.086    |
| Asian   | -0.017    |
| Black or African American                               | 0.001     |

|   | FRESHMEN     |
|---|--------------|
| Hispanic or Latino                        | 0.145***     |
| Non-Resident Alien                        | 0.249        |
| Native Hawaiian or Other Pacific Islander | -0.020       |
| Two or More Races                         | -0.001       |
| Unknown/Did Not Respond                   | 0.161**      |
| <b>Legacy/First-Generation Status</b>     |              |
| First Generation                          | -0.071***    |
| Relative is Alum                          | 0.079        |
| <b>Home State</b>                         |              |
| California                                | 0.064        |
| Hawaii                                    | 0.191***     |
| Washington                                | -0.011       |
| Other/Unknown                             | 0.044        |
| <b>Other Variables</b>                    |              |
| Athlete                                   | 0.014        |
| On Campus Housing in Freshman Year        | 0.048        |
| <b>Observations</b>                       | <b>2,245</b> |

Note: Statistically significant variables and categories are color-coded. Coral color cells show statistical significance that are negatively predictive of graduation. Green color cells show statistical significance that are positively predictive of graduation. Statistically significant variables are denoted with \*\*\* p<0.01, \*\* p<0.05, \* p<0.1



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