



# Analysis of the Economic Impact and Return on Investment of Education

THE ECONOMIC VALUE OF THE PUBLIC UNIVERSITIES OF OHIO

May 2018

# EXECUTIVE SUMMARY

# Executive summary

Inter-University Council of Ohio's (IUC) public universities create value in a variety of ways. The universities improve higher education delivery throughout the state and help students increase their career readiness. They facilitate new research and economic development, provide healthcare for the state through their clinics and hospitals, and also draw visitors to the state, generating new dollars and opportunities for Ohio.

The value of the public universities of Ohio influences both the lives of students and the state economy. The universities serve a range of industries in Ohio, support state businesses, and benefit society as a whole from an expanded economy and improved quality of life. The benefits created by the universities also extend to the state and local government through increased tax revenues and public sector savings.

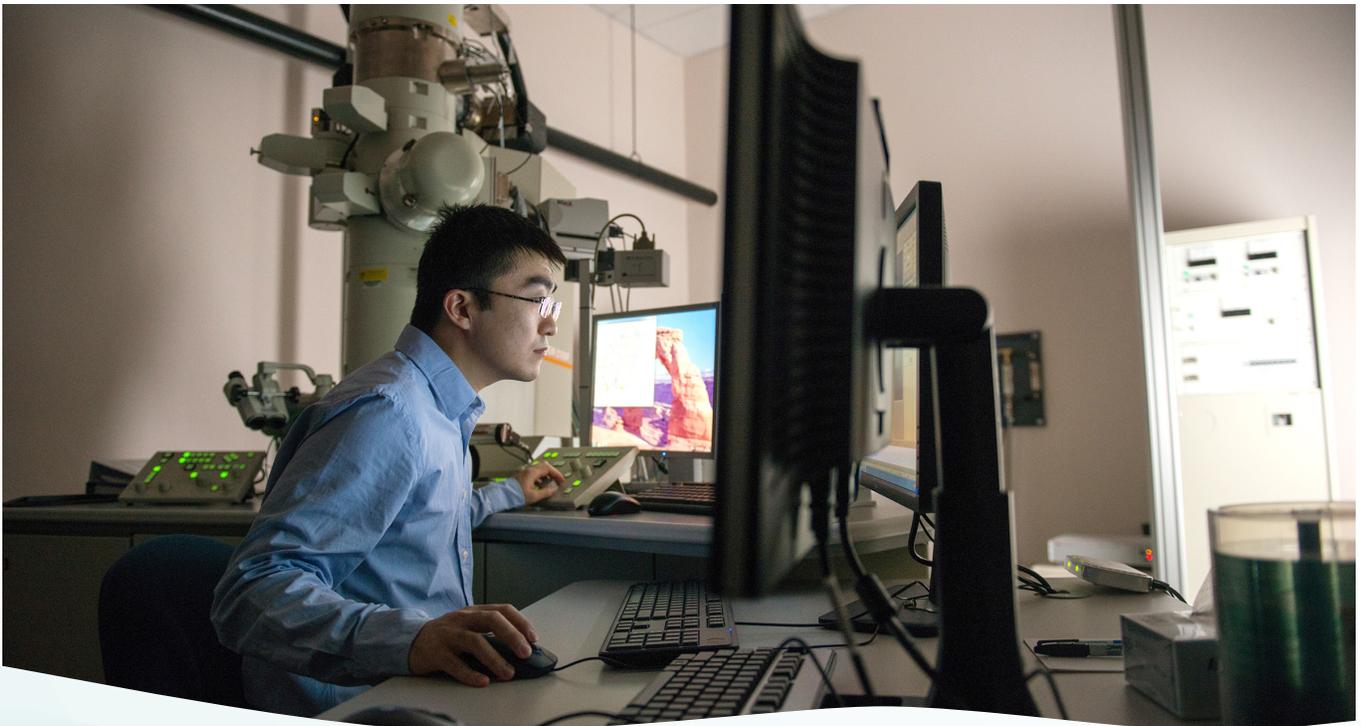
This study investigates the economic impacts created by the public universities on the business community and the benefits that the universities generate in return for the investments made by their key stakeholder groups—students, taxpayers, and society. The universities serve

the entire state of Ohio. The following two analyses are presented:

- **Economic impact analysis**
- **Investment analysis**

All results reflect student and financial data for fiscal year (FY) 2016-17. Impacts on the state business community are reported under the economic impact analysis. Results are measured in terms of added income. The returns on investment to students, taxpayers, and society are reported under the investment analysis. Both analyses are described more fully in the following sections.

Photo provided by Ohio University.



# Economic impact analysis

The public universities of Ohio promote economic growth in Ohio through their direct expenditures and resulting expenditures of students, visitors, and state businesses. They serve as employers and buyers of goods and services for their general, research, clinical, and construction activities. Numerous start-up and spin-off companies have formed through programs and research at these universities. The universities' reputation and activities attract students and visitors from outside Ohio, whose expenditures benefit state vendors. In addition, they are primary sources of education to Ohio residents and suppliers of trained workers to the state's industries, increasing overall productivity in the workforce.

## OPERATIONS SPENDING IMPACT

The public universities of Ohio are important employers in Ohio. In FY 2016-17, the universities employed 53,986 full-time and part-time faculty and staff for their day-to-day operations. Of these, 93% lived in Ohio. Total payroll at the universities for those employees was \$4.9 billion, much of which was spent in the state for groceries, rent, dining out, clothing, and other household expenses.

The public universities themselves are large-scale buyers of goods and services. In FY 2016-17, the universities spent \$2.7 billion to cover their day-to-day expenses for facilities, professional services, and supplies.

The public universities added \$5.6 billion in income to the state during the analysis year as a result of their day-to-day operations. This figure represents the universities' payroll, the multiplier effects generated by the spending of the universities and their employees, and a downward adjustment to account for funding that the universities received from state and local sources. The \$5.6 billion in added income is equivalent to supporting 67,974 jobs.

## RESEARCH SPENDING IMPACT

Research activities impact the economy by employing people and requiring the purchase of equipment and other supplies and services. Over the last four years, the public universities of Ohio received 2,584 invention disclosures, filed 1,921 new US patent applications, and produced 449 licenses. In the last four years, the universities' patent applications have almost doubled.

**TABLE 1:** Research developments created by the public universities of Ohio in FY 2016-17

575
Inventions
603
Patents
95
Licenses

In FY 2016-17, the public universities spent \$598 million on payroll to support research activities. This, along with other research spending created a net total of \$1.4 billion in added income for the state economy. This added income is equivalent to supporting 18,489 jobs.

### CLINICAL SPENDING IMPACT

There are many clinics and medical centers that are related to and affiliated with the public universities of Ohio. These clinics and medical centers provide hands-on learning and research environments for students and employ hundreds of workers. Although broader health-related impacts are outside the scope of this analysis, the clinics and medical centers are also known for providing quality patient care.

In FY 2016-17, the clinics and medical centers spent over \$3 billion on clinical operations. These expenditures added a net impact of \$3.7 billion in added income to the state. This is equivalent to supporting 56,726 jobs.

### CONSTRUCTION SPENDING IMPACT

The public universities of Ohio commissioned contractors to build or renovate a number of facilities during the analysis year. The quick infusion of earnings and jobs that occurred in the state economy as a result of this construction spending is only considered short-term due to the one-time nature of construction projects. Nonetheless, the construction spending had a substantial impact on the state economy in FY 2016-17, equal to \$401 million in added income for Ohio and equivalent to supporting 5,241 jobs.

### START-UP AND SPIN-OFF COMPANY IMPACT

The public universities create exceptional environments that foster innovation and entrepreneurship, evidenced by the number of the universities’ start-up and spin-off companies created in the state. Start-up companies, created specifically to license and commercialize the universities’ technology or knowledge, have a strong and clearly defined link to the universities. Spin-off companies, created and fostered through the universities’ programs or faculty and alumni, have a clear but weaker link to the universities. As shown in Table 2, 113 start-up and 19 spin-off companies were active in FY 2016-17, employing a total of 990 people.

In FY 2016-17, the public universities’ start-up and spin off companies added \$248.7 million in income to the Ohio economy, which is equivalent to supporting 1,948 jobs. Of this added income, \$215.1 million was due to the start-up companies, with the remainder due to spin-off companies.

**TABLE 2:** Research developments created by the public universities of Ohio in FY 2016-17

START-UP COMPANIES	SPIN-OFF COMPANIES
<b>113</b>	<b>19</b>
Number of companies	
<b>872</b>	<b>118</b>
Number of Employees	

**TABLE 3:** Impacts created by the public universities of Ohio in FY 2016-17

ADDED INCOME	JOBS
<b>\$5.6 billion</b>	<b>67,974</b>
Operations spending impact	
<b>\$1.4 billion</b>	<b>18,489</b>
Research spending impact	
<b>\$3.7 billion</b>	<b>56,726</b>
Clinical spending impact	
<b>\$401.0 million</b>	<b>5,241</b>
Construction spending impact	
<b>\$248.7 million</b>	<b>1,948</b>
Start-up and spin-off company impact	
<b>\$710.7 million</b>	<b>14,589</b>
Student spending impact	
<b>\$76.2 million</b>	<b>2,198</b>
Visitor spending impact	
<b>\$29.8 billion</b>	<b>391,675</b>
Alumni impact	
<b>\$42.0 billion</b>	<b>558,841</b>
Total impact	



## STUDENT SPENDING IMPACT

Many students attending the public universities originated from outside the state in FY 2016-17, and some of these students relocated to Ohio to attend the universities. These students would not have come to the state if the universities did not exist. In addition, a number of in-state students would have left the state for other educational opportunities if not for the existence of the universities. While attending these universities, relocated and retained students spent \$960 million for everyday needs such as groceries, housing, and transportation. A significant portion of these expenditures occurred in the state, generating \$710.7 million in added income in the state economy during the analysis year, which is equivalent to supporting 14,589 jobs. Of the \$710.7 million impact, \$450 million was generated by out-of-state students.

## VISITOR SPENDING IMPACT

Thousands of visitors from outside the state were attracted to the public universities during the analysis year to attend commencement, sports events, and other activities sponsored by these universities. While in the state, visitors spent money for lodging, food, transportation, and other personal expenses. The off-campus expenditures of the universities' out-of-state visitors generated a net impact of \$76.2 million in added income for the state economy in FY 2016-17. This \$76.2 million in added income is equivalent to supporting 2,198 jobs.

## ALUMNI IMPACT

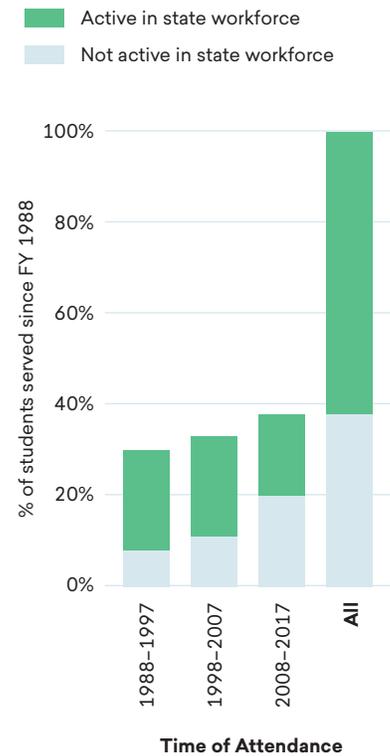
The education and training the universities provide for state residents results in the greatest impact. As shown in Figure 1, since the universities were established, students have studied at the universities and entered the state workforce with new skills. Today, hundreds of thousands of former students are employed in Ohio.

During the analysis year, past and present students of the public universities of Ohio generated \$29.8 billion in added income for the state. This figure represents the higher earnings that students earned during the year, the increased output of the businesses that employed the students, and the multiplier effects that occurred as students and their employers spent money at other businesses. This \$29.8 billion in added income is equivalent to supporting 391,675 jobs.

## TOTAL IMPACT

The overall impact of the public universities of Ohio on the state business community during the analysis year amounted to \$42 billion in added income, equal to the sum of the operations spending impact, the research spending impact, the clinical spending impact, the construction spending impact, the start-up and spin-off company impact, the student spending impact, the visitor spending impact, and

**FIGURE 1:** The universities' alumni working in-state today



the alumni impact. The \$42 billion in added income was equal to approximately 6.7% of the GSP of Ohio. By comparison, this contribution that the universities provide on their own is nearly three times as large as the entire Accommodation & Food Services industry in the state.

The total impact is also expressed in terms of the jobs supported by the added income; they are calculated by jobs-to-sales ratios specific to each industry. Overall, the \$42 billion impact supports 558,841 jobs. For perspective, this means that one out of every 12 jobs in Ohio is supported by the activities of the public universities and their students.

A portion of the total \$42 billion is broken out into an industry-by-industry impact ordered by added income. Table 4 outlines the top industries impacted by the universities. Because industries have different jobs-to-sales ratios, the associated jobs supported by the universities differ by impact. Nonetheless, these are impacts that would not have been generated without the universities' presence.

**TABLE 4:** Top industries impacted by the public universities of Ohio

TOTAL INCOME (BILLIONS)	JOBS
<b>\$6.6</b>	<b>114,605</b>
Health Care & Social Assistance	
<b>\$4.7</b>	<b>59,861</b>
Professional & Technical Services	
<b>\$4.3</b>	<b>24,200</b>
Manufacturing	
<b>\$3.7</b>	<b>36,476</b>
Government, Non-Education	
<b>\$2.1</b>	<b>11,288</b>
Finance & Insurance	
<b>\$20.4</b>	<b>312,411</b>
All other industries	
<b>\$42.0</b>	<b>558,841</b>
Total impact	

Photo provided by the University of Cincinnati.



# Investment analysis

Investment analysis is the process of evaluating total costs and measuring these against total benefits to determine whether or not a proposed venture will be profitable. If benefits outweigh costs, then the investment is worthwhile and considered profitable.

The public universities of Ohio received a total of \$9.6 billion in FY 2016-17. Tuition and fees comprised 36% of total revenue, student aid from government sources comprised another 31%, and all other revenue comprised the remaining 33%. This study considers the public universities, collectively, as an investment from the perspectives of those whom provided these revenues - students, taxpayers, and society. The backdrop for the analysis is the entire Ohio economy.

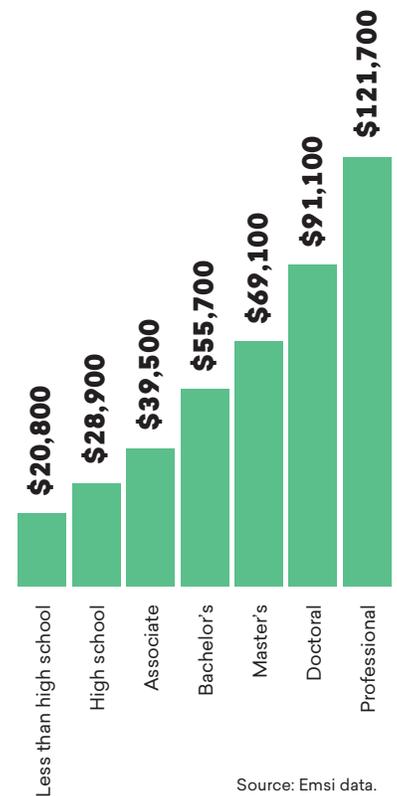
## STUDENT PERSPECTIVE

In FY 2016-17, the public universities of Ohio served 364,750 for-credit students and 20,149 non-credit students. In order to attend college, students paid for tuition, fees, books, and supplies. They also took out loans and will incur interest on those loans. Additionally, students gave up money that they would have otherwise earned had they been working instead of attending college. The total investment made by the universities' students for FY 2016-17 amounted to a present value of \$6.3 billion, equal to \$3.7 billion in out-of-pocket expenses (including future principal and interest paid on student loans) plus \$2.5 billion in forgone time and money.

In return for their investment, the universities' students will receive a stream of higher future earnings that will continue to grow through their working lives. As shown in Figure 2, mean earnings levels at the midpoint of the average-aged worker's career increase as people achieve higher levels of education. For example, the average bachelor's degree completer from a public university will see an increase in earnings of \$26,800 each year compared to someone with a high school diploma or equivalent working in Ohio. Over a working lifetime, this increase in earnings amounts to an undiscounted value of approximately \$1,179,200 in higher earnings.

The present value of the higher future earnings that the universities' students will receive over their working careers is \$29 billion. Dividing this value by the \$6.3 billion in present value student costs yields a benefit-cost ratio of 4.6. In other words, for every \$1 students invest in the universities in the form of out-of-pocket expenses and forgone time and money, they receive a cumulative of \$4.60 in higher future earnings. The average annual rate of return for students is 13.7%. This is an

**FIGURE 2:** Higher earnings by education level at career midpoint in Ohio



impressive return, especially when compared to the 30-year average 10.1% return for the U.S. stock market (Figure 3).

## TAXPAYER PERSPECTIVE

The public universities of Ohio generate more in tax revenue than they take. These benefits to taxpayers consist primarily of taxes that the state and local government will collect from the added revenue created in the state. As the universities' students earn more, they will make higher tax payments. Employers will also make higher tax payments as they increase their output and purchase more supplies and services. By the end of the FY 2016-17 students' working careers, the state and local government will have collected a present value of \$7.7 billion in added taxes.

Benefits to taxpayers consist of the savings generated by the improved lifestyles of students and the proportionally reduced government expenditures. Education is statistically correlated with a variety of lifestyle changes that generate taxpayer savings across three main categories: 1) health, 2) crime, and 3) unemployment. Improved health habits lower the students' demand for national health care services. Students are also less likely to commit crimes, so the demand for law enforcement and criminal justice services is reduced (study references are available in the main report). Students are also more employable, so the demand for welfare and unemployment benefits, such as earnings assistance and welfare benefits, is reduced. All of these benefits will generate a present value of \$748.4 million in savings to state and local taxpayers.

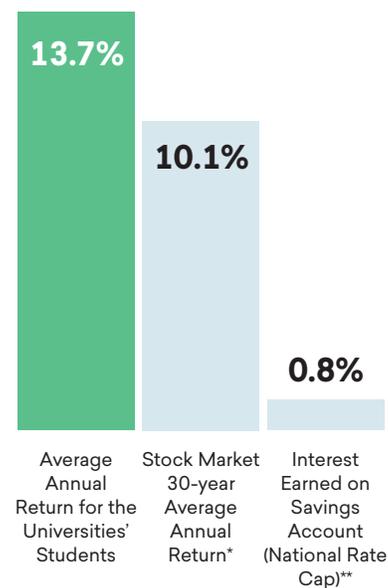
Total benefits to taxpayers equal \$8.4 billion, equal to the sum of the added taxes and public sector savings. Comparing this to the taxpayer costs of \$2.1 billion—equal to the funding that the public universities received from the state and local government during the analysis year—yields a benefit-cost ratio of 4.1. This means that for every \$1 of public money invested in the public universities, taxpayers receive a cumulative value of \$4.10 over the course of the students' working lives. The average annual rate of return is 8.6%, a solid investment that compares favorably with other long-term investments in both the private and public sectors.

## SOCIAL PERSPECTIVE

Society as a whole within Ohio benefits from the presence of the public universities in two major ways. The first and largest benefit that society receives is an increased state economic base. As discussed in the previous section, higher student earnings and increased business output occur across the state. This raises prosperity in Ohio and expands the economic base for society as a whole.

Benefits to society also consist of the savings generated by the improved lifestyles of students. Similar to the taxpayer section above, education is statistically correlated with a variety of lifestyle changes that generate social savings. Note that these costs are avoided by the consumers, and are distinct from the costs avoided

**FIGURE 3:** Student rate of return



\* Forbes' S&P 500, 1987-2016.  
 \*\* FDIC.gov, 7-2017.

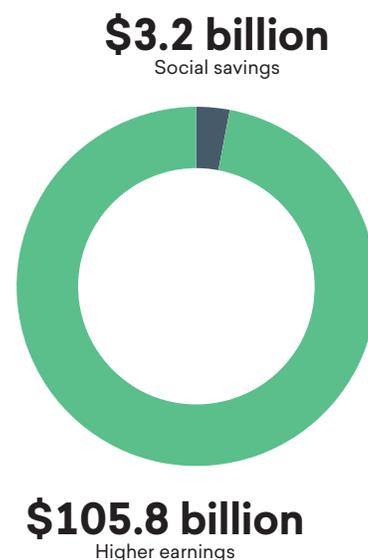


by taxpayers outlined above. Health savings include avoided medical costs associated with smoking, alcoholism, obesity, drug abuse, and mental disorders. Crime savings include reduced security expenditures and insurance administration, lower victim costs, and reduced criminal justice system expenditures. Unemployment savings include the reduced employer contributions towards unemployment claims. For a list of study references to these statistical benefits, please contact IUC for a copy of the main report.

Figure 4 shows the present value of the higher earnings and social savings that will occur in Ohio over the working lifetime of the FY 2016-17 student population at the universities. Higher earnings amount to a present value of \$105.8 billion due to the increased lifetime earnings of students and associated increases in business output. Social savings amount to \$3.2 billion, the sum of health, crime, and unemployment savings in Ohio. Altogether, total benefits to society equal \$109 billion (in present value terms).

Society invested a present value of \$13.3 billion for FY 2016-17 public universities' educations. This includes all expenditures by the universities, all student expenditures, and all student opportunity costs. For every \$1 of this investment, society as a whole in Ohio will receive a cumulative value of \$8.20 in benefits, equal to the \$109 billion in benefits divided by the \$13.3 billion in costs. These benefits will occur for as long as the universities' FY 2016-17 students remain employed in the state workforce.

**FIGURE 4:** Present value of higher earnings and social savings in Ohio



## SUMMARY OF INVESTMENT ANALYSIS RESULTS

Table 5 presents the results of the investment analysis for all three of the universities' major stakeholder groups—students, taxpayers, and society. As shown, students receive great value for their educational investment. At the same time, the investment made by state and local taxpayers to the universities creates a wide range of benefits to society and returns more to government budgets than it costs.

**TABLE 5:** Summary of investment analysis results

	STUDENT PERSPECTIVE	TAXPAYER PERSPECTIVE	SOCIAL PERSPECTIVE
Present value benefits (thousands)	<b>\$29,155,433</b>	<b>\$8,428,472</b>	<b>\$108,970,335</b>
Present value costs (thousands)	<b>\$6,283,177</b>	<b>\$2,074,590</b>	<b>\$13,337,108</b>
<b>Net present value (thousands)</b>	<b>\$22,872,256</b>	<b>\$6,353,883</b>	<b>\$95,633,227</b>
Benefit-cost ratio	<b>4.6</b>	<b>4.1</b>	<b>8.2</b>
Rate of return	<b>13.7%</b>	<b>8.6%</b>	<b>NA*</b>

\* The rate of return is not reported for the social perspective because the beneficiaries of the investment are not necessarily the same as the original investors.

# Conclusion

The results of this study demonstrate that public universities of Ohio create value from multiple perspectives. The universities benefit local businesses by increasing consumer spending in the state and supplying a steady flow of qualified, trained workers into the workforce. They enrich the lives of students by raising their lifetime earnings and helping them achieve their individual potential. They benefit state and local taxpayers through increased tax receipts across the state and a reduced demand for government-supported social services. Finally, they benefit society as a whole in Ohio by creating a more prosperous economy and generating a variety of savings through the improved lifestyles of students.

## ABOUT THE STUDY

Data and assumptions used in the study are based on several sources, including the FY 2016-17 academic and financial reports from the public universities of Ohio, industry and employment data from the U.S. Bureau of Labor Statistics and U.S. Census Bureau, outputs of Emsi's Multi-Regional Social Accounting Matrix model, and a variety of studies and surveys relating education to social behavior. The study applies a conservative methodology and follows standard practice using only the most recognized indicators of investment effectiveness and economic impact. For a full description of the data and approach used in the study, please contact IUC for a copy of the full report.



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