DEMONSTRATING THE COLLECTIVE ECONOMIC VALUE OF NORTH CAROLINA'S HIGHER EDUCATION INSTITUTIONS

EXECUTIVE SUMMARY

FEBRUARY 2015

North Carolina Independent Colleges & Universities

NC Community Colleges

University of North Carolina

EXECUTIVE SUMMARY

North Carolina's Higher Education Institutions (NCHE institutions) include 16 universities of the University of North Carolina System*, 36 independent colleges and universities, 58 community colleges, and the clinics and hospitals associated with the NCHE institutions. This study analyzes the collective economic value these institutions create for North Carolina.

Our analysis shows that in FY 2012-13, the $22.0 billion in payroll and operations spending of NCHE institutions, together with their construction spending and the spending of their students, visitors, alumni, and start-up companies, created **$63.5 billion** in added state income, which is equal to approximately **14.6%** of the total Gross State Product of North Carolina, and is equivalent to creating **1,021,158** new jobs.

The institutions improve higher education delivery throughout the state and help students increase their employability and potential. By facilitating new research and new business creation and drawing students and visitors to North Carolina, the institutions also generate new dollars and opportunities for the state. However, the contributions of NCHE institutions consist of more than just influencing the lives of students. The institutions serve a range of industries in North Carolina and support state businesses. Communities throughout North Carolina benefit from an expanded economy and improved quality of life. The benefits created by NCHE institutions extend as far as the state and local government, in the form of increased tax revenues and public sector savings.

The purpose of this study is to investigate the statewide economic impacts created by NCHE institutions on the state business community and the benefits that the institutions generate in return for the investments made by their key stakeholder groups—students, society, and taxpayers. We present two types of analyses in turn below: a statewide economic impact analysis and an investment analysis.

* Note: The University of North Carolina (UNC) system also includes the North Carolina School of Science and Mathematics, the North Carolina Arboretum, UNC Public Television, along with other affiliated entities. This study only includes the economic impact of the UNC system's 16 universities, along with the clinical activities of the UNC Medical Center and East Carolina University Health Services.

STATEWIDE ECONOMIC IMPACT ANALYSIS

Economic growth is promoted in North Carolina by NCHE institutions through the direct expenditures of the institutions, their students, and their visitors. There are additional expenditures from state businesses whose economic activity increases as a result of these direct expenditures. NCHE institutions represent employers and buyers of goods and services for their general, clinical, research, and extension operations. Numerous start-up and spin-off companies have formed through programs and knowledge created at NCHE institutions. Their reputation and activities attract students and visitors from outside North Carolina, whose expenditures benefit state vendors. In addition, NCHE institutions are a primary source of education to state residents and suppliers of trained workers to the state industry, increasing overall productivity in the North Carolina workforce.

All results reflect student and financial data for Fiscal Year (FY) 2012-13. Impacts on the state business community are reported under the statewide economic impact analysis, and the return on investment to students, society, and taxpayers are reported under the investment analysis. Both analyses are described more fully in the following sections.

The statewide economic impact analysis examines the impact of NCHE institutions on the state business community through increased consumer spending and enhanced business productivity. Results are measured in terms of *added state income*, which it may be helpful to realize in this context is equivalent to the commonly referred to measure of *Gross State Product*. Also reported are the corresponding number of created jobs.

The economic impacts are organized as follows: (1) impact of spending for the institutions' day-to-day operations; (2) impact of spending on clinical services; (3) impact of spending on research and development; (4) impact of spending on construction; (5) impact of start-up companies (with an additional assessment of spin-off companies); (6) impact of spending on extension services; (7) impact of the spending of out-of-state students; (8) impact of the spending of out-of-state visitors, and; (9) impact of the increased productivity of alumni employed in the state workforce. These impacts represent new economic activity created in the state economy solely attributable to the operations of NCHE institutions.*

* Note: Our estimated economic impacts are conservative in that we directly take into account the fact that state and local dollars spent on the institutions could have been spent elsewhere in North Carolina if not directed

OPERATIONS SPENDING IMPACT

NCHE institutions are important employers in North Carolina. Excluding clinical, research, and extension activities, the institutions employed 130,333 full-time and part-time faculty and staff in FY 2012-13. Of these, 97% lived in North Carolina. Total payroll at the institutions was $6.7 billion, much of which was spent in the state for groceries, eating out, clothing, and other household expenses. In addition, NCHE institutions are large-scale buyers of goods and services. In FY 2012-13 the institutions spent $7.1 billion to cover their general expenses for facilities, professional services, and supplies.

This initial round of spending creates more spending across other businesses throughout the state economy, resulting in the commonly referred to multiplier effects. We also apply a downward adjustment to account for funding that the institutions received from state and local sources that could have been spent elsewhere in the state and created impacts even if not directed towards NCHE institutions. We term this an alternative use of funds and account for it by estimating the impacts that would have been created from the alternative spending and subtracting the alternative impacts from the spending impact of NCHE institutions.

The net added state income that NCHE institutions created during the analysis year as a result of their day-to-day operations was approximately $8.7 billion in added state income, equivalent to creating 149,555 jobs.

toward the NCHE institutions, and thus would have created some economic impacts regardless. We account for these alternative uses of funds directly in our analysis by (i) assuming that if funds were not directed to the NCHE institutions, they would have been returned to the taxpayer and generate economic impacts through household spending on goods and services, and (ii) subtracting the estimated economic impacts generated by this alternative use of funds from the estimated economic impacts of the NCHE institutions. Thus, we report a net impact of the NCHE institutions that is above and beyond what would have occurred had the funds been returned to the taxpayer.

CLINICAL SPENDING IMPACT

In FY 2012-13, the NCHE institutions spent over $5.3 billion on their operations in North Carolina. These expenditures were used to employ thousands of workers to further the teaching missions of NCHE institutions and provide state-of-the-art patient care. Although we recognize there are additional broader health-related impacts from these operations, estimating their value are outside the scope of this analysis.

The expenditures of clinics and hospitals associated with NCHE institutions added a net impact of $6.8 billion in added income for North Carolina, equivalent to creating 90,501 new 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, NCHE institutions received 2,007 invention disclosures, filed 1,026 new U.S. patent applications, and produced 711 licenses.

In FY 2012-13, NCHE institutions collectively spent around $2.8 billion on research and development activities. These efforts attracted new dollars into the state to support a large portion of the research activities, with 60% of funding received from federal sources. The research activities also brought in additional

INTELLECTUAL PROPERTY CREATED BY NCHE INSTITUTIONS

	INVENTIONS	PATENT APPLICATIONS	LICENSES
2009-10	388	206	152
2010-11	480	276	172
2011-12	589	276	168
2012-13	550	268	219
TOTAL	**2,007**	**1,026**	**711**

funds from sources within the state, including from foundations and state and local governments.

The expenditures on research activities by NCHE institutions stimulated other economic activity in the state that resulted in an additional $2.6 billion in new income that would not have existed in the state but for the $2.8 billion spent to directly support research. As with the operations spending impact, this impact has been adjusted to account for the opportunity cost of monies withdrawn from the state economy to support the research of NCHE institutions. The $2.6 billion is equivalent to creating 39,292 new jobs.

CONSTRUCTION SPENDING IMPACT

NCHE institutions commissioned in-state and out-of-state contractors to build or renovate a number of facilities during the analysis year. The quick infusion of income 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 2012-13, equal to $376.4 million in added state income and the creation of 12,959 new jobs.

BUSINESS START-UP & SPIN-OFF EFFECT

NCHE institutions create an exceptional environment that fosters innovation and entrepreneurship, evidenced by the number of start-up and spin-off companies related to NCHE institutions created in the state. Start-up companies, created specifically to license and commercialize NCHE institutions' technology or knowledge, have a strong and clearly defined link to NCHE institutions. Spin-off companies, created and fostered through institutional programs or faculty and alumni, do not have license agreements with NCHE institutions, but still have a clear and important, if less direct, link.

In FY 2012-13, start-up and spin-off companies related to NCHE institutions added $3.6 billion in income to the North Carolina economy. Of this added income, $1.5 billion, equivalent to 8,189 new jobs, was due to the start-up com-

panies. Given the clearly defined link between start-up companies licensing institutional technology and NCHE institutions, this added start-up income can be wholly attributed to NCHE institutions. Notice the amount of income created per job is much higher than in the other effects. This is due to the higher average incomes within the industries of the start-up companies.

EXTENSION SPENDING IMPACT

The North Carolina Cooperative Extension Service is a partnership between North Carolina State University and North Carolina A&T State University. Its purpose is to provide education and technology to help address the needs and local problems of the state's diverse communities. North Carolina State University also operates an Industrial Extension Service program that caters to North Carolina's industries and businesses.

In FY 2012-13, these two universities and their partner counties spent $78.3 million on extension services, adding $112.1 million in state income to the North Carolina economy, which is equivalent to creating 1,459 new jobs.

STUDENT SPENDING IMPACT

Around 14% of graduate and undergraduate students at NCHE institutions originated from outside the state in FY 2012-13. These students would not have come to the state if the institutions did not exist. While attending, these students spent $835.9 million to purchase groceries, rent accommodation, pay for transportation, and so on. A significant portion of these expenditures occurred in the state, generating $675 million in new income in the state economy during the analysis year, which is equivalent to creating 12,339 new jobs.

VISITOR SPENDING IMPACT

Thousands of visitors from outside the state were attracted to NCHE institutions during the analysis year to attend commencements, sports events, and other activities sponsored by the institutions. While in the state, visitors spent money for lodging, food, transportation, and other personal expenses. The off-campus expenditures of these out-of-state visitors generated a net impact of $372.4 million in new income for the state economy in FY 2012-13, equivalent to creating 9,515 new jobs.

ALUMNI IMPACT

The education and training NCHE institutions provide for state residents result in the greatest impact. Since they were established, students have studied at NCHE institutions and entered the workforce with new skills. Today, hundreds of thousands of former students who attended NCHE institutions are employed in North Carolina.

During the analysis year, past and present students of NCHE institutions generated $42.4 billion in added income in the state, which is equivalent to creating 697,347 new jobs. This figure represents the higher wages that alumni earned during the year as a result of attending NCHE institutions, the increased output of the businesses that employed the alumni, and the multiplier effects that occurred as alumni and their employers spent money at other businesses.

TOTAL IMPACT

The overall impact of NCHE institutions on the state business community during the analysis year amounted to $63.5 billion in added state income, equal to the sum of the operations spending impact, the clinical spending impact, the research spending impact, the construction spending impact, the impact of start-up companies, the extension spending impact, the student spending impact, the visitor spending impact, and the alumni impact. This added income was equal to approximately 14.6% of the Gross State Product and equivalent to creating 1,021,158 new jobs.

IMPACTS CREATED BY NCHE INSTITUTIONS IN FY 2012-13

INCOME	JOBS	
$8.7 billion	149,555	Operations spending impact
$6.8 billion	90,501	Clinical spending impact
$2.6 billion	39,292	Research spending impact
$376.4 million	12,959	Construction spending impact
$1.5 billion	8,189	Business start-up impact
$112.1 million	1,459	Extension service impact
$675 million	12,339	Student spending impact
$372.4 million	9,515	Visitor spending impact
$42.4 billion	697,347	Alumni impact
$63.5 billion	1,021,158	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.

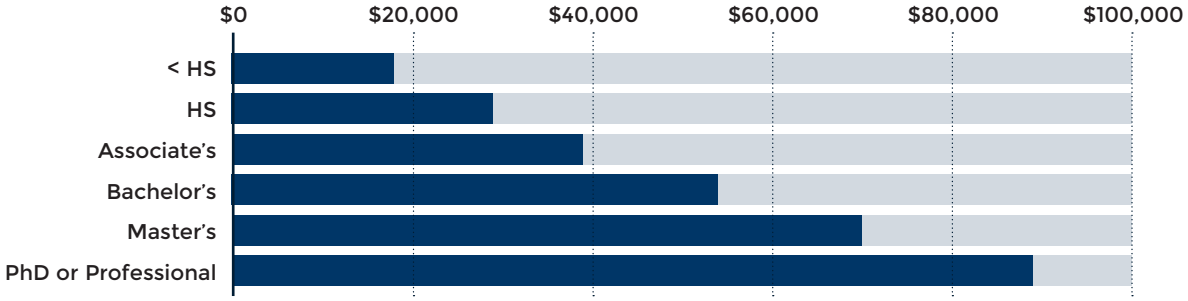
The 110 NCHE institutions received a total of $24.5 billion in FY 2012-13. Tuition and fees comprised 13% of total revenue, revenues from government sources comprised another 30%, and all other revenue comprised the remaining 58%. This study considers NCHE institutions as an investment from the perspectives of those who provided these revenues - students, society, and taxpayers. The backdrop for the analysis is the entire North Carolina economy.

STUDENT PERSPECTIVE

In 2012-13, NCHE institutions served 684,561 for-credit students and 1,521,130 registrations for courses not for credit towards a degree. In order to attend college, 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 college. The total investment made by NCHE institutions students in FY 2012-13 amounted to $14.2 billion, equal to $3.7 billion in out-of-pocket expenses plus $10.4 billion in forgone time and money.

In return for their investment, students will receive a stream of higher future wages that will continue to grow through their working lives. As shown in Figure 1, mean income levels at the midpoint of the average-aged worker's career increase as people achieve higher levels

FIGURE 1. ANNUAL INCOME BY EDUCATION LEVEL AT CAREER MIDPOINT IN NORTH CAROLINA



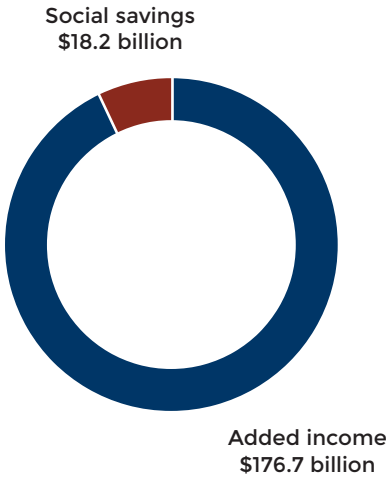
of education. For example, the average bachelor's degree completer from NCHE institutions will see an increase in earnings of $25,700 each year compared to someone with a high school diploma or equivalent. Over a working lifetime, this increase in earnings amounts to an undiscounted value of approximately $1,002,160 in higher income.

The present value of the higher future wages that students attending NCHE institutions will receive over their working careers is $37.9 billion. Dividing this value by the $14.2 billion in student costs yields a benefit-cost ratio of 2.7. In other words, for every $1 students invest in NCHE institutions in the form of out-of-pocket expenses and forgone time and money, they receive a cumulative of $2.70 in higher future wages. The average annual rate of return for students is 12.4%. This is an impressive return compared, for example, to the less than 1% return per annum that is generally expected from saving money in today's standard bank savings accounts.

SOCIETAL PERSPECTIVE

Communities and citizens throughout North Carolina benefit from the presence of NCHE institutions 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 NCHE institutions. 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 North Carolina and expanding the economic base for the citizenry as a whole.

FIGURE 2. PRESENT VALUE OF ADDED INCOME AND SOCIAL SAVINGS IN NORTH CAROLINA



Benefits also include the savings generated by the improved lifestyles of students. 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. Health savings include avoided medical costs associated with smoking, alcoholism, obesity, drug abuse, and mental disorders. Crime savings include reduced security expenditure and insurance administration, lower victim costs, and reduced criminal justice system expenditures. Unemployment savings include the reduced demand for income assistance and welfare benefits.

Figure 2 shows the present value of the added income and social savings that will occur in North Carolina over the working lifetimes of NCHE institutions' 2012-13 students. Added income amounts to a present value of $176.7 billion due to the increased lifetime incomes of students and associated increases in business output. Social savings amount to $18.2 billion, the sum of health, crime, and unemployment savings in North Carolina. Altogether, total ben-

efits to North Carolina equal $194.9 billion (in present value terms).

Investment in NCHE institutions during the analysis year totaled $27.7 billion. This includes all expenditures by the institutions (less clinical), all student expenditures, and all student opportunity costs. For every dollar of this investment, North Carolina as a whole will receive a cumulative value of $7.00 in benefits, equal to the $194.9 billion in benefits divided by the $27.7 billion in costs. These benefits will occur for as long as NCHE institutions' 2012-13 students remain employed in the state workforce.

TAXPAYER PERSPECTIVE

From the taxpayer perspective, benefits consist primarily of the taxes that state and local government will collect from the added income created in the state. As NCHE institutions' 2012-13 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 students' working careers, state and local government will have collected a present value of $17 billion in added taxes.

A portion of the savings enjoyed by society also accrues to state and local taxpayers. Students are more employable, so the demand for welfare and unemployment benefits reduces. Improved health habits lower the students' demand for public health care services. Students are also less likely to commit crimes, so the demand for law enforcement services reduces. All of these benefits will generate a present value of $3.4 billion in savings to state and local taxpayers.

Total benefits to taxpayers equal $20.4 billion, equal to the sum of the added taxes and public sector savings. However, because private institutions receive the majority of their funding from non-governmental sources, we cannot make the claim that the benefits they generate are directly linked to the state and

SUMMARY OF INVESTMENT ANALYSIS RESULTS

STUDENT PERSPECTIVE	
$37,891,185	Benefits (thousands)
$14,154,586	Costs (thousands)
$23,736,599	Net present value (thousands)
2.7	Benefit-cost ratio
12.4%	Rate of return
SOCIETAL PERSPECTIVE	
$194,875,438	Benefits (thousands)
$27,684,118	Costs (thousands)
$167,191,320	Net present value (thousands)
7.0	Benefit-cost ratio
N/A	Rate of return*
TAXPAYER PERSPECTIVE	
$16,969,632	Benefits (thousands)**
$4,308,132	Costs (thousands)**
$12,661,500	Net present value (thousands)
3.9	Benefit-cost ratio
12.7%	Rate of return

** The rate of return is not reported for the societal perspective because the beneficiaries of the investment are not necessarily the same as the original investors.*
*** Benefits and costs from the taxpayer perspective exclude those generated by private institutions.*

local taxpayer costs of supporting them. As such, we must remove the state and local taxpayer benefits and costs generated by private institutions before conducting an analysis of the taxpayer investment returns.

The net benefits to state and local taxpayers—less the benefits generated by private institutions—comes to $17 billion. Taxpayer costs amount to $4.3 billion—equal to the funding that NCHE institutions received from state and local government (less funding received by private institutions). Costs also exclude funding for clinical operations. Dividing the benefits by the costs yields a benefit-cost ratio of 3.9. This means that for every $1 of public money invested in NCHE institutions, taxpayers receive a cumulative value of $3.90 over the course of the students' working lives. The average annual rate of return is 12.7%, a solid investment that compares favorably with other long-term investments in both the private and public sectors.

SUMMARY OF INVESTMENT ANALYSIS RESULTS

The summary table on the previous page presents the results of the investment analysis for all three of NCHE institutions' 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 creates a wide range of benefits to North Carolina communities and citizens and returns more to government budgets than it costs.

CONCLUSION

The results of this study demonstrate that NCHE institutions create value from multiple perspectives. The institutions benefit state 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 incomes and helping them achieve their individual potential. They benefit North Carolina as a whole by creating a more prosperous economy and generating a variety of savings through the improved lifestyles of students. Finally, they benefit state and local taxpayers through increased tax receipts across the state and a reduced demand for government-supported social services.

ABOUT THE STUDY

Data and assumptions used in the study are based on several sources, including the 2012-13 academic and financial reports from the institutions, 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 description of the data and methods used to derive the results for each education sector, please visit the University of North Carolina website at www.northcarolina.edu/economic-impact-2015, the North Carolina Independent Colleges and Universities website at www.ncicu.org/economic-impact-2015, and the North Carolina Community College System website at www.nccommunitycolleges.edu/emsi-study.

ABOUT EMSI

Economic Modeling Specialists International turns labor market data into useful information that helps organizations understand the connection between economies, people, and work. Since 2000, EMSI has completed numerous economic impact studies for educational institutions across the US, Canada, the UK, and Australia. It also provides industry-leading labor market data via software and reports to higher education professionals, workforce planners, and regional developers in the U.S. and internationally. For more information, visit www.economicmodeling.com.