

ANALYSIS OF THE
ECONOMIC IMPACT AND
RETURN ON INVESTMENT OF EDUCATION

The Economic Value of Northern Colorado Public Colleges and Universities

June 2017



EXECUTIVE SUMMARY

 Emsi

Photo Credit: University of Northern Colorado



Executive summary

Northern Colorado Public Colleges and Universities (NoCoPCU) create value in a variety of ways. The institutions improve higher education delivery throughout the region and help students increase their employability and potential. The institutions facilitate new research and company developments, generating new dollars and opportunities for Larimer and Weld Counties.

The value of NoCoPCU influences both the lives of students and the regional economy. The institutions serve a range of industries in Larimer and Weld Counties, support regional businesses, and benefit society as a whole in Colorado from an expanded economy and improved quality of life. The benefits created by NoCoPCU extend as far as the state and local government through increased tax revenues and public sector savings.

This study investigates the economic impacts created by NoCoPCU on the business community and the benefits that the institutions generate in return for the investments made by their key stakeholder groups—students, taxpayers, and society. The following two analyses are presented:

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

All results reflect student and financial data for Fiscal Year (FY) 2015-16.¹ Impacts on the regional business community are reported under the economic impact analysis. Results are measured in terms of income. The return on investment to students, taxpayers, and society are reported under the investment analysis. Both analyses are described more fully in the following sections.

¹ Not all institutions were able to provide FY 2015-16 financial data, hence FY 2014-15 financial data was used for those select institutions.

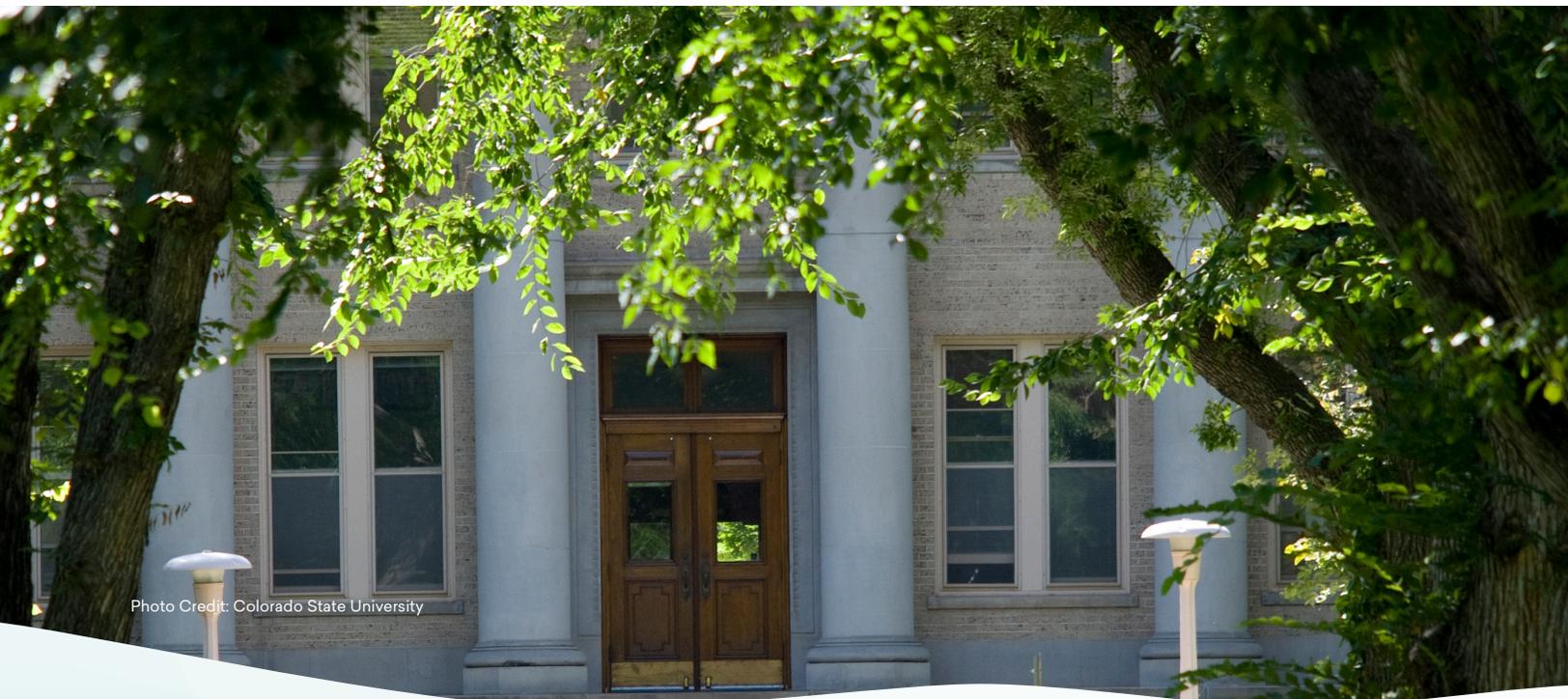


Photo Credit: Colorado State University

Economic impact analysis

NoCoPCU promote economic growth in Larimer and Weld Counties through their direct expenditures and resulting expenditures of students and regional businesses. The institutions serve as employers and buyers of goods and services for their general and research operations, along with their construction activities. Numerous start-up companies have formed through programs and knowledge at NoCoPCU. The institutions' reputation and activities attract students from outside Larimer and Weld Counties, whose expenditures benefit regional vendors. In addition, NoCoPCU are primary sources of education to Larimer and Weld Counties residents and a supplier of trained workers to the regional businesses, increasing overall productivity in the regional workforce.

OPERATIONS SPENDING IMPACT

NoCoPCU are important employers in Larimer and Weld Counties. In FY 2015-16, the institutions employed 10,330 full-time and part-time faculty and staff (less research employees). Of these, 75% lived in Larimer and Weld Counties. Total payroll at NoCoPCU was \$724.9 million (excluding payroll from research employees), much of which was spent in the region for groceries, eating out, clothing, and other household expenses.

In addition, NoCoPCU are large-scale buyers of goods and services. In FY 2015-16, the institutions spent \$261.3 million to cover their expenses for facilities, professional services, and supplies, excluding research expenditures.

NoCoPCU added \$676.8 million in income to the region during the analysis year as a result of their day-to-day operations. This figure represents the institutions' payroll, the multiplier effects generated by the spending of the institutions and their employees, and a downward adjustment to account for funding that the institutions received from state and local sources. The \$676.8 million in added income is equivalent to supporting 9,986 jobs.

RESEARCH SPENDING IMPACT

Research activities impact the economy by employing people and requiring the purchase of equipment and other supplies and services. In FY 2015-16, NoCoPCU received 129 invention disclosures, filed 147 new US patent applications, and produced 43 licenses.

FIGURE 1: NoCoPCU Service Region, Larimer and Weld Counties

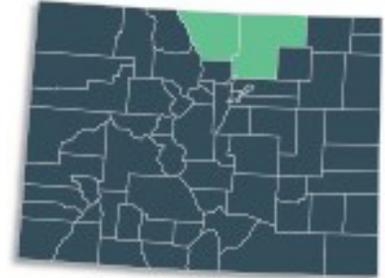


TABLE 1: Impacts created by NoCoPCU in FY 2015-16

ADDED INCOME	JOBS
\$676.8 million	9,986
Operations spending impact	
\$172.7 million	2,894
Research spending impact	
\$78.9 million	1,354
Construction spending impact	
\$35.8 million	548
Start-up company impact	
\$159.6 million	2,428
Student spending impact	
\$1.3 billion	22,467
Alumni impact	
\$2.4 billion	39,677
Total impact	

In FY 2015-16, NoCoPCU spent \$127.4 million on payroll to support research activities, creating a net total of \$172.7 million in added income for the regional economy. This added income is equivalent to supporting 2,894 jobs.

CONSTRUCTION SPENDING IMPACT

NoCoPCU 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 2015-16, equal to \$78.9 million in added income for Larimer and Weld Counties, which is equivalent to supporting 1,354 jobs.

START-UP COMPANY IMPACT

NoCoPCU create an exceptional environment that fosters innovation and entrepreneurship, evidenced by the number of NoCoPCU start-up companies created in the region. Start-up companies, created specifically to license and commercialize NoCoPCU technology or knowledge, have a strong and clearly defined link to NoCoPCU.

In FY 2015-16, NoCoPCU start-up and companies added \$35.8 million in income to the Larimer and Weld Counties' economy, which is equivalent to supporting 548 jobs.

STUDENT SPENDING IMPACT

Around 45% of students attending NoCoPCU originated from outside the region in FY 2015-16. Some of these students relocated to Larimer and Weld Counties. These students would not have come to the region if the institutions 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 NoCoPCU. While attending the institutions, these relocated and retained students spent \$341.5 million to purchase groceries, rent accommodation, pay for transportation, and so on. A significant portion of these expenditures occurred in the region, generating \$159.6 million in added income in the regional economy during the analysis year, which is equivalent to supporting 2,428 jobs.

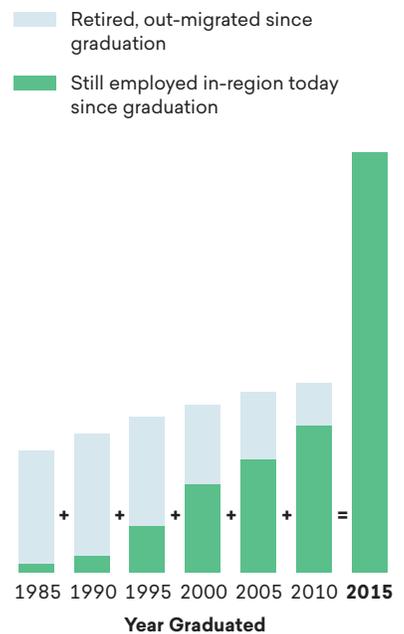
ALUMNI IMPACT

The education and training NoCoPCU provide for region residents results in the greatest impact. Since the institutions were established, students have studied at NoCoPCU and entered the workforce with new skills. Today, hundreds of thousands of former students are employed in Larimer and Weld Counties (Figure 2).



Photo Credit: Aims Community College

FIGURE 2: NoCoPCU alumni working in-region today



During the analysis year, past and present students of NoCoPCU generated \$1.3 billion in added income for the region. This figure represents the higher wages 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 \$1.3 billion in added income is equivalent to supporting 22,467 jobs.

TOTAL IMPACT

The overall impact of NoCoPCU on the local business community during the analysis year amounted to \$2.4 billion in added income, equal to the sum of the operations spending impact, the research spending impact, the construction spending impact, the start-up company impact, the student spending impact, and the alumni impact. The \$2.4 billion in added income was equal to approximately 9.6% of the GRP of Larimer and Weld Counties. By comparison, this contribution that the institutions provide on their own is almost twice as large as the entire Health Care & Social Assistance 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 \$2.4 billion impact supports 39,677 jobs.

A portion of the total \$2.4 billion is broken out into an industry-by-industry impact ordered by added income. Table 2 outlines the top industries impacted by NoCoPCU. Because industries have different jobs-to-sales ratios, the associated jobs supported by the NoCoPCU impact differ by industry. Nonetheless, these are impacts that would not have been generated without the institutions' presence.

TABLE 2: Top industries impacted by NoCoPCU

TOTAL INCOME (MILLIONS)	JOBS
\$326.5	5,015
Professional & Technical Services	
\$201.1	2,501
Government, Non-Education	
\$186.2	3,003
Construction	
\$178.6	4,104
Health Care & Social Assistance	
\$159	1,297
Manufacturing	
\$1,370.9	23,757
All other industries	
\$2,422.1	39,677
Total impact	



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.

NoCoPCU received a total of \$1.4 billion in FY 2015-16. Tuition and fees comprised 37% of total revenue, student aid from government sources comprised another 35%, and all other revenue comprised the remaining 28%. This study considers NoCoPCU as an investment from the perspectives of those whom provided these revenues - students, taxpayers, and society. The backdrop for the analysis is the entire Colorado economy.

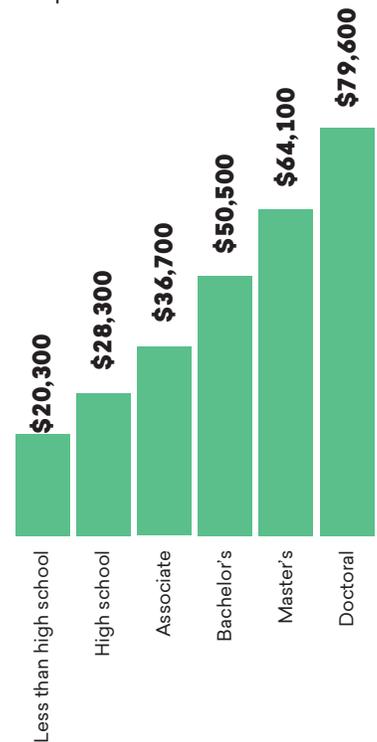
STUDENT PERSPECTIVE

In FY 2015-16, NoCoPCU served 68,145 credit students and 4,737 non-credit students. In order to attend the institutions, students paid for tuition, fees, books, and supplies. They also gave up money that they would have otherwise earned had they been working instead of attending the institutions. The total investment made by NoCoPCU's students in FY 2015-16 amounted to \$1 billion, equal to \$556.5 million in out-of-pocket expenses plus \$480.2 million in forgone time and money.

In return for their investment, NoCoPCU's students will receive a stream of higher future wages that will continue to grow through their working lives. As shown in Figure 3, mean earnings levels at the midpoint of the average-aged worker's career in Colorado increase as people achieve higher levels of education. For example, the average bachelor's degree completer from NoCoPCU will see an increase in earnings of \$22,200 each year compared to someone with a high school diploma or equivalent. Over a working lifetime, this increase in earnings amounts to an undiscounted value of approximately \$954,600 in higher earnings.

The present value of the higher future wages that NoCoPCU's students will receive over their working careers is \$3.2 billion. Dividing this value by the \$1 billion in student costs yields a benefit-cost ratio of 3.1. In other words, for every \$1 students invest in NoCoPCU in the form of out-of-pocket expenses and forgone time and money, they receive a cumulative of \$3.10 in higher future wages. The average annual rate of return for students is 10.9%. This is an impressive return, especially when compared to the 10-year average 7.2% return to the US stock market.

FIGURE 3: Higher earnings by education level at career midpoint in Colorado



Source: Emsi complete employment data.

TAXPAYER PERSPECTIVE

The institutions within NoCoPCU 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 income created in the state. As NoCoPCU's 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 2015-16 students' working careers, the state and local government will have collected a present value of \$1 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). In addition, students are 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 \$305 million in savings to state and local taxpayers.

Total benefits to taxpayers equal \$1.3 billion, equal to the sum of the added taxes and public sector savings. Comparing this to the taxpayer costs of \$231.4 million—equal to the funding that NoCoPCU received from the state and local government during the analysis year—yields a benefit-cost ratio of 5.8. This means that for every \$1 of public money invested in NoCoPCU, taxpayers receive a cumulative value of \$5.80 over the course of the students' working lives. The average annual rate of return is 33.6%, 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 Colorado benefits from the presence of NoCoPCU in two major ways. The first and largest benefit that society receives is the added income created in the state. As discussed in the previous section, students earn more because of the skills they acquire while attending NoCoPCU. Businesses also earn more because the enhanced skills of students make them more productive. Together, higher student wages and increased business output stimulate increases in income across the state, thereby raising prosperity in Colorado and expanding 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 across three main categories: 1) health, 2) crime, and 3) unemployment. Note that these costs are avoided by the consumers, and are distinct from the costs avoided by taxpay-

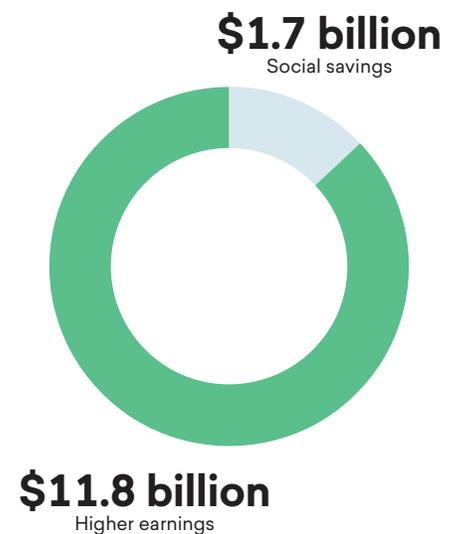
FIGURE 4: Student rate of return



* Forbes' S&P 500, 1994-2014.

** FDIC.gov 12-2016.

FIGURE 5: Present value of higher earnings and social savings in Colorado



ers 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 the institutions for a copy of the main report.

Figure 5 shows the present value of the added income and social savings that will occur in Colorado over the working lifetime of the FY 2015-16 student population at NoCoPCU. Added income amounts to a present value of \$11.8 billion due to the increased lifetime earnings of students and associated increases in business output. Social savings amount to \$1.7 billion, the sum of health, crime, and unemployment savings in Colorado. Altogether, total benefits to society equal \$13.5 billion (in present value terms).

Society invested \$2.2 billion in NoCoPCU educations during the analysis year. This includes all expenditures by NoCoPCU, all student expenditures, and all student opportunity costs. For every dollar of this investment, society as a whole in Colorado will receive a cumulative value of \$6.30 in benefits, equal to the \$13.5 billion in benefits divided by the \$2.2 billion in costs. These benefits will occur for as long as NoCoPCU's FY 2015-16 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 NoCoPCU's major stakeholder groups—students, society, and taxpayers. As shown, students receive great value for their educational investment. At the same time, the investment made by state and local taxpayers to the institutions 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)	\$3,171,211	\$1,339,206	\$13,500,794
Costs (thousands)	\$1,036,695	\$231,413	\$2,151,181
Net present value (thousands)	\$2,134,516	\$1,107,793	\$11,649,613
Benefit-cost ratio	3.1	5.8	6.3
Rate of return*	10.9%	33.6%	

* 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 NoCoPCU create value from multiple perspectives. The institutions benefit local businesses by increasing consumer spending in the region 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 Colorado 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 2015-16 academic and financial reports from NoCoPCU, industry and employment data from the U.S. Bureau of Labor Statistics and U.S. Census Bureau, outputs of Emsi's Social Accounting Matrix (SAM) 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 the institutions for a copy of the technical report.



Emsi, a CareerBuilder company, is a leading provider of economic impact studies and labor market data to educational institutions, workforce planners, and regional developers in the U.S. and internationally. Since 2000, Emsi has completed over 1,700 economic impact studies for educational institutions in four countries. Visit www.economicmodeling.com for more information about Emsi's products and services.

