Higher Education Enrollments and Student Success in Times of Budget Scarcity: Examining System-Level Impacts in Recessionary Periods

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Introduction

The conventional wisdom surrounding higher education enrollments in California holds that when times are tough in the University of California (UC) and California State University (CSU) system, the California Community College (CCC) system benefits from a surge in enrollments. The story runs something like this: when budgets get cut at the UC and CSU system, access gets reduced and the CCC system gets an enrollment „boost" because of the belt-tightening in the 4-year universities. The corollary impact is that the CCC"s benefit from a higher concentration of college-prepared students, which translates into a greater percentage of transfer course offerings. A secondary effect could result in higher rates of course completion in those transfer courses. In other words, all other things being equal, if a greater share of college-prepared students do enroll at CCC"s as a result of reduced access in the CSU and UC system, then not only will higher proportions of transfer course offerings appear, but higher rates of successful course completion should also materialize. That"s the conventional wisdom – but does it hold up to investigation? This paper seeks to address these questions.

Literature Review

Numerous postsecondary education researchers (Douglass, 2008; Green, 2009; Zimmer, Hightower & Gregory, 2006) have posited a relationship between the national economy and the demand for college enrollment. Douglass (2008) states that, in times of economic hardship, the demand for higher education increases substantially, and particularly for public institutions. Several studies have produced evidence of a link between national economic indicators and the demand for higher education. Given that community colleges enroll a large share of the nation"s undergraduates, these institutions often bear the brunt of enrollment demands during a recession. A recent study conducted by the Pew Research Center (Fry, 2010) examined college enrollment

trends during the current recession. The author concluded that, while four-year institution enrollment has remained relatively stable, community college enrollment has increased substantially during the current recession.

A study conducted by the American Association of Community Colleges (AACC, 2009) revealed similar findings: dramatic increases in community college enrollment from 2007 to 2009. Other studies have examined the relationship between the characteristics of the national economy and demand for community college enrollment. Pennington and McGinty (2002) found that community college enrollment was positively correlated with the previous year‟s unemployment rate and negatively correlated with the previous year‟s disposable income, gross domestic product, and personal consumption expenditures. Indeed, the immediate impact of unemployment increases led Pennington and McGinty (2002, 436) to suggest that state funding formulas for community college ought to be tied to semester-based calculations rather than annual allotments. Moreover, a study conducted by Betts & MacFarland (1995) revealed that, during recessionary periods, community colleges are challenged not only by dramatic increases in enrollment but simultaneous decreases in funding. Considering the traditionally open-door policy of community colleges across the United States, decreases in funding leave colleges with the difficult decision of where to make budget cuts (Humphreys, 2000; Zimmer, Hightower and Gregory, 2006).

Recent studies have demonstrated significant shifts in the types of student who attend community colleges during economic recessions. Studies conducted by the AACC (2009) and the California Community College Chancellor‟s Office (CCCCO, 2005) revealed disproportional increases in full-time and award-seeking students during recessionary periods. These findings may be due to an influx of four-year university-bound students who instead enroll in a less-

expensive community college. More locally, an emerging trend in the 2000"s is the increasing flight of students to for-profit universities in the California higher education market (see van Ommeren 2010; Perry 2009). Perry has suggested that for-profit universities like the University of Phoenix have exploited a market niche during the state"s budget scarcity by selling access to traditionally under-served minorities in the California system.

To put some precise numbers on the effects of the recession in the CCC system, in the summer of 2009, the CCC system cut 23% of its courses, and that was followed by a six percent cut in the fall term (Perry 2009). Even with that reduction in course sections, CCC Full Time Equivalent Students (FTES) actually grew by 1.3% over the prior year. The class size ratio at CCC"s went up to historic levels, to the point that the average class size topped 31 in Fall 2009 (Perry 2009). These data reflect a remarkable achievement in the midst of the recession: CCC faculty and administrators have attempted to keep the doors to course sections as open as possible during significant funding reductions.

Data and Findings

Our study seeks to extend the literature on higher education enrollment patterns during times of recession by examining patterns of enrollment and successful course completion in one of the world"s largest higher education systems – the California Community College system. The data are drawn from publicly available data sources on the web. CCC system budget data can be found on the Chancellor"s Office website (CCCCO 2010). The CCCCO Data Mart was used to collect term-level data on head counts, enrollments in transfer courses and course success patterns. Economic data and unemployment statistics came from the California Employment

Development Department (EDD 2010). Other data relevant to CSU enrollments were pulled from the CSU Office of Analytic Studies.

We begin by examining enrollment patterns during times of economic recession over the last 20 years. Figure 1 provides a snapshot of annual changes in CCC head count from 1992 to the fall 2010 term. To be more specific, the graph charts fall to fall, spring to spring, and summer to summer changes in the unduplicated term head count, so each academic year has three enrolment bars. In many of the terms, one can witness growth from year to year that tracks with California‟s growing adult population, and the state‟s budget fortunes – allowing for growth funding in the system budget. The downturns in enrollment track reasonably well with the three California recessions identified by state economists (June 1990 to May 1993, March 2001 to July 2003, and July 2007 to December 2009). The two largest drops in CCC enrollment occurred in the fall term of 2003 (-187,973) and the summer term of 2010 (-266,713), and both of those terms came immediately after the declared end of the two recessions. Community College veterans of the prior recessionary period (2003) can readily recall the massive number of course section reductions that occurred at that time and the loss in both head count and FTES. The CCC system office (CCCCO 2005, 11) reported at that time that a nearly 10% decline in unduplicated head count occurred in the 2003-04 academic year, accompanied by a decline of 4.3% in FTES enrollment. Beyond the reduced budget dollars flowing from the state, the 2003-04 period featured increased enrollment fees for students, with prices per unit of enrollment rising from $11 in spring 2003 to $18 the following year, and $26 beginning in fall 2004 (CCCCO 2005, 8). Interestingly, research at that time uncovered no real dramatic impact on access across the state when looking at patterns of student household income. In short, student attendance declines in the 2003-04 period occurred in zip codes featuring both high and low median incomes, with a

Pearson‟s Correlation coefficient of -.05 between median income and attendance gains (CCCCO 2005, 25).

INSERT FIGURE 1 HERE

The problem with the conventional wisdom is the inattention it pays to the recessionary spiral that works its way through the higher education funding system specifically and state agencies generally. Recessions tend to foster higher rates of unemployment and with that a decline in state revenues. The decline in revenues usually takes about a year to work itself through the state budget process. Absent any changes in revenue-generating taxes or fees, state agency spending tends to take a hit roughly 12 months after the start of a recession, and doesn‟t typically rebound until a year after the close of a recession. In other words, just as government spending and revenue takes roughly a year to "catch a recessionary cold," it takes roughly the same time for state agencies to catch up with expanding state revenues.

By introducing a lagged effect, the recessionary impact on enrollment can be seen in a very simple bivariate difference of means test. We utilized analysis of variance techniques to determine the difference in mean changes in CCC head count enrollment during times of recession and times when California was officially not in a recession. We introduced a one-year lag effect for the data to allow for the recession to have an impact both on state finances and on the psyche of the residents of the State. The results fit the conventional wisdom: for the 11 terms demarked by recessions between 1993 and 2010, fall and spring CCC enrollments were <u>down an average of 5,821 students</u> compared to the prior year. In contrast, during periods when the state was not experiencing a recession, the average annual change in CCC head count was an increase of 30,335 in any regular fall or spring term. Thus, our preliminary analysis confirms

that recessionary periods have a slight negative impact on access to the CCC system, shutting the doors to classes at a time when job training and education advancement are critical needs for the state‟s populace.

Do the claims of recessionary impacts stand up when tested against rival explanatory variables? Here testing the research question gets trickier. A simple approach would be to use ordinary least squares (OLS) regression to examine the effects of the recession along with other rival variables. However, any longitudinal data, like the enrollment data set, suffers from a serious degree of collinearity across years, and in concert with that, the error terms associated with the dependent variable are also highly correlated (see Chen 2008; Ostrom 1990; McDowall et al. 1980; Stata 2005, 7-9). The intuitive way to understand this measurement and modeling problem is to look back at Figure 1 and think of enrollment in any given term being highly correlated with enrollment in the previous term (i.e., this term‟s enrollment is very easily predicted by last term‟s enrollment). Table 1 provides other evidence of autoregression in the data set by providing the bivariate correlation between various independent and dependent variables in our models. Readers should note the high degree of correlation between the total headcount measure and the previous year‟s head count (Pearson‟s R = .901). Because the term-to-term enrollments are highly correlated, the error terms associated with the measure over time are also highly correlated, biasing the estimates obtained in any regression equation. This is known as autoregression in the error terms (see McDowall at al. 1980; Ostrom 1990). Two other factors can introduce potential bias unless they are accounted for: a moving average function in a series of data (a trend upward or downward over time), and seasonality of data (i.e., summer enrollment "dips" might be seen as a seasonal component if all three major terms are included in the data series).

INSERT TABLE 1 HERE

Given the problems that can appear in time series data, two approaches can be taken. One approach is to recognize the potential autoregressive and collinearity problems inherent in the data and use ordinary least squares regression knowing that tests of significance may be biased. The other approach is to model the autoregressive components, trend and seasonality impacts using techniques suggested by Box and Jenkins (1976; see also Ostrom 1990). These models are often referred to as ARIMA time series models (Autoregressive, Integrated Moving Averages models), and they are explicitly designed by researchers who have examined the patterns of autocorrelation in the time series. Our approach follows both routes. In Table 1, we provide ordinary least squares regression results to examine the impact of various independent variables on the change in head count enrollment in the CCC system. The key test is whether recessions foster lesser enrollments in the CCC system (we expect a negative coefficient for the recession indicator). The regression model includes three rival variables, with the equation taking the following form:

Predicted Change in CCC Head Count	=	a	+	b1 (Change in CCC System Funding)
			+	b2 (Change in the Number Unemployed)
			+	b3 (Change in CSU Head Count)
			-	b4 (Recession)
			+	error

In the case of the ARIMA modeling technique, we include a variable in the equation that controls for the first-order autocorrelation that exists within the time series (the right side of Table 1).[1] So, beyond OLS results, Table 1 also features an ARIMA model that attempts to

[1] The ARIMA model represents a (1,1,0) model because the dependent and independent variable are all "differenced" from the prior year. That is to say that the dependent variable is the change in head count from the prior year (i.e., head count at time t minus head count at time t minus one). Even with this "first differencing" an examination of the autocorrelation and partial autocorrelation among the residuals led us to correct for first order

correct for serial autocorrelation and provides coefficient estimates and tests of significance when attempting to control for that correlation.

Our hypotheses are rather straightforward: we expect increases in system funding to foster higher levels of enrollment change; we expect increases in the number of unemployed to promote higher levels of enrollment change; positive changes in CSU enrollment to also foster higher levels of enrollment change in the CCC system; and that our key independent variable – a recession – would foster declines in CCC enrollment. The coefficients are relatively stable across the two models, but note how the OLS results tend to produce "better" p values for the test of statistical significance. This is a reflection of the tendency for OLS results to produce decent coefficients, but positively biased indicators of statistical significance. When examining the coefficients, all of the expected hypotheses play out. Most importantly, when controlling for changes in system funding levels, unemployment and CSU enrollments, a recession tends to drive down CCC enrollment by either 69,000 or 76,000 students per term, depending on whether looking at the OLS or ARIMA results. Conversely, positive changes in system funding result in year to year increases in head count, although the impact is not significant when controlling for the other factors. The other two variables, the change in the number of unemployed and the number of CSU enrollments, both track in the positive direction, indicating that when changes in those numbers are positive (more CSU students and more unemployed), the CCC system also benefits from higher enrollments.

INSERT TABLE 2 HERE

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autoregression in the series. See McDowall et al. (1980) for a primer on diagnosing the types of ARIMA models to utilize with time series data.

A similar approach to model estimation is taken with our second equation, with the spotlight now turned to changes in transfer enrollments (rather than overall headcount). The model is estimated using several independent variables, including 1) changes in CCC system funding; 2) changes in the number of unemployed Californians; 3) the change in the CSU system head count of enrollment; and 4) a lagged indicator of the recession variable.[2] Examining the OLS regression results, the predictors explain 64 percent of the variance in changes in CCC transfer enrollments from year-to-year. The recession indicator features a significant negative impact in the OLS model, suggesting that all other things being equal, a recession has a negative impact on CCC transfer enrollments, driving them down by roughly 74,000 course enrollments (see Table 3). However, the OLS results can produce biased estimates of statistical significance, which demonstrates the importance of controlling for autocorrelation in an ARIMA time series model. In fact, a 1,1,0 ARIMA model of the time series generates a non-significant coefficient for the recession variable (b = -69,368, significant at only the 91% confidence level).

INSERT TABLE 3 HERE

The coefficients for other variables suggest that the change in the number of unemployed has positive significant impacts on year-to-year changes in transfer enrollments. It makes intuitive sense that large swings in the unemployment rate would foster greater numbers of young students to enroll in transfer-directed courses. This reflects strategic rational thinking on the part of CCC students, with plans for longer term educational goals perhaps winning out over shorter term goals because students can see the bad economy‟s impact on short term job prospects.

[2] The ARIMA model used for this equation is similar to the first equation, a first-differenced model that still featured first order autocorrelation, qualifying it as a (1,1,0) ARIMA model

A final test of the effects of a recession appears in Table 4. The conventional wisdom suggests that greater enrollments in the CCC system by students who may have been turned away from the CSU or UC system will generate not just greater transfer enrollments, but also greater rates of success in transfer classes. So, a final dependent variable taps the year-to-year change in the successful completion rate for transfer course work in the CCC system. We employed both OLS regression and ARIMA time series models for this equation as well. The key independent variable is the state of a recession (using the familiar one-year lag effect). Unlike in the two prior equations, the expected coefficient for this variable is positive, with the hypothesis being that a recession should drive up the successful completion rate in transfer-eligible courses if the enrollments feature higher caliber students. We control for other rival variables, including the percentage of transfer enrollments in the system, changes in system funding, the change in the number of unemployed Californians, and changes in CSU system enrollment. Our findings from the OLS regression results and ARIMA model provide support for the conventional wisdom – recessions do tend to result in greater rates of course success in transfer eligible courses in the CCC system. The coefficients suggest that, all other things being equal, a recession can have a positive effect of just over seven-tenths of a percentage point on the percentage of students earning grades of C or higher (b = .74 and .71 in the two equations, significant at the 95 percent confidence level). The effect of a recession is akin to increasing the percentage of successful transfer course completers from 70.0 to 70.7 percent. It is important to point out that we are presuming that the recession indicator is a kind of surrogate for the greater percentage of CSU/UC eligible students who are more motivated to complete their transfer curriculum quickly, but have been denied access in the 4-year public system because of the same

recession. This may be a long leap for some readers, but it is a leap that makes a good deal of intuitive sense.

INSERT TABLE 4 HERE

Conclusion and Implications

We started with a mission of testing several propositions about the impact that recessions can have on CCC system enrollments and rates of student success. The literature is filled with claims that recessions cause a spike in enrollments at community colleges generally, but that many colleges come to face a reckoning of dealing with increasing demand amid dwindling dollars. In fact, this results in a downward spiral in overall enrollments during recessions. While the number of unemployed can have a recognizable positive impact on CCC enrollment, recessions tend to actually reduce access to the CCC system once the funding spiral gets taken into account. As a result, sophisticated models of enrollment history pinpoint a notable finding – recessions tend to have a negative impact on higher education access across the board, and CCC"s, just like the CSU and UC system must ultimately turn away students because of recessionary budget losses.

Despite the negative implications that come with recessionary dips in enrollment, the greater interest in transfer courses and the spill-over effect of perhaps better prepared students in the CCC system does result in positive changes in the system"s success rates in transfer-eligible courses. So while access gets tighter, the rates of student success improve in transfer courses. This fits with the often hypothesized impact of CSU and UC contraction – that it results in "positive" payoffs for transfer success patterns in the CCC system. Unfortunately, in periods of a long recession, these new, successful CCC students may have limited seats to compete for

when they fill out their transfer applications to the CSU and UC system. This may explain why the for-profit four year institutions have seen surges in CCC transfers (Van Ommeren 2010; Perry 2009). The transfer pathway between CCC"s and the University of Phoenix has grown from a trickle in 2000 to roughly 10,000 in 2009 (Perry 2009), far outpacing the growth in transfers to the CSU and UC system.

The closing of the doors in the state"s public higher education system will have long-term negative economic impacts on students who have traditionally been under-represented in the college ranks (see Perry 2009; Van Ommeren 2010). Consider how limited UC and CSU access has impacted African Americans. Van Ommeren (2010, 57) reports that in recent years, African American women are three times more likely than white women to transfer out of the CCC system to a for-profit institution (30 percent versus 10 percent). For African American men, the rate is two times higher (19 percent versus 9 percent for white men). Hispanic rates of transfer to for-profit universities are also higher (Van Ommeren 2010, 57). Overall, CCC students who transfer to for-profit schools tend to be disproportionately drawn from female, non-white backgrounds with lower incomes and lower GPA"s in the CCC system (Van Ommeren 2010, 71-81).

To the extent that for-profit four year universities have benefitted from the reduced access in the public system, students of impoverished backgrounds are increasingly finding themselves with large debt burdens that come with financial aid loan packages at these colleges. It is estimated that universities like Phoenix draw as much as 90 percent of their revenue from federal financial aid packages (Hechinger and Lauerman 2010). The case of for-profit access is not helped by recent reports that CEOs at these institutions are pulling in excessive annual salaries and making millions in stock sales. A recent study found that Peter Sperling, Vice

Chairman of Apollo Group‟s University of Phoenix, made $574 million in stock sales over a seven year period (Hechinger and Lauerman 2010).

In the end, disproportionately large percentages of poor Hispanic and African American CCC transfer students end up at for-profit universities, and their economic vulnerability is only heightened if their education is financed through federal loan programs. As Perry (2009) points out, this model of educational financing and the current economic downturn has only strengthened the ability of for-profit four-year colleges to cement a marketing niche.

> "The University of Phoenix exists only where the CCC and CSU have failed: we don‟t offer full programs online (or very few), we do not offer a viable CCC to CSU undergraduate transfer online, we make our transition points incredibly difficult, we don‟t offer accelerated learning, we don‟t offer much flexibility for working adults, we don‟t offer adequate academic guidance or technological support. Lately we don‟t offer courses you can get into."

Perry‟s underlying point is obvious – unless state higher educational systems become more flexible and responsive to market forces and the new budget environment, the enrollment market share will increasingly grow for private, for-profit institutions.

Figure 1

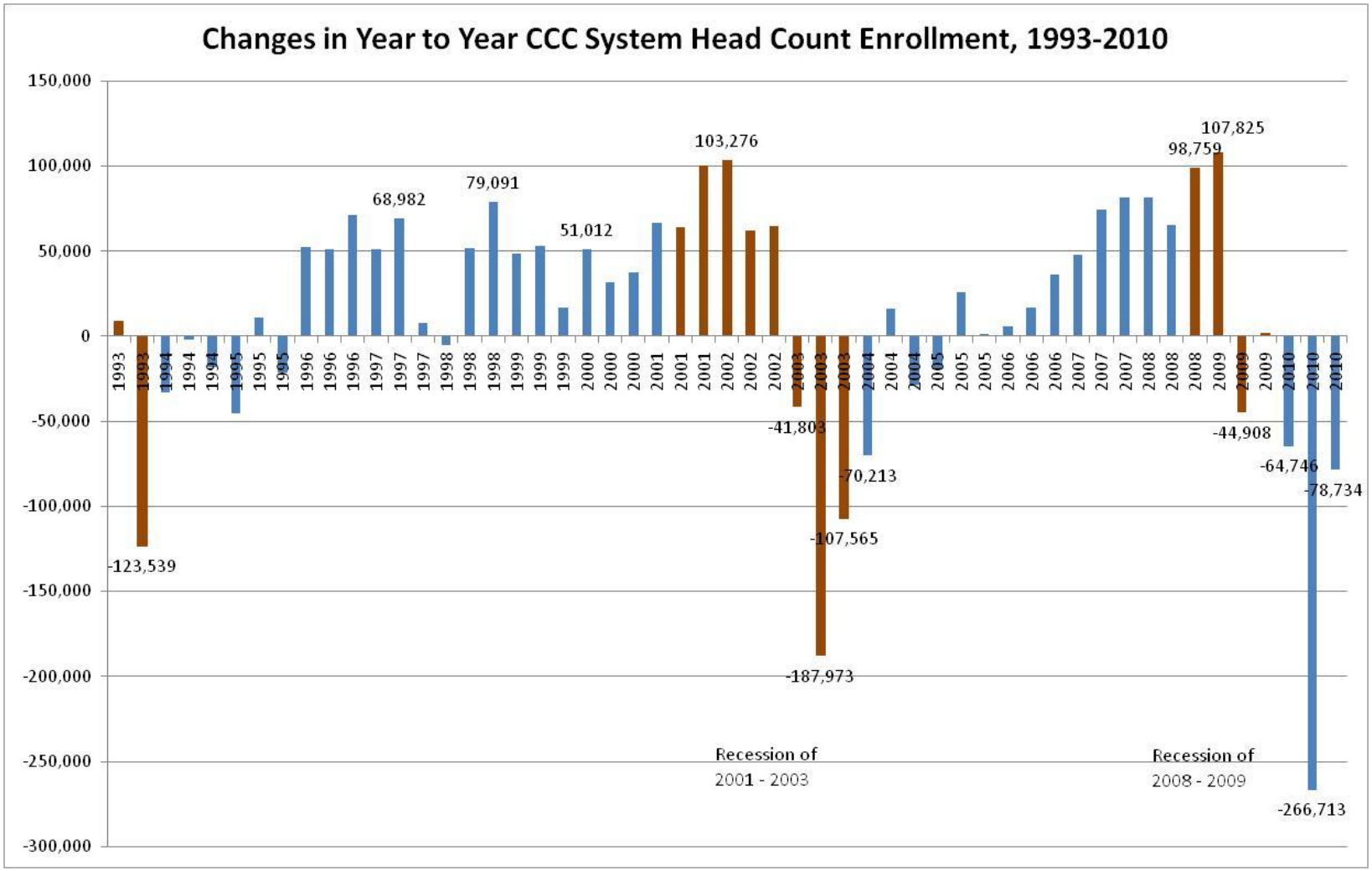
Changes in Year to Year CCC System Head Count Enrollment, 1993-2010
150,000
100,000
50,000
0
-50,000
-100,000
-150,000
-200,000
-250,000
-300,000
-123,539
68,982
79,091
51,012
103,276
-41,803
-187,973
-107,565
-70,213
98,759
107,825
-44,908
-64,746
-266,713
-78,734
Recession of
2001 - 2003
Recession of
2008 - 2009

Table 1 – Bivariate Correlations of Independent Variables in Enrollment and Transfer Success Prediction Models

	Total Head Count	Previous Year Head Count	CSU Head Count	Total Enroll	Transfer Enroll	Transfer Success Rate	Number Un-employed	Recession Period	System Funding
Total Headcount	--								
Previous Year Headcount	.901**	--							
CSU Headcount	.911**	.858**	--						
Total Enrollment	.965**	.940**	.901**	--					
Transfer Enrollment	.957**	.949**	.899**	.998**	--				
Transfer Success Rate	-.332*	-.066	-.452**	-.318	-.291	--			
Number Unemployed	.326*	.546**	.204	.487**	.503**	.322	--		
Recessionary Period	.626**	.566**	.454**	.535**	.509**	-.053	.342*	--	
System Funding	.900**	.829**	.968**	.896**	.894**	-.498**	.148	.363*	--

*Significant at $p<.05$
**Significant at $p<.01$

Table 2 - Predicting Fall & Spring Changes in CCC Head Count, 1993-2010

	OLS REGRESSION MODEL				ARIMA (1,0,0) MODEL			
Variable	**Coefficient**	**Standard Error**	**T Test**	**Signif.**	**Coefficient**	**Standard Error**	**T Test**	**Signif.**
Change in CCC Funding (million $)	33.4	44.0	0.76	.227	34.3	73.1	0.47	.319
Change in Unemployed	.191	.038	5.03	.000	.198	.047	4.26	.000
Change in CSU Head Count	2.00	.600	3.34	.001	2.00	.970	2.06	.020
Recession – 1 year lag	-69,296	20,958	-3.31	.001	-76,367	30,250	-2.52	.006
Constant	15,038	14,831	1.01	.160	15,102	18,441	0.82	.206
Lag 1 of Dependent Var.					.039	.276	0.14	.443
N of cases	35				34			
F Test/Wald Chi Square	15.00			.000	30.26			.000
Adjusted R Square	.622							
Durbin Watson (d)	1.63							

Lower limit for d = 1.271, upper limit for d = 1.650
Accept the null hypothesis of no autocorrelation in error terms

Table 3 - Predicting Fall & Spring Changes in Transfer Enrollments in the CCC System, 1993-2010

	OLS REGRESSION MODEL				ARIMA (1,0,0) MODEL			
Variable	**Coefficient**	**Standard Error**	**T Test**	**Signif.**	**Coefficient**	**Standard Error**	**T Test**	**Signif.**
Change in CCC Funding (million $)	15.6	7.2	.217	.415	17.3	10.6	0.16	.436
Change in Unemployed	.410	.062	6.59	.000	.418	.072	5.79	.000
Change in CSU Head Count	2.42	.980	2.47	.009	2.36	1.53	1.55	.066
Recession – 1 Year Lag	-74,145	34,238	-2.17	.019	-69,368	53,869	-1.29	.099
Lag 1 of Dependent Var.					-.036	.265	-0.14	.446
Constant	45,642	24,229	1.88	.035	46,167	34,341	1.34	.090
N of cases	34				33			
F Test/Wald Chi Square	16.24			.000	59.20			.000
Adjusted R Square	.642							
Durbin Watson (d)	1.286							

Lower limit for d = 1.284, upper limit for d = 1.567
Accept the null hypothesis of no autocorrelation in error terms

Table 4 - Predicting Changes in Successful Course Completion in Transfer Courses in the CCC System, 1993-2010

	OLS REGRESSION MODEL				ARIMA (1,0,0) MODEL			
Variable	**Coefficient**	**Standard Error**	**T Test**	**Signif.**	**Coefficient**	**Standard Error**	**T Test**	**Signif.**
Percentage of Transfer Enrollments	-.192	.161	-1.19	.121	-.117	.210	-0.56	.288
Change in CCC Funding (billion $)	1.48	.596	2.49	.009	1.13	.591	1.90	.029
Change in Unemployed (in thousands)	.001	.000	2.47	.010	.001	.000	2.00	.023
Change in CSU Head Count (in thousands)	-.023	.000	-2.75	.000	-.019	.000	-2.50	.006
Recession – 1 Year Lag	.738	.290	2.54	.009	.709	.408	1.74	.041
Lag 1 of Dependent Var.					-.334	.160	-2.09	.019
Constant	14.26	12.29	1.16	.128	8.55	16.02	0.53	.287
N of cases	34				33			
F Test/Wald Chi Square	4.40			.004	58.31			.000
Adjusted R Square	.333							
Durbin Watson (d)	1.73							

Lower limit for d = 1.284, upper limit for d = 1.567
Reject the null hypothesis of no autocorrelation in error terms

References

American Association of Community Colleges. (2009). Community college enrollment surge: An analysis of estimated fall 2009 headcount enrollments at community colleges. Retrieved November 2, 2010 from www.aacc.nche.org.

Betts, J. R. and MacFarland, L.L. (1995). Safe port in a storm: The impact of labor market conditions on community college enrollment. *The Journal of Human Resources, (30),* 741-765.

Box, G. E. P., and G. M. Jenkins. (1976). *Time Series Analysis: Forecasting and Control*. San Francisco: Holden-Day.

California Community College Chancellor"s Office. (2010). California Community Colleges Budget Comparisons over the Years. Sacramento: CCCCO, Fiscal Services Unit.

_____. (2005). Impacts of student fee increase and budget changes on enrollment in the California Community Colleges: analysis of fee increase from $18 to $26 per unit. Sacramento: CCCCO.

California Employment Development Department. (2010). Historical civilian labor force (March 2009 benchmark, seasonally adjusted). Sacramento: EDD, Labor Market Information Division. Available online (25 October 2010): http://www.labormarketinfo.edd.ca.gov

Chen, C. K. (2008). An integrated enrollment forecast model. Association for Institutional Research, *IR Applications* 15 (January 2008).

Douglass, J.A. (2008, November). *College vs. unemployment: Expanding access to higher education is the smart investment during economic downturns*. Berkeley, CA: University of California, Berkeley.

Fry, R. (2010). Minorities and the recession-era college enrollment boom. Washington, DC: Pew Research Center Social and Demographic Trends Project.

Green, K. (2009). Community colleges and the economic downturn. Encino, CA: The Campus Computing Project.

Hechinger, J., and J. Lauerman. (2010). Executives collect $2 billion at for-profit colleges. *Bloomberg.com* (12 November 2010).

Humphreys, B.R. (2000). Do business cycles affect state appropriations to higher education? *Southern Economic Journal, 67*(2), 398-413.

McDowall, D., R. McCleary, E. E. Meidinger, and R. A. Hay, Jr. (1980). *Interrupted Time Series Analysis*. Sage University Paper Series on Quantitative Applications in the Social Sciences, Series No. 07-021. Newbury Park, CA: Sage.

Ostrom, C. W. Jr. (1990). *Time Series Analysis: Regression Techniques*, second ed. Sage University Paper Series on Quantitative Applications in the Social Sciences, Series No. 07-009. Newbury Park, CA: Sage.

Pennington, K.L. and McGinty, D. (2002). Community college enrollment as a function of economic indicators. *Community College Journal of Research and Practice, (26),*431-437.

Perry, P. (2009). Observations on the budget, enrollments, and where we are headed as a system. *The iJournal: Insight into Student Services*. Available online (9 October 2010): http://ijournalccc.com/articles/issue_25/perry.html

StataCorp. (2005). *Stata Statistical Software: Release 9 (Time Series)*. College Station, TX: StataCorp LP.

Van Ommeren, A. (2010). New transfer partners: California Community Colleges and for-profit four year institutions. Unpublished dissertation, Bernerd School of Education. Stockton, CA: University of the Pacific.

Zimmer, H. R., W.H. Hightower, and D. E. Gregory. (2006). State funding limitations and community college open door policy: Conflicting priorities? *Community College Journal of Research and Practice, 30* (8), 627-640.