

Oakland Community College: An Economic Impact Analysis*

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Introduction:

In the present age, with the dramatic growth in global competition, American policymakers have increasingly turned to higher education as the preeminent option for maintaining a strong economy and boosting the nation's standard of living. While all kinds of education from pre-school to graduate school have received increased attention as part and parcel of an overall economic strategy, universities, colleges and community colleges have been singled out as the premier institutions for generating and maintaining the national's professional and technical work force. In an era in which "brainwork" has largely replaced "Backwork" institutions of higher education provide the critical training ground for an even larger share of the workforce.

Historically public higher education has made a special contribution to the skill base of the nation. It has provided post-secondary educational opportunities to those who could not afford private higher education and made it possible for other students to receive advanced schooling without the risk of taking on enormous debts. In Michigan, the development of the 28 community colleges has provided for the first time a college education to working adults and other non-traditional students. Today, over 240,000 citizens in Michigan attend community colleges. Yet for all their size and increasingly visibility in state and economic development plans, there has been little attempt to measure the impact of these institutions upon the local economy of a community.¹

¹This study follows the work done in 1994 by Bluestone and Jacobs in their "Henry Ford Community College: An Economic Impact Analysis. To our knowledge this is the first time the methodology of

Moreover, because most of the students who attend public education, particularly a community college, continue to reside in their communities after receiving their education, it is significant to determine the contribution of Oakland Community to the future growth of this county.

National data sets which track individuals over a long time period indicate a relationship between a sub-baccalaureate degree and economic earning do indicate a relationship between earning associates degree and enhanced wages. Using the National Longitudinal Survey of the Class of 1972, and the High School and Beyond Study of the classes of 1980 and 1982, and the National Longitudinal Survey of Youth which followed a group of individuals who would have graduated from high school between 1976 and 1983, Grubb found that completing an Associate degree enhanced wages, employment and earning by significant amount. Men with an Associate's Degree earn 18% more and women 23 percent more than high school graduates. (Grubb, 1999). Even for those students who did not receive an Associate's degree, if they earned more than 12 credits, there appears to be economic benefits associated with as little as this amount of sub-baccalaureate education.

However, these national studies concentrate on individual earnings, they do not reveal what a community receives from educating its citizens. One of the important characteristics of the comprehensive community college is the role the institution plays within its community. Oakland Community College provides a number of measurable

computing an "option value" of a college education to a community as been applied to a community college. (Bluestone and Jacobs, 1994)

benefits to Oakland County. Businesses have their workers trained by Oakland Community College. An overwhelming majority of the police, firefighters and medical personnel in the County have received their post-secondary education from Oakland Community College. Oakland Community College has maintained nationally recognized programs serving working poor people on Oakland County obtaining them sustainable wage jobs for the first time. These and countless other activities have been know and documented.

This study, however, attempts to examine the core function of Oakland Community College: the process by which students earn credits and either continues their education and continues their economic career paths. The overwhelming majority of students attending Oakland Community College resides in Oakland County, and continues to reside in Oakland County after they complete their education at OCC. This study asks the following question: what economic benefits do these students earn when they attend OCC?

Economic Benefits in Human Investment

This section examines the value of a community college education over the life of a student attending Oakland Community College. It is based on a methodology that calculates the regional returns to educational attainment, and uses those figures to estimate the likely return to those who get an Associate's degree, and those from OCC who continue on for higher educational attainment. We begin this analysis by estimating

the relationship between income and educational attainment over time. This is done² using data from the March 2000 Current Population Survey for the Midwestern states, and estimating the following equation:

$$\text{Income} = \alpha + (\beta_1) \text{Age} + (\beta_2) \text{Age}^2 + \varepsilon$$

The results are then used to compute income projections for each age by educational attainment for 18 to 65 year olds.³ For this analysis, we used the CPS data to estimate the income of all earners, those with a HS diploma, with some college, with an Associate's degree, with a Bachelor's of Arts degree, with a Master's Degree, with a Professional Degree, and with a Ph.D. in some area. The results are attached to this report. Tables 1-3 provide earnings estimates for all workers, men and women by educational attainment at key age junctures. As expected, income grows over time, and falls off for most by the time they are ready to retire (see Figures 1-7 to compare the income profiles of all earners, men and women over their working lifetime). Peak incomes vary, with less educated workers peaking in their early to mid 40s, and more educated workers peaking in their late 40s through their 50s.⁴

We then approximated the lifetime earnings of all individuals (again, and throughout this report, we estimate education based income for all earners, for men and for women

² A more detailed explanation of the methods is provided in the appendix.

³ In the case of advanced degrees we begin the projections at higher ages to reflect time spent in school and the unusually low income during that period.

⁴ Keep in mind these data are for midwestern earners only, and are just mean estimates with some variation at the individual level. For this analysis we did not project increases in earning due to salary adjustments since the rapid increase of some incomes during the 1990s and the recent slowing of the economy makes such a projection high speculative. It is sufficient to argue that on average we can count on the general magnitude of the income projection to reflect relative and perhaps absolute earning levels.

separately), and then discount this earning over time (see the methods section below).⁵

These data are summarized in Tables 4-6 below. The results of this calculation allow us to compute the increment over the lifetime of an earner depending on their highest level of educational attainment, and are summarized in Tables 7-9 below. For example, men with some college education will earn on average \$126,038 more in their lifetime than men who just have a High School diploma. Clearly these figures conform to general information about the returns to continued education.

These data are then used to project the additional value of an Oakland Community College education using information provided by OCC from a survey of students and alumni. Based on a 1994 population of 6445 students first time in any college (FTIAC) they identified a sample frame of 2500 potential interviewees. They crafted a survey and polled 849 persons through telephone interviews. The resulting 542 completed responses are the basis for our OCC projections.

According to their survey, by 2001 one third of the students from 1994 have achieved a degree: 12.8 percent received an AA degree, 16.6 percent went on for a BA degree, 3.1 percent have their Master's degree and an additional 0.6 percent have a Ph.D. since leaving OCC. Of the remainder, 88 percent they have some college (58.6 percent of the total) though it is unclear whether they are still at OCC or at another university (23.3 percent report only one year of college, 18.5 percent report two years, 7.2 percent three

⁵ That is to say, we compute the value of a dollar earned in 5 years in today's terms. For example, if we were to put \$50 in the bank and in ten years get \$100 in compounded interest and principal then the value of \$100 ten years from now is \$50 in today's dollars. We used a conservative 2% discount rate to compute

years and 9.6 percent report 4 years though no degree). For the purposes of this report we assume only those having reported earning a degree have one, with the rest having transferred out of OCC once they report more than 2 years of college.⁶

As a last step, we use the incremental earnings data projected onto the OCC student data to generate overall estimates of the additional lifetime earnings of students who have attended OCC. We make a necessarily simplified assumption that most students remain in the area and probably in Oakland County to assign the economic benefit locally.⁷ This generates a total income attributable to OCC education, and using a conservative estimate of a local multiplier⁸ of 1.2 we can project overall spending in the local economy over the lifetime of OCC graduates.

Results

Based on the steps outlined above, we estimated the number of students in the 1994 cohort who have graduated with some degree, and the number who have some college education (the remaining 8 percent of the respondents oddly indicate the did not know—or would not say—whether they had a degree and how many years of college they had).

our net present value of total earned income—while historically interests rates tend to be higher, these are compensated by salary increases holding real dollar value of earnings fairly constant.

⁶ That means, for respondents to this survey (and therefore for OCC projections overall), we assume they are people classified as “some college” under the degree based earnings ranking. Note that for this section the number of responses is too few to permit a gender-based analysis.

⁷ That assumption is easiest to defend at lower levels of educational attainment. It is likely that many of the Master’s level students and most of the Ph.D. students had to leave the county to complete their education. It is impossible to determine as an overall percentage how many return to the county and work there for most of their lives (we can assume some of the Master’s students, but fewer of the Ph.D.’s remain in the county given the specifications of their job market).

⁸ The multiplier calculates the overall impact of a dollar spent in the economy. A multiplier of 1.2 implies that for each \$1000 dollars earned \$200 is returned to the local economy in the form of expenditures on things like meals, clothing, gas, etc. This in turn generates \$200 of income to the local economy, which

Using that estimate, and combining it with the incremental lifetime earnings of having been to college or earned a degree, we can project the lifetime increment in the earnings of an OCC student entering in 1994. Table 10 below summarizes these findings:

TABLE 10. Total Earnings Impact on the Oakland County Community				
Degree Earned	Distribution of OCC FTIACs	Lifetime NPV Increment	Imputed Lifetime Increment	With Multiplier Effects
Associate	825	\$107,356	\$88,564,406	\$106,277,287
Some College	3777	\$134,823	\$509,195,462	\$611,034,554
Bachelor of Arts	1070	\$495,163	\$529,760,039	\$635,712,047
Master of Arts	200	\$712,849	\$142,423,666	\$170,908,399
Ph. D.	39	\$1,433,536	\$55,434,837	\$66,521,805
TOTAL			\$1,325,378,409	\$1,590,454,091

This means that the 1994 cohort will have, over the course of their 40 year working life, earned more than \$1.3 billion more than a similar number of high school graduates and almost \$1.6 billion more was added into the local economy as a result. That comes to about \$39 million more each year into the local economy, which translates roughly into about \$1.56 million in State income tax revenues per year and about \$1.67 million in sales tax revenues (if we assume about half of the money is spent on items taxes at the point of sale).

This represents only one class's contribution to the Oakland County Economy. In order to appreciate the full amount, it would be necessary to calculate these numbers of each of the classes of OCC students. This would add millions more funds to the annual local

means additional salaries of which another 20 percent is spent, which generates a little more income, etc until all the money has circulated.

economy---raising the significance of OCC to the local economy. This exercise has been important in demonstrating not only to the community, but to the college on how the use of data is part of making institutions self-conscious about their effectiveness and better at serving their community.

Reference:

W. Norton Grubb, "The Economic Benefits of Sub-Baccalaureate Education: Results from National Studies, *CCRC Brief, No. 2*, June 1999.

APPENDIX

Methods Used for the Age-Education-Earnings Projections

Estimating the economic impact of an Oakland Community College (OCC) education is the purpose of this study. Age-earning projections (see below) were calculated to determine predicted incomes based upon the highest educational degree earned by gender. These figures may be used to make forecasts regarding the earning capacity of students attending OCC, and the economic benefits to the community if they receive higher education degrees. The methodology of this study resembles that one developed in Jacobs and Miller's (1995) study of the economic impact of a community college.⁹ Using projections based on an OCC survey of the educational experience of the 1994 FTIAC, this analysis computes the incremental lifetimes earnings as a result of that enrollment (assessing the added benefit of "some college", an Associate's degree, a Bachelor's degree, or a graduate degree of some form).

A positive relationship exists between earnings and educational degree attainment. One way to determine the direct positive impact on the community the role of educational attainment plays may be measured through "direct wage and salary increases." More advanced educational degrees will result in higher earnings throughout the careers of males and females. It was determined that females generally earn less than males with equivalent degrees. Also, it was shown that the greater one's earnings are, the greater the benefit will be on a community in respect to the amount of taxes and dollars spent in

local commerce. Thus we can approximate the economic benefit and positive impact a local community college will have within a city. If alumni, after completing their degrees, choose to reside in the city in which their OCC campus is located, the city, county and state will benefit through local commerce and various taxes collected.

Using 2000 Current Population Survey (CPS) March Supplemental File, age-earning projections were calculated for males and females living in the Midwest Region (Ohio, Indiana, Illinois, Michigan and Wisconsin) by highest educational degree attained (High School Diploma, Some College, Associate Degree, Bachelor Degree, Master's Degree, Professional Degree and Doctorate Degree). The data were weighted by MARSUPWT ("March supplemental final weight"). Using SPSS, the data were filtered by gender and educational degree level. Regressions for each educational degree level were calculated with the dependent variable PEARNVAL ("Earnings, total value 1999" – Midwest Region) with AGE (age of respondent) and AGESQRD (age of respondent squared) as the independent variables (see Tables A1-A3 for regression results of both the weighted and unweighted runs). The equation used was:

$$\text{Income} = \alpha + (\beta_1) \text{Age} + (\beta_2) \text{Age}^2 + \varepsilon$$

Where: α is the intercept term estimating a baseline earnings level;
 β_1 is the increment to income for each year of life;
 β_2 is the increment to income for each year of life squared¹⁰
 ε is the unexplained variation in the model

The regression estimates were then used to calculate predicted income levels for each gender by educational attainment level for the ages of 18 – 65 (primary work force age).

⁹ Jacobs, James & Miller, Randall. "Economic Impact of a Community College: A New Approach to Accountability." 1995.

We then constructed income projections for educational attainment by gender (see the attached Tables A4-A6 for the annual estimates).

The income projections for male high school graduates were calculated using the regression equation $y=21013+(2308)*Age+(22*Age^2)$. Males with high school diplomas earnings peak at age 52 at \$38,824. Income projections for females with high school diplomas was calculated using $y=-763+(719)*Age+(-7*Age^2)$. Females with high school diplomas earnings peak one year later at age 53 at \$18,264. Those with high school diplomas as a whole earnings reach their highest point at age 51 at \$27,825. This figure was calculated using the equation $y=-9832.76+(1473.8)*Age+(-14.42*Age^2)$.

Income projections for both males and females with “some college” were calculated by $y=-30834.5+(2621.3)*Age + (-25.45*Age^2)$. It was determined that for this population earnings peak at age 52 at \$36,656. To determine earnings for males with “some college” the equation $y=-43524.4+(3535.7)*Age+(-34.7*Age^2)$ was used. Males with “some college” earn their highest amount at age 51 with \$46,542. To determine earnings for females with “some college” $y=-17230.6+(1666.6)*Age+(-15.7*Age^2)$ was used. Females with “some college” earn their highest amount at age 53 with \$26,998.

Males and females with vocational associate degrees earned their highest amount at age 51 with \$38,516 by using $y=-22171.3+(2416.5)*Age+(-24.05*Age^2)$. To calculate age-earning projections for males with vocational associate degrees the regression equation

¹⁰ This allows for a non-linear path over time, for example our income peaks and then starts to fall as we approach retirement age and work less hard

$y = -44118.3 + (3861.6) * \text{Age} + (-39.5 * \text{Age}^2)$. To calculate the age-earning projections for females with vocational associate degrees the regression equation $y = -5628.06 + (1295.9) * \text{Age} + (-12.4 * \text{Age}^2)$. Males with vocational associate degrees earnings peak at age 49 at \$50,261. Females are predicted to peak three years later at age 52 with earnings at \$28,229 was derived by $y = -5628.06 + (1295.9) * \text{Age} + (-12.4 * \text{Age}^2)$.

Among those who have earned an academic associate degree are expected to reach their peak earnings at age 53 with \$40,574. This figure was computed using the regression equation $y = -32348.5 + (2766.61) * \text{Age} + (-26.24 * \text{Age}^2)$. Males in this educational category are predicted to achieve their highest level of earnings at age 55 with \$57,385 computed using $y = -44656.4 + (3730.8) * \text{Age} + (-34.1 * \text{Age}^2)$. Females in this educational degree level are predicted to achieve their highest earnings at age 50 with \$28,391, from $y = -16144.2 + (1775.7) * \text{Age} + (-17.7 * \text{Age}^2)$.

For both males and females with bachelor degrees earnings peak at age 51 with \$51,758 using $y = -29306.1 + (3190.9) * \text{Age} + (-31.4 * \text{Age}^2)$. Males who have achieved bachelor degrees are expected to have their earnings peak at age 51 with \$69,594. This figure was computed using $y = -61587.5 + (5189.5) * \text{Age} + (-51.32 * \text{Age}^2)$. Females who are within this educational degree level are expected to achieve their highest earnings at age 48 with \$33,423, the regression equation is $y = 6082.05 + (1140.8) * \text{Age} + (-11.9 * \text{Age}^2)$.

For both males and females with master's degrees earnings peak at age 47 with \$42,357, from $y = -16891.9 + (3405.5) * \text{Age} + (-36.42 * \text{Age}^2)$. Males who have their master's degrees

are expected to achieve their highest earnings at age 48 with \$83,186. This figure was computed using $y = -76241.3 + (6667) * \text{Age} + (-69.7 * \text{Age}^2)$. Females who have acquired their master's degree are expected to achieve their highest earnings at age 42 with \$42,357. The regression equation $y = 27270.6 + (712) * \text{Age} + (-8.4 * \text{Age}^2)$.

For both males and females with professional degrees, earnings peak at age 59 with \$127,247, from $y = -173064.3 + (10236.6) * \text{Age} + (-87.23 * \text{Age}^2)$. Males with a professional degree are expected to achieve their highest earnings at age 59 with \$141,436. This figure was computed using $y = -209118 + (11841.6) * \text{Age} + (-100 * \text{Age}^2)$. Females with a professional degree are expected to achieve their highest earnings at age 46 with \$66,537, by regression equation $y = -41447.7 + (4661.3) * \text{Age} + (-50.3 * \text{Age}^2)$. Interestingly at the beginning of their careers females with professional degrees earned more than their male counterparts, however, this only remains true till the age of 30 where males pass females.

The populations of those with doctorate degrees are expected to achieve their highest earnings at age 53 with \$111,257. This was computed using the regression equation $y = -175779.8 + (10935.2) * \text{Age} + (-104.14 * \text{Age}^2)$. Males in this education category are expected to achieve their highest level of earnings at age 53 with \$126,656. This figure was computed using $y = -248435.3 + (14189.8) * \text{Age} + (-134.2 * \text{Age}^2)$. Females in this education category are expected to reach their highest earnings much earlier in life at age 37 with \$70,044. This was computed using the regression equation $y = 28385.7 + (2232.2) * \text{Age} + (-29.9 * \text{Age}^2)$.

Using this baseline data to estimate the average overall gain from greater academic achievement, coupled with the estimates of the achievement of 1994 FTIACs at Oakland Community College, the study projects both the total net present value of the marginal income stream and the inferred local tax revenues derived as a result.