California Community College Transfer Rates:

Policy Implications and a Future Research Agenda

A Quantitative Study

California Senate Office of Research

June 2003

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Dear Colleagues:

This analysis by researchers at California State University, Sacramento, finds that California community colleges with higher percentages of Latino or African-American students have lower rates of student transfers to four-year colleges and universities. It also finds that community colleges with higher shares of female students have lower transfer rates.

Community colleges offer an important route of access to post-secondary education opportunities in California. Yet some student groups are not experiencing the same success as others in pursuing this cost-effective path to the institutions that offer baccalaureate degrees.

Factors other than socioeconomic status or academic preparation apparently account for transfer patterns among students of color, the CSUS researchers concluded, because the study controlled for those factors.

We believe that policy-makers and educators alike must ask why some groups of community college students are not moving in proportionate numbers to four-year institutions – and to the opportunities that bachelor's and perhaps master's degrees would offer them. Answering this question may not be easy; it may require new analysis on community college campuses and perhaps more research. But without answers, the trends likely will grow more troubling, especially as California's Latino population continues to grow beyond its present-day ratio of 32 percent.

Given the close correlation between earnings and education, the wellbeing of our state and its individual residents relies on equal opportunities for all Californians to pursue academic success. We hope you will find this study illuminating and useful for the questions it raises as well as those it answers.

SINCERELY,

JOHN VASCONCELLOS
Chair, Senate Education Committee

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Executive Summary

The mission of most community college systems in the United States has always included the preparation of students for transfer to universities to complete a bachelor's degree. In recent years, researchers, policy-makers, and administrators of higher education throughout the country have expressed concern about the effectiveness of the community college transfer function.

The transfer role of community colleges is especially critical in California, where two-year colleges account for nearly 75 percent of all post-secondary enrollments and are widely recognized as a crucial gateway to higher education for large numbers of low-income students and students of color. While enrollment in California's community colleges has increased by almost 30 percent over the past two decades, there has been a much smaller increase in the number of transfers, and transfer as a share of enrollment has actually declined. Of particular concern in California, rates of transfer to four-year institutions for Latino and African-American community college students are lower than for other students.

This reinforces a need to further analyze, beyond the work done in this report, factors that may be playing a role in hindering transfer to universities by these student groups. Might it be, for example, that they disproportionately attend college part-time and work full-time, that they're more likely to be raising children or that they tend to be older than traditional college populations – all factors associated with lower rates of transfer? Do they face more obstacles in attending universities outside their home communities? Researching what lies behind the trends would be a crucial step in crafting effective solutions (such as, perhaps, making more coursework and on-campus child care available in the evenings). Absent problem-solving answers, the trends pose serious policy implications for the state, especially given the continued rapid growth in the state's Latino population and the importance of a college degree to success in today's increasingly knowledge-based workforce.

Studies indicate that higher transfer rates are associated with:

- Better academic preparation in high school,

- Younger student populations,
- Higher socioeconomic status, and
- A strong focus on academic programs at community colleges.

Purpose and Methods

The purpose of this study is to identify factors that explain observed differences in transfer rates among California's 108 community colleges. Our goal is to identify the factors that policy-makers need to consider in monitoring the transfer function of community colleges.

This purpose is achieved through a cohort-based study of first-time freshmen in community colleges that uses three statistical models to explain differences in transfer rates across colleges. Because there is not full agreement on the "best" way to measure a community college's rate of transfer, we employ in our models two different methods of calculating transfer rates and two different time spans over which to observe transfer behavior. The use of multiple models enables us to address and comment on many of the methodological concerns raised in earlier research.

The models can be summarized as follows:

- Model 1: A broad, "inclusive" transfer rate measured over three years.
- Model 2: The same "inclusive" transfer rate measured over six years.
- Model 3: A more narrowly defined transfer rate for those students demonstrating "transfer intent" measured over six years.

All three models use the same set of explanatory variables and employ regression techniques in order to identify how each variable independently influences college transfer rates.

Findings

Many of our findings confirm the results of other studies: California community colleges with higher transfer rates tend to have younger student populations, students with higher socioeconomic status and better academic preparation, and a greater focus on academic programs. One of the most interesting results of our analysis is the disparity we find in transfer rates across California community colleges based upon the percentage of students who are Asian-American, African-American, or Latino. This racial/ethnic disparity arises even after controlling for differences in socioeconomic status and academic preparation.

We summarize here only the findings on race/ethnicity from Model 3, because we believe that the transfer rate of students with an attendance

pattern indicative of a transfer goal is the more appropriate rate from which to derive policy. The results of Model 3 indicate that community colleges with higher percentages of either Latino or African-American students have lower six-year transfer rates (after controlling for other factors), while colleges that have a larger percentage of Asian-American students have higher transfer rates.

These findings from Model 3, and similar findings discussed in the report from Models 1 and 2, offer compelling evidence of a racial/ethnic disparity in rates of transfer from California's community colleges. Factors other than socioeconomic status or academic preparation apparently account for transfer patterns among students of color, since our statistical method of analysis allowed us to control for these factors. We believe that the lower rate of transfer exhibited by Latinos and African-Americans in California, and the higher rate of transfer of Asian-Americans, deserves further study and the attention of policy-makers. Further analysis may reveal a range of policy solutions that could increase the transfer success of students currently under-represented at California's four-year universities.

Other statistical findings of note include:

- California Community colleges with a higher share of female students tend to have lower transfer rates,
- California community colleges in urban areas tend to have higher transfer rates, and
- California community colleges that have higher shares of graduates getting two-year degrees in general studies or liberal arts/sciences tend to have higher transfer rates.

A Proposed Research Agenda

Our findings raise interesting questions for California's policy-makers and administrators of higher education regarding the ability of community colleges to meet the educational goals of students as currently intended under the state's Master Plan for Higher Education. There is a need for additional research on transfer rates to answer the following questions:

- What accounts for the lower transfer rates of California community colleges with higher concentrations of African-American and Latino students? What policy interventions would be appropriate to reduce racial/ethnic disparities in transfer?
- Are there unique barriers to transfer for female students, or are female students more affected by the barriers to persistence, transfer and graduation than are male students?

- Given the increasing importance of community colleges in preparing and retraining older students for the workplace, what can be done to reduce the disparity in transfer rate between younger and older students?

- What policies and programs do colleges with high transfer rates (after accounting for student and community characteristics) use to achieve these outcomes and how can that information best be shared with other community colleges?

- Are there conflicts among the various missions of California's community colleges that affect transfer rates? Can we reasonably expect all community colleges to be equally successful at each of the various missions?

Such questions are best answered with a combination of quantitative and qualitative analysis; a purely statistical study like ours necessarily has data limitations. But we hope that our results, and the accumulation of evidence from similar studies, can help to set the agenda for follow-up case studies and qualitative analyses that can probe more deeply some of the factors that appear to enhance or impede the transfer function. Effective transfer programs are essential to maintaining California's commitment to access and educational equity, and to producing the educated workforce essential to the state's economic future.

Introduction

Most community college systems in the United States began with a primary mission of promoting transfer education (Dougherty, 1994). But by the latter half of the 20th century, community colleges had evolved into more comprehensive institutions. Community colleges in California and the rest of the United States now offer a mix of vocational, remedial, adult education, and liberal arts programs (Bailey & Averianova, 1999). As the functions of community colleges expanded, the percentage of enrolled students transferring to four-year institutions to pursue bachelor's degrees declined. Until the late 1960s, the majority of community college students in the United States eventually transferred to four-year institutions; recent studies estimate the current national transfer rate to be between 20 and 25 percent (Grubb, 1991; Bryant, 2001).

While there is general agreement that transfer rates in California and the rest of the United States have declined, data limitations and controversy over how best to measure transfer rates make it difficult to precisely define the extent or causes of the decline, or to determine the degree to which the decline represents a problem requiring policy intervention. A natural consequence of the expansion of mission beyond transfer is a reduction in transfer rates. This condition becomes a problem if students face obstacles in meeting their educational goals, if whole classes of the population are under-served or under-achieving, or if society's need for an educated workforce and citizenry goes unfulfilled.

In this report, we examine the factors thought to influence the rate of transfer from California's community colleges to four-year institutions. We use aggregate college-level data in our analysis, and include factors associated with students, community colleges, and the wider community to determine what affects a typical California community college's rate of transfer. In the next section of the paper, we offer information on community colleges and the transfer function, and outline the significance of community college transfer for California's policy-makers and administrators of higher education. In subsequent sections, we describe the data, the analytical methods and the results. Finally, we discuss the significance of the findings and outline the policy implications of our results and the need for additional research.

Background

In the year 2000, two-thirds of all first-time freshmen in California enrolled in a community college.[1] This concentration of students in community colleges is due in part to community colleges' significantly lower student fees. Full-time fees for state residents at a California community college averaged $330 for the 2001-02 academic year, while the respective fees at the California State University and University of California campuses averaged $1,876 and $4,399.[2] In addition, community college campuses are conveniently located near most California residents and, perhaps most importantly, their open enrollment policy makes them accessible to students who do not qualify academically to attend one of the state's four-year universities. California's community colleges offer an affordable and accessible gateway to higher education for large numbers of low-income and historically underrepresented minority students.

Table 1 summarizes the growth in enrollment in California's community colleges over the past two decades, as well as the changes in the number of transfers to public four-year institutions.[3] As shown in this table, both enrollment and transfers have fluctuated over the past two decades. Total enrollment in community colleges has grown by nearly 28 percent,[4] while the traditional college-age population in the state rose only 3.5 percent over the same period.[5]

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[1] California Postsecondary Education Commission, www.cpec.ca.gov (Data & Reports – Student Data).

[2] From California State University chancellor at www.calstate.edu/budget; University of California Office of the President at www.budget.ucop.edu; and California Community Colleges Chancellor's Office at www.cccco.edu/faq_colleges.htm.

[3] Community college students also transfer to private four-year colleges and universities, as well as to public institutions in other states. However, reliable data on the number of transfers to those institutions is not available. According to a recent report by the California Community Colleges Chancellor's Office, titled "Transfer Capacity and Readiness in the California Community Colleges," approximately 20 percent of transfer students enroll at in-state private and out-of-state institutions.

[4] California Postsecondary Education Commission, "Total Enrollment by Segment," accessed at www.cpec.ca.gov (Data & Reports – Student Data).

[5] Calculated from census data on the population for ages 18 to 24. Population figure for 2000 from Department of Finance, *California Statistical Abstract 2000*, Table B-6 "Population and Percent Distribution by Age and by Race and Hispanic Origin, California Census 2000" at www.dof.ca.gov/HTML/FS_DATA/stat-abs/tables/b6.xls. Data for 1980 from U.S. Census Bureau archives at www.eire.census.gov/popest/archives/1980.php.

Table 1
California Community College Enrollment and Transfers to Public 4-Year Institutions 1980 to 2000

Year	Transfers to UC and CSU	Community College Enrollment	Transfers as a Share of Enrollment
1980	35,838	1,221,279	2.9%
1981	34,882	1,266,724	2.8%
1982	34,943	1,304,997	2.7%
1983	35,569	1,250,340	2.8%
1984	35,386	1,175,649	3.0%
1985	34,609	1,176,712	2.9%
1986	32,620	1,225,373	2.7%
1987	33,719	1,264,409	2.7%
1988	35,319	1,326,413	2.7%
1989	34,538	1,406,949	2.5%
1990	36,787	1,394,563	2.6%
1991	36,021	1,374,049	2.6%
1992	36,617	1,366,706	2.7%
1993	38,386	1,243,508	3.1%
1994	39,416	1,218,713	3.2%
1995	40,903	1,203,816	3.4%
1996	41,167	1,305,380	3.2%
1997	38,599	1,314,680	2.9%
1998	37,103	1,331,758	2.8%
1999	39,143	1,400,954	2.8%
2000	39,411	1,558,450	2.5%
Growth 1980 to 2000	9.97%	27.61%	

Source: California Postsecondary Education Commission

As a positive indicator of greater access to higher education in the state, there are greater percentages of traditional college-age students (age 18-24) attending the state's community colleges as well as greater numbers of historically underrepresented minority students, older students, and other nontraditional students. However, while total enrollment in California's community colleges grew by nearly 28 percent, the number of transfers to public four-year institutions rose by only 10 percent. As reflected in the last column of Table 1, the number of transfers as a share of enrollment has fluctuated in the last two decades,[6] and has declined from a high of 3.4 percent in 1995. Is this the result of changes in the mission of California's community colleges or in the educational goals of the students now enrolling, or are there other factors that policy-

[6] As described in a later section, the number of transfers as a share of total enrollment does not represent a valid "transfer rate." A rate calculated in this way would assume that current-year transfers are drawn from current-year enrollment; it takes most students more than one year to complete their transfer curriculum.

makers need to consider? These are some of the issues addressed in this report.

Why Should Californians Be Interested in Community College Transfers?

While California's total population is expected to increase by 17 percent between 2000 and 2010,[7] enrollment in California's public institutions of higher education is projected to increase by more than 28 percent over the same period.[8] This enrollment growth is presenting a formidable challenge to the state's policy-makers and higher education leaders.

The significant enrollment growth will occur in the context of increasing diversity in the student population. Table 2 summarizes the distributions of college enrollments and transfers by race/ethnicity in California, and the change in these distributions over the past two decades. Reflecting the growing diversity of California's population, white students now account for a smaller share of both community college enrollments and transfers. The percentages of community college students who are Asian-American or Latino have more than doubled in the past 20 years, while the share that is African-American has remained fairly constant. In addition, African-American and Latino students represent a substantially greater share of enrollment in California's community colleges than in its four-year institutions. White and Asian-American students are over-represented in the number of transfers as compared to their share of community college enrollment, while African-American and Latino students are underrepresented.

Table 2
Distribution of Enrollment and Transfers by Race/Ethnicity In California

Race/ Ethnicity	Share of Community College Enrollment			Share of Transfers to UC/CSU			Share of Enrollment in 4-Year Institutions		
	1980	1990	2000	1980	1990	2000	1980	1990	2000
White	70%	60%	45%	72%	63%	47%	75%	65%	50%
African-American	9%	8%	8%	6%	6%	5%	6%	5%	6%
Latino	11%	17%	28%	9%	13%	21%	7%	11%	18%
Asian-American	6%	12%	16%	8%	14%	20%	9%	16%	22%
Other	4%	3%	3%	5%	4%	6%	2%	3%	3%
Total *	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: California Postsecondary Education Commission
* Excludes "no response" and "nonresident alien" categories

[7] California Department of Finance, "Interim County Population Projections: Estimated July 1, 2000, and Projections for 2005, 2010, 2015 and 2020," accessed at www.dof.ca.gov/HTML/DEMOGRAP/P1.doc.

[8] California Department of Finance, "California Public Postsecondary Enrollment Projections: 2001 Series," accessed on July 18, 2002, at www.dof.ca.gov/HTML/DEMOGRAP/Post2nd.htm.

The continued growth in the traditional college-age population expected to occur in California, along with the increasing demand for higher education opportunities and the higher costs of providing that education, suggests that California is likely to increase its reliance on community colleges as the gateway to a baccalaureate degree (Ehrenberg & Smith, 2002). Using community colleges as the point of access to the baccalaureate reduces the cost per degree for both students and the state, and may help to reduce the disparities in obtaining bachelor's degrees for low-income and historically underrepresented minority students as compared to other students (Wellman, 2002). But as demonstrated in Table 2, California's student population is growing dramatically more diverse, with certain ethnic populations being over-represented in community colleges and underrepresented among transfers to the state's four-year universities.

The transfer function of community colleges has the potential to mitigate disparities in educational attainment. However, the issue of transfer cannot be considered apart from other higher education policy concerns. For example, capacity constraints at California's four-year institutions are likely to impede the community colleges' ability to increase transfers (California Community Colleges Chancellor's Office, 2002). Statutory requirements for the ratio of upper-to-lower division students, the increasing designation of particular majors and campuses as "full" or "impacted" by crowding, and any resulting increase in academic standards for admission may significantly restrict opportunities for students who are otherwise transfer-prepared. These problems will be particularly acute for underrepresented students who have faced the greatest academic challenges and who may be less competitive for some popular programs.

A vast amount of research has demonstrated the growing importance of earning a baccalaureate degree to achieving personal economic mobility (Grubb, 1999). Research has also shown that the likelihood of attaining a four-year university degree diminishes when students begin their studies in a community college, even when controlling for academic preparation and socioeconomic factors (Grubb, 1991; Dougherty, 1992; Pascarella & Terenzini, 1991). Promoting the transfer of community college students to four-year colleges and universities must therefore continue to be an important public policy goal in California. As noted by Wellman (2002, p. 3), "…the 2/4 community college-baccalaureate transfer function is one of the most important state policy issues in higher education, because its success (or failure) is central to many dimensions of state higher education performance, including access, equity, affordability, cost-effectiveness, degree productivity, and quality."

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[9] California Department of Finance, "California Public Postsecondary Enrollment Projections: 2001 Series," www.dof.ca.gov/HTML/DEMOGRAP/Post2nd.htm.

Transfer rates have declined in recent decades with rates lowest among the growing segments of the population already underrepresented in higher education. If current transfer rates continue, or continue to decline, California may lack all the educated residents it needs to fill the workforce requirements of an information-based economy and to ensure the state's economic health. A better understanding of the factors affecting transfer rates will serve to help define the transfer "problem" so that more effective policy and program solutions can be crafted.

California's System of Community Colleges and the Transfer Function

Along with state policy-makers, community college leaders have a stake in the transfer function. The California Master Plan for Higher Education places substantial importance on this function of the community colleges (California Postsecondary Education Commission, 2002). It envisions these two-year colleges as "second-chance" institutions, offering access to higher education beyond the first two years of college, to students who might not otherwise be able to attend for reasons of cost, insufficient academic preparation, or other circumstances. Declines in transfer rates and disparities in transfer among racial, ethnic and socioeconomic groups work to undermine the California Master Plan's claim of offering equal access. The "access" provided through an open enrollment policy is diminished if it does not effectively offer an alternative route to the baccalaureate for those who aspire to that degree.

Despite the broadening of the community college mission and the increasing enrollment of nontraditional students, a large number of California's community college students still aspire to a bachelor's degree.[10] Some of these students may not actually have the commitment to follow through on their stated aspirations, or may have unrealistic expectations about the requirements or their ability to fulfill them. Conversely, students who do not initially indicate intent to transfer may alter their goals over time. In fact, community colleges can have a profound impact on social mobility to the extent they expose students to the idea of degree attainment. If community colleges are to respond to both the initial and emergent goals of their students, then a healthy transfer function is essential.

Finally, a strong transfer function is necessary to maintain the position of community colleges as academic institutions. With the proliferation of adult education, community service, vocational training, and economic development activities in recent decades, it has become more difficult for community colleges to sustain their original function as a provider of the

[10] Based upon data used later in our analysis, on average for all campuses, nearly 38 percent of all freshmen who entered a California community college in the fall of 1996 or 1997 stated that they desired ultimately to transfer to a four-year institution to complete a bachelor's degree.

first two years of baccalaureate education. The "ability of students to transfer to four-year colleges and then compete as equals against students who begin in four-year colleges is one test of the acceptability of community colleges within higher education" (Grubb, 1991, p. 195).

Defining and Measuring the Transfer Rate

Efforts to understand the issue of community college transfer are complicated by the controversy surrounding the best way to define and measure transfer rates. Table 1 presented data on transfers as a share of enrollment in California community colleges. Most would argue that the ratio of the number of transfers in a particular year to that year's total enrollment does not accurately capture how well a college is fulfilling its transfer function. Because it takes time for an entering group of students to fulfill necessary transfer requirements, it is necessary to follow a cohort of students over a number of years to observe the share that eventually transfers. Despite this agreement on the need for cohort analysis, researchers have struggled to find a uniform measure of transfer activity that could be used to monitor the health of the transfer function of community colleges (Wellman, 2002).

Most discussions of the transfer function refer to the traditional vertical transfer from two-year to four-year institutions in pursuit of a bachelor's degree. However, other transfer patterns have emerged, including transfer to other community colleges or to private sub-baccalaureate institutions, and transfer of community college courses taken by students still attending high school or by those already enrolled in four-year institutions (Townsend, 2001). The National Center for Education Statistics (NCES, 1998) estimates that, among students who began their studies in a community college, 22 percent transferred to a four-year institution, 15 percent to another community college, and 5 percent to a less-than-two-year institution. In addition, Townsend and Dever (1999) report that 13 percent of two-year college students are "reverse transfers," or students who began their education at a four-year institution but later transferred to a community college. Clearly, the transfer activities of community colleges are more complex and varied than those laid out in California's Master Plan.

Even if we restrict our interest to the issue of transfer from community colleges to four-year institutions, there is substantial debate over how to appropriately define the transfer rate, resulting from disagreement over which students to include in the "base." The calculation of a transfer rate would seem to be relatively straightforward: the number of students who transfer to a four-year institution divided by the number of potential transfer students. However, there are many possible specifications of this denominator. For example, should it include: (1) all entering students, (2) only students indicating an intent to transfer, (3) only students enrolled in a degree-granting program, (4) students completing a

specified minimum number of course credits, or (5) a combination of two or more of these possibilities?

Previous studies have noted great disparities in transfer rates based upon how the denominator is defined. Bradburn and Hurst (2001) reported transfer rates ranging from 25 percent to 52 percent depending on how narrowly they defined "potential transfer students." In a recent report to the state Legislature, the California Community Colleges Chancellor's Office (2002) calculated transfer rates using a denominator that included first-time students in a cohort who (1) attempted transfer-level math or English and (2) completed at least 12 units in the California Community Colleges system. The method produced a statewide transfer rate of 33.7 percent, as compared to a rate of 14.6 percent when including all first-time students in the base. The Chancellor's Office contends that its definition of "intent to transfer" screens out students attending for brief remediation, English language instruction, or other non-degree pursuits, and allows for an accurate measure of "value-added" by the community college system. The method may, however, overestimate transfer rates by including only those students who are well on their way to satisfying transfer requirements, and excluding students who might have aspired to a bachelor's degree but who needed significant remediation before taking transfer-level coursework. The current study uses both the Chancellor's Office definition of transfer rate and a more inclusive method of calculating rates, and draws conclusions about the effects of that methodological choice.

It should be noted that useful conclusions can be drawn without coming to agreement about the best way to define transfer rate. A change in the transfer rate over time, using any one consistent definition, is useful information, as are disparities across sub-populations. In fact, whether the absolute rate is in the 20 percent or 40 percent range is not the important point. What is important is how transfer outcomes are changing over time and how they differ across sub-groups of students.

Transfer Rates Have Declined

Regardless of how transfer rates are defined, there is evidence to support the notion that the rates are lower now than they were in the 1960s and 1970s – that is, before the dramatic expansion of the community college mission and the significant increase in enrollment of nontraditional students. In one of the most widely cited longitudinal studies of the change in transfer rates, Grubb (1991) found that the rate of transfer to four-year colleges was lower for the cohort of students entering college in 1980 as compared to the rate for students entering in 1972. Grubb calculated the change in transfer rates using several different definitions of the "base" or denominator, and found substantial declines regardless of the specification. Increases in enrollment of women, minorities, lower-income students, and "experimenters" (those attending only for a few courses) did not fully explain the decline in transfer rates. While the

declines were more substantial for those groups of students, transfer rates decreased for every group, even those most likely to transfer.

More recent research offers little to suggest that transfer rates have increased since the mid-1980s. The Transfer Assembly Project at the University of California at Los Angeles has been tracking community college transfer rates in 18 states since 1989. Its estimates of the national transfer rate over this period fluctuate in the range of 22 to 25 percent (Wellman, 2002). Based on a review of its own data, the California Postsecondary Education Commission (CPEC, 2002) recently concluded that, while enrollment in the state's community colleges has grown by nearly a quarter-million students since 1989, the number of students who transfer remains at essentially the same level. This result occurred despite a significant state investment in transfer programs and services. As Grubb's (1991) research suggests, these lower rates of transfer are not entirely explained by changes in the student population, but must be associated with institutional factors as well.

Research on Transfer Rate Differences

Many studies have found significant disparities in transfer rates among community colleges, both among states and within the same state. For example, colleges included in the Transfer Assembly Project in 1993 had transfer rates ranging from 8 percent to more than 60 percent (Cohen & Brawer, 1996). The Chancellor's Office (2002) analysis found transfer rates in California's community colleges varying from 5 percent to 48 percent for the cohort of students beginning their studies in 1993.

Researchers have attempted to identify both institutional and student factors associated with higher transfer rates. Cuseo (1998) reviewed the literature on transfer, and found that transfer rates are higher in colleges that have a more "academic" curriculum, higher faculty involvement in transfer issues, more effective institutional research, better articulation with four-year institutions, and substantial support and advising services for students. Other research points to the importance of a community college exhibiting a "transfer ethos," where the goal of transfer is given high priority among the faculty, staff and administration (Cohen & Brawer, 1996). Case studies of community colleges with high transfer rates have revealed that, while each college is unique in the characteristics of its student body, its programs, and its educational ideology, the "culture" of each institution regarding transfer issues generally matches well with its student population (Shaw & London, 1995; 2001). Focusing on student characteristics related to transfer, Grubb (1991) found that transfer rates are higher for males, Caucasians, students of high socioeconomic status, and those scoring higher on high school achievement tests and completing an academic track in high school.

Much of the research has involved case studies or other qualitative analyses of community colleges with high or low transfer rates. However, several studies have used quantitative modeling methods to study the factors associated with transfer success – the approach that we use in this research (Hurst & Bradburn, 2001; Lee & Frank, 1990; Bailey & Weininger, 2002; Blau, 1999; California Community Colleges Chancellor's Office, 2002).

While the methods and data varied in these studies, several factors were consistently found to increase transfer rates, including:

- Younger student populations,
- Higher socioeconomic status, and
- Better academic preparation in high school.

Other factors found to increase transfer rates in one (or more) of the studies include:

- Students having higher expectations for their educational attainment,
- Fewer commitments outside of pursuing education (work, child care, etc.),
- Receipt of financial aid,
- Citizenship status, and
- An academic, as opposed to vocational, emphasis or orientation in the community college.

Effects of race/ethnicity on transfer rates

Race and ethnicity were found to exert an independent effect on transfer rates in some models, but not in others. Lee and Frank (1990) as well as Blau (1999) concluded that racial and ethnic minority students have lower transfer rates, even after controlling for other factors. The research conducted by Bailey and Weininger (2002) indicated that African-American and Latino students did not have significantly lower rates of transfer than whites after controlling for other socioeconomic factors, although they were less likely to complete a bachelor's degree after transfer.

The difficulty in pinpointing the effect of race and ethnicity on transfer rates in quantitative models, holding other factors constant, is very likely due to the high degree of correlation between race/ethnicity and other factors such as socioeconomic status and, in particular, academic preparation. Research conducted by the U.S. Department of Education (DOE) has found that the most significant predictor of persistence through the baccalaureate degree for all students, including those beginning their postsecondary studies in community colleges, is the degree of academic rigor of their high school curriculum (Adelman, 1999). This research demonstrated that African-American and Latino students were significantly less likely to have completed rigorous high

school curricula. Further research showed that differences in college outcome by race/ethnicity were not significant after controlling for academic preparation and other factors (Horn & Kojaku, 2001).

The regression model developed as part of the Chancellor's Office (2002) report on transfer did not include race/ethnicity as a factor. The model was mandated and designed for administrative purposes to index the effects of a specified set of variables on transfer rates, and to identify persistently low-performing colleges in terms of their transfer function. The model includes as explanatory factors students' academic preparedness, the proportion of the student population that is under age 25, the proximity of the college to a California State University (CSU) campus, and the per-capita income and unemployment rate in the county where the college is located. The model was primarily developed to predict an "expected" transfer rate for each community college, to allow for a comparison between a college's actual transfer rate and the rate that would be expected given the characteristics that are controlled for in the regression analysis. This technique can be used to identify both high- and low-performing community colleges in regard to their transfer function. However, the predicted transfer rates are highly dependent on choices made about which explanatory variables to include in the model. The next section of this report describes models for analyzing transfer rates in California's community colleges that attempt to incorporate additional causal factors shown in previous studies to exert a measurable influence on transfer rates.

In summary, previous research on the factors that lead to higher transfer rates have pointed to the importance of counseling and advising services at the community college, a comprehensive academic curriculum, good articulation with four-year institutions, administrator and faculty commitment to transfer, and an institutional culture well-suited to the needs of the student body. Barriers to successful transfer include lack of academic preparation in high school and insufficient personal financial resources. Unfortunately, the factors that lower the likelihood of transfer are more likely to be observed among low-income and underrepresented-minority community college students. This is significant for California's policy-makers because Latino students, in particular, represent an increasing share of enrollment in the state's community colleges.

Empirical Analysis

As described previously, several studies have attempted to model the impact of various factors on transfer rates, including the recent analysis conducted by the California Community Colleges Chancellor's Office (2002). While the results of these studies provide conclusive evidence of the importance of academic preparation and socioeconomic status to transfer rates, the evidence is mixed on a number of other factors. Based on our review of other studies, we develop several regression models that use explanatory variables representing student, college and community characteristics expected to account for differences in transfer rates. We use two alternate definitions of the transfer rate, and observe transfer behavior over two different time spans.

Our goal is to identify the factors that policy-makers should consider in monitoring the transfer function of community colleges in California. The statistical models we employ include several of the same variables used in the Chancellor's Office (2002) model. Based on our review of the literature on transfer, we included additional explanatory factors expected to have an impact on the transfer rate. In particular, we were interested in including measures of race/ethnicity in an effort to determine if this factor has an independent influence on transfer rates in California's community colleges. Any differences in transfer rates by race/ethnicity, after controlling for other important factors, would have important implications for our understanding of barriers to higher education and policy solutions to reduce those barriers.

In one model, we use the transfer rate definition developed by the Chancellor's Office and observe the transfer behavior of cohorts of first-time freshmen at all California community colleges over a period of six years.[11] This method calculates transfer as a share of students in a cohort who (1) completed at least 12 units and (2) enrolled in either transfer-level math or English. In two other models, we used a more inclusive definition that calculates transfer as a share of all students in a first-time freshman cohort, and observed transfer rates over three-year and six-year periods. In all cases, the data used were produced by the Chancellor's Office as part of its First-Time-Freshman (FTF) cohort study. For the three-year model, we used data for the cohorts of students

[11] In a few cases, data for a specific college were not available.

beginning their studies in 1996 and 1997; the cohorts beginning their studies in 1994 and 1995 were used for the six-year models.

We included in our models the same explanatory variables as used in the chancellor's (2002) study: the proportion of the cohort of students under age 25, the proximity of the college to the nearest CSU campus, the unemployment rate in the college's county, and a measure of academic preparedness. In addition, we included student and college characteristics from the FTF data, along with community characteristics gathered from the California Departments of Finance and Education. Specifically, we included data on students' gender, race/ethnicity[12] and citizenship status. These are included to pick up differences these variables can make (possibly through expectations, culture, background, etc.) on observed transfer rates after controlling for other factors.

Because the denominator in the more inclusive transfer rate calculation includes all first-time freshmen regardless of educational goal, our models account for differences in "intent to transfer" through a variable measuring the percentage of students who indicated a goal to transfer upon initial entry to community college.[13] Furthermore, we attempt to control for differences in the focus of different community colleges by including the percentage of a college's graduates who received a two-year degree in general studies or in the liberal arts/sciences. We expect that colleges with a greater percentage of students graduating in these degree programs are more likely to be geared through their "mission" to attracting and producing transfer students.

Community characteristics in the model include the population density and measures of the social and economic characteristics of the county where the college is located. We used a log-linear form of regression analysis and conducted tests for multicollinearity and other statistical considerations in using this form of analysis. A more detailed description of the data and our analytical techniques can be found in the Appendix.

Factors Influencing Transfer Rates

For readers familiar with statistical techniques, the results of the three regression analyses are displayed in Tables 3, 4, and 5 in the Appendix and described there in more detail. The results of all three analyses indicate that academic preparedness exerted the greatest positive influence on transfer rates; higher levels of academic preparedness among a college's students lead to higher transfer rates. The share of students under age 25 exerted nearly as strong a positive influence and

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12 A small but growing ratio of students has declined to identify their race or ethnicity. In the data we used, the percentage of students not indicating their race or ethnicity was 5.7 in 1997, 5.3 in 1996, 4.3 in 1995, and 3.8 in 1994.

13 The survey that collects this data is conducted upon students' initial entry into community college, before they have met with a counselor. The colleges define this as an "uninformed" goal.

confirmed the results of other studies showing that students in this age group are more likely to transfer. A modest positive impact is also exerted in all three models by the share of Asian-American students in the cohort; a higher share of Asian-Americans in a college tends to increase the college's transfer rates. As described next, the effects of the other variables differed somewhat in the three models, demonstrating the impact of methodological choices about the transfer rate calculation and the time span over which transfer behavior is observed.

Differences by time span

Models 1 and 2 used a broad definition of "potential transfer students." We calculated this more "inclusive" transfer rate for each college as the number of transfers divided by the total number of students in the cohort. The same explanatory variables were used in each model. Model 1 observes the impact of the various factors on transfer rates over a three-year period. In addition to the effects summarized above, this model reveals a negative influence on transfer rate related to the share of Latinos in the student cohort; that is, the higher the share of students who are Latino, the lower the college's transfer rate. Higher transfer rates are associated with greater shares of students in a cohort with temporary U.S. residency status and with a higher unemployment rate in the county where the college is located.

Model 2 looks at the impact of the various factors on the "inclusive" transfer rates over a six-year period. The negative influence on transfer rate associated with the share of Latinos in the student cohort is no longer evident in this model. A negative influence on transfer rate is exerted by the share of high school students in the county eligible for free or reduced-price meals, the variable representing the socioeconomic status of local families. Over a six-year period, the share of students in the cohort that indicated a goal of transfer has a positive influence on transfer rates, a result not seen over three years. Greater population density in the county in which the college is located, a measure of the "urban" nature of the college's location, is positively related to transfer rates.

Differences by transfer rate definition

The third model also analyzes transfer behavior over a six-year period and uses the same 1994 and 1995 cohorts of students as in Model 2. However, Model 3 uses as its dependent variable the transfer rate calculation developed by the Chancellor's Office that restricts the pool of "potential transfer students" to those taking at least 12 units of coursework and enrolling in transfer-level math or English. This model reveals negative influences on transfer rates of increasing shares of students in the cohort who are Latino, African-American or female. These relationships were not apparent in the six-year model using the more "inclusive" transfer rate calculation. In addition, the model demonstrates

a positive influence on transfer rates related to the share of a college's graduates earning two-year degrees in general studies or liberal arts/sciences. The size of the student cohort and the population density of the surrounding county also exert positive influences on transfer rate in this model.

We save our discussion of the policy implications of these findings for the last section of this report. Next, we describe the method and results for forecasting an expected transfer rate for each California community college.

Predicting Transfer Rates

Using the results of Model 3, we predict a transfer rate for each college's 1994 and 1995 cohorts and compare it to the actual rate of transfer over six years achieved by the colleges. The results of this analysis are shown in Table 6 in the Appendix. After controlling for all factors included in the regression model, the differences between the predicted transfer rates and the actual rates allow us to examine how each college is performing on the transfer function in comparison to how it might be expected to do given factors, out of the college's control, that influence transfer.

As an example of how the analysis in Table 6 might be used to draw conclusions about high- and low-performing community colleges in regards to transfer, we use a specific percentage difference between the actual and predicted transfer rates for both cohorts as a cut-off. Using the arbitrarily chosen value of 25 percent occurring in both the 1994 and 1995 cohorts, six colleges could be labeled as high-performing (i.e., having higher-than-predicted transfer rates). In alphabetical order, these include Cañada, Foothill, Los Angeles Southwest, Ohlone, Reedley, and Ventura. Applying a similar minus-25 percent in both cohorts to identify low-performing transfer colleges produces a list of six colleges that include Compton, Cuyamaca, Grossmont, Marin, Palo Verde and Santa Monica.

There is some overlap between this list of "low-performers" and the ones mentioned in the Chancellor's Office (2002) study. The regression model used to generate these predicted transfer rates (Model 3) uses the same transfer rate and includes the same explanatory variables used in the Chancellor's Office model. However, our model includes additional explanatory variables to account for other factors known to influence transfer rates. We include these additional variables because calculations of predicted transfer rates are highly dependent on which explanatory variables are included in the model.[14] When using regression models to

[14] Using Model 1 or Model 2 to calculate predicted rates would result in somewhat different lists of "high" and "low" performance colleges because the method of calculating transfer rates was different for those models (and Model 1 only looked at transfer over three years rather than six).

evaluate the "performance" of particular colleges on the transfer function, it is important to include as explanatory variables all factors known to affect the rate at which students transfer. It is also important to come to some consensus about how to define transfer rate or, barring consensus, at least to use the same rate definition consistently to allow for valid comparisons over time.

Conclusions and Policy Implications

The success of the community college transfer function is critical to maintaining California's commitments to access and equity in public higher education. Underrepresented minority students account for an increasingly large share of the enrollment in California's community colleges; a viable transfer function is essential to reducing the current disparities in educational attainment for low-income and minority students as California's population grows ever more diverse. Failure to reduce the disparity may leave California without the educated workforce necessary to maintain a healthy economy.

Previous research has described the important influence of academic preparation, socioeconomic status and comprehensive transfer programs on the transfer rates of community colleges. Researchers have identified several other factors that may have an independent influence on transfer rates, including the race or ethnicity of the colleges' student population. We conducted the current study in an effort to better identify the factors that are influencing transfer rates in California's community colleges, factors that are important for policy-makers to consider in monitoring the colleges' transfer function. We developed several models to test the value of different methodological choices in measuring and monitoring the transfer function of community colleges.

We calculated transfer rates using two methodologies; the more "inclusive" method measures transfer as a share of all students in the cohort, while the more restrictive method measures transfer as a share of students indicating "intent to transfer" according to the definition developed by the Chancellor's Office (2002). We estimated the impact of relevant student, college and community factors on the calculated transfer rates in three regression models. Below we outline some policy implications of our results, and make recommendations for additional research that could help policy-makers and administrators improve the transfer function of California's community colleges.

Characteristics of the Colleges' Student Population

Age

The results of our regression analyses confirm other research indicating that colleges with younger student populations have higher transfer rates, reflecting the lesser likelihood of transfer for older, nontraditional students who are likely to have significant work and family responsibilities. This result emphasizes the importance of designing programs and supportive services that accommodate the needs of older students, both within community colleges and in the senior institutions, as community college transfer represents the primary means of access to undergraduate education for older students.

Recommended research questions:

> *What can be done to reduce the disparity in transfer rates between younger and older students, given the increasing importance of community colleges in preparing and re-training older students for the workplace? Are there specific programs, supportive services, teaching methods, course schedules, financial aid programs, etc., that seem to increase the rate of successful transfer for older students?*

Gender

The results of Model 3 also show that, on average, colleges with higher shares of female students have lower rates of transfer. Other researchers have also found this gender effect in examining transfer rates (Grubb, 1991). While some recent press reports have suggested that the gender gap in college attendance has disappeared, pointing out that women outnumber men on many university campuses (Garofoli, 2002), our results indicate that there may still be reason for concern about the transfer success of women beginning their studies in community colleges. The circumstances that can impede baccalaureate attainment for any community college student (i.e., part-time attendance, lack of financial resources, work/family obligations, etc.) may affect female students even more strongly than males. For example, recent research by the U.S. Department of Education demonstrated that female undergraduates are more likely than their male counterparts to have children under their care, one risk factor for failing to persist through the baccalaureate (Horn, Peter, & Rooney, 2002).

Recommended research questions:

> *Are there unique barriers to transfer for female students, or are female students more affected by the barriers to persistence, transfer and graduation than are male students? Are there specific programs, supportive services, course schedules, financial aid programs, etc., that seem to increase the rate of successful transfer for female students?*

Race/Ethnicity

Perhaps the most interesting results of the analyses relate to the disparity in transfer rates according to the share of historically underrepresented minority students in the colleges' student population. According to Model 1, colleges with higher percentages of Latino students have lower transfer rates over three years, even after controlling for academic preparation, socioeconomic status, and the other variables in the model. Model 2, which estimated the same "inclusive" transfer rates over six-year cohorts, did not show this disparity. This suggests that, given more time, Latino students transfer at the same rate as other students. Other researchers have noted that more Latino students attend college part-time and work more hours while attending college (Fry, 2002), which would result in a longer time to successfully transfer. Taking a longer time to achieve the same rate of transfer could still be reason for concern, however. Students who take longer to complete college incur greater costs, both for themselves and for the state, and they forestall the economic benefits of attaining a baccalaureate degree.

The results of Model 3, however, suggest that there are lasting differences in colleges' transfer rates related to the racial/ethnic composition of their student population. This model also used a six-year time frame, but measured the more restrictive transfer rates that include only students demonstrating "intent to transfer." The results show that colleges with higher shares of either Latino or African-American students have lower transfer rates. This finding makes a stronger case that race/ethnicity has independent effects that are important to acknowledge, understand and monitor.

Factors other than socioeconomic status or academic preparation are involved in the transfer patterns among these students, since we accounted for those factors in the analysis. Our review of previous research suggests that these factors could include part-time attendance, work and family obligations, and access to information regarding college and transfer. Research demonstrates that persistence and completion rates are higher for students who begin college immediately after high school, enroll full-time, and attend continuously than for students with more nontraditional attendance patterns (Berkner, He, Cataldi & Knepper, 2002). Latino and African-American students are more likely to have nontraditional enrollment patterns, including delayed entry, part-time attendance, and periods of "stopping out" or taking time off from college (Lee & Frank, 1990; Fry, 2002). This is particularly true for students who begin their studies in community colleges. In addition, underrepresented minority students are more likely to be the first in their families to attend college, and to therefore have less access to the knowledge and advice of parents and other family members about the college process in general and transfer in particular (Striplin, 1999; Schwartz, 2001; Ceja, 2001).

Cultural factors may play a role in transfer disparities, including both organizational culture and social culture. The organizational culture within colleges and universities could introduce barriers ranging from blatant discrimination to subtle messages that dissuade students from the successful pursuit of a transfer program (Nevarez, 2001; Solorzano, Ceja, & Yosso, 2001). Research suggests that having an effective "transfer culture" in a community college is important to facilitate students' pursuit of the baccalaureate, particularly for low-income and underrepresented students (Shaw & London, 2001). There is a need, however, to document the specific components of a successful "transfer culture" and to disseminate that information to community college leaders.

The cultural traditions of particular ethnic populations, even when they reflect a positive focus on family and community, could reduce the likelihood of transfer. For example, research suggests that Latino parents place a high value on education for their children (Ceja, 2001; Gandara, 1995; Perez, 1999; Arzubiaga, Ceja, & Artiles, 2000). At the same time, Latino culture often places more value on the welfare of the family than on individual aspirations, and encourages Latino youth to remain close to home and family (Ginorio & Huston, 2001). The desire or need of Latino students to stay within a particular geographic area and to contribute economically to the welfare of their families may make it more difficult for them to transfer to four-year universities (Rendon, Justiz & Resta, 1988), which may not be located nearby or may not offer programs with flexible class schedules. A recent study on the educational outcomes of Latino students found that, while Latinos enroll in some form of postsecondary education at rates similar to other students, they are less likely to persist through the baccalaureate (Fry, 2002). Fry's research, as well as our own, suggests that it is precisely the lower rate of transfer that is impeding success and confirms the importance of efforts to identify barriers to transfer.

Clearly, further research could help policy-makers to better understand racial/ethnic disparities in transfer, and to craft effective solutions to minimize barriers to transfer for historically underrepresented minority students.[15] For example, a few community colleges across the state are implementing programs that make upper-division courses available on community college campuses through cooperative agreements with four-year universities, making the baccalaureate more available to students who are limited to a specific geographical area either by choice or by circumstance ("North Aims Higher," 2002). In addition, a number of community colleges have programs offering mentoring, academic and career counseling, and peer support to increase the retention, graduation and transfer rates of underrepresented minority students. Some institutional research suggests that these programs are effective (see, for

[15] Policy solutions must, of course, be designed within the parameters of state laws and constitutional provisions, including Proposition 209 of 1996.

example, Kangas, 1994), but no comprehensive review of these programs has been conducted.

Financial aid policies should also be examined for their potential to increase transfer among underrepresented students. While low-income students at community colleges can obtain fee waivers, few resources are available to help these students with living expenses. Recent legislation made Cal Grants an entitlement for every income-eligible student meeting the minimum academic requirements. However, the entitlement is only available to recent high school graduates, and excludes older, nontraditional students who must compete for a limited number of Cal Grants allocated specifically for this group of students. Research has demonstrated that both Latino and African-American students more often delay college attendance and attend part-time, so that their attendance stretches beyond the traditional college age of 18 to 24 (Fry, 2002). The restriction of Cal Grant entitlements for community college transfer students to those under age 24 may miss the opportunity to use financial aid policy to increase transfer among underrepresented students.

Underrepresented students in general, and Latino students in particular, are increasingly dominant in California's schools and colleges; the California Department of Finance estimates that Latinos will account for 35 percent of the state's population by the year 2010.[16] Considering the large and growing Latino population in California, it is critical to acknowledge and understand any barriers to higher education faced by these students, and to find effective ways to support the educational goals of Latino students and their families.

Recommended research questions:

> *What accounts for the lower transfer rates at California community colleges with higher concentrations of African-American and Latino students? What policy interventions or administrative practices would be appropriate to reduce the barriers to transfer for underrepresented students? Are current programs designed to support the educational goals of underrepresented students effective in increasing the rate of transfer and baccalaureate completion? Are transfer and completion rates higher in community colleges that offer on-site access to the baccalaureate? What characterizes a supportive college "transfer culture" for Latino and other underrepresented students?*

In summary, our research demonstrates that community college transfer rates are affected by certain characteristics of the student population, including age, gender and race/ethnicity. It is important

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[16] California Department of Finance, "County Population Projections with Age, Sex and Race/Ethnic Detail: July 1, 1990-2040 in 10-Year Increments," accessed at www.dof.ca.gov/HTML/DEMOGRAP/Proj_age.htm.

to remember that our analyses involved college-level, rather than student-level, data. The results indicate the effect on a college's transfer rate of having greater shares of students with these characteristics. Regression modeling using student-level data for California community colleges would be appropriate to further explore the relationship between individual characteristics and the likelihood of transfer. Ideally, the models would incorporate other factors that we were unable to analyze in our models, including part-time/full-time status, hours of work, parents' level of education, and other factors shown in previous research to influence educational outcomes.

College Mission

As expected based on previous research, the results of Model 3 demonstrate that colleges that produce a greater share of graduates in general studies or liberal arts/sciences have higher rates of transferring students to four-year institutions. This may reflect a greater emphasis by these colleges on the transfer mission, and/or a greater ability to attract students with serious transfer intentions. It may indicate that colleges placing significant effort and resources into alternative missions such as vocational education and economic development have more difficulty achieving high transfer rates. Additional research is warranted into the potential conflicts among the many missions of California's community colleges, and the impact of those conflicts on the colleges' ability to maintain a strong transfer function.

Recommended research questions:

> *Are there conflicts among the various missions of California's community colleges that affect transfer rates? Can we reasonably expect all community colleges to be equally successful at each of the various missions? Are there alternative organizational, programmatic or governance structures that might yield better results for the transfer mission and/or for other missions of the community colleges?*

Transfer Program Efforts

The models developed in this report include variables considered exogenous to the colleges; that is, factors over which the colleges have little or no control but which can affect the success of their transfer function.[17] The models do not include any measures of the efforts colleges are making specific to the transfer function. Examples of such

[17] In a few cases, it could be argued that the colleges have some influence over a variable included in our model. For example, a college's program offerings and class scheduling could affect the share of their students that were under age 25 in that these factors may make the college more or less attractive to older students.

measures might include the amount of resources invested in transfer efforts, whether or not a college has a dedicated transfer center, the number of hours the center is open to provide services to students, and the degree to which promoting transfer is seen as a campus-wide responsibility. If available, college-level data on these issues could be included in a model to help identify effective transfer efforts; this approach could be particularly useful if the research included some follow-up qualitative analysis to better describe the more successful transfer programs. Qualitative analysis would be particularly valuable for examining the characteristics of a supportive "transfer culture" within community colleges.

The variables included in our model explained approximately half of the variance in community college transfer rates. That suggests that policies and practices at community colleges have a significant impact on the rate at which their students transfer to four-year universities. This is a hopeful thought. If the characteristics of successful institutional practices can be systematically identified and shared, improvements in transfer outcomes should be forthcoming.

Recommended research questions:

> *What policies and practices do colleges with high transfer rates use to achieve these outcomes and how can that information best be shared with other community colleges? Can the characteristics of a more supportive and successful "transfer culture" be identified and replicated in other colleges?*

Identifying High- and Low-Performers

We also used our regression results to calculate predicted transfer rates for each community college, or the rate that could be expected given the characteristics of the students, the college and the community. We offer the analysis in Table 6 as a means of demonstrating the potential value of predicted transfer rates for policy-makers to monitor the transfer function of community colleges once consensus is reached on definitions and methodology. Without such consensus, one could draw widely different conclusions about which colleges have low-performing transfer functions.

We intend this analysis to encourage policy-makers and the Chancellor's Office to continue their efforts to develop a good method for measuring and monitoring the transfer activity of community colleges. The goal of a predictive model is not to excuse colleges from higher performance on the transfer function, or to "set the bar lower" for particular colleges based on the social and economic characteristics of their student populations. To the contrary, identifying high-performing colleges, particularly those serving underrepresented student populations, allows for a more in-depth review of their transfer policies and programs, and for the sharing

of information on effective practices with similar colleges that are not currently as successful in transferring these students to senior institutions. Identifying low-performers helps target the colleges in need of more information and support to increase their transfer rates.

Defining Transfer Rates

Our results suggest that the more restrictive method of calculating and monitoring transfer rates may be more appropriate from a policy perspective. While using the more "inclusive" method of considering all students as "potential transfer students" may best reflect the mission of California's community colleges to offer broad access to higher education, it may mask some problems within our educational system. Using the more "inclusive" transfer rate, we found no disparity in rates by the gender distribution of the student population, and found no differences in transfer rate for colleges with a high share of African-American students. In addition, while the method revealed lower transfer rates over a three-year period for colleges with large numbers of Latino students, those differences did not show up when examining the "inclusive" rate over six years. Including all students in the "base," even those who attend for brief periods for specific purposes unrelated to transfer, may make it more difficult to analyze success rates for students who intend to transfer. When we limit our focus to these students, we find discrepancies that warrant the attention of policy-makers. While it could still be debated how best to define "intent" and which students to include,[18] our results suggest that, in determining the factors affecting transfer and in monitoring the transfer function of community colleges, including all students in the transfer rate calculation obscures important information.

Summary

This research helps to identify student, college, and community factors that influence transfer success in California. Among other findings, our results indicate that colleges' transfer rates vary according to the gender, age and racial/ethnic composition of their student bodies. The degree of focus within a college on the academic mission is also important. The results of the study point to the need for additional research in specific areas as outlined above, using a mix of quantitative and qualitative methods. Quantitative analysis can identify some factors that need to be monitored and provide an agenda for more in-depth review. However, statistics can never tell the whole story. It is essential to visit campuses, talk to students, faculty and staff, observe policies and practices, and

[18] For example, we might include in the base all students taking at least 12 units, but impose no restriction on taking transfer-level math or English. This might serve to exclude students attending only to take a class or two, but would still include students who might have intended to transfer, took a number of classes toward that goal, but were in need of significant remediation and never enrolled in transfer-level math or English.

compare experiences in order to uncover the full depth of the transfer story. It is particularly important to identify and study successful efforts to increase transfer among California's large Latino student population, a group identified in our analysis as facing significant obstacles in its quest for baccalaureate education. In order to preserve access to higher education, ensure educational equity, and produce the educated workforce essential to California's economic future, the state's community colleges need better information and better tools to enhance transfer opportunities for all students.

Appendix: Methodology and Results

Transfer Rate Calculation

"Inclusive" Transfer Rate Definition

We used two definitions of transfer rate in this study. The more "inclusive" definition of the transfer rate was calculated from data available to the public on the California Community Colleges Chancellor's Office Website.[19] This site includes college-specific information drawn from the First-Time-Freshman (FTF) study. The FTF is a cohort study that collects data from all first-time freshmen in California's community colleges in the fall of a given year and then tracks these students for six years regarding transfer activity and the number of certificates and awards granted.[20] We used the cohorts beginning their studies in 1996 and 1997 for an analysis of three-year transfer rates, and the cohorts beginning their studies in 1994 and 1995 for an analysis of transfer rates over six years.

From this Internet-based data set, we were able to gather the number of first-time freshmen enrolled at California's 108 community colleges for each cohort.[21] We also gathered information on the number of these students who transferred to any four-year institution over the next three years and over the next six years.[22] The "inclusive" transfer rates were calculated by dividing the number of transfers by the total number of first-time freshmen in a given cohort.

We realize that this method of calculating transfer rates uses a denominator that includes students who may have no "intent to transfer" when they enter college. It is not possible to exclude students from the denominator using the publicly available FTF data. Including all students in the cohort may best reflect the inclusive mission of California's community colleges to offer broad access to higher education. We do, however, attempt to control for the fact that all first-time freshmen are

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19 http://srtk.cccco.edu/index.asp.

20 The data allow for the calculation of the transfer rate of a cohort over three to six years.

21 The 1996 cohort data were missing for Santiago Canyon College.

22 Data also include transfers to out-of-state two-year institutions, but they represent a small share of total transfers.

not expected to transfer through the inclusion of explanatory variables that account for differences in "intent to transfer" across colleges.

Chancellor's Office Definition

The second definition of transfer used in this study was developed by the Chancellor's Office (2002) for its recent report on transfer. The rate was calculated by dividing the number of transfers in a cohort over six years by the number of students in the cohort who (1) completed at least 12 units and (2) enrolled in transfer-level math or English. The Chancellor's Office provided us with the rates for each college for the 1994 and 1995 freshman cohorts.[23] This definition of transfer was designed by the Chancellor's Office to assess the transfer rate among students demonstrating some "intent to transfer" through their behavior over the six-year period. One could argue that this method may inflate transfer rates by restricting the denominator only to those well on their way toward meeting the requirements of transfer. It is, however, a fairly common practice to exclude some students from the "base" when calculating transfer rates based on the knowledge that many community college students have no intention to transfer, although there is considerable debate over which students to exclude.

Regression Models

A regression analysis begins with a causal model of the factors expected to account for observed differences in the dependent variable under consideration. In this case, the dependent variable is the transfer rate for California's community colleges, and the major causal factors are student, college, and community characteristics. The model is defined as follows:

$$\text{Transfer Rate}_i = f(\text{Student Cohort Characteristics}_i, \text{College Characteristics}_i, \text{Community Characteristics}_i);$$

where,

$i = 1,2,3,4, \ldots 108$ California community colleges.

Student Cohort Characteristics: % Less Age 25, % Female, % African-American, % Asian-American, % Latino, % Filipino/Pacific Islander, % Temporary Resident, % Uninformed Transfer Desire.

College Characteristics: Miles to CSU, Number of Students, Academic Performance Index for Recent Freshmen, % Degrees Awarded in General Studies or Liberal Arts/Sciences.

[23] It also provided us with data on the characteristics of the student cohorts, used as explanatory factors.

Community Characteristics: County Population Density, County Unemployment Rate, % County High School Students Receiving Reduced-Price Meals, % County High School Students Who Are English-Language Learners.

We developed three regression models using the two different transfer rate definitions as the dependent variable:

- Model 1: "Inclusive" transfer rate measured over three years.
- Model 2: "Inclusive" transfer rate measured over six years.
- Model 3: Chancellor's Office transfer rate measured over six years (data for a comparison model of this transfer rate using a three-year period were not available)

Our regression models contain the same explanatory variables as the Chancellor's Office (2002) study, including the proportion of the cohort of students that is under age 25, the proximity of the college to the nearest CSU campus, the unemployment rate in the college's county, and the Academic Performance Index (API) for recent groups of freshmen at each college.[24] The Chancellor's Office developed the API for each college by matching the records of first-time freshmen enrolled in community colleges in fall 2000 with data from the California Department of Education on the Stanford 9 test scores of high school juniors in 1998 and 1999 (see Bahr, 2002 for a detailed description of the development of the API index).

Our regression model also contains additional explanatory variables shown to be important to transfer in other studies but absent from the Chancellor's Office model. These include characteristics of the student cohort at each college that account for gender, race/ethnicity, and citizenship status. These are included to pick up any differences these variables can make (possibly through expectations, culture, background, etc.) on observed transfer rates after controlling for the other included factors.

Since the denominator in the "inclusive" measure of transfer rate includes all first-time freshmen, the regression models also try to account for differences in "intent to transfer" across colleges. The % Uninformed Transfer Desire variable is based on a survey of a large majority of the students in each cohort and measures the percentage that state in the survey that their desire in attending community college is ultimately to transfer to a four-year program. It is defined as "uninformed" because the survey is taken before students have had a chance to talk to a counselor. Furthermore, we attempt to control for differences in the missions of different community colleges by including

[24] The Chancellor's Office study used the percentage of students age 25 or less. At the Chancellor's Office Website, data were available only for the percentage of students age 24 or less.

the percentage of recent graduates of each college who received a general studies or a liberal arts/sciences degree. We expect that colleges with a greater percentage of students graduating in these degree programs are more likely to be geared through their "mission" to attracting and producing transfer students. Our *a priori* expectation is that these explanatory variables measuring "intent to transfer" exert a positive influence on transfer rates.

Moreover, under the broad category of community characteristics, we include factors identified in other studies as having an influence on differences in community college transfer rates. These include population density, and the social and economic characteristics of the county where the college is located. Population density is intended as a proxy for the "urban" nature of a county. The characteristics of urban counties (crime rates, economic opportunities, transportation, etc.) can exert uncontrollable influences on the transfer rate of a college operating within them. As a measure of a community-wide economic constraint on college transfer rates, we include the weighted-average percentage of the county's high school students that receive reduced-price meals. We also include the share of the county's high school students who are identified as English-language learners.

A further consideration before the regressions were calculated was the functional form to use.[25] Entering the variables included in a regression model in an unaltered form will result in a linear regression analysis that calculates, through each regression coefficient, the expected change in the dependent variable (Transfer Rate) given a one-unit change in a respective independent variable (for instance, % Less Age 25). A linear functional form is appropriate when we expect a constant or linear relationship between the dependent variable and the explanatory variables (i.e., when % Less Age 25 in the cohort rises from 4% to 5%, that is expected to result in the same change in Transfer Rate as % Less Age 25 in the cohort rising from 40% to 41%). Given that non-linear relationships are more likely to occur between our chosen explanatory variables and Transfer Rate, we alter the dependent variable and place it in log form. This log-linear form of regression analysis allows for the calculation of regression coefficients that account for the expected non-linear relationships.

Also, there are statistical advantages to be gained if we can combine the data from two cohorts together into a single regression analysis. To check for the appropriateness of doing this, we ran two separate regressions for the 1996 and 1997 three-year cohorts, one with each cohort's data, and then ran a third regression that used data from both cohorts combined. Chow Tests (Studenmund, 2002, pp. 241-242) indicated that it was acceptable to combine both cohorts of data because the regression

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[25] See Studenmund (2002, Chapter 7) for a full description of functional form considerations in regression analysis.

coefficients calculated from the separate regressions were statistically equivalent. Our final regression results are reported using the pooled data sets, with the addition of a dummy variable equal to one for data from the 1996 cohort (the 1994 cohort for the six-year analysis) to control for any unmeasured differences between the two years. The final regression analyses contained 212 observations.[26]

Problems with multicollinearity can arise in regression analysis of the sort reported upon here (Studenmund, 2002, Chapter 8). This occurs when two or more explanatory variables are so closely related that the regression procedure cannot separate their independent effects on the dependent variable. Multicollinearity is of particular concern if present in regression analyses used for policy analysis because it may lead to false conclusions about the magnitude of influence of a variable. We checked for multicollinearity in our regression by calculating variance inflation factors (VIFs) for each explanatory variable and found that it was not an issue.[27] The regression results for each model are recorded below in Tables 3, 4 and 5.

Regression Results

Since the dependent variable in the regression is in log form, the regression coefficients recorded in Tables 3, 4 and 5 measure the percentage change in Transfer Rate given a one-unit change in the respective explanatory variable (Studenmund, 2002, Chapter 7). Therefore, the magnitudes of the regression coefficients are not comparable because the units of measurement are different for each explanatory variable. Comparability can be achieved by transforming the regression coefficients into "elasticities" that measure the percentage change in the dependent variable given a 1 percent change in an explanatory variable. Elasticities, calculated by multiplying a regression coefficient by the mean of the respective explanatory variable, are recorded in the last column of the tables. Only the statistically significant elasticities (highlighted in bold) should be considered as exerting non-zero influences on Transfer Rate.

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[26] This is down from the 216 observations available for transfer rates alone (108 from each year) due to missing values for some of the variables for some colleges in one or more of the years.

[27] See Studenmund (2002, pp. 256-257) for a description of the method of using variance inflation factors (VIFs) to check for multicollinearity. A VIF value greater than 5.0 for an explanatory variable's regression coefficient usually is used to indicate a potential problem due to multicollinearity. Calculated VIFs for each regression coefficient were all below 3.4, with most being below 2.0.

Model 1

As indicated by an elasticity of 1.93, we found that API exerted the greatest single influence in determining Transfer Rate for the cohorts entering in 1996 and 1997 and tracked over three years. A 1 percent increase in the API, holding other explanatory factors constant, on average resulted in a nearly two 2 increase in Transfer Rate. A 1 percent increase in % Less Age 25 resulted in a slightly lower 1.82 percent increase in Transfer Rate. The variables % Asian-American, % Temporary Resident, and County Unemployment Rate also exerted significant positive influences on Transfer Rate. A surprising finding was that % County High School Students English-Language Learners also had a positive effect on Transfer Rate. The only negative influence on Transfer Rate in this model is a 0.24 percent decrease in rate for every 1 percent increase in the percentage of the freshmen student cohort that is Latino.

Model 2

As in Model 1, API and % Less Age 25 exerted the greatest positive effects on Transfer Rate for the cohorts entering in 1994 and 1995 and tracked over six years. A 1 percent increase in the API, holding other explanatory factors constant, on average resulted in a 1.46 percent increase in Transfer Rate. A one percent increase in % Less Age 25 resulted in a 1.1 percent increase in Transfer Rate. Also as in Model 1, the variable % Asian-American exerted a significant positive influence on Transfer Rate, with an elasticity of 0.07. The variables % Uninformed Transfer Goal and County Population Density exerted significant positive effects on Transfer Rate, effects not seen in Model 1. Also, consistent with other research demonstrating the effects of socioeconomic status, % County High School Students with Reduced Price Meals exerted a statistically significant negative influence on Transfer Rate. The % Latino variable no longer had a significant effect when analyzing the “inclusive” Transfer Rate over six years rather than three years.

Model 3

Model 3 estimates the Chancellor’s Office calculated Transfer Rate using the same predictors as in Models 1 and 2, using a six-year time frame. API and % Less Age 25 again exerted the greatest positive effects on Transfer Rate for the cohorts entering in 1994 and 1995. A 1 percent increase in the API, holding other explanatory factors constant, on average resulted in a 0.75 percent increase in Transfer Rate. A 1 percent increase in the % Less Age 25 resulted in a 0.63 percent increase in Transfer Rate. As in both Models 1 and 2, the variable % Asian-American exerted a significant positive influence on Transfer Rate, with an elasticity of 0.04. Other significant positive predictors include % Degrees Awarded in General Studies or Liberal Arts/Sciences, Number of Students, and County Population Density. Disparities in transfer rates

by gender and by race were evident in this model. Both % Latino and % African-American exerted significant negative influences on Transfer Rate, as did % Female.

Predicting Transfer Rate

The Chancellor's Office (2002) study used its regression results from three six-year student cohorts to predict the expected transfer rate for a given community college's cohort of students. This was done by taking the actual values for the five explanatory variables included in its regressions and multiplying them by the appropriate regression coefficients. A college was defined as "low-transfer" if its actual transfer rate less its predicted rate was negative and fell below a specified value.[28]

Using Model 3 (a modified version of the Chancellor's Office model), we also predict a transfer rate for each college's 1994 and 1995 cohorts and compare it to the actual transfer rate. As a simpler and more transparent method of identifying high- and low-performing colleges, we calculate the difference between a college's actual transfer rate and the rate predicted from our regression model. Recall that this predicted rate attempts to control for student, college, and community characteristics that affect a college's transfer rate. After controlling for these factors, the differences between the actual and expected transfer rates allow us to examine how each college is doing in comparison to how it might be expected to do given the other factors. See Table 6 for the results of these calculations.

We leave to the reader the task of reviewing Table 6 and drawing conclusions regarding persistently high- or low-performing community colleges in regards to transfer. As an example, if we use an arbitrary cutoff that defines "high-performing" as a 25 percent difference between actual and predicted transfer rates occurring in both the 1994 and 1995 cohorts, six colleges could be labeled as high-performing. In alphabetic order, these include Cañada, Foothill, Los Angeles Southwest, Ohlone, Reedley, and Ventura. Applying a similar minus-25 percent to identify low-performing transfer colleges would produce another list of six colleges that includes Compton, Cuyamaca, Grossmont, Marin, Palo Verde and Santa Monica. See our previous discussions of this analysis in the "Empirical Analysis" and "Conclusions" sections for an explanation of our intent in producing the predicted transfer rates.

[28] See Chancellor's Office (2002, p. 43) for a description of their "interquartile range" method.

Table 3: Model 1
Regression Analysis of 1996 and 1997
California Community College Three-Year Student Cohorts
Using "Inclusive" Definition of Transfer Rate

(N=211, Mean of Transfer Rate = 6.44, R-squared = 0.46, Adj. R-squared = 0.41)

Explanatory Variable	Mean of Explanatory Variable	Regression Coefficient	Regression Coefficient's Standard Error	t-ratio	Elasticity
Constant	-	-1.887	0.865	-2.18	-
1996 Dummy	0.500	0.157	0.064	2.46***	-
% Less Age 25	69.9	0.026	0.005	4.94***	**1.82**
% Female	52.2	-0.003	0.008	-0.37	-0.15
% African-American	10.0	0.003	0.004	0.70	0.03
% Asian-American	9.49	0.015	0.005	2.87***	**0.13**
% Latino	27.3	-0.009	0.003	-3.09***	**-0.24**
% Filipino/Pacific Islander	4.2	-0.014	0.014	-1.05	-0.06
% Temporary U.S. Resident	1.2	0.016	0.009	1.72*	**0.02**
% "Uninformed" Transfer Goal	38.7	-0.005	0.004	-1.52	-0.19
% Degrees Awarded in General Studies or Liberal Arts/Sciences	44.1	-0.003	0.003	-0.94	-0.12
API	47.7	0.040	0.013	3.21***	**1.93**
Miles to CSU	29.3	-0.0005	0.002	-0.29	-0.01
Number of Students	2,055.2	-0.00001	0.00003	-0.31	-0.02
County Population Density	1,481.3	-0.00001	0.00001	-1.01	-0.01
County Unemployment Rate	6.48	0.028	0.008	3.50***	**0.19**
% County HS Students Reduced Price Meals	36.7	-0.00005	0.0002	-0.24	-0.002
% County HS Students English Learners	15.7	0.016	0.007	2.45**	**0.25**

Regression coefficient statistically significant from zero in a two-tailed test: *** = >99% confidence, ** = 95 to 99% confidence, and * = 90 to 95% confidence.

Table 4: Model 2
Regression Analysis of 1994 and 1995
California Community College Six-Year Student Cohorts
Using "Inclusive" Definition of Transfer Rate

(N=211, Mean of Transfer Rate = 23.8, R-squared = 0.65, Adj. R-squared = 0.62)

Explanatory Variable	Mean of Explanatory Variable	Regression Coefficient	Regression Coefficient's Standard Error	t-ratio	Elasticity
Constant	-	-0.100	0.736	-0.14	-
1994 Dummy	0.500	0.057	0.040	1.42	-
% Less Age 25	69.9	0.016	0.003	5.88***	**1.10**
% Female	52.0	0.010	0.009	1.07	0.51
% African-American	9.12	-0.001	0.003	-0.38	-0.01
% Asian-American	10.08	0.007	0.003	2.69***	**0.07**
% Latino	26.0	-0.0009	0.003	-0.34	-0.02
% Filipino/Pacific Islander	0.7	-0.053	0.042	-1.27	-0.04
% Temporary U.S. Resident	0.7	-0.034	0.041	-0.84	-0.02
% "Uninformed" Transfer Goal	35.6	0.007	0.002	3.51***	**0.25**
% Degrees Awarded in General Studies or Liberal Arts/Sciences	44.1	0.0004	0.001	0.27	0.17
API	47.7	0.031	0.008	4.06***	**1.46**
Miles to CSU	29.2	-0.002	0.001	-1.15	-0.05
Number of Students	2,142.1	-0.00001	0.00001	-0.89	-0.02
County Population Density	1,465.9	0.00001	0.000004	2.23**	**0.01**
County Unemployment Rate	6.72	0.007	0.008	0.92	0.05
% County HS Students Reduced Price Meals	30.0	-0.010	0.003	-3.61***	**-0.29**
% County HS Students English Learners	15.7	0.008	0.005	1.46	0.13

Regression coefficient statistically significant from zero in a two-tailed test: *** = >99% confidence and ** = 95 to 99% confidence.

Table 5: Model 3
Regression Analysis of 1994 and 1995
California Community College Six-Year Student Cohorts
Using Chancellor's Office Definition of Transfer Rate

(N=212, Mean of Transfer Rate = 31.6, R-squared = 0.57, Adj. R-squared = 0.53)

Explanatory Variable	Mean of Explanatory Variable	Regression Coefficient	Regression Coefficient's Standard Error	t-ratio	Elasticity
Constant	-	2.569	0.518	4.96	-
1994 Dummy	0.500	-0.043	0.031	-1.37	-
% Less Age 25	69.9	0.009	0.002	4.21***	**0.63**
% Female	55.4	-0.008	0.004	-1.93*	**-0.43**
% African-American	8.51	-0.004	0.002	-1.96**	**-0.04**
% Asian-American	12.42	0.003	0.002	1.84*	**0.04**
% Latino	22.3	-0.004	0.002	-1.67*	**-0.09**
% Filipino/Pacific Islander	0.8	0.003	0.017	0.19	0.002
% Temporary Resident	0.4	0.041	0.040	1.03	0.02
% Uninformed Transfer Goal	56.3	-.001	0.001	-0.99	-0.07
% Degrees Awarded in General Studies or Liberal Arts/Sciences	44.1	0.002	0.001	1.63*	**0.08**
API	47.7	0.016	0.006	2.51***	**0.75**
Miles to CSU	29.2	-0.001	0.0009	-1.31	-0.04
Number of Students	2,142.1	0.00003	0.00002	1.90*	**0.06**
County Population Density	1,465.9	0.00001	0.000005	2.05**	**0.02**
County Unemployment Rate	6.72	0.001	0.005	0.20	0.008
% County HS Students Reduced Price Meals	30.0	-0.003	0.002	-1.59	-0.10
% County HS Students English Learners	15.7	0.0001	0.007	0.02	0.002

Regression coefficient statistically significant from zero in a two-tailed test: *** = >99% confidence, ** = 95 to 99% confidence, and * = 90 to 95% confidence.

Table 6
California Community College Transfer Rates Using Chancellor's Office Definition, Regression Predicted Transfer Rates, and Difference Between Actual and Predicted Rates
1994 and 1995 Cohorts

Community College Name	Six-Year Actual Transfer Rate 1994 Cohort (Chancellor's Definition)	Regression Predicted Transfer Rate 1994 (Model 3)	Difference Actual Less Predicted 1994	Six-Year Actual Transfer Rate 1995 Cohort (Chancellor's Definition)	Regression Predicted Transfer Rate 1995 (Model 3)	Difference Actual Less Predicted 1995
ALAMEDA	36.9	32.0	4.9	36.3	33.2	3.1
ALLAN HANCOCK	34.1	31.0	3.1	36.1	31.3	4.8
AMERICAN RIVER	37.6	36.2	1.4	37.6	37.6	0.0
ANTELOPE VALLEY	28.3	25.3	3.0	25.9	26.9	-1.0
BAKERSFIELD	32.7	27.9	4.8	32.1	28.4	3.8
BARSTOW	18.7	24.5	-5.8	27.5	23.5	4.0
BUTTE	31.4	34.9	-3.4	30.8	34.0	-3.2
CABRILLO	38.3	32.7	5.6	38.2	33.2	5.0
CAÑADA	44.1	28.5	15.6	39.7	27.5	12.2
CANYONS	40.8	32.4	8.4	41.6	34.4	7.3
CERRITOS	29.1	24.7	4.4	29.7	25.6	4.1
CERRO COSO	25.8	23.5	2.3	24.4	23.8	0.5
CHABOT HAYWARD	33.7	37.3	-3.5	37.8	37.3	0.5
CHAFFEY	22.3	26.0	-3.8	24.9	29.1	-4.2
CITRUS	25.6	29.2	-3.7	26.3	30.2	-3.9
COASTLINE	25.3	22.4	2.9	32.7	24.9	7.9
COLUMBIA	29.0	28.5	0.5	32.4	28.4	4.0
COMPTON	10.0	14.0	-4.0	8.6	15.2	-6.6
CONTRA COSTA	21.2	22.4	-1.2	21.5	23.9	-2.4
COSUMNES RIVER	37.9	33.2	4.8	36.5	33.0	3.5
CRAFTON HILLS	32.8	31.8	1.0	22.3	31.0	-8.7
CUESTA	47.0	41.6	5.4	45.1	42.1	3.0
CUYAMACA	19.4	29.4	-9.9	20.0	29.7	-9.7
CYPRESS	36.0	37.7	-1.8	34.4	36.9	-2.5
DEANZA	47.6	47.3	0.3	50.0	49.9	0.2
DESERT	28.1	24.9	3.3	26.1	24.9	1.2
DIABLO VALLEY	45.8	44.1	1.7	44.2	47.4	-3.3
EAST LA	26.0	18.9	7.1	23.9	19.5	4.4
EL CAMINO	30.4	31.3	-0.9	30.9	31.7	-0.8
EVERGREEN VALLEY	27.7	27.4	0.4	26.8	27.1	-0.3
FEATHER RIVER	30.6	25.5	5.1	31.2	26.6	4.6
FOOTHILL	47.8	35.3	12.5	45.5	35.4	10.1
FRESNO CITY	36.5	34.0	2.5	34.3	37.6	-3.3
FULLERTON	42.1	38.3	3.8	34.9	38.6	-3.8
GAVILAN	28.0	27.3	0.7	35.2	28.3	7.0
GLENDALE	28.9	28.8	0.1	33.5	29.3	4.1
GOLDEN WEST	42.5	38.8	3.6	40.3	40.2	0.0
GROSSMONT	25.6	37.7	-12.1	26.7	38.9	-12.2
HARTNELL	28.6	23.5	5.2	28.0	24.4	3.6
IMPERIAL VALLEY	6.7	13.6	-7.0	16.4	14.3	2.1
IRVINE VALLEY	37.1	40.7	-3.6	43.7	42.4	1.3
LA CITY	23.0	23.5	-0.5	23.6	24.7	-1.0

Table 6
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1994 and 1995 Cohorts

Community College Name	Six-Year Actual Transfer Rate 1994 Cohort (Chancellor's Definition)	Regression Predicted Transfer Rate 1994 (Model 3)	Difference Actual Less Predicted 1994	Six-Year Actual Transfer Rate 1995 Cohort (Chancellor's Definition)	Regression Predicted Transfer Rate 1995 (Model 3)	Difference Actual Less Predicted 1995
LA HARBOR	25.1	27.9	-2.8	26.7	26.0	0.7
LA MISSION	30.5	20.5	10.1	26.2	22.8	3.4
LA PIERCE	41.0	34.7	6.3	40.4	35.8	4.6
LA SOUTHWEST	17.6	12.8	4.8	19.1	14.0	5.1
LA TRADE-TECH	14.7	17.4	-2.7	16.9	18.5	-1.6
LA VALLEY	32.5	28.4	4.1	32.0	28.7	3.3
LAKE TAHOE	19.3	25.4	-6.1	34.2	25.6	8.6
LANEY	32.4	32.9	-0.4	33.1	34.1	-1.0
LAS POSITAS	40.4	37.8	2.7	41.4	36.5	4.9
LASSEN	41.2	32.4	8.8	35.7	33.6	2.0
LONG BEACH	30.9	26.7	4.1	26.4	26.9	-0.5
LOS MEDANOS	25.2	23.2	2.0	22.8	23.4	-0.5
MARIN	14.2	30.6	-16.4	17.1	32.0	-14.9
MENDOCINO	27.2	27.3	-0.1	22.3	27.1	-4.7
MERCED	28.4	26.4	2.0	32.1	28.7	3.4
MERRITT	23.9	19.6	4.3	25.7	20.5	5.2
MIRA COSTA	35.4	34.0	1.5	36.7	38.3	-1.5
MISSION	31.1	28.9	2.3	36.5	29.4	7.1
MODESTO	34.9	34.4	0.5	34.7	36.6	-1.8
MONTEREY	6.0	28.2	-22.3	26.2	31.1	-4.9
MOORPARK	43.8	41.6	2.2	47.9	44.4	3.5
MT SAN ANTONIO	32.7	33.7	-1.0	32.2	35.3	-3.1
MT. SAN JACINTO	27.5	27.6	-0.2	27.6	27.9	-0.4
NAPA VALLEY	37.0	28.5	8.5	33.8	28.3	5.5
OHLONE	47.3	31.4	15.9	46.2	34.4	11.9
ORANGE COAST	42.0	47.7	-5.7	43.6	48.4	-4.8
OXNARD	30.4	24.9	5.5	27.4	25.8	1.6
PALO VERDE	12.1	16.6	-4.5	7.9	16.0	-8.1
PALOMAR	41.4	43.0	-1.6	40.8	44.7	-3.9
PASADENA CITY	37.6	40.8	-3.1	40.2	43.5	-3.3
PORTERVILLE	23.5	23.6	0.0	31.6	26.5	5.1
RANCHO SANTIAGO	42.9	37.3	5.7	37.5	37.3	0.2
REDWOODS	45.3	29.0	16.4	41.7	31.3	10.4
REEDLEY	22.1	22.8	-0.8	22.1	23.7	-1.6
RIO HONDO	32.1	30.0	2.0	32.4	30.3	2.2
RIVERSIDE	45.7	39.6	6.2	49.0	41.8	7.1
SACRAMENTO CITY	41.6	40.7	1.0	44.6	42.1	2.5
SADDLEBACK	25.4	24.7	0.7	15.1	23.1	-7.9
SAN BERNARDINO	22.9	25.4	-2.5	25.6	25.7	-0.2
SAN DIEGO CITY	37.4	38.6	-1.1	38.3	39.9	-1.7
SAN DIEGO MESA	32.7	33.0	-0.3	31.8	34.1	-2.3
SAN DIEGO MIRAMAR	43.3	43.6	-0.3	43.2	47.0	-3.8
SAN FRANCISCO	38.2	31.2	7.0	35.4	30.4	5.0

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SAN JOAQUIN DELTA	22.4	28.2	-5.8	25.1	28.3	-3.1
SAN JOSE CITY	43.6	42.1	1.4	45.4	41.8	3.6
SAN MATEO	30.3	30.8	-0.6	26.7	39.4	-12.7
SANTA BARBARA	44.1	38.9	5.3	42.9	40.4	2.4
SANTA MONICA	27.8	37.4	-9.6	22.8	38.7	-15.9
SANTA ROSA	37.7	38.5	-0.8	40.7	40.5	0.2
SEQUOIAS	31.8	26.7	5.1	32.4	26.8	5.6
SHASTA	34.2	32.7	1.4	34.2	33.4	0.8
SIERRA	34.7	45.0	-10.4	36.4	46.3	-9.9
SISKIYOUS	34.0	28.4	5.6	37.4	30.5	6.8
SKYLINE	36.9	42.1	-5.2	39.7	41.6	-1.9
SOLANO	25.9	33.2	-7.4	30.5	33.3	-2.8
SOUTHWESTERN	21.1	27.0	-5.9	19.5	28.3	-8.8
TAFT	16.7	23.1	-6.4	23.6	26.8	-3.1
VENTURA	41.5	30.3	11.2	39.4	31.2	8.2
VICTOR VALLEY	25.9	27.1	-1.2	22.1	29.7	-7.7
VISTA	19.7	22.9	-3.1	25.2	26.3	-1.1
WEST HILLS	19.9	19.8	0.1	28.4	21.0	7.5
WEST LA	22.0	17.7	4.3	21.7	18.6	3.1
WEST VALLEY	44.9	40.2	4.7	45.3	40.3	5.0
YUBA	21.8	25.5	-3.7	24.7	25.2	-0.5

Copper Mountain Community College is not listed in the above table because it was part of Desert Community College until June 2001.

Reedley Community College was previously named Kings River Community College. The name change occurred in July 1998.

The current Santa Anna and Santiago Canyon Community Colleges were together called Rancho Santiago Community College at the time the 1994 and 1995 FTF cohorts began.

References

Adelman, C. (1999). *Answers in the toolbox: Academic intensity, attendance patterns, and bachelor's degree attainment.* Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement.

Arzubiaga, A., Ceja, M., & Artiles, A.J. (2000). Transcending deficit thinking about Latinos' parenting styles: Toward an ecocultural view of family life. In C. Martinez, Z. Leonardo, & C. Tejeda (Eds.), *Charting new terrains of Chicana(o)/Latina(o) education* (pp. 93-106). Creskill, NJ: Hampton Press.

Bahr, P. R. (2002). *Student average academic preparation: The development of a college-level summary measure of student preparedness for academic coursework*. Paper presented at the Annual Meeting of the Research and Planning Group of the California Community Colleges, Sacramento, CA.

Bailey, T. R. & Averianova, I. E. (1999). Multiple missions of community colleges: Conflicting or complementary? *CCRC Brief*. New York: Columbia University Community College Research Center.

Bailey, T. & Weininger, E. (2002). *Performance, graduation, and transfer of immigrants and natives in City University of New York community colleges*. New York: Columbia University Community College Research Center.

Berkner, L., He, S., Cataldi, E. F., & Knepper, P. (2002). Descriptive summary of 1995-96 beginning postsecondary students: Six years later (NCES 2003-151). Washington, DC: U.S. Department of Education, National Center for Education Statistics.

Blau, J. R. (1999). Two-year college transfer rates of black American students. *Community College Journal of Research and Practice*, *23*, 525-531.

Bradburn, E. & Hurst, D. (2001). Community college transfer rates to 4-year institutions using alternative definitions of transfer. *Education Statistics Quarterly*, *3*(3), 119-125.

Bryant, A. N. (2001). ERIC review: Community college students: Recent findings and trends. *Community College Review*, 29(3), 77-94.

California Community Colleges Chancellor's Office (2002). *Transfer capacity and readiness in the California community colleges*. Sacramento, CA: Author.

California Postsecondary Education Commission (2002). *Student transfer in California postsecondary education*. Sacramento, CA: Author.

Ceja, M. (2001). Applying, choosing, and enrolling in higher education: Understanding the college choice process of first-generation Chicana students. Unpublished doctoral dissertation. University of California, Los Angeles.

Cejda, B. D., Rewey, K. L., & Kaylor, A. J. (1998). The effect of academic factors on transfer student persistence and graduation: A community college to liberal arts college case study. *Community College Journal of Research and Practice*, *22*(1), 675-686.

Cohen, A. M. & Brawer, F. B. (1996). *Policies and programs that affect transfer*. Washington, DC: American Council on Education (ED 385 336).

Cuseo, J. B. (1998). *The transfer transition: A summary of key issues, target areas and tactics for reform*. Unpublished manuscript (ED 425 771).

Dougherty, K. J. (1994). *The contradictory college: The conflicting origins, impacts and futures of the community college*. State University of New York Press, Albany.

Dougherty, K. J. (1992). Community colleges and baccalaureate attainment. *Journal of Higher Education*, *63*(2), 188-214.

Ehrenberg, R. G. & Smith, C. L. (2002). *Within state transitions from 2-year to 4-year public institutions*. NBER Working Paper No. w8792. Cambridge, MA: National Bureau of Economic Research.

Fry, R. (2002). *Latinos in higher education: Many enroll, too few graduate*. Washington, DC: Pew Hispanic Center.

Gandara, P. (1995). *Over the ivy walls: The educational mobility of low income Chicanos*. State University of New York Press, Albany.

Garofoli, J. (2002, August 26). On college campuses, it's a woman's world: Females outnumber males -- and diploma gap will widen. *The San Francisco Chronicle*, p. B1.

Ginorio, A. & Huston, M. (2001). *Si se puede! Yes, we can. Latinas in school*. Washington, DC: American Association of University Women Educational Foundation (ED 452 330).

Grubb, W. N. (1999). The economic benefits of sub-baccalaureate education: Results from national studies. *CCRC Brief*. New York: Columbia University Community College Research Center.

Grubb, W. N. (1991). The decline of community college transfer rates: Evidence from national longitudinal surveys. *Journal of Higher Education*, *62*(2), 194-222.

Horn, L. J. & Kojaku, L. (2001). *High school academic curriculum and the persistence path through college: Persistence and transfer behavior of undergraduates 3 years after entering 4-year institutions*. Washington, DC: U.S. Department of Education, National Center for Education Statistics.

Horn, L., Peter, K., & Rooney, K. (2002). *Profile of undergraduates in U.S. postsecondary education institutions: 1999-2000*. Washington, DC: U.S. Department of Education, National Center for Education Statistics.

Hurst, D. G. & Bradburn, E. M. (2001). *State- and institution-level effects on community college students' transfer to 4-year institutions*. Paper prepared for the meeting of the American Educational Research Association, Seattle, WA.

Kangas, J. (1994). *ADELANTE success rates compared to success rates of other Latino students in the same courses*. San Jose, CA: Evergreen Community College District (ED 376 883).

Lee, V. E., & Frank, K. F. (1990). Students' characteristics that facilitate the transfer from two-year to four-year colleges. *Sociology of Education*, 63(July), 178-193.

National Center for Education Statistics (1998). *The condition of education, 1998*. Washington, DC: U.S. Department of Education.

Nevarez, C. (2001). Mexican-Americans and other Latinos in postsecondary education: Institutional influences (ERIC Digest). (ERIC Document Reproduction Service No. ED 459 038)

North aims higher for education (2002, September 13). *Sacramento Bee*, p. B1.

Pascarella, E. T. & Terenzini, P. T. (1991). *How college affects students: Findings and insights from twenty years of research*. San Francisco: Jossey-Bass.

Perez, L. X. (1999). The interface of individual, structural, and cultural constructs in Latino parents' efforts to support their children in planning for college. Unpublished doctoral dissertation. University of California, Los Angeles.

Rendon, L., Justiz, M., & Resta, P. (1988). *Transfer education in southwest community colleges*. Columbia, SC: University of South Carolina.

Schwartz, W. (2001). Strategies for improving the educational outcomes of Latinas. *ERIC Digest* (ED 458 344).

Shaw, K. M. & London, H. B. (2001). Culture and ideology in keeping transfer commitment: Three community colleges. *The Review of Higher Education*, *25*(1), 91-114.

Shaw, K. M. & London, H. B. (1995). *Negotiating class and cultural boundaries: Toward an expanded definition of the transfer process*. Paper presented at the annual meeting of the Association for the Study of Higher Education (ED 391 432).

Solorzano, D., Ceja, M., & Yosso, T. (2001). Critical race theory, racial microaggressions and campus racial climate and the experience of African-American college students. *Journal of Negro Education*, *69*(1/2), 60-73.

Studenmund, A. H. (2002). *Using econometrics: A practical guide* (4th ed.). Boston: Addison Wesley Longman.

Townsend, B. (2001). Redefining the community college transfer mission. *Community College Review*, *29*(2), 29-42.

Townsend, B. & Dever, J. (1999). What do we know about reverse transfer students? In B. Townsend (Ed.) *Understanding the impact of reverse transfers on the community college. New Directions for Community Colleges* (No. 106). San Francisco: Jossey-Bass.

Wellman, J. V. (2002). *State policy and community college-baccalaureate transfer*. San Jose, CA: National Center for Public Policy and Higher Education.