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AMERICA'S BYWAYS RESOURCE CENTER
JOURNEY THROUGH HALLOWED GROUND
**ECONOMIC IMPACT TOOL:
SENSITIVITY ANALYSIS**

CASE STUDY

AUGUST 16, 2012

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Executive Summary

Since the inception of the National Scenic Byways Program in the early 1990s, local byway organizations have often found themselves asked to prove their worth to elected officials and taxpayers. Hence, the need to quantify their contribution to the local economy in terms of output growth, job creation and additions to the tax base in particular. However, conducting an economic impact analysis can be daunting for byway organizations, the majority of which have modest budgets, limited staff resources and little to no expertise in economic modeling.

As part of its congressionally designated function of providing technical assistance to local byway groups, America's Byways Resource Center commissioned the development of an Economic Impact Tool (Tool) for National Scenic Byways and All-American Roads. The Tool's main purpose is to assist byway organizations in showing the positive effect of scenic byways on the economy to elected officials, business leaders and the community at large. The Tool was officially released in February 2010 and has been made available to byway organizations since then.

HDR Decision Economics (HDR) has been commissioned by the Resource Center to perform a sensitivity analysis of the tool and to determine its effectiveness. As part of the study, HDR has been tasked with conducting a number of case studies with selected byways, including the Journey Through Hallowed Ground (JTHG) National Scenic Byway.

Through visitor spending and various capital projects, the JTHG National Scenic Byway is generating multiple impacts on the 14-county byway region, including:

- \$1.06 billion in total business sales;
- More than 6,500 jobs; and
- An increase of about \$165.1 million in earnings.

A summary of economic impacts is provided in the table below.

Overall Economic Impacts by Type of Impact

	Direct Impacts	Indirect Impacts	Total Impacts
Employment (No. of Jobs)	4,736	1,805	6,541
Earnings (\$000)	\$101,991.7	\$63,072.7	\$165,064.3
Economic Output (\$000)			
Visitor Spending	\$633,834.6	\$427,186.2	\$1,061,020.8
Annual Operating Expenses	-	-	-
Capital Investments to Date	\$1,620.0	\$1,449.4	\$3,069.4

1 Introduction

As part of its congressionally designated function of providing technical assistance to local byway groups, America's Byways Resource Center commissioned the development of an Economic Impact Tool (Tool) for National Scenic Byways and All-American Roads. The Tool's main purpose is to assist byway organizations in showing the positive effect of scenic byways on the economy to elected officials, business leaders and the community at large. The Tool was officially released in February 2010 and has been made available to byway organizations since then.

HDR Decision Economics (HDR) has been commissioned by the Resource Center to perform a sensitivity analysis of the tool and to determine its effectiveness. As part of the study, HDR has been tasked with conducting a number of case studies with selected byways.

1.1 Case Study Objectives

The case studies have three key objectives:

- Ensure that the tool is both practical (ease of use) and reliable (sound methodology and valuable results);
- Ensure that the tool meets all the needs of the byway community (i.e., the outputs from the Tool can be readily used for a variety of purposes such as investor outreach and federal grant application); and
- Identify potential areas for improvement (interface, organization of the workbook, inputs, results, technical manual, etc.).

In collaboration with the Resource Center, HDR developed a list of candidate byways and sent a short solicitation form. Of those who responded favorably, the following five byways were selected:

- Woodward Avenue All-American Road;
- Journey Through Hallowed Ground National Scenic Byway;
- Blue Ridge Parkway All-American Road;
- Volcanic Legacy All-American Road; and
- Cherokee Hills National Scenic Byway.

HDR assisted each selected byway organization to conduct an economic impact analysis with the Tool and organized webinars that covered the following topics:

- Installation of the Economic Impact Tool;
- Overview of the Tool structure and logic;
- Utilization of the Tool (entering input data, producing the results, etc.);

- Examination and resolution of issues identified during the interviews, if necessary; and
- One-on-one hands-on training using up to three (3) examples customized to each byway.

1.2 Organization of the Report

This report presents the results of the case study that was conducted for the Journey Through Hallowed Ground (JTHG) National Scenic Byway. It consists of four chapters. Following this introduction, Chapter 2 provides background information on the case study. Chapter 3 discusses the data sources and the model inputs used to estimate the economic impacts of the byway. And Chapter 4 presents the results of the case study.

The report also includes a number of appendices. A table describing the different model input variables of the Tool is provided in Appendix A. Economic multipliers obtained from the US Bureau of Economic Analysis and used to estimate the total economic impacts are provided in Appendix B. Finally, a list of data sources and references used in the sources of the case study is available in Appendix C.

2 Background Information

This chapter provides general background information on the case study. Section 2.1 gives an overview of the Economic Impact Tool for National Scenic Byways and All-American Roads. Section 2.2 introduces the JTHG National Scenic Byway.

2.1 Economic Impact Tool

Since the inception of the National Scenic Byways Program in the early 1990s, local byway organizations have often found themselves asked to prove their worth to elected officials and taxpayers. Hence, the need to quantify their contribution to the local economy in terms of output growth, job creation and additions to the tax base in particular. However, conducting an economic impact analysis can be daunting for byway organizations, the majority of which have modest budgets, limited staff resources and little to no expertise in economic modeling.

As part of its Congressionally-designated function of providing technical assistance to byway groups, America's Byways Resource Center commissioned the development of an Economic Impact Tool that would allow byway staff and/or volunteers to easily measure the impacts of byways and byway-related activities in their communities. The most recent version of the Tool (Version 2.0) was released in May 2010.

The Economic Impact Tool is a Microsoft Excel-based software program with a user-friendly interface that allows even those with little or no knowledge of either economic impact analysis or spreadsheet applications to make effective use of it. The Tool is highly scalable – not all model features need to be used to conduct an analysis. This allows the user to adjust the scope of the analysis based on available resources as well as experience in Excel and economic impact analysis. The model inputs can be entered by means of one of two forms: the short form and the long form. The short form allows the user to run the Tool with only a few key inputs and is therefore an attractive option for those looking to obtain results quickly. On the other hand, the long form requires more detailed inputs, thus the results are more comprehensive and reliable. The Tool is designed to be used to measure a broad range of activities, from the overall economic effects of byway-related (tourism) activities to the specific effects of a given investment. The model results can be used for different purposes, such as supporting federal grant applications, improving tourism marketing efforts and increasing policymakers' awareness of the byway.

2.2 Journey Through Hallowed Ground National Scenic Byway

The Journey Through Hallowed Ground National Scenic Byway runs 180 miles through three states (Virginia, Maryland and Pennsylvania), extending from Gettysburg, PA in the north to Charlottesville, VA in the south. Once known as Old Carolina Road, it includes portions of US Rt. 15, VA 231, VA 20 and VA 53. It is known for the numerous historical sites and Civil War battlefields located along it, including the Manassas National Battlefield Park and the Gettysburg National Military Park. The road received the National Scenic Byway designation from the Federal Highway Administration in October 2009. A map of the byway region is shown on the following page.

Figure 1: Map of the Byway Region



3 Model Inputs

This chapter presents the model inputs used for this case study. Section 3.1 covers the different sources that were tapped to obtain the necessary data. The inputs used in the Tool, along with the assumptions made to derive these inputs, are discussed in Section 3.2.

3.1 Data Sources

Most byways have limited data about visitors because they do not survey them typically. However, a lot of information on travel impacts is available at the county level from state tourism agencies. Also, the Forest Service at the US Department of Agriculture administers the National Visitor Use Monitoring (NVUM) program, which provides reliable information on recreation visitors to national forests. In the same way, national parks routinely survey visitors and publish the results.

Information on grants and other investments that are wholly or partially attributable to the byway was collected by the JTHG National Scenic Byway. It includes data on capital investments using federal and mixed funds. When a specific investment could not be entirely attributed to the byway, the Tool's "But For Test" was used to determine the portion of that investment the byway could be given credit for.

Finally, economic multipliers for the byway region were purchased from the US Bureau of Economic Analysis (BEA).

3.2 Case Study Inputs

A table describing the different model input variables of the Tool is provided in Appendix A. The table includes references to pages of the technical manual where the user can find additional information. Since the byway is located in a very rural area it is not expected to have any significant impact on property values. Therefore, data on property value appreciation were not collected as part of this case study.

3.2.1 Visitor Profiles

Information on the number of overnight visitors, the place of residence of visitors, the type of accommodation preferred as well as information on the length of stay and the travel party size are essential to characterize visitor trips and thereby to estimate the impacts of the byway on the local economy.

Table 1 on the following page shows the visitor profile inputs used in the Tool. These inputs are based on survey data for Antietam National Battlefield and Fredericksburg and Spotsylvania National Military Park (The Civil War Preservation Trust, 2006).

A majority of visitors to the byway region are overnight visitors, even though more than half of visitors are living in the byway region. Those overnight visitors tend to stay in paid accommodations (82 percent). The average length of stay for all visitors is 1.9 days while the average number of nights stayed in the byway region for overnight visitors is 2.5. The average travel party size is estimated at 3 individuals.

Table 1: Visitor Profile Data

Variable	Estimate
% Daytrippers	37%
% Overnight Visitors	63%
% Living Within the Byway Region	55%
% Living Outside of the Byway Region	45%
% Staying in Paid Accommodations	82%
% Staying with Friends/Relatives	18%
Average Length of Stay in Region (Days) for All Visitors	1.9
Average Nights Stayed in Region for Overnight Visitors	2.5
Average Number of People in Travel Party	3.0

3.2.2 Visitor Spending

Recent visitor spending data at the county level were obtained from the Virginia Tourism Corporation and a 2009 publication by IHS Global Insight. This information was used to determine total visitor spending attributed to the byway in 2008.¹ The average spending per person and per trip was calculated by dividing total visitor spending attributed to byway designation by the number of visitors to the byway region. This estimate was then apportioned to each spending category (Entertainment & Recreation, Groceries, etc.) using survey data from a 2006 study by The Civil War Preservation Trust. When the breakdown of expenditures was not detailed enough, default US values provided in the Tool were used instead (for Groceries, Gas Stations and Lodging).

As shown in Table 2 below, more than half of all visitor expenditures are for lodging and food services. The average spending per person and per trip (directly attributed to the byway) is estimated at \$69.33.

Table 2: Visitor Spending Data (2008)

Variable	Estimate
Entertainment & Recreation	\$6.00
Restaurant Food/Drink	\$17.12
Groceries	\$3.22
Gas Stations	\$2.92
Private Hotels/Campgrounds	\$11.80
Public Campgrounds/Lodges	\$4.92
Rental Homes/Cottages	\$2.95
Transportation	\$2.08
Retail Purchases	\$15.33
Services Purchases	\$3.00
Average spending per person, per trip	\$69.33

¹ Based on anecdotal evidence, it was assumed that only 15 percent of visitor spending in the 14-county byway region could be attributed to the byway.

3.2.3 Visitor Counts

The total number of visitors (or person trips) to the byway region in 2008 is estimated at 9.1 million approximately. This estimate was obtained by dividing total annual visitor spending (attributed to byway designation in selected counties) by the average spending per person, per trip. Total annual visitor spending was collected for all 14 counties of the byway region using various data sources (IHS Global Insight, 2009; Virginia Tourism Corporation; and Gettysburg Adams Chamber of Commerce).

3.2.4 Investments

Table 3 below shows the investment data provided by the JTHG National Scenic Byway for 2008. Please note that these estimates represent the average annual funding received by the byway since its creation (and used as a proxy for the average funding spent annually). Note also that these estimates only account for public investments, as no attempt was made to quantify potential private investments that could be wholly or partially attributed to the byway. Investments to the byway totaled \$1.6 million in 2008.

Table 3: Investment Data (2008)

Investment Name	Total Amount	Amount Attributable to Byway Designation	Investment Type
Mixed funds	\$1,000,000	\$1,000,000	Capital Investment
Federal funds	\$620,000	\$620,000	Capital Investment

3.2.5 Economic Multipliers

Economic multipliers are used to estimate the overall impacts of visitor spending and investments on the economy. Type II multipliers (accounting for the direct and indirect effects) for the byway region were purchased on the BEA website.² The byway region consists of the following jurisdictions: Carroll, MD; Frederick, MD; Washington, MD; Adams, PA; Culpeper, VA; Fauquier, VA; Greene, VA; Loudoun, VA; Madison, VA; Orange, VA; Rappahannock, VA; Albemarle and Charlottesville, VA; Prince William, Manassas and Manassas Park, VA; Spotsylvania and Fredericksburg, VA.

A table showing the output, earnings, employment, and value added³ multipliers by industry aggregate for the byway region is provided in Appendix B.

² BEA's RIMS II multipliers can be purchased online at <http://www.bea.gov/regional/rims/>. You will need to order *benchmark series* multipliers for your byway *region* (as of July 1, 2012 the cost is \$275). Orders are typically processed within 24 hours. You will be notified by email when the multipliers can be accessed online. Note that both Type I and Type II multipliers will be available for download. However, only Type II multipliers are actually used in the Tool. You will need to save the following two data files in the appropriate folder on your computer's hard drive (C:\BywaysImpactTool\Multipliers): *M406RG01.DAT* and *M_62RG01.DAT*. Though the multipliers are updated annually, they can be used for a number of years (3-5 years).

³ Refer to the Technical Manual for the definitions of these terms.

4 Study Results

This chapter presents the final results of the case study. A summary of the overall economic impacts is provided in Section 4.1.1. Employment impacts and tax revenue impacts are presented in Section 4.1.2 and Section 4.1.3 respectively.

4.1 Scenario 1

Though the tool was originally designed to measure the net impacts generated by a byway over a period of several years, it can also be used to estimate the contribution of the byway to the economy at a given point in time. For this case study, the Tool was used to estimate the economic impacts associated with visitor spending and public investments in the JTHG byway region in 2008.

4.1.1 Economic Impact Summary

Through visitor spending and various investment projects, the JTHG National Scenic Byway is generating multiple impacts on the six-county byway region, including:

- \$1.06 billion in total business sales;
- More than 6,500 jobs; and
- An increase of about \$165.1 million in earnings.

A summary of economic impacts is provided in Table 4 below.

Table 4: Overall Economic Impacts by Type of Impact

	Direct Impacts	Indirect Impacts	Total Impacts
Employment (No. of Jobs)	4,736	1,805	6,541
Earnings (\$000)	\$101,991.7	\$63,072.7	\$165,064.3
Economic Output (\$000)			
Visitor Spending	\$633,834.6	\$427,186.2	\$1,061,020.8
Annual Operating Expenses	-	-	-
Capital Investments to Date	\$1,620.0	\$1,449.4	\$3,069.4

4.1.2 Employment and Earnings Impacts

Based on the inputs presented in Chapter 3, it is estimated that the JTHG National Scenic Byway sustained a total of 6,541 jobs in the 14-county byway region in 2008. A majority of these jobs (72 percent) were the direct consequence of visitor spending and investments. The remaining jobs were the result of suppliers' spending and expenditures made by the employees of the suppliers and the directly affected businesses.

A summary of the employment impacts by type of expenditure and by type of impact is provided in Table 5 below. Please note that these estimates include both part-and full-time jobs and should not be interpreted as full-time equivalents (FTEs).

Table 5: Employment Impacts by Type of Impact

	Direct Impacts	Indirect Impacts	Total Impacts
Employment Change from Capital (One-Time) Investments			
Public Investments	9	9	17
Private Investments	-	-	-
Total from Capital Investments	9	9	17
Employment Change from Operating (Ongoing) Investments			
Operating Expenses	-	-	-
Visitor Spending	4,727	1,797	6,524
Total from Operating Investments	4,727	1,797	6,524
Total Byway Related Employment Change	4,736	1,805	6,541

These job impacts represent \$165.1 million in earnings annually, or about \$25,000 per employee. A summary of the earnings impacts by type of expenditure and by type of impact is provided in Table 6 below.

Table 6: Earnings Impacts by Type of Impact

	Direct Impacts	Indirect Impacts	Total Impacts
Earnings Change from Capital (One-Time) Investments (\$000)			
Public Investments	\$366.9	\$314.3	\$681.2
Private Investments	-	-	-
Total from Capital Investments	\$366.9	\$314.3	\$681.2
Earnings Change from Operating (Ongoing) Investments (\$000)			
Operating Expenses	-	-	-
Visitor Spending	\$101,624.7	\$62,758.4	\$164,383.1
Total from Operating Investments	\$101,624.7	\$62,758.4	\$164,383.1
Total Byway Related Earnings Change	\$101,991.7	\$63,072.7	\$165,064.3

4.1.3 Tax Impacts

The diverse economic activities spurred by the JTHG National Scenic Byway also generate tax revenues to municipal, county and state governments. Total tax revenues in the byway region are estimated to

range from \$37.4 million to \$47.1 million in 2010.⁴ Sales/Use/Lodging taxes represent at least 80 percent of that total. A summary of the tax revenue impacts by type of tax is provided in Table 7 below.

Table 7: Tax Impacts by Type of Tax (\$000)

	Property Taxes	Sales/Use/Lodging Taxes	Income Taxes
Value/Sales/Earnings Increase	-	\$606,853.8	\$165,064.3
Minimum Tax Amount			
Jurisdiction	Carroll, Maryland	Virginia	Pennsylvania
Primary Tax Rate	\$0 per \$1,000	5.0%	3.1%
Tax Revenue	-	\$32,350.1	\$5,067.5
Maximum Tax Amount			
Jurisdiction	Carroll, Maryland	Maryland	Virginia
Primary Tax Rate	\$0 per \$1,000	6.0%	5.8%
Tax Revenue	-	\$37,576.1	\$9,491.2

Note: Sales/Use/Lodging tax rates vary for different types of purchases. This table only displays General Sales & Use Tax rates.

⁴ The Tool is not equipped to calculate local or county income taxes, as these taxes are typically paid based on a person's place of residence, and not the place of employment. Since the place of residence of those whose jobs are directly or indirectly influenced by the byway cannot be known, local or county income taxes cannot be accurately calculated.

APPENDIX A: ECONOMIC IMPACT TOOL INPUT VARIABLES

		TYPE OF DATA <i>(click on cell for a short description of the variable)</i>	UNIT	DEFAULT VALUE	WORKSHEET	COMMENTS	POTENTIAL DATA SOURCES	REFERENCE TO TECHNICAL MANUAL	
Economic Activity	Visitor Profiles	% Daytrippers	%	Yes	InputVisitorProfiles	Sum of the two must be 100%	State or local agencies	pp. 17-18 & 29	
		% Overnight Visitors	%	Yes	InputVisitorProfiles				
		% Living Within the Byway Region	%	Yes	InputVisitorProfiles	Sum of the two must be 100%			
		% Living Outside of the Byway Region	%	Yes	InputVisitorProfiles				
		% Staying in Paid Accommodations	%	Yes	InputVisitorProfiles	Sum of the two must be 100%			
		% Staying with Friends/Relatives	%	Yes	InputVisitorProfiles				
		Average Length of Stay in Region (Days) for All Visitors	Days	Yes	InputVisitorProfiles				
		Average Nights Stayed in Region for Overnight Visitors	Nights	Yes	InputVisitorProfiles				
		Average Number of People in Travel Party	People	Yes	InputVisitorProfiles				
		Visitor Spending		Entertainment & Recreation	Per person, per trip	Yes	InputVisitorSpending	Determine whether it is taxable	State Department of Revenue or Taxation
Restaurant Food/Drink				Yes	InputVisitorSpending	Determine whether it is taxable			
Groceries	OR Per person, per day/night			Yes	InputVisitorSpending	Determine whether it is taxable			
Gas Stations				Yes	InputVisitorSpending	Determine whether it is taxable			
Private Hotels/Campgrounds	OR Per party, per trip			Yes	InputVisitorSpending	Determine whether it is taxable			
Public Campgrounds/Lodges				Yes	InputVisitorSpending	Determine whether it is taxable			
Rental Homes/Cottages	OR Per party, per day/night			Yes	InputVisitorSpending	Determine whether it is taxable			
Transportation				Yes	InputVisitorSpending	Determine whether it is taxable			
Retail Purchases	OR Total annual spending			Yes	InputVisitorSpending	Determine whether it is taxable			
Services Purchases		Yes	InputVisitorSpending	Determine whether it is taxable					
Visitor Counts	Person Trips	Person-trips	No	InputVisitorCounts	Info needed for the base year <u>and</u> the current year. Enter up to 200 counts for individual segments of the Byway and specific sites, <u>or</u> enter the overall number of visitors to the Byway region.	Specific visitor locations (e.g., museums); state DOT (traffic data)	pp. 18 & 30		
Investments (Public & Private)		Investment amount	\$	No	InputInvestments	Determine whether to measure the value of how investments affect intrinsic qualities (archeological, cultural, historical, etc.)	Byway	pp. 18-19 & 30-32	
		Amount Attributable to Byway Designation	\$ OR %	No	InputInvestments				
		Investment Type	N/A	No	InputInvestments				
		Investment Sources	%	No	InputInvestments				
Property Value Appreciation		Jurisdiction's Total Valuation by Year	\$	No	InputPropertyValue	For base year and current year	Tax Assessor's office	pp. 20 & 32	
		% of Valuation of Jurisdiction Located in Byway Area	%	No	InputPropertyValue				
		Ratio of Value Change in Byway Area as % of Jurisdiction's Overall Growth Rate	%	Yes	InputPropertyValue	Default assumption is that the ratio is 1:1 (100%). If you feel that values in the Byway Area have grown faster or slower, you will need to adjust the ratio accordingly.			
Tax Rate	Property Tax Rates	Property Tax Rate	Amount per \$1,000	No	InputPropertyTax	Enter inputs for non-primary jurisdictions if necessary	Tax Assessor's office	pp. 20 & 32-33	
		% of Value Assessed	%	No	InputPropertyTax				
		Equalization Ratio	%	No	InputPropertyTax				
	Sales, Use, and Lodging Tax Rates		General Sales and Use	%	Yes	InputSalesTax	Enter inputs for non-primary jurisdictions if necessary; Cumulative tax rates (state and local)	State Department of Revenue or Taxation;	pp. 20 & 33
			Groceries	%	Yes	InputSalesTax		Tax Assessor's office	
			Prepared Food	%	Yes	InputSalesTax			
			Amusements	%	Yes	InputSalesTax			
Income Tax Rates		Median Adjusted Gross Income	\$	Yes	InputIncomeTax	ALL INPUTS ARE ALREADY LOADED IN THE TOOL	State Department of Revenue or Taxation	pp. 20-21 & 33	
		Income Tax Rate for Median Adjusted Gross Income Level	%	Yes	InputIncomeTax				
Total increase in visitor spending from base year to current year			\$	No	InputEconActivity1	If you choose to Enter Data with Short Form, a window will pop up asking you to enter the required information		pp. 27-28	
Total value of new public/nonprofit capital investments due to byway designation			\$	No	InputEconActivity1				
Total value of new private capital investments due to byway designation			\$	No	InputEconActivity1				
Total increase in public, private & nonprofit operating expenses from base year to current year due to byway designation			\$	No	InputEconActivity1				
Total property appreciation in the byway area from base year to current year			\$	No	InputEconActivity1				
Property tax rate in primary jurisdiction (per \$1,000 of assessed value)			%	No	InputEconActivity1				
Sales/Use tax rate in primary jurisdiction			%	No	InputEconActivity1				
Income tax rate in primary state (for appropriate median bracket)			%	No	InputEconActivity1				

APPENDIX B: RIMS II MULTIPLIERS

Total Multipliers for Output, Earnings, Employment, and Value Added by Industry Aggregation (Type II)

INDUSTRY	Multiplier					
	Final Demand				Direct Effect	
	Output/1/ (dollars)	Earnings/2/ (dollars)	Employment/3/ (jobs)	Value-added/4/ (dollars)	Earnings/5/ (dollars)	Employment/6/ (jobs)
1. Crop and animal production	1.7608	0.2991	11.0972	0.7322	1.8939	1.5976
2. Forestry, fishing, and related activities	1.6689	0.3243	12.4305	0.7861	1.7763	1.4897
3. Oil and gas extraction	1.5888	0.3260	6.1376	0.8606	1.7086	2.1667
4. Mining, except oil and gas	1.6716	0.3454	7.0991	0.9189	1.7944	2.0670
5. Support activities for mining	1.7196	0.3049	6.2907	0.8727	2.3417	2.7001
6. Utilities*	1.3780	0.2413	3.7429	0.8197	1.5559	2.6406
7. Construction	1.8683	0.4762	11.5630	0.9957	1.6852	1.8070
8. Wood product manufacturing	1.8822	0.3422	9.8193	0.7467	2.1416	2.0688
9. Nonmetallic mineral product manufacturing	1.7243	0.3421	7.6372	0.8444	1.8694	2.0501
10. Primary metal manufacturing	1.6050	0.2809	5.5293	0.6354	1.8807	2.3512
11. Fabricated metal product manufacturing	1.5875	0.3089	7.0040	0.7652	1.7246	1.8753
12. Machinery manufacturing	1.6239	0.2769	5.7984	0.7258	1.9110	2.2083
13. Computer and electronic product manufacturing	1.7415	0.3048	5.4870	0.7735	2.1599	2.9791
14. Electrical equipment and appliance manufacturing	1.5580	0.2944	6.2147	0.7473	1.7146	1.9099
15. Motor vehicle, body, trailer, and parts manufacturing	1.5809	0.2364	5.3075	0.5708	2.1022	2.2317
16. Other transportation equipment manufacturing	1.5494	0.2533	4.6722	0.6748	1.8749	2.3766
17. Furniture and related product manufacturing	1.7617	0.3784	10.0019	0.8403	1.7874	1.7806
18. Miscellaneous manufacturing	1.6859	0.4083	9.0732	0.8899	1.5840	1.7427
19. Food, beverage, and tobacco product manufacturing	1.7252	0.2437	6.0468	0.6456	2.4873	2.6391
20. Textile and textile product mills	1.6284	0.3042	8.4655	0.6554	1.7979	1.7106
21. Apparel, leather, and allied product manufacturing	1.4774	0.2347	7.1728	0.6720	1.8902	1.6733
22. Paper manufacturing	1.5054	0.2586	5.3849	0.6590	1.7573	2.0410
23. Printing and related support activities	1.6223	0.3588	8.6268	0.8357	1.6356	1.7390
24. Petroleum and coal products manufacturing	1.5032	0.2576	4.6497	0.3887	1.7840	2.3326
25. Chemical manufacturing	1.6947	0.3299	5.7011	0.7485	2.0147	2.8549
26. Plastics and rubber products manufacturing	1.5475	0.2688	6.1983	0.6886	1.7819	1.8895
27. Wholesale trade	1.5917	0.3791	7.3493	1.0354	1.5633	1.9801
28. Retail trade	1.6378	0.4136	15.2498	1.0427	1.5023	1.3388
29. Air transportation	1.6534	0.3381	7.7857	0.8374	1.8126	2.2632
30. Rail transportation	1.7399	0.3085	6.1873	0.9217	2.1591	2.9962
31. Water transportation	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000
32. Truck transportation	1.7989	0.4202	10.2270	0.9359	1.8553	2.0534
33. Transit and ground passenger transportation*	1.7729	0.3927	16.9233	0.7715	1.8370	1.3688
34. Pipeline transportation	1.8649	0.3916	7.4484	0.7656	2.0968	3.3811
35. Other transportation and support activities*	1.7370	0.5035	12.2700	1.0907	1.5315	1.6627
36. Warehousing and storage	1.7657	0.4941	13.5509	1.0847	1.5303	1.5613
37. Publishing industries, except Internet	1.7288	0.3532	7.6559	0.9943	1.9105	2.3170
38. Motion picture and sound recording industries	1.5469	0.3269	11.7895	0.9254	1.6034	1.4209

(Continued)

INDUSTRY	Multiplier					
	Final Demand				Direct Effect	
	Output/1/ (dollars)	Earnings/2/ (dollars)	Employment/3/ (jobs)	Value-added/4/ (dollars)	Earnings/5/ (dollars)	Employment/6/ (jobs)
39. Broadcasting, except Internet	1.7385	0.4748	8.7808	0.8829	1.6254	2.7795
40. Telecommunications	1.6606	0.2541	4.9889	0.9393	2.1004	2.8434
41. Internet and other information services	1.5800	0.2735	5.7517	0.9760	1.8813	2.4739
42. Federal Reserve banks, credit intermediation and related services	1.5590	0.3032	6.0927	1.0098	1.7000	2.1673
43. Securities, commodity contracts, investments	1.8654	0.6371	15.1958	1.0947	1.4315	1.5208
44. Insurance carriers and related activities	1.7815	0.4229	8.4167	0.9994	1.7312	2.1209
45. Funds, trusts, and other financial vehicles	1.5863	0.2825	5.8611	0.5402	2.1835	2.8055
46. Real estate	1.3786	0.1184	5.0974	0.9753	2.9347	1.6664
47. Rental and leasing services and lessors of intangible assets	1.5668	0.2793	6.2404	1.0384	1.8471	2.1171
48. Professional, scientific, and technical services	1.7435	0.5081	9.8731	1.1244	1.5038	1.9394
49. Management of companies and enterprises	1.7476	0.4806	7.7146	1.0781	1.5443	2.3606
50. Administrative and support services	1.6824	0.4586	18.5396	1.0858	1.4992	1.3052
51. Waste management and remediation services	1.7335	0.4229	10.1804	0.9948	1.6699	1.8199
52. Educational services	1.7923	0.5024	14.9953	1.0568	1.4811	1.4574
53. Ambulatory health care services	1.7215	0.5581	11.8957	1.0849	1.4100	1.6312
54. Hospitals	1.7246	0.4820	11.0309	1.0094	1.4600	1.6381
55. Nursing and residential care facilities	1.7066	0.5536	18.0331	1.0952	1.3791	1.3276
56. Social assistance	1.7316	0.4749	20.4041	1.0228	1.4902	1.2849
57. Performing arts, spectator sports, museums, zoos, and parks	1.8373	0.5875	22.7424	1.1123	1.5187	1.3721
58. Amusements, gambling, and recreation	1.6870	0.4148	20.8394	1.0505	1.5464	1.2427
59. Accommodation	1.6121	0.3702	12.4124	1.0126	1.6074	1.4566
60. Food services and drinking places	1.7046	0.4063	19.7498	0.9314	1.5743	1.2548
61. Other services*	1.7446	0.4124	11.1020	0.9583	1.6563	1.6728
62. Households	0.9706	0.2137	6.5453	0.5935	0.0000	0.0000

*Includes Government enterprises.

Source: Bureau of Economic Analysis, Regional Product Division, Regional Input-Output Modeling System (RIMS II).

Notes: 1) Multipliers are based on the 2002 Benchmark Input-Output Table for the Nation and 2008 regional data.

2) Each entry in column 1 represents the total dollar change in output that occurs in all industries for each additional dollar of output delivered to final demand by the industry corresponding to the entry.

3) Each entry in column 2 represents the total dollar change in earnings of households employed by all industries for each additional dollar of output delivered to final demand by the industry corresponding to the entry.

4) Each entry in column 3 represents the total change in number of jobs that occurs in all industries for each additional 1 million dollars of output delivered to final demand by the industry corresponding to the entry.

5) Each entry in column 4 represents the total dollar change in value added that occurs in all industries for each additional dollar of output delivered to final demand by the industry corresponding to the entry.

6) Each entry in column 5 represents the total dollar change in earnings of households employed by all industries for each additional dollar of earnings paid directly to households employed by the industry corresponding to the entry.

7) Each entry in column 6 represents the total change in number of jobs in all industries for each additional job in the industry corresponding to the entry.

APPENDIX B: DATA SOURCES AND REFERENCES

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