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UNIVERSITY OF CALIFORNIA

June 8, 2018

CATHERINE KOSHLAND
Vice Chancellor for Undergraduate Education

TSU-JAE KING LIU
Vice Provost for Academic and Space Planning

*Subject: Addressing Capped and Restricted Majors at UC Berkeley: Analysis and
Recommendations from the Undergraduate Council*

Dear Cathy and Tsu-Jae,

Prior to its merger with the Undergraduate Council (UGC), the Academic Senate Committee on Educational Policy undertook a study of capped and restricted majors on campus. The report of findings and recommendations was submitted to Divisional Council (DIVCO) during AY 17-18. DIVCO endorsed the report.

DIVCO believes that the divisions of the Vice Chancellor for Undergraduate Education and the Vice Provost for Academic and Space Planning are well-situated to make progress on the report's recommendations. On behalf of DIVCO, I am forwarding it for your consideration. In particular, we call to your attention Recommendations 1 through 3, which focus on policy development, and on incorporating these issues into the academic program review process. Recommendation 4 has been referred to the Senate Committee on Admissions, Enrollment and Preparatory Education (AEPE) for its consideration.

We would appreciate your feedback on the feasibility of implementing these recommendations, and of course, stand ready to assist.

Sincerely,

A handwritten signature in black ink, appearing to read 'Lisa Alvarez-Cohen'.

Lisa Alvarez-Cohen
Chair, Berkeley Division of the Academic Senate
Fred and Claire Sauer Professor
Department of Civil and Environmental Engineering

Encl.

Cc: Mark Stacey, Chair, Undergraduate Council

Max Auffhammer, Vice Chair, Undergraduate Council

Sumei Quiggle, Associate Director staffing Undergraduate Council

Cynthia Bumgarner, Assistant Vice Chancellor and Chief of Staff

John Scroggs, Chief of Staff to the Vice Provost for Academic and Space Planning

Addressing Capped and Restricted Majors at UC Berkeley: Analysis and Recommendations from the Undergraduate Council¹

May 15, 2018

1. Introduction

Undergraduates arriving on the Berkeley campus as freshmen or transfer students cannot freely choose any major they want as many departments restrict admission to or declaration of their majors. The restrictions generally take two forms, which we use throughout this report:

- A. **Admission.** There are five avenues of application to the incoming Berkeley student. One chooses to apply to the College of Letters and Sciences, the College of Engineering, the College of Chemistry, the College of Environmental Design, the College of Natural Resources, or the Haas School of Business (juniors only). Out of those, the college of Chemistry and the College of Engineering use admissions as the sole avenue of becoming a major in their undergraduate programs. While it is not impossible to transfer into these two colleges after arrival on campus, it is very difficult.
- B. **Cap.** Most majors require a specific set of prerequisite courses. However, some further require a minimum GPA (either overall or for a specific set of courses) to be able to declare the major. We refer to these majors as **capped majors** throughout the report, if such a GPA requirement is higher than the L&S-wide minimum of 2.0. For some capped majors, there is a further limit on the total number of students allowed to declare a major in a given year. This means that some students who satisfy the prerequisite requirements get turned away from their desired majors. We refer to this as an **enrollment cap** throughout the report.

Our research indicates that the reasons for capping majors given in the proposals written for this purpose are many, yet most cite high student demand and insufficient resources. Some departments also motivate their caps by citing a desire for being able to select better performing students. Capped majors restrict declaration in different ways but in general, transfer students must apply during

¹ The research that underpins this report was carried out from 2014-2016 by the Committee on Educational Policy. CEP spoke with administrators, advisors, faculty, staff, and students, as well as analyzed application data. Due to the lack of a central database, much of the data was gathered from departmental websites and hence is only as accurate as the respective sites. We wish to thank Sereeta Alexander, Georjana Barnes, Janet Broughton, Anne De Luca, Andrew Eppig, and Bob Jacobsen for their helpful conversations with us. We are grateful to Erika Walker, Martha Olney, Patrick Allen, and William Hughes for providing application data and historical data. Chelan Huddleston deserves special thanks for carrying out the case study on economics described in this report. This report contains updated recommendations incorporating CEP and Undergraduate Council (UGC) discussions on March 15, 2017, and October 4, 2017, respectively.

their first semester, and non-transfer students must apply prior to exceeding 80 units of post-high school coursework.

Our analysis indicates that as of this academic year more undergraduates are enrolled in majors with one of the two types of restrictions given above than in majors without them. Members of CEP were curious to better understand the “restricted landscape” which Berkeley undergraduates have to navigate. This proved to be quite a challenge as there exists no centralized deposit of this information. This is especially true for the existence and level of enrollment caps. Below we provide some basic data on which majors are capped in some form. We then offer a case study of the economics landscape, which involves a professional school (Haas) and two colleges (L&S, CNR), and follow student applicants across departments, where a clear picture emerges. We conclude with some policy recommendations, which are meant to improve the undergraduate experience, all the while recognizing departmental resource limitations.

2. Basic Data

Table 1 lists the data collected by CEP on majors that admit freshmen and transfer students directly upon application to Berkeley and make it extremely difficult if not impossible to transfer in from other colleges. The degrees granted from these programs are B.S. degrees. There is the option to declare Computer Science and Chemistry through L&S in order to earn a Bachelor of Arts, which is the most accessible way for non-direct admits to major in these fields. A more complete database is available from the authors of this report. The only two programs that fall into this category are the College of Chemistry and the College of Engineering and to some degree the Haas School of Business. Haas only accepts applicants with junior standing and hence does not admit freshmen. The other colleges (L&S, CED, CNR) make it possible, albeit not easy, to transfer in and out if students decide to switch colleges.

Table 1: Admissions restricted majors

Division	Majors
College of Chemistry	<ul style="list-style-type: none"> ● Chemistry ● Chemical Biology ● Chemical Engineering
College of Engineering	<ul style="list-style-type: none"> ● Bioengineering ● Civil & Environmental Engineering ● Electrical Engineering & Computer Sciences ● Engineering Science ● Industrial Engineering & Operations Research ● Materials Science & Engineering

	<ul style="list-style-type: none"> ● Mechanical Engineering ● Nuclear Engineering
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Table 2 lists capped majors. These include the three non-interdisciplinary economics-type majors (Business Administration, Economics, and Environmental Economics and Policy [EEP]), which we discuss in greater detail below in our case study.

Table 2: Capped Majors

Division	Major	Minimum GPA	Numerical Cap
HAAS	Business Administration	C- or better in all pre-reqs. (most admitted students do better)	Yes
L&S	Economics	3.0 UCB overall	No
L&S/CNR	Environmental Economics & Policy	2.7 UCB overall (only for L&S majors)	No
L&S	Media Studies	3.2 in major courses	No
L&S	Operations Research & Management Science	3.2 L.D. pre-reqs.	Yes
L&S	Practice of Art	3.3 UCB overall	Yes
L&S	Psychology	3.2 UCB overall	No
L&S	Public Health	1.7 in courses applicable to major (2.7 GPA is suggested)	Yes
L&S	Social Welfare	2.0 L.D. pre-reqs.	Yes
L&S	Computer Science	2.0 in major courses, 3.0 in pre-reqs.	No
L&S	Interdisciplinary Studies	2.7 in pre-reqs., 2.0 overall	No

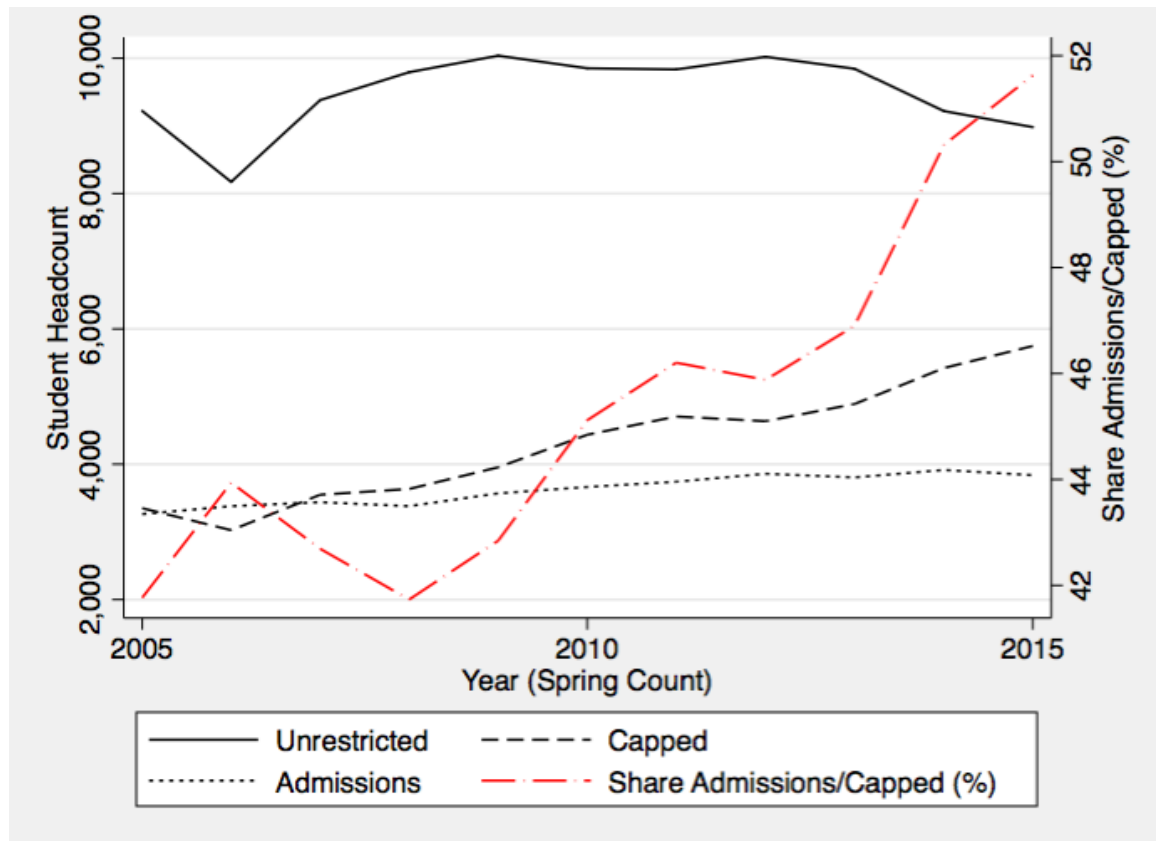
L&S	Political Economy	2.7 UCB overall	No
L&S	Statistics	3.2 overall, no grade lower than C in pre-reqs.	No

In order to determine what happens to student enrollment after majors impose these varying restrictions, it would be helpful to have data on the date the restrictions were imposed and/or enforced along with data on student enrollments. These data do not exist, as far as we are aware. The reason for this is twofold:

- 1) There is no central body at Berkeley that governs and keeps track of capping and restriction requests. The Executive Committees of the individual colleges rule on requests to cap. This is a broader problem we will further discuss below.
- 2) Most majors that are capped have been capped for longer than we have reliable major-level student counts for.

What we can do, however, is use the student census headcounts in Cal Answers to assign students to majors and categorize them that way—subject to the limitations of double counting in CalAnswers. Figure 1 below shows the time series of majors by type of restriction. The graph shows that over the past decade (spring 2005-spring 2015) the number of students in unrestricted majors has fallen modestly—by 3%. However, there has been a growth of 18% (575 students) in majors which restrict at the point of admission. The growth in majors with caps has been more drastic at 72% (2,397 students). The red line displays the share of students in either the admissions restricted or capped majors in the total headcount. This number was 42% in 2005 and has risen to 52% in the spring of 2015. Hence as of this past year, more Berkeley undergraduates are enrolled in a major with some sort of restriction than in majors without.

Figure 1: Breakdown of Current Majors by Type of Restriction



The largest unrestricted majors are Political Science (Headcount: 845), ESPM (818), MCB (739), Integrative Biology (626), Math (567), English (536), and Sociology (495). The largest restricted majors are EECS (1,201), Economics (1,104), L&S Computer Science (904), Psychology (714), and Business Administration (632).

3. Economics Landscape Case Study

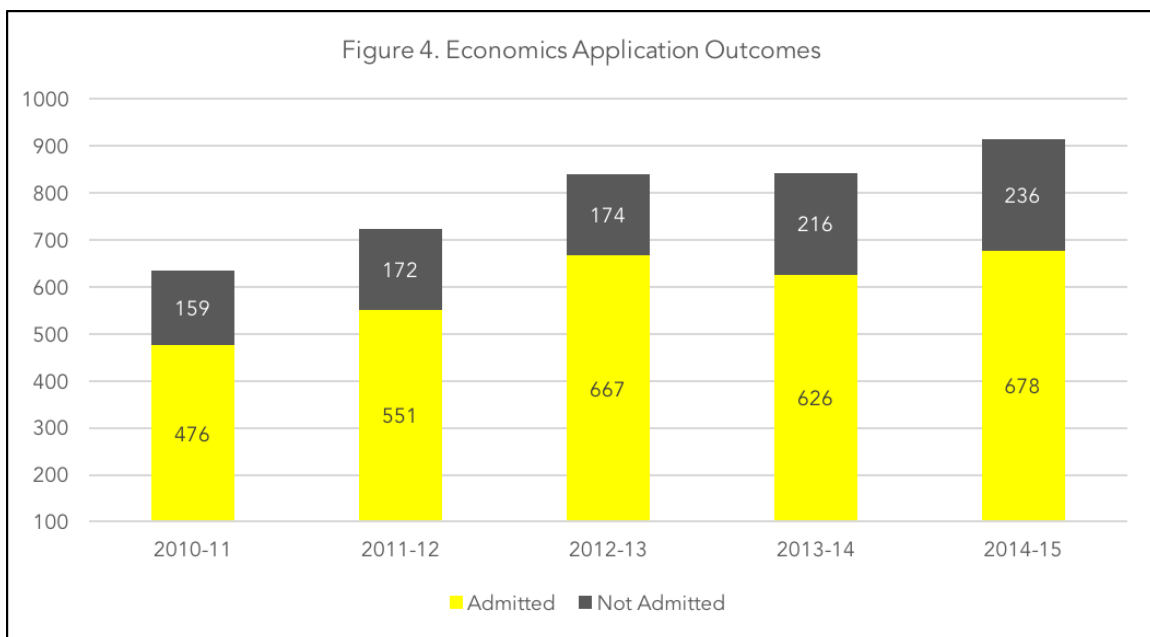
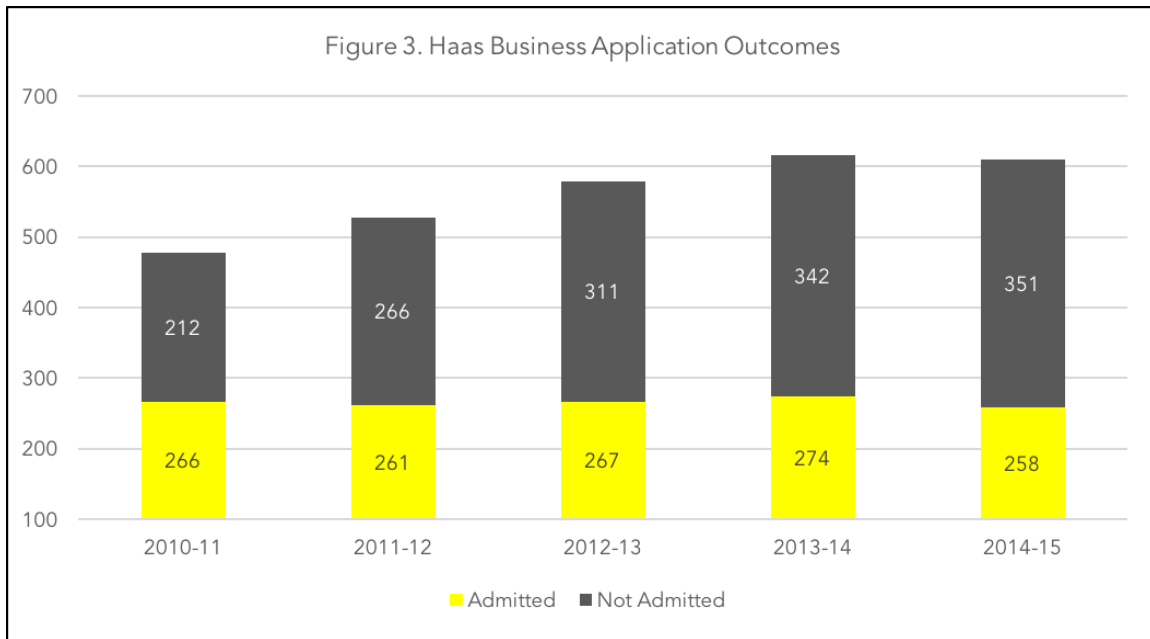
To look at a specific example of what happens when UC Berkeley students confront capped and restricted majors, we conducted a case study in the broad area of economics. At Berkeley, students can study economics in the Haas School of Business (UGBA Major), the Department of Economics, the College of Natural Resources (EEP Major), and International and Area Studies (Political Economy Major). Over time, each of these majors has been capped, which allows us to investigate the impact of sequential capping across majors, departments, and colleges. In effect, we can get a bird's eye view of the circuitous paths that students take in order to secure their desired field of study. Our full report also provides a brief history of restrictions and cappings in these majors, as completely as we could reconstruct it. For example, Economics has required a minimum grade point average of 3.0 since 1938, shifting to 3.2 in 1983 and back again to 3.0 in 1987.

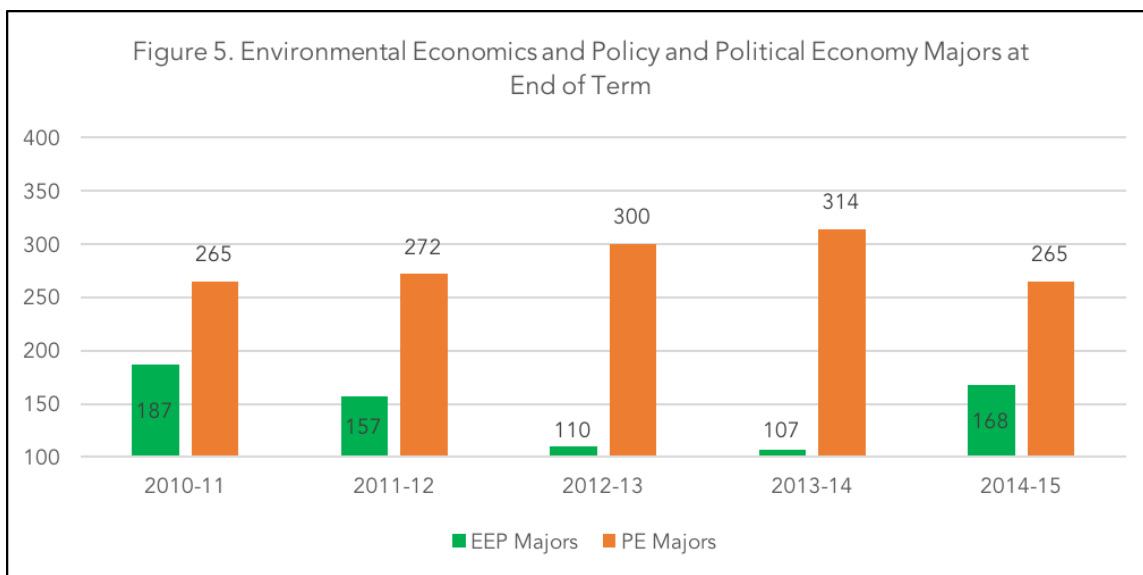
Economics has capped its major for as long as anyone remembers. The number of students admitted has fluctuated from 476 to 678 over the last five years. Haas decided to cap its major rather than eliminate it in 1977, a cap that was increased from 550 to 700 students in 2004-2005. In each of the four majors we consider here, caps and restrictions *have been modified over time, but never eliminated*. We hypothesized that students who do not meet the requirements of Haas or Economics might attempt EEP or PE, and that is what we found when we examined the complex interrelationships among these four majors through an analysis of application data.

Haas Business and Economics provided CEP with applicant data for the last six academic years, which allowed us to determine how many applicants were admitted and denied. Because similar data aren't kept by EEP and Political Economy, we relied on end-of-term major counts for each academic year drawn from Cal Answers. We also determined which students applied to or declared more than one major, and whether applications and declarations took place during the same or different academic years, and which majors students applied to in what order.

When we studied the flows of applicants, subject to data limitations, a relatively clear picture emerged. Students rejected from the Haas School of Business turn mostly towards Economics. The ones rejected from Economics take one additional semester and then apply to Political Economy (using the additional semester to satisfy the World History requirement) or spare themselves the semester and apply to EEP. The magnitude of the flows is significant as well. Each year several hundred students in this space "go shopping" for another major after being barred admission to their preferred major. Below we describe in more detail how we arrived at this conclusion.

It is instructive to study the trends in student applications and major declarations for these majors. Figures 3-5 below detail the counts of applicants (Business and Economics) and majors (EEP and Political Economy). What emerges pretty clearly is that the number of applications to Business has grown by 20%, but the major itself has not. Applications to Economics have grown by almost 50%, and the number of admitted majors has grown by a similar proportion. The number of rejected students has grown from 159 to 236 students per year over the past five years. According to these statistics, enrollments in EEP and PE have held relatively constant over the study period.





It is worth underscoring that Figures 3-5 provide counts of applicants and majors—not students—because a significant proportion (19%) of students applied to or declared more than one major. The preponderance of such students applied to or declared majors in two programs, and a third of these applied to or declared these two majors in the same academic year. Detailed counts are provided below in Table 3.

Table 3. Counts and percentages of students who applied to or were declared in one or multiple of the four majors between Fall 2009 and Summer 2015.

	Total Students		Applied Same AY	Applied Later
One Major	7369 (81%)			
Two Majors	1650 (18%)	>	537 (33%)	1113 (67%)
Three Majors	117 (1%)	>	34 (29%)	83 (71%)

As is apparent from Table 3, the vast majority of students seeking entrance to more than one major applied to or declared in two majors. The most common major pairing was being admitted to Economics and applying to and being rejected from Haas Business the following year (31% of all dual applicants/majors), with the next most common case being admitted to Economics and being denied from Haas Business the same year (11%). For details on all the observed pairings and progressions, please see Table 4 (and see the full report [here](#) for further detail on methodology).

Table 4. Number of students who applied/majored in two programs between Fall 2009 and Summer 2015, broken out by program combination and year of second application/major

Combination	Same Year	Different Years				Total	Percent
		Next Year	2 Years	3 Years	Total		
Econ_Admit : Haas_No		519	22		541	541	33%
Haas_No : Econ_Admit	189	2	1		3	192	12%
Econ_No : PE Major	13	152	15	1	168	181	11%
Econ_Admit : Haas_Admit		147	15		162	162	10%
Haas_No : PE Major	131	29	1		30	161	10%
Econ_No : EEP Major	39	60	2	1	63	102	6%
Haas_No : EEP Major	67	5			5	72	4%
Haas_No : Econ_No	30	2			2	32	2%
Econ_No : Haas_No		31			31	31	2%
EEP Major : Haas_No		24	2		26	26	2%
Econ_Admit : EEP Major	14	5	2		7	21	1%
PE Major : Haas_No		19	1		20	20	1%
Econ_Admit : PE Major	6	8	3		11	17	1%
EEP Major : Haas_Admit		10	7		17	17	1%
Haas_Admit : Econ_Admit	15				0	15	1%
Haas_Admit : EEP Major	13	1			1	14	1%
Haas_Admit : Econ_No	13				0	13	1%
Econ_No : Haas_Admit		12			12	12	1%
PE Major : EEP Major	5	3			3	8	0%
Haas_Admit : PE Major	2	4			4	6	0%
EEP Major : Econ_No		2			2	2	0%
EEP Major : PE Major		1	1		2	2	0%

PE Major : Haas_Admit		2			2	2	0%
EEP Major : Econ_Admit		1			1	1	0%
Total	537	1039	72	2	1113	1650	

Although few students applied to or declared in three majors, most who did fell into one of two categories: approximately 51% of these students were denied by Economics and Haas Business and accepted into Political Economy, and 35% of these students were denied from Economics and Business and accepted into EEP. (For all observed combinations, please see Table 4 in full report [here](#).)

4. Benefits and Costs of Restricting Majors

There are several benefits from capping majors that accrue to departments and the students who are admitted:

1. Departments with capped/restricted majors may have fewer students in the major compared to the same major without a cap/restriction, potentially resulting in smaller class sizes (and presumed greater faculty-student interaction) in essential core classes required for the major.
2. Depending on the criteria for admitting students to the major (e.g., overall GPA, grade in one particular class, etc.), the overall academic capabilities of students may be stronger and therefore the course topics can be taught at a more advanced level, which could potentially result in better learning outcomes for the students.
3. Capped or restricted majors could conceivably generate interest for that major because of the limited access, adding to the overall appeal of the major.
4. Because students may likely be happier with the smaller classes, alumni gifts to the department may potentially increase over time.
5. With capped majors, students have increased opportunities to become involved with independent research projects because of reduced competition to find a departmental faculty sponsor.
6. Maintaining a lower number of students in a major allows departments to more effectively use their limited resources for teaching and also provides for better long-term planning because the number of majors stays relatively constant.
7. Maintaining a lower number of students in a major allows departments to be responsive to faculty workload issues (not overloading faculty), if temporary resources are not available to hire additional instructors.

8. With capped majors, departments may be less likely to submit requests for additional FTE to teach the courses designed specifically for their majors.

However, there are significant costs for departments associated with restricting access to majors, which accrue mostly to other departments on campus. This is the classic example of an externality, which is a major market failure. In addition, there are of course the professional and psychological costs to students who are prevented from specializing in a particular field. We have identified the following six “costs”:

1. Students turned away from capped majors could flood alternative departments with non-restricted majors (already observed to occur, for example, in the Department of Sociology). This phenomenon could possibly reduce the overall quality of classes in the majors of these alternative departments as well as compromise learning outcomes because of increased class sizes.
2. Redirected students could strain the resources in the alternative departments that might need more faculty FTE to teach classes because of the increased numbers of majors.
3. Students who matriculate in a major that was not their first choice upon applying to UC Berkeley could see the university as pulling a “bait-and-switch;” this could result in higher numbers of unhappy students in a given major.
4. More than half of all the students are now in a capped or admissions restricted major. At some threshold percentage, increasing numbers of students who have been denied access to a major will find it more and more difficult to locate a suitable substitute major, and their educational experiences will be seriously impacted.
5. The student population within a capped major may be more homogeneous (by GPA, past experiences, etc.) than in uncapped majors, perhaps limiting students’ exposure to the heterogeneity of the university as a whole.
6. There are significant and tangible costs for students in the form of longer time to degree and the psychological stress of being unable to declare the major they came to Berkeley to study.

5. Recommendations

As a general principle, an undergraduate landscape with fewer barriers is desirable. As of today, there is **no central campus body that governs the process of capping or restricting a major**. In L&S, the Executive Committee is responsible for approving restrictions. As far as we can tell, the Haas School of Business capped itself in 1976, while considering the elimination of their undergraduate major. The issue of barriers is most significant in Chemistry and Engineering, where Berkeley students are essentially locked out of these majors. Further, from what we can tell, these restrictions are not revisited in a regular fashion. While many program reviews point out that restrictions are necessary because of resource constraints, the restrictions are imposed but rarely if ever removed.

UGC recommends the following:

1. A set of specific and written criteria should be developed and enforced by the respective college executive committees as a framework for departments seeking to cap or restrict their majors. This set of criteria would take into account different reasons and mechanisms to cap or restrict a given major, which would provide flexibility in the process.
2. We recommend that caps not be considered permanent. Rather, they should be reviewed and re-evaluated as part of regular program reviews. Departments should explain the original rationale for a capped/restricted major and provide evidence as to its continued applicability. The self study should provide information on the criteria for selecting students for the major, describe the impact of the capped major on student learning, and describe the benefits to the department and the university. Review teams could then assess the viability of continuing the capped major. Special attention should be paid to student populations likely to be at a notable disadvantage in applying to capped/restricted majors. Specifically departments should study and discuss the consequences of such restrictions on gender balance, URM students, and transfer students.
3. As a part of the self study, the Department should consider, to the extent possible, the effects of the capped major on other related departments and majors. The interactions and interdependencies should also be a component of the Undergraduate Council's review of the Department during the Academic Program Review.
4. We recommend a university wide review of the current admissions process of matching applicants to departments, which at present is highly unsatisfactory. At minimum, students should have to signal their most desired major on their application, and Admissions should take this into account when making decisions. The current practice of matching by college (and division within L&S) is simply too coarse a filter and greatly contributes to the problems outlined in this report.

