

ECONOMIC IMPACT ANALYSIS

REPORT PREPARED
BY ECONOMIC
LEADERSHIP, LLC



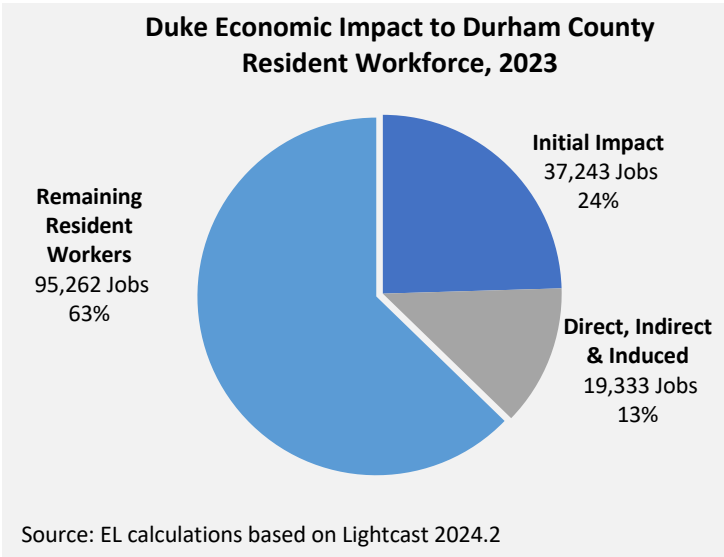
Duke

SEPTEMBER 2024

Executive Summary

Duke University engaged Economic Leadership LLC, a North Carolina-based research firm, to analyze the organization’s economic impact on the regional economy, using data from the 2023 calendar year. The analysis assessed the economic benefits of various factors, including university and health system operations, student spending, visitor spending, startup jobs, and the increased earning potential of graduates. For the purposes of this research, the regional economy was defined as Durham County. Although Duke’s impact extends beyond its home county, this report concentrates solely on its local impact.

The analysis found that in 2023, Duke University initially supported 37,243 jobs for Durham County residents, who collectively earned over \$2.8 billion. Accounting for the multiplier effect of these initial impacts, an additional 19,333 jobs and \$934 million in earnings were generated elsewhere in the county’s economy. **Thus, the total economic impact attributable to Duke in Durham County for 2023 amounted to 56,576 jobs and \$3.8 billion in earnings.** On average, for every job created by Duke’s initial impact, approximately 0.52 additional jobs were generated across the county. Payroll for the university and health system, along with the increased earnings of graduates who stay and work in the county, accounted for the largest benefits.



Total Duke Economic Impacts, 2023

Impact Type	Resident Jobs	Resident Earnings (million\$)	Durham County Sales (million\$)
Initial	37,243	\$2,817	\$10,205
Direct, Indirect & Induced	19,333	\$934	\$4,078
Total	56,576	\$3,751	\$14,283

This report highlights the earnings effects, as income is more likely to remain in the region compared to sales dollars, which can leave the region through intermediary costs and transactions. However, sales dollars still provide insight into the scale of economic activity associated with Duke. In 2023, total sales attributable to Duke were approximately \$14 billion. The report also estimated the local tax revenue impacts, revealing that **Duke’s economic activity contributed over \$18.7 million in local tax revenue for the county and city in 2023.**

Introduction

Duke University, a private institution, was founded in Durham County in 1924 when the Duke family purchased Trinity College, which had been established in Durham in 1892. Since then, the university has evolved into a globally recognized, highly prestigious institution, consistently ranked among the best in the world. Beyond education, Duke conducts research across a wide array of fields. Recent rankings place Duke among the top ten U.S. universities for research expenditures. With cutting-edge laboratories, interdisciplinary collaboration, and a supportive research environment, Duke fosters groundbreaking discoveries that push the frontiers of knowledge and contribute significantly to business and society.

Complementing its academic and research excellence, Duke is also home to a comprehensive healthcare system. Duke Health operates a network of hospitals, outpatient facilities, and specialized care centers throughout the Triangle region. In this report, “Duke” will refer to all its operations, including the university, research, and health system. If impacts relate specifically to one of these aspects, they will be denoted in the text.

Today, Duke University and Duke Health encompass an 1097-acre campus in Durham County, including an additional 1542 acres of forest that comprise Duke Forest. Over the past 15 years, the university has experienced a remarkable transformation, with significant increases in campus size and enrollment. Duke is home to ten academic schools and ten institutes and centers. In 2023, the university had 6,488 undergraduate students and 10,624 graduate or professional degree students.

Duke University engaged Economic Leadership LLC, a North Carolina-based research firm, to analyze the organization’s economic impact on the local economy using data from the calendar year 2023. The analysis assessed the economic benefits of various factors, including university and health system operations, student spending, visitor spending, startup jobs, and several other impacts. For this research, the regional economy was defined as Durham County. While Duke’s impact extends beyond its home county, this report focuses on the local impact. It highlights the quantifiable impacts listed below and discusses the quantitative benefits Duke provides to the region. An in-depth description of the report’s methodology is provided in the appendix.

Types of Quantitative Impacts

- Payroll Impacts
- Local Vendor Spending
- Student Spending
- Start-Up Impacts
- Visitor Spending at Events
- Volunteering & Donations
- Graduate Contribution

Duke Payroll Impacts

The main driver of Duke's economic impact in Durham County is its role as an employer. Across all its operations - university, healthcare, research, and more - the organization employs over 57,000 workers. Duke provided researchers with specific data on payroll and worker earnings for both its full and part time workforce. According to Duke's records for 2023, the total payroll for the entire Duke workforce was over \$4 billion in 2023.

Duke Employment Totals, 2023

Impact Type	Full-Time	Part-Time	Total Jobs
University Staff	17,745	3,008	20,753
Student Workers	--	9,305	9,305
Health System	16,011	10,957	26,968
Total	33,756	23,270	57,026

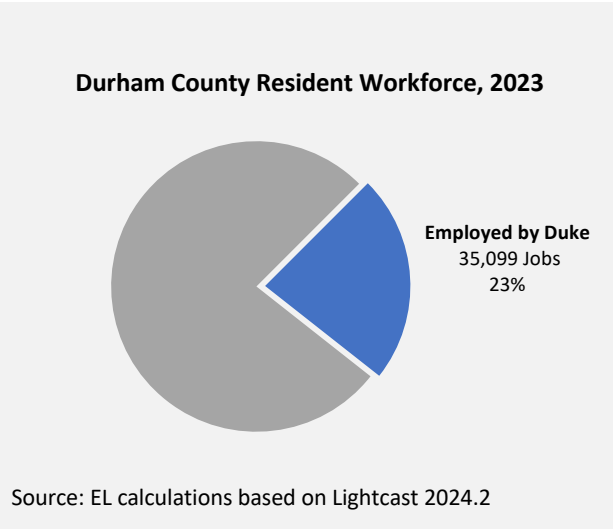
According to Duke's employment records, 62.4 percent of the workforce resides in Durham County, and this metric was used to estimate the resident jobs for the payroll impacts and many other impacts studied in this report. Removing the workers who reside outside of the county helps focus only on the local impacts. Resident workers are more likely to stimulate economic activity in the county by purchasing local goods, using local services, and contribute to the tax base.

When the non-resident jobs are filtered out, this results in about 35,099 resident jobs in Durham County from Duke's payroll. These Duke employees living in Durham County earned almost \$2.5 billion in 2023.

Duke Resident Employment and Payroll in Durham County

Impact Type	Resident Jobs	Resident Earnings (million\$)
University	18,271	\$1,053
Health System	16,828	\$1,431
Total	35,099	\$2,484

Data from Lightcast shows there were about 151,840 Durham County residents who were employed in 2023. Duke’s resident jobs (35,099) accounted for 23 percent of the total workers in the county.



Jobs at the university account for more than half of Duke’s resident jobs. These jobs include professors, researchers, administration staff, facilities managers, and many others.

In 2023, the average non-student worker employed by Duke University earned about \$80,860 per year. This average wage is higher than both the national average of \$72,400 and the state average of \$65,600.¹ The jobs, earnings, and sales multipliers from the Colleges, Universities, and Professional School industry were applied to these initial impacts.

Through supply chain and income effects, Duke University’s operations create or support another 8,076 jobs in the county. The total impacts in Durham County from the university operations are 26,347 resident jobs and \$1.3 billion in earnings in 2023.

Duke University Payroll Economic Impacts, 2023

Impact Type	Resident Jobs	Resident Earnings (million\$)	Durham County Sales (million\$)
Initial	18,271	\$1,053	\$4,414
Direct, Indirect & Induced	8,076	\$265	\$1,680
Total	26,347	\$1,317	\$6,095

The same analysis was done for the resident jobs from Duke’s health system. Workers in the health system average slightly higher than the university wages at \$85,020 per year. The industry multipliers used for the health system, General Medical and Surgical Hospitals, were also higher than the multipliers used for the university payroll impacts. This results in higher payroll and sales impacts for the health system. In total, the health system creates or supports another 9,331 jobs in the county resulting in a total impact of 26,159 jobs. These workers earned almost \$2 billion in wages in 2023.

Duke Health Payroll Economic Impacts, 2023

Impact Type	Resident Jobs	Resident Earnings (million\$)	Durham County Sales (million\$)
Initial	16,828	\$1,431	\$4,507
Direct, Indirect & Induced	9,331	\$525	\$1,919
Total	26,159	\$1,956	\$6,426

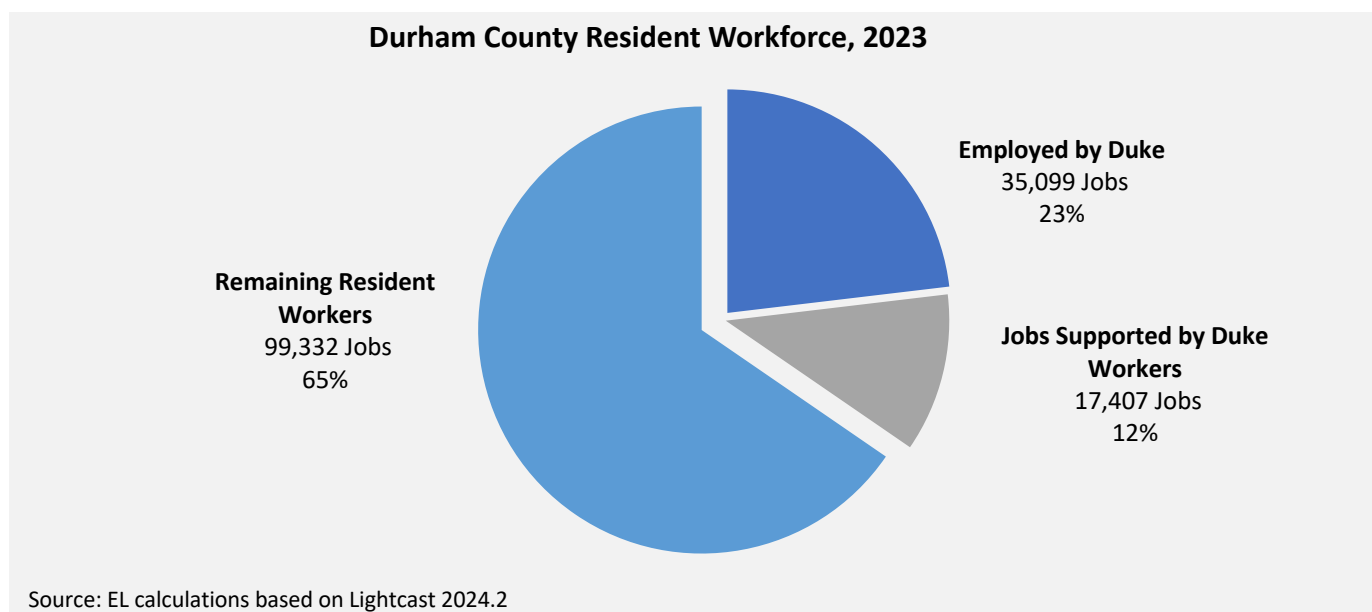
¹ Bureau of Labor Statistics, Quarterly Census of Employment and Wages
© 2024 Duke University

When the university and health system impacts are combined, the full impact of Duke as an employer in the region can be assessed. The 35,099 jobs at Duke filled by Durham County residents create or support another 17,407 resident jobs in the county. **The total economic impact from Duke's payroll is 52,506 resident workers and \$3.3 billion in wages.**

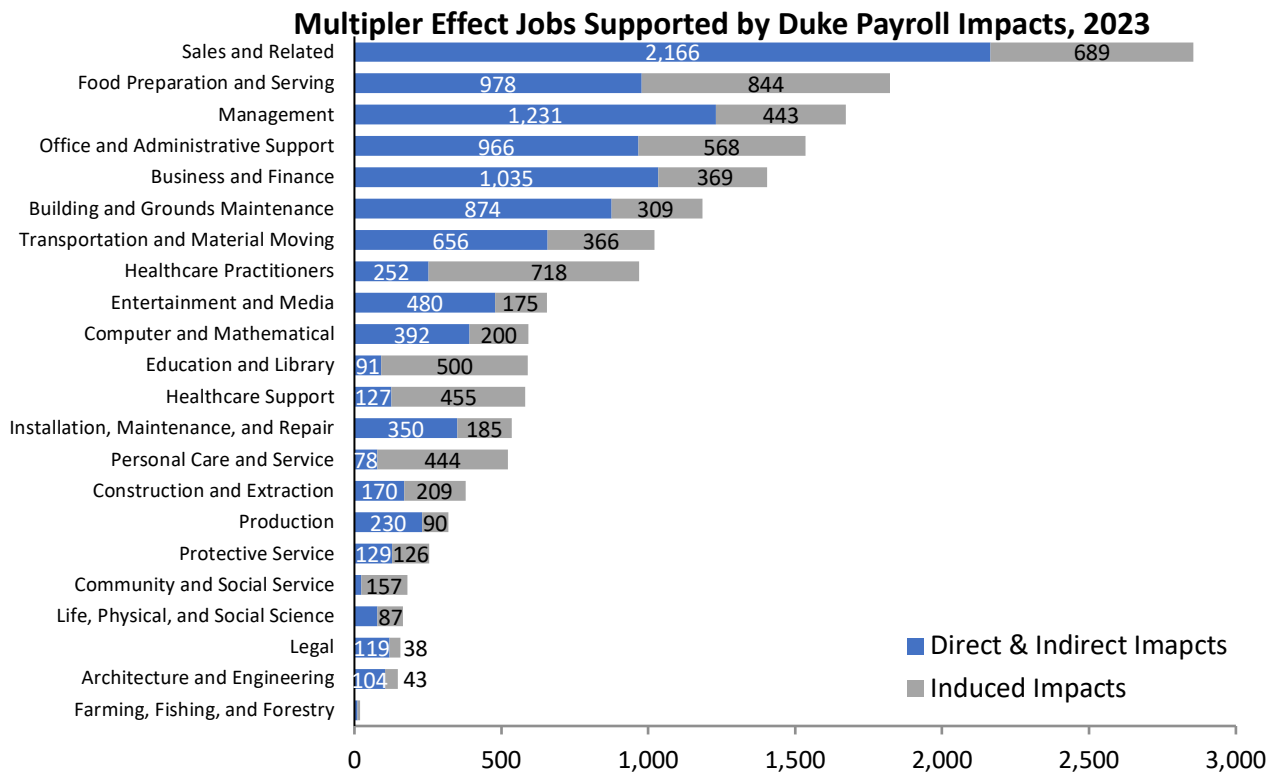
Duke Combined Payroll Economic Impacts, 2023 (University and Health System)

Impact Type	Resident Jobs	Resident Earnings (million\$)	Durham County Sales (million\$)
Initial	35,099	\$2,484	\$8,921
Direct, Indirect & Induced	17,407	\$790	\$3,600
Total	52,506	\$3,274	\$12,521

This means that for every worker employed by Duke that resides in Durham County, another .5 resident jobs are created or supported. This combined payroll impact accounts for 35 percent of Durham County's workforce. This is only the impact from Duke's payroll, this does not include other benefits that are being studied later in this report such as student spending, visitor spending, startups, and more.



The following chart provides deeper context of the types of jobs within the 17,407-multiplier effect employment figure. The jobs in blue reflect the supply chain impacts (direct and indirect) and the green jobs reflect the jobs created or supported by Duke employees spending their wages in the local economy (induced effects). Sales and related occupations are the group with the highest number of multiplier effect jobs. The top jobs within this group include real estate agents and brokers, insurance agents, cashiers, and retail salespersons. Management, business and finance, and healthcare practitioners' occupations are among the top groups of multiplier effect jobs. These occupations also garner above average annual wages.



Local Vendor Spending Impacts

Most of Duke’s operational economic impact comes through its extensive payroll. However, the organization also conducts some of its necessary operations through vendors. Duke provided detailed vendor spending data, highlighting the money paid to Durham County vendors. This operational impact includes construction, external research partnerships, and more. In 2023, Duke paid \$233 million to local vendors in the county.

Duke Local Vendor Spending in Durham County

Vendor Type	Duke Spending (million\$)
Construction	\$49.2
Research	\$16.5
Other Vendors	\$167.1
Total	\$232.8

This spending by Duke created and supported about 777 initial jobs in the county. However, like Duke’s employment metrics, only 62 percent of these jobs were assumed to be filled by residents of Durham County. This results in 485 initial resident jobs in Durham County, with earnings totaling 51.9 million in earnings in 2023. Once the multipliers are applied to these respectively industries another 253 jobs and

\$19.4 million in earnings are added to the Durham County economy. **The total impact of Duke's local vendor spending is the creation and support of 738 resident jobs across the region, generating \$71.3 million in income.**

Local Vendor Spending Economic Impacts, 2023

Impact Type	Resident Jobs	Resident Earnings (million\$)	Durham County Sales (million\$)
Initial	485	\$51.9	\$232.8
Direct, Indirect & Induced	253	\$19.4	\$80.5
Total	738	\$71.3	\$313.4

Student Spending Impacts

The money spent by Duke University students in the regional economy also generates significant economic activity. Students frequent local eating establishments and entertainment venues, and those who live off-campus help sustain the local rental market. For an economic impact analysis, it is crucial to attribute the spending only to students who are in the region solely because of Duke University. Students who attend the university from outside the region count as local spending generated by Duke. In 2023, about 96 percent of undergraduate students and 68 percent of graduate/professional degree students came to the university from outside of Durham County, according to Duke's records. Duke University also helps retain local students in the area. It is assumed that 50 percent of local undergraduate students and 15 percent of local graduate/professional degree students would have left the region if not for Duke's local presence. The remaining local students are assumed to have been in the region regardless of attending Duke and were already spending money throughout the economy already.

Only the spending from these out-of-region and retained local students is included in the economic impacts. About 62 percent of the relocated graduate/professional degree students were estimated to be living within Durham County. The graduate students estimated to be living outside of Durham County were not included as much of their spending would occur in the county they reside. Based on these assumptions, approximately 11,410 students out of the total 17,100 students in 2023 were in the region because of Duke University.

Spending Per Duke Student, 2023

Spending Type	Off-Campus	On-Campus
Housing	\$13,480	\$0
Utilities	\$1,970	\$0
Grocery	\$3,890	\$580
Restaurant	\$3,890	\$580
Transportation	\$4,740	\$710
Other	\$1,730	\$260
Total Per Student	\$29,700	\$2,130

Student spending was assumed to vary based on whether a student was living on or off campus. On-campus expenditures, such as residence halls and cafeteria spending, are captured in the university operations impacts of the analysis. According to records provided by Duke, 84 percent of undergraduate students lived on campus in 2023, while all graduate and professional degree students lived off campus.

Off-campus spending was estimated using The Council for Community and Economic Research (C2ER) cost of living data for city of Durham. Adjustments were made to some of the C2ER figures to account for students likely sharing housing and utilities costs with roommates. The assumption of \$29,700 for off-campus spending is well below the Durham city average renter spending of \$56,700. On-campus students were estimated to spend 15 percent of the off-campus expenditure amount on groceries, dining out, and transportation. Additionally, the payroll paid by Duke to students was deducted from student spending total to avoid double counting in the payroll impact analysis.

Under these assumptions, students brought to the region and local students retained by Duke University spent \$146 million in Durham County in 2023. This initial sales spending supported 589 resident jobs and generated \$26 million in earnings. This spending rippled through the county, creating an additional 251 resident jobs and another \$16 million in income. **The total economic impact of university student spending in Durham County was 840 jobs and \$42 million in income.**

Student Spending Economic Impacts, 2023

Impact Type	Resident Jobs	Resident Earnings (million\$)	Durham County Sales (million\$)
Initial	589	\$26.1	\$146.4
Direct, Indirect & Induced	251	\$16.1	\$67.9
Total	840	\$42.2	\$214.3

Startup Impacts

Another way universities can impact a local economy is by generating new technologies and ideas that lead to the formation of new businesses. If these startups establish their operations locally, they can significantly stimulate economic growth. In 2023 alone, 15 startups were formed from the university. Duke Capital Partners, the venture firm led by Duke, also invests in some of these startups. In 2023, the firm invested \$10.8 million in venture capital deals. Currently, there are a total 139 active startups that originated from Duke University. According to Duke's records, about 66 percent of these startups are in North Carolina. Duke's data also estimates that the average number of employees for these North Carolina-based startups is 16.9 workers.

To determine the number of startups located specifically in Durham County, it was assumed that 62 percent of North Carolina-based startups are based in the county. This assumption resulted in 57 startups, employing 967 workers in the county. Under these assumptions, these startups added \$286 million in sales to Durham County's economy in 2023.

Additionally, it was assumed that, like the broader Duke organization, about 62 percent of these workers reside in Durham County. This results in 604 resident jobs being supported in the local economy because of Duke's research and entrepreneurial ecosystem. The earnings and sales data for these jobs were generated using the regional average across all industries. Once the multiplier effect is accounted for, **the total local economic impact of Duke startups is 926 resident jobs created and \$84.5 million in new earnings.**

Startup Economic Impacts, 2023

Impact Type	Resident Jobs	Resident Earnings (million\$)	Durham County Sales (million\$)
Initial	604	\$59.8	\$286.2
Direct, Indirect & Induced	323	\$24.7	\$100.9
Total	926	\$84.5	\$387.2

Volunteering & Donations Impact

Another way that Duke positively impacts the local region is through supporting local nonprofits through financial donations and volunteering. In 2023, Duke donated \$10.1 million to local nonprofits in Durham County. These donations help nonprofits hire staff and fund their operations. Duke also acts as a connector, helping alumni, staff, and students find ways to give back to the community by volunteering with nonprofit organizations. Although Duke is still formalizing its methods for categorizing all its volunteer efforts, it provided the available data on volunteering conducted by students, staff, departments, and alumni. This data likely does not fully reflect all the volunteering done through the Duke organization.

Duke recorded approximately 7,090 volunteers in 2023. Using the national average of hours committed per volunteer², a total of 478,960 service hours was estimated. Considering that Duke's volunteer efforts focus on the local community, but also include regional and global programs, it was assumed that about 62 percent of the volunteer hours were conducted in Durham.

These 298,870 local service hours were estimated to bring the equivalent of \$9.5 million in economic activity.³ This figure serves as the initial sales figure used to estimate the economic impact. However, only the multiplier effects are included in the impacts, as volunteering by nature does not create jobs or wages. The next tier of impacts is supported by making existing nonprofit jobs in the region more productive. **These volunteering impacts combined with the impact of Duke's nonprofit donations have an economic impact in Durham County of 110 resident jobs created or supported and \$5.3 million in earnings.**

² US Census Bureau

³ Independent Sector

Volunteering & Donations Economic Impacts, 2023

Impact Type	Resident Jobs	Resident Earnings (million\$)	Durham County Sales (million\$)
Initial	80	\$3.3	\$10.1
Direct, Indirect & Induced	29	\$2.0	\$7.6
Total	110	\$5.3	\$17.7

Visitor Spending Impacts

Duke University hosts numerous events for the greater community, including athletic events, guest speakers, art festivals, and parents' weekend, among others. These visitors generate travel and tourism spending in the regional economy. To qualify this spending as attributable to Duke, local residents are excluded from the calculation. This exclusion assumes that local residents would already be spending their money elsewhere in the Durham County economy if they were not attending Duke's events.

Duke provided data on event attendance for sports, alumni, and arts programs. By scanning ticket barcodes, specific data on each attendee's zip code was available, allowing the identification of how many attendees came from outside the county and the state.

Outside of specific events, visitors come to tour Duke's campus or come from out of the region to receive medical care from Duke's health system. This visitation likely has a large impact on the local economy, but it is much harder to quantify and track. Therefore, in the absence of data for general campus and hospital visitors, they were not included in the estimation of visitor spending impacts.

Duke Event Attendance, 2023

Event Type	Alumni	Sports	Arts
Number of Events	87	166	797
Total Attendees	10,070	340,715	176,000

Once the Durham zip codes were removed from the attendance data, it was assumed that visitors from within North Carolina made day trips, while those traveling from outside the state stayed overnight. It was assumed that each overnight visit was for two days. Durham city travel averages were used to estimate spending for each visitor⁴.

Duke Out of Region Visitors, 2023

Alumni	Sports	Arts
8,560	264,320	155,940

⁴ Budget Your Trip

It's likely that some portion of event visitors used air travel to attend these events. However, there was no reliable way to determine which visitors flew versus drove. The nearest airport is regionally owned and managed, making it difficult to determine the benefits specific to Durham County. Therefore, airfare spending was not included in this analysis, reflecting the conservative approach of this report.

Spending Per Duke Event Visitor Per Trip

Spending Type	Day	Overnight
Hotel	\$0	\$183*
Food	\$44	\$88
Local Transport	\$33	\$66
Other	\$43	\$86

* This is the average accommodation cost in Durham County per person for two nights, it was assumed that two visitors split one hotel room

For this visitor spending analysis, Lightcast's regional economic data was used to estimate the amount of spending in each category captured within the county. For example, it was estimated that 75 percent of the money spent by visitors on restaurants was spent within Durham County, with the remaining 25 percent assumed to leak outside the region. The small portion of hotel rooms in Durham County that are owned and operated by Duke were also removed from the hotel impacts to avoid double counting impacts as the employment for these hotels are captured in the payroll section of this report. The three hotels that are operated by Duke account for 8 percent of the total hotel rooms in Durham County.

Duke's out-of-region visitors generated approximately \$81.3 million in sales through their local spending in 2023. This spending supported about 386 resident jobs and resulted in \$16 million in increased income. As the tourism spending trickled through the economy, an additional 119 resident jobs and \$8.8 million in earnings were added. **The total economic impact of visitors to Duke in 2023 was 505 jobs and \$25 million in earnings created and supported for Durham County residents.**

Visitor Spending Economic Impacts, 2023

Impact Type	Resident Jobs	Resident Earnings (million\$)	Durham County Sales (million\$)
Initial	386	\$15.9	\$81.3
Direct, Indirect & Induced	119	\$8.8	\$35.7
Total	505	\$24.7	\$117.0

Graduate Contribution Impacts

Each year, Duke University graduates students with bachelor’s, graduate, and professional degrees, significantly increasing their earning potential. The increased earnings of students who remain in the region have a substantial economic impact on the regional economy. Based on median earnings data for Durham County, a graduate with a bachelor’s degree can earn \$31,850 more annually than someone with an associate degree or technical certification.

Durham County Earnings by Entry Level Education Requirement, 2023

Education Attainment Required for Occupation	Median Earnings	Increase from Lower Level of Attainment
Advanced Degree	\$109,000	\$26,800
Bachelor’s	\$82,200	\$31,850
Associate’s/ Certification	\$50,350	\$12,050
High School Diploma or Less	\$38,300	--

Source: EL calculations based on Lightcast 2024.2

To determine the increased earnings in Durham County attributable to Duke graduates, Duke provided data on the number of alumni by degree type who are living in Durham County. It was assumed that some of these alumni might be retired or not working for other reasons. The county employment-to-population ratio⁵ was used to estimate the number of local alumni who were employed. To avoid duplication, the number of resident jobs from Duke startups was removed in case local alumni were working for Duke spinoff startups. Additionally, a portion of local alumni was removed to account for those potentially working for the Duke organization, as their earnings would already be captured in the payroll impacts.

Finally, the earnings increase garnered by Duke graduates was offset by the median annual debt payments calculated for Duke students.⁶ This adjustment provides data on the net increase in earnings for these workers attributable to the education received at Duke. The result is a net increase of \$176 million in resident earnings in 2023. Additionally, the advanced education of these workers stimulates a higher level of productivity in the economy compared to if they were filling jobs with lower educational requirements, an estimated increase in sales of \$527 million. There is no initial increase in employment, as it was assumed these workers would be employed, but in lower-paying jobs.

The contribution of Duke graduates to the Durham County economy had a total impact of 951 resident jobs and \$249 million in earnings.

⁵ US Census Bureau, 5-Year American Community Survey

⁶ US News & World Report

Duke Graduate Contribution Economic Impacts, 2023

Impact Type	Resident Jobs	Resident Earnings (million\$)	Durham County Sales (million\$)
Initial	--	\$176.4	\$526.6
Direct, Indirect & Induced	951	\$72.8	\$185.7
Total	951	\$249.2	\$712.3

Total Economic Impacts

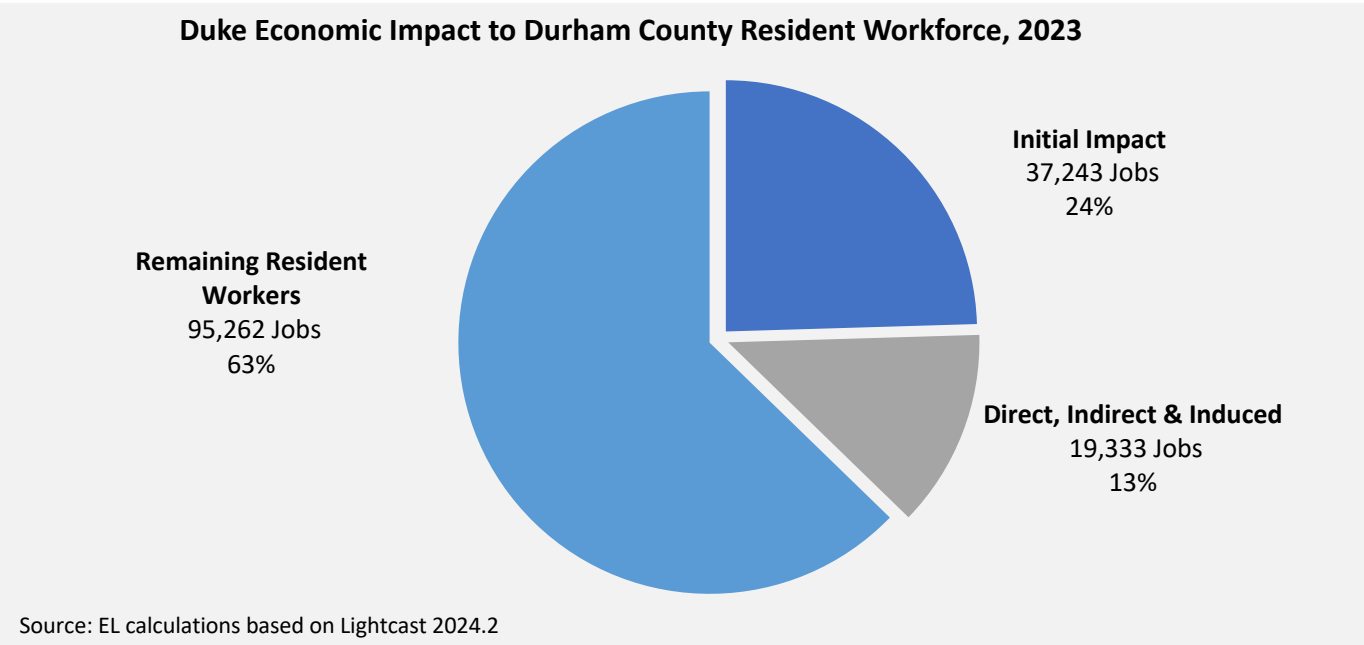
When all the different types of economic activity attributable to Duke are combined, the total economic benefit to Durham County can be estimated. The analysis found that the economic impacts initially related to the presence of Duke support 37,243 resident jobs and \$2.8 billion in annual income for these residents. When the secondary impacts are considered using the multipliers detailed in the methodology (see appendix), an additional 19,333 resident jobs and \$934 million in earnings are generated elsewhere in the county.

The total economic impact of Duke on the region in 2023 is estimated at 56,576 jobs and \$3.8 billion in earnings. Additionally, Duke creates and supports over \$14 billion in sales across the region.

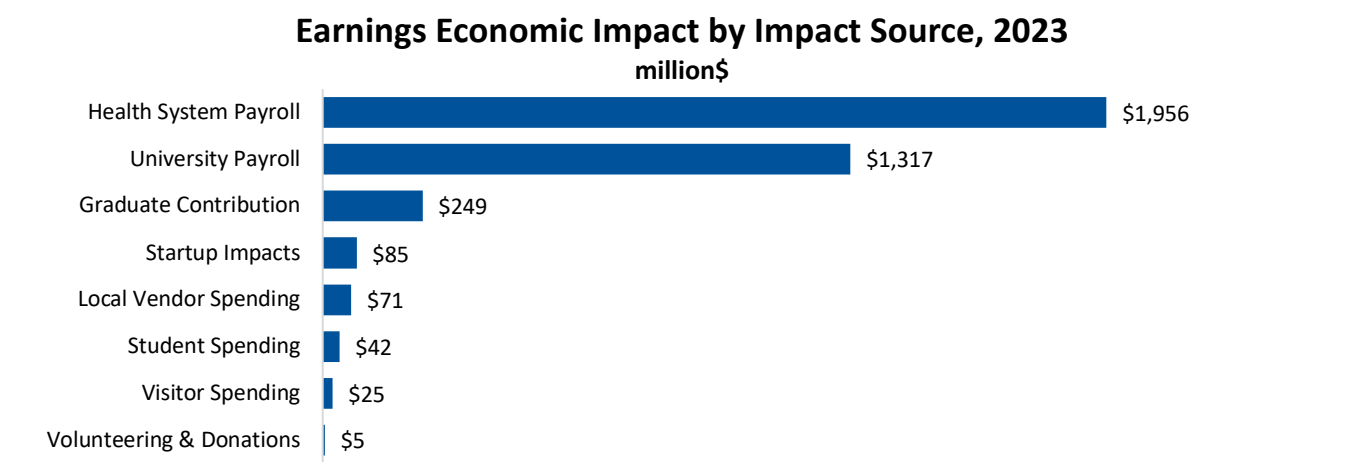
Total Duke Economic Impacts, 2023

Impact Type	Resident Jobs	Resident Earnings (million\$)	Durham County Sales (million\$)
Initial	37,243	\$2,817	\$10,205
Direct, Indirect & Induced	19,333	\$934	\$4,078
Total	56,576	\$3,751	\$14,283

On average, for every resident job created from Duke's initial impact, about 0.52 additional jobs are created across the county. This means for every 2 resident jobs initially spurred by Duke, another job is created or supported by the multiplier effect in Durham County. The total resident job impact associated with Duke represents approximately 37 percent of all resident workers within Durham County.



Duke’s payroll spending accounted for the majority of the economic impacts. The health system had the biggest impact with almost \$2.0 billion of the total \$3.8 billion in earnings (approximately 52 percent) are attributable to the health system’s impact. The payroll associated with the university and its impacts generated about \$1.3 billion, or 35 percent of the total impact. Increased earnings and contributions to the local economy by Duke graduates were the next highest contributors, accounting for almost 7 percent of the total earnings impact on the regional economy.



Tax Revenue Impacts

As a nonprofit entity, Duke is exempt from several forms of taxation. However, this exemption does not apply to all forms of taxation. In addition to the direct taxes Duke pays, the economic activity generated by Duke also generates revenue in the form of sales, vehicle rental, and occupancy taxes. Duke provided data on the property taxes paid on buildings they own and the property tax generated through the properties they rent across Durham County. In total, this resulted in about \$5.6 million generated for the

county and another \$4.2 million for the City of Durham in 2023. Additionally, Duke paid \$4 million into the county's fire and emergency medical service (EMS) in 2023.

Local Tax Revenue Impacts, 2023

Tax Type	Durham County	City of Durham
Property Tax	\$5,550,000	\$4,150,000
Direct Fire/EMS Payments	\$4,000,000	
Sales Tax	\$2,680,000	
Occupancy Tax	\$2,320,000	
Total Tax Revenue	\$14,550,000	\$4,150,000

Another source of tax revenue attributed to Duke is from spending by students and event attendees. The student and visitor spending estimated in this report was used to estimate county sales and occupancy taxes attributable to Duke. This economic activity prompted by Duke is estimated to have added \$2.7 million in sales tax revenue and another \$2.3 million in occupancy tax revenue to the county's coffers. A portion of the occupancy tax impact comes directly from Duke as the three hotels operated by the organization pay this tax to the county. **This results in a total local tax revenue of \$18.7 million in 2023 attributable to Duke.**

There are likely many other vectors for local tax revenue generation attributable to Duke that are difficult to estimate and, therefore, not included in this section. For example, a startup spun off from Duke technology might pay property taxes on a building they own or host a conference every year that brings in several out-of-region visitors. The general campus and hospital visitors that were not included in the visitor spending of this report also generate tax income through sales and occupancy tax. Thus, the local tax estimate in this report likely represents only a portion of the tax revenue that could be ascribed to Duke.

In addition to the local taxes paid by Duke, the organization also self-funds many of its own critical services. This includes funding and operating its own water and sewer system, police force, and fire safety group. Duke invests \$10 million annually for its water and sewer system. In recent years, the organization spent another \$300 million in infrastructure improvements for this system. Duke also spends about \$19 million annually for its own sworn police coverage and another \$2.2 million for its fire safety operation. By funding its own public safety and infrastructure needs, Duke does not require these needs from the local government and frees these public operations to focus their efforts on other parts of the county and city.

Other Potential Benefits

This report focuses on the quantifiable impacts of Duke on Durham County; however, there are several other potential benefits that are more difficult to measure but can have a significant impact on the community and the economy. These include:

Private Funding

Duke University is a privately funded institution. Since the public is not supporting Duke with state tax dollars, the economic benefits do not need to be offset by public funding, as is often the case in economic impact studies for publicly funded universities. Therefore, Durham residents experience a positive economic impact from Duke without having to contribute via taxation.

Branding Impacts

Duke enhances the image of Durham, NC, and supports the region's brand, particularly for those outside of North Carolina and the Southeast. Nationally televised basketball games and researchers quoted in national news stories help create awareness and promote the region. When a worker considers a job posting in Durham, NC, the strong brand of Duke can make the worker more willing to relocate to the area.

Economic Development impacts

The presence of a prestigious local university and health system is a significant asset to a community when businesses are considering where to relocate or expand their operations. Duke can provide workforce development, research, healthcare, and more to local companies. While it is difficult to determine exactly how many companies have chosen Durham County based on the presence of Duke, it is likely a significant factor in the location decisions of current and future companies.

Community Impacts

Duke serves as a communal social and cultural hub for the community, fostering more volunteering than might otherwise occur. University events can bring diverse groups together, promoting cohesion. Increased access to the arts through Duke might inspire residents to engage in creative projects, such as painting murals in other parts of town. Duke has also contributed to the revitalization of neighborhoods, which can promote economic growth, reduce crime, and enhance public services. There are many ways Duke positively affects the community that are not easily quantified in economic terms.

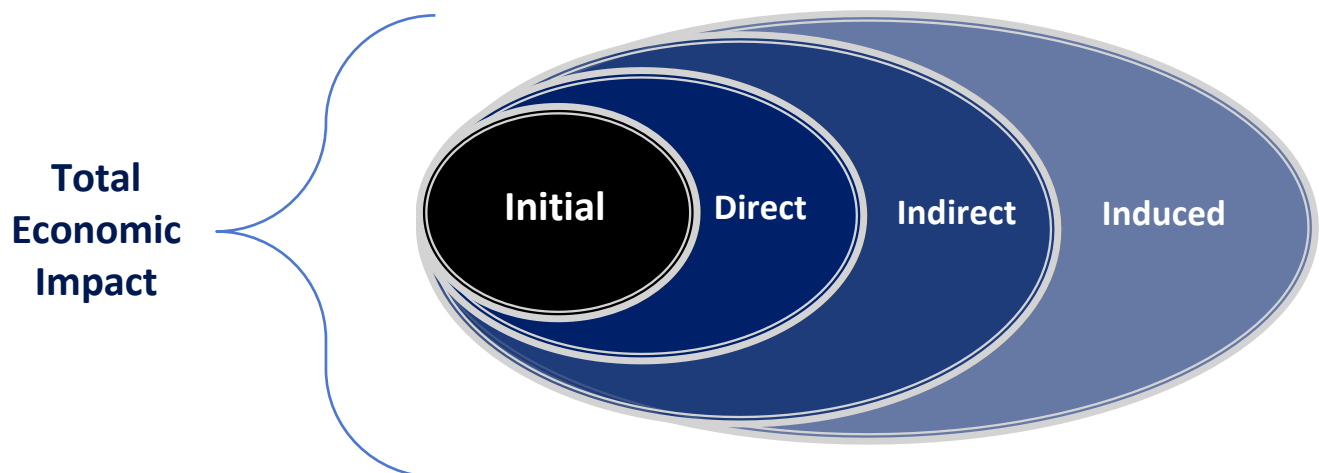
This report was written by Skylar Elliott Casey of Economic Leadership LLC in the fall of 2024.

Appendix: Economic Impacts Methodology

Economic activity is known to ripple beyond an initial transaction. In addition to Duke's direct spending in the local economy, it also generates supply-chain impacts. When Duke pays a regional supplier, and that company subsequently makes additional purchases from local suppliers, this stimulates further economic growth in the region. This phenomenon in regional economies is referred to as the multiplier effect.

Multipliers are specific values that measure the ripple or secondary effect of how changes in one industry can influence the broader economy. For this analysis, Economic Leadership LLC utilized multipliers from Lightcast's licensed software. Lightcast is a labor market data company that produces a social accounting matrix to determine the linkages in purchasing patterns between different sectors of the economy. From this matrix, Lightcast creates an input/output model to calculate the final equilibrium impacts of a change in a regional economy. The Lightcast input/output model identifies four types of multiplying effects:

1. **Initial** – This represents the jobs, revenues, and earnings directly related to the Duke's operations, tourism, or property value impacts.
2. **Direct** – These impacts are the first round of effects on the industry's supply chain due to new input purchases required by Duke.
3. **Indirect** – These impacts reflect the second round of activity when the supply chains stimulate sales within their own supply chains.
4. **Induced** – These impacts result from increased earnings and subsequent further spending throughout the economy.



For example, students at Duke University come from outside the region and spend money while pursuing their studies. If a student spends money on an off-campus apartment, the money paid to the landlord represents an *initial* impact to the regional economy. If the landlord then purchases an HVAC unit from a regional supplier, that would be a *direct* impact. If the HVAC supplier, now with increased revenue, hires an accounting firm, the revenue received by the accounting firm would be an *indirect* impact. The increase in local spending by all these employees, due to their new or increased earnings, represents the *induced* impacts. All these impacts are attributable to Duke for recruiting out-of-region students to the area.

College, Universities, and Professional Schools Regional Industry Multipliers

Multiplier Effect Type	Sales	Earnings	Jobs
Initial	1.00	1.00	1.00
Direct	0.14	0.10	0.17
Indirect	0.05	0.03	0.06
Induced	0.19	0.12	0.21
Total	1.38	1.25	1.44

Source: Lightcast 2024.2

The multipliers generated by Lightcast for Durham County quantify each of these economic impacts. According to these multipliers, creating 100 jobs at a private university in Durham County results in 17 jobs in the direct supply chain, 6 jobs in the indirect supply chain, and 21 jobs from the wages those employees spend in the county. This amounts to 44 additional jobs created, bringing the total impact to 144 jobs in the county.

Durham County Regional Industry Multipliers

Industry	Sales	Earnings	Jobs
Colleges, Universities, and Professional Schools	1.38	1.25	1.44
General Medical and Surgical Hospitals	1.43	1.37	1.55
Research & Development	1.43	1.46	1.98
Commercial and Institutional Building Construction	1.29	1.24	1.38
Hotels (except Casino Hotels) and Motels	1.46	1.61	1.32
Full-Service Restaurants	1.42	1.44	1.19
All Industry Average	1.35	1.41	1.53

Source: Lightcast 2024.2

The table above displays the job multipliers from Durham County across various industry categories used in this study. These multipliers are based on 2023 economic conditions in the county and illustrate how changes in different industries can have varying levels of impact. For example, the institutional building construction sector has a job multiplier of 1.38, meaning that adding one job in this industry can create or support 0.38 jobs elsewhere in the county. In contrast, research and development firms have a higher multiplying effect, with a job multiplier of 1.98. Higher wages are often an indicator of which industries have the highest multiplying effect, as greater earnings lead to increased regional spending and, consequently, a higher induced impact. When the impact is expected to spread across various industries, the average multiplier across all industries is used.

This study focuses on measuring the economic impact of Duke University for the calendar year 2023. The initial impact analysis was based on data provided by Duke staff on enrollment, payroll, event attendance, and other factors. In cases where sales, jobs, or earnings data were unavailable, ratios derived from Lightcast data on average sales per worker and earnings per worker were used to produce estimates. Earnings data from Lightcast includes both wages and benefits. This report emphasizes the earnings effects, as income is more likely to remain in the region compared to sales dollars, which can leave the region through intermediary costs and transactions.

Since this study focuses on the local impacts to Durham County, the report concentrates solely on the jobs and earnings of Durham County residents. Duke is a major regional employer, and many of its employees commute from outside the county. Consequently, their earnings are likely spent outside Durham County, and these workers are excluded from the impact analysis. An economic impact analysis with a different geographic scope would yield different results. The sales data reported in this analysis reflects sales within the county, regardless of whether the employee resides in Durham County.

The researchers prioritized rational but conservative assumptions when specific data from Duke was unavailable. Some potential impacts were excluded to avoid overcounting, with the goal of erring on the side of undercounting rather than overstating the organization's benefits. The follow charts highlight the data and assumptions used for calculating the initial impacts in the report. Many of these assumptions were provided specifically by Duke or from 3rd party data.

Duke Payroll Assumptions

Metric	Value
% of Employees Living Outside Durham County	62%

Student Spending Assumptions

Metric	Undergraduate	Graduate/ Professional
% of Students from Outside of Durham County	96%	68%
% of Local Students Retained because of Duke	50%	15%
% of Undergraduate Students Living on Campus	84%	
% of Relocated Grad/Prof Students Living in Durham County		62%

Volunteering & Donations Assumptions

Metric	Value
Average Annual Hours Per Volunteer	67.5
% of Volunteer Hours Conducted in Durham County	62%
NC Value of a Volunteer Hour	\$31.64

Visitor Spending Assumptions

Metric	Alumni	Sports	Arts
Percentage of Attendees from Outside of Durham County	85%	78%	89%
Percent of Out-Of-Region Travelers Staying Overnight	59%	51%	50%

Graduate Contributions Assumptions

Metric	Value
Durham County Resident Alumni Working	88%
Duke % of All Jobs in Durham County	18%
Median Annual Debt Payment Undergraduate	\$1,670
Median Annual Debt Payment Graduate/Prof	\$8,760

Sources

Budget Your Trip. 2024 “How Much Does It Cost to Travel to Durham?”

<https://www.budgetyourtrip.com/united-states-of-america/durham>

Bureau of Labor Statistics. 2024. “Quarterly Census of Employment and Wages.”

<https://www.bls.gov/cew>

Council for Community and Economic Research (C2ER). 2024. “Cost of Living Index.” <http://coli.org/>

Independent Sector. 2024. “Value of Volunteer Time by State.” https://independentsector.org/wp-content/uploads/2024/04/is-vovt-report-all-years_v2-1.pdf

Lightcast. Developer Tool: Class of Worker 2024.2. <https://e.economicmodeling.com/analyst>

US Census Bureau. 2024. “American Community Survey: ACS 5-Year Estimates.” Accessed through data.census.gov

US News & World Report. “Duke University Tuition, Cost & Financial Aid.”

<https://www.usnews.com/best-colleges/duke-university-2920/paying>