Item 3

CPEC

Ready for Learning

California Postsecondary Education Commission
www.cpec.ca.gov

Draft report • September 2010
by Stacy Wilson, Mallory Newell and Ryan Fuller

The Contribution of California's Independent Colleges and Universities in Meeting Undergraduate Demand

IMPETUS FOR THE REPORT

Since January 2010, the Administration and the Legislature have been engaged in discussions on how best to preserve access to public higher education during the state's current economic and fiscal crises. In March 2010, CPEC released updated projections of public undergraduate enrollment demand and institutional capacity to assist the Administration and Legislature as they attempt to balance higher education funding needs with other vital public needs.

Although public universities account for most of the higher education enrollment in California, independent colleges and universities make an important contribution to meeting enrollment demand. California's 76 independent non-profit colleges and universities provide a wide range of degree and certificate programs. In fall 2008, the independents served approximately 241,000 undergraduate and graduate students, a number that could not be absorbed by public campuses, given the existing and projected demand.

The purpose of *Ready for Learning* is to:

- Update policymakers and the general public on the range of independent institutions serving California and the importance of incorporating the independents as an integral part of state higher education long-range planning.
- Provide a benchmark estimate of undergraduate demand for the independents by student ethnicity and institution type.
- Highlight key demographic and economic factors that influence demand for the independents.
- Identify additional data elements that would enable CPEC to derive undergraduate demand projections for the independents that are more refined and useful for higher education planning.

Undergraduate demand estimates were derived from two forecast models: a demographic model that relies principally on observed and projected changes in college-going rates and the population aged 18 to 49 by ethnicity; and an economic model that considers projected changes in personal income, annual unemployment, and Cal Grant funding levels as a function of student demand.

Both models estimate undergraduate demand for the independents to increase by about 16%, from about 130,000 students in fall 2008 to approximately 150,000 in 2019. The similarity in findings is evidence of construct validity in modeling enrollment demand. The findings are also consistent with projections developed in 2009 by the National Center for Education Statistics that show undergraduate enrollments at private institutions increasing by 13% nationwide.

CPEC analysts recognize that estimating demand for the independents is more complex than for public colleges and universities. The independents, unlike public institutions, are not a system with a common purpose, mission, and legislated obligations and mandates.

The objective of *Ready for Learning* is not to project precisely how many students will be enrolled at any particular independent institution in a particular year, but to derive a reasonable and valid trend in undergraduate demand to support long-range planning. Following formal Commission adoption of this report, staff expects to convene an advisory committee consisting of representatives of public and independent institutions to identify policy recommendations that address the increased enrollment demand shown by these projections and CPEC's projections for the public systems.

Although strong evidence of statistical reliability for CPEC's forecasts is cited in this report, it is recommended that in interpreting the demand estimates, the reader review the comments expressed by the Association of Independent California Colleges and Universities (AICCU). The comments are presented in Appendix A on page 14.

DISPLAY 1 Forecast of Undergraduate Enrollment Demand

	Public Higher Education			Independents		
	UC	CSU	Community colleges	Demographic model	Economic model	Total
2008	172,775	362,226	1,823,516	129,606	129,606	2,488,123
2009	176,284	370,371	1,897,197	136,119	132,332	2,576,184
2010	179,960	378,910	1,969,143	137,386	133,177	2,661,190
2011	183,811	387,863	2,041,666	138,706	134,720	2,748,060
2012	187,850	397,253	2,060,953	140,055	136,668	2,782,724
2013	192,086	407,099	2,076,558	141,428	138,613	2,814,356
2014	196,448	417,442	2,090,152	142,811	140,554	2,844,596
2015	195,880	419,572	2,103,820	144,154	142,488	2,861,760
2016	194,621	419,405	2,113,684	145,526	144,421	2,872,131
2017	193,701	418,730	2,122,914	146,928	146,351	2,881,696
2018	193,254	417,309	3,130,174	148,365	148,281	2,889,018
2019	193,018	416,106	2,136,779	149,849	150,215	2,896,118
change	20,243	53,880	313,263	20,243	20,609	407,995
	11.7%	14.9%	17.2%	15.6%	15.9%	16.4%

Totals include only the economic model for independents.

Understanding the Terms *Independent* and *Private Postsecondary Education*

State law does not reference a formal definition for *independent postsecondary institution*. California Education Code § 94858 defines *private postsecondary education institution* as a private entity with a physical presence in the state that offers postsecondary education to the public for an institutional charge. In 2007, more than 400,000 students attended more than 1,500 private postsecondary institutions in California.

For the purpose of this report, *independent* refers to the 76 non-profit, private degree-granting institutions that are accredited by the Western Association of Schools and Colleges (WASC) and that are AICCU members. The enrollment demand analysis was limited to the independents because it accounts for the majority of non-public baccalaureate and graduate degree production.

California is served by 395 non-AICCU private institutions that participate in federal student aid programs. Most are vocational, technical, or religious schools that offer certificates. Some offer associate and baccalaureate degrees. The private degree-granting institutions are accredited by various entities such as WASC, the Higher Education Commission of the North Central Association of Colleges and Schools, the Council for Higher Education Accreditation, and the Association of Collegiate Business Colleges and Schools and Programs. Discussion of the independents does not include proprietary and non-profit vocational schools that require approval by the Bureau of Private Postsecondary Education within the Department of Consumer Affairs. State approval is required because these schools are not accredited by a regional or national agency recognized by the U.S. Department of Education. In October 2009, Governor Schwarzenegger signed Assembly Bill 48, which contains some revised oversight guidelines.

Undergraduate Demand Summary for Public Higher Education

Enrollment demand is an estimate of the total number of qualified prospective and continuing students who would enroll in a higher education system in a given year at a prevailing student fee level if enrollments were not constrained by state funding or by operational and capital resources. CPEC analysis in *Ready or Not, Here They Come* indicates that public undergraduate demand is expected to increase from 2.36 million students in fall 2008 to 2.75 million by fall 2019, representing a 16.4% increase and 387,000 additional students.

Community college enrollment demand is expected to increase by 17.2% or 313,263 additional students; CSU by 15% or 53,880 additional students; and UC by 11.7% or 20,243 additional students.

Undergraduate Demand Summary for the Independents

Ready for Learning serves as a companion to *Ready or Not, Here They Come* and provides estimates of the contribution of independent colleges and universities in meeting undergraduate demand for the future.

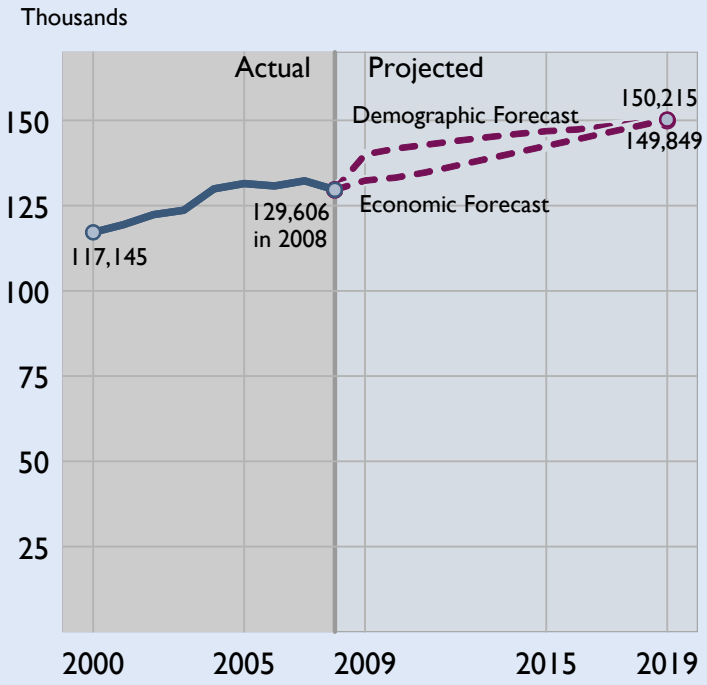
The independent sector represents the oldest higher education tradition in California. Santa Clara University and University of the Pacific were founded in the 1850s, several years before the first public college was established.

CPEC staff used a demographic model and an economic model to forecast demand at the independents. Both models indicate that undergraduate demand is expected to increase from 129,606 students in fall 2008 to about 150,000 by fall 2019, an increase of about 16% or 20,000 additional students.

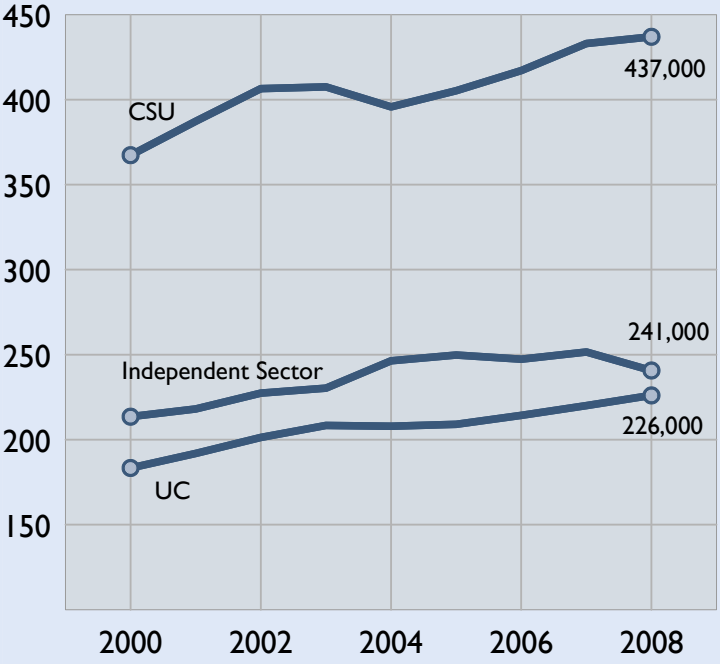
Undergraduate enrollment trends influenced the projections. Those enrollments were stable between 2004 and 2007, and dipped by about 2,700 in fall 2008. The figure to the right shows combined undergraduate and graduate enrollments by higher education sector for 2000 to 2008.

Many students are likely to find the independents as a favorable alternative to UC and CSU because admission practices tend

Demographic and Economic Forecasts



Total Enrollments, 2000–2008



to be more flexible. For example, the University of Southern California expects prospective freshmen to demonstrate "high scholastic achievement," but no specific course pattern is required. High school graduates applying for enrollment at UC and CSU must complete college preparatory *a–g* courses and take standardized tests.

Classification Categories

The independent sector includes major research universities, such as Stanford and the University of Southern California; comprehensive institutions, such as University of San Diego and University of San Francisco; liberal arts colleges, such as Mills College and Pitzer College; art colleges, such as the San Francisco Conservatory of Music; and specialized and graduate and professional institutions, such as Claremont Graduate University and Drexel University Center for Graduate Studies. For the purposes of the enrollment projections, the 76 independent colleges and universities were broken down into the groups shown in Display 2. This grouping was developed by CPEC in consultation with AICCU.

DISPLAY 2 Classification of Independent Colleges and Universities in California

Classification	Definition
Doctoral research	Offers comprehensive graduate and undergraduate degree programs with an intensive research focus.
Comprehensive, FTES over 5,000	Combined undergraduate and graduate enrollment of over 5,000 FTES, meeting two or more of the following characteristics: limited capacity in offering doctoral programs and engaging in research; large master's programs; comprehensive post–baccalaureate programs; high or majority graduate or professional student enrollment.
Comprehensive, FTES under 5,000	Same as above, but combined undergraduate and graduate enrollment is under 5,000 FTES.
Liberal arts, high endowments	Enrolls predominantly undergraduate students. Most offer master's degree programs and a few offer limited doctoral programs. A significant portion of expenses are covered by endowments.
Liberal arts, average endowments, FTES over 1,000	No doctoral programs offered. Most operational expenses are covered by funding sources other than endowments.
Small liberal arts, average endowments, FTES under 1,000	Enrollment is under 1,000 FTES. Most operational expenses are covered by funding sources other than endowments.
Creative arts	Enrolls predominately undergraduate students. Offers bachelor's degrees in art, music, or design.
Specialized	Offers undergraduate degree programs for specific professions, including business, health care, nursing, or paraprofessional services.
Graduate and professional	Offers graduate degree programs for specific professions, including business, health care, or paraprofessional services

FTES, or Full-Time-Equivalent Students, refers to the equivalent of one undergraduate student enrolled in 15 semester units, or one graduate student enrolled in 12 units.

DISPLAY 3 Independent Colleges and Universities in California

Classification	Campus	
Doctoral research	California Institute of Technology	Loma Linda University
	Stanford University	University of Southern California
Comprehensive, FTES over 5,000	Chapman University	Loyola Marymount University
	National University	Pepperdine University
	Santa Clara University	University of La Verne
	University of San Diego	University of San Francisco
	University of the Pacific	
Comprehensive, FTES under 5,000	Alliant International University	Antioch College – Los Angeles
	Azusa Pacific University	Biola University
	Brandman University	California Lutheran University
	Golden Gate University	Point Loma Nazarene University
	Saint Mary's College of California	University of Redlands
Liberal arts, high endowment	Soka University of America	Claremont McKenna College*
	Harvey Mudd College*	Mills College
	Occidental College	Pitzer College*
	Pomona College*	Scripps College*
Liberal arts, average endowments, FTES over 1,000	California Baptist University	Concordia University
	Dominican University of California	Fresno Pacific University
	La Sierra University	The Master's College
	Mount St. Mary's College	Pacific Union College
	Vanguard Univ. of Southern Calif.	Westmont College
	Whittier College	Woodbury University
Small liberal arts, average endowments, FTES under 1,000	American Jewish University	Holy Names University
	Hope International University	Humphreys College
	Marymount College	Menlo College
	Notre Dame de Namur University	Patten College
	San Diego Christian College	Simpson University
	Thomas Aquinas College	William Jessup University
Creative arts	American Academy of Dramatic Arts West	
	Art Center College of Design	California College of the Arts
	California Institute of the Arts	Laguna College of Art and Design
	Otis College of Art & Design	San Francisco Conservatory of Music
Specialized	Charles R. Drew Univ. of Medicine & Science	
	Cogswell Polytechnical College	Pacific Oaks College
	Samuel Merritt University	
Graduate and professional	Claremont Graduate University	
	Drexel University Center for Graduate Studies	
	Fielding Graduate University	Palo Alto University
	Philips Graduate Institute	Saybrook University
	Southern California University of Health Sciences	
	Touro University	Western Univ. of Health Sciences

* — campuses in the Claremont Colleges, made up of five undergraduate and two graduate institutions.

The enrollment projections in this report do not include the graduate and professional institutions.

Undergraduate Enrollment Demand Analysis for the Independent Segment

Demographic Model Projection

As shown in Display 4 below, the demographic model indicates that undergraduate demand is expected to increase from 129,606 students in fall 2008 to 149,849 students by fall 2019, representing a 15.6% increase or 20,243 additional students. Most institutions are expected to experience moderate to above-average growth in enrollment demand.

The draft demographic forecast that was reviewed by the Commission at the June 2010 meeting revealed undergraduate demand would increase by only 7%. The forecast was influenced by historical enrollments, which had been rather flat since 2004, and by a projected population decline of about 880,000 White/Other residents aged 14 to 49, as shown in Display 5 on page 8. At the meeting, AICCU made a convincing argument that if in-state demand started to slow, the independents would make up the difference by admitting more out-of-state and foreign students. To be consistent with this reasoning, the updated demographic forecast holds demand for the White/Other ethnic category constant at its peak enrollment level, rather than simulating a decline in demand. When this adjustment is made, total undergraduate demand for the independents increases by 15.6%.

The method used to derive the demographic forecast was not as comprehensive as used in CPEC's projections for UC and CSU, because few data elements were available for analysis. Ideally, it would have been helpful to have longitudinal data pertaining to community college transfer and freshman enrollments and participation rates; freshman and transfer persistence and graduation rates; student level (undergraduate or graduate), and the gender and age of students.

DISPLAY 4 Independent Colleges and Universities – Demographic Forecast by Category

	Doctoral research	Comprehensive FTE >5,000	Comprehensive FTE <5,000	Liberal arts, high endowment	Liberal arts FTE >1,000	Small liberal arts	Creative arts	Specialized	Total
2008	25,213	41,193	21,905	8,654	18,955	7,097	5,521	1,068	129,606
2009	25,511	44,538	22,896	8,614	19,585	7,322	6,505	1,149	136,119
2010	25,700	45,015	23,103	8,667	19,805	7,380	6,546	1,169	137,386
2011	25,904	45,505	23,322	8,722	20,032	7,442	6,588	1,191	138,706
2012	26,107	46,010	23,547	8,778	20,265	7,503	6,631	1,213	140,055
2013	26,307	46,530	23,799	8,835	20,504	7,561	6,674	1,237	141,428
2014	26,489	47,064	24,018	8,894	20,750	7,618	6,718	1,261	142,811
2015	26,658	47,615	24,262	8,948	20,980	7,657	6,762	1,273	144,154
2016	26,827	48,181	24,515	9,002	21,215	7,693	6,807	1,286	145,526
2017	26,994	48,764	24,777	9,058	21,455	7,728	6,853	1,299	146,928
2018	27,164	49,364	24,049	9,114	21,701	7,761	6,900	1,312	148,365
2019	27,342	49,982	25,335	9,171	21,950	7,796	6,947	1,324	149,849
change	2,129	8,789	3,430	517	2,995	699	1,426	256	20,243
	8.4%	21.3%	15.7%	6.0%	15.8%	9.8%	25.8%	24%	15.6%

2008 actual data.

The only information available for the analysis was student level, institution attended, and ethnicity. CPEC staff combined the data with a set of reasonable demographic, cognitive, and institutional policy assumptions to derive a benchmark of undergraduate demand for the independent segment. Cognition refers to mental capacities and abilities such as student understanding, critical thinking, interpreting, reasoning, and analyzing. These abilities are crucial to academic achievement. The Commission assumed that the current rate of improvement in academic preparation and achievement would continue over the projection period and be sufficient to support projected improvements in college participation detailed in Appendix C.

Details of the methodology are presented in Appendix B on page 15. Staff will continue to explore with AICCU the possibility of independent colleges and universities reporting more data elements so that future enrollment demand projections will be more refined and useful to educational planners and public officials.

Demand for doctoral research universities is expected to edge up about 1% per year, but the estimate is probably low because CPEC's model uses actual enrollments as a proxy for student demand. Research universities like Stanford and USC are very competitive and selective, so observed changes in new student enrollments serve less well as an indication or measurement of student demand. Conversely, UC research universities strive as a unifying system to offer admission to all eligible undergraduates, so observed changes in UC enrollments are more reliable as a measurement of change in enrollment demand.

DISPLAY 5 Population Projections, 2008–2019, ages 14–49, by Ethnicity

	Am. Indian	Asian	Black	Latino	White/Other	Total
2008	130,147	2,543,467	1,285,708	8,003,754	7,939,910	19,902,986
2009	131,981	2,560,935	1,281,983	8,192,008	7,851,723	20,018,630
2010	133,591	2,574,931	1,273,653	8,361,375	7,746,944	20,090,494
2011	135,645	2,593,017	1,266,498	8,534,853	7,642,985	20,172,998
2012	137,480	2,608,653	1,258,730	8,696,117	7,539,472	20,240,452
2013	139,350	2,619,373	1,251,252	8,850,103	7,443,277	20,303,355
2014	140,984	2,630,491	1,242,750	9,001,174	7,351,618	20,367,017
2015	141,442	2,646,585	1,232,828	9,170,265	7,271,349	20,462,469
2016	142,022	2,663,054	1,224,823	9,338,407	7,212,155	20,580,461
2017	142,633	2,682,685	1,218,305	9,506,176	7,162,359	20,712,158
2018	143,171	2,699,179	1,211,958	9,668,988	7,113,510	20,836,806
2019	143,670	2,712,961	1,204,914	9,834,654	7,056,182	20,952,381
change	13,523	169,494	–80,794	1,830,900	–883,728	1,049,395
	10.4%	6.7%	–6.3%	22.9%	–11.1%	5.3%

Adapted from California Department of Finance, *Race/Ethnic Population with Age and Sex Detail, 2000–2050*.

Display 6, starting on page 9, provides demand estimates by ethnicity. If the independents were able to enroll all eligible applicants, the representation of Latino students would increase by about 45%, American Indians by 26%, Asians by 17%, and Blacks by 14%. Black and Latino students are underrepresented in the public four-year systems. It is encouraging to note that their numbers increase statewide when including the 8,244 Black and 22,242 Latino undergraduates attending independent universities in fall 2008.

DISPLAY 6 Demographic Forecast, by Classification and Ethnicity

	Am. Indian	Asian	Black	Latino	White/Other	Total
Doctoral research						
2008	343	6,208	1,681	3,197	13,784	25,213
2009	350	6,214	1,696	3,297	13,953	25,511
2010	357	6,277	1,712	3,400	13,953	25,700
2011	365	6,351	1,727	3,506	13,953	25,904
2012	373	6,422	1,743	3,616	13,953	26,107
2013	380	6,485	1,759	3,729	13,953	26,307
2014	387	6,544	1,758	3,846	13,953	26,489
2015	394	6,591	1,753	3,966	13,953	26,658
2016	400	6,636	1,747	4,090	13,953	26,827
2017	405	6,678	1,739	4,218	13,953	26,994
2018	410	6,720	1,730	4,350	13,953	27,164
2019	413	6,772	1,718	4,486	13,953	27,342
Comprehensive, FTES over 5,000						
2008	376	6,293	2,635	7,560	24,329	41,193
2009	388	6,424	2,693	7,821	27,211	44,538
2010	401	6,558	2,753	8,092	27,211	45,015
2011	414	6,695	2,814	8,371	27,211	45,505
2012	427	6,835	2,876	8,661	27,211	46,010
2013	441	6,977	2,940	8,960	27,211	46,530
2014	455	7,123	3,005	9,270	27,211	47,064
2015	470	7,271	3,072	9,590	27,211	47,615
2016	485	7,423	3,140	9,922	27,211	48,181
2017	501	7,578	3,210	10,265	27,211	48,764
2018	517	7,736	3,281	10,619	27,211	49,364
2019	534	7,897	3,354	10,987	27,211	49,982
Comprehensive, FTES under 5,000						
2008	201	1,890	1,126	3,594	15,094	21,905
2009	204	1,915	1,143	3,752	15,882	22,896
2010	208	1,936	1,160	3,918	15,882	23,103
2011	211	1,962	1,177	4,091	15,882	23,322
2012	214	1,986	1,194	4,271	15,882	23,547
2013	218	2,008	1,212	4,459	15,882	23,779
2014	221	2,028	1,230	4,656	15,882	24,018
2015	225	2,045	1,248	4,861	15,882	24,262
2016	229	2,062	1,267	5,076	15,882	24,515
2017	232	2,077	1,286	5,300	15,882	24,777
2018	236	2,093	1,305	5,533	15,882	25,049
2019	240	2,112	1,324	5,777	15,882	25,335

Asian includes Filipinos and Pacific Islanders. 2007 and 2008 actual data.

DISPLAY 6, continued

	Am. Indian	Asian	Black	Latino	White/Other	Total
Liberal arts, above-average endowments						
2008	62	1,374	578	1,191	5,449	8,654
2009	62	1,387	582	1,226	5,356	8,614
2010	62	1,401	587	1,261	5,356	8,667
2011	63	1,415	591	1,298	5,356	8,722
2012	63	1,428	596	1,335	5,356	8,778
2013	63	1,442	600	1,374	5,356	8,835
2014	63	1,456	605	1,414	5,356	8,894
2015	64	1,470	603	1,455	5,356	8,948
2016	64	1,485	601	1,497	5,356	9,002
2017	64	1,499	598	1,540	5,356	9,058
2018	64	1,514	595	1,585	5,356	9,114
2019	65	1,529	591	1,631	5,356	9,171
Liberal arts, average endowments, FTES over 1,000						
2008	219	2,411	1,110	4,615	10,600	18,955
2009	224	2,465	1,126	4,754	11,014	19,585
2010	229	2,521	1,143	4,898	11,014	19,805
2011	234	2,578	1,160	5,046	11,014	20,032
2012	240	2,636	1,177	5,198	11,014	20,265
2013	245	2,696	1,195	5,355	11,014	20,504
2014	250	2,757	1,213	5,517	11,014	20,750
2015	254	2,819	1,209	5,683	11,014	20,980
2016	258	2,883	1,205	5,855	11,014	21,215
2017	262	2,948	1,200	6,031	11,014	21,455
2018	266	3,014	1,193	6,214	11,014	21,701
2019	268	3,082	1,185	6,401	11,014	21,950
Small liberal arts, average endowments, FTES under 1,000						
2008	82	738	751	1,251	4,275	7,097
2009	84	741	761	1,336	4,400	7,322
2010	86	749	770	1,375	4,400	7,380
2011	88	758	780	1,416	4,400	7,442
2012	90	766	790	1,457	4,400	7,503
2013	92	774	800	1,496	4,400	7,561
2014	93	781	810	1,533	4,400	7,618
2015	95	786	808	1,567	4,400	7,657
2016	97	792	805	1,600	4,400	7,693
2017	98	797	802	1,631	4,400	7,728
2018	99	802	797	1,662	4,400	7,761
2019	100	808	792	1,697	4,400	7,796

Asian includes Filipinos and Pacific Islanders. 2007 and 2008 actual data.

DISPLAY 6, continued

	Am. Indian	Asian	Black	Latino	White/Other	Total
Creative arts						
2008	40	1,334	220	637	3,290	5,521
2009	42	1,351	224	658	4,230	6,505
2010	43	1,368	224	680	4,230	6,546
2011	44	1,386	225	703	4,230	6,588
2012	45	1,403	226	726	4,230	6,631
2013	46	1,421	227	750	4,230	6,674
2014	47	1,439	227	775	4,230	6,718
2015	47	1,458	226	801	4,230	6,762
2016	48	1,476	225	827	4,230	6,807
2017	49	1,495	224	855	4,230	6,853
2018	49	1,514	223	883	4,230	6,900
2019	50	1,533	221	913	4,230	6,947
Specialized						
2008	8	237	143	197	483	1,068
2009	11	242	152	203	542	1,149
2010	11	247	161	209	542	1,169
2011	11	252	171	215	542	1,191
2012	11	258	181	222	542	1,213
2013	11	263	192	228	542	1,237
2014	12	269	204	235	542	1,261
2015	12	274	203	242	542	1,273
2016	12	280	202	250	542	1,286
2017	12	286	201	257	542	1,299
2018	12	292	200	265	542	1,312
2019	12	298	199	273	542	1,324
Totals						
2008	1,331	20,485	8,244	22,242	77,304	129,606
2009	1,366	20,740	8,377	23,047	82,589	136,119
2010	1,397	21,058	8,510	23,832	82,589	137,386
2011	1,430	21,396	8,645	24,646	82,589	138,706
2012	1,463	21,734	8,784	25,486	82,589	140,055
2013	1,496	22,066	8,924	26,352	82,589	141,428
2014	1,528	22,396	9,051	27,246	82,589	142,811
2015	1,561	22,716	9,123	28,166	82,589	144,154
2016	1,592	23,037	9,192	29,116	82,589	145,526
2017	1,624	23,358	9,260	30,098	82,589	146,928
2018	1,655	23,686	9,323	31,112	82,589	148,365
2019	1,680	24,031	9,384	32,164	82,589	149,849
change	349	3,546	1,140	9,922	5,285	20,243
	26.2%	17.3%	13.8%	44.6%	6.8%	15.6%

Asian includes Filipinos and Pacific Islanders. 2008 actual data.

Economic Analysis of Undergraduate Enrollment Demand

Overall, the demand projections derived by the economic model resemble closely the results obtained by the demographic model. As shown in Display 7 below, undergraduate demand is anticipated to increase from 129,606 in fall 2008 to 150,215 in 2019, representing a 15.9% increase and 20,609 additional students. All classification categories are expected to experience moderate to above average growth in demand, except for doctoral research universities and small specialized institutions. Unlike the economic model, the demographic forecast shows growth in enrollment demand for doctoral research institutions because of a statistical adjustment made to the White/Other ethnic category. That adjustment is explained in the section on demographic model projections, on page 7.

CPEC's economic model is similar to the higher education projection model developed by the National Center for Education Statistics. Both models include personal income and unemployment rates as explanatory factors. Personal income reflects a family's ability to pay tuition costs not covered by scholarships and student aid, whereas unemployment rates serve as a proxy for opportunity costs faced by prospective students. The idea is that when age-specific unemployment rates are relatively high, enrollment demand is likely to increase because gainful employment is less of a viable option or opportunity. Projections of personal income and annual unemployment used in the model are in Appendix B on page 15.

DISPLAY 7 Independent Sector – Economic Projections Model

	Doctoral research	Comprehensive FTES >5,000	Comprehensive FTES <5,000	Liberal arts, high endowment	Liberal arts FTES >1,000	Small liberal arts	Creative arts	Specialized	Total
2008	25,213	41,193	21,905	8,654	18,955	7,097	5,521	1,032	129,606
2009	25,220	40,657	24,122	8,603	19,429	7,360	5,691	1,249	132,332
2010	25,209	40,853	24,349	8,681	19,671	7,412	5,742	1,261	133,177
2011	25,184	41,769	24,326	8,805	20,078	7,467	5,829	1,260	134,720
2012	25,152	42,901	24,326	8,966	20,600	7,521	5,941	1,260	136,668
2013	25,120	44,041	24,321	9,126	21,121	7,572	6,053	1,260	138,613
2014	25,088	45,188	24,308	9,286	21,642	7,618	6,165	1,260	140,554
2015	25,055	46,345	24,289	9,445	22,162	7,657	6,276	1,259	142,488
2016	25,023	47,512	24,261	9,605	22,681	7,693	6,388	1,257	144,421
2017	24,991	48,689	24,226	9,764	23,200	7,728	6,499	1,255	146,351
2018	24,958	49,879	24,180	9,922	23,718	7,761	6,610	1,253	148,281
2019	24,926	51,083	24,123	10,080	24,234	7,796	6,721	1,250	150,215
change	–287	9,890	2,218	1,426	5,279	699	1,200	218	20,609
	–1.1%	24.0%	10.1%	16.5%	27.9%	9.8%	21.7%	21.1%	15.9%

Estimating demand for the independents is complex because the number of variables available for analysis are limited, and because independent campuses are not a single system with a shared or common purpose, mission, and legislated obligations and mandates. CPEC staff conducted a reliability study and found with but one exception that an economic model can be used to estimate undergraduate demand for the independents when considering personal income, unemployment rate, and Cal Grant funding levels as explanatory factors in a linear-log regression equation. The exception was the small liberal arts category, where none of the economic factors proved to be useful in estimating demand. Thus, the figures derived from the demographic model for the small liberal arts category are shown in Display 7 above.

Economists often employ a linear-log model when they suspect that the relationship between a set of explanatory variables and an outcome variable of interest might not be linear. For example, economists do not expect that as household income (explanatory factor) rises, food expenditures (outcome of interest) will continue to rise indefinitely at a constant rate. Rather, as income rises, the expectation is that food expenditures will increase, but at a decreasing rate. If one transforms the explanatory factors by taking the natural logarithm of each, the analysis can be carried out conveniently using the standard multiple regression approach. More details are in Appendix B, on page 15.

Reliability Evidence for the Economic Demand Model

Enrollment demand is the number of qualified prospective students who would pursue postsecondary education at a prevailing student fee or tuition level if institutions have the operational and capital resources necessary to accommodate all eligible students. During non-recession periods, a reasonable proxy for demand is actual enrollments. Reliability evidence can be established by comparing actual enrollments to demand estimates. It is assumed that most independent institutions are able to accommodate the majority of qualified applicants during favorable economic times. The exceptions are doctoral research institutions and specialized institutions, which are more competitive and admit a smaller percentage of applicants.

CPEC staff found a high correlation between actual enrollments and the demand estimates derived by the economic model. Results for the comprehensive institution categories are highlighted in Display 8, at right. Reliability coefficients were derived by dividing actual enrollments by the demand estimates. A value of 1 reflects a perfect match between actual enrollments and the demand estimates.

A value less than 1 means an estimate was lower than the actual enrollment, whereas a value greater than 1 means actual enrollment was higher than the projection. Statisticians consider values of 0.5–0.65 as "acceptable," 0.65–0.85 as "high," and 0.85–1.05 as "exceptionally strong" evidence of reliability. CPEC's analysis resulted in values from 0.97 to 1.05.

One reason why the reliability test returned favorable results is that the independent variables represent actual values. Projections require reliable estimates of the explanatory factors for 2009 to 2019. The economic model forecast would almost certainly be less reliable if personal income does not increase at an annual rate of about 5% between 2012 and 2015, as projected by the Legislative Analyst's Office, and if California's annual unemployment rate does not gradually decline to approximately 7.6% by 2019.

DISPLAY 8 Reliability Evidence for the Economic Enrollment Demand Model

	Actual enrollments	Projected	Difference	Reliability coefficient
Comprehensive FTES >5,000				
2000	36,201	37,360	1,159	0.97
2001	37,360	37,582	222	0.99
2002	37,531	37,109	–422	1.01
2003	37,191	37,806	615	0.98
2004	41,292	39,383	–1,909	1.05
2005	41,980	41,000	–980	1.02
2006	42,488	42,846	358	0.99
2007	43,833	43,555	–278	1.01
2008	41,193	42,835	1,642	0.96
Comprehensive FTES <5,000				
2000	19,793	20,848	1,055	0.95
2001	20,460	21,205	745	0.96
2002	22,345	21,869	–476	1.02
2003	22,394	22,010	–384	1.02
2004	22,781	21,905	–876	1.04
2005	22,685	21,652	–1,033	1.05
2006	22,049	21,567	–482	1.02
2007	21,762	21,924	162	0.99
2008	21,905	22,861	956	0.96

APPENDIX A

AICCU's Comments on the Projections

The Association of Independent California Colleges and Universities (AICCU) salutes the Commission staff for augmenting their enrollment model to include both a traditional approach and one based on some more dynamic assumptions. However, all linear models, even ones that include the elegance of regressions, are inadequate to the task of accurately predicting the future. Estimating the future is tough, as the huge errors in revenue estimating to account for changes in the tax code repeatedly demonstrate.

Getting the estimates right for the independent sector is critical. The independents represent 22% of the undergraduate degrees awarded. The percentage of graduate degrees awarded by the independents range from about 50% of the Masters to over 60% of the Doctorates. Compared to the four-year public sector institutions, however, the variability of undergraduate growth rates is considerably more dynamic.

State policy has long recognized that without a thriving independent sector of higher education, opportunities for students will be limited and the state's economic growth will diminish. The model used in this report for estimating the independent sector capacity is inadequate; it reduces the dynamic to a predominant variable. Clearly, it is possible to reduce all capacity estimates to economic factors like price and disposable income. The National Commission on College Costs used the analytical categories of Cost, Price, Net Cost, and Subsidy. The historic pattern of subsidy to public institutions is based on an assumption that enrollments in higher education depend on a generalized discount of tuition based on a non-need based subsidy (called net price). However, in the independent sector, the interaction of variables clouds the picture considerably.

For example, the independents have a higher percentage of out-of-state students than either the UC or CSU systems. That results in three dynamics not captured in the model. First, variability in California income is inadequate in capturing the economic variable, which overly simplifies the CPEC model to the point of inaccuracy. In recent years, income growth in California has lagged behind the other states where the independents recruit students. Second, when conditions in California are favorable (especially as they relate to Cal Grant funding), the independents recruit more California students. During periods of unfavorable conditions in California, the out-of-state percentages rise, reducing the California capacity. The percentage of California residents as undergraduates, which is normally near two-thirds, will change in response to state policy around Cal Grants. Third, small enrollment changes could yield huge changes in overall enrollment patterns. For example, the efforts among the independents and the community colleges to improve transfer rates, if successful, are likely to affect enrollment trends at both independent and public institutions.

There is a more fundamental variable for which the modeling fails to account. Over the last decade the relative price to attend a UC or CSU has dramatically increased along with their time-to-degree. Consequently, more California families are comparing independent institutions to UC or CSU on the basis of net cost to earn a degree. The shorter time-to-degree and potential institutional aid at the independents results in a lower cost option for many. If fees in the public sector continue their current trend, if class availability continues to decline, and if the independent sector continues offering reasonable alternatives, that trend will accelerate.

It is AICCU's position that in these times of economic uncertainty, the ability to construct a reliable projection of capacity using a static model (such as the one used by the Commission) is problematic. However, AICCU recognizes that it is the Commission's role to produce estimates to assist the state in planning. Because of the variability in the very diverse independent sector, AICCU believes a range of estimates would be more appropriate. The limitations of the estimates and model in this report must be considered when relying on this report to make policy recommendations. AICCU also believes that improving predictive capacity modeling is heavily conditioned on the success of achieving the Commission's long-time goal for California to create and maintain stable fee and financial aid policies for the state's students.

APPENDIX B

Methodology

A key advantage of statistical modeling is that various parameters of a complex phenomenon, such as enrollment demand, can often be estimated with a high degree of confidence by identifying a few variables that are correlated with the outcome of interest. All social science models by definition are a generalization of the attribute being studied. In social science research, *parsimony* refers to a common desire among researchers to model complexity with the least number of variables necessary to yield valid and reliable results.

Demographic Model

Although most enrollment demand models use the participation rate to represent demand, that rate is influenced by the personal characteristics of prospective students and by institutional, demographic, and economic factors. CPEC staff derived annual participation rates by dividing actual enrollments for each year by the corresponding population aged 18 to 49. The rates were disaggregated by institutional classification and by ethnicity and multiplied by 1,000 to reflect the number of undergraduates enrolled in the independent segment per 1,000 adults.

It is presumed that the influence of the factors on college-going, as evident by observed historical patterns of participation, will be similar during the projection period. Participation rates that remained level between 2000 and 2007 were held constant through the projection period.

For classifications that showed a clear upward trend in participation, a regression analysis was used to derive the mean rate of change for a seven-year historical period. The slope of the regression represents a linear average change rate and is defined symbolically as:

$$b_{yx} = n \sum xy - (\sum x)(\sum y) / n \sum x^2 - (\sum x)^2$$

where n = number of cases
x = year y = participation rate

Ethnic-specific change rates by institutional classification were extended over the first three years of the projection period and held constant thereafter. CPEC staff highlighted several factors in *Ready or Not, Here They Come* as a rationale for increasing college-going rates in the near term:

- Significant job losses occurring in the state, which are associated with an increasing number of residents returning to colleges and universities to prepare for new careers and occupations.
- School reform efforts, including teacher development, aimed at increasing college and university readiness.
- Federal stimulus dollars and programs made available by the Obama Administration to significantly enhance college-going.
- Economic analyses and public policy papers calling for California to increase baccalaureate degree production to meet workforce and labor needs as the state recovers from the recession.

The participation rates used to derive the forecast are listed in Appendix C.

Economic Model

The economic model is similar to the model developed by the National Center for Education Statistics. Both include personal income and unemployment rates as explanatory factors. Personal income reflects a family's ability to pay tuition and costs not covered by scholarships and student aid, whereas unemployment rates serve as a proxy for opportunity costs faced by prospective students. When age-specific unemployment rates are relatively high, enrollment demand is likely to increase because gainful employment is less of a viable option or opportunity.

CPEC's model uses personal income projections derived by the Legislative Analyst's Office. California's annual unemployment is assumed to decline to 7.6% by 2019, reflecting a slower recovery of jobs than previously predicted by economists. The projections are shown on the next page.

Economists use a variety of log models to estimate an outcome of interest. Model selection is based on the distributional shape of the data being analyzed. Some common models are:

Reciprocal | *Log-Log* | *Log-Linear (Exponential)* | *Linear-Log (Semi-log)* | *Log-Inverse*

Economists often employ a linear-log model when they suspect that the relationship between a set of explanatory variables and an outcome variable of interest might not be linear. For example, economists do not expect that as household income (explanatory factor) rises, food expenditures (outcome of interest) will continue to rise indefinitely at a constant rate. Rather, as income rises, the expectation is that food expenditures will increase, but at a decreasing rate. If one transforms the explanatory factors by taking the natural logarithm of each, the analysis can be carried out conveniently using the standard multiple regression approach.

CPEC staff elected to use a linear-log approach for two reasons. First, the demographic forecast reveals that undergraduate demand is expected to increase at a decreasing rate towards the latter part of the projection period because of slower population growth. By undertaking a log transformation of the economic variables, the economic projection model is made theoretically consistent with the demographic model. Second, a key regression assumption is that as the outcome variable gets larger the error in predicting the outcome will not get larger. This assumption is referred to as *homogeneity of variance*. The log transformation of the economic variables helped ensure that the variance assumption would be met.

For each institutional category, staff determined which economic factors were most highly correlated with historical enrollments. For all categories except small liberal arts institutions, personal income had the strongest association with actual enrollments. Therefore, in all regressions, personal income was used as the primary explanatory factor. In some of the regressions, projected unemployment rates and Cal Grant A funding levels were included as additional explanatory factors.

By taking the natural logarithm of each explanatory factor, demand projections can be derived using the standard multiple regression approach. The equation is:

$$y = \ln(a) + b1 \ \ln(X1) + b2 \ \ln(X2)$$

where $\ln$ = natural log X = explanatory factor
b = beta weight for a given factor y = undergraduate enrollment

Forecast of Economic Assumptions

	Total Personal Income	Unemployment	Cal Grant A
2009	$1,564,389	11.4%	$9,708
2010	1,597,241	12.1	9,708
2011	1,659,534	11.6	9,708
2012	1,742,510	11.1	9,708
2013	1,829,636	10.6	9,708
2014	1,921,118	10.1	9,708
2015	2,017,173	9.6	9,708
2016	2,118,032	9.1	9,708
2017	2,223,934	8.6	9,708
2018	2,335,130	8.1	9,708
2019	2,451,887	7.6	9,708

Total Personal Income consistent with LAO projections through 2015. Growth was held at 5% annually in later years.

Because of a slower than expected economic recovery, economists now project that California's annual unemployment rate will decrease to about 7.6% by 2019.

Because of current uncertainties, maximum Cal Grant A awards were held constant throughout the projected period.

APPENDIX C

Participation Rates, by Classification and Ethnicity, 2000–2008

	Mean	Am. Indian	Asian	Black	Latino	White/Other
Doctoral research						
2000	1.6	2.1	2.4	1.3	0.5	1.5
2001	1.5	2.1	2.2	1.3	0.5	1.5
2002	1.5	2.0	2.2	1.4	0.5	1.5
2003	1.5	2.0	2.1	1.4	0.5	1.4
2004	1.5	2.1	2.1	1.4	0.5	1.4
2005	1.5	2.1	2.1	1.4	0.5	1.4
2006	1.5	2.2	2.0	1.3	0.4	1.4
2007	1.4	2.0	2.1	1.2	0.4	1.4
2008	1.5	2.3	2.1	1.2	0.4	1.4
Comprehensive, FTES over 5,000						
2000	2.0	3.0	2.0	1.7	0.9	2.3
2001	2.0	2.8	2.0	1.9	1.0	2.3
2002	2.0	2.7	2.0	1.8	1.0	2.3
2003	1.9	2.5	2.0	1.7	0.9	2.3
2004	2.1	2.6	2.2	2.1	1.0	2.5
2005	2.1	2.8	2.1	2.1	1.0	2.5
2006	2.2	3.1	2.2	2.1	1.0	2.5
2007	2.2	2.9	2.3	2.1	1.0	2.6
2008	2.0	2.5	2.1	1.9	0.9	2.5
Comprehensive, FTES under 5,000						
2000	0.9	1.4	0.6	0.8	0.4	1.5
2001	0.9	1.2	0.6	0.9	0.4	1.5
2002	1.0	1.3	0.6	0.9	0.4	1.7
2003	0.9	1.2	0.6	0.9	0.4	1.7
2004	1.0	1.3	0.6	0.8	0.5	1.7
2005	1.0	1.3	0.6	0.8	0.5	1.6
2006	1.0	1.4	0.6	0.8	0.5	1.6
2007	0.9	1.2	0.6	0.9	0.5	1.5
2008	1.0	1.3	0.6	0.8	0.4	1.5
Liberal arts, above-average endowments						
2000	0.4	0.5	0.5	0.3	0.1	0.5
2001	0.4	0.5	0.5	0.3	0.1	0.5
2002	0.4	0.5	0.4	0.3	0.1	0.5
2003	0.4	0.5	0.4	0.4	0.1	0.5
2004	0.4	0.4	0.4	0.4	0.1	0.5
2005	0.4	0.4	0.5	0.4	0.1	0.5
2006	0.4	0.4	0.5	0.4	0.1	0.5
2007	0.4	0.4	0.5	0.4	0.2	0.5
2008	0.4	0.4	0.5	0.4	0.1	0.6

Participation rates per 1,000 Californians by age (18–49) and by ethnicity.
Asian includes Filipinos and Pacific Islanders.

Participation Rates, by Classification and Ethnicity, 2000–2008

	Mean	Am. Indian	Asian	Black	Latino	White/Other
Liberal arts, average endowments, FTES over 1,000						
2000	0.8	1.1	0.6	0.7	0.4	1.0
2001	0.8	1.2	0.6	0.7	0.5	1.0
2002	0.8	1.4	0.6	0.7	0.5	1.0
2003	0.9	1.3	0.6	0.8	0.5	1.1
2004	0.9	1.3	0.7	0.8	0.6	1.1
2005	0.9	1.3	0.8	0.8	0.6	1.1
2006	0.9	1.3	0.8	0.8	0.6	1.1
2007	0.9	1.4	0.8	0.8	0.6	1.1
2008	0.9	1.5	0.8	0.8	0.6	1.1
Small liberal arts, average endowments, FTES under 1,000						
2000	0.4	0.5	0.3	0.5	0.2	0.5
2001	0.3	0.3	0.3	0.5	0.2	0.5
2002	0.4	0.6	0.3	0.5	0.2	0.5
2003	0.4	0.6	0.3	0.6	0.2	0.5
2004	0.4	0.6	0.3	0.6	0.2	0.5
2005	0.4	0.6	0.3	0.6	0.2	0.5
2006	0.4	0.5	0.2	0.6	0.2	0.4
2007	0.4	0.5	0.2	0.6	0.2	0.4
2008	0.4	0.5	0.3	0.5	0.2	0.4
Creative arts						
2000	0.3	0.4	0.4	0.1	0.1	0.3
2001	0.3	0.4	0.4	0.1	0.1	0.3
2002	0.2	0.3	0.4	0.1	0.1	0.3
2003	0.3	0.3	0.4	0.1	0.1	0.3
2004	0.3	0.3	0.4	0.1	0.1	0.3
2005	0.3	0.3	0.5	0.1	0.1	0.3
2006	0.3	0.3	0.4	0.2	0.1	0.4
2007	0.3	0.3	0.5	0.2	0.1	0.3
2008	0.3	0.3	0.5	0.2	0.1	0.3
Specialized						
2000	0.1	0.2	0.1	0.1	0.0	0.1
2001	0.1	0.1	0.1	0.1	0.0	0.1
2002	0.1	0.1	0.1	0.1	0.0	0.1
2003	0.1	0.1	0.1	0.3	0.0	0.0
2004	0.1	0.1	0.1	0.2	0.0	0.0
2005	0.1	0.1	0.1	0.1	0.0	0.0
2006	0.1	0.0	0.1	0.1	0.0	0.1
2007	0.1	0.1	0.1	0.1	0.0	0.1
2008	0.1	0.1	0.1	0.1	0.0	0.0

Participation rates per 1,000 Californians by age (18–49) and by ethnicity.
Asian includes Filipinos and Pacific Islanders.

About the authors

Dr. Stacy Wilson is a senior researcher and policy analyst. His primary responsibilities include assessing the need for new degree and certificate programs and the need for new campuses and educational centers. Dr. Wilson is also a lecturer in public administration at CSU East Bay. He holds a bachelor's degree in political science from UC Berkeley, a master's degree in public administration from CSU East Bay, and a doctorate in student learning and instruction from the University of San Francisco.

Ryan Fuller is a policy analyst. His areas of interest include state higher education financing, quantitative data analysis and the use of geographic information systems to highlight higher education issues in California. He has a master's degree in sociology from CSU Sacramento.

Mallory Angeli Newell is a policy analyst. Her research areas include access and equity, workforce issues, and student services. She is pursuing a doctorate in educational leadership and policy at CSU Sacramento. She has a master's degree in political science and a bachelor's degree in communication studies from CSU Chico.

Design and Editing *Kendyce Manguchei* | Photography *courtesy AICCU* and *Phil Hayworth*
The Commission appreciates the cooperation and guidance of Jonathan Brown, Robert E. Oakes, and Danyelle Norman of the Association of Independent California Colleges and Universities in producing this enrollment demand report.