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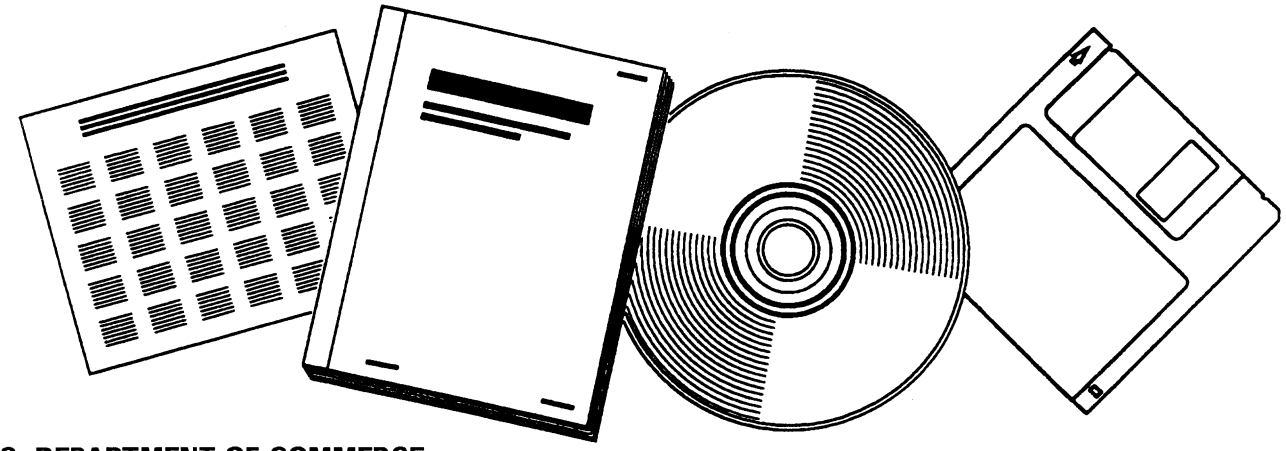

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Final Report

ECONOMIC IMPACTS OF THE KANSAS COMPREHENSIVE HIGHWAY PROGRAM

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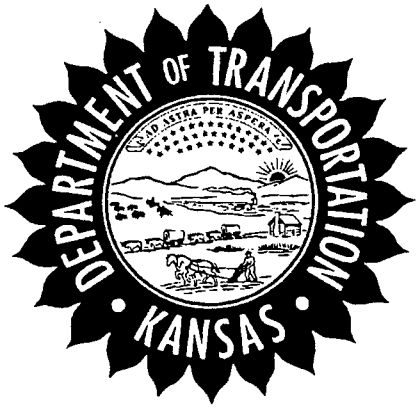

June 1997

ECONOMIC IMPACTS OF THE KANSAS COMPREHENSIVE HIGHWAY PROGRAM

Final Report

Prepared for

Kansas Department of Transportation

by
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Manhattan, Kansas

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16. Abstract

The Kansas Comprehensive Highway Program (CHP) was an eight year program of highway construction beginning July 1, 1989 and ending June 30, 1997. Overall funding totaled $4 billion.

This study measures the economic impact of the $2.86 billion used for construction of K jurisdiction projects. The two objectives were: 1) Measure the DIRECT output, income, and employment impacts by highway improvement type of the CHP. 2) Measure INDIRECT and INDUCED output, income, and employment impacts by highway improvement type of the CHP. The output impact is the increase in Kansas production as a result of the CHP. The income impact is the increase in Kansas wages and salaries in response to an increase in the income of the workers employed on CHP construction projects.

The economic impact of the CHP (K Jurisdiction) highway construction contracts as measured by output is $7.4 billion. The economic impact of the CHP (K jurisdiction) highway construction contracts as measured by income is $1.4 billion. The economic impact of the CHP (K jurisdiction) highway construction contracts as measured by employment is 117,820 full time equivalent jobs.

Although the economic impacts measured in this study are considerable, it should be noted that highway investment yields many other benefits to the highway users that are beyond the scope of this project. For example, the highway improvements that reduce congestion can result in reductions in vehicle operating costs such as maintenance, fuel, tires, and depreciation. These improvements can also reduce travel times and result in lower highway accident costs. This study also did not examine the economic impact of such items as preliminary engineering, utility adjustments, right-of-way acquisitions, construction engineering, and construction projects not on the state highway system. Further research is needed to quantify these user benefits and the impact of these and other activities.

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The contents of this report reflect the views of the authors who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the views or the policies of the State of Kansas. This report does not constitute a standard, specification or regulation.

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John Morrill and Mary Hancock (KSU Department of Economics) and John Leatherman (KSU Department of Agricultural Economics) provided valuable data gathering and computer expertise to the project.

Marcy Kanak, Joelle Wolters, and Susan Koch of the Department of Economics typed the draft of the final report. Velda Deutsch and Julie Whited also provided valuable clerical support.

Special thanks goes to the owners and support staff of the contracting firms that build Kansas highways and bridges. Without their assistance and cooperation, this study would not have been possible.

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EXECUTIVE SUMMARY

The final contracts for construction of the Kansas Comprehensive Highway Program (CHP) will be awarded by June 30, 1997. As the executive and legislative branches of the Kansas government consider the next state highway program, it is appropriate to measure the construction economic impacts of the CHP to facilitate an evaluation of the state's investment in highways.

The CHP was established by passage of 1989 House Bill 2014 and the first contracts for construction were awarded in fiscal year 1990. After the final CHP contracts for construction are awarded, approximately $4 billion will have been spent on CHP projects. After deducting from the $4 billion the costs for preliminary engineering, utility adjustments, right-of-way acquisition and construction engineering, the remaining $3.18 billion was devoted to as let construction expenditures. After deducting from the $3.18 billion the as let costs for construction projects of jurisdictions off the state highway system, the remaining $2.86 billion was spent on K jurisdiction projects. These are typically those projects on the state highway system outside of cities except for interstate roads, which are classified as K jurisdiction projects regardless of location. This study measures the economic impact of the $2.86 billion devoted to K jurisdiction construction projects. This is achieved through analysis of a sample of these construction contracts which have a total contract value of $2 billion.

Given the need for measuring the economic impacts of the Kansas Comprehensive Highway Program, the objectives of the study are as follows:

> Objective 1. Measure *direct* output, income, and employment impacts by highway improvement type of the Kansas Comprehensive Highway Program.

Objective 2. Measure *indirect* and *induced* output, income, and employment impacts by highway improvement type of the Kansas Comprehensive Highway Program.

The output impact is the increase in Kansas production as a result of the CHP. The income impact is the increase in Kansas wages and salaries in response to an increase in income of the workers employed on CHP construction projects. The direct impact is CHP induced output, income, and employment within the highway construction industry itself while the indirect impact is the CHP induced output, income, and employment of the industries that supply the construction industry with goods, services, and materials. The induced impact is the additional output, income, and employment in various consumer markets produced by the increased consumer spending of people employed on CHP projects.

In cooperation with personnel from the KDOT Office of Management and Budget and the Division of Planning and Development, the research team selected the following highway improvement types for analysis.

Category	Highway Improvement Type
1	Resurfacing
2	Restoration and Rehabilitation; Reconstruction and Minor Widening
3	New Bridges and Bridge Replacement
4	Major and Minor Bridge Rehabilitation
5	New Construction; Relocation; Major Widening
6	Safety/Traffic Operations/Traffic Systems Management; Environmentally Related; Physical Maintenance; Traffic Services

The objectives of the study are accomplished through the use of a 68 sector, survey-based input-output model (Emerson, 1989) for the state of Kansas developed by the Economics Department at Kansas State University. The objectives are achieved by adapting the model to include six additional sectors corresponding to the six highway improvement types listed above. The input-output data for these six sectors is obtained by surveying highway contractors who obtained CHP (K jurisdiction) highway construction contracts during the period July 1, 1991 to September 30, 1996. We did not attempt to survey all contractors since the larger contracts were obtained by a relatively small number of firms. Thus we surveyed the firms that account for a large percentage of the value of CHP (K jurisdiction) highway construction contracts awarded during the sample period. The surveys include both a personal interview of the owner of the contracting firm and questionnaires containing the firm's purchase and employment data.

The major findings of the study include the following.

1. The economic impact of the Kansas CHP (K jurisdiction) highway construction contracts as measured by output is $7.4 billion distributed by highway improvement type as follows:

Highway Improvement Type	Value of Highway Contracts (Millions of Dollars)	Output Multiplier	Output Impact (Millions of Dollars)
Category 1	$647.0	2.671768	$1728.6
Category 2	1621.6	2.587211	4195.4
Category 3	156.0	2.374471	370.4
Category 4	80.6	2.518010	203.0
Category 5	309.8	2.468194	764.6
Category 6	49.6	2.159928	107.1
Total	$2864.6		$7369.1

The output impact for each highway improvement type is obtained by multiplying the value of highway contracts by the output multiplier.

2. The economic impact of the Kansas CHP (K jurisdiction) highway construction contracts as measured by income is $1.4 billion distributed by highway improvement type as follows:

Highway Improvement Type	Direct Wages and Salaries (Millions of Dollars)	Income Multiplier	Income Impact (Millions of Dollars)
Category 1	$91.1	2.990495	$272.4
Category 2	358.9	2.346804	842.3
Category 3	39.1	2.087858	81.6
Category 4	31.2	1.725710	53.8
Category 5	68.2	2.240519	152.8
Category 6	9.3	2.123587	19.7
Total	$597.8		$1422.6

The direct wages and salaries are the payments to workers in the construction industry attributable to the CHP. The income impact for each highway improvement type is obtained by multiplying the direct wages and salaries by the income multiplier.

3. The economic impact of the Kansas CHP (K jurisdiction) highway construction contracts as measured by employment is 117,820 full time equivalent (FTE) jobs distributed by highway improvement type as follows:

Highway Improvement Type	Value of Highway Contracts (Millions of Dollars)	Employment Multiplier	Employment Impact (FTE Jobs)
Category 1	$647.0	37.68	24,379.0
Category 2	1621.6	42.26	68,528.8
Category 3	156.0	41.74	6511.4
Category 4	80.6	54.44	4387.9
Category 5	309.8	39.77	12,320.7
Category 6	49.6	34.12	1692.4
Total	$2864.6		117,820.2

The employment impact of 117,820 FTE jobs is obtained by multiplying the employment multiplier (employment per million dollars of output) by the value of highway contracts in each highway improvement type and then summing all six categories.

4. The output, income, and employment impacts measured in this study under-estimate the economic impact of the Kansas CHP (K jurisdiction) highway construction contracts since we were unable to obtain input purchase data for highway work that was subcontracted. The effect of this is to omit the economic impact of the inputs that the highway contractors purchased from each other. Thus the economic impacts measured in this study are conservative estimates.

5. An output multiplier measures the increase in Kansas total output (production) in response to an increase in the output of one of the various Kansas highway improvement types. An income multiplier measures the increase in Kansas total income in response to an increase in income of the workers employed in one of the various Kansas highway improvement types. The employment multiplier measures the overall employment impact per million dollars of CHP highway contract

value. The output, income, and employment multipliers for the six highway improvement types are as follows:

Highway Improvement Type	Output Multiplier	Income Multiplier	Employment Multiplier
Category 1	2.671768	2.990495	37.68
Category 2	2.587211	2.346804	42.26
Category 3	2.374471	2.087858	41.74
Category 4	2.518010	1.725710	54.44
Category 5	2.468194	2.240519	39.77
Category 6	2.159928	2.123587	34.12

6. The major supplying industries that are common to most of the six highway improvement types are Nonmetallic Mining, Petroleum and Coal Products, Cement and Concrete, Motor Freight, and Fabricated Metals.

Nonmetallic Mining consists mostly of crushed stone, sand, gravel, and aggregate while Petroleum and Coal Products includes asphalt, paving material, oil and greases, and diesel fuel. Fabricated Metals consists of fabricated structural steel, reinforcing steel, rebar, guard rail, bridge rail, sheet metal, and metal pipe.

7. The significance of imports (purchases from out-of-state suppliers) in the input structure varies by highway improvement type. For Categories 3 and 6, imports account for 30 and 36.7 percent of purchases from supplying industries (total inputs minus final payments except imports). The corresponding percentage for Category 1 is only 6.3 percent. Thus Category 1 has the largest output multiplier since most of the economic impact is internalized within Kansas. Conversely, Category 6 has the smallest output multiplier since it has the largest propensity to import.

Although the economic impacts measured in this study are considerable, it should be noted that highway investment yields many other benefits to highway users that are beyond the scope of this project. For example highway improvements that reduce congestion can result in reductions in vehicle operating costs such as maintenance, fuel, tires, and depreciation. These improvements can also reduce average travel times and result in lower highway accident costs. Further research is needed to quantify these highway user benefits.

CHAPTER 1

INTRODUCTION

The Kansas Comprehensive Highway Program

The final contracts for construction of the Kansas Comprehensive Highway Program (CHP) will be awarded by June 30, 1997. As the executive and legislative branches of the Kansas government consider the next state highway program, it is appropriate to measure the construction economic impacts of the CHP to facilitate an evaluation of the state's investment in highways.

The CHP was established by passage of 1989 House Bill 2014 and the first contracts for construction were awarded in fiscal year 1990. After the final CHP contracts for construction are awarded (by June 30, 1997), approximately $4 billion will have been spent on CHP projects. After deducting from the $4 billion the costs for preliminary engineering, utility adjustments, right-of-way acquisition and construction engineering, the remaining $3.18 billion was devoted to as let construction expenditures. After deducting from the $3.18 billion the as let costs for construction projects of jurisdictions off the state highway system, the remaining $2.86 billion was spent on K jurisdiction projects. These are typically those projects on the state highway system outside of cities except for interstate roads, which are classified as K jurisdiction projects regardless of location. This study measures the economic impact of the $2.86 billion devoted to K jurisdiction construction projects. This is achieved through analysis of a sample of these construction contracts which have a total contract value of $2 billion.

Research Objectives

Given the need for measuring economic impacts of the Kansas Comprehensive Highway Program, the objectives of the study are as follows:

> Objective 1. Measure *direct* output, income, and employment impacts by highway improvement type of the Kansas Comprehensive Highway Program.
>
> Objective 2. Measure *indirect* and *induced* output, income, and employment impacts by highway improvement type of the Kansas Comprehensive Highway Program.

The output impact is the increase in Kansas production as a result of the CHP. The income impact is the increase in Kansas wages and salaries in response to an increase in income of the workers employed on CHP construction projects. The direct impact is CHP induced output, income, and employment within the highway construction industry itself while the indirect impact is the CHP induced output, income, and employment of the industries that supply the construction industry with goods, services, and materials. The induced impact is the additional output, income, and employment in various consumer markets produced by the increased consumer spending of people employed on CHP projects.

In cooperation with personnel from the KDOT Office of Management and Budget and the Division of Planning and Development, the research team selected the following highway improvement types for analysis.

Category	Highway Improvement Type
1	Resurfacing
2	Restoration and Rehabilitation; Reconstruction and Minor Widening
3	New Bridges and Bridge Replacement
4	Major and Minor Bridge Rehabilitation

5	New Construction; Relocation; Major Widening
6	Safety/Traffic Operations/Traffic Systems Management; Environmentally Related; Physical Maintenance; Traffic Services

The above categories are combinations of Federal Highway Administration (FHWA) highway improvement types. See Appendix A for FHWA definitions.

Methodology

The objectives of the research are achieved with input-output modeling. An input-output model is a quantitative framework of analysis for examining the complicated interdependence within the production system of an economy. There are four components to the standard input-output model: an interindustry transactions matrix; a direct requirements matrix; a direct and indirect requirements matrix; and a direct, indirect, and induced requirements matrix. Each of these can be explained with the aid of a simple illustrative example drawn from Emerson (1989).

The transactions matrix describes the flows of goods and services between all individual sectors of the economy in a given year. The columns show purchases by a particular industry from all other industries. For example, in the highly simplified example of an input-output transactions matrix appearing in Table 1, the data in the Farming sector column show that, in order to produce its $30 million output, that sector purchased $4 million from farm enterprises, $7 million from manufacturing firms, $6 million from trade establishments, and made $13 million of payments to the final payments sectors (households, gross saving, government, and imports). The data in the Farming sector row indicate that Farming sold $4 million to farm enterprises, $8 million to manufacturing, $2 million to trade, and $16 million to final demand (households,

investment, government, and exports).

The direct requirements matrix indicates the input requirements from each industry for a particular industry to produce an average $1 of output. These purchase coefficients are obtained by dividing purchase data in each industry column of the transactions matrix by the corresponding output value for that industry. The resulting purchase coefficients, or input ratios, may be thought of as production recipes for a particular product. From the data in the simplistic transactions matrix in Table 1, a direct requirements matrix can be calculated (Table 2). As an example, the first column (farming) shows that to produce an average $1 of output, the Farming sector buys $.13 from farming enterprises, $.23 from manufacturing firms, $.20 from trade firms, and makes $.44 of payments to the final payments sectors.

The direct and indirect requirements matrix is one of two matrixes that measures the interaction among industries. The other, the direct, indirect, and induced requirements matrix, is similar but includes the effects of household income and spending in addition to the interindustry interaction. The data in the columns of Table 3 for each industry indicate the direct and indirect requirements of all industries necessary for that industry to deliver $1 of output to final demand. As an example, for the Farming sector to increase output to final demand by $1, it must increase its overall output by $1.2844 (including the initial $1 increase), the Manufacturing sector must increase its output $.5493, and the Trade sector must increase its output $.3712. The total output increase of agriculture in this simplistic economy is the sum of these three values or 2.2049 times larger than the initial output expansion in agriculture. The corresponding values for Manufacturing and Trade are 2.2312 and 2.0354 respectively. This is the concept of an output multiplier.

Table 1

Illustrative Input-Output Transactions Matrix

	Farming	Mfg.	Trade	Final Demand	Total Output
Farming	4	8	2	16	30
Manufacturing	7	15	6	22	50
Trade	6	5	4	10	25
Final Payments	13	22	13	0	48
Total Inputs	30	50	25	48	153

Table 2

Illustrative Direct Requirements Matrix

	Farming	Mfg.	Trade
Farming	.13	.16	.08
Manufacturing	.23	.30	.24
Trade	.20	.10	.16
Final Payments	.44	.44	.52
Total	1.00	1.00	1.00

Table 3

Illustrative Direct and Indirect Requirements Matrix

	Farming	Mfg.	Trade
Farming	1.2844	.3242	.2149
Manufacturing	.5493	1.6360	.5174
Trade	.3712	.2710	1.3031

Employment multipliers can be obtained by combining the information in Table 3 with industry employment/output ratios. Suppose we have the following information.

Sector	Employment	Output	Employment/Output Ratio
Farming	30,000	$10,000,000	0.003
Manufacturing	50,000	$12,500,000	0.004
Trade	100,000	$50,000,000	0.002

To obtain the direct and indirect employment multiplier for Farming we multiply each of the entries in the Farming column of Table 3 by its employment/output ratio and then sum the column.

Farming	0.003 x 1.2844 = .003853
Manufacturing	0.004 x .5493 = .002197
Trade	0.002 x .3712 = .000742
Total	.006792

The figure .006792 is the direct and indirect employment per dollar of Farming output. Employment multipliers are typically expressed as employment per $1 million of output or 6792 for the Farming sector. The employment multipliers for Manufacturing and Trade are calculated in the same manner and are 8058 and 5321 respectively.

Implementing the Input-Output Methodology

The objectives of the study are accomplished through the use of a 68 sector, survey-based input-output model (Emerson, 1989) for the state of Kansas developed by the Economics Department at Kansas State University. The objectives are achieved by adapting the model to include six additional sectors corresponding to the six highway improvement types discussed previously. The input-output data for these six sectors is obtained by surveying highway

contractors who obtained Kansas CHP (K jurisdiction) highway construction contracts during the period July 1, 1991 to September 30, 1996. The value of these sample contracts as well as the value of total K jurisdiction contracts by highway improvement type is displayed in Table 4. As noted above, K jurisdiction highway construction projects are typically those projects on the state highway system outside of cities except for interstate highways, which are classified as K jurisdiction projects regardless of location.

Table 5 reveals the number of highway contractor firms that received CHP (K jurisdiction) highway prime contracts or subcontracts during the July 1, 1991 to September 30, 1996 period. We did not attempt to survey all these firms since the larger contracts were obtained by a relatively small number of firms. Thus we surveyed the firms that account for a large percentage of the value of Kansas CHP (K jurisdiction) highway construction contracts awarded during the sample period. The surveys include both a personal interview of the owner of the contracting firm and questionnaires containing the firm's purchase and employment data.

To simplify the contractors' task of completing the questionnaires, the number of sectors in the input-output model was reduced from 68 to 51 (see Table 6 for a description of the sectors). The survey forms for purchase-cost information and total labor hours are in Appendix B.

The output, income, and employment multipliers to measure economic impacts are obtained by analyzing Kansas CHP (K jurisdiction) highway construction contracts awarded between July 1, 1991 and September 30, 1996. In order to measure the economic impacts of the entire CHP, KDOT furnished the research team with the value of Kansas CHP (K jurisdiction) highway construction contracts awarded during the non-sample period. For the last 3 months of

Table 4

Value of CHP (K Jurisdiction) Highway Construction Contracts
by Highway Improvement Type*
(Millions of Dollars)

Highway Improvement Type	Value of CHP K Jurisdiction Sample Construction Contracts July 1, 1991 - September 30, 1996	Value of CHP K Jurisdiction Construction Contracts**
Resurfacing	$375.3	$647.0
Restoration and Rehabilitation; Reconstruction and Minor Widening	1227.0	1621.6
New Bridges and Bridge Replacement	106.6	156.0
Major and Minor Bridge Rehabilitation	43.9	80.6
New Construction; Relocation; Major Widening	221.1	309.8
Safety / Traffic Operations / Traffic Systems Management; Environmentally Related; Physical Maintenance; Traffic Services	30.7	49.6
Grand Total	$2004.6	$2864.6

* K jurisdiction highway construction projects are typically those projects on the state highway system outside of cities except for interstate highways, which are classified as K jurisdiction projects regardless of location.

** The total value of CHP (K jurisdiction) construction contracts includes the value of all the contracts let over the entire duration (fiscal years 1990 through 1997) of the CHP.

Table 5
Number of Firms Receiving CHP (K Jurisdiction) Highway Construction Contracts by Highway Improvement Type
July 1, 1991 to September 30, 1996

Highway Improvement Type	Number of Firms Receiving Prime Contracts	Number of Firms Receiving Subcontracts
Resurfacing	42	56
Restoration and Rehabilitation; Reconstruction and Minor Widening	70	261
New Bridges and Bridge Replacement	27	88
Major and Minor Bridge Rehabilitation	28	67
New Construction; Relocation; Major Widening	28	128
Safety / Traffic Operations / Traffic Systems Management; Environmentally Related; Physical Maintenance; Traffic Services	48	50

the CHP, KDOT provided the estimated letting costs for these contracts. In measuring the economic impacts of the CHP, it is assumed that the multipliers derived for the sample period construction contracts remain the same for the non-sample contracts.

Table 6

Kansas Input-Output Model Sector Definitions

Agricultural

1. Agricultural Products - grain, soybeans, hay, dairying, poultry, cattle, hogs, other agricultural products

2. Agricultural Services - Includes establishments primarily engaged in performing soil preparation services, crop services, veterinary services, other animal services, farm labor and management services, and landscape and horticultural services for others on a fee or contract basis. SIC 07

Mining

3. Crude Petroleum and Natural Gas - Includes establishments engaged in operating oil and gas field properties. SIC 1311

4. Oil and Gas Field Services - Establishments primarily engaged in drilling wells for oil or gas field operations for others and establishments performing geophysical, geological, and other exploration services for oil and gas, on a contract, fee, or similar basis. SIC 138

5. Nonmetallic Mineral Mining, excluding Fuels - Establishments primarily engaged in mining or quarrying, developing mines, or exploring for nonmetallic minerals, except fuels. SIC 14

6. Other Mining - Includes mining of coal, metals, and other minerals not previously classified. SIC 10, 12, 132

Construction

7. Maintenance and Repair - Includes expenditures by firms for maintenance and repair services on capital assets.

8. Building Construction - Includes general contractors engaged in construction of residential, farm, industrial, public, and other buildings. SIC 15

9. Heavy Construction - Includes general contractors engaged in the construction of highways and streets, bridges, sewers, railroads, etc. SIC 16

10. Special Trade Contractors - Includes contractors specializing in activities such as plumbing, painting, plastering, carpentering, etc. SIC 17

Table 6

Kansas Input-Output Model Sector Definitions

Manufacturing

11. Apparel and Related Products - Includes establishments producing clothing and fabricating products by cutting and sewing purchased woven or knit textile fabrics and related materials. SIC 23

12. Paper and Allied Products - Includes establishments manufacturing pulp from wood and other cellulose fibers, and manufacturing paper and paper products such as bags, boxes, envelopes, etc. SIC 26

13. Printing and Publishing - Includes establishments engaged in printing by one or more of the common processes, such as letterpress, lithography, gravure, or screen; establishments that perform services for the printing trade such as bookbinding, typesetting, and photoengraving. SIC 27

14. Industrial Inorganic and Organic Chemicals - Includes establishments engaged in manufacturing basic industrial chemicals such as industrial gases, dyes, pigments, etc. SIC 281, 286

15. Agricultural Chemicals - Includes establishments engaged in manufacturing fertilizers, agricultural pesticides, and other agricultural chemicals. SIC 287

16. Other Chemicals and Chemical Products - Includes establishments manufacturing unfinished plastics, drugs, cleaning preparations, perfumes, paints, explosives, glue, ink, etc. SIC 282, 283, 284, 285, 289

17. Petroleum and Coal Products - Includes establishments primarily engaged in petroleum refining, manufacturing paving and roofing materials, and compounding lubricating oils and greases from purchased materials. SIC 29

18. Rubber and Plastic Products - Includes establishments manufacturing rubber products such as tires, rubber footwear, mechanical rubber goods, flooring, etc., and establishments manufacturing primary plastic products and miscellaneous plastics products. SIC 30

19. Cement, Concrete and Plaster Products - Includes establishments producing hydraulic cement, concrete, concrete products, plasterboard, etc. SIC 324, 327

20. Other Stone, Clay, and Glass Products - Includes establishments producing glass and glass products, brick, pottery, etc. SIC 321, 322, 323, 325, 326, 328, 329

21. Primary Metal Industries - Includes establishments engaged in the smelting and refining of ferrous and nonferrous metals. SIC 33

Table 6

Kansas Input-Output Model Sector Definitions

22. Fabricated Structural Metal Products - Includes establishments engaged in manufacturing fabricated iron and steel for structural purposes such as metal sash and doors, sheet metal work, boiler plate fabrication, etc. SIC 344

23. Other Fabricated Metal Products - Includes establishments producing nonstructural metal products such as tools, containers, fasteners, stampings, wire, pipe, etc. SIC 341, 342, 343, 345, 346, 347, 348, 349.

24. Farm Machinery and Equipment - Includes establishments engaged in manufacturing farm machinery and equipment. SIC 352

25. Construction and Industrial Machinery - Includes establishments engaged in manufacturing heavy machinery and equipment used by the construction, manufacturing, and mining industries. SIC 353

26. Food Products and Special Industry Machinery - Includes establishments manufacturing feed mill equipment, flour mill equipment, power saws, printing equipment, food packing machinery, etc. SIC 355

27. Electrical Machinery - Includes establishments engaged in manufacturing machinery, apparatus, and supplies for the generation, storage, transmission, transformation, and utilization of electrical energy. SIC 36

28. Other Machinery - Includes establishments manufacturing engines and turbines, machine tools, computing and accounting equipment, industrial machinery, etc. SIC 351, 354, 356, 357, 358, 359

29. Motor Vehicles and Equipment - Includes establishments manufacturing or assembling motor vehicles, passenger cars, truck and bus bodies, truck trailers, and parts for motor vehicles. SIC 371

30. Trailer Coaches - Establishments engaged in manufacturing trailer coaches, motor homes, and mobile homes. SIC 3792, 2451

31. Other Transportation Equipment - Includes establishments manufacturing transportation equipment not elsewhere classified. SIC 373, 375, 3799

32. Other Manufacturing - Includes establishments manufacturing goods not elsewhere classified such as textile mill products, lumber and wood products, furniture and fixtures, leather and leather products, scientific instruments, office supplies. SIC 21, 22, 24, 25, 31, 38

Table 6

Kansas Input-Output Model Sector Definitions

Transportation

33. Railroad Transportation - Includes establishments furnishing transportation by line-haul railroad, as well as switching and terminal establishments. SIC 40

34. Motor Freight Transportation - Includes establishments furnishing local or long-distance trucking or transfer services or those engaged in the storage of farm products, furniture, and other household goods or commercial goods of any nature. SIC 42

35. Other Transportation - Includes transportation services not elsewhere classified. SIC 41, 44, 45, 46, 47

Utilities

36. Communication - Includes establishments furnishing point-to-point communication services, whether by wire or radio and whether intended to be received aurally or visually, and radio and television broadcasting. SIC 48

37. Electric, Gas, and Sanitary Services - Includes establishments engaged in supplying electricity, natural gas, and other gas products, water, garbage collection, and other sanitary services. SIC 49

Wholesale Trade

38. Machinery, Equipment, and Supplies - Includes establishments engaged in wholesaling machinery, equipment, and supplies. SIC 508

39. Other Wholesale Trade - Includes wholesalers not elsewhere classified. SIC 501, 502, 503, 504, 505, 506, 507, 509, 511, 512, 513, 516, 517, 518, 519

Retail Trade

40. Farm Equipment Dealers - Includes establishments engaged in marketing agricultural machinery and equipment. SIC 5083

41. Gasoline Service Stations - Includes establishments engaged in selling gasoline and lubricating oils and possibly selling other merchandise or performing minor repair work. SIC 554

42. Eating and Drinking Places - Includes establishments selling prepared foods and drinks for consumption on the premises. SIC 58

Table 6

Kansas Input-Output Model Sector Definitions

43. Other Retail Trade - Includes retail trade establishments not elsewhere classified. SIC 52, 53, 54, 55 (except 554), 56, 57, 59

Finance, Insurance, and Real Estate

44. Banking - Includes institutions that are engaged in deposit banking or closely related functions, including fiduciary activities. SIC 60

45. Other Financial Institutions - Includes credit and lending institutions other than banks, as well as security and commodity dealers, investment companies, etc. SIC 61, 62, 67

46. Insurance and Real Estate - Includes insurance carriers, agents, and insurance services, as well as real estate operators, agents, and real estate services. SIC 63, 64, 65, 66

Services

47. Lodging Services - Includes commercial and institutional establishments engaged in furnishing lodging, lodging and meals, and camping space and camping facilities on a fee basis. SIC 70

48. Personal Services - Includes establishments engaged in providing services, generally involving the care of the person or his/her apparel. SIC 72

49. Business Services - Includes establishments engaged in rendering services, not elsewhere classified, to business establishments on a fee or contract basis including advertising, maintenance services, employment services, equipment rental and leasing, and consulting services. SIC 73

50. Medical and Other Health Services - Includes establishments engaged in furnishing medical, surgical, and other health services to persons. SIC 80

51. Other Services - Includes establishments providing services not elsewhere classified including legal services, repair services, entertainment services, etc. SIC 75, 76, 78, 79, 82 (part), 83, 84, 86, 89

CHAPTER 2

THE SAMPLE OF KANSAS CHP (K JURISDICTION) HIGHWAY CONSTRUCTION PROJECTS

The objectives of this study are achieved by adapting the Kansas input-output model to include six additional sectors corresponding to the six highway improvement types. The input-output data for these six sectors is obtained by surveying highway contractors who obtained Kansas CHP (K jurisdiction) highway construction contracts during the period July 1, 1991 to September 30, 1996. The value of sample period contracts by highway improvement type is displayed in Table 4. The total value of these contracts is $2004.6 million or 70 percent of the K jurisdiction contracts of $2864.6 million. In this chapter we analyze the purchase of goods and services by highway contractors for each of the six highway improvement types for the sample contracts. We also develop the output, income, and employment multipliers that are used to measure the economic impacts of the K jurisdiction highway construction projects of the CHP.

The Transactions Matrix

Table 7 is that part of the Kansas input-output transactions matrix which shows the purchases of goods and services by highway contractors for each of the six highway improvement types. The data in the matrix is obtained by expanding the sample data obtained from highway contractors who received the larger construction contracts in each highway improvement category. The percentages of total sample period contract value accounted for by data from surveyed contractors are as follows:

Table 7

Transactions Matrix of the Six Highway Improvement Types
July 1, 1991 - September 30, 1996
(Expenditures in Thousands of Dollars)

Supplying Industries and Final Payment Sectors	Highway Improvement Types					
	Category 1	Category 2	Category 3	Category 4	Category 5	Category 6
Agricultural Products	0	0	0	0	0	0
Agricultural Services	185	792	267	26	314	101
Crude Oil & Natural Gas	0	278	220	0	0	0
Oil & Gas Field Services	0	0	0	0	0	0
Nonmetallic Mineral Mining	92,691	147,921	4,036	786	21,290	2,658
Other Mining	3,180	0	0	0	0	0
Maintenance & Repair	3,359	24,476	518	84	6,328	292
Building Construction	0	0	0	0	0	0
Category 1	0	0	0	0	0	0
Category 2	0	0	0	0	0	0
Category 3	0	0	0	0	0	0
Category 4	0	0	0	0	0	0
Category 5	0	0	0	0	0	0
Category 6	0	0	0	0	0	0
Heavy Construction	0	5,430	125	642	622	0
Special Trade Contractors	30	83	11	0	31	0
Apparel	0	0	0	0	0	0
Paper & Allied Products	1	19	0	0	0	0
Printing & Publishing	1	10	0	0	0	0
Industrial Chemicals	1	4,142	2	0	267	0
Agricultural Chemicals	0	108	0	0	312	0
Other Chemicals	12	1,720	9	0	171	0
Petroleum & Coal Products	73,151	81,592	2,556	1,103	13,361	1,798
Rubber & Plastic	194	6,687	318	346	847	0
Cement & Concrete	476	140,756	12,668	3,753	24,525	840
Other Stone, Clay & Glass	0	1,194	170	74	729	2
Primary Metal	1	257	321	0	0	10
Fabricated Metal	1,071	18,324	5,717	900	5,901	226
Other Fabricated Metal	1	3,136	1,124	0	50	33
Farm Machinery & Equipment	48	2,284	0	0	0	0
Const. & Industrial Machinery	7,693	32,946	973	1,000	4,986	176
Food Products Machinery	0	0	0	0	0	0
Electrical Machinery	0	172	195	0	2	1,221
Other Machinery	0	3,798	0	0	0	0
Motor Vehicles & Equipment	0	80	230	0	0	0
Trailer Coaches	0	0	0	0	0	0
Other Transportation Equip.	2	70	0	0	0	0
Other Manufacturing	797	20,727	1,629	430	3,408	424
Railroad Transportation	190	1,266	0	0	0	0
Motor Freight	37,150	45,729	1,736	324	4,712	1,072
Other Transportation	3	43	189	23	9	0

Table 7

Transactions Matrix of the Six Highway Improvement Types
July 1, 1991 - September 30, 1996
(Expenditures in Thousands of Dollars)

Supplying Industries and Final Payment Sectors	Highway Improvement Types					
	Category 1	Category 2	Category 3	Category 4	Category 5	Category 6
Communication	283	738	84	47	178	14
Elec., Gas, & Sanitary Services	264	1,412	95	33	220	81
Mach., Equip., & Supplies Whole.	28	354	596	59	112	0
Other Wholesale Trade	201	2,648	23	76	0	14
Farm Equipment - Retail	0	0	0	0	0	0
Gasoline Stations	1,804	4,164	579	193	395	630
Eating & Drinking Places	570	1,669	202	439	202	84
Other Retail Trade	1,379	6,620	348	511	101	43
Banking	39	814	19	26	0	2
Other Financial Institutions	276	586	0	72	0	0
Insurance & Real Estate	4,334	14,768	1,448	748	2,552	282
Lodging Services	2,305	3,270	515	586	938	209
Personal Services	2	14	22	4	2	0
Business Services	552	8,741	476	513	1,349	83
Medical & Health Services	728	514	81	25	41	11
Other Services	3,746	3,654	271	88	15	61
Households	52,782	271,657	26,654	16,944	48,715	5,793
Gross Savings	50,705	156,245	20,087	7,480	44,418	7,496
Federal Government	13,087	32,350	3,574	1,437	9,667	677
State Government	4,654	19,440	1,423	871	3,426	237
Local Government	1,312	5,459	905	146	950	88
Imports	16,020	147,843	16,186	4,100	19,993	6,007
Total Inputs	375,308	1,227,000	106,602	43,889	221,139	30,665

Highway Improvement Type	Percent of Sample Period Contract Value Accounted for by Surveyed Contractors
Resurfacing	55.2
Restoration and Rehabilitation; Reconstruction and Minor Widening	58.4
New Bridges and Bridge Replacement	55.6
Major and Minor Bridge Rehabilitation	49.0
New Construction; Relocation; Major Widening	57.0
Safety / Traffic Operations / Traffic Systems Management; Environmentally Related; Physical Maintenance; Traffic Services	16.8

To obtain the data in the transactions matrix all the purchase data of each highway improvement type is inflated by the appropriate expansion factor. For example if the sample data accounts for 50 percent of the known value of the total, the total can be obtained by multiplying the sample by 2.0. To obtain the expansion factors for each highway improvement type, simply divide 1.0 by the sample percentage expressed as a decimal. Thus the expansion factor for Resurfacing is 1.0 / 0.552 = 1.812.

In addition to the 51 industry sectors defined in Table 6, the complete Kansas input-output model transactions matrix has six final payment sectors which are defined as follows:

Households - Personal income paid to Kansas residents by industry or sector

Gross Saving - Retained earnings and depreciation of industries and savings of households

Federal Government - Payments made by industries and sectors to the federal government, mostly in the form of taxes and fees

State Government - Payments made by industries and sectors to the state government, mostly in the form of taxes and fees

Local Government - Payments made by industries and sectors to local governments, mostly in the form of taxes and fees

Imports - Purchases made from out-of-state sources by Kansas industries, sectors, and households

Variation in Purchase Patterns by Highway Improvement Type

An examination of Table 7 indicates that the principal supplying industries for Resurfacing projects (hereafter referred to as Category 1) are Nonmetallic Mining, Petroleum and Coal Products, and Motor Freight. Nonmetallic Mining consists mostly of crushed stone, sand, gravel, and aggregate while Petroleum and Coal Products consists of asphalt, paving material, oil and greases, and diesel fuel. The $92.7 million expenditure on Nonmetallic Mining accounts for 36.7 percent of the total purchases from supplying industries ($252.8 million), which is defined as total inputs minus final payments except imports. The corresponding percentages for Petroleum and Coal Products and for Motor Freight are 28.9 and 14.7 respectively.

For Restoration and Rehabilitation; Reconstruction and Minor Widening projects (hereafter referred to as Category 2) the principal supplying industries are Nonmetallic Mining, Cement and Concrete, Petroleum and Coal Products, and Motor Freight. Together, these four sectors account for 56.1 percent of the total purchases from supplying industries ($741.8 million).

Cement and Concrete, Fabricated Metals, and Nonmetallic Mining are the major raw material inputs for New Bridges and Bridge Replacement projects (hereafter referred to as Category 3). Fabricated Metals include fabricated structural steel, reinforcing steel, rebar, guard

rail, bridge rail, sheet metal, and metal pipe. These three supplying sectors collectively account for 41.5 percent of total purchases from supplying industries ($54.0 million).

For Major and Minor Bridge Rehabilitation projects (hereafter referred to as Category 4) the paramount supplying industries are Cement and Concrete, Petroleum and Coal Products, Construction and Industrial Machinery, and Fabricated Metals. These four supplying sectors account or 39.7 percent of the total purchases from supplying industries ($17.0 million), with 22.1 percent attributable to Cement and Concrete.

Cement and Concrete, Nonmetallic Mining, and Petroleum and Coal Products constitute the principal supplying industries for New Construction; Relocation; Major Widening projects (hereafter referred to as Category 5). These three supplying sectors collectively account for 51.9 percent of total purchases from supplying industries ($114.0 million), with Cement and Concrete alone accounting for 21.5 percent.

For the sixth highway improvement type (hereafter referred to as Category 6) the major supplying industries are Nonmetallic Mining, Petroleum and Coal Products, Electrical Machinery (primarily traffic lights), Motor Freight, and Cement and Concrete. The percent of total purchases from supplying industries ($16.4 million) attributable to these five sectors is 46.3 percent.

The significance of imports (purchases from out-of-state suppliers) in the purchase pattern varies by highway improvement type. For Categories 3 and 6, imports account for 30.0 and 36.7 percent of total purchases from supplying industries. However the corresponding percentage for Category 1 is only 6.3 percent.

Substantial variation exists in the purchase patterns of the six highway improvement types. For example Nonmetallic Mining accounts for 36.7 percent of Category 1 total purchases from supplying industries, but only 4.6 percent of the Category 4 purchases. Petroleum and Coal Products expenditure represents about 29 percent of Category 1 total purchases from supplying industries, but the corresponding percentage for Category 3 is only 4.7 percent. Cement and Concrete plays almost no role in the purchase pattern of Category 1. However Cement and Concrete accounts for 19.0 to 23.5 percent of Category 2 through 5 total purchases from supplying industries. Fabricated Metal is virtually absent from Category 1 but accounts for 10.6 percent of the Category 3 purchases from supplying industries.

Table 8 is the portion of the direct requirements matrix that pertains to the six highway improvement types. It is obtained by dividing each of the numbers in the columns of the transactions matrix (Table 7) by the column total. The direct requirements matrix reveals the cents worth of input required from supplying industries and final payments sectors to produce one dollar of output.

Multipliers

Output multipliers for each Kansas industry can be calculated by summing the columns of the direct, indirect, and induced requirements matrix (see Appendix C for the matrix). The output multiplier reveals the total increase in Kansas output resulting from a given increase in the output of a particular industry sector. Thus if the output of an industry increased by $10 million and the output multiplier is 2.0, then the total output increase is $20 million. Output multipliers are a good indicator of the degree of economic interaction between each state industry sector and

Table 8

Direct Coefficients Matrix of the Six Highway Improvement Types
July 1, 1991 - September 30, 1996
(Dollars)

Supplying Industries and Final Payment Sectors	Highway Improvement Types					
	Category 1	Category 2	Category 3	Category 4	Category 5	Category 6
Agricultural Products	0	0	0	0	0	0
Agricultural Services	0.000493	0.000645	0.002505	0.000592	0.001420	0.003294
Crude Oil & Natural Gas	0	0.000227	0.002064	0	0	0
Oil & Gas Field Services	0	0	0	0	0	0
Nonmetallic Mineral Mining	0.246977	0.120555	0.037860	0.017909	0.096274	0.086679
Other Mining	0.008473	0	0	0	0	0
Maintenance & Repair	0.008950	0.019948	0.004859	0.001914	0.028615	0.009522
Building Construction	0	0	0	0	0	0
Category 1	0	0	0	0	0	0
Category 2	0	0	0	0	0	0
Category 3	0	0	0	0	0	0
Category 4	0	0	0	0	0	0
Category 5	0	0	0	0	0	0
Category 6	0	0	0	0	0	0
Heavy Construction	0	0.004425	0.001173	0.014628	0.002813	0
Special Trade Contractors	0.000080	0.000068	0.000103	0	0.000140	0
Apparel	0	0	0	0	0	0
Paper & Allied Products	0.000003	0.000015	0	0	0	0
Printing & Publishing	0.000003	0.000008	0	0	0	0
Industrial Chemicals	0.000003	0.003376	0.000019	0	0.001207	0
Agricultural Chemicals	0	0.000088	0	0	0.001411	0
Other Chemicals	0.000032	0.001402	0.000084	0	0.000773	0
Petroleum & Coal Products	0.194911	0.066497	0.023977	0.025132	0.060419	0.058634
Rubber & Plastic	0.000517	0.005450	0.002983	0.007884	0.003830	0
Cement & Concrete	0.001268	0.114716	0.118835	0.085511	0.110903	0.027393
Other Stone, Clay & Glass	0	0.000973	0.001595	0.001686	0.003297	0.000065
Primary Metal	0.000003	0.000209	0.003011	0	0	0.000326
Fabricated Metal	0.002853	0.014934	0.053629	0.020506	0.026685	0.007370
Other Fabricated Metal	0.000003	0.002556	0.010544	0	0.000226	0.001076
Farm Machinery & Equipment	0.000128	0.001861	0	0	0	0
Const. & Industrial Machinery	0.020498	0.026851	0.009127	0.022785	0.022547	0.005739
Food Products Machinery	0	0	0	0	0	0
Electrical Machinery	0	0.000140	0.001829	0	0.000009	0.039817
Other Machinery	0	0.003095	0	0	0	0
Motor Vehicles & Equipment	0	0.000065	0.002158	0	0	0
Trailer Coaches	0	0	0	0	0	0
Other Transportation Equip.	0.000005	0.000057	0	0	0	0
Other Manufacturing	0.002123	0.016892	0.015281	0.009797	0.015411	0.013827
Railroad Transportation	0.000506	0.001032	0	0	0	0
Motor Freight	0.098986	0.037269	0.016285	0.007382	0.021308	0.034958
Other Transportation	0.000008	0.000035	0.001773	0.000524	0.000041	0

Table 8

Direct Coefficients Matrix of the Six Highway Improvement Types
July 1, 1991 - September 30, 1996
(Dollars)

Supplying Industries and Final Payment Sectors	Highway Improvement Types					
	Category 1	Category 2	Category 3	Category 4	Category 5	Category 6
Communication	0.000754	0.000601	0.000788	0.001071	0.000805	0.000457
Elec., Gas, & Sanitary Services	0.000703	0.001151	0.000891	0.000752	0.000995	0.002641
Mach., Equip., & Supplies Wh	0.000075	0.000289	0.005591	0.001344	0.000506	0
Other Wholesale Trade	0.000535	0.002158	0.000216	0.001732	0	0.000457
Farm Equipment - Retail	0	0	0	0	0	0
Gasoline Stations	0.004805	0.003394	0.005431	0.004397	0.001786	0.020545
Eating & Drinking Places	0.001518	0.001360	0.001895	0.010003	0.000913	0.002739
Other Retail Trade	0.003673	0.005395	0.003264	0.011643	0.000457	0.001402
Banking	0.000104	0.000663	0.000178	0.000592	0	0.000065
Other Financial Institutions	0.000735	0.000478	0	0.001641	0	0
Insurance & Real Estate	0.011547	0.012036	0.013583	0.017043	0.011540	0.009196
Lodging Services	0.006143	0.002665	0.004831	0.013352	0.004242	0.006816
Personal Services	0.000005	0.000011	0.000206	0.000091	0.000009	0
Business Services	0.001470	0.007124	0.004465	0.011689	0.006100	0.002707
Medical & Health Services	0.001939	0.000419	0.000760	0.000570	0.000185	0.000359
Other Services	0.009981	0.002978	0.002542	0.002005	0.000068	0.001989
Households	0.140639	0.221399	0.250033	0.386065	0.220291	0.188912
Gross Savings	0.135104	0.127339	0.188430	0.170430	0.200860	0.244448
Federal Government	0.034869	0.026365	0.033527	0.032742	0.043715	0.022077
State Government	0.012400	0.015844	0.013349	0.019846	0.015493	0.007729
Local Government	0.003495	0.004449	0.008490	0.003327	0.004296	0.002870
Imports	0.042684	0.120491	0.151836	0.093417	0.090409	0.195891
Total Inputs	1.0	1.0	1.0	1.0	1.0	1.0

In some cases the column totals may not sum to exactly 1.0 due to rounding error.

the rest of the state economy. Thus Kansas industries that purchase most of their inputs from Kansas producers will have higher output multipliers than sectors that rely heavily on out-of-state suppliers. Thus since Category 1 has the lowest propensity to import, it has the largest output multiplier.

Income multipliers can be calculated by dividing the values in the household row of the direct, indirect, and induced matrix by their corresponding values in the household row of the direct requirements matrix. Income multipliers indicate the total income generated from the construction projects including direct wages and salaries as well as indirect income.

The employment multipliers by highway improvement type are computed by employing a three step procedure. The first step is to calculate employment/output ratios for each of the industry sectors in the Kansas input-output model, including the six highway improvement categories. The employment/output ratios for the six highway improvement types are computed from data supplied by the sample highway contractors. The corresponding ratios for the other Kansas industry sectors are computed from data in [IMPLAN, 1993]. The second step is to multiply each of the entries in the columns of the six highway categories of the matrix in Appendix C by the appropriate employment/output ratio. The third step is to sum the columns. The result is an employment multiplier for each of the six highway improvement types. These multipliers are expressed as employment per million dollars of output (i.e. highway contract value).

The output, income, and employment multipliers for all Kansas industry sectors are displayed in Table 9.

Table 9

Output, Income, and Employment Multipliers of Kansas Industries

Kansas Industry	Output Multiplier	Income Multiplier	Employment Multiplier
Corn	2.367879	2.119918	44.85
Sorghum	2.406270	1.944704	47.38
Wheat	2.685687	1.885769	57.41
Other Grains	2.578868	1.894206	50.99
Soybeans	2.439980	2.073368	53.12
Hay	2.428953	1.567228	55.57
Dairy	2.881539	2.870977	50.29
Poultry	2.787577	2.583003	44.81
Cattle	2.865587	4.404180	47.31
Hogs	2.872786	4.836714	51.00
Other Agricultural Products	2.407106	2.772161	57.92
Agricultural Services	2.048085	1.612013	69.37
Crude Oil & Natural Gas	1.923375	3.310774	39.73
Oil & Gas Field Services	2.565424	3.057609	68.32
Nonmetallic Mineral Mining	1.914371	3.303427	27.87
Other Mining	2.875019	2.005431	51.10
Maintenance & Repair	3.571030	n.a.	66.60
Building Construction	2.783418	3.319424	53.38
Category 1	2.671768	2.990495	37.68
Category 2	2.587211	2.346804	42.26
Category 3	2.374471	2.087858	41.74
Category 4	2.518010	1.725710	54.44
Category 5	2.468194	2.240519	39.77
Category 6	2.159928	2.123587	34.12
Heavy Construction	2.765026	1.973319	52.67
Special Trade Contractors	2.571030	1.571192	56.79
Apparel	1.493767	2.675133	25.51
Paper & Allied Products	2.226493	2.670520	37.04
Printing & Publishing	1.867400	1.673898	34.78
Industrial Chemicals	2.729608	2.824057	36.84
Agricultural Chemicals	2.022306	2.255037	26.50
Other Chemicals	1.836140	2.000676	22.51
Petroleum & Coal Products	2.332864	8.564197	28.62
Rubber & Plastic	1.843217	1.862267	31.62
Cement & Concrete	2.556355	1.776322	46.65
Other Stone, Clay, Glass	2.557319	2.331672	41.72
Primary Metals	2.487136	2.259783	43.92
Fabricated Metal	2.600051	1.874190	51.35
Other Fabricated Metal	2.379366	1.674303	46.93
Farm Machinery & Equipment	2.565020	2.733575	43.71
Const. & Industrial Machinery	2.135823	2.219496	34.96
Food Products Machinery	2.264101	2.057034	39.86
Electrical Machinery	2.424399	2.082785	45.28
Other Machinery	2.369058	2.388912	43.45
Motor Vehicles & Equipment	1.619144	2.057048	18.67
Trailer Coaches	2.793826	2.744912	51.30

Table 9

Output, Income, and Employment Multipliers of Kansas Industries

Kansas Industry	Output Multiplier	Income Multiplier	Employment Multiplier
Other Transport Equipment	2.252346	1.920213	39.23
Other Manufacturing	1.923064	1.493734	39.22
Railroad Transportation	2.463251	1.479530	50.11
Motor Freight	2.271656	1.526228	52.86
Other Transportation	2.352978	1.553125	43.52
Communication	2.192036	1.410622	43.75
Elec., Gas, Sanitary Serv.	1.656502	1.991570	21.40
Mach., Equip. & Supplies Wholesale	2.741069	1.675687	69.56
Other Wholesale Trade	2.557401	1.598065	67.42
Farm Equipment-Retail	2.602634	1.579802	82.94
Gasoline Stations	2.213328	1.484249	72.87
Eating & Drinking Places	2.595213	2.029643	76.15
Other Retail Trade	2.810186	1.937910	87.62
Banking	2.621621	1.671543	54.95
Other Financial Institutions	2.482629	1.724756	68.11
Insurance & Real Estate	2.678050	1.877532	53.56
Lodging Services	2.352356	2.034057	73.32
Personal Services	2.307992	1.694261	81.38
Business Services	2.397032	1.733589	64.43
Medical & Health Services	2.356601	1.475040	63.61
Other Services	2.323070	1.389535	64.09

The output, income, and employment multipliers for the six highway improvement types are as follows:

Highway Improvement Type	Output Multiplier	Income Multiplier	Employment Multiplier
Category 1	2.671768	2.990495	37.68
Category 2	2.587211	2.346804	42.26
Category 3	2.374471	2.087858	41.74
Category 4	2.518010	1.725710	54.44
Category 5	2.468194	2.240519	39.77
Category 6	2.159928	2.123587	34.12

The above multipliers actually under-estimate the economic impact of the Kansas CHP (K jurisdiction) highway construction contracts examined in this study. The sample highway contractors that provided purchase data for this study received 1136 prime contracts and 2464 subcontracts. Since many of these contracts involved multiple subcontractors it was impractical to attempt to obtain the input data for highway work that was subcontracted. The effect of this is to omit the economic impact of the inputs that the contractors purchased from each other. This is reflected in the transactions matrix (Table 7) in which all transactions in the rows for Categories 1 through 6 are zero. Thus the output, income, and employment impacts calculated with the above listed multipliers are conservative estimates.

CHAPTER 3

THE ECONOMIC IMPACT OF THE KANSAS COMPREHENSIVE HIGHWAY PROGRAM

Direct Wages and Salaries and Employment

This project examines the economic and employment impacts of Kansas CHP (K jurisdiction) highway construction contracts which have a total value of $2864.6 million (see Table 4). An estimated total of $597.8 million in wages and salaries (including employer paid benefits) are attributable to these contracts, or 20.9 percent of the total contract value. The wages and salaries paid by highway improvement type are as follows:

Highway Improvement Type	Wages and Salaries	Percent of Contract Value
Resurfacing	$91.1 million	14.1
Restoration and Rehabilitation; Reconstruction and Minor Widening	$358.9 million	22.1
New Bridges and Bridge Replacement	$39.1 million	25.1
Major and Minor Bridge Rehabilitation	$31.2 million	38.7
New Construction; Relocation; Major Widening	$68.2 million	22.0
Safety / Traffic Operations / Traffic Systems Management; Environmentally Related; Physical Maintenance; Traffic Services	$9.3 million	18.8

The above data reveal that the percent of total contract value attributable to wages and salaries varies a great deal by highway improvement type; from a low of 14.1 percent for Resurfacing projects to a high of 38.7 percent for Major and Minor Bridge Rehabilitation.

Direct total labor hours and full time equivalent employment attributable to the CHP (K jurisdiction) highway construction contracts are as follows:

Highway Improvement Type	Total Hours Worked	Full Time Equivalent Employment
Resurfacing	6,337,525	3169
Restoration and Rehabilitation; Reconstruction and Minor Widening	20,686,782	10,343
New Bridges and Bridge Replacement	2,319,628	1160
Major and Minor Bridge Rehabilitation	1,975,344	988
New Construction; Relocation; Major Widening	3,884,015	1942
Safety / Traffic Operations / Traffic Systems Management; Environmentally Related; Physical Maintenance; Traffic Services	616,289	308

Total labor hours can be converted to full time equivalent employment by assuming some value for annual hours worked per employee. Since highway construction is a very seasonal business we asked several contractors to provide an estimate of this figure. While there was some variation in the estimates, most of them clustered around 2000 hours. Thus annual full time equivalent employment is obtained by dividing total hours worked by 2000 hours. The total hours worked for all six highway improvement types as a group is 35,819,583, resulting in annual full time equivalent employment of 17,910 in the highway construction industry.

It also should be noted that these are good paying jobs. The average wage per hour (including employer paid benefits) can be obtained for each highway improvement type by dividing wages and salaries by hours worked.

Highway Improvement Type	Average Wage per Hour
Resurfacing	$14.37
Restoration and Rehabilitation; Reconstruction and Minor Widening	$17.35
New Bridges and Bridge Replacement	$16.86
Major and Minor Bridge Rehabilitation	$15.79
New Construction; Relocation; Major Widening	$17.56
Safety / Traffic Operations / Traffic Systems Management; Environmentally Related; Physical Maintenance; Traffic Services	$15.09

When total wages and salaries of $597.8 million are divided by total hours worked of 35.8 million, the result is an average wage per hour of $16.70 for all Kansas CHP (K jurisdiction) highway construction contracts.

Output, Income, and Employment Impacts

The output, income, and employment multipliers for the six highway improvement types are obtained by analyzing Kansas CHP (K jurisdiction) highway construction contracts awarded between July 1, 1991 and September 30, 1996. In order to measure the economic impacts of the entire CHP, KDOT supplied the research the team with the value of Kansas CHP (K jurisdiction)

highway construction contracts awarded during the non-sample period. For the last 3 months of the CHP (April - June 1997), KDOT provided the estimated letting costs for these contracts. In measuring the output, income, and employment impacts of the CHP, it is assumed that the multipliers derived from the sample period contracts are the same for the other CHP contracts.

One way to measure the economic impact of the Kansas CHP is to multiply the total CHP contract value of each highway improvement type by its respective output multiplier. As indicated by the data in Table 10, the Kansas CHP (K jurisdiction) highway construction contracts generated output valued at $7.4 billion (includes the direct impact of $2.86 billion).

An alternative measure of the economic impact of the Kansas CHP can be obtained by multiplying the direct wages and salaries of each highway improvement type by its respective income multiplier. Direct wages and salaries for CHP (K jurisdiction) highway construction contracts are estimated by assuming that wages and salaries are the same percentage of total contract value as the contracts awarded during the sample period. Estimated direct wages and salaries for all CHP (K jurisdiction) highway construction contracts are in column 2 of Table 11. As indicated by Table 11, the income impact is $1.4 billion (includes the direct impact of $597.8 million).

The actual output and income impacts are greater than the estimates of $7.4 billion and $1.4 billion due to the understatement of the output and income multipliers discussed in Chapter 2.

The employment multipliers can be combined with the total contract value of the six highway improvement types to calculate the employment impacts of the Kansas CHP. The

Table 10

Kansas CHP Economic Impact (Output) by Highway Improvement Type
(Millions of Dollars)

(1) Highway Improvement Type	(2) Total Highway Contract Value	(3) Output Multiplier	(4) Output Impact
Category 1	$647.0	2.671768	$1728.6
Category 2	$1621.6	2.587211	$4195.4
Category 3	$156.0	2.374471	$370.4
Category 4	$80.6	2.518010	$203.0
Category 5	$309.8	2.468194	$764.6
Category 6	$49.6	2.159928	$107.1
Total	$2864.6		$7369.1

Column (4) is the product of columns (2) and (3).

Table 11
Kansas CHP Economic Impact (Income) by Highway Improvement Type
(Millions of Dollars)

(1) Highway Improvement Type	(2) Direct Wages and Salaries	(3) Income Multiplier	(4) Income Impact
Category 1	$91.1	2.990495	$272.4
Category 2	$358.9	2.346804	$842.3
Category 3	$39.1	2.087858	$81.6
Category 4	$31.2	1.725710	$53.8
Category 5	$68.2	2.240519	$152.8
Category 6	$9.3	2.123587	$19.7
Total	$597.8		$1422.6

Column (4) is the product of columns (2) and (3).

results are in Table 12, which indicates that the Kansas CHP (K jurisdiction) highway construction contracts generated 117,820 full time equivalent jobs with 58.2 percent occurring in Category 2. It should be noted that the employment impact is also understated due to the inability to obtain purchase data for highway work that was subcontracted.

Table 12
Kansas CHP Employment Impact by Highway Improvement Type
(Measured in Full Time Equivalent Employment)

(1)	(2)	(3)	(4)
Highway Improvement Type	Total Highway Contract Value*	Employment Multiplier	Employment Impact
Category 1	$647.0	37.68	24,379.0
Category 2	$1621.6	42.26	68,528.8
Category 3	$156.0	41.74	6511.4
Category 4	$80.6	54.44	4387.9
Category 5	$309.8	39.77	12,320.7
Category 6	$49.6	34.12	1692.4
Total	$2864.6		117,820.2

*Highway contract value measured in millions of dollars

Column (4) is the product of columns (2) and (3).

CHAPTER 4

CONCLUSION

The CHP was established by passage of 1989 House Bill 2014 and the first contracts for construction were awarded in fiscal year 1990. After the final CHP contracts for construction are awarded in June 1997 approximately $4 billion will have been spent on CHP projects. After deducting from the $4 billion the costs for preliminary engineering, utility adjustments, right-of-way acquisition and construction engineering, the remaining $3.18 billion was devoted to as let construction expenditures. After deducting from the $3.18 billion the as let costs for construction projects of jurisdictions off the state highway system, the remaining $2.86 billion was spent on K jurisdiction projects. These are typically those projects on the state highway system outside of cities except for interstate roads, which are classified as K jurisdiction projects regardless of location. This study measures the output, income, and employment impacts of the $2.86 billion devoted to K jurisdiction construction projects. This is achieved through analysis of a sample of these construction contracts which have a total contract value of $2 billion. A 68 sector, survey-based, input-output model of the Kansas economy is employed to measure the economic impacts. The principal conclusions of the study are as follows:

1. The economic impact of the Kansas CHP (K jurisdiction) highway construction contracts as measured by output is $7.4 billion distributed by highway improvement type as follows:

Highway Improvement Type	Highway Contract Value (Millions of Dollars)	Output Multiplier	Output Impact (Millions of Dollars)
Category 1	$647.0	2.671768	$1728.6
Category 2	$1621.6	2.587211	$4195.4
Category 3	$156.0	2.374471	$370.4
Category 4	$80.6	2.518010	$203.0

Category 5	$309.8	2.468194	$764.6
Category 6	$49.6	2.159928	$107.1
Total	$2864.6		$7369.1

The output impact for each highway improvement type is obtained by multiplying the highway contract value by the output multiplier.

2. The economic impact of the Kansas CHP (K jurisdiction) highway construction contracts as measured by income is $1.4 billion distributed by highway improvement type as follows:

Highway Improvement Type	Direct Wages and Salaries (Millions of Dollars)	Income Multiplier	Income Impact (Millions of Dollars)
Category 1	$91.1	2.990495	$272.4
Category 2	$358.9	2.346804	$842.3
Category 3	$39.1	2.087858	$81.6
Category 4	$31.2	1.725710	$53.8
Category 5	$68.2	2.240519	$152.8
Category 6	$9.3	2.123587	$19.7
Total	$597.8		$1422.6

The income impact for each highway improvement type is calculated by multiplying direct wages and salaries (i.e., wages and salaries generated in the highway construction industry) by the income multiplier.

3. The economic impact of the Kansas CHP (K jurisdiction) highway construction contracts as measured by employment is 117,820 full time equivalent (FTE) jobs distributed by highway improvement type as follows:

Highway Improvement Type	Highway Contract Value (Millions of Dollars)	Employment Multiplier	Employment Impact (Full-Time Equivalent Jobs)
Category 1	$647.0	37.68	24,379.0
Category 2	$1621.6	42.26	68,528.8
Category 3	$156.0	41.74	6511.4
Category 4	$80.6	54.44	4387.9
Category 5	$309.8	39.77	12,320.7
Category 6	$49.6	34.12	1692.4
Total	$2864.6		117,820.2

The employment impact for each highway improvement type is calculated by multiplying highway contract value by the employment multiplier.

4. The output, income, and employment impacts in conclusions 1 through 3 under-estimate the economic impact of the Kansas CHP (K jurisdiction) highway construction contracts since we were unable to obtain input purchase data for highway work that was subcontracted. The effect of this is to omit the economic impact of the inputs that the highway contractors purchased from each other.

5. The output, income, and employment multipliers for the six highway improvement types are as follows:

Highway Improvement Type	Output Multiplier	Income Multiplier	Employment Multiplier
Category 1	2.671768	2.990495	37.68
Category 2	2.587211	2.346804	42.26
Category 3	2.374471	2.087858	41.74
Category 4	2.518010	1.725710	54.44
Category 5	2.468194	2.240519	39.77
Category 6	2.159928	2.123587	34.12

The employment multiplier measures the employment per million dollars of CHP highway contract value.

6. Wages and salaries account for 20.9 percent of the total value of the Kansas CHP (K jurisdiction) highway construction contracts. However there is substantial variation in this percentage among highway improvement types ranging from a low of 14.1 percent for Category 1 to a high of 38.7 percent for Category 4.

7. The $2864.6 million in CHP (K jurisdiction) highway construction contracts let by KDOT provided full time equivalent jobs for 17,910 construction industry workers. These are good paying jobs. The average wage per hour for the CHP contracts is $16.70.

8. The principal supplying industries for the various highway improvement types are as follows:

Category 1	Category 2	Category 3	Category 4	Category 5	Category 6
Nonmetallic Mining	Nonmetallic Mining	Cement & Concrete	Cement & Concrete	Cement & Concrete	Nonmetallic Mining
Petroleum and Coal Products	Cement & Concrete	Fabricated Metals	Petroleum and Coal Products	Nonmetallic Mining	Petroleum and Coal Products
Motor Freight	Petroleum and Coal Products	Nonmetallic Mining	Construction Machinery	Petroleum and Coal Products	Electrical Machinery
	Motor Freight	Fabricated Metals			Motor Freight
					Cement & Concrete

9. There is substantial variation in the input structure / cost structure of the six highway improvement types.

10. The significance of imports (purchases from out-of-state suppliers) in the input structure varies by highway improvement type. For Categories 3 and 6, imports account for 30 and 36.7 percent of purchases from supplying industries. The corresponding percentage for Category 1 is only 6.3 percent. Thus Category 1 has the largest output multiplier since most of the economic impact is "internalized" within Kansas.

Although the economic impacts measured in this study are considerable, it should be noted that highway investment yields many other benefits to highway users that are beyond the scope of this project. For example highway improvements that reduce congestion can result in reductions in vehicle operating costs such as maintenance, fuel, tires, and depreciation. These improvements can also reduce average travel times and result in lower highway accident costs. Further research is needed to quantify these highway user benefits.

The study did not examine the economic impacts of other aspects of the Kansas CHP such as preliminary engineering by consultants which includes surveys, environmental clearances, permits, and preparation of design plans. The study also excludes the impact of utility adjustments which provide for payment of funds to affected utility companies to move utilities on KDOT right of way. The research project does not measure the impact of right-of-way acquisitions which involve payments to property owners to obtain land for construction of new bridges or pavements. The study omits the impact of construction engineering which includes surveys for bridge and pavement construction, inspection of construction materials, and other project administration activities. Finally, the study omits the as let costs for construction projects of jurisdictions off the state highway system. Further research is needed to quantify these impacts.

REFERENCES

Emerson, M. Jarvin, "The Kansas Input - Output Model: A Study in Economic Linkages," Bulletin 655, Agricultural Experiment Station, Kansas State University, 1989.

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APPENDIX A

FEDERAL HIGHWAY ADMINISTRATION DEFINITIONS OF HIGHWAY IMPROVEMENT TYPES

NEW CONSTRUCTION - Construction of a new facility that will not replace or relocate an existing facility. A new facility will provide: (1) a facility where none existed, or (2) an additional and alternate facility to an existing facility that will remain open and continue to serve through traffic.

RELOCATION - Construction of a facility on a new location that replaces an existing route. The new facility carries all the through traffic with the previous facility closed or retained as a land-service road only.

RECONSTRUCTION - Construction on approximate alignment of an existing route where the old pavement structure is substantially removed and replaced. Such reconstruction may be to the existing number of lanes or may include widening to provide additional through lanes, or utilizing, or adding, or revising interchanges, replacing other highway elements such as a grade separation to replace an existing grade intersection or otherwise improving the existing facility without changing the basic character of the facility.

MAJOR WIDENING - The addition of lanes or dualization of an existing facility where the existing pavement is salvaged. Also included, where necessary, is the resurfacing of existing pavement and other incidental improvements such as drainage and shoulder improvements.

MINOR WIDENING - Widening the lanes and/or shoulders of an existing facility without adding through lanes. In many cases, the improvement will include resurfacing the existing pavement and other incidental improvements such as shoulder and drainage improvements.

RESTORATION AND REHABILITATION - Work required to return an existing pavement (including shoulders) to a condition of adequate structural support or to a condition adequate for placement of an additional stage of construction. There may be some upgrading of unsafe features or other incidental work in conjunction with restoration and rehabilitation. Typical

improvements would include replacing spalled or malfunctioning joints; substantial pavement stabilization prior to resurfacing; grinding/grooving of rigid pavements; replacing deteriorated materials; reworking or strengthening bases or subbases, and adding underdrains.

RESURFACING - Placement of additional surface material over the existing roadway to improve serviceability or to provide additional strength. There may be some upgrading of unsafe features and other incidental work in conjunction with resurfacing. Where surfacing is constructed by separate project as a final state of construction, the type of improvement should be the same as that of the preceding stage -- new route, relocation, reconstruction, minor widening, etc.

NEW BRIDGE - Construction of a new bridge which does not replace or relocate an existing bridge.

BRIDGE REPLACEMENT - The total replacement of a structurally inadequate or functionally obsolete bridge with a new structure constructed in the same general traffic corridor to current geometric construction standards. A bridge removed and not replaced or replaced with a lesser facility is considered a bridge replacement. Incidental roadway approach work is included.

MAJOR BRIDGE REHABILITATION - The major work required to restore the structural integrity of a bridge as well as work necessary to correct major safety defects. Bridge deck replacement (both partial and complete) and the widening of bridges to specified standards are included. Construction of a dual structure to alleviate a capacity deficiency is also included.

MINOR BRIDGE REHABILITATION - Work required to correct minor structure and safety defects or deficiencies, such as deck patching, deck resurfacing, deck protective systems, upgrading railings, curbs and gutters, and other minor bridge work.

SAFETY/TRAFFIC OPERATIONS/TSM (Traffic System Management) - A project or a significant portion of a project that provides features or devices to enhance safety; or a traffic

operation improvement which is designed to reduce traffic congestion and to facilitate the flow of traffic, both people and vehicles, on existing systems, or to conserve motor fuels; or which is designed to reduce vehicle use or to improve transit service.

ENVIRONMENTALLY RELATED - The category includes improvements that do not provide any increase in the level of service, in the condition of the facility, or in safety features. Typical improvements, which fall in this category, would be noise barriers, beautification and other environmentally related features not built as a part of the above identified improvement types.

PHYSICAL MAINTENANCE - Includes maintenance of condition for roads and structures.

TRAFFIC SERVICES - Includes snow removal and the maintenance of traffic control devices.

APPENDIX B

HIGHWAY CONTRACTOR SURVEY FORMS FOR PURCHASE - COST INFORMATION AND TOTAL LABOR HOURS

HIGHWAY ECONOMIC IMPACT PROJECT

KDOT Contractor No.: SAMPLE PQ1

Person answering questionnaire _____

We request your purchase and cost information on the highway projects listed below.

These contracts deal only with:

KDOT Contract Numbers	Route	KDOT Project Number	Final Contract Amount (if avail.)	Total Labor Hours
92000001	K-490	K 1000-01	_____	_____
93000001	U-220	K 2000-01	_____	_____
		TOTALS	_____	_____

HIGHWAY ECONOMIC IMPACT PROJECT

KDOT Contractor No.: SAMPLE Respondent_____ PQ1

Please provide your firm's purchases by supplying industry on only the projects on the previous page, which were let from July 1, 1991 to September 30, 1996.

Provide figures from all the projects as though they were one project.

These contracts deal only with:

PURCHASES:

Supplying Industries - brief description (See attached list of industries.)	Total Purchases (Include both direct and overhead costs) ($ or %)	Percent Supplied by Producers in Kansas
Other Expenditures:		
Paid to Subcontractors		
Wages and salaries (include both direct and overhead salaries)		
Taxes - Federal		
- State		
- Local		
Depreciation and Retained Earnings		
TOTAL EXPENDITURES		

HIGHWAY ECONOMIC IMPACT PROJECT

KDOT Contractor No.: SAMPLE SQ1

Person answering questionnaire _____

We request your purchase and cost information on the highway projects listed below.

These contracts deal only with:

KDOT Contract Numbers	Route	KDOT Project Number	Final Contract Amount (if avail.)	Type of Subcontract Work Done	Total Labor Hours
92000001	K-490	K 1000-01	_____	_____	____
93000001	U-220	K 2000-01	_____	_____	____
		TOTALS	_____	_____	____

HIGHWAY ECONOMIC IMPACT PROJECT

KDOT Contractor No.: SAMPLE Respondent_____ SQ1

Please provide your firm's purchases by supplying industry on only the projects on the previous page, which were let from July 1, 1991 to September 30, 1996.

Provide figures from all the projects as though they were one project.

These contracts deal only with:

PURCHASES:

Supplying Industries - brief description (See attached list of industries.)	Total Purchases (Include both direct and overhead costs) ($ or %)	Percent Supplied by Producers in Kansas
Other Expenditures:		
Paid to Subcontractors		
Wages and salaries (include both direct and overhead salaries)		
Taxes - Federal		
- State		
- Local		
Depreciation and Retained Earnings		
TOTAL EXPENDITURES		

HIGHWAY EMPLOYMENT IMPACT PROJECT SECTOR LIST

AGRICULTURAL:

1. Agricultural Products
2. Agricultural Services

MINING:

3. Crude Oil and Natural Gas
4. Oil and Gas Field Services
5. Nonmetallic Mining
6. Other Mining

CONSTRUCTION:

7. Maintenance and Repair
8. Building Construction
9. Heavy Construction
10. Special Trade Construction

MANUFACTURING:

11. Apparel
12. Paper and Allied Products
13. Printing and Publishing
14. Industrial Chemicals
15. Agricultural Chemicals
16. Other Chemicals
17. Petroleum and Coal Products
18. Rubber and Plastics
19. Cement and Concrete
20. Other Stone and Clay Products
21. Primary Metals
22. Fabricated Metals
23. Other Fabricated Metals
24. Farm Machinery
25. Construction Machinery
26. Food Products Machinery
27. Electrical Machinery
28. Other Machinery
29. Motor Vehicles
30. Trailer Coaches
31. Other Transportation Equipment
32. Other Manufacturing

TRANSPORTATION:

33. Railroad Transportation
34. Motor Freight
35. Other Transportation

UTILITIES:

36. Communications
37. Electric, Gas, and Sanitary Services

WHOLESALE:

38. Machinery and Equipment
39. Other Wholesale Trade

RETAIL:

40. Farm Equipment Dealers
41. Gasoline Service Stations
42. Eating and Drinking Places
43. Other Retail Trade

FINANCE, INSURANCE, REAL ESTATE:

44. Banking
45. Other Finance
46. Insurance and Real Estate

SERVICES:

47. Lodging Services
48. Personal Services
49. Business Services
50. Medical and Health Services
51. Other Services

APPENDIX C

THE DIRECT, INDIRECT, AND INDUCED REQUIREMENTS MATRIX OF THE KANSAS INPUT-OUTPUT MODEL

Direct, Indirect, and Induced Requirements Matrix	Corn	Sorghum	Wheat	Other Grains	Soybeans	Hay	Dairy	Poultry	Cattle
Corn	1.036114	0.000577	0.000699	0.000587	0.000566	0.000666	0.084712	0.012216	0.080321
Sorghum	0.001081	1.010873	0.001411	0.001184	0.001153	0.001342	0.119968	0.021757	0.139800
Wheat	0.000925	0.001023	1.033975	0.000962	0.001075	0.001107	0.046929	0.057106	0.034678
Other Grains	0.000046	0.000050	0.000062	1.053843	0.000048	0.000574	0.000068	0.000061	0.000114
Soybeans	0.000052	0.000056	0.000069	0.000058	1.009861	0.000066	0.000304	0.000302	0.000154
Hay	0.000624	0.000672	0.000812	0.000683	0.000657	1.000844	0.016584	0.001106	0.127744
Dairy	0.001483	0.001615	0.002015	0.001710	0.001572	0.001967	1.001988	0.001960	0.001590
Poutlry	0.000049	0.000053	0.000066	0.000056	0.000052	0.000065	0.000080	1.000079	0.000059
Cattle	0.005747	0.006188	0.007469	0.006281	0.006044	0.007076	0.039248	0.006930	1.233883
Hogs	0.000571	0.000616	0.000744	0.000626	0.000601	0.000706	0.000687	0.000686	0.000567
Other Ag Prod	0.000611	0.000664	0.000823	0.000696	0.000642	0.007695	0.000904	0.000812	0.001528
Ag Services	0.011414	0.024265	0.049307	0.041525	0.000634	0.025117	0.059108	0.031546	0.024940
Oil/Gas Mining	0.025245	0.024853	0.032205	0.058749	0.030620	0.024984	0.015078	0.027790	0.014054
Oil/Gas Fld Sv	0.006851	0.006744	0.008742	0.015934	0.008306	0.006778	0.004092	0.007539	0.003814
Nonmetalic Mng	0.000148	0.000117	0.000246	0.000096	0.000072	0.000075	0.000089	0.000086	0.000071
Other Mining	0.000226	0.000214	0.000306	0.000390	0.000227	0.000279	0.000198	0.000245	0.000160
Maint & Repair	0.012276	0.011851	0.011243	0.010772	0.007692	0.009950	0.017216	0.019971	0.008889
Bldg Constr	0.000003	0.000003	0.000004	0.000004	0.000003	0.000004	0.000003	0.000003	0.000003
Category 1	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Category 2	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Category 3	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Category 4	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Category 5	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Category 6	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Heavy Constr	0.000051	0.000049	0.000047	0.000045	0.000032	0.000041	0.000071	0.000083	0.000037
Spec Tr Constr	0.012619	0.012183	0.011565	0.011088	0.007924	0.010234	0.017681	0.020506	0.009140
Meat Prod	0.012107	0.013031	0.015709	0.013207	0.012734	0.014866	0.014638	0.014632	0.012033
Dairy Prod	0.003932	0.004281	0.005343	0.004532	0.004167	0.005215	0.004942	0.004871	0.004077
Grain Mill Prd	0.003818	0.004234	0.004837	0.003951	0.004489	0.004556	0.212635	0.260577	0.110792
Other Food Prd	0.010226	0.011067	0.013527	0.011429	0.010868	0.012943	0.060063	0.059679	0.030461
Apparel	0.000254	0.000266	0.000332	0.000389	0.000278	0.000300	0.000962	0.001168	0.000588
Paper Prod	0.002942	0.002920	0.003104	0.002229	0.002516	0.002263	0.004736	0.005354	0.003276
Printing & Pub	0.015647	0.015332	0.017552	0.011801	0.013406	0.012577	0.013869	0.014894	0.011772
Ind Chemicals	0.000419	0.000405	0.000393	0.000471	0.000416	0.000270	0.000306	0.000388	0.000255
Ag Chemicals	0.046475	0.056986	0.042270	0.025239	0.081443	0.016489	0.016132	0.006102	0.018036
Other Chemicals	0.084143	0.078801	0.052963	0.033675	0.080525	0.012297	0.032865	0.045611	0.032255
Petro & Coal	0.053054	0.049726	0.071493	0.143850	0.059163	0.056766	0.032402	0.067894	0.030185
Rubber/Plastic	0.002290	0.002250	0.002214	0.003390	0.002802	0.001988	0.001843	0.001805	0.001525
Cement/Concr	0.003003	0.002069	0.005572	0.000624	0.000498	0.000612	0.001332	0.001141	0.001035
O Stone/Clay	0.001211	0.001262	0.001494	0.001694	0.001374	0.001467	0.001223	0.001192	0.001042
Primary Metals	0.001487	0.001364	0.001180	0.003380	0.002262	0.001227	0.000967	0.000849	0.000738
Fab Metals	0.003911	0.003618	0.003312	0.008481	0.005473	0.003324	0.002856	0.002807	0.002117
O Fab Metals	0.002226	0.002105	0.001945	0.005031	0.003238	0.001946	0.001659	0.001334	0.001207
Farm Machinery	0.025081	0.022579	0.018268	0.062354	0.039952	0.020107	0.014395	0.011412	0.011036
Constr Mach	0.000147	0.000141	0.000153	0.000144	0.000223	0.000102	0.000105	0.000115	0.000103
Food/Spec Mach	0.000495	0.000475	0.000667	0.000509	0.000397	0.000280	0.000379	0.001178	0.000296
Elec Mach	0.001970	0.002091	0.002528	0.002260	0.002149	0.002383	0.002125	0.002208	0.001819
Other Mach	0.000914	0.000921	0.001013	0.001338	0.001080	0.000971	0.000884	0.000898	0.000725
Motor Vehicles	0.001077	0.001125	0.001298	0.001571	0.001249	0.001305	0.001104	0.001118	0.000957
Aerospace	0.002896	0.002787	0.002967	0.001549	0.005597	0.001702	0.002052	0.002151	0.002307
Trailer Coach	0.000142	0.000155	0.000195	0.000166	0.000151	0.000191	0.000157	0.000154	0.000139
O Trans Eq	0.000055	0.000058	0.000071	0.000074	0.000061	0.000068	0.000060	0.000063	0.000051
Other Mfg	0.004121	0.003893	0.003926	0.002129	0.002730	0.001719	0.002734	0.002353	0.002258
RR Transp	0.006050	0.006129	0.007384	0.008460	0.006706	0.007028	0.007144	0.007790	0.005532
Motor Freight	0.016139	0.016621	0.021879	0.030221	0.022385	0.016195	0.015131	0.018314	0.013189
Other Transp	0.007469	0.007223	0.008147	0.008511	0.006544	0.005821	0.005327	0.006199	0.004638
Communications	0.015338	0.014957	0.016240	0.016761	0.017021	0.013858	0.013046	0.013853	0.011179
Elec/Gas/SanSr	0.042116	0.043371	0.050945	0.056411	0.049291	0.075298	0.053403	0.048463	0.039866
Groc Whlse	0.003359	0.003651	0.004534	0.003845	0.003549	0.004404	0.008620	0.009295	0.005619
Farm Prod	0.004527	0.004540	0.005852	0.003776	0.002039	0.006523	0.030188	0.031789	0.025869
Mach/Equip	0.005291	0.004973	0.005917	0.010023	0.008448	0.005591	0.006452	0.008630	0.004728
O Whlse Trade	0.024654	0.026712	0.030090	0.025859	0.018929	0.035588	0.043726	0.061772	0.039052
Farm Eq Dealer	0.016195	0.015061	0.026443	0.012722	0.009347	0.003764	0.011603	0.033314	0.008046
Gas Serv Stat	0.008691	0.008992	0.014535	0.021469	0.013600	0.011147	0.004862	0.009500	0.005233
Eating/Drink	0.018093	0.019341	0.023703	0.019376	0.018757	0.022257	0.019164	0.019257	0.016933
O Retail Trade	0.037618	0.040956	0.051217	0.043800	0.039743	0.050031	0.041707	0.041421	0.036705
Banking	0.061593	0.058324	0.060603	0.027318	0.126679	0.030342	0.040567	0.042979	0.047928
Other Finance	0.007314	0.007663	0.008910	0.006314	0.007510	0.007217	0.007273	0.007486	0.006324
Ins/Real Est	0.043112	0.040261	0.046813	0.014663	0.014164	0.029632	0.022676	0.018637	0.020685
Lodging	0.004114	0.004377	0.005372	0.004725	0.004559	0.005060	0.004569	0.004750	0.004037
Personal Serv	0.008637	0.009519	0.011561	0.009757	0.008707	0.011644	0.013171	0.012891	0.009441
Business Serv	0.055171	0.054262	0.058196	0.031280	0.028704	0.036979	0.040249	0.039779	0.032967
Medical/Health	0.035896	0.039183	0.049054	0.041915	0.038142	0.048164	0.040545	0.039840	0.035356
Other Services	0.043803	0.044735	0.054686	0.044382	0.043722	0.049497	0.043918	0.043645	0.039063
Households	0.502523	0.548811	0.687471	0.586524	0.534410	0.675408	0.555767	0.545243	0.490566

Hogs	Other Ag Products	Ag Services	Crude Oil & Nat Gas	Oil/Gas Field Serv	Nonmetal Mining	Other Mining	Maint & Repair	Building Constr	Category1	Category2	Category3
0.020224	0.000786	0.000481	0.000271	0.000546	0.000307	0.000782	0.000780	0.000649	0.000428	0.000518	0.000518
0.302267	0.002023	0.000976	0.000542	0.001092	0.000614	0.001564	0.001566	0.001300	0.000858	0.001039	0.001038
0.052966	0.008042	0.000897	0.000422	0.000830	0.000459	0.001188	0.001187	0.000988	0.000652	0.000791	0.000791
0.000054	0.078125	0.000043	0.000024	0.000048	0.000026	0.000068	0.000070	0.000058	0.000038	0.000052	0.000051
0.000370	0.000072	0.000047	0.000027	0.000056	0.000032	0.000080	0.000077	0.000065	0.000043	0.000052	0.000052
0.001019	0.011749	0.000555	0.000313	0.000631	0.000357	0.000904	0.000908	0.000753	0.000496	0.000602	0.000602
0.001845	0.001450	0.001376	0.000810	0.001645	0.000912	0.002369	0.002311	0.001935	0.001283	0.001547	0.001547
0.000080	0.000049	0.000045	0.000026	0.000051	0.000028	0.000074	0.000076	0.000063	0.000041	0.000050	0.000050
0.006368	0.005165	0.005095	0.002873	0.005803	0.003283	0.008304	0.008352	0.006922	0.004562	0.005531	0.005523
1.015579	0.000515	0.000508	0.000286	0.000577	0.000326	0.000826	0.000833	0.000690	0.000454	0.000551	0.000551
0.000717	1.046827	0.000573	0.000318	0.000639	0.000345	0.000907	0.000941	0.000780	0.000511	0.000690	0.000684
0.018195	0.020123	1.011022	0.000304	0.000607	0.000332	0.000872	0.000894	0.000737	0.000980	0.001244	0.003124
0.020678	0.018641	0.018878	1.010731	0.031743	0.029394	0.029112	0.013701	0.017050	0.094886	0.040915	0.022592
0.005610	0.005058	0.005121	0.274038	1.108125	0.039944	0.015851	0.003760	0.004828	0.033697	0.015103	0.007489
0.000080	0.000072	0.000051	0.000027	0.000060	1.006375	0.001204	0.001334	0.006265	0.248656	0.125875	0.042580
0.000187	0.000212	0.000162	0.000086	0.000223	0.045347	1.020711	0.000503	0.001029	0.020307	0.007057	0.003277
0.009603	0.019765	0.009910	0.004132	0.011444	0.014091	0.030083	1.006364	0.006094	0.016347	0.027522	0.011796
0.000002	0.000003	0.000002	0.000001	0.000003	0.000002	0.000004	0.000011	1.011001	0.000002	0.000008	0.000009
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000040	0.000082	0.000041	0.000017	0.000048	0.000058	0.000124	0.004156	0.008339	0.000068	0.004611	0.001241
0.009877	0.020322	0.010194	0.004268	0.011842	0.014477	0.030886	1.031228	0.342902	0.016880	0.028507	0.012353
0.013460	0.010860	0.010715	0.006036	0.012199	0.006918	0.017464	0.017551	0.014548	0.009591	0.011623	0.011606
0.004466	0.003817	0.003647	0.002151	0.004372	0.002428	0.006300	0.006130	0.005135	0.003407	0.004105	0.004106
0.241360	0.036424	0.003740	0.001718	0.003363	0.001857	0.004824	0.004831	0.004014	0.002650	0.003216	0.003217
0.073051	0.014144	0.009252	0.005357	0.010957	0.006223	0.015735	0.015183	0.012754	0.008517	0.010186	0.010173
0.001054	0.000354	0.000223	0.003538	0.014133	0.000601	0.000452	0.000605	0.000542	0.000572	0.000382	0.000296
0.005160	0.008681	0.001745	0.001842	0.004032	0.004460	0.007830	0.002600	0.002511	0.002987	0.002683	0.002948
0.013760	0.011670	0.009404	0.009576	0.019895	0.008801	0.021240	0.015884	0.016784	0.011124	0.011590	0.011051
0.000321	0.000372	0.000216	0.003389	0.013504	0.010524	0.000689	0.001466	0.000765	0.003000	0.006044	0.000718
0.020835	0.004256	0.059941	0.003653	0.000321	0.000220	0.000401	0.000349	0.000310	0.000528	0.000479	0.000435
0.042235	0.009558	0.033300	0.005480	0.014611	0.027493	0.012490	0.023260	0.015317	0.010764	0.010884	0.007746
0.046892	0.044132	0.033750	0.011409	0.026827	0.037131	0.071025	0.032159	0.040216	0.235367	0.096007	0.047336
0.001701	0.001491	0.001077	0.000729	0.001476	0.005045	0.045707	0.001755	0.004141	0.003321	0.008020	0.004840
0.001231	0.000822	0.000504	0.000273	0.000587	0.000590	0.002390	0.027346	0.053588	0.002059	0.123235	0.127035
0.001011	0.001138	0.000891	0.000509	0.001021	0.000576	0.001513	0.004322	0.008350	0.000832	0.003023	0.003649
0.000800	0.000874	0.000484	0.000427	0.001284	0.001438	0.003016	0.003763	0.002427	0.001204	0.002104	0.005094
0.002489	0.003148	0.000902	0.002512	0.008171	0.002763	0.005432	0.020870	0.017013	0.006882	0.019450	0.056241
0.001268	0.001365	0.004697	0.000388	0.000901	0.000670	0.001013	0.000676	0.000607	0.000940	0.003923	0.011573
0.011980	0.012519	0.000286	0.000951	0.000439	0.000176	0.000368	0.000320	0.000309	0.000410	0.002127	0.000237
0.000121	0.000084	0.000064	0.000510	0.000793	0.012660	0.017412	0.000170	0.000950	0.023910	0.028609	0.009844
0.000351	0.000448	0.000385	0.002388	0.008535	0.000438	0.000374	0.000237	0.000291	0.000456	0.000307	0.000223
0.001808	0.002066	0.001679	0.004117	0.012716	0.008868	0.010530	0.014441	0.006864	0.003852	0.003422	0.004368
0.000780	0.000774	0.000649	0.000794	0.002501	0.001035	0.003771	0.002837	0.001812	0.001038	0.004613	0.002429
0.000924	0.001239	0.000746	0.000593	0.001415	0.001696	0.002015	0.001354	0.001213	0.001070	0.001178	0.003116
0.002559	0.001476	0.000949	0.000761	0.001909	0.000932	0.002457	0.001474	0.001324	0.001156	0.001107	0.001061
0.000133	0.000135	0.000134	0.000075	0.000148	0.000079	0.000214	0.000224	0.000183	0.000119	0.000147	0.000148
0.000053	0.000052	0.000053	0.000126	0.000417	0.001635	0.000210	0.000079	0.000091	0.000460	0.000321	0.000130
0.002966	0.017440	0.004154	0.001756	0.005297	0.003532	0.004715	0.004283	0.005305	0.004052	0.019002	0.017051
0.006447	0.006085	0.006587	0.006466	0.021744	0.006254	0.010127	0.006739	0.010146	0.007182	0.007913	0.006514
0.016808	0.011527	0.011061	0.014705	0.050704	0.010229	0.019138	0.012821	0.017538	0.109866	0.048173	0.027836
0.005727	0.004374	0.005124	0.003754	0.009298	0.003197	0.007129	0.006156	0.005702	0.010689	0.006440	0.006371
0.012636	0.013305	0.016528	0.007473	0.017896	0.010953	0.019642	0.013503	0.015131	0.012992	0.015955	0.015482
0.038353	0.054204	0.041116	0.019760	0.050784	0.037863	0.065537	0.046384	0.052816	0.034324	0.057552	0.058348
0.009038	0.003960	0.003089	0.002111	0.004733	0.002992	0.006697	0.005220	0.004482	0.003294	0.003793	0.003634
0.031534	0.010710	0.009493	0.000565	0.001193	0.000699	0.001668	0.001489	0.001259	0.000885	0.001038	0.001036
0.008386	0.004962	0.006630	0.017071	0.064618	0.015450	0.028621	0.006136	0.009058	0.012114	0.007957	0.010887
0.033507	0.134489	0.013460	0.016260	0.046440	0.028848	0.072232	0.049116	0.055972	0.019370	0.020464	0.015804
0.009018	0.018568	0.013588	0.000063	0.000126	0.000069	0.000180	0.000183	0.000152	0.000106	0.000131	0.000156
0.007887	0.007555	0.007449	0.002242	0.006784	0.004072	0.008201	0.008396	0.006202	0.009055	0.006604	0.007946
0.016724	0.018200	0.015326	0.012108	0.027706	0.018028	0.040189	0.027133	0.025862	0.019013	0.020111	0.019673
0.035336	0.037024	0.034952	0.027443	0.066357	0.046322	0.093761	0.059818	0.051885	0.042255	0.047481	0.043278
0.054175	0.027258	0.015027	0.012301	0.031275	0.012874	0.040666	0.019454	0.019309	0.018592	0.015503	0.012868
0.006161	0.005367	0.005373	0.002968	0.006108	0.003236	0.008501	0.009939	0.007954	0.005361	0.005993	0.005407
0.026150	0.019705	0.011200	0.043185	0.079178	0.046459	0.088996	0.023704	0.022569	0.034097	0.028813	0.026565
0.004102	0.004519	0.003470	0.004257	0.012451	0.003628	0.008666	0.006343	0.005694	0.010871	0.007153	0.009090
0.009960	0.016952	0.007872	0.005654	0.014032	0.006111	0.014953	0.013024	0.012900	0.007163	0.008281	0.008205
0.040588	0.030581	0.030053	0.043634	0.078015	0.023411	0.052939	0.052890	0.052659	0.034597	0.037413	0.031120
0.034548	0.034196	0.033758	0.020650	0.043846	0.026746	0.057235	0.062685	0.053796	0.034004	0.038609	0.038438
0.038713	0.038358	0.034309	0.025111	0.060174	0.023009	0.069664	0.067313	0.075439	0.043903	0.042201	0.041241
0.468458	0.476787	0.473060	0.265021	0.524126	0.278428	0.754776	0.789363	0.647083	0.420580	0.519581	0.522033

Category4	Category5	Category6	Heavy Constr	SpecTrade Constr	Meat Products	Dairy Products	GrainMill Products	OtherFood Products	Apparel	Paper Products	Printing/ Publish
0.000679	0.000490	0.000404	0.000676	0.000780	0.032886	0.033413	0.010708	0.003031	0.000165	0.000441	0.000380
0.001360	0.000983	0.000809	0.001354	0.001566	0.069600	0.047583	0.036159	0.007039	0.000330	0.000885	0.000761
0.001034	0.000751	0.000618	0.001027	0.001187	0.016431	0.019548	0.240839	0.025206	0.000252	0.000665	0.000579
0.000062	0.000049	0.000040	0.000059	0.000070	0.000514	0.000054	0.000095	0.000061	0.000015	0.000038	0.000034
0.000069	0.000049	0.000041	0.000068	0.000077	0.000094	0.000291	0.000850	0.005185	0.000016	0.000044	0.000038
0.000786	0.000569	0.000468	0.000783	0.000908	0.050873	0.006886	0.002443	0.002553	0.000191	0.000514	0.000441
0.002052	0.001460	0.001210	0.002026	0.002311	0.001085	0.391463	0.002612	0.008643	0.000493	0.001306	0.001134
0.000065	0.000048	0.000039	0.000064	0.000076	0.000039	0.002290	0.000134	0.000596	0.000016	0.000041	0.000037
0.007223	0.005228	0.004299	0.007202	0.008352	0.490523	0.019173	0.008600	0.022323	0.001757	0.004729	0.004053
0.000719	0.000521	0.000428	0.000717	0.000833	0.047229	0.000651	0.000842	0.002141	0.000175	0.000470	0.000404
0.000831	0.000652	0.000537	0.000789	0.000941	0.006886	0.000715	0.001276	0.000817	0.000206	0.000504	0.000457
0.001363	0.001996	0.003787	0.000759	0.000894	0.010977	0.023490	0.012934	0.002493	0.000188	0.000491	0.000435
0.021697	0.036828	0.033045	0.061514	0.013701	0.009188	0.019143	0.015423	0.010737	0.003825	0.011533	0.006482
0.006598	0.013213	0.011768	0.018956	0.003760	0.002493	0.005195	0.004186	0.002914	0.001039	0.003131	0.001760
0.022257	0.101256	0.088285	0.071477	0.001334	0.000044	0.000091	0.000095	0.000047	0.000040	0.000096	0.000040
0.002057	0.005922	0.004445	0.004179	0.000503	0.000114	0.000260	0.000187	0.000164	0.000078	0.000192	0.000125
0.008489	0.035592	0.015984	0.007373	0.006364	0.006563	0.025531	0.010651	0.007247	0.020362	0.050967	0.009495
0.000009	0.000014	0.000003	0.000005	0.000011	0.000002	0.000003	0.000002	0.000002	0.000001	0.000002	0.000002
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.014897	0.003006	0.000066	1.016013	0.004156	0.000027	0.000106	0.000044	0.000030	0.000084	0.000211	0.000039
0.009238	0.036801	0.016448	0.038975	1.031228	0.006765	0.026204	0.010974	0.007506	0.020890	0.052274	0.009752
0.015186	0.010986	0.009036	0.015143	0.017551	1.070324	0.013907	0.018259	0.047840	0.003692	0.009952	0.008515
0.005453	0.003874	0.003212	0.005383	0.006130	0.002798	1.100924	0.005872	0.016143	0.001309	0.003470	0.003008
0.004203	0.003060	0.002512	0.004173	0.004831	0.056054	0.087855	1.101349	0.095715	0.001023	0.002697	0.002357
0.013575	0.009594	0.008079	0.013446	0.015183	0.018476	0.057435	0.167685	1.023517	0.003243	0.008738	0.007417
0.000319	0.000356	0.000297	0.000465	0.000605	0.000343	0.000612	0.004032	0.000518	1.029865	0.000191	0.000143
0.002727	0.002613	0.001963	0.003043	0.002600	0.011670	0.035294	0.015782	0.006094	0.010197	1.065743	0.018818
0.013450	0.010656	0.008641	0.016654	0.015884	0.009626	0.024362	0.019722	0.017952	0.005713	0.012188	1.106662
0.000502	0.002944	0.001124	0.001187	0.001466	0.000265	0.001410	0.000404	0.000281	0.000203	0.011279	0.001223
0.000376	0.001843	0.000474	0.000475	0.000349	0.008261	0.006521	0.013156	0.002343	0.000078	0.000209	0.000169
0.007767	0.009526	0.006540	0.017023	0.023260	0.016568	0.018251	0.026751	0.015985	0.002141	0.030002	0.005022
0.051630	0.087244	0.080347	0.153492	0.032159	0.020215	0.043360	0.034405	0.024348	0.008376	0.020708	0.013996
0.010083	0.006069	0.001516	0.003687	0.001755	0.000949	0.002517	0.001757	0.003347	0.005244	0.001007	0.000749
0.092436	0.119313	0.029764	0.065232	0.027346	0.000600	0.001179	0.001756	0.000553	0.000649	0.001578	0.000444
0.003722	0.005389	0.001073	0.001822	0.004322	0.000699	0.001102	0.001010	0.000831	0.000373	0.000946	0.000737
0.001158	0.001380	0.001161	0.003097	0.003763	0.000390	0.000603	0.000499	0.000256	0.000225	0.000334	0.000304
0.023776	0.030633	0.010008	0.013511	0.020870	0.001254	0.002338	0.002196	0.004314	0.001075	0.003086	0.000921
0.001083	0.001361	0.002065	0.000652	0.000676	0.000646	0.000956	0.000893	0.000470	0.000676	0.000347	0.000264
0.000286	0.000239	0.000195	0.000365	0.000320	0.005080	0.005837	0.005580	0.001237	0.000098	0.000243	0.000163
0.023264	0.023974	0.006930	0.005331	0.000170	0.000074	0.000118	0.000108	0.000076	0.000039	0.000076	0.000047
0.000238	0.000273	0.000223	0.000402	0.000237	0.000370	0.001379	0.000382	0.000287	0.000087	0.000231	0.003438
0.002575	0.003040	0.043983	0.005180	0.014441	0.001277	0.004178	0.001892	0.001621	0.004117	0.002066	0.001401
0.001601	0.001714	0.000937	0.001351	0.002837	0.000501	0.000831	0.000996	0.000715	0.000918	0.000749	0.001513
0.001303	0.000925	0.000779	0.001267	0.001354	0.000647	0.001212	0.000930	0.000856	0.000293	0.001283	0.000628
0.001188	0.001006	0.001177	0.001552	0.001474	0.001427	0.001776	0.001806	0.001131	0.000548	0.001066	0.000726
0.000189	0.000140	0.000114	0.000187	0.000224	0.000096	0.000143	0.000140	0.000117	0.000047	0.000120	0.000109
0.000102	0.000218	0.000186	0.000196	0.000079	0.000045	0.000058	0.000070	0.000067	0.000025	0.000063	0.000038
0.011521	0.017345	0.015420	0.003024	0.004283	0.003619	0.003982	0.004076	0.010653	0.002954	0.001366	0.001655
0.006805	0.006248	0.005143	0.009724	0.006739	0.006838	0.007236	0.011133	0.011674	0.004040	0.010246	0.004163
0.017904	0.031754	0.047317	0.013344	0.012821	0.020727	0.019634	0.023121	0.021742	0.021930	0.079350	0.017449
0.006057	0.005965	0.005034	0.010049	0.006156	0.003171	0.005217	0.007246	0.004995	0.001749	0.004323	0.002770
0.015762	0.015111	0.009843	0.017265	0.013503	0.008194	0.015135	0.013977	0.012602	0.009790	0.019704	0.013006
0.053670	0.054686	0.033426	0.054258	0.046384	0.029664	0.075658	0.044877	0.048717	0.024035	0.059498	0.041179
0.005066	0.003393	0.002862	0.004771	0.005220	0.006767	0.006697	0.025564	0.041792	0.001123	0.004097	0.002543
0.001378	0.000969	0.000829	0.001333	0.001489	0.024593	0.013262	0.116009	0.030711	0.000319	0.000980	0.000724
0.006334	0.007292	0.005140	0.018962	0.006136	0.011368	0.028562	0.015193	0.013146	0.012950	0.019034	0.006966
0.021332	0.016398	0.014549	0.038329	0.049116	0.027909	0.054840	0.037869	0.065819	0.012583	0.029899	0.015922
0.000166	0.000135	0.000139	0.000157	0.000183	0.003741	0.004690	0.006949	0.001037	0.000039	0.000101	0.000089
0.006813	0.004628	0.022846	0.006472	0.008396	0.003121	0.007173	0.005598	0.004196	0.002045	0.002918	0.002442
0.032206	0.018331	0.016987	0.031070	0.027133	0.012066	0.031263	0.018113	0.016822	0.006470	0.020313	0.013906
0.061989	0.039912	0.033624	0.054984	0.059818	0.025771	0.039348	0.038198	0.032860	0.012729	0.062960	0.028886
0.015194	0.013766	0.011037	0.024728	0.019454	0.028960	0.033863	0.035274	0.019897	0.009410	0.014653	0.011168
0.008582	0.005195	0.004197	0.009477	0.009939	0.004272	0.006508	0.006278	0.005536	0.002958	0.010999	0.004073
0.031137	0.026736	0.021584	0.029208	0.023704	0.014749	0.027964	0.029098	0.023093	0.024787	0.033671	0.010708
0.018335	0.008333	0.010280	0.009966	0.006343	0.003309	0.006510	0.004980	0.004302	0.001797	0.004333	0.003122
0.010489	0.007683	0.006340	0.017968	0.013024	0.006728	0.013145	0.010993	0.012479	0.003112	0.008018	0.005901
0.042146	0.033516	0.025421	0.056760	0.052890	0.027875	0.047811	0.057056	0.046566	0.015428	0.039948	0.025161
0.048447	0.036327	0.029712	0.047958	0.062685	0.024425	0.037097	0.038000	0.046977	0.011934	0.030886	0.027476
0.050762	0.037109	0.031963	0.075657	0.067313	0.031240	0.050158	0.044061	0.033614	0.015562	0.039444	0.027843
0.666236	0.493567	0.401172	0.661225	0.789363	0.339383	0.505435	0.493876	0.411857	0.165644	0.422844	0.384989

Industrial Chemicals	Ag Chemicals	Other Chemicals	Petroleum & Coal	Rubber/ Plastics	Cement/ Concrete	O Stone/ Clay	Primary Metals	Fabricated Metals	O Fab Metals	Farm Machinery	Constr Machinery
0.000444	0.000451	0.000735	0.000266	0.000371	0.000622	0.000472	0.000552	0.000647	0.000600	0.000538	0.000420
0.000890	0.001096	0.001530	0.000532	0.000743	0.001246	0.000945	0.001107	0.001298	0.001203	0.001081	0.000842
0.000678	0.003599	0.000786	0.000410	0.000565	0.000948	0.000718	0.000838	0.000982	0.000915	0.000808	0.000640
0.000040	0.000031	0.000031	0.000024	0.000033	0.000056	0.000042	0.000052	0.000057	0.000055	0.000047	0.000038
0.000044	0.000042	0.000059	0.000027	0.000037	0.000061	0.000048	0.000055	0.000064	0.000059	0.000053	0.000042
0.000516	0.000396	0.001021	0.000307	0.000431	0.000722	0.000547	0.000643	0.000753	0.000697	0.000631	0.000488
0.001319	0.000951	0.000868	0.000795	0.001097	0.001852	0.001405	0.001628	0.001915	0.001784	0.001552	0.001249
0.000043	0.000032	0.000030	0.000026	0.000036	0.000061	0.000045	0.000053	0.000062	0.000059	0.000051	0.000041
0.004741	0.003463	0.009693	0.002824	0.003966	0.006637	0.005032	0.005910	0.006928	0.006406	0.005816	0.004483
0.000473	0.000345	0.000943	0.000281	0.000395	0.000662	0.000501	0.000589	0.000690	0.000639	0.000579	0.000447
0.000530	0.000416	0.000421	0.000315	0.000439	0.000746	0.000559	0.000700	0.000767	0.000729	0.000633	0.000511
0.000508	0.000523	0.000594	0.000300	0.000422	0.000714	0.000532	0.000630	0.000736	0.000691	0.000607	0.000481
0.120896	0.120934	0.007207	0.415113	0.006315	0.020345	0.094506	0.018042	0.023236	0.012319	0.019408	0.017008
0.032786	0.032792	0.001957	0.112564	0.001719	0.006740	0.026596	0.004987	0.006309	0.003351	0.005279	0.004617
0.000071	0.000059	0.000031	0.000037	0.000173	0.036073	0.027597	0.002919	0.000170	0.000255	0.000450	0.000135
0.000739	0.000241	0.000209	0.001897	0.000129	0.011637	0.013606	0.000454	0.000439	0.000357	0.000398	0.000231
0.026943	0.016238	0.006896	0.006819	0.004907	0.017531	0.024272	0.019801	0.020713	0.014130	0.012782	0.011901
0.000003	0.000002	0.000001	0.000001	0.000002	0.000023	0.002556	0.000005	0.000003	0.000003	0.000025	0.000021
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000112	0.000067	0.000029	0.000028	0.000020	0.000073	0.000122	0.000083	0.000090	0.000059	0.000054	0.000050
0.027698	0.016689	0.007093	0.007043	0.005047	0.018023	0.025821	0.020661	0.022265	0.014578	0.013337	0.012404
0.009959	0.007280	0.020910	0.005931	0.008330	0.013942	0.010578	0.012422	0.014565	0.013456	0.012240	0.009416
0.003499	0.002509	0.002260	0.002112	0.002909	0.004911	0.003730	0.004318	0.005081	0.004731	0.004116	0.003312
0.002755	0.016213	0.003010	0.001664	0.002291	0.003859	0.002915	0.003408	0.003992	0.003726	0.003279	0.002604
0.008639	0.008331	0.011644	0.005256	0.007224	0.012101	0.009335	0.010738	0.012647	0.011645	0.010404	0.008175
0.000560	0.000571	0.000117	0.001506	0.000140	0.000284	0.000584	0.000255	0.000678	0.000310	0.000288	0.000227
0.001662	0.004867	0.008542	0.003282	0.002757	0.002137	0.005842	0.003097	0.019612	0.010857	0.004852	0.003389
0.013376	0.010400	0.008972	0.013241	0.013126	0.013788	0.015171	0.015402	0.030364	0.015665	0.015681	0.014995
1.308235	0.000556	0.002180	0.001471	0.004395	0.000672	0.007558	0.004767	0.000522	0.000623	0.001981	0.000445
0.000595	1.016272	0.000262	0.001560	0.000164	0.000311	0.000518	0.000280	0.000330	0.000275	0.000274	0.000222
0.009538	0.016799	1.161375	0.003896	0.013020	0.008966	0.015104	0.022225	0.025503	0.008496	0.053584	0.007784
0.057099	0.096187	0.013125	1.076659	0.014061	0.031735	0.213870	0.041256	0.051345	0.023683	0.045000	0.040351
0.000999	0.000780	0.006762	0.000788	1.015853	0.002348	0.006033	0.003487	0.004958	0.002581	0.035214	0.021296
0.000954	0.000623	0.000353	0.000422	0.004362	1.063059	0.010050	0.004142	0.002583	0.000930	0.001166	0.000835
0.001059	0.000632	0.000570	0.000521	0.000726	0.009488	1.052705	0.001978	0.001321	0.001266	0.010467	0.000856
0.000413	0.000213	0.000220	0.000337	0.000739	0.000402	0.001338	1.082003	0.010069	0.072050	0.051002	0.030028
0.001792	0.001484	0.000637	0.005636	0.001255	0.001441	0.008563	0.018505	1.010045	0.016172	0.114694	0.078608
0.000822	0.000305	0.000716	0.000405	0.000332	0.000778	0.007933	0.005790	0.005645	1.008600	0.072904	0.025012
0.000377	0.000354	0.000209	0.000557	0.000228	0.000298	0.000388	0.000626	0.000365	0.000311	1.001066	0.000336
0.000140	0.000120	0.000036	0.000343	0.000104	0.000696	0.000977	0.012590	0.000657	0.000931	0.000735	1.001829
0.000771	0.000453	0.000708	0.001250	0.000155	0.000291	0.003305	0.000933	0.000422	0.000313	0.000474	0.000422
0.002251	0.001627	0.001029	0.002412	0.001549	0.002700	0.006233	0.009845	0.005903	0.003115	0.002923	0.002349
0.000967	0.000571	0.001012	0.000785	0.006154	0.001207	0.003110	0.028762	0.028550	0.006876	0.010041	0.008639
0.000750	0.000533	0.000456	0.000502	0.000631	0.001079	0.001598	0.003727	0.001099	0.001177	0.010844	0.000770
0.001480	0.000960	0.000536	0.002099	0.001376	0.001188	0.001267	0.001243	0.003627	0.001552	0.001409	0.001512
0.000127	0.000090	0.000080	0.000075	0.000105	0.000179	0.000132	0.000157	0.000183	0.000174	0.000149	0.000121
0.000106	0.000054	0.000037	0.000089	0.000036	0.000139	0.000497	0.001624	0.000122	0.000187	0.000193	0.000161
0.001244	0.008086	0.000648	0.001624	0.001124	0.001573	0.003357	0.012024	0.002575	0.003102	0.003124	0.003314
0.019724	0.007118	0.005670	0.010668	0.003312	0.010989	0.019400	0.075090	0.019735	0.017636	0.026825	0.027993
0.029275	0.019195	0.007523	0.019383	0.007929	0.015308	0.028303	0.040641	0.062499	0.023172	0.047900	0.029549
0.005381	0.025617	0.002151	0.038732	0.008269	0.005034	0.022335	0.006870	0.005859	0.004487	0.005405	0.004470
0.029590	0.017196	0.037585	0.017929	0.008112	0.052569	0.014656	0.021611	0.025332	0.024208	0.022018	0.013217
0.293674	0.029438	0.083586	0.041288	0.024021	0.228385	0.096138	0.074488	0.143831	0.132301	0.078166	0.060700
0.002990	0.002424	0.002146	0.001915	0.002481	0.004211	0.003390	0.003771	0.004348	0.004031	0.003571	0.002809
0.000851	0.002105	0.001034	0.000532	0.000715	0.001191	0.000934	0.001064	0.001240	0.001145	0.001026	0.000805
0.007770	0.006530	0.003635	0.032828	0.028351	0.008491	0.011907	0.015977	0.022841	0.006946	0.025140	0.015237
0.019613	0.012457	0.009319	0.013860	0.021664	0.021898	0.023953	0.034124	0.027291	0.019325	0.036217	0.017712
0.000104	0.000163	0.000122	0.000062	0.000087	0.000146	0.000109	0.000130	0.000151	0.000141	0.000124	0.000099
0.002247	0.019000	0.001049	0.004541	0.001997	0.005417	0.011291	0.005864	0.005458	0.004518	0.004801	0.003020
0.015898	0.011431	0.009595	0.011327	0.013775	0.021679	0.019999	0.019547	0.024492	0.020106	0.018875	0.014936
0.034303	0.024551	0.021260	0.022941	0.027940	0.048976	0.041000	0.044160	0.049481	0.046650	0.041175	0.031786
0.027526	0.016316	0.007155	0.043620	0.023567	0.016741	0.019923	0.017304	0.029362	0.017585	0.018260	0.025480
0.008115	0.003557	0.002945	0.003554	0.004129	0.006525	0.005429	0.006093	0.007050	0.006407	0.005630	0.004739
0.011785	0.021313	0.005427	0.023605	0.029553	0.019971	0.020403	0.032634	0.027352	0.015958	0.025584	0.016334
0.003783	0.002780	0.002049	0.003700	0.003438	0.004959	0.005585	0.004757	0.007723	0.004511	0.006405	0.003781
0.007088	0.005029	0.004215	0.004970	0.006930	0.009620	0.007902	0.009929	0.011167	0.010263	0.009425	0.008904
0.044518	0.035658	0.020934	0.040433	0.061776	0.044539	0.050746	0.046763	0.045025	0.037887	0.042918	0.041362
0.032340	0.022957	0.020180	0.019501	0.026430	0.045467	0.033716	0.039727	0.046846	0.043787	0.037738	0.030604
0.034525	0.024632	0.020856	0.030454	0.038038	0.046997	0.037008	0.047204	0.056481	0.053315	0.048727	0.033803
0.448866	0.317596	0.281162	0.262987	0.370711	0.632897	0.464583	0.554070	0.645603	0.613291	0.526853	0.425429

Food/Spec Machinery	Electrical Machinery	Other Machinery	Motor Vehicles	Aerospace	Trailer Coaches	O Transp Equipm't	Other Mfg	RR Transp	Motor Freight	Other Transp	Commun-ications
0.000497	0.000563	0.000505	0.000251	0.000501	0.000622	0.000500	0.000464	0.000709	0.000626	0.000568	0.000673
0.000996	0.001128	0.001012	0.000506	0.001004	0.001247	0.001003	0.000934	0.001422	0.001252	0.001138	0.001346
0.000757	0.000859	0.000772	0.000373	0.000764	0.000950	0.000764	0.000752	0.001081	0.000956	0.000867	0.001022
0.000046	0.000050	0.000046	0.000022	0.000046	0.000067	0.000045	0.000376	0.000064	0.000055	0.000052	0.000058
0.000049	0.000056	0.000050	0.000024	0.000049	0.000062	0.000049	0.000049	0.000070	0.000064	0.000056	0.000069
0.000577	0.000653	0.000586	0.000297	0.000582	0.000723	0.000581	0.000585	0.000823	0.000723	0.000659	0.000777
0.001481	0.001679	0.001508	0.000709	0.001491	0.001857	0.001490	0.001377	0.002110	0.001884	0.001691	0.002039
0.000049	0.000055	0.000049	0.000023	0.000049	0.000060	0.000049	0.000046	0.000070	0.000060	0.000056	0.000064
0.005303	0.006005	0.005385	0.002740	0.005346	0.006634	0.005342	0.004936	0.007569	0.006650	0.006058	0.007145
0.000529	0.000599	0.000537	0.000273	0.000534	0.000661	0.000533	0.000493	0.000756	0.000662	0.000604	0.000712
0.000616	0.000674	0.000610	0.000288	0.000609	0.000900	0.000600	0.005034	0.000857	0.000728	0.000690	0.000772
0.000571	0.000646	0.000577	0.000281	0.000578	0.000711	0.000575	0.000617	0.000819	0.000705	0.000654	0.000753
0.010609	0.012125	0.011818	0.005663	0.006925	0.012148	0.011560	0.007214	0.035969	0.033263	0.071269	0.011748
0.002883	0.003293	0.003227	0.001538	0.001881	0.003299	0.003139	0.001959	0.009761	0.009022	0.019328	0.003188
0.000160	0.000118	0.000675	0.000048	0.000080	0.000130	0.000116	0.000068	0.000084	0.000060	0.000058	0.000057
0.000253	0.000207	0.000252	0.000123	0.000120	0.000227	0.000182	0.000152	0.000839	0.000232	0.000419	0.000175
0.020179	0.048294	0.030382	0.012043	0.004475	0.013895	0.017108	0.005496	0.017846	0.004461	0.010311	0.005456
0.000003	0.000003	0.000003	0.000001	0.000015	0.000003	0.000002	0.000002	0.000003	0.000003	0.000003	0.000003
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000084	0.000200	0.000126	0.000050	0.000019	0.000059	0.000071	0.000032	0.000092	0.000019	0.000043	0.000023
0.020874	0.049653	0.031223	0.012501	0.004623	0.014547	0.017634	0.008034	0.022743	0.004604	0.010613	0.005622
0.011141	0.012613	0.011309	0.005771	0.011230	0.013936	0.011220	0.010368	0.015900	0.013971	0.012724	0.015027
0.003928	0.004453	0.004001	0.001880	0.003954	0.004929	0.003953	0.003648	0.005596	0.005005	0.004485	0.005420
0.003084	0.003494	0.003135	0.001514	0.003112	0.003860	0.003106	0.003075	0.004407	0.003878	0.003532	0.004154
0.009680	0.010970	0.009887	0.004812	0.009699	0.012246	0.009734	0.009596	0.013732	0.012494	0.011034	0.013510
0.000231	0.000241	0.000223	0.000260	0.000194	0.000315	0.000221	0.000909	0.000350	0.000315	0.000427	0.000240
0.004147	0.002851	0.003048	0.001575	0.002279	0.007090	0.004002	0.003311	0.001999	0.002464	0.002321	0.004375
0.011429	0.011895	0.019967	0.005532	0.010357	0.021490	0.021374	0.008981	0.022565	0.016410	0.012315	0.017310
0.000341	0.000280	0.000534	0.000204	0.000289	0.000374	0.000709	0.000169	0.000281	0.000277	0.000363	0.000188
0.000231	0.000259	0.000236	0.000115	0.000218	0.000300	0.000233	0.000708	0.000399	0.000356	0.000469	0.000297
0.007016	0.006670	0.006774	0.038114	0.005041	0.011500	0.007127	0.004999	0.007348	0.005833	0.005821	0.006143
0.022279	0.027997	0.026172	0.012585	0.015710	0.027401	0.026790	0.015564	0.090478	0.084313	0.182514	0.027273
0.001436	0.003681	0.005551	0.007517	0.001341	0.002523	0.106616	0.005962	0.001961	0.001238	0.001211	0.001253
0.001023	0.001642	0.001327	0.000490	0.000423	0.000901	0.001256	0.001044	0.000964	0.000428	0.000589	0.000468
0.001049	0.001204	0.001098	0.000510	0.000953	0.001209	0.001002	0.000956	0.001430	0.001128	0.001093	0.001208
0.033324	0.005173	0.065135	0.005484	0.014892	0.022709	0.015472	0.001338	0.001098	0.000174	0.000523	0.000639
0.078231	0.021049	0.028695	0.000773	0.003504	0.076282	0.048961	0.008594	0.003117	0.001127	0.007541	0.000958
0.010004	0.012309	0.003974	0.000761	0.006424	0.041736	0.015584	0.003112	0.000905	0.000378	0.001981	0.000352
0.000312	0.000339	0.000361	0.000290	0.000202	0.000485	0.000273	0.000249	0.005648	0.000334	0.001250	0.000257
0.000484	0.000131	0.000901	0.000096	0.000220	0.000401	0.000283	0.000069	0.000103	0.000095	0.000654	0.000065
1.000364	0.000366	0.000287	0.000455	0.000145	0.000596	0.000271	0.000220	0.010791	0.000278	0.001528	0.000194
0.006810	1.049678	0.028158	0.001471	0.017220	0.002771	0.002204	0.002846	0.003031	0.002124	0.002367	0.002345
0.017815	0.003233	1.004146	0.001136	0.003266	0.003752	0.003038	0.001393	0.003823	0.000760	0.001336	0.007764
0.000956	0.000975	0.001024	1.002793	0.000839	0.103720	0.000877	0.000756	0.001223	0.000985	0.000964	0.001037
0.001420	0.010838	0.001452	0.002323	1.019620	0.002100	0.001581	0.001824	0.001264	0.001135	0.003080	0.002601
0.000143	0.000162	0.000144	0.000069	0.000146	1.000176	0.000144	0.000134	0.000206	0.000175	0.000165	0.000185
0.000159	0.000125	0.000157	0.000149	0.000068	0.000184	1.000093	0.000047	0.003623	0.000063	0.000068	0.000062
0.006047	0.001322	0.003406	0.000584	0.002237	0.039637	0.001358	1.030726	0.001758	0.001281	0.002716	0.001156
0.025156	0.023960	0.012830	0.036709	0.005513	0.033786	0.012379	0.004795	1.027523	0.006606	0.007804	0.006155
0.035578	0.133524	0.037454	0.026861	0.008336	0.041387	0.019305	0.016106	0.017805	1.010930	0.011926	0.009735
0.004300	0.005012	0.004797	0.007555	0.003583	0.006144	0.004535	0.004202	0.013379	0.007214	1.011758	0.004997
0.022734	0.016265	0.021157	0.005879	0.012033	0.024193	0.019431	0.006845	0.013819	0.019355	0.019436	1.019018
0.084135	0.055270	0.071074	0.033637	0.035416	0.065358	0.049859	0.048605	0.047382	0.033412	0.043592	0.051255
0.003333	0.003764	0.003403	0.001596	0.003319	0.004186	0.003361	0.003080	0.004877	0.004231	0.003852	0.004517
0.000948	0.001074	0.000976	0.000468	0.000948	0.001200	0.000957	0.000936	0.001347	0.001218	0.001089	0.001279
0.007861	0.005493	0.077888	0.001670	0.004712	0.017127	0.016716	0.002616	0.005587	0.004331	0.010357	0.007921
0.038886	0.036800	0.030143	0.007594	0.012032	0.018520	0.021389	0.012460	0.020776	0.019645	0.016363	0.021610
0.000117	0.000132	0.000118	0.000057	0.000118	0.005635	0.000117	0.000188	0.000167	0.000145	0.000134	0.000155
0.002348	0.003712	0.003851	0.001114	0.001234	0.006856	0.003073	0.002076	0.003635	0.016383	0.005806	0.003982
0.017639	0.020094	0.019181	0.008339	0.016465	0.024730	0.017497	0.015142	0.023064	0.028620	0.019121	0.034075
0.037823	0.042513	0.038160	0.017996	0.037983	0.047008	0.038524	0.034782	0.055219	0.045791	0.045147	0.048319
0.020850	0.013234	0.015981	0.008750	0.009565	0.031177	0.026939	0.014047	0.018341	0.017298	0.019295	0.012942
0.005460	0.005990	0.005835	0.002717	0.005222	0.007213	0.005534	0.004867	0.011287	0.006347	0.008766	0.006628
0.029601	0.022023	0.029948	0.022437	0.025392	0.193629	0.022400	0.007266	0.012660	0.010972	0.021119	0.009655
0.004574	0.005445	0.006554	0.001989	0.003601	0.005875	0.004212	0.003336	0.005267	0.013919	0.004370	0.005094
0.009269	0.009937	0.009373	0.003585	0.007358	0.009431	0.008042	0.007332	0.010689	0.009702	0.008733	0.009888
0.028550	0.041993	0.066876	0.017997	0.027108	0.072300	0.042564	0.033276	0.028816	0.082892	0.038509	0.030275
0.037535	0.041085	0.036633	0.017330	0.036627	0.044471	0.038306	0.033748	0.052935	0.043948	0.041560	0.046612
0.042814	0.044116	0.047391	0.018003	0.036591	0.050062	0.039204	0.034865	0.052468	0.049359	0.045010	0.047635
0.504992	0.572152	0.508985	0.241843	0.514133	0.622112	0.509176	0.473273	0.728520	0.616291	0.581025	0.654107

Elec/Gas/ SanServ	Grocery Whlse	Farm Products	Mach/Eqp Whlse	Other Whlse	Farm Eq Dealers	Gas Serv Stations	Eating/ Drinking	Other Retail	Banking	Other Finance	Ins/Real Estate
0.000252	0.000912	0.000580	0.000821	0.000793	0.000782	0.000636	0.003313	0.000831	0.000790	0.000689	0.000770
0.000506	0.001849	0.001163	0.001643	0.001585	0.001567	0.001280	0.006428	0.001656	0.001582	0.001381	0.001536
0.000386	0.001692	0.000902	0.001249	0.001204	0.001193	0.001081	0.004698	0.001263	0.001203	0.001053	0.001173
0.000023	0.000077	0.000054	0.000072	0.000068	0.000070	0.000057	0.000079	0.000071	0.000070	0.000061	0.000065
0.000025	0.000120	0.000057	0.000084	0.000082	0.000077	0.000089	0.000506	0.000084	0.000080	0.000069	0.000080
0.000293	0.001052	0.000672	0.000949	0.000915	0.000908	0.000733	0.003551	0.000947	0.000914	0.000799	0.000885
0.000753	0.002625	0.001726	0.002483	0.002415	0.002332	0.001893	0.012528	0.002635	0.002388	0.002066	0.002343
0.000025	0.000087	0.000057	0.000078	0.000075	0.000077	0.000064	0.000163	0.000079	0.000076	0.000067	0.000072
0.002690	0.009673	0.006177	0.008718	0.008405	0.008343	0.006732	0.032523	0.008683	0.008400	0.007342	0.008135
0.000268	0.000963	0.000616	0.000868	0.000836	0.000833	0.000671	0.003119	0.000864	0.000837	0.000732	0.000808
0.000302	0.001030	0.000719	0.000957	0.000903	0.000943	0.000762	0.001057	0.000946	0.000942	0.000818	0.000863
0.000288	0.001021	0.000667	0.000920	0.000878	0.000900	0.000727	0.001990	0.000926	0.000888	0.000785	0.000844
0.037092	0.012658	0.014613	0.025613	0.017293	0.014291	0.010513	0.012005	0.014526	0.010302	0.009637	0.013370
0.010076	0.003437	0.003966	0.006950	0.004693	0.003878	0.002880	0.003259	0.003943	0.002797	0.002617	0.003629
0.000072	0.000094	0.000066	0.000088	0.000085	0.000074	0.000902	0.000065	0.000080	0.000084	0.000078	0.000069
0.002197	0.000257	0.000232	0.000329	0.000240	0.000198	0.000192	0.000280	0.000217	0.000188	0.000179	0.000185
0.025902	0.020378	0.019065	0.020541	0.008637	0.010327	0.007460	0.009495	0.012759	0.023592	0.024658	0.015232
0.000003	0.000004	0.000003	0.000004	0.000005	0.000004	0.000003	0.000004	0.000004	0.000004	0.000003	0.000003
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000108	0.000085	0.000079	0.000085	0.000036	0.000043	0.000031	0.000039	0.000053	0.000098	0.000102	0.000063
0.026687	0.020996	0.019604	0.021141	0.008906	0.010698	0.007678	0.009777	0.013240	0.024221	0.025298	0.015643
0.005647	0.020364	0.012974	0.018331	0.017681	0.017526	0.014142	0.069715	0.018246	0.017660	0.015421	0.017092
0.001998	0.006921	0.004576	0.006600	0.006426	0.006185	0.004983	0.034277	0.007028	0.006345	0.005484	0.006236
0.001568	0.006936	0.003681	0.005076	0.004889	0.004858	0.004363	0.018427	0.005136	0.004889	0.004278	0.004734
0.004934	0.023735	0.011272	0.016481	0.016109	0.015209	0.017504	0.099774	0.016579	0.015788	0.013542	0.015654
0.000215	0.000324	0.001033	0.000364	0.000337	0.000296	0.000237	0.000287	0.000411	0.000288	0.000258	0.000287
0.001467	0.016079	0.009772	0.003311	0.003586	0.003260	0.003179	0.012538	0.005574	0.003787	0.005985	0.023042
0.008954	0.023484	0.030566	0.033594	0.024544	0.045940	0.035219	0.032861	0.038771	0.044363	0.047488	0.053659
0.000243	0.000506	0.000297	0.000302	0.000993	0.000239	0.000229	0.000375	0.000384	0.000264	0.000292	0.000575
0.000227	0.000407	0.005959	0.000404	0.000362	0.000354	0.000289	0.001048	0.000391	0.000341	0.000299	0.000338
0.003083	0.078878	0.006034	0.007885	0.007898	0.007764	0.006060	0.009257	0.011123	0.007548	0.006876	0.007524
0.034221	0.027737	0.032211	0.060862	0.040709	0.033979	0.024507	0.024652	0.034248	0.023167	0.021555	0.031400
0.000770	0.002056	0.001186	0.001624	0.001753	0.001679	0.001250	0.001763	0.002095	0.001746	0.001462	0.001597
0.000838	0.000975	0.000806	0.000953	0.000614	0.000676	0.000514	0.000584	0.000744	0.001017	0.001000	0.000765
0.001158	0.001647	0.001145	0.001549	0.002133	0.001519	0.001190	0.001453	0.001584	0.001474	0.001330	0.001369
0.000701	0.000306	0.000334	0.000436	0.000273	0.000950	0.000178	0.000258	0.000463	0.000927	0.000287	0.000290
0.002205	0.001777	0.001588	0.003739	0.002254	0.002708	0.000900	0.001405	0.003626	0.001546	0.001318	0.001583
0.002166	0.000517	0.001199	0.000620	0.000720	0.000872	0.000352	0.000510	0.000692	0.000728	0.000434	0.000639
0.000319	0.000447	0.000341	0.001251	0.000341	0.005317	0.000272	0.000750	0.000493	0.000319	0.000315	0.000491
0.000100	0.000091	0.000088	0.000891	0.000096	0.000120	0.000080	0.000076	0.000097	0.001244	0.000122	0.000154
0.000486	0.000466	0.000314	0.000437	0.000300	0.014431	0.000243	0.000318	0.000600	0.000304	0.000311	0.000396
0.001549	0.003028	0.002197	0.004712	0.004277	0.002804	0.002171	0.002204	0.003235	0.004874	0.002578	0.002651
0.001074	0.001154	0.001291	0.001766	0.000931	0.001267	0.000747	0.000937	0.001128	0.001222	0.001022	0.001189
0.000448	0.001781	0.000991	0.001320	0.004183	0.001411	0.001085	0.001472	0.019648	0.001232	0.001265	0.001265
0.000589	0.001682	0.001325	0.001904	0.001656	0.002137	0.001128	0.001408	0.006354	0.043248	0.002405	0.002069
0.000072	0.000245	0.000167	0.000227	0.000214	0.000227	0.000180	0.000167	0.000226	0.000219	0.000196	0.000205
0.000134	0.000139	0.000078	0.000115	0.000084	0.000135	0.000058	0.000067	0.000175	0.000070	0.000063	0.000067
0.000975	0.002586	0.006588	0.004337	0.003221	0.002355	0.004229	0.003257	0.002492	0.007894	0.002144	0.002775
0.032758	0.024807	0.011689	0.018286	0.010372	0.024583	0.005016	0.008672	0.036076	0.006133	0.005773	0.006188
0.007544	0.018334	0.027269	0.041775	0.021351	0.041293	0.021285	0.014040	0.019052	0.010546	0.009700	0.011272
0.003340	0.005817	0.005050	0.006963	0.006001	0.005367	0.004529	0.004535	0.006092	0.006060	0.005786	0.009488
0.006777	0.027794	0.023820	0.034022	0.017703	0.017835	0.015139	0.037207	0.016903	0.041234	0.038822	0.054789
1.013474	0.080135	0.071998	0.090827	0.064436	0.049333	0.043467	0.101193	0.054239	0.056388	0.054450	0.050382
0.001739	1.010049	0.004006	0.005638	0.006257	0.005418	0.004383	0.026765	0.043402	0.005341	0.004967	0.005421
0.000491	0.002067	1.015907	0.001620	0.001637	0.002012	0.001348	0.006668	0.006089	0.001520	0.001367	0.001526
0.002893	0.006514	0.007027	1.006126	0.005064	0.025692	0.005395	0.004992	0.010603	0.005384	0.003537	0.003490
0.013175	0.036775	0.016825	0.033488	1.028391	0.022160	0.042519	0.075926	0.160581	0.020588	0.020315	0.026659
0.000059	0.000216	0.000137	0.000190	0.000182	1.000184	0.000151	0.000532	0.000191	0.000184	0.000162	0.000175
0.002303	0.013207	0.002631	0.009502	0.006759	0.007018	1.002560	0.004527	0.010001	0.002012	0.001930	0.003005
0.009461	0.033456	0.019860	0.040722	0.044556	0.026719	0.021096	1.021618	0.039159	0.037924	0.027478	0.045848
0.020185	0.085539	0.046868	0.060198	0.067691	0.065051	0.047884	0.064272	1.068771	0.057927	0.060571	0.058695
0.009686	0.024078	0.021686	0.031978	0.026057	0.038299	0.017006	0.021233	0.022526	1.036477	0.045186	0.036242
0.002835	0.021493	0.006276	0.008499	0.007990	0.014122	0.006501	0.008929	0.011995	0.025844	1.022662	0.010271
0.007460	0.023321	0.018316	0.024913	0.022736	0.054541	0.010640	0.018480	0.034597	0.030801	0.040057	1.070926
0.001976	0.008945	0.010166	0.029509	0.013115	0.006521	0.005009	0.005184	0.007302	0.009678	0.008063	0.009378
0.004074	0.027929	0.017850	0.019840	0.061128	0.012039	0.010489	0.018035	0.022956	0.012843	0.011615	0.011088
0.038499	0.051770	0.047264	0.054482	0.053249	0.037435	0.051947	0.044084	0.056828	0.056223	0.074529	0.188294
0.018399	0.062130	0.042259	0.057127	0.054087	0.057089	0.045435	0.043893	0.070737	0.055286	0.049534	0.051634
0.020636	0.071872	0.077202	0.092876	0.077717	0.058669	0.045707	0.049509	0.069612	0.096953	0.088110	0.056899
0.254651	0.864974	0.591200	0.799805	0.756284	0.799496	0.636148	0.590203	0.797120	0.774311	0.691851	0.722566

Lodging	Personal Services	Business Services	Medical/ Health	Other Services	Households
0.000548	0.000617	0.000682	0.000751	0.000743	0.001257
0.001096	0.001234	0.001342	0.001503	0.001491	0.002523
0.000837	0.000940	0.001075	0.001153	0.001156	0.001918
0.000048	0.000054	0.000059	0.000065	0.000067	0.000114
0.000055	0.000064	0.000073	0.000074	0.000075	0.000123
0.000634	0.000712	0.000772	0.000866	0.000862	0.001462
0.001643	0.001874	0.002019	0.002293	0.002210	0.003743
0.000053	0.000058	0.000061	0.000071	0.000073	0.000124
0.005826	0.006545	0.007096	0.007951	0.007920	0.013437
0.000580	0.000651	0.000696	0.000792	0.000790	0.001342
0.000641	0.000721	0.000744	0.000866	0.000890	0.001522
0.000619	0.000685	0.000727	0.000843	0.000852	0.001456
0.011459	0.010319	0.019148	0.009398	0.009706	0.014354
0.003111	0.002801	0.005195	0.002551	0.002634	0.003896
0.000063	0.000050	0.000057	0.000055	0.000058	0.000093
0.000295	0.000230	0.000183	0.000151	0.000139	0.000207
0.018720	0.006396	0.008211	0.005034	0.005743	0.006837
0.000003	0.000003	0.000003	0.000003	0.000003	0.000006
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
0.000077	0.000027	0.000034	0.000021	0.000024	0.000028
0.019218	0.006597	0.008449	0.005189	0.005914	0.007049
0.012235	0.013759	0.014747	0.016716	0.016638	0.028227
0.004363	0.004984	0.005376	0.006103	0.005859	0.009921
0.003395	0.003810	0.004187	0.004704	0.004710	0.007821
0.010824	0.012478	0.013509	0.014571	0.014799	0.024293
0.001190	0.000229	0.000339	0.000269	0.000281	0.000439
0.007733	0.006712	0.006081	0.002468	0.002575	0.002491
0.035361	0.073772	0.125007	0.021971	0.023196	0.015869
0.000320	0.000688	0.001245	0.000180	0.000339	0.000219
0.000260	0.000279	0.000324	0.000319	0.000333	0.000535
0.007532	0.006380	0.006618	0.012208	0.007158	0.011779
0.022788	0.021513	0.047083	0.021622	0.022821	0.033914
0.001159	0.001227	0.002663	0.001607	0.001528	0.002343
0.000769	0.000465	0.000538	0.000493	0.000523	0.000813
0.001098	0.001122	0.001219	0.001332	0.001369	0.002334
0.000270	0.000208	0.000470	0.000178	0.000204	0.000250
0.001303	0.001006	0.004248	0.000775	0.000968	0.001109
0.000544	0.000485	0.002192	0.000354	0.000450	0.000466
0.000312	0.000315	0.001648	0.000278	0.000306	0.000425
0.000091	0.000087	0.000501	0.000064	0.000329	0.000082
0.000489	0.000393	0.001051	0.000209	0.000492	0.000250
0.002071	0.002025	0.002988	0.002684	0.002594	0.004065
0.000920	0.000813	0.001278	0.000861	0.000884	0.001261
0.001180	0.000996	0.001230	0.001174	0.001256	0.001985
0.001115	0.001154	0.001190	0.001246	0.001144	0.001664
0.000154	0.000167	0.000174	0.000207	0.000214	0.000368
0.000059	0.000059	0.000062	0.000110	0.000093	0.000107
0.001404	0.005980	0.003462	0.001727	0.002164	0.001972
0.007119	0.006419	0.005266	0.005856	0.005319	0.008373
0.008535	0.015578	0.015582	0.009534	0.011486	0.012696
0.006315	0.007929	0.027710	0.005112	0.012192	0.007018
0.037646	0.018817	0.025807	0.020876	0.017885	0.014293
0.111741	0.083072	0.038782	0.043750	0.036712	0.052246
0.007038	0.006440	0.004796	0.004969	0.005056	0.008279
0.002831	0.002375	0.001513	0.001563	0.001495	0.002368
0.005399	0.005404	0.004170	0.002666	0.002570	0.003433
0.032644	0.018787	0.054612	0.017379	0.017667	0.026383
0.000127	0.000142	0.000153	0.000174	0.000191	0.000297
0.002462	0.002216	0.003393	0.001624	0.002450	0.002467
0.023494	0.033622	0.040962	0.026425	0.025943	0.039424
0.055312	0.046746	0.047559	0.055990	0.056214	0.094765
0.015384	0.017684	0.016842	0.018090	0.015288	0.020568
0.006230	0.006739	0.006729	0.008411	0.007921	0.012898
0.087998	0.047714	0.013215	0.037001	0.013543	0.014817
1.004356	0.007366	0.004983	0.005547	0.005293	0.008509
0.026937	1.013241	0.011070	0.013212	0.010785	0.018198
0.091163	0.083658	1.063641	0.037317	0.054874	0.035862
0.038963	0.042181	0.043849	1.102347	0.053728	0.092433
0.053620	0.049038	0.046126	0.052632	1.057645	0.090334
0.542579	0.591139	0.614218	0.732062	0.754240	1.298627

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