



The Economic Impact of Lincoln Memorial University on the State & Regional Economies

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on the State and Regional Economies**

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The Economic Impact of Lincoln Memorial University on the State and Regional Economies

EXECUTIVE SUMMARY

Everyone is aware that Lincoln Memorial University (LMU) provides an outstanding quality educational program to its students. However, many are not aware of the huge economic contributions that LMU makes to the State of Tennessee and to its primary impact region. The objective of this study was to measure the economic contributions that LMU provides to the state and region. The economic contributions are measured in employment, income (wages, salaries, and benefits) and retail sales.

The University creates economic impacts from four different activities. These include activities from (1) operations, (2) construction projects, (3) student non-university spending, and (4) visitor spending. The annual operations of the University involve the number of employees and the resulting wages, salaries, and benefits paid. In FY 2011, the University had 638 full- and part-time employees and a payroll of over \$34.5 million.

Construction impacts occur only during the year the construction activity occurs. In FY 2011, the University had over \$11.5 million in construction projects. This generates 98 full and part-time jobs and almost \$3.8 million in payroll.

Students spend money off campus for such items as housing, food, gasoline, entertainment, etc. It is estimated that students spend annually \$42.1 million. This creates 360 full or part-time jobs and \$16.5 million in payroll. Finally, visitors come to the campus and spend money in the region while visiting the campus. This was estimated at \$4.6 million in FY 2011. These expenditures created 74 full and part-time jobs with a payroll of over \$1.9 million.

Using a computer program developed specifically to measure the economic impact of the university, the study not only measured the direct economic contribution of the activities of the

University, but also calculated how many jobs and how much income were created in other businesses due to all of the activities of the University. The model was able to measure the economic impact of LMU on the State of Tennessee as well as in its primary impact region. The impact results for the state are presented in **Executive Table 1**.

University operations create 638 full and part-time jobs. This activity has an employment multiplier of 1.68 which means that for every job created by University operations, another 0.68 job is created in other businesses due to the money spent by the University and its employees. The total impact of the University operations was 1,072 jobs in FY 2011.

Likewise, the model can measure the economic impact of income (wages, salaries and benefits) on the economy. LMU paid \$34.5 million in payroll in FY 2011. The income multiplier is 1.60 which means that for every \$1 of income paid by LMU, another \$0.60 of income is generated in other businesses. Thus, the total income impact of LMU's payroll was over \$55.0 million. Total retail sales and sales taxes generated from this income were estimated. From the University operating activities, approximately \$20.4 million in retail sales was generated and with the current seven percent state tax rate, over \$1.4 million in state sales tax collections.

When all of the activities were included, the total impact of LMU on the state's economy was 1,996 full and part-time jobs, \$95.0 million in income (wages, salaries and benefits,) \$35.2 million in retail sales and \$2.5 million in sales tax collections.

The model was also applied to what was identified as the primary impact region. This included three counties in Virginia, ten counties in Kentucky and 14 counties in Tennessee. The economic impact in the region was 1,962 jobs and almost \$93 million. The bottom line is that

LMU contributes greatly to the economies of the State of Tennessee and to its primary impact region. LMU is extremely important for educational reasons as well as economic reasons.

Executive Table 1
Annual Economic Impact of Lincoln Memorial University on the State of Tennessee, FY2011

Sector	Direct	Employment Multiplier	Total Impact	Income			Sales Tax	
				Direct	Multiplier	Total Impact	Retail Sales	7 Cent Tax
University	638	1.68	1,072	\$34,502,329	1.60	\$55,203,726	\$20,425,379	\$1,429,777
Construction	98	1.74	171	\$3,758,202	1.88	\$7,065,420	\$2,614,205	\$182,994
Student Spending ¹	360	1.80	648	\$16,493,760	1.79	\$29,523,830	\$10,923,817	\$764,667
Visitor Spending	<u>74</u>	1.42	<u>105</u>	<u>\$1,918,450</u>	1.68	<u>\$3,222,996</u>	<u>\$1,192,509</u>	<u>\$83,476</u>
TOTAL	1,170		1,996	\$56,672,741		\$95,015,972	\$35,155,910	\$2,460,914

¹Total expenditures include non-university spending only. Revenue from campus spending such as tuition, campus housing costs and books purchased at the campus bookstore are captured in LMU auxiliary revenue.

Source: Employment, spending and income data from LMU; Multipliers and coefficients from 2011 IMPLAN Data, Minnesota Implan Group Inc., Retail Sales data from Tennessee Department of Revenue, U.S. Department of Commerce Bureau of Economic Analysis.

The Economic Impact of Lincoln Memorial University on the State and Regional Economies

INTRODUCTION

Colleges and universities are many things to many people. Viewed through the lens of economics, however, they are key to the viability of local, state, regional and national economies. From this perspective, they are sources of jobs and income to their employees and students. They are also large consumers which create additional jobs and income to suppliers of materials, services, equipment and capital structures. They provide entertainment and cultural opportunities. They produce skilled labor, enhance the lifetime income of graduates and increase the productive capacity of the economy. They contribute to the fund of knowledge through extension and technology transfer activities. They also spin off and attract research and industrial enterprises (**Appendix A.**)

The objective of this study is to estimate the economic impact that Lincoln Memorial University (LMU) has on the economy. More specifically, the report will:

1. Present financial, student and other data reflecting LMU activities,
2. Measure the following economic impacts that LMU operation and construction activities as well as student and visitor spending had on the State of Tennessee economy through increased;
 - employment
 - wages, salaries and benefits
 - retail sales
3. Measure the following economic impacts that LMU operation and construction activities, as well as student and visitor spending had on the primary economic

impact region including parts of Tennessee, Kentucky and Virginia through increased;

- employment
- wages, salaries and benefits
- retail sales

RESEARCH METHODOLOGY

This report is an update to a previous study done in 2007 and focuses primarily on the impacts on jobs and income (wages, salaries and benefits) created on an annual basis by the entire LMU system, its employees, its students, and its visitors to the campuses. A review of previous literature relative to impact studies is given in **Appendix A**. Data for this study are from FY 2011 - 2012. These impacts are concentrated on the local community, but also spill over to the surrounding counties and to the state. Much of the revenue is used to hire faculty, staff and maintenance employees. Most of the income provided directly through these jobs is spent and re-spent, creating additional jobs and income. As a result, the total number of jobs and the total income attributable to LMU are larger than the number of jobs and wages and salaries from the system itself. The revenue that is not used to hire employees is used to procure various goods and services. The businesses use this revenue to hire employees, pay salaries and purchase materials. This additional economic activity is called the multiplier effect.

To calculate the economic impacts noted above, a widely-accepted input-output model and data from IMPLAN were utilized to estimate the direct, secondary, and total impacts of LMU on the economy of the State of Tennessee and a primary impact region including parts of Tennessee, Kentucky and Virginia. The economic impact in this report

will be quantified as total employment including direct, secondary and total jobs and the associated wages, salaries and benefits. Detailed information on the model used in this report can be found in **Appendix B**. This study is directed by Dr. Gerald A. Doeksen, a renowned economist from Oklahoma State University, who is widely recognized for his research regarding economic impact studies of universities, health systems and industrial changes (**Appendix C**).

OVERVIEW OF LINCOLN MEMORIAL UNIVERSITY

Lincoln Memorial University (LMU) was chartered by the State of Tennessee on February 12, 1897, as a commitment to Abraham Lincoln's 1863 request to organize a university for the people of this area. The main campus, located on 1,000 wooded acres in Harrogate Tennessee, has 35 academic, administrative and residential buildings. LMU has grown significantly since the last report. The current total enrollment of undergraduate and graduate students, including enrollment at 11 extended sites in the surrounding area, is over 4,100. The LMU-DeBusk College of Osteopathic Medicine which is part of the LMU-Health Sciences Division had their inaugural graduation class of Doctor of Osteopathic Medicine (DO) in 2011. The Physician Assistant (PA) and Master of Science in Nursing (MSN) programs also experienced their inaugural graduation classes in 2011. LMU announced plans to pursue a Doctor of Juris prudence (JD) program in 2008 with part-time evening classes beginning in August, 2009 and expanded to a full-time day program at the LMU- Duncan School of Law in fall of 2010. In addition, a new Doctor of Veterinarian Medicine (DVM) program is proposed to begin in 2013. Today, LMU continues the mission of providing educational opportunities, developing community leadership and expanding economic and social forces within its

region. By making educational and research opportunities available to students where they live and through various recreational and cultural events open to the community, LMU seeks to advance life in the Cumberland Gap area and throughout the region through its teaching, research, and service mission. Although LMU graduates can be found in all 50 states, 62 percent of LMU graduates reside within 100 miles of the university and 76 percent have stayed in the Appalachian region (**Figure 1**).

University Revenues

LMU finances its day-to-day operations with revenues derived from a variety of sources. In Fiscal Year 2011, the system's income exceeded \$86 million. Total revenues for LMU by major funding source are shown in **Table 1**. LMU is a private university and therefore 83.9 percent (\$72.5 million) of the total revenues came from tuition and fees (**Figure 2**.) Student fees include registration, information technology, student

Table 1
Sources of Operating Revenues for Lincoln Memorial University, FY 2011

Source	Revenue	Percent
Tuition and Fees	\$72,535,061	83.9
Auxiliary Enterprises	\$7,031,612	8.1
Investment Income	\$2,958,632	3.4
Private Gifts and Non-Federal Grants	\$1,252,327	1.5
Federal Grants and Contracts	\$2,116,345	2.5
Other Sources	<u>\$518,012</u>	<u>0.6</u>
TOTAL Operating Revenue	\$86,411,989	100.0

Source: LMU financial reports

Figure 1 National Distribution of Lincoln Memorial University Alumni

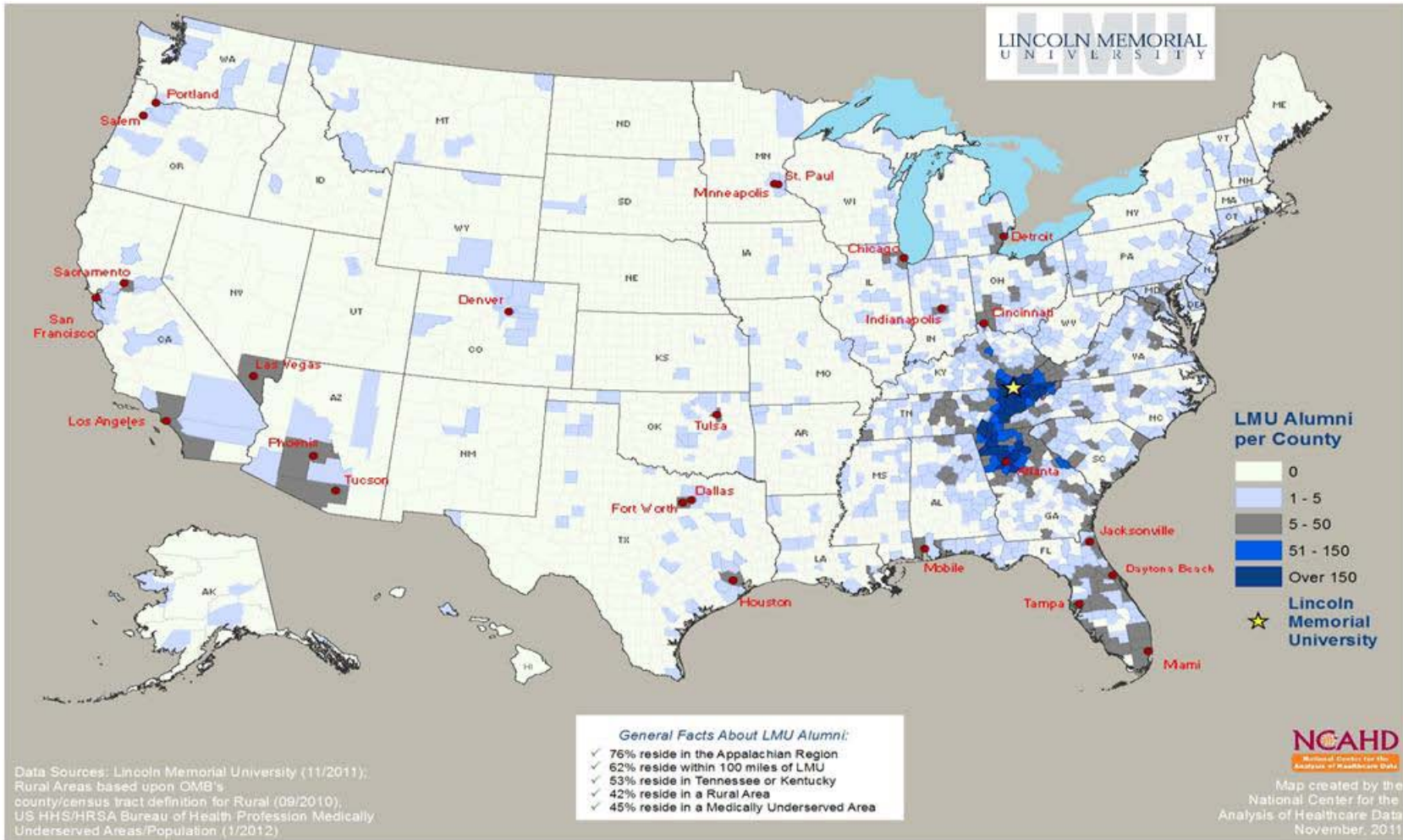
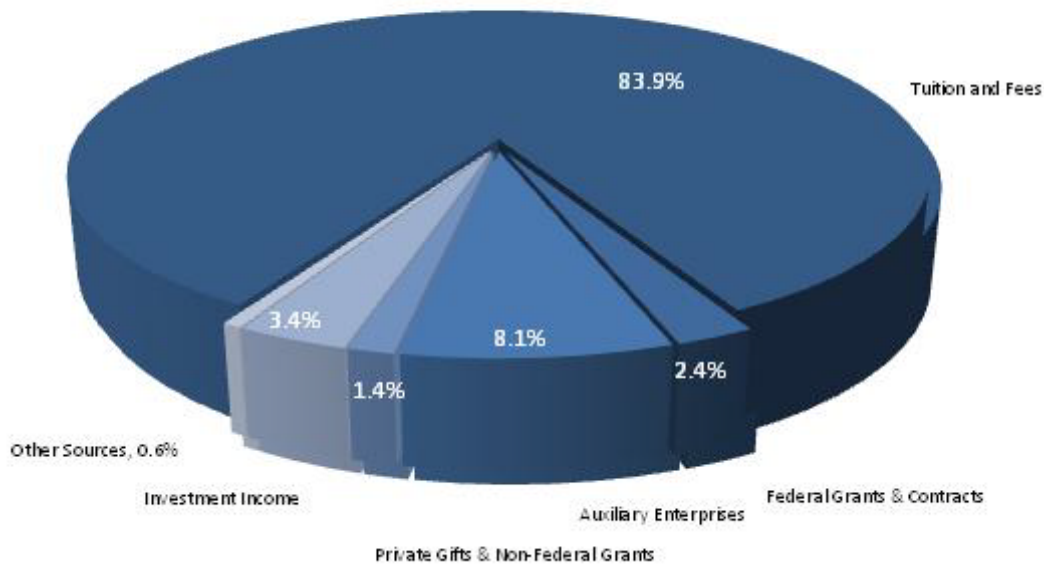


Figure 2
Sources of Operating Revenue for Lincoln Memorial University
Fiscal Year 2011



activities, etc. The largest of the other sources was slightly over \$7 million from the auxiliary enterprises operated by the University such as dormitories, cafeteria and bookstore. Approximately \$2.9 million are derived from income from investments. The remaining \$3.9 million comes from grants, both federal and non-federal, private gifts and miscellaneous sources.

University Expenditures

Total expenditures for LMU by major funding use are given in **Table 2**. Almost \$25.3 million were spent in FY 2011 for instruction and research. A major part of these two fund uses was wages, salaries and benefits to faculty and professional staff. Approximately, \$12 million was given to the students for assistance and \$9.3 million was spent for operation and maintenance. Expenditures for LMU totaled over \$71.9 million.

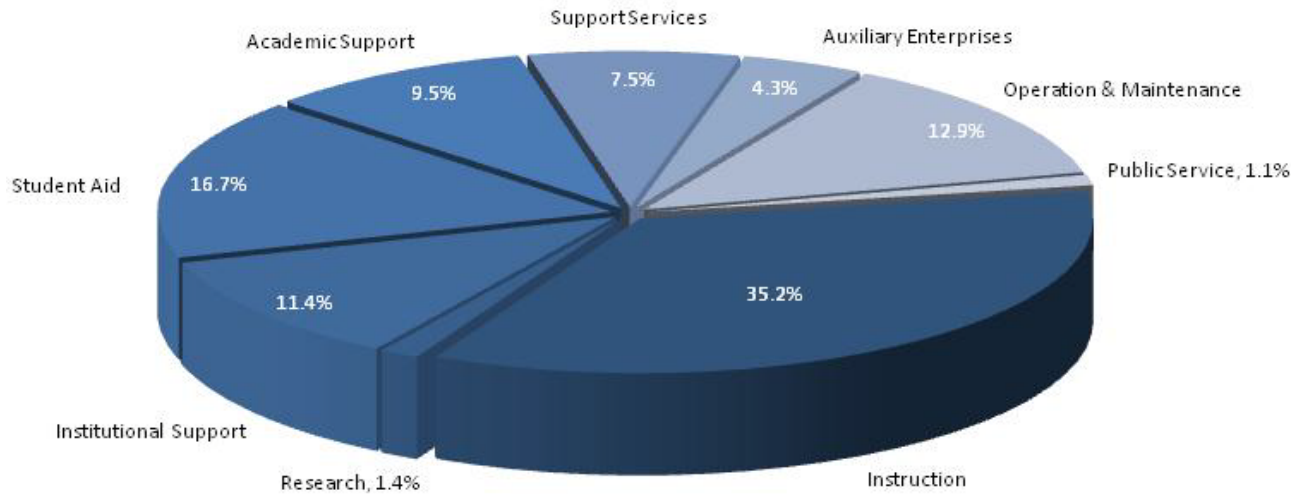
Table 2
Total Expenditures by Funding Use for Lincoln Memorial University, FY 2011

Funding Use	Expenditures	Percent
Instruction	\$25,310,981	35.2
Research	\$988,571	1.4
Operations and Maintenance	\$9,308,197	12.9
Student Aid	\$11,981,688	16.7
Institutional Support	\$8,214,184	11.4
Academic Support	\$6,852,314	9.5
Support Services	\$5,367,393	7.5
Auxiliary Enterprises	\$3,126,723	4.3
Public Service	<u>\$755,760</u>	<u>1.1</u>
TOTAL Expenditures	\$71,905,811	100.0

Source: LMU financial reports

The pie chart in **Figure 3** illustrates the proportions of university expenditures by funding use. Instruction is the largest category utilizing 35.2 percent of total expenditures. Combined expenditures for academic support, institutional support and support services totaled 28.4 percent. Student aid expenditures including scholarships, and federal and state assistance was the second largest single funding use with 16.7 percent of the funds going toward student financial assistance. Nearly 65 percent of LMU students received some type of financial assistance. Another 12.9 percent of total expenditures were spent on operations and maintenance. LMU is a liberal arts college and although it offers research opportunities, the percent of funds going toward research (1.4) is relatively small as compared to research based universities.

Figure 3
 Total Expenditures by Funding Use for Lincoln Memorial University
 Fiscal Year 2011



Another way of analyzing university expenditures is by major spending category or total operating expenditures as shown in **Table 3**. Almost half of the total operating expenses or \$34.5 million went toward employee wages, salaries and benefits. LMU paid \$13.4 million of their unrestricted funds for additional student support. Food service costs were \$2.2 million. The cost of utilities was another major expense, and last year LMU spent over \$1.8 million. Typical operations require continuous purchasing of equipment. LMU spent \$2.3 million on equipment in FY 2011. These expenses illustrate the demand for various services in the community and surrounding region which stimulate additional economic activity.

Table 3
Total Expenditures by Category for Lincoln Memorial University, FY 2011

Fund Category	Expenditures	Percent
Employee Expenses		
Wages and Salaries	\$26,879,762	37.4
Student Wages	\$561,102	0.8
Related Expenses	<u>\$7,061,465</u>	<u>9.8</u>
Total Wages, Salaries and Benefits	\$34,502,329	48.0
Student Support	\$13,356,062	18.6
Supplies and Printing	\$1,005,698	1.4
Travel	\$1,571,328	2.2
Utilities	\$1,867,171	2.6
Communication	\$699,039	1.0
Advertising	\$737,809	1.0
Equipment	\$2,254,867	3.1
Insurance	\$1,038,130	1.5
Food Service	\$2,165,926	3.0
Interest on Debt	3,766,801	5.2
Other	<u>\$3,613,221</u>	<u>10.6</u>
TOTAL Expenditures	\$71,905,811	100.0

Source: LMU financial reports

University Employment and Salaries

Employee expenses are detailed below in **Table 4**. There were 206 full-time and 46 part-time faculty and other professionals on the payroll in FY 2011. Wages, salaries and benefits for professionals totaled almost \$17.7 million. In addition there were 358 full and part-time staff and 28 students working for LMU during the last fiscal year.

Total employee expenses for all LMU staff were \$34.5 million

Table 4
Number of Faculty, Staff and Student Employees
Lincoln Memorial University, FY 2011

Category	Full-time	Part-time	Wages Salaries Benefits
Professional	206	46	\$17,657,556
Staff	316	42	\$16,557,299
Student	<u>0</u>	<u>28</u>	<u>\$287,474</u>
TOTAL Employment	522	116	\$34,502,329

Source: LMU Academic Affairs

University Construction Expenditures

Construction was another important activity for LMU. Approximately, \$27.3 million were spent on new construction and building improvements in the last two fiscal years (**Table 5.**) Construction operations impact the local community and surrounding region as contractors purchase building material and employ construction workers, many of whom travel from other towns and spend part of their wages on food, drink and lodging.

Table 5
Total Construction Expenditures for Lincoln Memorial University
FY 2011 and 2012

Year	Dollars
Fiscal Year 2011	\$11,592,603
Fiscal Year 2012	<u>\$15,690,083</u>
TOTAL Construction Expenditures	\$27,282,686

Source: LMU financial reports

Student Enrollment and Non-university Spending

During 2011, total student enrollment ranged from 4,133 in the spring to 4,550 in the fall semester. An estimated 2,538 students attended classes during the 2011 summer session. Approximately 59 percent of the total students enrolled in the fall and spring semesters are graduate professional students. A detailed listing by class of all the students attending LMU is given in **Table 6**.

Student spending can be a challenge to estimate due to the wide-range of spending patterns, number of commuter students and the varied student traffic associated with 11 extended campus sites. Estimated total student spending is provided in **Table 7**. These costs represent only the non-university portion of student spending by full-time students. Tuition, fees, campus housing costs and a large portion of book purchases are not included as they are paid directly to the university and will be captured through university revenues. This method was believed to best approximate student expenditures.

It was estimated that the 3,123 spring full-time students spent approximately \$22.0 million and the 2,820 students enrolled full-time in the fall spent almost \$19.0 million. The students enrolled full-time in the summer spent over \$1.1 million for a total of \$42.1 million in 2011.

Visitor Days and Spending

A university attracts a large number of visitors each year for various events and activities. Parents bring their sons and daughters to enroll, help them with their living arrangements and attend some of their activities. Alumni revisit the campus for athletic events and to attend banquets and other special events. In addition, several visitors are brought to the campus by administrators and faculty to attend conferences and other

Table 6
Estimated Total Student Enrollment for Lincoln Memorial University, 2011

Student Category	Spring 2011	Summer 2011	Fall 2011
Undergraduate			
Freshman	398	24	457
Sophomore	421	37	451
Junior	370	63	431
Senior	410	98	417
Undergraduate Special	<u>69</u>	<u>25</u>	<u>102</u>
TOTAL Undergraduate	1,668	247	1,858
Graduate	2,224	2,143	2,566
Graduate Special	241	148	126
TOTAL Graduate Professional ¹	<u>2,465</u>	<u>2,291</u>	<u>2,692</u>
TOTAL Student Enrollment	4,133	2,538	4,550
TOTAL Full-Time Enrollment	3,123	290	2,820

¹Graduate professional includes medical students (DCOM) and law students (DSOL)
Source: LMU enrollment statistics

miscellaneous meetings. Each time a non-local visitor comes to campus, they spend money at the local restaurants and often buy gas before they leave. Some of the activities require an overnight stay which generates revenue for the local motels. These are all local expenditures that occur due to the university's presence. Data in **Table 8** show that in FY 2011, the estimated 49,314 non-local visitors to LMU spent almost \$4.6 million while participating in on-campus activities.

Table 7
Lincoln Memorial University Student Non-university Spending, 2011¹

Student Category	Spring 2011	Summer 2011	Fall 2011
Students Living in Campus Housing			
Full-time Students	776	47	887
Spending per Student	<u>\$3,350</u>	<u>\$1,860</u>	<u>\$3,350</u>
Total Student Spending	\$2,599,600	\$87,420	\$2,971,450
Students Living Off-Campus			
Full-time Students	2,347	243	1,933
Spending per Student	<u>\$8,270</u>	<u>\$4,265</u>	<u>\$8,270</u>
Total Student Spending	\$19,409,690	\$1,036,395	\$15,985,910
TOTAL Student Expenditures	\$22,009,290	\$1,123,815	\$18,957,360

¹Total expenditures include non-university spending only. Revenue from campus spending such as tuition, fees, campus housing costs and books purchased at the campus bookstore are captured in LMU auxiliary revenue.

Source: Based on proposed student budget available on LMU website, <http://www.lmunet.edu>

Table 8
Estimated FY 2011 Expenditures from Visitors to Lincoln Memorial University

Visitor Category	Visitors	Daily Spending	Total Expenditures
Student Visitors and Parent Activities	4,108	\$55	\$220,990
Alumni and Athletic Activities	26,992	\$109	\$2,942,128
University Activities	17,319	\$74	\$1,281,606
Faculty and Staff Visitors	985	\$156	\$153,660
TOTAL Visitor Expenditures	49,314		\$4,598,384

Source: Visitor days was obtained from LMU Enrollment Management and Student Services and estimated daily spending was based on University of Arizona research and estimates from LMU officials.

THE IMPACT OF LMU ON THE STATE OF TENNESSEE ECONOMY

As stated earlier, this report focuses on the economic impact as it relates to jobs and wages, salaries, and benefits resulting from activities associated with LMU. These activities are divided into the following categories:

1. Operation;
2. Construction;
3. Student Non-university Spending; and
4. Visitor Spending.

The previous section clearly documents that the direct activities of these categories are significant. However, this does not tell the complete story. Secondary economic impacts are created when the LMU and university employees, construction firms and their employees, students, and visitors all spend money. These secondary benefits are measured by economic multipliers.

The Multiplier Effect

To further illustrate the multiplier effect, consider the opening of a new department in the University. The new department purchases goods and services from other businesses, and the dollars flowing to those businesses increase. Likewise, the new department will hire employees who purchase goods and services locally. The purchases of the new department and its employees will create additional jobs and wages and salaries throughout the local economy.

A multiplier from an input-output model such as IMPLAN can measure the effect created by an increase or decrease in economic activity. For example, an employment multiplier of 1.75 indicates that if one job is created by the new department, then an

additional 0.75 job is created in other businesses due to the new department and employee spending. The model calculates employment and income multipliers.

Economic Impact from Operational Activities

The economic impact from activities related to operations is presented in **Table 9**. Employment (full and part time) and income (payroll including wages, salaries, and benefits) from operation activities were obtained from LMU. These activities occur every year. The University employed 638 full and part-time employees in FY 2011 (**Table 4**.) The higher education sector employment multiplier is 1.68. This means that for every job in the university, another 0.68 job is created in other business in the state. The secondary employment generated in the state from LMU is estimated at 434 jobs. The University had a total impact of 1,072 jobs in the State of Tennessee in FY 2011.

Data on the income from employees are also presented in **Table 9**. Data from LMU indicated that total income for the University is \$34.5 million. Using the higher education sector income multiplier of 1.60, LMU generated secondary income of \$20.7 million for a total of \$55.2 million.

Income also has an impact on retail sales. The retail sales capture ratio can be used to estimate the impact of operational activities on retail sales. This ratio indicates the percent of personal income spent on items that generate sales tax. Data from the Tennessee Department of Revenue indicated that 37.0 percent of the income was spent in retail stores that collect state sales taxes. Thus it is estimated that \$20.4 million were generated in retail sales from operations. Given the current 7.0 percent state sales tax rate in Tennessee, an estimated state sales tax collection of \$1.4 million occurred as a result of the retail sales from operational activities.

Table 9
Employment, Income and Retail Sales Impact of Lincoln Memorial University on
the State of Tennessee from Operational Activities, FY 2011

Category	Amount
Employment Impact	
LMU Employment	638
Higher Ed. Sector Employment Multiplier	1.68
Secondary Employment Impact	<u>434</u>
TOTAL Employment Impact	1,072
Income Impact	
LMU Income	\$34,502,329
Higher Ed. Sector Income Multiplier	1.60
Secondary Income Impact	<u>\$20,701,397</u>
TOTAL Income Impact	\$55,203,726
Retail Sales and Sales Tax Impact	
Retail Sales	\$20,425,379
Sales Tax (7%)	\$1,429,777

Source: Employment and income data from Lincoln Memorial University; 2011 IMPLAN Data, Minnesota Implan Group Inc., Retail Sales data from Tennessee Department of Revenue, U.S. Department of Commerce Bureau of Economic Analysis.

Economic Impact from Construction Activities

LMU spends a significant amount on construction activities. This impact is often overlooked. It must be remembered that these impacts only occur during the year of construction and are not recurring. In FY 2011, LMU spent \$11.6 million on construction projects and in FY 2012 the amount increased to almost \$15.7 million

(Table 10.)

Table 10
Employment and Income Generated from LMU Capital Investment
Projects, FY 2011 and FY 2012

Year	Capital Investment	Full-time and Part-time Employees	Wages, Salaries and Benefits
FY 2011	\$11,592,603	98	\$3,758,202
FY 2012	\$15,690,083	133	\$5,100,417

Source: LMU, 2011 Implan Data, Minnesota Implan Group Inc.

From IMPLAN, the statewide ratios for employment and wages generated per million dollars of construction were used to estimate employment and income for each fiscal year. In FY 2011, the capital investment was estimated to create 98 full- and part-time jobs and approximately \$3.8 million in wages, salaries and benefits.

The total employment impact from LMU construction activities is presented in **Table 11**. The construction employment multiplier of 1.74 indicates that another 0.74 job is created in other businesses in the state due to these expenditures. Those jobs in other businesses are referred to as secondary jobs. The estimated secondary employment impact for FY 2011 was 73 jobs, making a total employment impact of 171 full- and part-time jobs from construction activities.

Table 11
Employment Impact of LMU from Construction Activities, FY 2011 and FY 2012

Year	Direct Employment	Construction Employment Multiplier	Secondary Employment Impact	Total Employment Impact
FY 2011	98	1.74	73	171
FY 2012	133	1.74	98	231

Source: 2011 IMPLAN Data, Minnesota Implan Group Inc.

The impact on income is presented in **Table 12**. The construction income multiplier is 1.88, which means that for each dollar of wages and salaries paid to construction workers, another \$0.88 of wages is generated in other businesses in the state. The secondary income for FY 2011 was \$3.3 million and the total income from construction activities was \$7.1 million. Retail sales are estimated at \$2.6 million with a 7.0 percent sales tax rate generating \$182,994 from construction activities.

Table 12
Income, Retail Sales and Sales Tax Impact of Lincoln Memorial University on the State of Tennessee from Construction Spending, FY 2011 and FY 2012

Year	Direct Income	Construction Income Multiplier	Secondary Income Impact	Total Income Impact	Retail Sales	Sales Taxes
2011	\$3,758,202	1.88	\$3,307,218	\$7,065,420	\$2,614,205	\$182,994
2012	\$5,100,417	1.88	\$4,488,367	\$9,558,784	\$3,547,850	\$248,350

Source: Construction data from Lincoln Memorial University; 2011 IMPLAN Data, Minnesota Implan Group Inc., Retail Sales data from Tennessee Department of Revenue, U.S. Department of Commerce Bureau of Economic Analysis.

Economic Impact of Student Non-University Spending

When students attend classes at the university, they spend money for housing, food, entertainment, etc. The money they spend locally, outside of the university, stimulates additional economic activity that in turn generates jobs and income in other businesses. Student non-university expenditures were estimated in the previous section. Using ratios of expenditures to employment and income from IMPLAN, the employment and income generated from non-university spending were estimated. **Table 13** contains the estimates.

Table 13
Employment, Income and Retail Sales Impact of Lincoln Memorial University on
the State of Tennessee from Student Spending, FY 2011

Category	Amount
Employment Impact	
Jobs from Student Spending	360
Retail Trade and Services Employment Multiplier	1.80
Secondary Employment Impact	<u>288</u>
TOTAL Employment Impact	648
Income Impact	
Income from Student Spending	\$16,493,760
Retail Trade and Services Income Multiplier	1.79
Secondary Income Impact	<u>\$13,030,070</u>
TOTAL Income Impact	\$29,523,830
Retail Sales and Sales Tax Impact	
Retail Sales	\$10,923,817
Sales Tax (7%)	\$764,667

Source: Student spending data from Lincoln Memorial University; 2011 IMPLAN Data, Minnesota Implan Group Inc., Retail Sales data from Tennessee Department of Revenue, U.S. Department of Commerce Bureau of Economic Analysis.

Jobs created from student spending were estimated at 360. The employment multiplier for retail trade and services was utilized to measure the multiplier impact. The employment multiplier for this sector was 1.80. Thus, 288 secondary jobs were created in other businesses and the total employment impact from student spending was 648 full and part-time jobs

Income generated from student expenditures was estimated at \$16.5 million. The income multiplier for retail trade and services was utilized to estimate the secondary income impact of \$13.0 million. The total income impact from student non-university spending was \$29.5 million. This income generated \$10.9 million in retail sales and \$764,455 in state sales taxes.

Economic Impact from Visitor Spending

LMU activities attract many visitors to the campus. These visitors spend dollars that contribute to the local economy. Data in **Table 8** showed that an estimated 49,314 visitors spent \$4.6 million in FY 2011. These data were converted to jobs and income based on ratios of expenditures to jobs and income from IMPLAN. The impact of visitor spending is presented in **Table 14**.

Full and part-time jobs created in businesses due to visitor spending were estimated at 74. The employment multiplier of 1.42 estimated that 31 secondary jobs were created. The total impact on employment was 105 jobs generated due to visitor spending at LMU.

Table 14
Employment, Income and Retail Sales Impact of Lincoln Memorial University on the State of Tennessee from Visitor Spending, FY 2011

Category	Amount
Employment Impact	
Jobs from Visitor Spending	74
Retail Trade and Services Employment Multiplier	1.42
Secondary Employment Impact	<u>31</u>
TOTAL Employment Impact	105
Income Impact	
Income from Visitor Spending	\$1,918,450
Retail Trade and Services Income Multiplier	1.68
Secondary Income Impact	<u>\$1,304,546</u>
TOTAL Income Impact	\$3,222,996
Retail Sales and Sales Tax Impact	
Retail Sales	\$1,192,509
Sales Tax (7%)	\$83,476

Source: Visitor data from Lincoln Memorial University; 2011 IMPLAN Data, Minnesota Implan Group Inc., Retail Sales data from Tennessee Department of Revenue, U.S. Department of Commerce Bureau of Economic Analysis.

Income generated from visitor spending was estimated at a little over \$1.9 million. The estimated secondary impact was \$1.3 million using the retail trade and services sector income multiplier of 1.68. This yielded a total income impact from visitor spending of over \$3.2 million. This income resulted in retail sales of almost \$1.2 million and \$83,476 in state sales tax collections.

Summary of LMU Impacts on the State of Tennessee Economy

In summary, LMU's total impact as it relates to jobs, income, retail sales and sales tax on the State of Tennessee economy is presented in **Table 15**. Total estimate for FY 2011 was 1,170 direct jobs. When including the secondary impacts, the total employment impact was 1,996 full- and part-time jobs. The direct income activities were estimated at almost \$56.7 million with the total income impact from LMU on the State of Tennessee of over \$95.0 million. These dollars resulted in \$35.2 million in retail sales and \$2.5 million in state sales taxes.

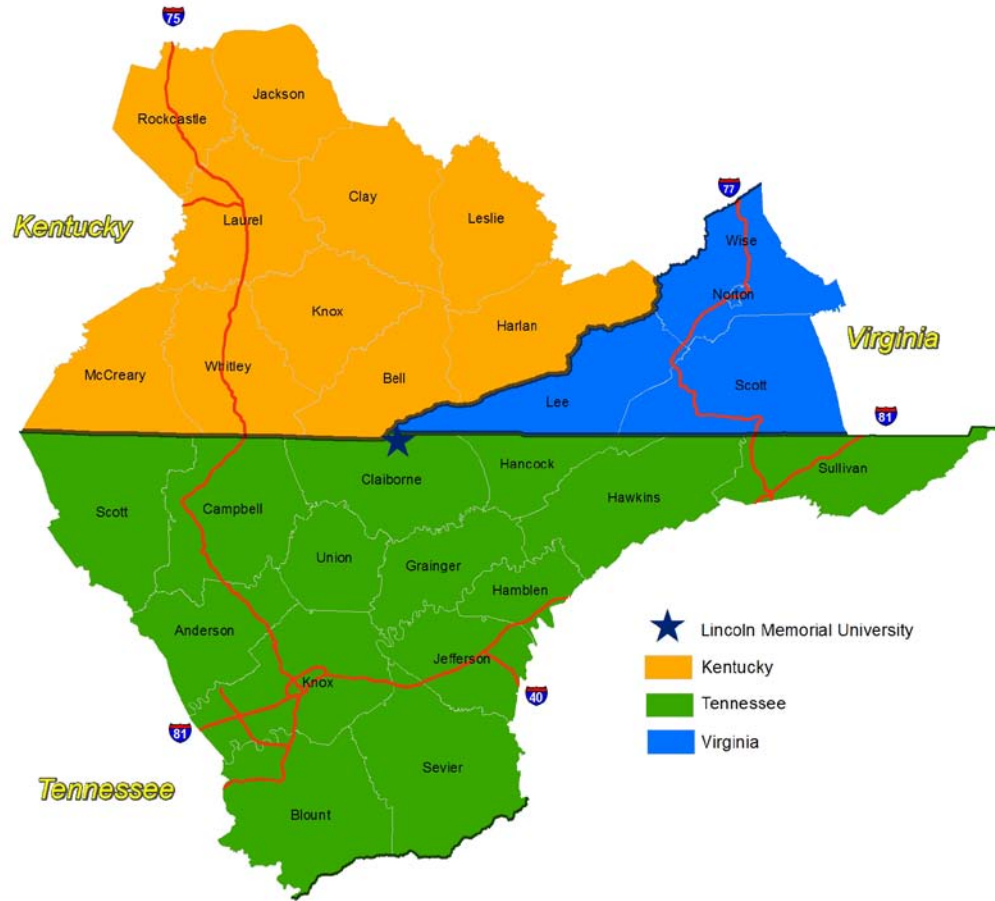
Table 15
Economic Impact of Lincoln Memorial University on the State of Tennessee, FY2011

Sector	Direct	Employment Multiplier	Total Impact	Income			Sales Tax	
				Direct	Multiplier	Total Impact	Retail Sales	7 Cent Tax
University	638	1.68	1,072	\$34,502,329	1.60	\$55,203,726	\$20,425,379	\$1,429,777
Construction	98	1.74	171	\$3,758,202	1.88	\$7,065,420	\$2,614,205	\$182,994
Student Spending ¹	360	1.80	648	\$16,493,760	1.79	\$29,523,830	\$10,923,817	\$764,667
Visitor Spending	<u>74</u>	1.42	<u>105</u>	<u>\$1,918,450</u>	1.68	<u>\$3,222,996</u>	<u>\$1,192,509</u>	<u>\$83,476</u>
TOTAL	1,170		1,996	\$56,672,741		\$95,015,972	\$35,155,910	\$2,460,914

¹Total expenditures include non-university spending only. Revenue from campus spending such as tuition, campus housing costs and books purchased at the campus bookstore are captured in LMU-DCOM auxiliary revenue.

Source: Employment, spending and income data from Lincoln Memorial University; Multipliers and coefficients from 2011 IMPLAN Data, Minnesota Implan Group Inc., Retail Sales data from Tennessee Department of Revenue, U.S. Department of Commerce Bureau of Economic Analysis.

Figure 4
Primary Impact Region for Lincoln Memorial University



THE IMPACT OF LMU ON THE PRIMARY IMPACT REGION ECONOMY

Lincoln Memorial University is located on the extreme northern border of Tennessee. Thus, it was decided to measure the economic impact of LMU on its primary impact region. Most of the economic impact will occur in this region (**Figure 4**.) The region consists of three counties in Virginia, ten counties in Kentucky, and 14 counties in Tennessee as identified by LMU officials.

The methodology presented in the previous selection was utilized to estimate the economic impact of LMU on the impact region. Again, the study analyzed the impact relative to four activities. These include the economic activity resulting from LMU:

1. Operations;
2. Construction;
3. Student Non-university Spending; and
4. Visitor Spending.

Construction activity only occurs during the construction year, whereas the other activities occur every year. Since the same methodology was used as in the previous section, only the summary impact table is presented. Data relative to the employment, income, and retail sales are presented in **Table 16**.

LMU has 638 employees and the regional employment multiplier is 1.63. This means that for each job created at LMU, another 0.63 job is created in other businesses due to LMU and its employees spending money in the region. The total estimated employment impact from LMU operations was 1,040 jobs. The economic impact of construction, student spending and visitor spending activities was also measured and yielded a total impact of 1,962 jobs in the region. Income for LMU operations was \$34.5 million. With the region's higher education sector income multiplier of 1.58, the total impact on income in the primary region due to operational activities was \$54.5 million. In total, when including all activities of LMU, the total income impact in the region was approximately \$94.1 million.

By applying the regional sales capture ratio of 38.8 percent to the income impacts generated from all four activities, it was estimated that the impact on retail sales was \$36.5 million of retail purchases. A one-cent sales tax would generate \$365,104 in sales tax revenues for the region. Total impact on sales tax collection was not estimated due to the different tax rates throughout the region.

Summary of All LMU Impacts

LMU was started to provide additional educational opportunities for residents in the Cumberland Gap area. It has successfully met the challenges and goals since 1897 and continues to do so today with increased enrollment through program expansion and efforts at additional satellite sites. Everyone understands the tremendous educational contributions that LMU provides to the State of Tennessee and to its primary region. Often overlooked, is the economic impacts that a university such as LMU has on the state and surrounding region. When all activities were included, the total impact of LMU on the state's economy was 1,996 full- and part-time jobs, \$95.0 million in income, \$35.2 million in retail sales and \$2.5 million in state sales tax collections. This study clearly documents that LMU has a significant economic impact on both the State of Tennessee, particularly the immediate surrounding region.

Table 16
Economic Impact of Lincoln Memorial University on the Primary Impact Region, FY2011

Sector	Direct	Employment Multiplier	Total Impact	Direct	Income Multiplier	Total Impact	Retail Sales
University	638	1.63	1,040	\$34,502,329	1.58	\$54,513,680	\$21,151,308
Construction	98	1.78	174	\$3,758,202	1.84	\$6,915,092	\$2,683,056
Student Spending ¹	360	1.79	644	\$16,493,760	1.79	\$29,523,830	\$11,455,246
Visitor Spending	<u>74</u>	1.41	<u>104</u>	<u>\$1,918,450</u>	1.64	<u>\$3,146,258</u>	\$1,220,748
TOTAL	1,170		1,962	\$56,672,741		\$94,098,860	\$36,510,358

¹Total expenditures include non-university spending only. Revenue from campus spending such as tuition, campus housing costs and books purchased at the campus bookstore are captured in LMU-DCOM auxiliary revenue.

Source: Employment, spending and income data from Lincoln Memorial University; Multipliers and coefficients from 2011 IMPLAN Data, Minnesota Implan Group Inc., Retail Sales data from Tennessee Department of Revenue, U.S. Department of Commerce Bureau of Economic Analysis.

Appendix A

Review of Literature Relative to Impact Studies

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Review of Literature Relative to Impact Studies

For many years, researchers have been interested in quantifying the benefits, beyond the provision of degrees, of universities and colleges. One of the first detailed guides to measure the economic benefits of a college or university to the local community was requested by the American Council on Education (ACE) in 1968.^[2] Based on some previous impact studies, Caffrey and Isaacs identified four primary groups that generated economic activity through spending. These four categories were: 1. the college, 2. faculty and staff, 3. students, and 4. visitors to the college. They developed several models and sub-models to estimate the spending. These models have provided the foundation for numerous economic impact studies since and are still being adopted today. For example, the Association of American Medical Colleges has been measuring the economic impact of their member institutions on the individual states in which they were located for a number of years. The results are based on adaptations of the ACE models with the latest study completed in 2006.^[3]

Since the development of the ACE models, technology has simplified the process for deriving multipliers. The original ACE model depends upon numerous surveys to faculty, staff, students, local businesses and community residents and relies heavily upon proportional spending calculations to estimate indirect economic impact. It is a difficult model to implement and is less applicable to some colleges such as community colleges.^[4] The proportion of money spent locally can be difficult to estimate. More recently, computer models have been created utilizing input-output analysis that not only make estimating the multiplier effect more reasonable, but allow different multipliers to be created for local, regional or state impacts (**Appendix B**). Two frequently used

computer models are the Regional Input-Output Modeling System (RIMS II) published by the U.S. Bureau of Economic Analysis and MicroIMPLAN developed by the United States Forest Service. These computer models have been used to estimate the impact of universities, medical schools, hospital construction and physician clinics, just to name a few.^[5-11] For example, a detailed study estimating the impacts of the University of Arizona on the State of Arizona and Pima County Arizona was completed using the IMPLAN model.^[11] This study measured the impacts of university operations and construction, as well as student and visitor spending. In 2001, the National Association of State Universities and Land-Grant Universities surveyed its members for their most recent economic impact reports. They published a summary analysis based on data from 96 member institutions and 10 member university systems.^[12]

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Appendix B

Model and Data Used to Estimate Employment and Income Multipliers

Appendix B

Model and Data Used to Estimate Employment and Income Multipliers

A computer spreadsheet that uses state IMPLAN multipliers was developed to enable community development specialists to easily measure the secondary benefits of the health sector on a state, regional or county economy. The complete methodology, which includes an aggregate version, a disaggregate version, and a dynamic version, is presented in Measuring the Economic Importance of the Health Sector on a Local Economy: A Brief Literature Review and Procedures to Measure Local Impacts (Doeksen, et al., 1997). A brief review of input-output analysis and IMPLAN are presented here.

A Review of Input-Output Analysis

Input-output (I/O) (Miernyk, 1965) was designed to analyze the transactions among the industries in an economy. These models are largely based on the work of Wassily Leontief (1936). Detailed I/O analysis captures the indirect and induced interrelated circular behavior of the economy. For example, an increase in the demand for health services requires more equipment, more labor, and more supplies, which, in turn, requires more labor to produce the supplies, etc. By simultaneously accounting for structural interaction between sectors and industries, I/O analysis gives expression to the general economic equilibrium system. The analysis utilizes assumptions based on linear and fixed coefficients and limited substitutions among inputs and outputs. The analysis also assumes that average and marginal I/O coefficients are equal.

Nonetheless, the framework has been widely accepted and used. I/O analysis is useful when carefully executed and interpreted in defining the structure of a region, the interdependencies among industries, and forecasting economic outcomes.

The I/O model coefficients describe the structural interdependence of an economy. From the coefficients, various predictive devices can be computed, which can be useful in analyzing economic changes in a state, a region or a county. Multipliers indicate the relationship between some observed change in the economy and the total change in economic activity created throughout the economy.

MicroIMPLAN

MicroIMPLAN is a computer program developed by the United States Forest Service (Alward, et al., 1989) to construct I/O accounts and models. Typically, the complexity of I/O modeling has hindered practitioners from constructing models specific to a community requesting an analysis. Too often, inappropriate U.S. multipliers have been used to estimate local economic impacts. In contrast, IMPLAN can construct a model for any state, region, county, or zip code area in the United States by using available state, county, and zip code level data. Impact analysis can be performed once a regional I/O model is constructed.

Five different sets of multipliers are estimated by IMPLAN, corresponding to five measures of regional economic activity. These are: total industry output, personal income, total income, value added, and employment. The total impact of a change in the economy consists of direct, indirect, and induced impacts. Direct impacts are the changes in the activities of the impacting industry such as the addition of another physician and corresponding medical staff to the medical service area. The increased purchases of inputs by the new physician clinic as a result of the direct impact are the indirect impact on the business sectors.

Two types of multipliers are generated. Type I multipliers measure the impact in terms of direct and indirect effects. However, the total impact of a change in the economy consists of direct, indirect, and induced changes. Both the direct and indirect impacts change the flow of dollars to the state, region, or county's households. Subsequently, the households alter their consumption accordingly. The effect of the changes in household consumption on businesses in a community is referred to as an induced effect. To measure the total impact, a Type II multiplier is used. The Type II multiplier compares direct, indirect, and induced effects with the direct effects generated by a change in final demand (the sum of direct, indirect, and induced divided by direct). IMPLAN also estimates a modified Type II multiplier, called a Type SAM multiplier, which also includes the direct, indirect, and induced effects. The Type SAM multiplier further modifies the induced effect to include spending patterns of households based on a breakdown of households by nine different income groups.

Minnesota IMPLAN Group, Inc. (MIG)

Dr. Wilbur Maki at the University of Minnesota utilized the I/O model and database work from the U. S. Forest Service's Land Management Planning Unit in Fort Collins to further develop the methodology and to expand the data sources. Scott Lindall and Doug Olson joined the University of Minnesota in 1984 and worked with Maki and the model.

As an outgrowth of their work with the University of Minnesota, Lindall and Olson entered into a technology transfer agreement with the University of Minnesota that allowed them to form MIG. At first, MIG focused on database development and provided data that could be used in the Forest Service version of the software. In 1995,

MIG took on the task of writing a new version of the IMPLAN software from scratch. This new version extended the previous Forest Service version by creating an entirely new modeling system that included creating Social Accounting Matrices (SAMs) – an extension of input-output accounts, and resulting SAM multipliers. Version 2 of the new IMPLAN software became available in May of 1999. For more information about Minnesota IMPLAN Group, Inc., please contact Scott Lindall or Doug Olson by phone at 651-439-4421 or by email at info@implan.com or review their website at www.implan.com.

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Appendix C

Dr. Doeksen's Professional Accomplishments

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Dr. Doeksen's Professional Accomplishments

Dr. Doeksen has 40 years of experience working with economic impact models. He has applied impact models to a variety of situations and also has advanced the theory of impact models. Dr. Doeksen's Master's thesis and Ph.D. dissertation both utilized input-output analysis, which is the most frequently used impact model. Both his thesis and dissertation received national awards.

Dr. Doeksen's early work in input-output analysis is referenced in textbooks such as Harry W. Richardson's book titled Input-Output and Regional Economics. He is given credit for groundbreaking work related to aggregation and size of multipliers.

Over the years, Dr. Doeksen has over 60 journal articles and publications regarding impact analysis. He has been involved with over 350 economic impact studies. These include such applications as to measure the economic impact of a university hospital, critical access hospital, golf course, manufacturing plant, large urban health clinic, medical program on a state's economy, dental practices, recreational facility, hotel, agricultural services, agricultural programs, etc. Results were used by local, state and federal policy makers to influence and justify political action. In addition, Dr. Doeksen is constantly being invited to speak at state, regional, national, and international conferences. He makes over 30 speaking engagements each year. Dr. Doeksen has recently received a lifetime achievement award from the Southern Agricultural Economics Association and the Bonnie Teeter Lifetime Achievement Award from the Southern Rural Development Center. Finally the Oklahoma Rural Health Association named his community development assessment model as the program of the year.

Dr. Doeksen's latest work with impact models is the founding of the National Center for Rural Health Works. The Center has been in operation over 10 years and its primary purpose is to train professionals in other states to measure the impact of health services on the rural economies. The Center is funded by the Federal Office of Rural Health Policy. Programs have been started in over 32 states. Dr. Doeksen continues to operate as Director and is continually developing new applications of the economic impact models.

In summary, Dr. Doeksen is nationally known for his economic impact studies and research applications. These applications relate to rural economies, many of which focus on various segments of the health sector.

