

## Topic in Brief

### Opportunities to increase the normative graduation rate: Freshman entrants

January, 2017

The 4-year graduation rate of freshman entrants might be increased by focusing on high-achieving students who may otherwise graduate in 4.5 years and by publicizing clear and achievable major pathways to 4-year degrees that include options for Work-Study and study abroad.

#### OVERVIEW

Most freshman entrants to Berkeley graduate within the normative time frame of 4 years. However, a sizeable portion takes an extra Fall or Spring term to complete the degree, graduating in 4.5 years.

Opportunities to increase the normative graduation rate surfaced when we identified large numbers of students from certain groups who graduated in an extra term. Students who are doing well academically are a promising group to focus on to increase the overall 4-year graduation rate. In their first term, the majority of freshmen (84%,  $n = 7,204$ ) earned at least a B average and the vast majority (97%,  $n = 8,371$ ) attempted at least 13 units. By the end of the fourth term, 75% ( $n = 6,447$ ) of students had declared a major. Although these groups of students are over-represented among those graduating within 4 years, many take an extra Fall or Spring term.

In the analysis, differences emerged in graduation rates by School, College, or Division of the first declared major. Those differences that persisted after controlling for demographic variables and admissions criteria highlight the potential benefits of clearly articulated pathways to a 4-year degree, matching course availability with student demand, and alternative pathways

for students who are not accepted into impacted majors.

Students who declared their majors by the end of the fourth term after entry were much more likely to graduate within 4 rather than 4.5 years. There may be opportunities, particularly within Letters & Science (L&S), to prepare students to declare a major by the end of the second year. For example, robust skills assessments before enrollment in lower-division pre-requisite courses could help students better plan their path to major declaration.

The analysis also points to opportunities for better curriculum articulation for Work-Study participation and study abroad programs, particularly those offered during the academic year.

#### Methodology

This analysis includes freshmen who entered during Fall 2008 ( $n = 4,263$ ) and Fall 2009 ( $n = 4,355$ ). These cohorts were chosen to allow for the analysis of 5-year graduation rates, presented in the accompanying report, "Factors related to graduation rates: Freshman entrants," which also presents descriptive statistics and bivariate analysis on graduation for the demographic, admissions selection, academic indicator, and campus experience variables presented in this briefing note.

Graduation data through Summer 2014 were pulled from Cal Answers. Normative graduation for freshman entrants is 4 years from the time of entry. One extra term is defined as an academic-year term (Fall or Spring) beyond the normative graduation time.

Demographic variables (gender, ethnicity, Pell Grant recipient status, and first-generation college student information) were sourced from Cal Answers in Spring 2016. “First-generation college” is defined as a student who reported that neither parent graduated from a 4-year college. “Pell Grant recipient” is defined as a student who received a Pell Grant while at Berkeley. U.S. residents and eligible non-citizens at lower annual income levels (typically less than \$45,000) are eligible to receive Pell Grants.

Admissions selection factors, including weighted high school grade point average (GPA), SAT Math and SAT Verbal scores, and athlete at entry were sourced from Cal Answers.

Initial academic indicators include first-term units attempted, first-term GPA, and first-year Academic Probation. The number of units attempted was measured at the time of Census for each student’s first term at Berkeley. To evaluate academic performance, students were placed into groups based on their first-term GPA and whether or not they were placed on Probation in their first year:

- GPA < 2.00 or Academic Probation
- GPA 2.00-2.69 (C / C+)
- GPA 2.70-3.69 (B average)
- GPA 3.70-4.00 (A average)

Students were grouped into the School, College, or Division in which they first declared a major. If a student declared more than one major at the same time, the first major alphabetically was used. Time to declaration was measured in elapsed terms from entry. Data on academic indicators were sourced from Cal Answers.

Campus experiences included in the analysis were Work-Study participation and study abroad participation. Information was provided by the Berkeley Study Abroad Office for students who participated in UC

Education Abroad Program (EAP) / Berkeley Abroad from Summer 2008 through Spring 2016. Students who studied abroad through other programs were not included in the count of study abroad participants. The Berkeley Financial Aid and Scholarships Office supplied the data about Work-Study activity from academic year 2008-09 through 2015-16.

These demographic, admissions selection, academic indicator, and campus experience factors were used in a logistic regression on 4-year graduation rate compared to 4.5-year graduation. Adjusted graduation rates were calculated post hoc.

## GRADUATION RATES

For students in the Fall 2008 and Fall 2009 cohorts of freshman entrants (N = 8,618), the 4-year graduation rate was 72% and the 4.5-year graduation rate was 82%.

For only those students who graduated in 4.5 years or fewer (n = 7,061), 88% (n = 6,241) graduated within 4 years and 12% (n = 820) took an extra term.

## BACKGROUND VARIABLES

In bivariate analysis of graduation rates by demographic groups and admissions criteria (see report “Factors related to graduation rates: Freshman entrants”), three groups emerged as having relatively low 4-year graduation rates: Underrepresented Minority (URM) students, student with a weighted high school GPA below 4.00, and student athletes at entry. Detailed analyses on these groups are presented in the accompanying report.

The difference in URM and non-URM 4-year graduation rates was diminished for students with high GPA in their first term at Berkeley. This was also true for the difference in graduation rates by weighted high school GPA. The difference in graduation rates between those with a high school GPA below 4.00 compared to those with a high school GPA of 4.00 or greater was reduced for students who earned GPA of at least 3.70 in their first term at Berkeley.

Another important factor in reducing differences in normative graduation rates was declaring a major by the end of the

fourth term. Doing so reduced the differences in 4-year graduation for all three groups (URM students, students with weighted high school GPA below 4.00, and student athletes at entry).

### ACADEMIC INDICATORS

The majority of freshman entrants attempted at least 13 units in their first term and earned at least a B average. While most of these students graduated within 4 years, a sizeable portion finished in 4.5 years.

#### Units attempted in the first term

For students who attempted fewer than 13 units in their first semester, 15% (n = 36) graduated in an extra term. If these 36 students had graduated within 4 years, the overall 4-year graduation rate would have increased by one point to 73%. Moreover, if **every** student who had attempted fewer than 13 units in their first term graduated within 4 years, the overall graduation rate would have been 74%. The small size of the change is due to the small proportion of students who attempted fewer than 13 units (3%, n = 246).

#### Potential change in campus 4-year graduation rate: Units attempted

Units attempted in the first term	Actual number graduated at 4.5 years	Overall 4-year rate if 4.5-year graduates finished in 4 years
<13	36	73%
13-14.5	471	78%
15+	313	76%

Greater gains would be made if those who attempted 13 units or greater (both groups 13-14.5 and 15+ units in the table above) and graduated in 4.5 years (n = 784) had not taken that extra term. In this scenario, the overall 4-year graduation rate would have increased 10 points, to 82%.

#### First-term GPA and first-year Probation

Students whose first-term GPA was lower than 2.00 or who were placed on Academic Probation in their first year (n =

520) had lower normative graduation rates (32%) than other students. Within this group, if the students who had graduated in 4.5 years (n = 54) had instead graduated within 4 years, the overall 4-year graduation rate would have increased one point to 73%.

Focusing on students who earned an A or B average in their first term leads to greater potential gains, in addition to presumably being more feasible since these students are doing well academically. If high-achieving students who took an extra term to graduate (n = 648) had instead graduated within 4 years, the overall 4-year graduation rate would have been 80%.

#### Potential change in campus 4-year graduation rate: First-term GPA

First-term GPA	Actual number graduated at 4.5 years	Overall 4-year rate if 4.5-year graduates finished in 4 years
<2.00 or Probation	54	73%
C / C+	116	74%
A or B avg	648	80%

#### Declaring a major

It is difficult for graduation rates within one School or College to greatly impact the overall campus 4-year graduation rate, with the exception of L&S.

#### Potential change in campus 4-year graduation rate: Unit of first declared major

School / College of first major	Actual number graduated at 4.5 years	Overall 4-year rate if 4.5-year graduates finished in 4 years
Chemistry	39	73%
Engineering	116	74%
CED	18	73%
CNR	103	74%
Haas	19	73%
L&S	525	79%

For example, if the students who first declared in the College of Engineering and graduated in 4.5 years (n = 116) had

graduated within 4 years, the overall campus 4-year graduation rate would have increased two points, to 74%. Furthermore, if **every** student within Haas had graduated within 4 years, the overall campus 4-year graduation rate would have increased only one point to 73% because Haas's 4-year graduation rate is already high (87%) and their share of students in these two cohorts is 4% (n = 306).

For individual Divisions within L&S, if students who graduated in 4.5 years had not taken the extra term, the overall 4-year graduation rate would have increased to 73% or 74%.

**Potential change in campus 4-year graduation rate: L&S Division of first major**

L&S Division of first major	Actual number graduated at 4.5 years	Overall 4-year rate if 4.5-year graduates finished in 4 years
Administered	65	73%
Arts & Hum	77	73%
Bio Sciences	85	73%
Math & Phys		
Sci	73	73%
Social Sciences	139	74%
Undergrad Div	86	73%

Efforts to increase the overall 4-year graduation rate must be made across all units on campus.

Students who did not declare by the end of the fourth term have a much lower 4-year graduation rate (48%) than those who declared before the end of the fourth term (81%). However, it would be more fruitful to focus on those students who have declared by the end of the fourth term. If those students who declared their major by the end of the fourth term and graduated in 4.5 years (n = 575) had instead graduated within 4 years, the overall 4-year graduation rate would have increased seven points, to 79%.

**Focusing on high-achieving students is the most effective way to increase the 4-year graduation rate**

The large number of students who had declared their major by the end of the fourth term could be the focus of attempts to increase normative graduation. As with the previous findings, students who are poised to do well are the most promising population for increasing the 4-year graduation rate.

**Potential change in campus 4-year graduation rate: Timing of declaration**

Declared major	Actual number graduated at 4.5 years	Overall 4-year rate if 4.5-year graduates finished in 4 years
After 4 <sup>th</sup> term	245	75%
By 4 <sup>th</sup> term	575	79%

Clear curricular pathways for major requirements might help students who have declared by the end of the fourth term, with potential benefits for all students.

**Declared by 4<sup>th</sup> term by Unit**

	Count	%
Engineering	1,330	100%
Chemistry	418	99%
Haas	286	94%
CED	250	93%
CNR	866	93%
Letters & Science	3,297	65%
Social Sciences	1,211	76%
Administered	473	74%
Arts & Hum	478	74%
Math & Phys Sci	268	65%
Bio Sciences	489	51%
Undergrad Div	378	47%

*Note: Students who did not declare a major (n = 291) are not included.*

Timing of major declaration is closely tied to the unit in which the student first declares (see table above). There may be opportunities, particularly within L&S, to prepare students to declare their majors by the end of the fourth term after entry.

**Adjusted graduation rates by Unit**

We fit a model estimating the relationship of School, College, or Division with graduating within 4 years compared to exactly 4.5 years. This model included only students who graduated within 4.5 years, and

excluded students who graduated in 5 years or greater or who had not yet graduated. Many of the differences between the Haas School of Business (reference category) and the other Colleges or Divisions were reduced by adjusting for demographic variables and admissions selection criteria (see Model 1 in the table below).

**Students who graduate within 4 years compared to 4.5 years: Unit of first declared major (N = 7,061)<sup>1</sup>**

	4-year share	Model 1 <sup>2</sup>
Chemistry	89%	89%
Engineering	90%	90%
CED	92%	93%
CNR	87% *	88% *
Haas (reference)	93%	93%
Letters & Science Administered	88% *	90%
Arts & Hum	86% *	88% *
Bio Sciences	90%	90%
Math & Phys Sci	79% *	77% *
Social Sciences	90%	91%
Undergrad Div	86% *	90%

\* Significant at the 0.05 level; <sup>1</sup>Excludes students who graduated in 5 years or greater or who had not graduated; <sup>2</sup> Adjusted for gender, ethnicity, parent education, family income, weighted high school GPA, SAT Math and Verbal scores, and Athlete at entry

Differences persisted for CNR, L&S Arts & Humanities, and L&S Math & Physical Sciences, suggesting that students in these units, in particular, might benefit from clearly articulated pathways to 4-year graduation.

**CAMPUS EXPERIENCES**

**Work-Study**

About one-fifth of students participated in Work-Study (21%, n = 1,837). We fit a model estimating the relationship of Work-Study with graduating within 4 years compared to exactly 4.5 years. This model excludes students who graduated in five years or greater or who had not yet graduated. The relationship between Work-Study participation and graduating within 4 rather than at 4.5 years was statistically significantly. Taking into account socioeconomic factors (e.g. parental education and family income) and admissions criteria, students who participated in Work-Study still had lower rates of graduating within 4 years compared to those who did

not participate in Work-Study (see Model 1 in the table below).

**Students who graduate within 4 years compared to 4.5 years: Work-Study participation (N = 7,061)<sup>1</sup>**

	4-year share	Model 1 <sup>2</sup>	Model 2 <sup>3</sup>
Work-Study	84% *	87% *	88% *
Not Work-Study (ref)	90%	90%	90%

\* Significant at the 0.05 level; <sup>1</sup>Excludes students who graduated in 5 years or greater or who had not graduated; <sup>2</sup> Adjusted for gender, ethnicity, parent education, family income, weighted high school GPA, SAT Math and Verbal scores, and Athlete at entry; <sup>3</sup> Further adjusted for first-term units attempted, first-term GPA / first-year Probation, timing and unit of first major declared

Further adjusting for academic indicators while at Berkeley, the difference diminished in magnitude but was still statistically significant (see Model 2 above). These results suggest that there may be an opportunity to better integrate Work-Study into student pathways to 4-year graduation.

**Study Abroad**

Eighteen percent of students in the two cohorts studied abroad (n = 1,516). One-third (n = 515) of those who studied abroad did so for one summer and were just as likely as students who did not study abroad to graduate within 4 years compared to exactly 4.5 years. Thus, participating in one summer program was not related to 4- versus 4.5-year graduation.

However, students who studied abroad during the academic year (n = 854) had lower shares of 4-year graduates (66%) compared to those who did not study abroad (89% share of 4-year graduates). These findings held after adjusting for demographic variables, admissions criteria (see Model 1 in the table on the following page), and academic indicators (see Model 2).

**Students who graduate within 4 years compared to 4.5 years: Study abroad participation (N = 7,061)<sup>1</sup>**

	4-year share		Model 1 <sup>2</sup>		Model 2 <sup>3</sup>	
Multiple trips	66% *		72% *		69% *	
One trip – academic year	83% *		83% *		82% *	
One trip – summer	89%		91%		91%	
No study abroad (ref)	89%		90%		91%	

\* Significant at the 0.05 level; <sup>1</sup>Excludes students who graduated in 5 years or greater or who had not graduated; <sup>2</sup> Adjusted for gender, ethnicity, parent education, family income, weighted high school GPA, SAT Math and Verbal scores, and Athlete at entry

<sup>3</sup> Further adjusted for first-term units attempted, first-term GPA / first-year Probation, timing and unit of first major declared

A tight integration of study abroad programs, particularly those offered during the academic year, with major-specific curricula is a promising strategy to increasing the campus 4-year graduation rate.

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