



AN INDEPENDENT ASSESSMENT OF THE IMPACT OF BROWARD COLLEGE

FEBRUARY 2020





Dominic M. Calabro
President & Chief Executive Officer

Dear Fellow Taxpayer

Florida's college system has provided an opportunity for generations of Floridians to have a better life, at a cost that is much more reasonable than other forms of higher education. A great many of our law enforcement officers, emergency medical technicians, nurses, and firefighters received their degrees from Florida community colleges. Likewise, a great many of our university graduates started at a community college (myself included).

Thousands of jobs in Florida are unfilled because businesses cannot find employees who have the right skills required to fill them. These are jobs in industries such as carpentry, plumbing, electrical work, and construction, jobs that do not require a baccalaureate degree. Two-year degrees and certificate programs can give people the requisite skills needed to fill these positions, thereby dramatically increasing their earning power. In fact, since past TaxWatch studies on this subject were undertaken, the wages of such 'skilled-labor' careers have increased significantly, which – as this analysis shows – have thus increased the value of the state's investment in the Florida College System. Florida currently ranks 24th in the US in the number of people age 25–64 with an associate in arts degree or higher, or with a high-quality, workforce-relevant certificate.

On January 30th, 2019, Governor DeSantis signed an Executive Order establishing the goal to make Florida number 1 in the U.S. for workforce education by 2030 and to ensure that Florida students are ready for high-demand, high-wage jobs. Building a workforce in health services, transportation, education, computing, trade, utilities, and jobs that require an industry certification or license will require a sizable investment of public and private funds.

In this report, TaxWatch takes a fresh look at Broward College, how it compares to other institutions of higher learning in the Tri-County South Florida region, and its return on investment. On behalf of the Board of Trustees and the members of Florida TaxWatch, I am pleased to present this report and its findings based on our independent analysis by Florida TaxWatch experts and renowned economist Richard Harper, Ph.D., a senior member of the Florida Council of Economic Advisors at Florida TaxWatch.

Sincerely,

A handwritten signature in black ink that reads "Dominic M. Calabro".

Dominic M. Calabro
President & CEO

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Key Findings

- At current levels of enrollment, annual federal, state and local tax revenue due to the economic impacts of Broward College is \$240,428,739.
- The majority of undergraduate students in Broward County attend Broward College (57 percent) in 2018-19.
- Broward College has low tuition rates compared to other institutions in the area and very low levels of total student debt.
- As expected, wages are higher for Certificate or Associates' Degree completers than non-completers but wages were also higher for Broward College completers than from comparable institutions. The average annual differential between the earnings of a Broward College graduate and a worker in Florida with only a high school degree is at least \$8,288 per year (when measured at median earnings per year by occupation across occupations typically requiring an Associate of Arts versus occupations typically requiring a high school diploma). This annual differential rises to \$21,448 for Associate of Science degrees, and \$17,756 for Baccalaureate degrees.
- Weighted for the number of graduates by type of degree, and assuming that Associate of Arts graduates stop with that credential, these increased earnings average \$167,182 per degree recipient.
- Looking strictly at economic activity that stays in the region, there are 13,147 sustainable jobs in the regional economy generating an annual total of \$625 million in wages to workers and income to business proprietors that stays in the local economy.
- About 68 percent of the economic impact of the College (regional Gross Domestic Product) is driven by the skills, credentials, and increased earning capacity of the graduating students.
- A Broward College education is becoming increasingly valuable over time, relative to a high school diploma. All signs indicate that these trends will continue.
- It is expected that there will be 70,251 job openings for Associates' Degree graduates in the Tri-County (Broward, Miami-Dade, and Palm Beach) South Florida region over the next 10 years.
- The high earnings differential means that, for every \$1 that a Broward College graduate spends on their education, they can expect to earn \$6.63 in additional personal income (in present money value) over a working career. This ratio peaks at \$13.52 for Associate of Science graduates but is \$5.22 for Associate of Arts graduates who do not pursue further education.
- On average, graduates earn a 9.7 percent return on their investment of time and money.

Executive Summary

The mission of Broward College is to transform students' lives and enrich South Florida's diverse community through academic excellence, innovation, and meaningful career opportunities. The vision is that Broward College will be a destination for academic excellence, serving students from local communities and beyond. The College will embrace diversity — student, faculty, staff, and business partnerships — and foster a welcoming, affirming, and empowering culture of respect and inclusion. The College will stand at the leading edge of technological and environmentally sound innovation, providing attainable, high-quality educational programs. Broward College will be recognized for its recruitment and retention of diverse, outstanding faculty and staff whose primary focus will be to promote the success of each individual student while supporting lifelong learning for all students. As a model post-secondary institution, the College will connect its students to diverse local and global communities through technical, professional, and academic careers.

The College provides the training necessary to qualify workers for high skill, high wage jobs, and does so at a very low cost to students and taxpayers.¹ In this report, Florida TaxWatch shows that the state's investment in Broward College yields a high return on investment, both for taxpayers and for students.

Overall Economic Impact of Broward College

The technological change that drives economic progress and in doing so provides higher family incomes and living standards is biased in favor of highly-skilled workers. This has resulted in higher growth rates for wages for highly-educated workers generally. In contrast, wages of those possessing only a high school degree, or less than a high school degree, have stagnated over the last several generations. By 2017, inflation-adjusted average weekly earnings of men with only a high school degree were only seven percent higher than they were in 1963. Over that same period, the inflation-adjusted average weekly earnings for men with a bachelor's degree grew by 37 percent.²

The 21st century job market places a high value on workers that can apply the latest technologies, and this creates a pressing need for Florida to supply the labor force that will attract the high wage firms that use these skills intensively.³ Because the economic structure of the state reflects its role as a premier vacation destination to the world, and a premier destination for U.S. retirees, Florida is at risk of falling farther behind in terms of its high-wage workforce.⁴ Broward College helps meet that demand.

1 Tuition and fees in the Florida College System (FCS) are low relative to national averages.

2 It is noteworthy that Broward College AS and Bachelor's degree holders have higher entry level wages than does the average Bachelor's Degree graduate of the State University System (SUS), according to recent American Institutes for Research, "Measuring the Economic Success of Florida's Graduates: Economic Security Report 2018" Available at: <http://www.floridajobs.org/docs/default-source/office-of-workforce-services/state-program-reports/2019-state-program-reports/florida-economic-security-report-final-01-10-2019.pdf>.

3 Rob Valetta, Higher Education, Wages, and Polarization, FRBSF Economic Letter (Jan 12, 2015) See, e.g., www.frbsf.org/economic-research/publications/economic-letter/2015/january/wages-education-college-labor-earnings-income/.

4 J Dewey and D Denslow, "Baby Boom Retirees and Florida's Job Structure," Business and Economics Journal, 2012, write "Absent urgent and aggressive policy intervention, Florida's workers that retire over the next 20 years are likely to be replaced by less educated and less skilled workers less suited to the knowledge economy, and the gap between Florida's average job skill and the national average is likely to widen substantially."

The most important finding of this study is that the present value of earnings to Broward College graduates at both the Associates and Bachelor’s degree level typically exceed the earnings of those who enter the workforce with a high school diploma (or less) by a substantial margin. Over a normal work-life expectancy, given the current degree composition of the most recent year of graduates, that margin sums to \$1.2 billion per year. This is the amount by which regional personal income to workers and owners of businesses of Broward College degree holders will exceed regional personal income were the Broward College graduates to have had only high school diplomas. At current regional average earnings per job, this is equivalent to the earnings paid to 26,058 jobs paying the current Florida average wage.

The following table shows the regional economic impact of Broward College activities during the 2018-19 fiscal year, measured in current (2019) dollars. The current annual impact of the College to the Tri-County South Florida economy is calculated to be more than \$1.035 billion in Gross Domestic Product at the regional level; more than \$625 million in labor income; and more than \$1.75 billion in overall sales, along with 13,147 jobs.⁵ This annual impact continues today and will grow with enrollment.

TABLE ES1: SUMMARY OF REGIONAL ECONOMIC IMPACT OF BROWARD COLLEGE, BY ACTIVITY, FY2018-19

	JOB	PERSONAL INCOME	LOCAL GDP	TOTAL OUTPUT
College Operations*	4,577	\$238,348,766	\$331,467,330	\$548,774,792
PV of Increased Earnings	8,570	\$386,951,900	\$704,241,660	\$1,206,973,357
Total	13,147	\$625,300,666	\$1,035,708,990	\$1,755,748,149

* includes annual new construction and spending of out-of-state students; Source: IMPLAN, author's calculations

As can be seen in the table above, economic impact can be expressed via several measures. These include the number of jobs in the region, the additional personal income paid to workers and business proprietors in the region, the increase in Gross Domestic Product (GDP) at the regional level, or the value of total output (this measure of total sales also includes regional sales of intermediate goods – i.e., inputs to the local production process, and thus would double-count certain economic activity).

Typically, GDP at the regional level is the preferred measure. The 13,147 job total represents the jobs associated with all components of Broward College-driven economic activity that stays local to the Tri-County area. The 8,570 jobs that are created by the higher spending enabled by the present money value of the lifetime earnings differential to Broward College graduates occur across the

⁵ See Appendix for explanation of key terms and a description of the IMPLAN model. This study calculates the impact of university operations spending, construction spending, and out-of-state student and of income differential to Broward College grads at the three-county level. Note that the number of jobs regionally is smaller than would be implied by the \$1.2 billion earnings differential divided by regional average earnings per job mentioned earlier. This is because much of the increase in local earnings is spent on goods produced outside the region (i.e., a car made in Detroit) or for payments on existing assets (e.g., mortgage payments made on a house build in a prior year), or for savings by the household. We adopt the standard convention of measuring student spending impact only from those students who would likely not had resided in the South Florida area absent attending Broward College (i.e., out-of-state students). See Watson, et al, "Determining economic contributions and impacts: what is the difference and why do we care?" Journal of Regional Analysis and Policy 37(2): pps140-146, 2007.

region, in proportion to the location decisions of graduates. The 4,577 jobs created by Broward College activities occur throughout the Tri-County Broward, Miami-Dade, and Palm Beach County region and represent the economic flows driven by spending on College operations, College spending on construction, and out-of-state student spending on things such as rent, transportation, and living expenses.

The flows of economic activity from increased family incomes for Broward College graduates along with operations of Broward College, capital improvements, and student spending also generate a substantial increase in annual federal, state and local tax revenue each year. At current levels of enrollment, annual federal, state and local tax revenue due to the economic impacts of Broward College is \$240,428,739.

Wages, Costs, and Return on Investment

The share of the Present Value of Lifetime Earnings Differential in the Table is responsible for the largest share of the annual economic impact of the institution to the economy. Because of the relatively high earnings in the occupations that Broward College trains for, particularly in AS, BAS, BS, and BSN programs, average earnings for Broward College graduates are much higher than for High School diploma holders.

The net change in the number of jobs in the core market area in occupations that are most closely associated with the Associates' Degree programs⁶ such as those offered by Broward College is projected to be 7,748 from 2019 to 2029. However, because of retirements and other job transitions, projections suggest that there will be 70,251 openings over the same timeframe that will be needed to generate the net 7,748 job increase. This represents strong labor market demand for Broward College graduates.⁷

The combination of high wages for graduates and low costs for students has predictable outcomes. This study finds that the average Broward College AA graduate who stops with the AA as a terminal degree can expect to earn \$191,329 in additional personal income (in present money value) over a working career relative to an average High School diploma holder. That differential increases to \$495,129 for a Broward College AS degree holder, and to \$409,899 for a Broward College Baccalaureate degree holder.

The above earnings differential can then be compared to dollars of current outlay by students to pursue a degree. Using the expected Broward College costs of attendance, adjusted for those expenses that would be incurred by students even if they were not in school (e.g., rent, transportation, personal expenses), but with wage differentials described above, for every \$1 that an average Broward

6 Associates' Degree programs include Associate of Science, Associate of Applied Science, and Associate of Arts degrees.

7 Data are from Economic Modeling Specialists International (EMSI), Q3/2019 data, from the Quarterly Census of Employment and Wages (QCEW).

College graduate spends on their education, they can expect to earn about \$6.63 in discounted additional personal income over a working career. For example, if a student paid \$10,000 for a Broward College degree, they could expect to make an additional \$66,300 over the course of their career compared to what they would have earned had they not obtained a degree from Broward College.

The overall impact of Broward College to the Tri-County region is seen in the hiring done and incomes paid to faculty and staff, in the construction of its buildings and physical plant, and in the spending done by students. Most important, however, is the increased income earning potential that accrues to its graduates. The impact of the College at current activity levels is already large, as some 13,147 jobs and \$1.04 billion in Gross Domestic Product occurs at the regional level.

Purpose

Florida TaxWatch undertakes this independent research project to assess the comparative benefits to students attending Broward College and the economic impact of Broward College on the Tri-County (Miami-Dade, Broward, and Palm Beach counties) South Florida regional economy.

Introduction

The 28-member Florida College System (FCS) is the primary access point to higher education for more than 733,000 Florida recent high school graduates and returning adult students. Located throughout Broward County, Broward College offers high-quality affordable academic and career educational programs to more than 63,000 students at three campuses and four centers.⁸

The student body at Broward College is largely Hispanic (35.5 percent) and Black (31 percent).⁹ Only one-in-five students attend Broward College on a full-time basis, and just fewer than one-half of Broward College students represent the first generation in their family to attend college.¹⁰ The average age of a Broward College student is 23.5 years of age.¹¹

Students at Broward College may earn any of the following academic and workforce credentials:

- Associate in Applied Science (AAS) --- two-year technical degree designed to train students for direct entry into a specialized occupation in the workforce;
- Associate in Science (AS) --- two-year technical degree designed to prepare students who are planning to enter a specific occupation upon degree completion. An AS degree serves as a basis for future admission to a related bachelor's degree program;
- Associate in Arts (AA) --- designed for students who plan to attend a four-year institution as a junior and complete a bachelor's degree program, the AA degree is awarded upon completion of 60 credit hours in a selected course of study (which includes the completion of a 36-credit-hour general education program);
- Workforce certificates and diplomas --- short (generally one year or less) but comprehensive training programs for immediate entry into high-demand jobs while often gaining credits towards an Associates' degree; and
- Bachelor --- four-year undergraduate degree program that typically requires completion of 120 credit hours and provides students a general and broad education with a focus on a specific major or field of study.

During the 2018-19 school year, Broward College awarded 4,422 Associate degrees, 520 Bachelor's degrees, and 5,139 technical certificates.¹²

8 Broward College, "Annual Report to the Community 2019," retrieved from <https://www.yumpu.com/en/document/read/62778924/annual-report-2019-final-digital>, January 9, 2020.

9 Broward College, "Broward College Fast Facts, Student Demographics," retrieved from <http://www.broward.edu/discover/Pages/Fast-Facts.aspx>, January 9, 2020.

10 Ibid.

11 Ibid.

12 Supra, footnote 8.

Broward College Performance

Awards

In May 2018, Broward College was named as a Top Ten Finalist for the \$1 million 2019 Aspen Prize for Community College Excellence, the nation's signature recognition of high achievement and performance among America's community colleges. Selected from 1,000 public community colleges nationwide, Top Ten Finalists for the Aspen Institute Community College Excellence award are evaluated for outstanding outcomes in four areas: student learning; certificate and degree completion; employment and earnings; and high levels of access and success for minority and low-income students. Two Florida community colleges, Indian River State College and Miami-Dade College, shared the 2019 Aspen Prize for Community College Excellence.

In addition to being named as a 2019 Top Ten Finalist, Broward College has also been recognized by the Aspen Institute in the past. In 2013, Broward College was a Top Ten finalist for the Aspen Prize and, again in 2016. The College was recognized as an Aspen Prize Finalist with Distinction in March 2017, which included a \$100,000 award.¹³

Service to Broward County and South Florida Undergraduate Students

Of the more than 259,000 undergraduate students who attend one of the more than 30 colleges and universities in the Tri-County South Florida region in 2018-19, 40,764 (15.7 percent) are enrolled at Broward College. More than one-half (57 percent) of the undergraduates attending a college or university within Broward County are enrolled at Broward College.

Florida TaxWatch contacted more than 30 public and private colleges and universities in the South Florida region to better understand the geographic origin of all their students. Of the seven institutions for which these data were available, for the Fall 2018 semester, Broward College had the highest percentage of students that are graduates of Broward County high schools (22 percent). The responses from the other institutions ranged from less than 2 percent to 17.2 percent.

Tuition Rates

The National Center for Education Statistics College Navigator has tuition data for 27 institutions of higher learning in the Tri-County South Florida region that offer college credit. With estimated annual tuition and fees of \$2,830 (in-state) for the 2018-19 school year, Broward College had the second-lowest tuition and fees.¹⁴ Annual tuition and fees for the eight other Broward County colleges and universities range from \$4,590 to \$30,900.

¹³ Broward College, "Broward College Named Among Top Ten Finalists for 2019 Aspen Prize," retrieved from <http://www.broward.edu/news/Pages/Broward-College-Named-Among-Top-Ten-Finalists-for-2019-Aspen-Prize.aspx>, January 9, 2020.

¹⁴ Broward County has three public Technical Colleges that were not utilized in the tuition comparison. Technical College program tuition and fees are charged based upon the hours in a program instead of based upon college credit enrollment. With the exception of Broward College's law enforcement academies, Broward College's post-secondary programs have a college credit basis for tuition and fees. The program hour tuition and fee comparison is \$2.80 per program hour at the Technical Colleges and \$2.82 per program hour at Broward College.

Within the Tri-County South Florida region, only Palm Beach State College (\$2,444) has lower tuition and fees. Fifty percent of those attending college in the Tri-County South Florida region paid \$13,052 or more in annual tuition and fees in 2018-19.

Compared to a national average annual tuition and fees for a public two-year college of \$3,440,¹⁵ all three of the FCS Institutions in the Tri-County South Florida region (Palm Beach State College, Broward College, and Miami-Dade College) provide high-quality academic and technical programs at about two-thirds the cost nationally. The annual tuition and fees for Broward College are about 60 percent or less of the tuition and fees paid to attend one of the State University System institutions in the Tri-County South Florida region.

Student Debt

Student loan debt is a significant and growing problem for the millions of college graduates who are in danger of defaulting each year. Nationwide, approximately 45 million loans totaling more than \$1.56 trillion are guaranteed or held by the federal government.¹⁶

Nationally, about two in three (65 percent) college seniors who graduated from public and private nonprofit colleges in 2017 had student loan debt, a slight decrease from 2016. These borrowers owed an average of \$28,650, which is only 1 percent higher than the 2016 average of \$28,350. State averages for debt at graduation ranged from a low of \$18,850 (Utah) to a high of \$38,500 (Connecticut), and new graduates' likelihood of having debt ranged from 38 percent (Utah) to 74 percent (New Hampshire). In 18 states, average debt was more than \$30,000. Many of the same states appear at the high and low ends of the spectrum as in previous years. High-debt states remain concentrated in the Northeast and low-debt states are mainly in the West.

At the college level, average debt at graduation covers an enormous range, from \$4,400 to \$58,000.¹⁷ Florida is considered to be a “low-debt” state, with an average debt level of \$24,041 and 50 percent of graduates with debt.¹⁸

The percentage of full-time beginning undergraduate Broward College students receiving federal student loans, and the average amount of those student loans, is lower than the other colleges and universities within Broward County. During the 2017-18 school year, 11 percent of full-time beginning Broward College undergraduate students received federal student loans, averaging \$3,243 per year. For the other colleges in Broward County that reported student loan data, the percentage of

15 College Board, “College Costs: FAQs,” retrieved from <https://bigfuture.collegeboard.org/pay-for-college/college-costs/college-costs-faqs>, September 3, 2019.

16 Lendingtree, “A Look at the Shocking Student Loan Debt Statistics for 2019,” retrieved from <https://studentloanhero.com/student-loan-debt-statistics/>, January 9, 2020.

17 Institute for College Access and Success, “Student Debt and the Class of 2017,” retrieved from https://ticas.org/wp-content/uploads/legacy-files/pub_files/classof2017.pdf, January 9, 2020.

18 Institute for College Access and Success, “Student Debt and the Class of 2017,” retrieved from https://ticas.org/wp-content/uploads/legacy-files/pub_files/classof2017.pdf, January 9, 2020.

full-time beginning undergraduate students who took out student loans range from 47 percent to 100 percent. Average annual student loan amounts for these colleges range from \$5,057 to \$11,315.

When all undergraduate students are considered, the percentage of undergraduate Broward College students receiving federal student loans, and the average amount of those student loans, is lower than the other colleges and universities within Broward County.¹⁹ During the 2017-18 school year, 47 percent of all Broward College undergraduate students received federal student loans, averaging \$925 per year.²⁰ For the other colleges and universities in Broward County that reported student loan data, the percentage of all undergraduate students who took out student loans range from 61 percent to 100 percent. Average annual student loan amounts for these colleges range from \$6,790 to \$10,562.

It is unclear why the average annual student loan amount for all Broward College undergraduates (\$925) is considerably less than the average annual student loan amount for full-time beginning undergraduate Broward College students (\$3,243) and for all other colleges and universities in the Tri-County South Florida region. One possible explanation is that only about one-in-five Broward College students attend college on a full-time basis, thereby lessening the need for federal student loans or other financial assistance.

The cohort default rate²¹ for Broward College students who receive federal student loans is 7.0 percent. The cohort default rate for other colleges and universities in Broward County that reported student loan data range from 2.2 percent to 10.5 percent.

Whether the metric is the average amount of federal student loans for full-time beginning undergraduate students or for all undergraduate students, the student debt facing Broward College students is far less than the average student loan debt for the state of Florida (\$24,041) and the U.S. (\$28,650). When compared to the other two FCS institutions in the Tri-County South Florida region, Broward College has a larger percentage of undergraduate students receiving federal student loans, but smaller average loan amounts.

Undergraduate Certificate and Degree Awards

The National Center for Education Statistics' Integrated Postsecondary Education Data System (IPEDS) has data on the number of certificates and degrees awarded during the 2016-17 academic year. More than two-thirds (68.4 percent) of the Certificates awarded to Broward County students during 2016-17 were awarded by Broward College. Within the Tri-County South Florida region, 43 percent of all Certificates awarded were awarded by Broward College.

19 The percentage of undergraduate students at Nova Southeastern University who receive federal student loans is also 47 percent.

20 National Center for Education Statistics, College Navigator, Broward College, retrieved from nces.ed.gov/collegenavigator/?q=broward+college&s=all&id=132709#findaid, January 9, 2020.

21 A cohort default rate is the percentage of a school's borrowers who enter repayment on certain Federal Family Education Loan (FFEL) Program or William D. Ford Federal Direct Loan (Direct Loan) Program loans during a particular federal fiscal year (FY), and default or meet other specified conditions prior to the end of the second following fiscal year.

Broward College awarded 97 percent of Associates' degrees awarded to Broward County students. Within the Tri-County South Florida region, 29.9 percent of all Associates' degrees awarded were awarded by Broward College. Miami-Dade College awarded 44 percent of Associates' degrees earned by students in the Tri-County South Florida Region.

Almost one-fourth (24.3 percent) of the Bachelor's degrees awarded in Broward County were awarded by Broward College. Nova Southeastern University awarded the most Bachelor's degrees in Broward County (59.2 percent). Within the South Florida region, Broward College awarded 2.1 percent of all Bachelor's degrees awarded. In terms of the volume of degrees conferred, Florida International University (9,520) and Florida Atlantic University (5,692) awarded the most Bachelor's degrees.

Earnings and Income

The Florida Education and Training Placement Information Program (FETPIP) is a data collection and consumer reporting system that provides follow-up data on former students and program participants who have graduated, exited or completed a public education or training program within the State of Florida.²² Follow-up studies are conducted annually by matching records of the student graduates, completers or exiters from the numerous public and independent organizations with information resources available to FETPIP.²³

FETPIP data show that 80 percent of Broward College undergraduate students who graduated with a Bachelor's degree in 2016-17 found employment and did not continue their education. Their average full-time, full-quarter salary is \$13,452, which equates to \$53,808 annually. This ranks Broward College first among the 14 institutions in the Tri-County South Florida region that award Bachelor's degrees in terms of percentage of graduates who find employment. Miami-Dade ranks second at 75 percent. With an annual salary for graduates in excess of \$50,000, Broward College trails only Nova Southeastern University (\$65,924), Barry University (\$63,868), and Miami-Dade College (\$58,672) in terms of average salaries for those graduating with a Bachelor's degree.

Data by institution for those awarded a Certificate or Associates' degree are unavailable; however, aggregate FETPIP data are available for Broward County public schools and FCS completers:

- FETPIP identified 589 graduates of Broward County public high schools who had found work and were not continuing their education. Their average quarterly earnings are \$3,192, which equates to annual earnings of \$12,768.
- FETPIP identified 7,402 students who had been awarded an Associate of Science degrees from an FCS institution who had found work and were not continuing their education. Their average quarterly earnings are \$10,797, which equates to annual earnings of \$43,188.

²² Section 1008.39, Florida Statutes.

²³ Florida Department of Education, "FETPIP Methodology," retrieved from <http://www.fldoe.org/accountability/fl-edu-training-placement-info-program/fetpip-methodology.shtml>, January 9, 2020.

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- FETPIP identified 109 students who had been awarded an Associate of Applied Science degree from an FCS institution who had found work and were not continuing their education. Their average quarterly earnings are \$8,819, which equates to annual earnings of \$35,276.
 - FETPIP identified 8,496 students who had been awarded a Certificate from an FCS institution who had found work and were not continuing their education. Their average quarterly earnings are \$6,756, which equates to annual earnings of \$27,024.
 - FETPIP identified 11,199 students who had been awarded an Associate of Arts degree from an FCS institution who had found work and were not continuing their education. Their average quarterly earnings are \$7,106, which equates to annual earnings of \$28,424.
 - FETPIP identified 7,402 students who had been awarded a Bachelor's degree from an FCS institution who had found work and were not continuing their education. Their average quarterly earnings are \$12,714, which equates to annual earnings of \$50,856.

Assessing the Economic Impact of Broward College

The following report evaluates and provides quantitative estimates of the economic value of Broward College activities. Florida TaxWatch first discusses how demographic, economic and market characteristics of the modern economy and of Florida influence the need for higher education. Florida TaxWatch then examines trends in enrollment, research and outreach that contribute importantly to the impact of Broward College, and conclude with estimates of economic impacts and economic development benefits to Florida from Broward College operations and wages of graduates.

Why is Higher Education So Important to Florida?

There has never been more knowledge in the world than there is today, and the amount of knowledge is increasing exponentially. The demand for human skills that enable productive use of new knowledge will grow strongly as employers work to master the emerging technologies that drive economic success in a competitive market. Colleges that provide the instruction that enables effective learning of these skills will likely thrive. Communities that successfully build and retain the human skills that enable useful new technologies will likely see higher incomes and a self-reinforcing dynamic of high-quality growth.²⁴

It can easily be the case that the use of new processes will make certain workers obsolete more quickly than those workers can obtain the skills needed to take a new job.²⁵ This has been true throughout the history of innovation in goods- and service-producing processes.²⁶ There has been consensus around the idea that the same things that lead to productivity growth in the economy (i.e., more output per worker) use technologies and processes that substitute automation and more highly skilled labor for less skilled workers, or that substitute less expensive labor in other nations for domestic labor via international trade.²⁷ Such substitution is particularly likely for occupations in which the job duties of workers are characterized by relative intensity in performing repetitive and manual tasks, as these are the easiest to automate or send offshore.²⁸

It is clear that these technology changes will result in shifts in demand for different types of labor. They will tend to raise the incomes of those workers with in-demand skills, while workers with less than cutting edge skills will likely see wages rising less rapidly. The following Figure from authors at

24 "The Second Fifty Years: Initial Assessment of the Impact on the University of West Florida of Adopting Florida's Emerging Preeminence Standards as a Primary Driver of the University's Strategic Planning Process," UWF Center for Research and Economic Opportunity, June 2016. This section of the report is taken largely from Harper, 2019, "Assessment of the Economic Impact of Florida Poly."

25 As was pointed out almost a century ago by John Maynard Keynes who noted "The increase of technical efficiency has been taking place faster than we can deal with the problem of labour absorption," in "The Economic Problems of our Grandchildren," 1930.

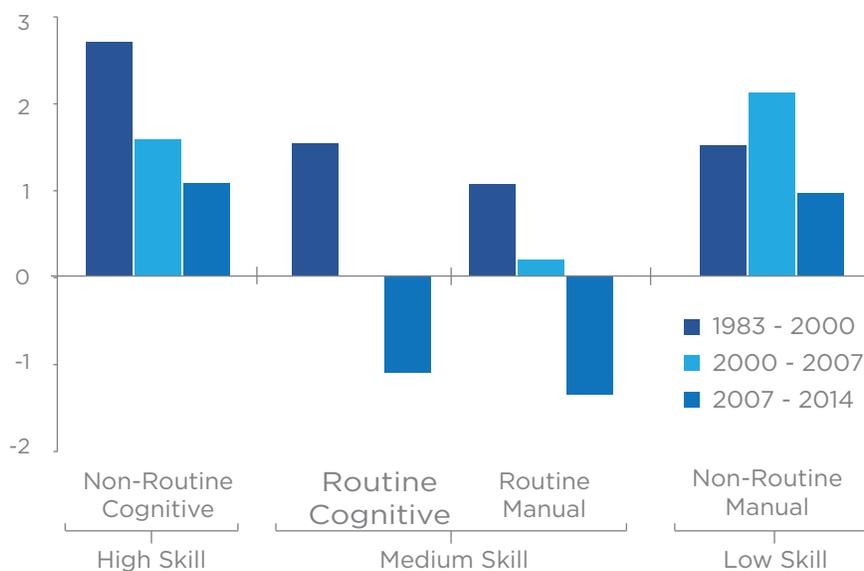
26 Ned Ludd in 1779 allegedly led hosiery workers to destroy mechanical looms that threatened their livelihood. Navickas, Katrina, "The search for 'General Ludd': the mythology of Luddism," *Social History* 30(3), August 2005. More generally, Luddites battle against labor-saving innovation.

27 See e.g., David Autor, "Work of the Past, Work of the Future," NBER working paper 25588, February 2019.

28 This has been a feature of the mainstream economics literature for a least a half-century. See, e.g., Jan Tinbergen, "Substitution of Graduate Labor by Other," *Kyklos* 27(2), 217 - 226, 1974.

the San Francisco Federal Reserve Bank shows the consequences of this substitution in terms of changes in the number of people employed by type of occupation. As can be seen, employment has grown over the past dozen years in occupations requiring non-routine cognitive skills and non-routine manual skills, but has shrunk in occupations characterized by routine cognitive skills and routine manual skills.

Fig. 1. Annual Change in Employment by Occupation Category
1983 - 2014 // percent change



Source: Valletta, FRBSF, Jan 2015

Various authors have commented that these innovations have been largely responsible for the observed growing wage gap between those with higher levels of skill attainment (as proxied by educational attainment of bachelor's degree or higher) and those who go to work with only a high school degree (or less).²⁹ That wage gap grew from the late 1970's through the 1990's, although its growth has since slowed over the period following the 2001 bursting of the dot-com bubble. Beaudry, Green and Sand explain the decreased rate of growth in the wage gap as being the result of a decline in the demand for skilled workers in manufacturing and the trades in the years since 2000, even as the supply of high education workers grew. They hypothesize that more sophisticated automation led to a demand reversal for cognitive skills in middle-skill jobs traditionally filled by non-college educated craft workers.

In response, many college-educated workers were forced to move down the occupational ladder and perform jobs traditionally performed by lower-skilled workers.³⁰ This de-skilling process lowered measured wages for low-skilled workers and for some college-educated workers. Valletta also finds

29 See e.g., Autor, Levy, and Murnane, "The skill content of recent technological change: an empirical exploration," NBER working paper 8337, June 2001.

30 Beaudry, Green, and Sand, "The Great Reversal in the Demand for Skill and Cognitive Tasks," *Journal of Labor Economics* 34, no. S1 (Part 2, January 2016): S199-S247.

that the wage gap widening rate slowed after the 1980's and that the wage gap remained essentially unchanged in recent years,³¹ which he attributes to a technology-driven shift away from middle-skilled occupations, and to a weakening in demand for advanced cognitive skill and suggests that both of these have been factors in the flattening of the higher education wage premium and an increase in income polarization.

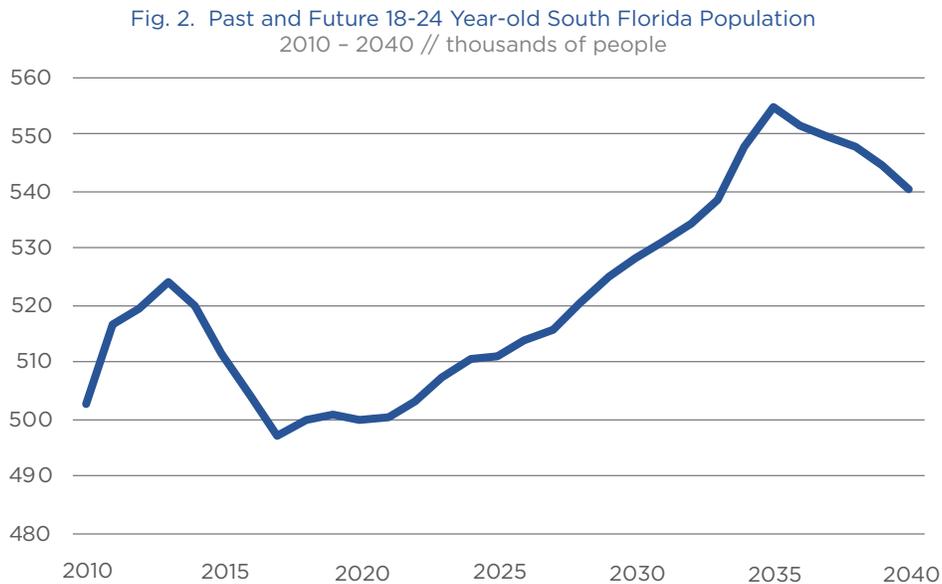
More recently, scholars have looked closely at technology-driven shifts in the task content of occupations. The displacement effect that characterizes adoption of machines and artificial intelligence (AI) can be quite large in occupations embodying routine and manual tasks. Autor (2019) concurs with previous scholars in finding that there are fewer middle-skill jobs than before, both for college-educated and non-college educated workers. However, these education groups fare differently in the labor market. Among college-educated workers, any loss in middle-skill jobs has been substantially offset by upward movement in the skill hierarchy of occupations. In contrast, non-college workers have moved almost exclusively towards the bottom of the occupational distribution. Autor finds that technology change has narrowed the set of jobs in which non-college workers perform specialized work that has commanded higher pay rates.³² These trends are particularly relevant for Broward College grads, and are especially beneficial for Associate of Science and Baccalaureate degree graduates, and for Associate of Arts graduates who go on to complete higher degrees.³³

As can be seen in the Figure below, the number of potential first-time-in-college (FTIC) freshmen appears to be increasing in South Florida after a several year period of decline. The current increase begins earliest and is most notable in the Tri-County South Florida region that provide most of Broward College enrollment. Given the challenges of recruiting qualified students, Broward College will benefit from the projected upswing in prime enrollment age population over the next 15 years. The projected persistence in the growth of college-aged residents in Florida relative to the U.S. points to the need for the capacity Broward College provides.

31 Robert Valletta, "Recent flattening in the higher education wage premium: polarization, skill downgrading, or both?" NBER working paper 22935, December 2016.

32 David Autor, "Work of the Past, Work of the Future," NBER working paper 25588, February 2019.

33 Not all of this effect can be attributed to what was learned at university. At least some of this premium is earned by university graduates who might otherwise have been better earners as mere high school graduates than the average high school graduate - i.e., there may be self-selection bias inherent in the calculations of wage differential. Skilled and motivated people tend to get degrees.



Source: Woods and Poole Economics, CEDDS, 2019

People with more education generally live longer, work later in life, and have higher earnings.³⁴ By holding costs and associated debt burdens to students down, the FCS encourages a level of educational attainment that is higher than would otherwise occur in a state economy driven by a high share of retirees that results in a service-oriented industry structure and occupational demand profile.³⁵ By focusing on Associate of Science, Associate of Arts and Baccalaureate programs, Broward College provides these benefits while also directly supporting Florida’s high-skill, high-wage economic development strategy.

Meeting Labor Market Needs

On the workforce skills side, the vision of Broward College is to serve as a destination for academic excellence that connects its students to diverse local and global communities through technical, professional, and academic careers.

The weighted average cumulative job growth rate for the 2019 - 2028 period is projected to be 10.7 percent in the Tri-County South Florida market footprint for occupations that have the Associates’ degree as the typical entry level educational attainment. Taking an average of the median earnings associated with these occupations and weighting that average to reflect the number of employees in each occupation, shows expected earnings per employed Broward College graduate of \$49,127. The corresponding measure for wages across occupations typically requiring a high school degree is \$37,976. This differential means that earnings per Broward College graduate are thus 29.4 percent higher than the median expected wage across job categories.

³⁴ Not all of this effect can be attributed to what was learned at university. At least some of this premium is earned by university graduates who might otherwise have been better earners as mere high school graduates than the average high school graduate - i.e., there may be self-selection bias inherent in the calculations of wage differential. Skilled and motivated people tend to get degrees.

³⁵ J Dewey and D Denslow, "Baby Boom Retirees and Florida's Job Structure," Business and Economics Journal, 2012.

The 2018 Economic Security Report produced by the Florida Department of Economic Opportunity found that the median wage for the most recent cohort of bachelor’s degree completers for the State University System was \$36,000, ranging from a high of \$37,476 at Florida International University to a low of \$23,760 at New College of Florida. This stands in strong contrast to the Baccalaureate completers in the Florida College System, where median first year earnings were \$43,584, or 21 percent higher. Much of this is due to choice of majors by students. The most popular major in the State University System over the study period was psychology, with first-year median wages of \$28,588, while the second most popular major was biology, with wages of \$27,272. This is in contrast to the business, computer science, and health fields that are the most popular Baccalaureate degrees at Broward College.

Sources of Broward College Economic Impact

Increased economic activity in the community and in the State of Florida due to the presence of Broward College flow from several sources. These include the operations expenditures of the College (including payroll), the average annual capital outlays of the College, the student spending done in the community, and, most importantly, from the increased future earnings of Broward College graduates relative to their peers. Specific assumptions are detailed in the Appendix.

The elements of net new direct spending described in the Appendix are entered into the IMPLAN model, and direct, indirect, and induced impacts of Broward College spending impacts, along with job creation, labor income, Gross Domestic Product and total output, are reported below.

TABLE 1: SUMMARY OF REGIONAL ECONOMIC IMPACT OF BROWARD COLLEGE, BY ACTIVITY, FY2018-19

	JOBS	PERSONAL INCOME	LOCAL GDP	TOTAL OUTPUT
College Operations*	4,577	\$238,348,766	\$331,467,330	\$548,774,792
PV of Increased Earnings	8,570	\$386,951,900	\$704,241,660	\$1,206,973,357
Total	13,147	\$625,300,666	\$1,035,708,990	\$1,755,748,149

* includes annual new construction and spending of out-of-state students; Source: IMPLAN, author's calculations

These impacts can be disaggregated into elements that flow from the presence of the College in Broward County, including operations, construction, and student spending, and elements that are statewide in nature. Statewide impacts are driven by the additional income that can be expected to flow to graduates of Broward College due to the valuable job market skills they possess. These are broken out in the Tables below.

TABLE 2: TOP 10 LOCAL SECTORS FOR TOTAL IMPACT OF ANNUAL COLLEGE OPERATIONS, CONSTRUCTION, STUDENT SPENDING, AND INCREASED HOUSEHOLD INCOME, BY CONTRIBUTION TO LOCAL GDP, FY2018-19

DESCRIPTION	JOBS	PERSONAL INCOME	REGIONAL GDP	TOTAL SALES
Junior colleges, colleges, universities, and professional schools	2,706	\$159,935,837	\$174,529,226	\$271,987,790
Real estate	801	\$11,420,816	\$89,726,378	\$137,566,090
Full-service restaurants	482	\$14,023,215	\$15,268,741	\$26,858,743
Limited-service restaurants	441	\$9,347,115	\$23,885,299	\$40,204,657
Hospitals	360	\$27,679,541	\$33,644,728	\$57,484,977
Offices of physicians	298	\$26,530,047	\$26,376,363	\$40,523,246
Retail - General merchandise stores	285	\$8,481,941	\$13,177,936	\$20,238,326
Retail - Food and beverage stores	274	\$8,135,523	\$12,320,639	\$18,580,035
Wholesale trade	264	\$22,535,365	\$43,993,302	\$65,223,984
Other financial investment activities	250	\$5,069,518	\$7,180,087	\$38,480,912
Other sectors	6,987	\$332,141,748	\$595,606,291	\$1,038,599,388
Total	13,147	\$625,300,666	\$1,035,708,990	\$1,755,748,148

Source: IMPLAN, author's calculations

Return on Investment from the Student Perspective

It is clear that Florida taxpayers receive excellent value for the tax dollars expended in support of Broward College. For the \$92.2 million in state non-capital appropriations reported in the March 2019 Florida Auditor General Report,³⁶ the figures presented above suggest that almost seven dollars in new personal income stay in Florida for every operating dollar appropriated by the State; however, the fact that most students will stay in the state after finishing their degree³⁷ means that the above impacts are higher than for many other post-secondary institutions. Continued economic growth in those jobs in Broward College occupations may permit Broward College graduates to work productively and meet their career expectations without having to leave the state. This would represent great progress towards Florida's high-wage economic development goals.

From the student perspective, the income gains that accrue from having obtained the scarce skills that are part of a quality core Science, Technology, Engineering, and Mathematics (STEM) education will follow them throughout a career, regardless of whether their paycheck comes from a Florida company or from elsewhere. Thus, when considering returns to individual Broward College students, there is no need to apply a discount to account for dollars earned as graduates migrate to pursue career opportunities. Unlike the taxpayer, however, a student must also consider his or her opportunity cost of a rigorous academic program, especially the sacrifice of the income that could have been earned had they gone directly into the workforce instead of spending time in class and studying while enrolled at Broward College.

³⁶ State of Florida Auditor General, "Financial Audit, Broward College, for the Fiscal Year Ended June 30, 2018," Report No. 2019-192, March 2019.

³⁷ Office of Program Policy Analysis and Government Accountability (OPPAGA) of the Florida Legislature. Florida's University Graduates Tend to Stay in the State Workforce After Completing Their Degrees. Report 05-59, 11 pages, Dec. 2005. See discussion in the Appendix regarding assumptions embodied in the impact calculations.

To perform these calculations, it makes sense to assume that the average graduate:

- has a 37.4 year work-life expectancy at age 25;³⁸
- gives up some fraction of a High School graduate's \$24,284 in income annually to attend Broward College; and
- has out-of-pocket school-related expenses of \$9,660 that would not have otherwise been incurred during his or her Broward College school career.

If the four percent after-inflation discount rate that the State of Florida uses in valuing future benefits from current outlays on transportation projects is included, then that ratio of the present money value of the earnings differential over the work-life summed across all Associates' and Baccalaureate graduates is \$1,909,856,159, which can be compared against an opportunity cost of students in terms of foregone earnings and out-of-pocket costs of about \$287,900,208.³⁹

This means that the average graduate can expect to earn \$6.63 in discounted additional personal income for every dollar of current outlay to pursue a degree. This calculation varies across the degrees that Broward College offers. The highest benefit cost ratio is that of the Associate of Science completers, with the equivalent of two years of opportunity costs, and a high starting wage, at \$13.52. It is substantially lower for Baccalaureate completers, at \$5.60 per dollar of cost, primarily due to the higher costs of more time-intensive Baccalaureate degree plans. The lowest benefit to cost ratio is for the Associate of Arts completers, where the wage differential over High School graduates is not as it is for the Associate of Science and Baccalaureate degrees. This means that the ratio is only \$5.22 in income for every dollar of cost; however, given that about 70 percent of Associate of Arts completers pursue further educational credentials within one year of completing the AA degree,⁴⁰ the wage statistic is perhaps not fully representative of their experience.

38 See, e.g., Skoog, Cieka, and Krueger, "The Markov Process Model of Labor Force Activity: Extended Tables of Central Tendency, Shape, Percentile Points, and Bootstrap Standard Errors," *Journal of Forensic Economics* 22(2), 2011, pp.165-229.

39 This assumes that inflation-adjusted wages, other costs, and Broward College tuition and supplies costs are effectively flat in the near term.

40 American Institutes for Research, "Measuring the Economic Success of Florida's Graduates," Economic Security Report 2018.

Conclusion

Florida is a rapid-growth state relative to the rest of the nation, and there are both challenges and opportunities in terms of student population growth. Broward College is well-positioned to benefit from population growth trends. Demographic trends may present challenges, among them being the aging of the State, and the ongoing trend towards more leisure and hospitality activities; however, these trends are exactly why there is a pressing need for the programs offered at Broward College – they are affordable to students, thus keeping financial risk and debt burdens low, and the higher wages will help enable the high wage economy to which Florida aspires.

About 68 percent of the economic impact of the College, as measured by the increment to state and local Gross Domestic Product, is driven by the skills, credentials, and increased earning capacity of the graduating students. The fields of study offered by Broward College at the AS and Baccalaureate levels ensure that high wages are attainable. While other fields of study may merit consideration by families and students, it is clear that a wage penalty will likely be paid for more popular State University System degrees particularly versus the business, information technology and health degrees offered by the College. A growing and converging body of work offers explanations that point to continuations of these wage trend differentials.

The Legislature obtains good returns for the taxpayer when it commits resources to operate and maintain Broward College and encourage its continued growth. Its merit can be seen in the large economic impact per student that is driven primarily by good wage differentials and low costs versus competing programs. While enrollments have been flat in recent years, the basic demographic trends are favorable for continued expansion. If that occurs, the State and Broward College students and families will be repaid many times over by high wages and bright career prospects.

Appendix A: The IMPLAN Model

Florida TaxWatch uses models constructed in the IMPLAN economic impact modeling software environment (www.implan.com) to identify Tri-County region-specific multipliers for the spending described above. IMPLAN is a member of the class of tools known as input-output models. Such models allow identification of the indirect and induced spending, or “multiplier effects,” also known as “ripple effects,” that are generated by direct spending elements such as those described in the body of the text above. These models use data on inter-industry linkages that are derived from data collected by the U.S. statistical agencies in their periodic surveys of businesses such as the annual Survey of Manufactures, and the Economic Census that is conducted every five years. The data from these and other surveys allows analysts to see from which sectors businesses buy their inputs and to whom they sell their outputs.

This process allows analysts to identify linkages between economic sectors and subsectors and construct a matrix that relates input-output (IO) relationships. The IMPLAN IO model consists of 536 sectors that correspond to the various types of businesses throughout the economy, as well as to personal spending by households at 10 different income levels, and by government entities, and the model specifies the spending linkages that on average exist between them. The model used in this analysis is calibrated to reflect the differences in relationships, as compared to the national average relationships for each sector, between sectors in Florida and each of its 67 counties.

Here Florida TaxWatch uses the Tri-County model to calculate impacts for those types of spending that occur in South Florida that would likely not occur in Broward County but for the presence of Broward College. These include the impacts of College operations, the non-tuition spending of out-of-state Broward College students, and the average annual construction spending being done by Broward College in the ongoing construction improvements of its campus. The Tri-County model is also used in calculating the spending impact that is due to the earnings differential between occupations that correspond to Broward College areas of study versus occupations that typically only require a high school diploma. It cannot yet be known where graduating students will start their careers. Clearly the majority share of the statewide impact of the present money value of the income differential will be felt in Broward, Miami-Dade, and Palm Beach counties.

Appendix B: Model Inputs and Assumptions

Increased economic activity in the three-county regional community and in the State of Florida due to the presence of Broward College flow from several sources. These include the operations expenditures of the College, the average annual capital outlays of the College, the student spending done in the community, and, most importantly, from the increased future earnings of Broward College graduates relative to their peers. College spending figures are taken from the most recent (March 2019) report on the College by the Florida Auditor General. Here Florida TaxWatch uses estimated operating expenses of \$276.9 million per year as an input into the college and university production sector for the Tri-County model. This captures not only the estimated direct employment at the College but also, via the models multiplier linkages, supply chain of local businesses.⁴¹ Operations expenditures consist of payroll, other operating expenses, and capital outlays associated with keeping the doors open. These values tend to be higher than spending done by a similar number of employees elsewhere in state and local government because of the higher wages commanded in the marketplace by workers with the educational attainment of College faculty and staff.

Because capital outlays tend to be unevenly distributed over time, with construction spending going from very low to very high as a new building is begun, and then back to a minimal level upon completion, here Florida TaxWatch uses an estimated annual average for construction spending. Florida TaxWatch uses \$14 million per year as an estimate of the average cost of construction to be done on campus.

It would be reasonable to expect that Broward College students might have had similar living expenses had they simply joined the workforce after high school or attended a different Florida school; however, spending done in the local community by out-of-area students who choose to attend Broward College would likely not have occurred elsewhere in the Tri-County area and is thus net new spending to the local economy. Here Florida TaxWatch follows Cost of Attendance figures taken from the College website adjusted to reflect the share of gross retail spending that stays in the local economy. The number of out-of-state students has steadily decreased over the last eight years.

While the above sources are important, the present money value of the increased lifetime wages associated with market demand for the scarce skills provided by a Broward College education are far and away the largest component of economic impact for any college or College.⁴² Here we use a four percent after-inflation discount rate applied to 30 years of wage differential between a Broward College grad and a high school graduated.

41 Purchases from outside the local area are effectively eliminated from calculations of impact by use of a local purchase coefficient that accounts for that fraction of purchases likely to originate from outside the local area.

42 On top of this, Associates' degree and Baccalaureate degree graduates are likely to stay in the workforce longer than workers with less educational attainment. See, e.g., Kurt Krueger and Frank Slesnick, "Total Worklife Expectancy," *Journal of Forensic Economics* 25(1), 2014, pp. 51 - 70.

Wage values are taken from the EMSI Q3 2019 database, with differentials calculated based on U.S. Bureau of Labor Statistics assumptions about the average academic qualification for entry into a particular occupation.

Information on the likely earnings of Broward College graduates is taken from EMSI data for workers in occupations corresponding to Broward College fields of study. These data are then used to compare to likely earnings for high school graduates in Florida working in occupations typically requiring a high school degree, as reported by EMSI. Florida TaxWatch then calculates the net present value of the differential over a 37.4-year work-life expectancy.

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