



Historically Black Colleges and Universities  
Economic Series

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# **The Economic Impact of North Carolina A&T State University**

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NORTH CAROLINA  
INSTITUTE OF MINORITY  
ECONOMIC DEVELOPMENT

September 2012



Historically Black Colleges and Universities Economic Series:

# The Economic Impact of NC A&T State University



A Report by the

North Carolina Institute of Minority Economic Development

September 2012



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The North Carolina Institute of Minority Economic Development commissioned this study to assess the economic impact of North Carolina A&T State University. This report is part of the Institute's Historically Black Colleges and Universities Economic Series designed to measure and quantify the economic impact of HBCUs on their local communities, the state and beyond.

### ABOUT THE INSTITUTE

The North Carolina Institute of Minority Economic Development ("The Institute") is a statewide nonprofit organization. The Institute's mission is to build the asset base among limited resource populations through research and information, education and training, and business development. Since inception in 1986, the Institute has published more than 15 economic studies/reports. Over the past eight years (2004-2012), its business development clients have realized more than \$459 million in contracts and financial transactions.



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## Profile of North Carolina A&T State University

(SOURCE: NC A&T STATE UNIVERSITY WEBSITE)

North Carolina Agricultural and Technical State University is a public, doctoral/research, 1890 land-grant university committed to exemplary teaching and learning, scholarly and creative research, and effective engagement and public service. The university offers degrees at the baccalaureate, master's and doctoral levels and has a commitment to excellence in a comprehensive range of academic disciplines. Our unique legacy and educational philosophy provide students with a broad range of experiences that foster transformation and leadership for a dynamic and global society.



In 1890, Congress enacted the Second Morrill Act that mandated “a separate college for the colored race.” The Agricultural and Mechanical College for the Colored Race (now N.C. A&T) was established as that school in the state of North Carolina by an act of the General Assembly ratified on March 9, 1891. Originally operating in Raleigh as an annex to Shaw University, the college made a permanent home in Greensboro with the help of citizens such as Dr. DeWitt (a black dentist), C. Benbow, and Charles H. Moore.

In 1915, state legislators changed the college’s name to the Agricultural and Technical College of North Carolina; and in 1967, they elevated it to university status. N.C. A&T became a constituent university of the University of North Carolina in 1972.



On February 1, 1960, four A&T freshmen helped spark the civil rights movement in the South. Four NC A&T students "sat-in" at an all white eating establishment (Woolworth's) and demanded equal service at the lunch counter. Because of their great desire for change and equality they inspired many other students of the university to join them in their non-violent protest to desegregate Woolworth's lunch counter. By the end of July 1960, their mission was accomplished and they became the A&T Four and their campaign became known as the Greensboro sit-ins.

For the fiscal year 2010–11, A&T generated more than \$60 million in sponsored programs and more than \$6 million in appropriations for agricultural research and cooperative extension. It also generates contracts with major international companies, foundations and federal agencies to secure funding to enhance academic programs and to provide student scholarships.

N.C. A&T graduates the nation's largest number of African American engineers at the undergraduate, master's and doctoral levels and psychology undergraduates. Through its School of Business and Economics, NC A&T is also among the largest producers of African American certified public accountants. True to its heritage, NC A&T is home to the largest agricultural school among historically black colleges and is the nation's second largest producer of minority agricultural graduates.

In 2008, NC A&T was awarded a prestigious National Science Foundation's Engineering Research Center (ERC) grant for biomedical engineering and nano-bio applications research.

This study will set out to examine the impact of NC A&T on the economy of Greensboro. In fulfilling this mission, the study will answer the following perennial questions: What is the short and long-term economic impact of North Carolina A&T State University on its host community? What are the college degrees granted by North Carolina A&T State University worth? This study also provides a detailed description of NC A&T's growth over time in terms of student enrollment, degrees conferred and graduation rates, and tuition and fees.

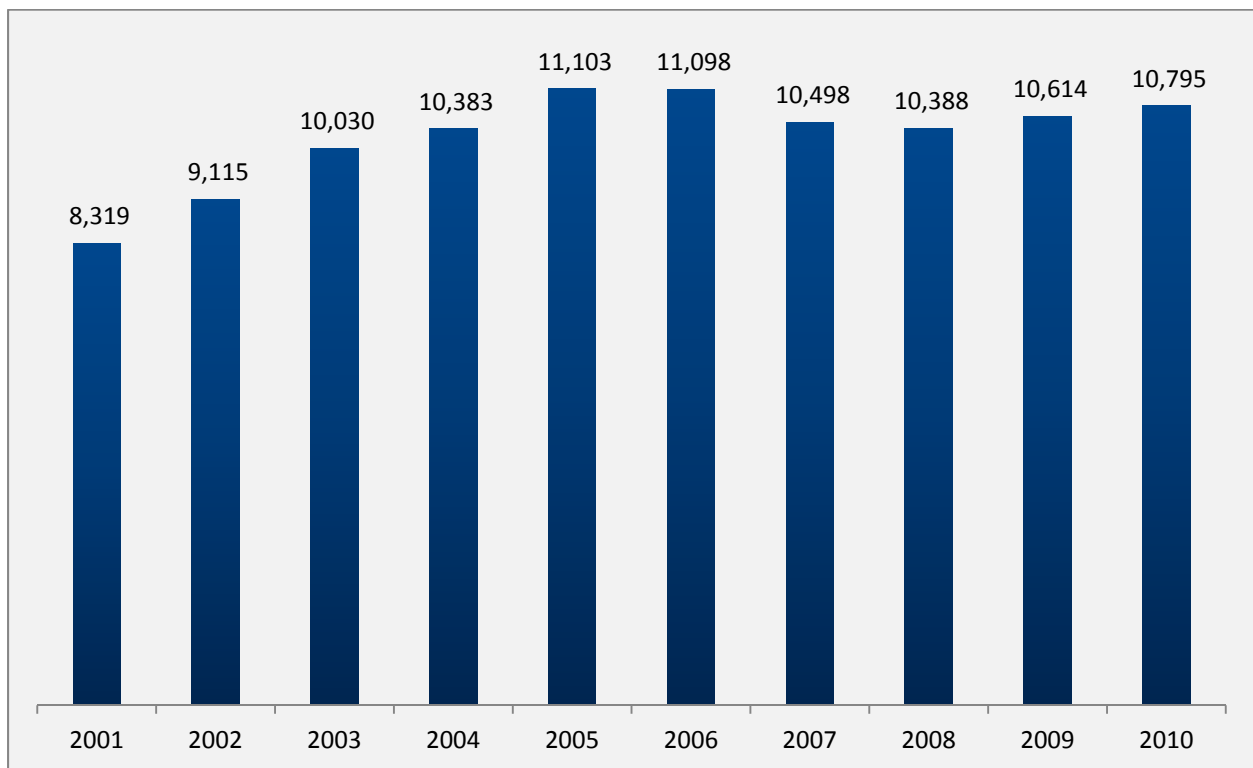


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## *Enrollment*

North Carolina A&T State University is the 8th largest public institution of higher education within the UNC School System and the largest HBCU in North Carolina. According to data provided by the UNC General Administration Office of Institutional Research and Analysis, 10,881 students were enrolled in the 2011-2012 school year at NC A&T. An analysis over a ten-year period shows from 2001-2010, a 30 percent change in enrollment.

**Figure 1: NC A&T State University Student Enrollment (2001-2010)**



NC A&T was one of the 7 (out of the 16) institutions in the UNC system that increased enrollment between 2010 and 2011.

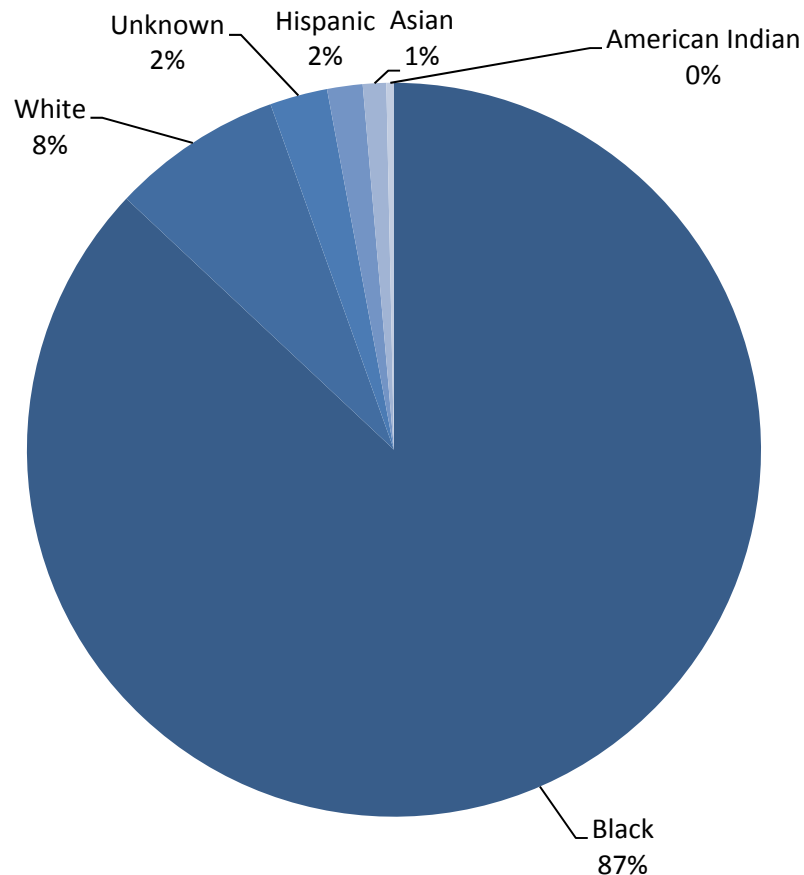
**Table 1: UNC System Student Enrollment and Percent Change (2010 - 2011)**

School	2010	2011	Change	%Change
NCSU	34,376	34,767	391	1%
UNC-CH	29,390	29,137	(253)	-1%
ECU	27,783	27,386	(397)	-1%
UNCC	25,063	25,277	214	1%
UNCG	18,771	18,627	(144)	-1%
ASU	17,222	17,344	122	1%
UNCW	13,071	13,145	74	1%
NC A&T	10,795	10,881	86	1%
WCU	9,407	9,352	(55)	-1%
NCCU	8,645	8,359	(286)	-3%
UNC-P	6,944	6,251	(693)	-10%
WSSU	6,333	6,163	(170)	-3%
FSU	5,781	5,930	149	3%
UNC-A	3,967	3,863	(104)	-3%
ECSU	3,307	2,930	(377)	-11%
UNC-SA	872	893	21	2%
<b>UNC Total</b>	<b>221,727</b>	<b>220,305</b>	<b>(1,422)</b>	<b>-1%</b>

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The diversity in terms of race and ethnicity of NC A&T students is changing as enrollment increases; however, African Americans still make up the largest (87%) of students enrolled at NC A&T (see Figure 2).

**Figure 2: NC A&T State University Student Enrollment Racial and Ethnic Distribution (2010)**



### ***Tuition and Fees***

With exception to extreme hikes in tuition and fees (in excess of 20%) for all UNC colleges and universities enforced by UNC General Administration between 2001 and 2002, tuition and fees for both in-state and out-of-state students to attend NC A&T have remained relatively low in comparison to all other public colleges and universities within the UNC system.

The current (2012-2013) tuition and fees for regular full-time undergraduate students at NC A&T is \$4,952 for residents and \$15,550 for non-residents (see Table 2). Within the UNC System, the annual cost for an in-state student to attend NC A&T is the 5<sup>th</sup> lowest. The total cost is well below the average total cost (\$5,754) for in-state students and out-of-state (\$17,987) students to attend a UNC college or university.

**Table 2: 2012-2013 UNC System Tuition and Fees (Resident and Non-Resident)**

School	Tuition Resident	Tuition Non-Resident	Fees	Total Tuition & Fees Resident	Total Tuition & Fees Non-Resident
ECSU	2,582.31	13,300.40	1,567.38	4,149.69	14,867.78
FSU	2,584.76	13,289.00	1,809.00	4,393.76	15,098.00
UNCP	3,012.00	12,219.00	1,764.00	4,776.00	13,983.00
WSSU	2,807.00	11,957.00	2,043.16	4,850.16	14,000.16
<b>NCATSU</b>	<b>3,070.00</b>	<b>13,668.00</b>	<b>1,881.50</b>	<b>4,951.50</b>	<b>15,549.50</b>
NCCU	3,244.00	13,817.00	1,875.03	5,119.03	15,692.03
WCU	3,397.00	12,994.00	2,375.00	5,772.00	15,369.00
UNCC	3,453.00	15,982.00	2,324.00	5,777.00	18,306.00
UNCA	3,476.00	17,298.00	2,330.50	5,806.50	19,628.50
ECU	3,758.00	17,572.00	2,055.00	5,813.00	19,627.00
ASU	3,542.00	15,590.00	2,420.00	5,962.00	18,010.00
UNCG	3,779.00	17,577.00	2,306.00	6,085.00	19,883.00
UNCW	3,743.00	15,845.79	2,378.70	6,121.70	18,224.49
UNC-SA	5,270.00	18,415.00	2,081.00	7,351.00	20,496.00
UNC-CH	5,823.00	26,575.00	1,676.81	7,499.81	28,251.81
NCSU	5,748.00	18,913.00	1,895.55	7,643.55	20,808.55
<b>UNC-Avg</b>	<b>3,705.57</b>	<b>15,938.26</b>	<b>2,048.91</b>	<b>5,754.48</b>	<b>17,987.18</b>

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## Economic Impact Highlights

The fundamental finding of this study is that the NC A&T creates substantial economic impacts in terms of output, value-added, labor income, and employment. The economic impact of NC A&T on its host community in 2010 includes:

- \$466 million in output (sales);
- \$347 million in value added (gross regional product);
- \$249 million in labor income; and
- 5,248 full- and part-time jobs.

Measured in the simplest and broadest possible terms, the total economic impact of NC A&T was \$466 million in 2010. Output can be thought of as the equivalent of business revenue, sales, or gross receipts. Of the 2010 total, \$322 million (69 percent) is initial spending by the institutions and students; \$144 million (31 percent) is the induced or respending (multiplier) impact. Dividing the 2010 total output impact (\$466 million) by initial spending by the institutions and students (\$322 million) yields an average multiplier value of 1.45. On average, therefore, every dollar of initial spending generates an additional 45 cents for the economy of the region hosting the institution.

In 2010, value added comprises \$347 million (74 percent) of the \$466 million output impact, with domestic and foreign trade comprising the remainder – \$120 million (26 percent) – of the output impact. Labor income received by residents of the

### 2010 ECONOMIC IMPACT OF NORTH CAROLINA A&T STATE UNIVERSITY SUMMARY:

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**\$466 million**

in output (sales)

**\$347 million**

in value added (gross regional  
product)

**\$249 million**

in labor income

**5,248**

full- and part-time jobs

**\$4.9 billion**

projected work-life earnings of  
1,385 graduates (2008 \$)

Greensboro-High Point MSA equals \$249 million, and represents 72 percent of the value-added impact. Expressed in other dimensions, the employment impact of NC A&T, including multiplier effects, is 5,248 full- and part-time jobs.

In addition to these short-term recurring impacts, the one-time (nonrecurring) impact of \$12 million in capital outlays on output was \$21 million in FY 2010. The FY 2010 economic impacts of capital outlays on value added, labor income, and employment were \$11 million, \$7 million, and 183 jobs, respectively. Moreover, the economic impact of construction outlays on output was significantly higher in both FY 2011 (\$42 million) and FY 2012 (\$83 million).



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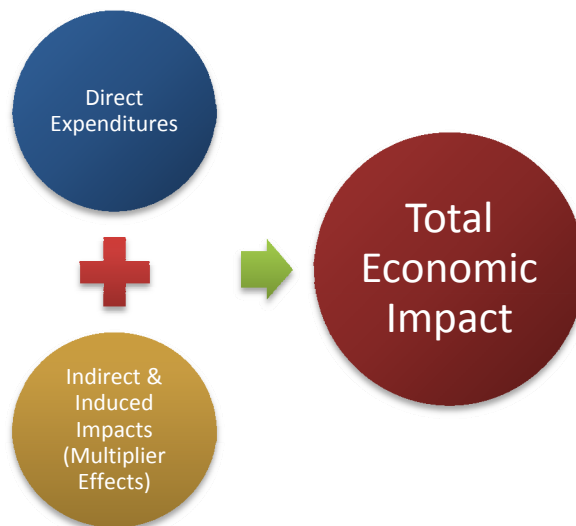
In addition to the short-term impacts of college- and university related spending on their host communities, the 1,726 graduates of NC A&T (2010) can expect work-life earnings of \$5.5 billion, of which \$2.1 billion (38%) represents the incremental work-life earnings that can be attributed to their college degrees. That amounts to an additional \$1.21 million in work-life earnings per degree conferred. On average, that's what a college degree is worth.

A 2010 degree conferred at  
NC A&T amounts to \$1.21 million  
of additional work-life earnings  
(per degree).

## Part I: The Short-Term Economic Impact of NC A&T State University-Related Spending in 2010

The total annual economic impact of university-related spending is defined to consist of the net changes in regional output, value added, labor income, and employment that are due to initial spending by NC A&T, by its' faculty and staff, and by its' students. The total economic impact includes the impact of the initial round of spending and the secondary, or indirect and induced, spending – often referred to as the multiplier effect – created as the initial expenditures are re-spent. Figure 3 provides a schematic representation of impact relationships.

**Figure 3: Schematic representation of economic impact relationships**



There are two types of secondary spending, indirect spending and induced spending. Indirect spending refers to the changes in inter-industry purchases as a region's industries respond to the additional demands triggered by spending by NC A&T, its faculty and staff, and its students. It consists of the ripples of activity that are created when the institution, its employees, and its students purchase goods or services from other industries located in the host community. Induced spending is similar to indirect spending except that it refers to the additional demand triggered by spending by households as their income increases due to changes in production. Basically, the induced impact captures the ripples of activity that are created when households



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spend more due to the increases in their earnings that were generated by the direct and indirect spending.

The sum of the direct, indirect, and induced economic impacts is the total economic impact, which often is expressed in terms of output (sales), value added (gross regional product), income, or employment. Total industry output is gross receipts or sales, plus or minus inventory. It is the value of production by industry (including households) for a given period of time (one year). Total output impacts are the most inclusive, largest, measure of economic impact. Because of their size, output impacts typically are emphasized in economic impact studies and receive much media attention. One problem with output as a measure of economic impact, however, is that it includes the value of inputs produced by other industries, which means that there inevitably is some double counting of economic activity. The other measures of economic impact (value added, labor income, and employment) are free from double counting and provide a much more realistic measure of the true economic impact of NC A&T on its regional economy.

Value added (or gross regional product) consists of employee compensation, proprietor income, other property income, and indirect business taxes. Value added is equivalent to gross output (sales or receipts and other operating income, commodity taxes, and inventory change) minus intermediate inputs (consumption of goods and services purchased from industries or imported). It is often referred to as the state- or regional-level counterpart of the nation's gross domestic product (GDP).

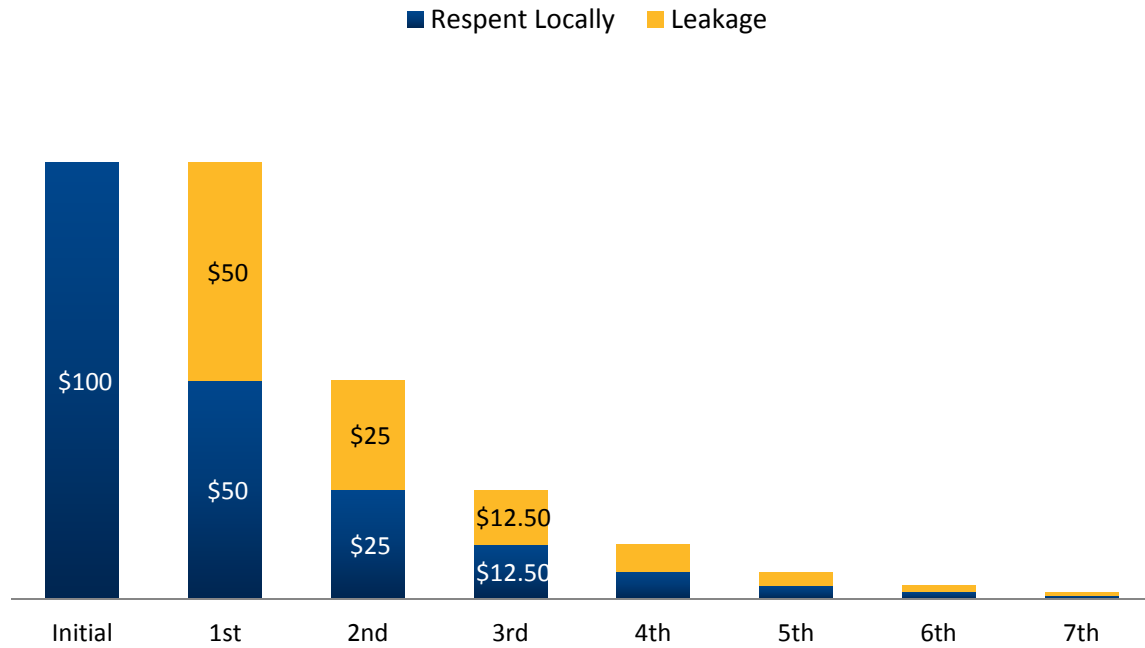
Income comprises all forms of employment income, including wages, salaries, and proprietors' incomes. It does not include non-wage compensation (e.g., pensions and health insurance), transfer payments (e.g., welfare or Social Security benefits), or unearned income (e.g., dividends, interest, and rent). Employment includes total wage and salary employees as well as self-employed individuals. It includes both full- and part-time jobs and is measured in annual average jobs. Employment therefore is expressed as the full- and part-time job count and not as full-time equivalents.

The regional economic area is the host community, including the surrounding counties from which employees and students commute. The effects of expenditures that go to persons, businesses, or governments located outside the regions are not included in the value added, labor income, and employment impact estimates. The definitions of NC A&T's regional economy (the Greensboro-High Point MSA) was based on the standard metropolitan and micropolitan statistical area definitions released by the Office of Management and Budget and consists of Guilford, Randolph, and Rockingham counties.

The multiplier concept is common to virtually all economic impact studies. Multipliers measure the response of the local economy to a change in demand or production. In essence, multipliers capture the impact of the initial round of spending (for final consumption) plus the impacts generated by successive rounds of re-spending of those initial dollars. The magnitude of a particular multiplier depends upon what proportion of each dollar spent leaves the region during each round of spending. Multipliers therefore are unique to the region and to the industry that receives the initial round of spending. Economic multipliers are model-based and dependent on the specific spending patterns of the industry and applicable regional economies.

Figure 4 illustrates the successive rounds of spending that might take place if a person buys an item locally. Assume that the amount spent is \$100 and that the appropriate regional output multiplier is 2.0. The initial injection of spending to the region is \$100, which creates a direct economic impact of \$100 to the regional economy. Of that \$100, only \$50 is re-spent locally; the rest flows out of the region through non-local taxes, non-local purchases, and income transfers. After the first round of re-spending, the total economic impact to the region is \$150. During the second round of re-spending, \$25 is re-spent locally and \$25 leaks out of the region, a 50 percent leakage. Now, the total economic impact to the region is \$175. After seven rounds of re-spending, less than one dollar remains in the local economy, but the total economic impact has reached almost \$200. The induced (multiplier effect) impact to the region (\$100) equals the total impact (\$200) minus the direct impact (\$100).

**Figure 4: Initial and Re-Spending Economic Impact (Multiplier Effect) Illustration**



Initial Direct or Indirect Impact		\$100
1 <sup>st</sup> Round of Re-spending	\$50 re-spent locally	\$50 leakage <sup>1</sup>
2 <sup>nd</sup> Round of Re-spending	\$25 re-spent locally	\$25 leakage
3 <sup>rd</sup> Round of Re-spending	\$12.50 re-spent locally	\$12.50 leakage
4 <sup>th</sup> Round of Re-spending	\$6.25 re-spent locally	\$6.25 leakage
5 <sup>th</sup> Round of Re-spending	\$3.12 re-spent locally	\$3.12 leakage
6 <sup>th</sup> Round of Re-spending	\$1.56 re-spent locally	\$1.56 leakage
7 <sup>th</sup> Round of Re-spending	\$.78 re-spent locally	\$.78 leakage
Total Economic Impact:		\$200
Total Leakage:		\$100

The multiplier traces the flows of re-spending that take place throughout the region until the initial dollars have completely leaked from it to other regions. Obviously, multiplier effects within large, self-sufficient areas are likely to be larger than those in small, rural, or specialized

<sup>1</sup> Leakage indicates amounts spent outside area and not re-circulated locally.

areas that are less able to capture spending for necessary goods and services. Multiplier effects also vary greatly from industry to industry, but in general, the greater the interaction with the local economy, the larger the multiplier for that industry. For example, personal services, business services, and entertainment industries have intricate relationships with local supporting industries, and therefore have relatively high multiplier values. Conversely, electric, gas, and sanitary services usually are less intertwined with local supporting industries, and their multipliers are lower.

## ***Results***

Total initial spending accruing to NC A&T's regional economy equals the summation of spending originating from spending by the institution for wages and salaries; spending by the institution for other budget categories (e.g., outlays for items other than wages and salaries); spending by undergraduate students attending the institution; and spending by the graduate and professional students attending the institution. For 2010, total initial spending for NC A&T was \$322 million. Initial spending for NC A&T is reported in the first column of Table 3 on page 15.



**Table 3: Total Economic Impact of NC A&T State University in 2010<sup>2</sup>**

Institution	Initial Spending (2010 dollars)	Output Impact (2010 dollars)	Value Added Impact (2010 dollars)	Labor Income Impact (2010 dollars)	Employment Impact (jobs)
NC A&T STATE UNIVERSITY	<b>322,429,865</b>	<b>466,332,934</b>	<b>346,687,811</b>	<b>248,903,636</b>	<b>5,248</b>
<b>Wages &amp; Salaries</b>	138,735,142	245,797,017	205,339,338	175,928,606	2,921
<b>Other Institutional Spending</b>	55,798,063	49,843,355	31,336,043	15,206,765	400
<b>Undergraduate Students</b>	110,384,160	146,827,395	94,566,848	49,449,240	1,659
<b>Graduate/Professional Students</b>	17,512,500	23,865,167	15,445,582	8,319,025	268

### TOTAL OUTPUT IMPACT

For each category of initial spending, an IMPLAN model of NC A&T's regional economy was used to calculate the total output impact. Output impacts for 2010 are reported in the second column of Table 3. The output impact includes the impact of the first round of spending and the impacts generated by the re-spending of these amounts – the multiplier effect.

NC A&T generated an output impact on the Greensboro-High Point region of \$466 million in 2010. The output impact was 1.45 times greater than their initial spending. The output impacts are reported in the second column of Table 3.

<sup>2</sup> Output refers to the value of total production, including domestic and foreign trade. Value added includes employee compensation, proprietary income, other property type income, and indirect business taxes. Labor income includes both the total payroll costs of workers who are paid by employers and payment received by self-employed individuals. Employment includes both full-time and part-time jobs. Initial spending estimates are based on survey data obtained from the National Center for Education Statistics' Integrated Postsecondary Education Data System (Fall 2010 Staff Survey, Fall 2010 Enrollment Survey, and the 2010 Finance Survey). The impacts of spending on Output, Value Added, Labor Income, and Employment were estimated using the IMPLAN system, Type SAM multipliers, and consumption functions provided by MIG, Inc.

### **TOTAL VALUE-ADDED IMPACT**

Because value-added impacts exclude expenditures related to foreign and domestic trade, they provide a much more accurate measure of the actual economic benefits flowing to businesses and households in a region than the more inclusive output impacts.

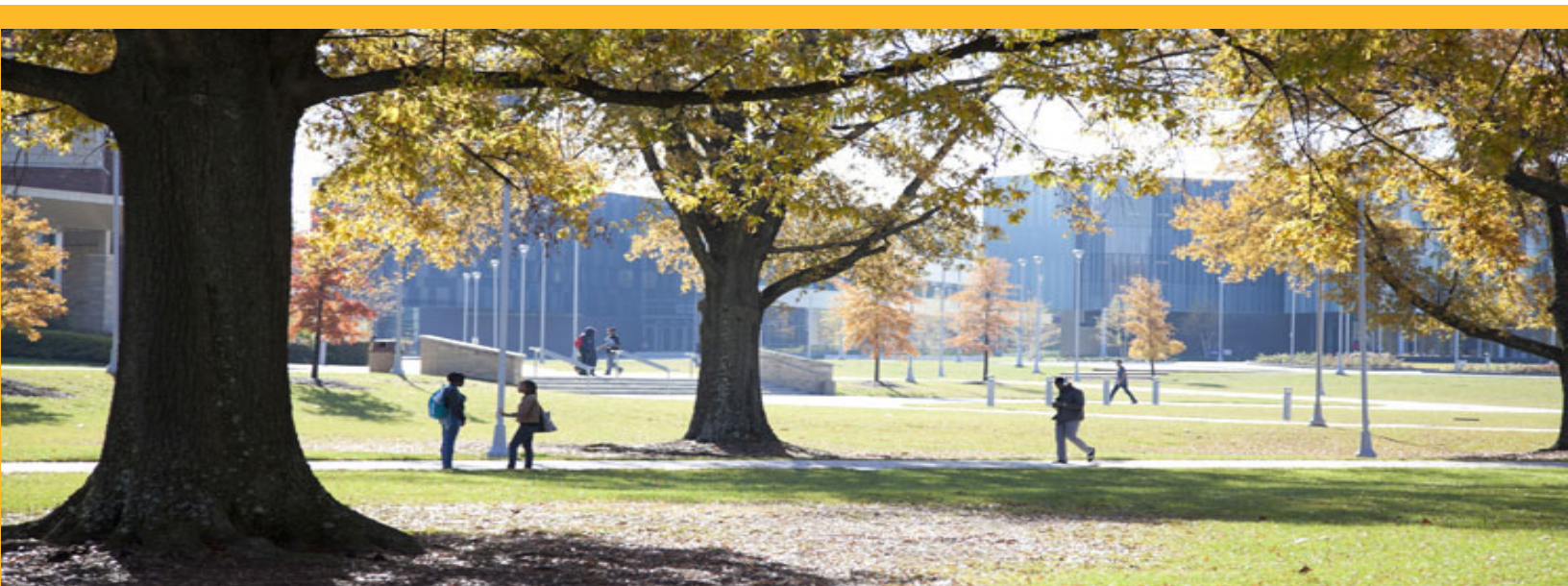
NC A&T generated a value-added impact of \$347 million in 2010. The value-added impact equaled 74 percent of the output impact. The value-added impacts are reported in the third column of Table 3.

### **LABOR INCOME IMPACTS**

The IMPLAN model also was used to calculate impacts in terms of labor income. NC A&T generated a labor income impact of \$249 million. The labor income impact equaled 72 percent of the value added impact. Labor income is reported in the fourth column of Table 3.

### **EMPLOYMENT IMPACTS**

The economic impact of hosting NC A&T probably is most easily understood in terms of its effects on employment. NC A&T generated an employment impact of 5,248 full- and part-time jobs. Employment impacts are reported in the fifth column of Table 3.





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## Part II: The Economic Impact of Construction Projects

Expenditures for major construction projects also generate economic impacts on a one-time or non-recurring basis. Initial spending for construction during FY 2010 was obtained from the NCESS' IPEDS 2010 Finance Survey, "Construction in progress", Part A, line 27. The amount reported for FY 2010 was \$12,368,545. The economic impacts of expenditures for construction in progress were estimated using the IMPLAN system.



In FY 2010, the economic impact of construction expenditures by NC A&T on output was \$21 million. The impacts on regional GDP and labor income were \$11 million and \$7 million, respectively. The FY 2010 employment impact of construction outlays was 183 jobs.

Initial spending on construction by NC A&T was much higher in FY 2011 and FY2012, \$25 million and \$50 million, respectively. Initial spending estimates for FY 2011 and FY 2012 were obtained from NC A&T (Bill Barlow). Based on those estimates, the output impacts were \$42 million in

FY 2011 and \$83 million in FY 2012. The job impacts also rose significantly, from 183 jobs in FY 2010, to 354 jobs in FY 2011, and to 679 jobs in FY 2012. The economic impacts generated by construction expenditures are reported in Table 4.

**Table 4: Economic Impact of Construction Expenditures by NC A&T State University**

Institution	Initial Spending (current dollars)	Output Impact (current dollars)	Value Added Impact (current dollars)	Labor Income Impact (current dollars)	Employment Impact (jobs)
<b>NC A&amp;T STATE UNIVERSITY</b>					
<b>Construction in FY 2010</b>	12,368,545	20,802,521	10,533,302	7,452,196	183
<b>Construction in FY 2011</b>	25,000,000	41,647,278	20,828,640	14,736,034	354
<b>Construction in FY 2012</b>	50,000,000	82,535,902	40,753,588	28,832,716	679

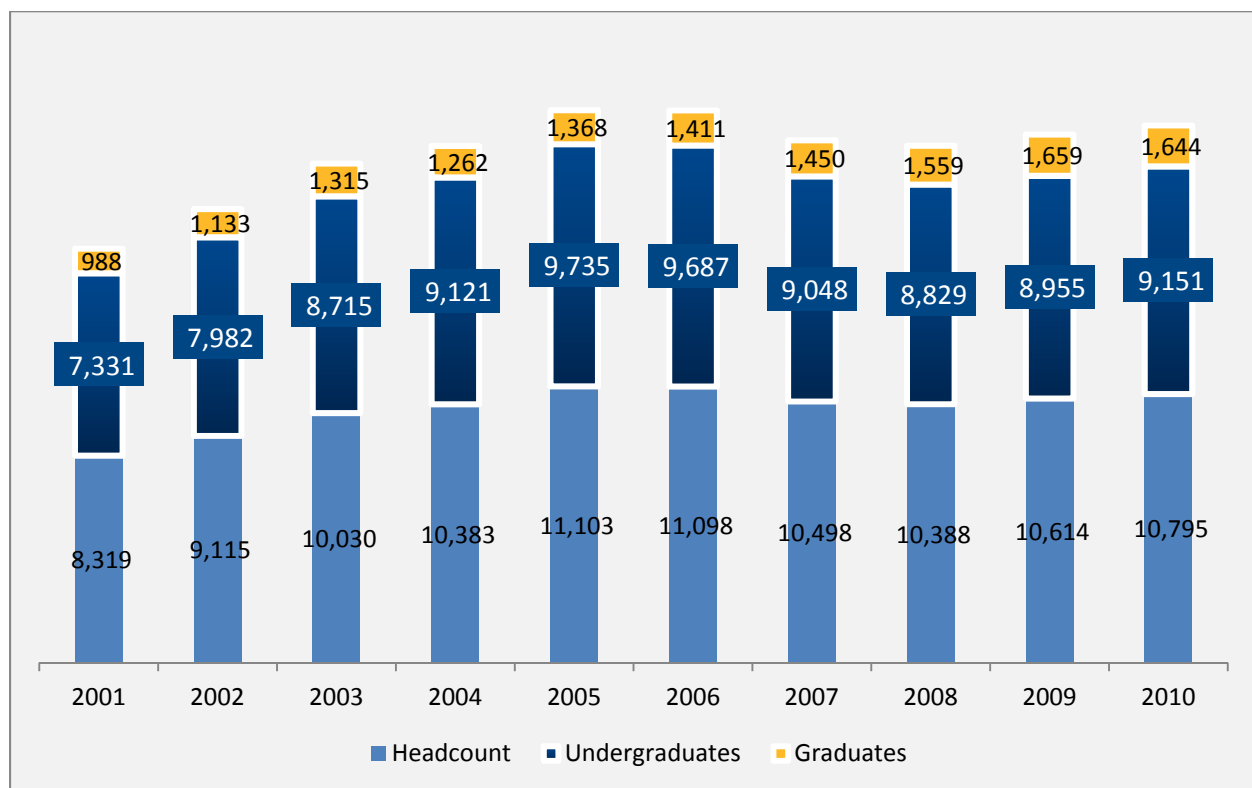


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## Part III: Increases in Work-Life Earnings Associated with Degrees from NC A&T State University

From the perspective of the students and their parents, perhaps the most relevant measure of the economic “worth” of higher education is increased earnings over a working lifetime. The increase in earnings associated with a degree will of course vary from one individual to another and overtime; it is possible, however, to estimate aggregate benefits to graduates of NC A&T in a given year, as well as benefits accruing to the average degree holder. This section of the report presents such estimates for graduates of NC A&T who received degrees in 2010. The number of degrees conferred by each institution was obtained from the NCES’s IPEDS.

**Figure 5: Undergraduate and Graduate Degrees Conferred (2001 - 2010)**



The higher work-life earnings obviously benefit degree holders, but due to migration and a host of other factors there is controversy in the academic literature regarding whether or not

increases in work-life earnings should be included in estimates of the economic impact of a college or university on its host community (Brown and Heaney 1997).

### ***Estimating Work-Life Earnings***

In 2002, the U.S. Census Bureau issued synthetic estimates of work-life earnings: “The Big Payoff: Educational Attainment and Synthetic Estimates of Work-Life Earnings” (P23-210). The estimates were based on earnings data for 1997-1999 from the *Current Population Surveys* conducted by the U.S. Census Bureau in 1998, 1999, and 2000. A typical work-life was defined as the period from age 25 through age 64. The synthetic estimates were created by using the working population’s 1-year annual earnings and summing their age-specific average earnings for people ages 25 through 64 years. The resulting totals represent what individuals with the same education level could expect to earn, on average, in today’s dollars, during a hypothetical 40-year working life. The estimates should be considered to be illustrative and do not predict actual future earnings. The synthetic work-life earnings are “expected average amounts” based on cross-sectional earnings data.

In 2007, Mark Kantrowitz updated the Census Bureau’s synthetic estimates of work-life earnings based on data from the Census Bureau’s *2006 Current Population Survey*. Kantrowitz’s estimates of work-life earnings were published the *NASFAA Journal of Student Financial Aid* (Vol. 37, No. 1), “The Financial Value of a Higher Education.” The estimates of “synthetic work-life earnings per degree” reported in the first column of Table 5 are based on the estimates produced by Mark Kantrowitz, but they were converted from 2005 dollars (as originally published) to 2010 dollars using the U.S. Bureau of Labor Statistic’s Consumer Price Index (all urban consumers).

**Table 5: Synthetic Estimates of Work-Life Earnings of 2010 Graduates of NC A&T State University (millions of 2010 dollars)<sup>3</sup>**

Institution	Synthetic Work-Life Earnings Per Degree	Incremental Work-Life Earnings Per Degree	Number of Degrees Conferred	Synthetic Work-Life Earnings All Graduates	Incremental Work-Life Earnings All Graduates
NC A&T STATE UNIVERSITY	-	-	<b>1,726</b>	<b>5,513</b>	<b>2,084</b>
<b>Professional</b>	6.21	3.18	0	0	0
<b>Doctoral</b>	4.93	1.89	21	103	40
<b>Master's</b>	3.70	0.66	356	1,317	237
<b>Bachelor's</b>	3.03	1.34	1,349	4,093	1,808
<b>Associate's</b>	2.13	0.43	0	0	0

Work-life earnings increase dramatically with education level. For example, over a working lifetime, the average worker with a high school diploma earns an average of \$1.69 million compared to \$2.13 million for the average worker with an Associate's degree, or \$3.03 million for the average worker with a Bachelor's degree, or \$3.70 million for the average worker with a Master's degree, or \$4.93 million for the average worker with a Doctoral degree (PhD), or \$6.21 million for the average worker with a Professional Degree.

Incremental work-life earnings per degree are reported in the second column of Table 5. Incremental work-life earnings for graduates with an Associate's degree are defined as the difference in synthetic work-life earnings between workers with a high school diploma and an Associate's degree. Incremental work-life earnings for graduates with a Bachelor's degree are

<sup>3</sup> The Synthetic work-life earnings estimate for a high school graduate, including GED, is \$1.69 (expressed in millions of 2010 dollars). The estimates of synthetic work life earnings per degree were obtained (in 2005 dollars) from Mark Kantrowitz, "The Financial Value of a Higher Education", NASFAA Journal of Student Financial Aid, Vol 37, NO. 1, 2007. The U.S. Bureau of Labor Statistics' consumer price index for all urban consumers was used to convert \$2005 to \$2010. The number of degrees conferred (2010) was obtained from the National Center for Education Statistics' Integrated Postsecondary Education Data System.

defined as the difference in synthetic work-life earnings for workers with a high school diploma and a Bachelor's degree. Incremental work-life earnings for graduates with a Master's degree are defined as the difference in synthetic work-life earnings between workers with a Bachelor's degree and a Master's degree. Incremental work-life earnings for graduates with a Doctoral degree are defined as the difference in synthetic work-life earnings between workers with a Bachelor's degree and a Doctoral Degree. Incremental work-life earnings for graduates with a Professional degree are defined as the difference in synthetic work-life earnings between workers with a Bachelor's degree and a Professional degree.

Synthetic work-life earnings of all graduates can be obtained by multiplying the number of degrees conferred by estimated synthetic work-life earning per degree. These amounts are reported in the fourth column of Table 5 on page 21. Similarly, incremental work-life earnings of all graduates can be obtained by multiplying the number of degrees conferred by estimated incremental work-life earnings per degree. These amounts are reported in the fifth column of Table 5.



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## *Results*

The analysis expects that the 1,726 graduates of NC A&T can expect work-life earnings of \$5.5 billion (\$ 2010), which is \$2.1 billion more than they could expect to earn had they not earned their college degrees (Table 5). Thus, in terms of incremental (additional) work-life earnings, the collective worth of the degrees granted by NC A&T is \$2.1 billion, or about \$1.21 million per graduate. The economic worth of higher education over the course of a graduate's working life thus is considerable.

The 1,349 graduates who received bachelor's degree will account for 87 percent of the collective increase in work-life earnings. On average, the work-life earnings of graduates with a bachelor's degree will be \$1.34 million more than for persons with a high school degree. The 356 graduates who earned master's degrees will account for 11 percent of the collective increase in work-life earnings. On average, the work-life earnings of graduates with a master's degree will be \$0.66 million more than for persons with a bachelor's degree. The 21 graduates who received a doctoral degree will account for 2 percent of the collective increase in work-life earnings. On average, the work-life earnings of graduates with a doctoral degree will be \$1.89 million more than for persons with a bachelor's degree.

Although average earnings rise considerably with educational attainment, individual earnings within each specific education level can vary substantially. These differences result from a variety of factors, including occupational choice and labor force experience. Nonetheless, most graduates of NC A&T will realize significantly higher work-life earnings when they earn a college degree, and those completing an advance degree will increase their total earnings even more. For example, lifetime earnings for persons with a bachelor's degree will be about four times more than those for a high school graduate.

This study shows that NC A&T plays a major role in raising the earning potential of its graduates. Investments in education should significantly increase the work-life earnings of many North Carolinians and foster the economic development of the entire state.

## Conclusions

In the simplest terms, the collective or rolled-up economic impact of NC A&T on its host community was \$466 million in 2010. This amount represents the impact of spending by the institution, spending by its faculty and staff, and spending by students. NC A&T added \$249 million in labor income to the local economy and 5,248 jobs. In addition, the economic impact of major capital (construction) projects on output was \$21 million in FY 2010.

Although this study measures \$466 million in recurring annual economic impact, plus a \$21 million impact generated by spending on major capital (construction) projects, the actual annual impact of university-related spending is much higher. The study's limited scope did not include the short-term impacts of spending by visitors, retirees, and non-university-related income received by employees of the institutions.

In addition to the annual impacts of university related spending, the 2010 graduates of NC A&T can expect to realize work-life earnings of \$5.5 billion, of which \$2.1 billion (38%) represents the incremental work-life earnings that can be attributed to their college degrees. That amounts to an additional \$1.21 million in work-life earnings per degree conferred. On average, that's what a college degree is worth.

*Additional economic impact categories NOT included in report analysis include:*

- ▶ *Spending by visitors, retirees, non-university related income received by employees*
- ▶ *Contribution to the Greensboro community's economic vitality based on NC A&T's superior educational reputation*
- ▶ *Thousands of hours of community service*

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## Limitations

Several types of short-term university-related expenditures were not estimated, including spending by visitors and spending by retirees who live in the Greensboro-High Point MSA. Expenditures supported by employees of the NC A&T non-institutional income also were not estimated. Such income may result from an employee's consulting, investments, and other personal business activities, and often would not come to the Greensboro-High Point MSA if that person's job at NC A&T did not exist.

Perhaps the greatest limitation of this report is that there was no attempt to evaluate the long-term impacts of NC A&T on the economic development of the Greensboro-High Point MSA, the state, and the nation. NC A&T not only spends money year by year, but also has long-term impacts on the labor force, business and industry, and government. Businesses benefit from easy access to a large pool of part-time and full-time workers. Moreover, companies and agencies that depend on highly specialized skills often cluster around universities, and this may be particularly true of high-tech and information-based companies – which, despite the recent recession, still are expected to account for a disproportionately high share of future economic growth.

In addition, cultural and educational programs and facilities may be available to the general public and provide intangible benefits to the Greensboro-High Point MSA by improving residents' quality of life.



## Methodology

Estimating the economic impact of NC A&T on its regional economies involved four basic steps. First, the most recent National Center of Education Statistics (NCES) Integrated Postsecondary Education Data System (IPEDS) finance and employment data (fiscal year 2010) were obtained for NC A&T; and then these institutional expenditures were allocated to industrial sectors recognized by the economic impact modeling system. Second, spending by undergraduate, graduate, and professional students was estimated based on the IPEDS Fall Enrollment Survey and other sources; and then these expenditures were allocated to industrial sectors recognized by the economic modeling system. Third, the IMPLAN Professional Social Accounting and Impact Analysis Software (Version 3.0) and data for 2010 were used to build a regional economic model specific to NC A&T. A detailed discussion of the IMPLAN modeling system, including its structure, methods, and use, can be found in *IMPLAN Version 3.0 User's Guide* ([www.IMPLAN.com](http://www.IMPLAN.com)). Once the economic model was generated, the total economic impacts of all categories of initial spending were estimated.

The geographic areas corresponding to the regional model that were built for NC A&T, which include the labor forces directly involved in their economic spheres was based on the standard metropolitan and micropolitan statistical area definitions released by the Executive Office of the President, Office of Management and Budget on December 1, 2009. The geographic area of the regional model for each institution therefore takes into consideration population and commuting patterns.

Type SAM (Social Accounting) multipliers from the IMPLAN modeling system were used to estimate the economic impacts associated with all categories of spending. Type SAM multipliers capture the original expenditures resulting from the impact, the indirect effects of industries buying from industries, and the induced effects of household expenditures based on information in the social account matrix. The multipliers account for Social Security and income tax leakage, institutional savings, commuting, and inter-institutional transfers, and people-to-people transfers.



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Wherever appropriate, the IMPLAN software applied margins to convert purchaser prices to producer prices. In input-output models, all expenditures are in terms of producer prices. Spending therefore can be allocated to the industries that actually produce the good or service. The margins are derived from U.S. Bureau of Economic Analysis data. The margins used differed depending on the consumer. For example, households pay transportation, wholesale, and the full retail margin. In contrast, NC A&T may pay little or no retail margin as they have typically more buying power than a household. Also, some sectors of the model do not have margins. For example, because there are no wholesalers or retailers involved when someone rents a room, hotels and lodging do not have margins.

The model's default estimates of the local economy's regional purchase coefficients were used to derive the ratio of locally purchased to imported goods. The regional purchase coefficient represents the proportion of the total demands for a given commodity that is supplied by the region to itself. The regional purchase coefficients were estimated with an econometric equation that predicts local purchases based on each region's unique characteristics. In addition, the entire analysis was conducted using the full range of industrial sectors in order to avoid aggregation bias.

It should be noted that the economic models are designed to measure the total economic impact of university-related spending on its host community, but if NC A&T were to close or otherwise cease to exist, economic activity might not drop as much as the models indicate. The net drop in economic activity might be less than indicated by the models because some spending might be directed toward other activities within the region. For example, a portion of the displaced students might transfer to other colleges or universities within the region. Since it is extraordinarily difficult to predict such adjustments, the total rather than net economic impacts of university-related spending are reported. Thus, the economic impact estimates should be considered an upper bound on the true economic impact of university-related spending. This approach is consistent with the vast majority of studies of the economic impact of institutions of higher education that have been produced.

### **INITIAL SPENDING FOR WAGES AND SALARIES**

The primary data resource was IPEDS, established by the NCES. Specifically, the *Fall Staff Survey* and the *Finance Survey* provided all of the institution-level data regarding staffing and spending for wages and salaries. The most recent surveys reported staffing and expenditure levels for the 2010 fiscal year. Spending for wages & salaries and fringe benefits is reported in the first column of Table 3. This amount was allocated to various economic sectors recognized by the IMPLAN software based on the typical expenditure pattern for households of moderate income.

### **INITIAL SPENDING FOR NON-WAGE AND SALARY (OTHER) ITEMS**

In addition to expenditures for wages & salaries and fringe benefits, the IPEDS *Finance Survey* provided institution-level expenditure data for all other major categories of spending, including instruction, research, public service, academic support, student services, institutional support, operation and maintenance of plant, independent organizations, and other expenditures.

To eliminate the potential for double counting, expenditures for auxiliary enterprises, scholarships and fellowships were not included in initial spending. Spending associated with these budget items is largely accounted for in the spending amounts attributed to faculty, staff, and students. Auxiliary Enterprises are essentially self-supporting operations of the institution that exist to furnish a service to students, faculty, or staff, and that charge a fee that is directly related to, although not necessarily equal to, the cost of service. Similarly, scholarships and fellowships transfer income to students, and students' spending of these funds is reflected in the amounts attributed to students' personal expenditures.

Budgeted expenditures were allocated to various economic sectors based on a typical expenditure (consumption) pattern for US colleges and universities that was developed by the IMPLAN modelers at MIG, Inc. This specific expenditure pattern was imported into the model from the IMPLAN Pro Library. Initial spending by NC A&T for items other than wages and salaries is reported in column 1 of Table 3.

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## STUDENTS PERSONAL EXPENDITURES

The students who attend an educational institution spend significant amounts of money in the local economy as a part of their living expenses, so the dollar value of this spending also was estimated. Since a detailed survey of students' spending habits was not feasible, typical expenditure levels per student and the pattern of spending by industry were estimated based on data obtained from several sources, including: (1) various *Consumer Expenditure Surveys* that are conducted annually by the U.S. Bureau of Labor Statistics (BLS); (2) a special BLS study that appeared in the July 2001 issue of the *Monthly Labor Review* that examined the expenditures of college-age students and non-students; and (3) a nationwide (not North Carolina specific) sample of the estimated costs of attendance prepared by individual institutions. Although the estimated costs of attendance prepared by individual institutions were not detailed enough to be used in the IMPLAN modeling system, they did provide information that was used to develop a profile of average expenditures for some of the items typically purchased by undergraduates, graduate students, and professional students.

Although the Bureau of Labor Statistics' *Consumer Expenditure Surveys* cover consumer units consisting of one person at low income levels, no recent data are available expressly for college students; therefore, in order to adapt the data for this study, spending estimates for several categories of goods or services were increased, decreased, or eliminated. For example, compared to a weighted average of consumer units at lower income levels, students' expenditures for books and food consumed away from home were increased substantially, while students' expenditures for grocery stores, cash contributions, insurance and pensions, and health care were reduced. Because expenditures for vacation and travel do not take place locally, such expenditures were eliminated entirely. After adjustment, the average local expenditure per undergraduate student per academic year was estimated at \$12,720. Similarly, the average local expenditure per graduate or professional student was estimated at \$14,010. These amounts include spending for some items that were purchased locally by others (e.g., parents) on behalf of the students. For example, parents may pay landlords directly for shelter (rent). It should be noted that these amounts do not include tuition and fees. The economic

impact of economic activities supported through tuition and fees is already captured in the impact estimates attributed to spending by the institution.

Students' expenditures were distributed to the IMPLAN sectoring scheme based on national average expenditure patterns, data provided by various *Consumer Expenditure Surveys*, and estimated costs of attendance prepared by a sampling of institutions. Part-time students were assumed to spend one-half the amount of full-time students. Initial spending by students is reported in column 1 of Table 3.



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