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ABSTRACT

A study was undertaken to determine the economic value of receiving a vocational certificate or associate degree from the California Community Colleges (CCCs). The study examined state Unemployment Insurance Wage Record (WR) data for a cohort of 841,952 leavers and completers from the CCCs during 1991-92, comparing educational attainment by post-college earnings from the last year in college, first year out of college, and third year out of college for vocational students and all students. In addition, the study sought to determine the relationship between educational attainment and earnings for non-vocational students by age, ethnicity, gender, and economic status. Study findings included the following: (1) WR data were available for 70% of the sample in their last year in college and 66% of those their first year out of college, while over 60% of the former students had WR data 3 years out of college; (2) a positive relationship was found between formal education and earnings; (3) for all students, the greatest gains were among certificate completes at 15% and associate degree completers at 11%; (4) students under 25 who completed a certificate experienced a 25% gain, compared to a gain of only 10% for certificate completers over 25; and (5) although men earned more than women across the three time periods, the gap narrowed for women who had earned an associate degree or certificate. Contains 33 references. Data tables are appended. (BCY)

What Is It Worth? The Economic Value of Obtaining a Certificate or Associate Degree from California Community Colleges

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There are many reasons why individuals attend college. One popular argument found in the literature is the notion that obtaining an education beyond high school will yield not only higher paying salaries but higher level jobs (Elam, 1983; Grubb, 1996; Pascarella & Terenzini, 1991). Numerous studies suggest that individuals are motivated to attend college because of the economic returns, and that there is a strong positive relationship between formal education and earnings (Grubb, 1996; Pascarella & Terenzini, 1991). In other words, workers who have the most education have the highest average annual earnings and the lowest unemployment rates (Occupational Outlook Quarterly, 1992).

Although most of the research has focused on the comparison between high school graduates and four-year college graduates in relation to earnings (Adams & Jaffe, 1971; Haller, 1982; Henderson & Ottinger, 1985; Pace, 1979), very little is known about the value of an associate degree or vocational certificate from community colleges. In fact, most reports show what the economic payoffs are if you obtain a baccalaureate degree on an individual's average earnings. Data provided by federal agencies like the U.S. Bureau of the Census tend to disaggregate educational attainment level from the spectrum of not a high school graduate, high school graduate, some college, baccalaureate, master, doctorate, to professional. The "some college" category usually includes associate degree completers and as a result remains ambiguous and vague. Attributing the ultimate contribution to community colleges in terms of the economic benefit to individuals' post-college earnings is difficult and often impossible.

For community colleges, a popular outcome measure is assessing the economic impact of the community college on the local economy (Head, 1994; Katsinas, 1994; McIntyre, 1996; Stout, 1996; Weitzman, 1991; Winter & Fadale, 1991). Much of the studies in this area

specifically examine the direct impact of the college in terms of the total expenditures in supplies and services, college budgetary expenditures, employee expenditures, employee training, and new business development in their respective communities. These studies focus on the college or system, its resources (fiscal and facilities), and its economic impact on the local community. Although these studies are important, the economic impact on students as measured by individual earnings is rarely discussed. In studying the economic benefit of a community college education on students' earnings, the unit of analysis moves from the college as an institution to the student as the unit. In other words, investigating multiple outcomes by examining students provides the opportunity to attribute the impact of a community college education on an individual's economic worth in the world of work.

PURPOSE

This study examines data from California Community Colleges and the Employment Development Department's Unemployment Insurance (EDD-UI) Wage Record data. Specifically, a cohort of *leavers* and *completers*, which is comprised of over 841,000 students during the 1991-92 academic year, are examined. The purpose of this study is to answer the question: What is the economic value of obtaining a vocational Certificate or an Associate degree from California Community Colleges. How do students' post-college earnings from last year in college, first year out of college, and third year out of college differ by educational attainment for all students and vocational students. For non-vocational students, what is the relationship between educational attainment and earnings for students under 25 and for students

25 and over? Are there differences by ethnic background, economic status, gender, and age group among vocational students?

REVIEW OF RELATED RESEARCH

In researching the economic benefits of a college education, a generalization is made that formal education has a strong positive association with earnings (Blaug, 1970, 1972; Grubb, 1996; Psacharopoulos, 1973, 1985) even when factors such as age, gender, and occupational category are held constant. Much of the research examining the net effects of college on students' earnings has focused primarily on the influence of different levels of formal education. According to Jencks et al. (1979), when you control for work experience, measures of intelligence, and socioeconomic background, a high school diploma provided a 15 to 25 percent earnings advantage over an eighth grade education. Although most of the comparisons tend to focus on differences between high school graduates and baccalaureate degree recipients, little is know about the value of an Associate degree or vocational Certificate from community colleges in relation to earnings advantage over a high school diploma.

A popular framework used in the literature to explain the effects of formal education on earnings is the "human capital" or "socialization" hypothesis (Pascarella & Terenzini, 1991). Most of the studies have applied these perspectives on individuals who completed a four-year college education. According to the hypothesis, those with baccalaureate degrees earn more than high school graduates because students who obtain a four-year education develop the cognitive skills and/or personal traits that make them more productive employees (Pascarella & Terenzini, 1991). Another hypothesis advanced in the literature is the notion of "certification" or

"screening." That is, employers can use college education as a way to screen out the applicant pool or to require a bachelor's degree as a way of certifying prospective employees (Jencks et al., 1979). In other words, by virtue of possessing the bachelor's degree, individuals are perceived as meeting a certification, which distinguishes them from non-degree recipients, and are thus, awarded with higher paying jobs or career paths.

Net Effects of Community College Education

The between-college effects of two-year and four-year institutions on economic benefits have been examined. Specifically, there is a small body of literature that has addressed the net impact of initially attending a two-year rather than a four-year institution on earnings. The evidence suggests that when controlling for background traits and educational attainment, any direct earnings penalties for attending a two-year college are quite small early in the career, but may increase slightly with longer work experience (Pascarella & Terenzini, 1991). However, students who begin at a two year may experience a negative impact on earnings since they are less likely to complete a bachelor's degree than their four-year counterparts (Astin, 1985).

Recently, Grubb (1996) reported the latest findings using the Survey of Income and Program Participation (SIPP), in his book entitled, *Working in the Middle*. According to Grubb, while individuals with baccalaureate degrees dominate managerial and professional jobs, those who earn an associate degree double their chances of becoming a professional or manager compared to the chances for someone with a high school diploma. Further, he maintains that the chances of obtaining a job, which requires technical skills, is highly increased with an associate degree or vocational certificate and the likelihood of becoming a laborer or having an unskilled

position is reduced. In other words, having a sub-baccalaureate credential as well as postsecondary coursework without credentials helps individuals move from the bottom levels of the labor force into mid-skilled positions.

State Efforts Using Unemployment Insurance Wage Records

Questions of the contributions that community colleges make to an individual's economic worth have been quantified in terms of income enhancement. States including California, Florida, North Carolina, Texas, and Washington and a few others have conducted statewide studies using the Employment Development Department's Unemployment Insurance (EDD-UI) Wage Record data to develop a methodology to measure students' post-college earnings. Most of the studies have followed program completers or graduates into the work place to estimate average annual earnings or placement. Collaborative efforts with the Department of Labor unemployment records offices have yielded information from the quarterly wage/earnings files for those students identified as program completers or graduates. Since matching with the student's social security number is required in order to access not only earnings, but also educational data, the concern surrounding confidentiality and privacy issues have been in the forefront of researchers, policymakers, and state agencies.

Florida is considered to be the pioneer in developing a follow-up strategy using the UI Wage Record data. As a result of a legislative directive and a joint agreement between the state Department of Education and the Department of Labor and Employment, the Florida Education and Training Placement Information Program (FETPIP) was developed. In a recent study (Pfeiffer, 1990), 200,000 vocational education graduates during the 1988-89 academic year were

tracked. Of these students, 64% of program completers were found employed in Florida businesses, an additional 20% continued their education within the state's higher education system, and two percent were federal employees or in the military.

In the state of Washington, over 12,269 postsecondary vocational education program completers during the 1990-91 academic year were tracked (Seppanen, 1993, 1994). The Washington State Board for Community and Technical Colleges (WSBCTC) compiles data on educational and job related outcomes for students leaving vocational preparation programs. Using an automated data matching procedure, this method examines state unemployment insurance and benefit records, public post-secondary enrollments, U.S. Armed Forces enlistments, and state community college enrollments. Specifically, data are compiled on employment status, estimated annual wages, hours worked per week, the relation of employment to training, post-secondary or military status, and a host of others. Based on a nine month analysis for the 12,269 graduates of vocational programs, the study revealed the overall job placement rate of 85%, with 27% of the graduates going into health related fields, 23% going into trades, 13% entering the service industry, and 12% in administrative support. To account for out-of-state employment of Washington program completers, efforts were made to collaborate with neighboring states such as Alaska, California, Idaho, and Oregon.

During the spring of 1990, the Indiana Commission on Vocational and Technical Education completed a pilot study of 1,497 student program completers from the 1988-89 school year. Other than social security identification no student demographic information was analyzed. Overall, 71% of the completers were found in either the state's unemployment insurance, the Department of Defense military personnel, or the Indiana Commission for Higher Education

databases. Specifically, 66% were found in state wage records, 16% were in higher education, and three percent in the military (Piper, 1990).

In Illinois, (Merano, 1990) a pilot study was conducted of the 1988-89 cohort of students who completed an occupational program. Of the 15,485 occupational education program completers, 70% matched in the subsequent quarter following their education/training. Of these students, 84% were still employed for one year. Average quarterly earnings increased from $4,207 to $4,621 for the first two quarters following program completion; no student demographic data were analyzed.

In 1993, the adoption of a new legislation and goals statement for the North Carolina Community College System reemphasized the efforts by community colleges on work force preparedness (Vanderheyden, 1994). In response to this policy, efforts were put forth to account for two outcome measures of successful work force training: employment rates and median salary of program completers. In a study examining 15,817 who completed a program during 1990-91, the findings revealed that 92% of students were employed during the third quarter of 1991 and their median earnings was $3,830. One year later, 97% of former students were employed and had an increase in their median earnings of $4,279.

In Texas, Froeschle (1991) examined 8,162 completers and non-returning postsecondary vocational-technical education students from four institutions. Approximately 85% of the former students were found in UI wage records file during the five quarters subsequent to the graduation. In Colorado, Smith (1989) reviewed 3,797 Associate degree and Certificate completers in 1985-86. The longitudinal student tracking system contained data from three sources: 1) Colorado Commission of Higher Education; 2) Colorado Department of Labor and

Employment; and 3) Colorado Community College and Occupational Education System. Of the award and program completers 20% were enrolled in higher education, 58% were in UI wage records file one year after graduation, and 12% of these students were also enrolled in higher education.

Alaska, Florida, Indiana, and Washington have accessed additional employment (i.e., federal personnel records, postal service employment and military/defense records) related databases in order to account for a greater proportion of their students. Only Alaska and Washington have arranged to retrieve employment earnings from neighboring states. Conversely, California and Texas have examined students who did not complete their program and left training, compared with students who completed their program. Generally, the results for California and Texas reveal that students who do not complete a certificate or degree have substantially lower quarterly earnings, compared to program completers. This information suggests that in order to maximize quarterly earnings students would be best served by completing their program. Although a few of the studies have addressed the need to account for those students who entered the ranks of the self-employed, efforts to examine earnings of those students have not been undertaken by these states. Estimates of how much of the work force is self-employed vary greatly from as little as three to five percent (Stevens et al., 1992) to a high of 10 to 15% and rising (U.S. Department of Commerce, 1996).

California's Efforts Using UI Wage Record Data

Jack Friedlander (1993a, 1993b, 1996) has been credited with being the pioneer in examining the post-college employment rates and wages of California community college

students. A pilot study was conducted in 1992-93 in coordination with the California Community Colleges Chancellor's Office (CCCCO), California Economic Development Department (EDD), Santa Barbara City College, and Grossmont College. This feasibility study was used to develop the Post-Education Employment Tracking System (PEETS) to track the post-college employment rates and earnings of community college program completers and leavers over an extended period of time. The methodology used social security numbers to match EDD quarterly wages data with student records maintained by the State Chancellor's Office. The study confirmed that PEETS can be used to answer questions regarding employment patterns of former students, employment rates by major and type of degree, comparative earnings of associate degree graduates and those who did not complete the degree, and earnings and employment rates in different student population groups (Friedlander, 1993a). Friedlander concluded that PEETS is an inexpensive method for tracking the success of former students, and can be used to meet accreditation requirements and respond to consumer inquiries.

Another study by Friedlander (1993b) examined students who attended Santa Barbara City College (SBCC) from 1986-87 to 1989-90 to determine the earnings made by students while they were enrolled, and first year and third years after leaving SBCC. Using the same methodology of matching students' social security numbers with income data collected from employers by the California EDD, the study compared employment status and earnings by occupational field, and outcomes for associate degree completers and those earning 12 or more credits at SBCC. In general, Friedlander found that students who completed associate degrees experienced an increase in annual wages of 41%, compared to students only completing 12 units

or more (28%). Among students who completed an associate degree, post-college earnings were highest among nursing graduates.

To refine the use of PEETS, Friedlander (1996) conducted a follow-up study that included a sample of 173,523 students from 18 California community colleges who either completed a certificate or degree or stopped attending in 1991 or 1992. The study found that UI records were available for the majority of the sample and that wages of students who received a certificate or degree from an occupational program were higher than both those who left occupational programs without a degree or certificate and those who completed non-occupational programs. Moreover, occupational students with a degree or certificate made a 47% gain in wages from last year in college to third year out of college.

DATA SOURCES AND METHODOLOGY

There are two main sources that were used to derive at a dataset to respond to questions about the post-college earnings of students. The process involves electronically matching the social security number in the UI wage record data files maintained by EDD with the student record files stored in the Chancellor's Office MIS. Specifically, the two sources are: 1) the Unemployment Insurance (UI) Wage record data collected by the California Employment Development Department (EDD); and the demographic and educational data for all California community college students maintained by the Chancellor's Office Management Information System (MIS).

The California EDD collects and maintains UI wage records, which are used to determine employment and earnings of individuals in the labor market. Employers are required to comply

with the state's UI Compensation law by submitting UI quarterly reports of earnings for their employees. For each employee covered, an employer is required to report the employee's social security number and the total amount of earnings received during the quarter. Additional information about the employer is also reported, such as the unique employer identification number, the county in which the business is located, and the industry affiliation of the business.

The Chancellor's Office MIS database contains demographic and educational data of all students who attended California community colleges since fall 1990. As the state's official repository of community college student data, the MIS contains demographic data such as age, gender, ethnicity, financial aid status, English language proficiency, and disability status. Furthermore, educational data maintained include pre-collegiate basic skills courses, occupational and non-occupational courses completed, grades, and degrees and certificates awarded.

For this analysis, the target population includes students who were either *completers* or *leavers* during the 1991-92 academic year. A *completer* is defined as a student who received a certificate or degree; whereas a *leaver* is defined as a student, who did not receive a certificate or degree, but may have completed some units. The data analyses conducted for this study is based on information from 841,952 students enrolled in 103 of the 106 California community colleges. The reporting domain of the cohort included students with a social security number, students who met the Full Term Reporting Criteria (FTR), and were enrolled in a least 1/2 unit or eight hours of positive attendance during the academic year. Excluded from the reporting domain were: 1) students enrolled in K-12 during the cohort year; 2) students enrolled in any California State University during the two years following the cohort year; and 3) students enrolled in the

two years following the end of the cohort year at any college in the California Community Colleges system. Individuals who were employed by the military or federal government, self-employed, unemployed, or not in the work force were also not part of the dataset.

Analytic Approach

In order to make comparisons of earnings from last year in college to third year out of college, the California Consumer Price Index for Urban (CPI-U) Consumers was used to adjust earnings for changes in inflation. Thus, all earnings were adjusted to 1995 dollars. For this study, only students who worked all four quarters were examined. These students were found in the labor market beginning July 1st during their last year in college and third year out of college. Further, the median annual earnings were used instead of the average earnings because this is how the data were made available to colleges from the Chancellor's Office. The median annual earnings represent the middle value in the distribution of the annual income. The annual income is derived by summing earnings for those working all four quarters. The purpose of using the median annual earnings is to have a more stable statistic. Compared to the mean, the median is more robust and less likely to be influenced by extreme outliers.

RESULTS

Figure 1 illustrates the different typology of students from California community colleges in 1991-92 by enrollment concentration. The data produced by the Chancellor's Office have been disaggregated into five concentrations: 1) all students (no vocational courses); 2) vocationally exposed; 3) skills upgrade; 4) vocational students; and 5) vocational students major.

Each typology is defined by the number of vocational courses, and the SAM codes found in the Chancellor's Office Data Element Dictionary. For this study, the focus of the analysis will be on all students and vocational majors. Students identified as vocational majors have taken 12 or more units in the same two-digit Taxonomy of Program (TOP) code or program area.

All Students

Figure 2 shows the median annual earnings of all students by educational attainment. Students' earnings during their last year in college, first year out of college, and third year out of college are reported. The educational attainment spectrum ranges from non-credit to associate degree completers. The non-credit or 0 unit category is the count of students enrolled in courses that generated zero (0) cumulative units of credit. This particular category includes counts of non-credit students as well as students who have not earned any cumulative units in credit courses. The results show that gains are evident across all levels; however, the largest gains were among Certificate and Associate degree completers. Although positive gains are evident among non-credit to 24+ unit completers, they were not substantial. Certificate completers experienced a 15% gain from first year out to third year out; Associate degree completers experienced an 11% gain, respectively. For the other levels, the percent gain from first to third year out ranged from 6% to 10%.

In examining the data by age, students under 25 (see Figure 3) experienced substantial gains across educational attainment levels from their last year in college earnings to first year out and third year out of college. Students who completed 24 or more units experienced a 27% gain from first year out to third year out of college; 25% gain among Certificate holders; and 28%

among Associate degree recipients. For students who completed the Certificate, they had higher median annual earnings during their first year out and third year out of college, compared to the others. For students under 25, their third year earnings ranged from $16,000 to $21,000.

For students 25 and over (see Figure 4) the results are very different compared to younger students. First, the percent gains are very small across all groups. However, if students completed a Certificate (+10%) or Associate degree (10%), they were more likely to experience higher gains three years out. Second, although students in the .01-11.99 unit category had slightly higher earnings, the percent gain was very minimal, as illustrated by the overlapping of the symbols. Third, older students had higher earnings for all three-time periods (last year, first year, and third year). In other words, students 25 and over were already making more money and were likely to be in the workforce much longer, compared to their counterparts. Compared to younger students, students 25 and over had earnings that ranged from $25,000 to $33,000, substantially higher than their counterparts.

Vocational Students Major

For students who comprised the vocational students major category (see Figure 5), they were identified to have had a "major" because they completed at least 12 units in the same program area. Overall, the 38,314 vocational majors experienced a 14% gain from first year out to third year out in terms of post-college earnings. An interesting pattern is evident among vocational majors. There were small gains among 12-23.99 unit completers. In terms of first year out to third year out earnings, students who completed 24 or more units experienced a 16% gain; while Certificate holders had slightly lower gains (+15%) and 12% for Associate degree

completers. Among AA or AS degree completers, their last year to third year college gains yielded a 71% gain; 34% among Certificate holders, and 38% among 24+ units. Three years out, students with Certificates or AA or AS degrees had higher earnings that ranged between $28,000 to $32,000, compared to the other groups.

About 12% of vocational majors were identified as economically disadvantaged students. To be identified as economically disadvantaged (see Figure 6), they had to meet one of the following: 1) awarded a Board of Governor's Grant; 2) awarded a Pell Grant; 3) identified as a GAIN participant; and 4) identified as a participant in the Job Training Partnership Program. According to Figure 6, there is a positive relationship between earnings and level of education. This trend is evident for students' first year out and third year out of college earnings. Overall, economically disadvantaged students experienced a 25% gain from first year to third year out. As students complete more education they experience higher earnings. For students' gains from last year to third year, Certificate completers experienced a 125% gain, while Associate degree completes experienced a 195% gain, respectively. In examining their first year out to third year, Certificate holders had an 18% gain, 20% gain for AA or AS degree completers.

Figure 7 depicts the third year median annual earnings of vocational students who earned an Associate degree by racial/ethnic background. All students experienced positive gains in their post-college earnings. In terms of students' first year out to third year out gains, African Americans (n=529) experienced +10%, Hispanic/Latino (n=868) +16% gain, Asian/Pacific Islander (n=872) +17%, and Other Minority (n=529) +22%, respectively. White (n=5,507) students had an 11% percent gain in their post-college earnings from first to third year out. In terms of actual earnings, students in the "Other Minority" category had the highest third year

earnings ($36,349), followed by White students ($32,420). Students in the Other Minority category include Pilipinos and Native Americans.

For the 1991-92 cohort, female vocational students (major) included 19,828 students, compared to 18,150 of men. In examining within the group, female students experienced substantial gains as they completed more education. Further, female students were more likely to have higher actual median annual earnings if they completed the Certificate of Associate degree. This is evident when examining female students' last year in college to third year out. A 44% gain among Certificates and 85% among AA or AS degree completers was realized. The third year earnings among female vocational students ranged from $18,000 to $31,000. Conversely, male vocational students had higher gains from first year out to third year out, compared to women. Certificate holders had a 15% gain, about two percent higher than women. AA or AS degree recipients among men experienced a 16% gain, about six percent more than their female counterparts. Figure 8 illustrates the closing of the earnings gap between men and women. The results reveal that as women complete more education the gap closes. That is, completing the Certificate or Associate degree positively impacts the earnings among women and thus, closes the gap. Although men tend to have higher third year earnings across all levels, women catch up and close the gap when they complete a formalized program, namely the Certificate or Associate degree.

In analyzing the data by age group, among associate degree completers students in the 18 to 24 year old category had the highest percent gain (+19%) from first year out of college to third year, followed by students 25 to 34 year olds (+13%), and 35 year olds and over (+12%), respectively. Although 18 to 24 year olds experience the highest change, they had substantially

lower third year earnings ($23,000 versus $33,000). There is over a $10,000 gap between younger students (under 25) and non-traditional students (over 25).

LIMITATIONS

Although there are advantages in utilizing the EDD-UI and MIS student data files, there are some methodological concerns with respect to studying California community college students. The accuracy of the data is dependent on the reliability and uniformity of data submitted to the Chancellor's Office by individual colleges and districts for the 1991-92 academic year. Although UI wage records are tagged with students' educational data, the dataset is strictly an administrative dataset, not a research dataset.

The data only reports students who had UI Wage Record matches with their MIS student files and does not control for students' educational experience and their place of employment in the work force. As a result, the link between type of program completed at the community college and the extent to which the student is employed in the field studied is currently not possible. Although collaborative efforts have been formalized between CCC and CSU, which has resulted in identifying and removing students who transferred to one of the 23 campuses, students who transferred to the University of California or private four-year institutions are currently included in these reports. Students who transferred to out-of-state institutions are also excluded. As a result, the data includes students who transferred to a four-year.

The percent matched is strictly a match rate for social security numbers found in the UI Wage Data files and thus, is not an employment rate. Students not found in the wage records are

not accounted for. Individuals who were employed by the military or federal government, self-employed, unemployed, or not in the work force were not part of the dataset.

Finally, the data are descriptive in nature. In other words, the data can only be used to answer the "what" and "how" questions relating to students' earnings during the last year and third year out of college. The aggregate data currently available to districts and individual colleges does not allow the researcher to conduct statistical analysis beyond descriptive statistics. In order to conduct parametric statistics (i.e., statistical test of significance, multivariate analyses, etc.), unitary records will need to be obtained.

DISCUSSION AND CONCLUSION

Similar to Friedlander's (1993, 1996) earlier studies, analysis of the 1991-92 cohort confirms that the matching process between EDD and the Chancellor's Office MIS student data is a cost-effective mechanism in beginning to understand former California community college students' progress in the workforce. Of the 841,952 students in the study, UI Wage Record data were available for 70% of students in their last year in college, of those 66% matched first year out of college, and over 60% of former students were in the UI Wage data three years out of college.

The results in this study support the notion that there is a positive relationship between formal education and earnings. In other words, as students complete more education they increase the likelihood of experiencing greater gains in their post-college earnings. However, completing a vocational Certificate or Associate degree greatly increases students' post-college earnings, compared to taking a hand full of units.

For all students, the greatest gains were among Certificate completers (+15%), followed by AA or AS degree (+11%). Completing a formalized educational program such as the Certificate of Associate degree positively impacts not only an individual's future earnings, but also the marketability of professional skills and technical abilities. Given the competitive economy and job market, employers are now becoming very demanding in terms of the type and quality of workers most suited for highly technical positions.

When examining the data by age (under 25 or 25 and over), younger students who completed a Certificate experienced a 25% gain, compared to students over 25 (10%), respectively. This finding suggests that for younger students, pursuing higher education impacts their post-college earnings. Because younger students would not have any work experience under their belt, possessing educational credentials to some extent serves as a proxy for work experience. Although the data in this study show that younger students make substantially lower earnings compared to older students, there are substantial positive gains from last year in college, first year out of college, and third year out when more education is attained. Although not surprising is the finding that older students (25 and over) have smaller gains, these students were already making substantially higher wages in the world of work. In other words, given their age and time spent in the work arena, completing a formalized education program, such as the Certificate or Associate degree has positive affects on their post-college earnings. However, when older students return to the community college to take a hand full of units, their gains are small. Figure 4 illustrates that students in the .01-11.99 unit category have slightly higher earnings across all three time periods. A possible explanation for their higher wages is that these students are most likely individuals who are returning to the two-year college for skills-upgrade

or retraining. Also, they may also be returning to the college for a career change and thus pursuing other technical careers, which require a completion of a hand full of courses.

When the data were analyzed by age group among vocational students, younger students (18 to 24) were more likely to have higher percent gains from first year out of college to third year out (+19%), compared to older students. Students 25-34 and 35 and over experienced a 12% gain three years out. This finding suggest that younger students will more likely experience the long-term economic benefit for completing the Associate degree upon making the transition from education to work. In other words, having credentials at the start of a new job will give the young professional a jump-start in terms of salary and position level, compared to non sub-baccalaureate degree recipients.

For students who were identified as vocational students with a major, completing a Certificate or Associate degree had a positive impact on their post-college earnings. The highest percent gain was among Certificate completers (+15%). This finding suggests that students who complete a vocational program area and earned a Certificate, their credential has a cache in the work force to employers. By possessing the credentials, which provides a basis for employers to evaluate prospective employees, these individuals will likely start at higher levels in their positions and in salary schedules. This supports Grubb's (1996) assertion that the chances of obtaining a job, which requires technical skills, is highly increased with an Associate degree or vocational certificate and the likelihood of becoming a laborer or having an unskilled position is reduced.

With the recent legislation both at the federal and state levels, the initiative to assist individuals to move from welfare to work has become a major policy issue in California.

Education has always been used as a way to explain the relationship between the level of education attained and earnings. The results from this study provide empirical evidence that for students who are economically disadvantaged, completing more education is positively related to higher percent gains and actual earnings. Specifically, completing the Associate degree or Certificate will impact their long-term sustainable economic worth. In other words, as economically disadvantaged students complete more education, they will not only have substantial gains in their post-college earnings, but also will have higher earnings. Moreover, when these students complete a Certificate they experienced an 18% gain, and 20% among AA or AS degree completers, respectively. This finding is important for policy makers, higher education leaders and faculty in terms of not only acknowledging the contribution of a community college education, but also as a tool to inform students about the value of attending a community college in California.

When examining the effects of a community college education by gender, interesting patterns arise. Female vocational students who completed the Certificate ($25,000) or Associate degree ($31,000) had higher third year out of college earnings, compared to students completing some units ($18,000 to $21,000). Conversely, male vocational students who completed the Certificate ($31,000) or Associate degree ($34,000) experienced substantial gains (15%) from first year to third year post-college earnings. The findings show that men were more likely to have higher earnings across the three time periods. Although not surprising, this is in support of what is found in the literature about the disparity between the earnings of men and women in the work force. However, a significant finding is that the earnings gap is narrowed when women complete the Certificate or Associate degree. In other words, completing some units will not

have a substantial effect on their marketability in the labor market. However, when they complete the Certificate of AA or AS degree, not only will they possess credential or meet the certification hypothesis, but they also experience higher earnings. This finding suggests that women are most likely going to benefit in terms of future earnings if they are encouraged to complete formalized programs and obtain the academic awards.

POLICY IMPLICATIONS AND FUTURE RESEARCH

Because community colleges in California are now required to utilize the EDD-UI wage data for final performance reports and program evaluation, there is a need to establish standard procedures to assess, understand, analyze, and interpret the data. Specifically, the data can be analyzed to assess colleges' program-level enrollment, completion, and follow-up employment of students. Given the availability of the data, colleges and districts can use the data for local programming, evaluation, and student advising. Individuals responsible for the data management, analysis, interpretation, and reporting must be acutely aware of specific "contextual information" required to adequately interpret the raw data displayed in these reports. Having an informed background of the local economy as well as the regional economy will assist in providing a framework to interpret the data to achieve meaningful results. California's efforts in developing a follow-up strategy using the UI wage records are considered to be comprehensive in nature. Given the size of the cohort and the different classification of enrollment concentrations, the results have significant policy implications. Further, unlike the other states' efforts California examines all students served by the colleges and left in 1991-92 academic year.

Recently, data for the 1992-93 cohort of leavers and completers have been generated. Over a million students comprise this cohort. A closer examination between the 1991-1992 and 1992-93 cohorts should be analyzed to assess the trends within and between groups. In the wake of the new Report Card bill, colleges will be required to utilize the data to provide various student outcomes, namely earnings of their graduates and placement in the work force. Future research studies should consider utilizing unitary records to design a methodology beyond descriptive statistics. Studies that consider the background characteristics and institutional environmental factors should be explored to better explain the relationship between earnings and education attainment.

In conclusion, the descriptive data reveal that obtaining an Associate degree or vocational Certificate positively affects students' post-college earnings three years out. The data form this study provides evidence of the economic value of completing a sub-baccalaureate credential awarded by community colleges. It is important for higher education administrators, policy makers, and society at large to acknowledge that a community college education positively contributes to an individual's long-term sustainable economic benefit. Moreover, completing formalized programs enables graduates to meet the certification or screening requirements maintained by employers upon embarking into the world of work. Further, by investing in their education these students not only develop certain skills and abilities but also foster their human capital - intellectually, professionally, and personally.

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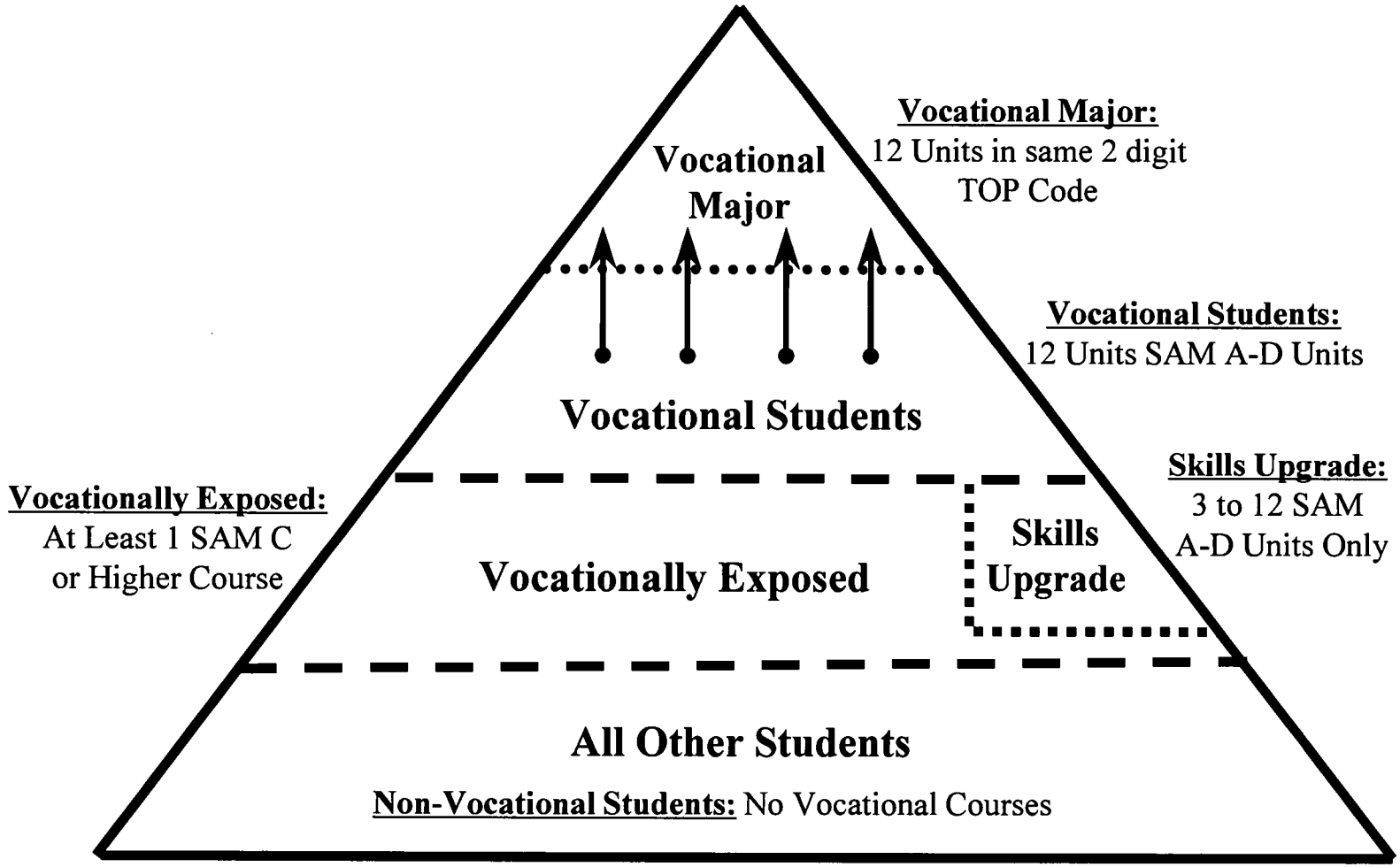
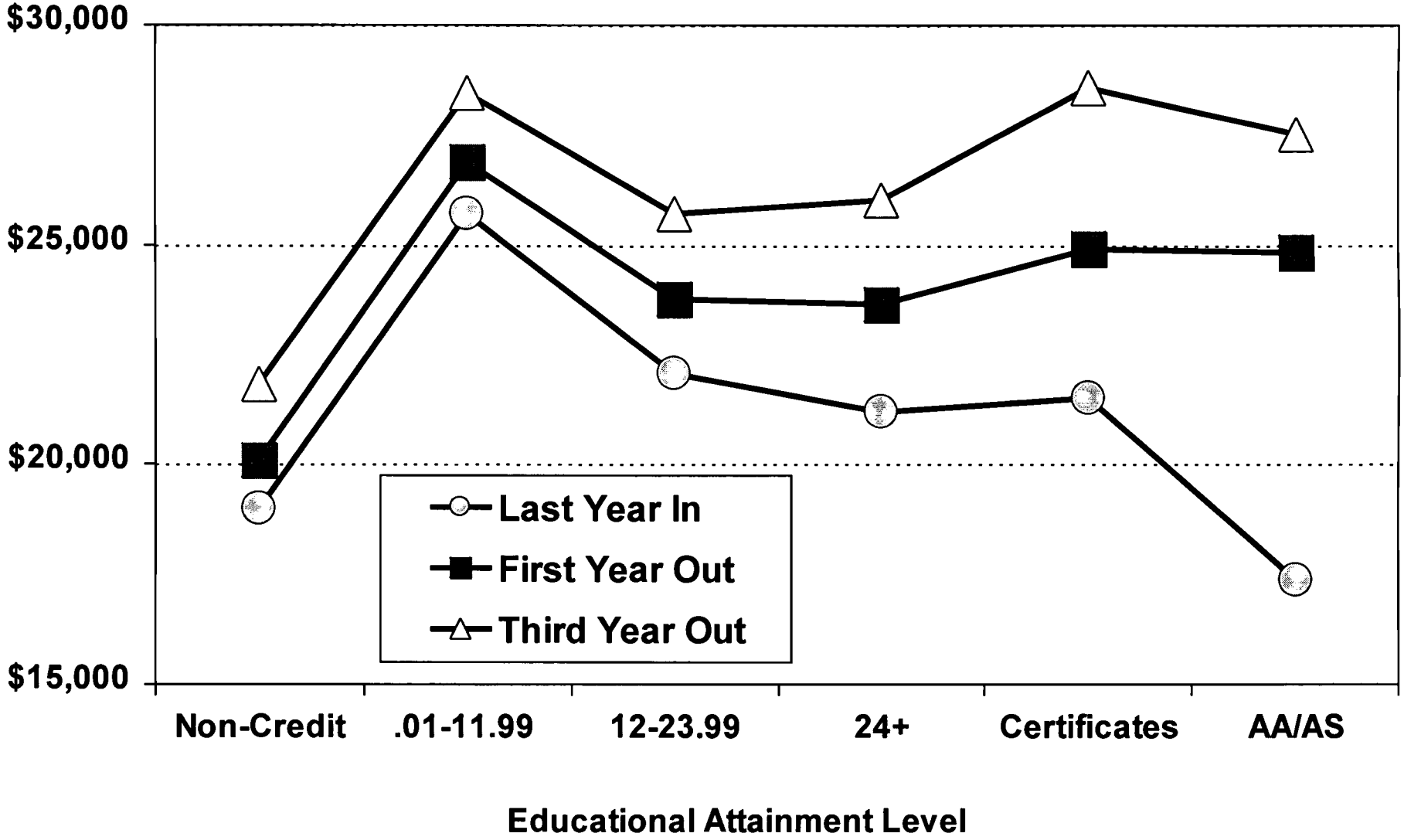
Figure 1: Enrollment Concentration
1991/92 Cohort



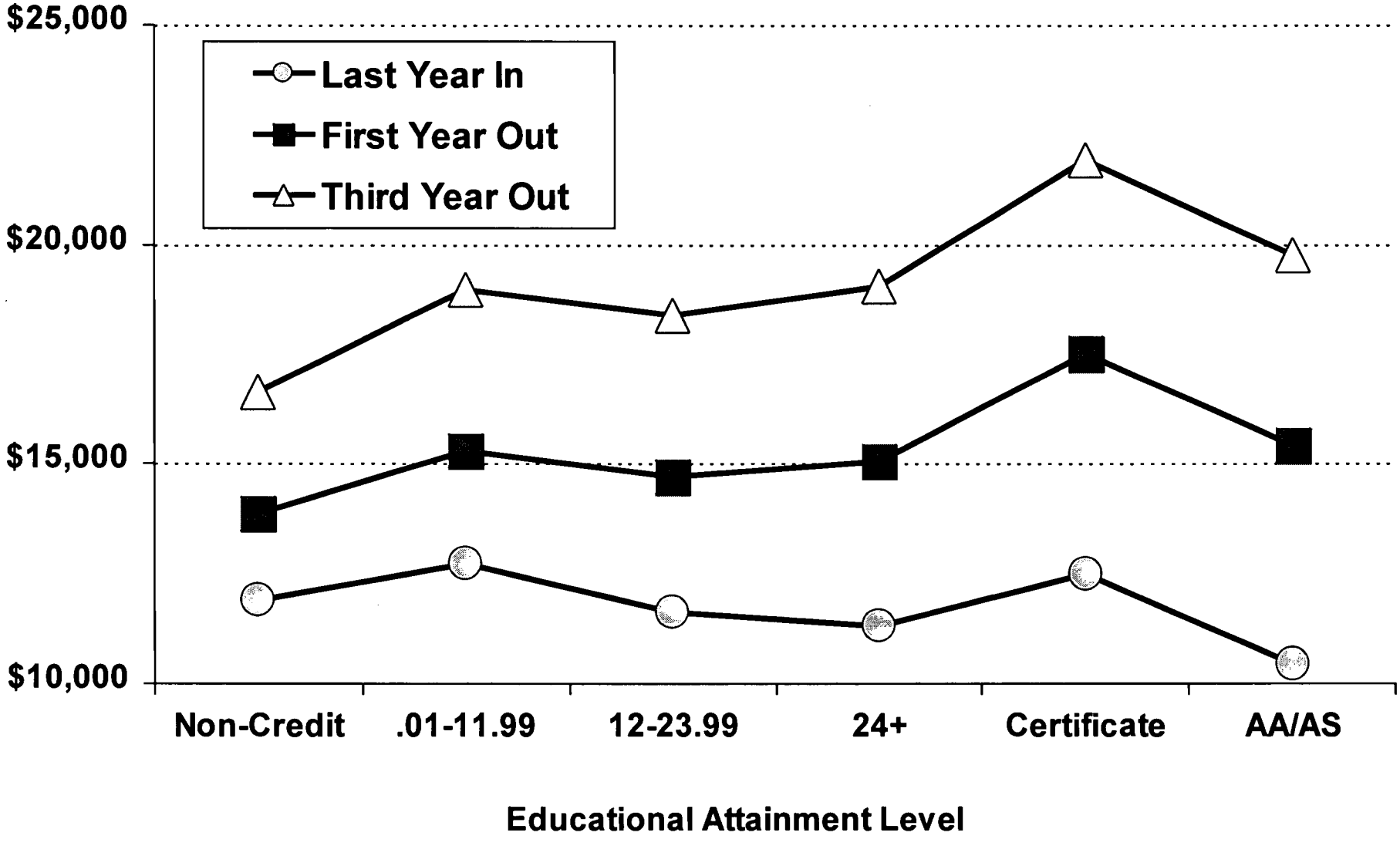
Source: California Community Colleges, Research Accountability Technical Advisory Committee

Figure 2: Median Annual Earnings of *All Students*, by Educational Attainment



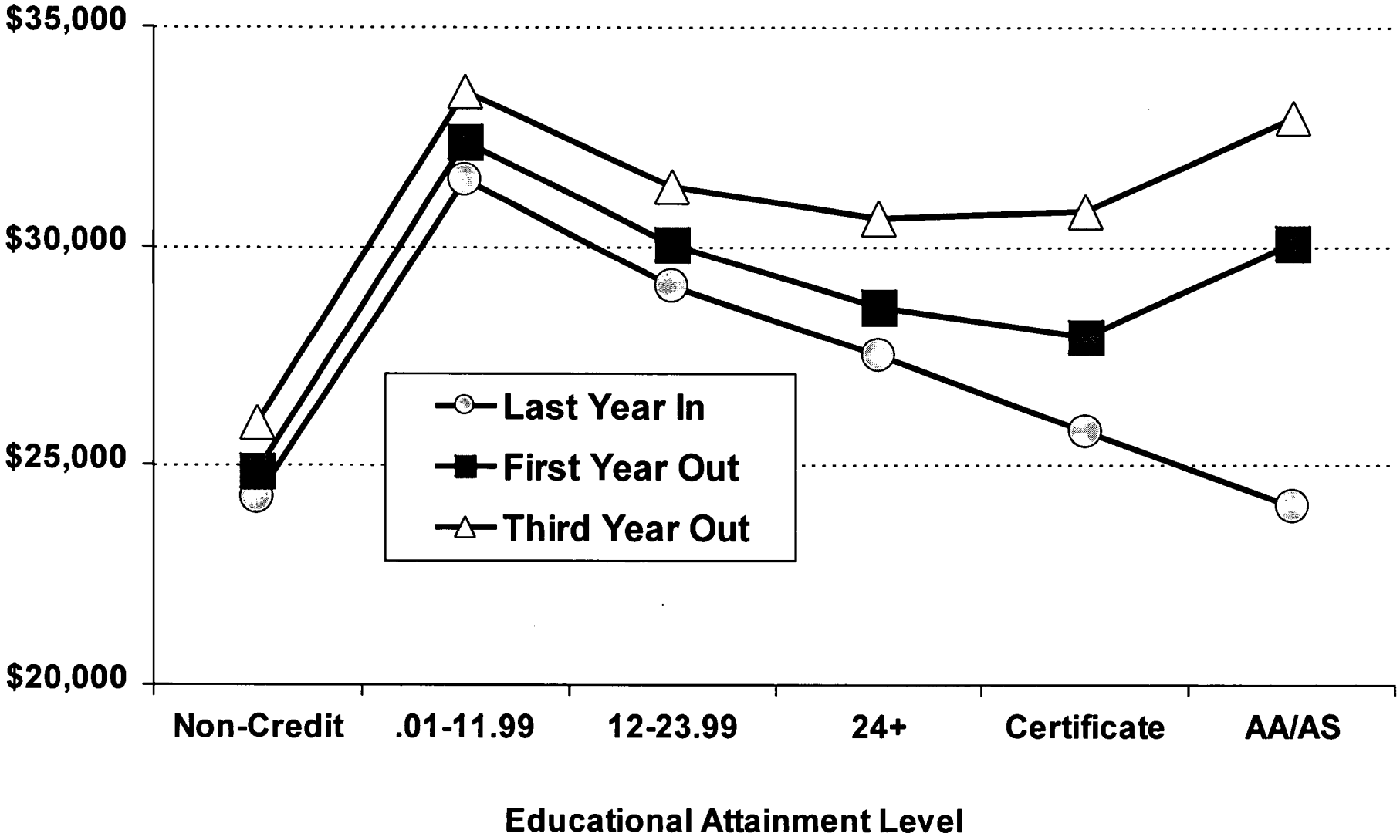
Source: California Community Colleges, Chancellor's Office; Management Information Systems Division

Figure 3: Median Annual Earnings of *Students Under 25*, by Educational Attainment



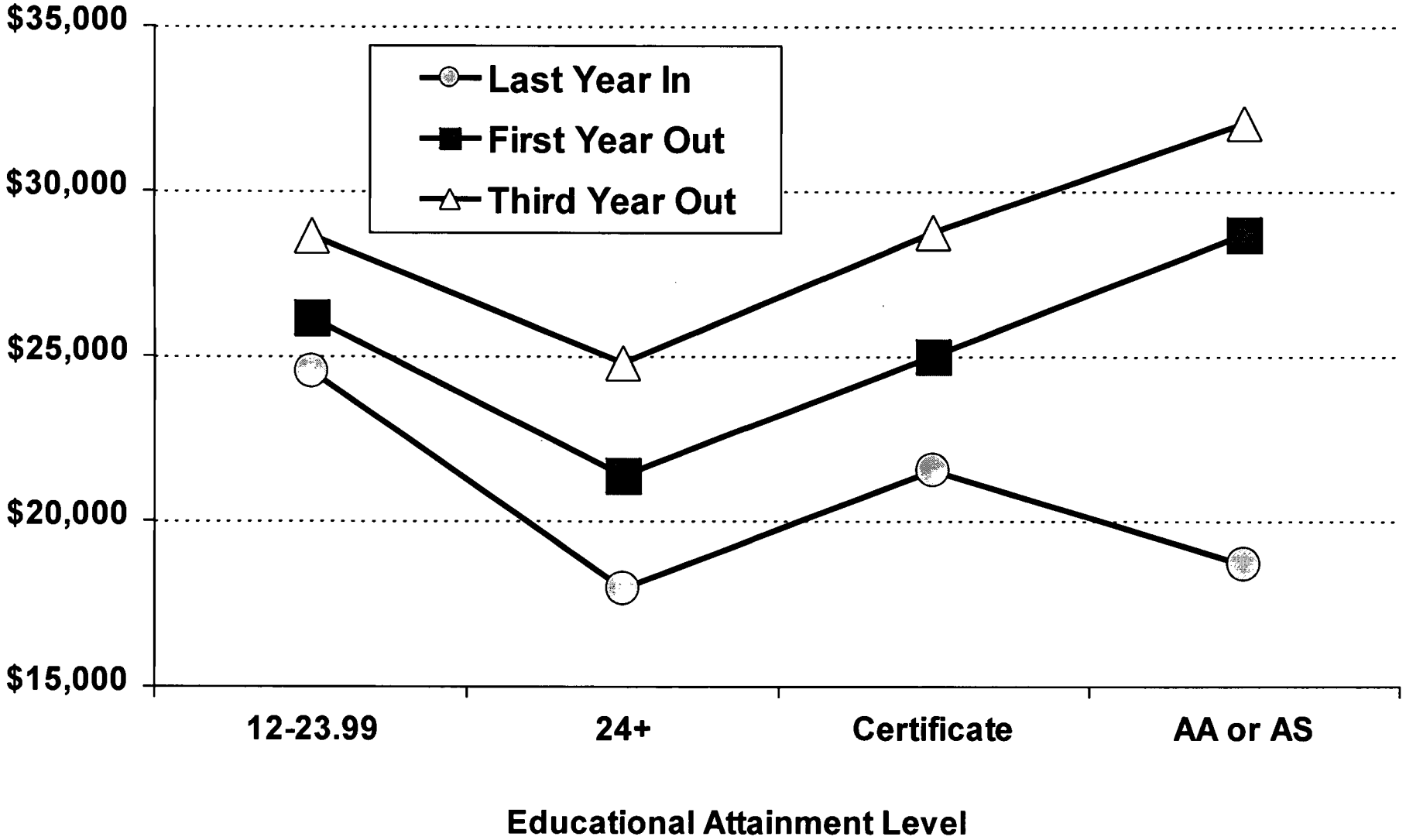
Source: California Community Colleges, Chancellor's Office; Management Information Systems Division

Figure 4: Median Annual Earnings of *Students 25 and Over*, by Educational Attainment



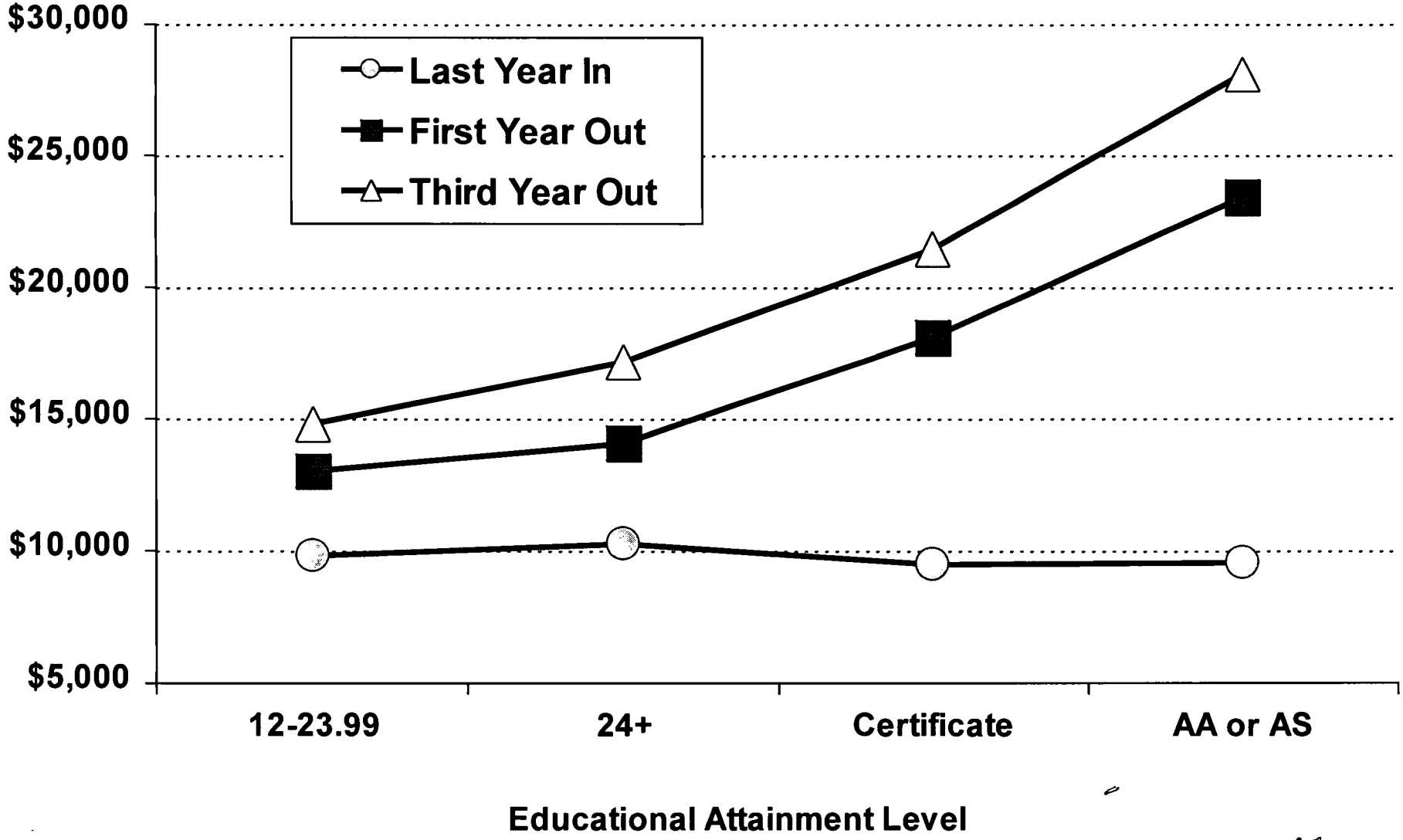
Source: California Community Colleges, Chancellor's Office; Management Information Systems Division

Figure 5: Median Annual Earnings of *Vocational Students (Majors)*, by Educational Attainment



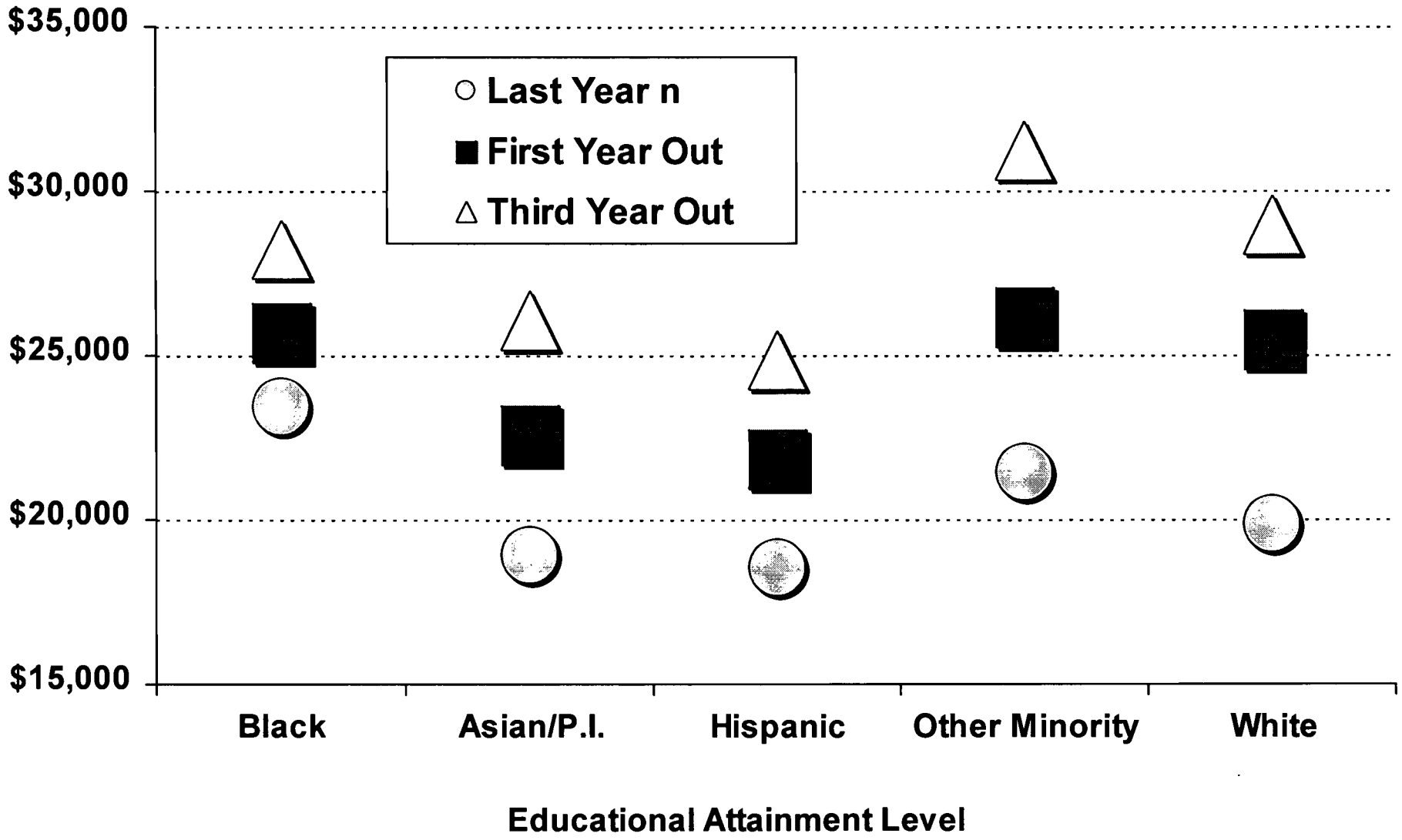
Source: California Community Colleges, Chancellor's Office; Management Information Systems Division

Figure 6: Median Annual Earnings of *Economically Disadvantaged Students*, by Educational Attainment



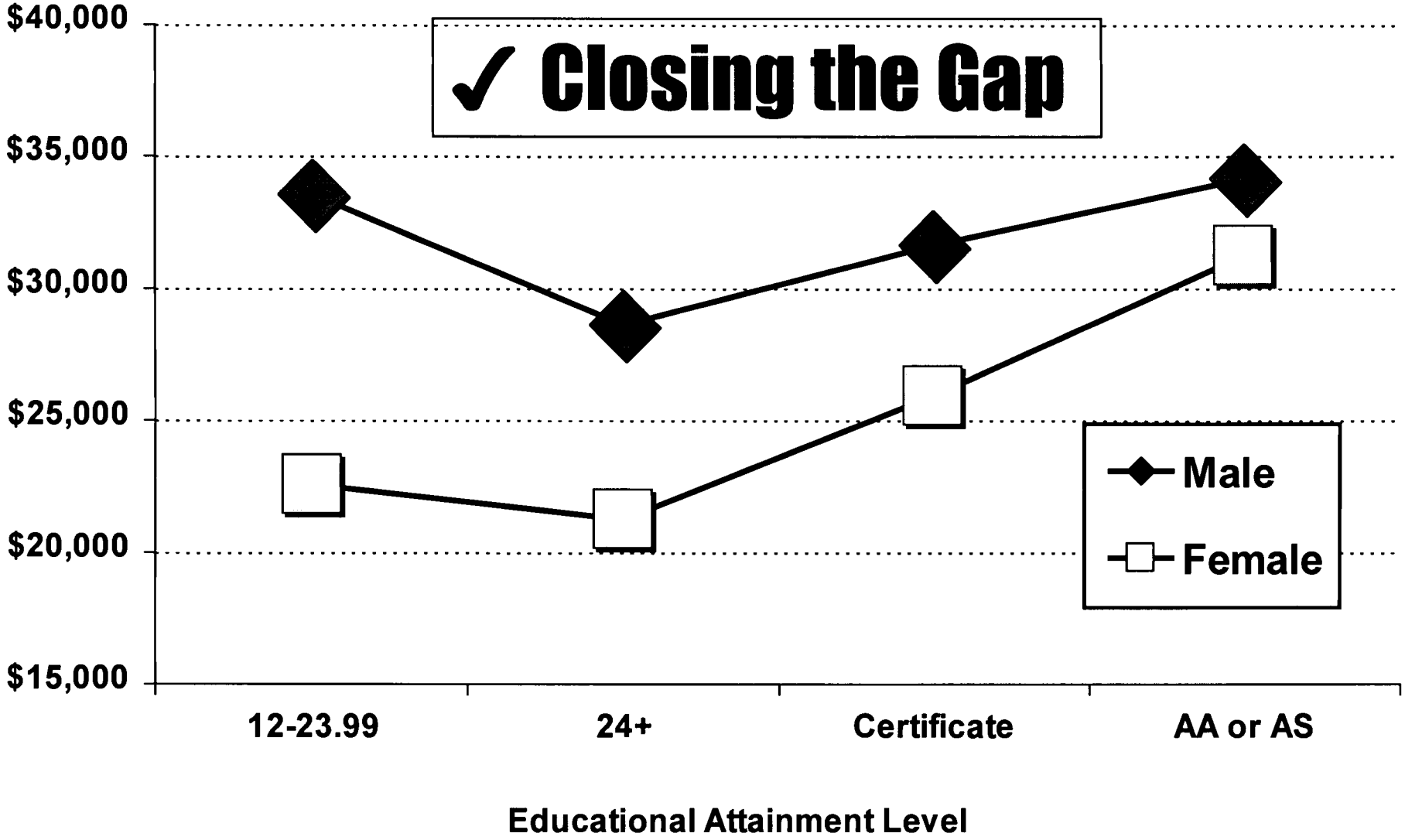
Source: California Community Colleges, Chancellor's Office; Management Information Systems Division

Figure 7: Median Annual Earnings of *Vocational Students*, by Race/Ethnic Background



Source: California Community Colleges, Chancellor's Office; Management Information Systems Division

Figure 8: Third Year Out: Median Annual Earnings of *Vocational Students*, by Sex and Educational Attainment



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