

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

THE ECONOMIC VALUE OF THE UNIVERSITY OF CINCINNATI

May 2018



# EXECUTIVE SUMMARY

# Executive summary

The University of Cincinnati (UC) creates value in a variety of ways. The university improves higher education delivery throughout the region and helps students increase their employability and potential. The university facilitates new research and company developments, provides healthcare for the region through its medical centers, and also draws visitors to the region, generating new dollars and opportunities for the Cincinnati Metropolitan Area.

The value of UC influences both the lives of students and the regional economy. The university serves a range of industries in the Cincinnati Metropolitan Area, supports regional businesses, and benefits society as a whole in Ohio from an expanded economy and improved quality of life. The benefits created by UC even extend to the state and local government through increased tax revenues and public sector savings.

This study investigates the economic impacts created by UC on the business community and the benefits that the university generates in return for the investments made by its key stakeholder groups—students, taxpayers, and society. The region the university serves, for the purposes of this report, is referred to as the Cincinnati Metropolitan Area consists of Brown, Clermont, Hamilton, Warren, Butler,

and Clinton Counties in Ohio; Dearborn, Franklin, and Ohio Counties in Indiana; and Boone, Bracken, Campbell, Gallatin, Grant, Kenton, and Pendleton Counties in Kentucky. 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 regional 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.



# Economic impact analysis

UC promotes economic growth in the Cincinnati Metropolitan Area through its direct expenditures and resulting expenditures of students, visitors, and regional businesses. The university serves as an employer and buyer of goods and services for its general, research, clinical, and construction activities. Numerous start-up companies have formed through programs and knowledge at UC. The university's reputation and activities attract students and visitors from outside the Cincinnati Metropolitan Area, whose expenditures benefit regional vendors. In addition, UC is a primary source of education to the Cincinnati Metropolitan Area residents and a supplier of trained workers to the regional industries, increasing overall productivity in the regional workforce.

## **OPERATIONS SPENDING IMPACT**

UC is an important employer in the Cincinnati Metropolitan Area. In FY 2016-17, the university employed 6,758 full-time and part-time faculty and staff for its day-to-day operations. Of these, 92% lived in the Cincinnati Metropolitan Area. Total payroll at UC for those employees was \$631.5 million, much of which was spent in the region for groceries, rent, dining out, clothing, and other household expenses.

UC is itself a large-scale buyer of goods and services. In FY 2016-17, the university spent \$204.1 million to cover its day-to-day expenses for facilities, professional services, and supplies.

UC added \$802.2 million in income to the region during the analysis year as a result of its day-to-day operations. This figure represents the university's payroll, the multiplier effects generated by the spending of the university and its employees, and a downward adjustment to account for funding that the university received from state and local sources. The \$802.2 million in added income is equivalent to supporting 9,024 jobs.

## **RESEARCH SPENDING IMPACT**

Research activities impact the economy by employing people and requiring the purchase of equipment and other supplies and services. As seen in Table 1, over the last four years, UC received 444 invention disclosures, filed 199 new US patent applications, and produced 66 licenses. Total license income over the same four-year time period grew from \$483.8 thousand in FY 2013-14 to \$539 thousand in FY 2016-17, an approximate \$55.2 thousand increase.

**TABLE 1:** Research developments created by UC

	INVENTIONS	PATENTS	LICENSES
2013-14	98	25	19
2014-15	130	63	12
2015-16	112	69	16
2016-17	104	42	19
<b>Total</b>	<b>444</b>	<b>199</b>	<b>66</b>

In FY 2016-17, UC spent \$103.6 million on payroll to support research activities, creating a net total of \$322 million in added income for the regional economy. This added income is equivalent to supporting 4,076 jobs.

### **CLINICAL SPENDING IMPACT**

UC Medical Center, West Chester Hospital, the Daniel Drake Center for Post-Acute Care, and UC Physicians Company in the Cincinnati Metropolitan Area are related to and affiliated with UC. They provide hands-on learning and research environments for students and employ thousands of workers. Although broader health-related impacts are outside the scope of this analysis, the clinics are also known for providing quality patient care.

In FY 2016-17, UC spent over \$1.6 million on clinical operations related to these medical centers. These expenditures added a net impact of \$1.7 million in added income to the region. This is equivalent to supporting 10,106 jobs.

### **CONSTRUCTION SPENDING IMPACT**

UC 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 region 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 region economy in FY 2016-17, equal to \$73.6 million in added income for the Cincinnati Metropolitan Area and is equivalent to supporting 947 jobs.

### **START-UP COMPANY IMPACT**

UC creates an exceptional environment that fosters innovation and entrepreneurship, evidenced by the number of UC start-up companies created in the region.



Start-up companies, created specifically to license and commercialize UC technology or knowledge, have a strong and clearly defined link to UC.

In FY 2016-17, UC start-up companies added \$18.1 million in income to the Cincinnati Metropolitan Area economy, which is equivalent to supporting 141 jobs.

## STUDENT SPENDING IMPACT

Around 49% of credit students attending UC originated from outside the region in FY 2016-17, and some of these students relocated to the Cincinnati Metropolitan Area to attend UC. These students would not have come to the region if the university did not exist. In addition, a number of in-region students would have left the region for other educational opportunities if not for the existence of UC. While attending the university, these relocated and retained students spent \$159.8 million for everyday needs such as groceries, rent accommodation, and transportation. A significant portion of these expenditures occurred in the region, generating \$109.5 million in added income in the regional economy during the analysis year, which is equivalent to supporting 1,867 jobs.

## VISITOR SPENDING IMPACT

Thousands of visitors from outside the regional were attracted to UC during the analysis year to attend commencement, sports events, and other activities sponsored by the university. While in the region, visitors spent money for lodging, food, transportation, and other personal expenses. The off-campus expenditures of the university's out-of-region visitors generated a net impact of \$24.8 million in added income for the regional economy in FY 2016-17. This \$24.8 million in added income is equivalent to supporting 660 jobs.

## ALUMNI IMPACT

The education and training UC provides for regional residents results in the greatest impact. Since the university was established, students have studied at UC and entered the regional workforce with new skills. Today, thousands of former students are employed in the Cincinnati Metropolitan Area.

During the analysis year, past and present students of UC generated \$2.8 billion in added income for the region. 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 \$2.8 billion in added income is equivalent to supporting 34,883 jobs.

**TABLE 2:** Impacts created by UC in FY 2016-17

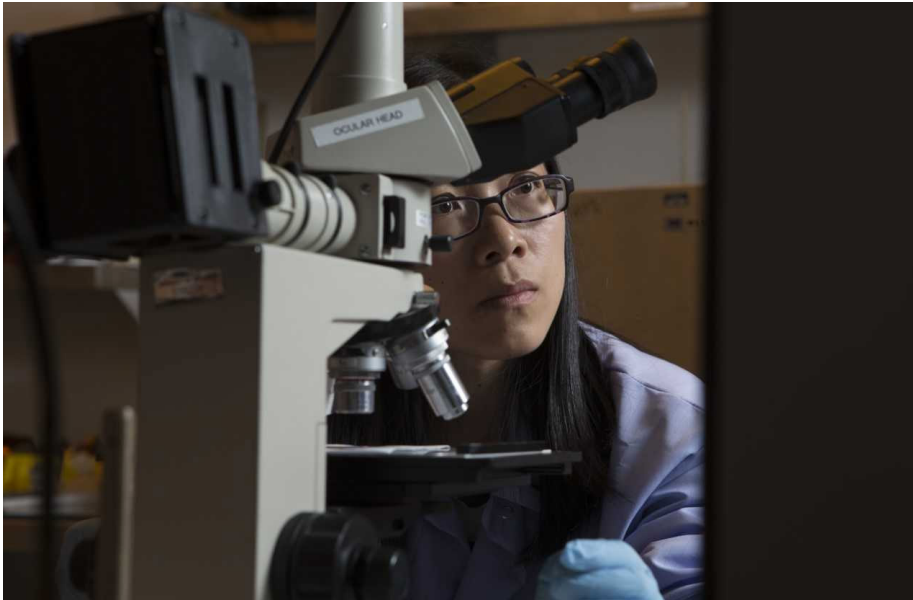
ADDED INCOME	JOBS
<b>\$802.2 million</b>	<b>9,024</b>
Operations spending impact	
<b>\$322.0 million</b>	<b>4,076</b>
Research spending impact	
<b>\$1.7 million</b>	<b>10,106</b>
Clinical spending impact	
<b>\$73.6 million</b>	<b>947</b>
Construction spending impact	
<b>\$18.1 million</b>	<b>141</b>
Start-up company impact	
<b>\$109.5 million</b>	<b>1,867</b>
Student spending impact	
<b>\$24.8 million</b>	<b>660</b>
Visitor spending impact	
<b>\$2.8 billion</b>	<b>34,883</b>
Alumni impact	
<b>\$4.2 billion</b>	<b>61,704</b>
Total impact	

## TOTAL IMPACT

The overall impact of UC on the local business community during the analysis year amounted to \$4.2 billion in added income, equal to the sum of the operations spending impact, the research spending impact, clinical spending impact, construction spending impact, the start-up and spin-off company impact, the student spending impact, the visitor spending impact, and the alumni impact. The \$4.2 billion in added income was equal to approximately 3.0% of the GRP of the Cincinnati Metropolitan Area. By comparison, this contribution that the university provides on its own is as large as the entire Real Estate & Rental & Leasing industry in the region.

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 \$4.2 billion impact supports 61,704 jobs. For perspective, this means that one out of every 22 jobs in the Cincinnati Metropolitan Area is supported by the activities of UC and its students.

A portion of the total \$4.2 billion is broken out into an industry-by-industry impact ordered by added income. Table 3 outlines the top industries impacted by UC. Because industries have different jobs-to-sales ratios, the associated jobs supported by UC differ by impact. Nonetheless, these are impacts that would not have been generated without the university's presence.



**TABLE 3:** Top industries impacted by UC

TOTAL INCOME (MILLIONS)	JOBS
<b>\$645.2</b>	<b>19,792</b>
<b>Health Care &amp; Social Assistance</b>	
<b>\$532.9</b>	<b>6,371</b>
<b>Professional &amp; Technical Services</b>	
<b>\$412.8</b>	<b>1,745</b>
<b>Manufacturing</b>	
<b>\$299.8</b>	<b>3,306</b>
<b>Government, Non-Education</b>	
<b>\$215.7</b>	<b>2,727</b>
<b>Construction</b>	
<b>\$2,053.0</b>	<b>27,763</b>
<b>All other industries</b>	
<b>\$4,159.4</b>	<b>61,704</b>
<b>Total impact</b>	

# 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.

UC received a total of \$1.3 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 UC 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.

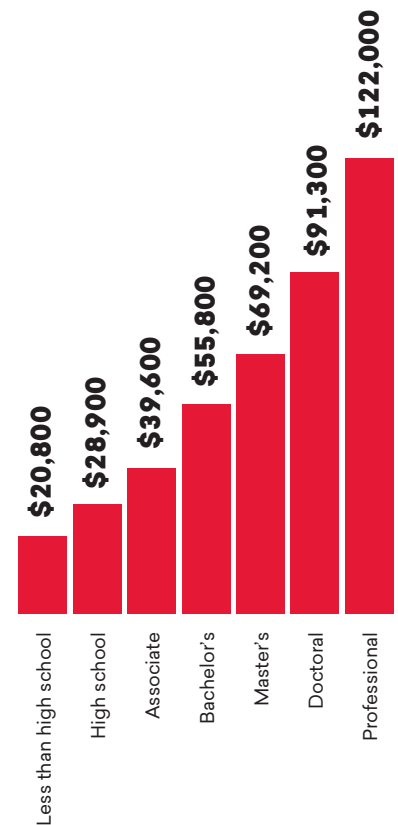
## STUDENT PERSPECTIVE

In FY 2016-17, UC served 47,889 credit students and 4,309 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 UC's students for FY 2016-17 amounted to a present value of \$975.4 million, equal to \$520.1 million in out-of-pocket expenses (including future principal and interest paid on student loans) plus \$455.3 million in forgone time and money.

In return for their investment, UC's 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 UC will see an increase in earnings of \$26,900 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 \$1,156,700 in higher earnings.

The present value of the higher future earnings that UC's students will receive over their working careers is \$4 billion. Dividing this value by the \$975.4 million in present value student costs yields a benefit-cost ratio of 4.1. In other words, for every \$1 students invest in UC in the form of out-of-pocket expenses and forgone time and money, they receive a cumulative of \$4.10 in higher future earnings. The average annual rate of return for students is 12.4%. This is an impressive return, especially when compared to the 30-year average 10.1% return to the U.S. stock market (Figure 3).

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



## TAXPAYER PERSPECTIVE

UC generates more in tax revenue than it takes. 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 UC 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 \$941 million 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. For a list of study references to these statistical benefits, please contact the university for a copy of the main report. All of these benefits will generate a present value of \$102.9 million in savings to state and local taxpayers.

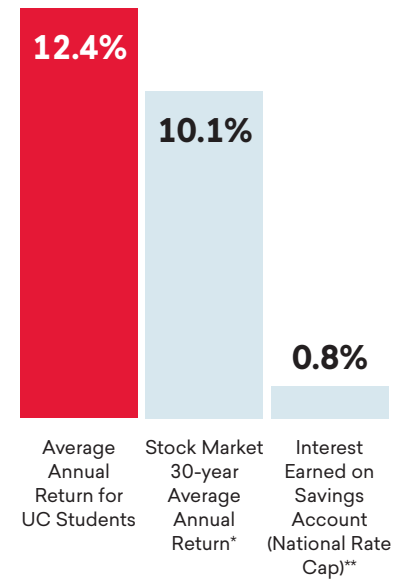
Total benefits to taxpayers equal \$1 billion, equal to the sum of the added taxes and public sector savings. Comparing this to the taxpayer costs of \$252 million—equal to the funding that UC received from the state and local government during the analysis year—yields a benefit-cost ratio of 4.1. This means that for every \$1 of public money invested in UC, taxpayers receive a cumulative value of \$4.10 over the course of the students' working lives. The average annual rate of return is 9.0%, 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 UC in two major ways. The first and largest benefit that society receives is an increased state economic base. As discussed in the previous section, the higher student earnings and increased business output occurs 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 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

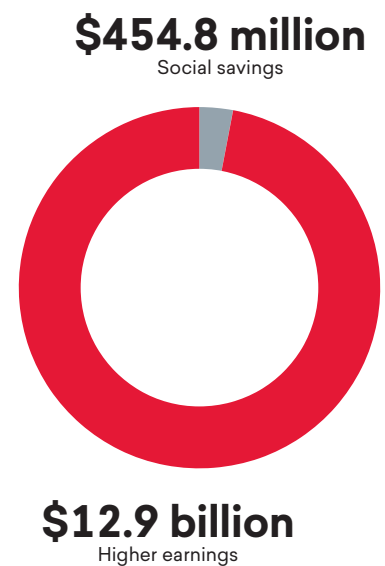
**FIGURE 3:** Student rate of return



\* Forbes' S&P 500, 1987-2016.

\*\* FDIC.gov, 7-2017.

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





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 the university 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 UC. Higher earnings amount to a present value of \$12.9 billion due to the increased lifetime earnings of students and associated increases in business output. Social savings amount to \$454.8 million, the sum of health, crime, and unemployment savings in Ohio. Altogether, total benefits to society equal \$13.4 billion (in present value terms).

Society invested a present value of \$2 billion for FY 2016-17 UC educations. This includes all expenditures by UC, 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 \$6.80 in benefits, equal to the \$13.4 billion in benefits divided by the \$2 billion in costs. These benefits will occur for as long as UC's FY 2016-17 students remain employed in the state workforce.

## SUMMARY OF INVESTMENT ANALYSIS RESULTS

Table 4 presents the results of the investment analysis for all three of UC's 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 university creates a wide range of benefits to society and returns more to government budgets than it costs.

**TABLE 3:** Summary of investment analysis results

	STUDENT PERSPECTIVE	TAXPAYER PERSPECTIVE	SOCIAL PERSPECTIVE
Present value benefits (thousands)	<b>\$3,958,652</b>	<b>\$1,043,865</b>	<b>\$13,379,924</b>
Present value costs (thousands)	<b>\$975,429</b>	<b>\$251,963</b>	<b>\$1,958,060</b>
<b>Net present value (thousands)</b>	<b>\$2,983,223</b>	<b>\$791,902</b>	<b>\$11,421,864</b>
Benefit-cost ratio	<b>4.1</b>	<b>4.1</b>	<b>6.8</b>
Rate of return	<b>12.4%</b>	<b>9.0%</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 UC creates value from multiple perspectives. The university benefits local businesses by increasing consumer spending in the region and supplying a steady flow of qualified, trained workers into the workforce. It enriches the lives of students by raising their lifetime earnings and helping them achieve their individual potential. It benefits state and local taxpayers through increased tax receipts across the state and a reduced demand for government-supported social services. Finally, it benefits 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 UC, 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 UC for a copy of the main report.



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