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An Interindustry Model of El Paso and Hudspeth Counties, Texas

W.S. Coffman
B.R. Beattie
L.L. Jones
J.W. Adams

Texas Water Resources Institute

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Principal Investigators

William S. Coffman
Bruce R. Beattie
Lonnie L. Jones
John W. Adams

A report contributing to

REGIONAL WATER MANAGEMENT WITH
FULL CONSUMPTIVE USE

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AN INTERINDUSTRY MODEL OF EL PASO AND HUDSPETH COUNTIES, TEXAS

William S. Coffman, Bruce R. Beattie, Lonnie L. Jones and John W. Adams*

SUMMARY AND PURPOSE

This report describes the economic structure of El Paso and Hudspeth Counties of Texas in an input-output (interindustry) framework. The report comprises a portion of a larger study designed to investigate the economic consequences of alternative allocations of surface and groundwater, under full consumptive use, in the reach of the Rio Grande River stretching from Elephant Butte Reservoir in southern New Mexico to Fort Quitman, Texas. El Paso and Hudspeth Counties in Texas and Dona Anna and Sierra Counties in New Mexico encompass the irrigated agricultural region of the U.S. portion of this reach of the Rio Grande. The input-output model reported herein provides the base data on the economic structure of the Texas subregion for the larger study.

In this report the transaction table for the two counties in Texas is presented as well as the direct requirements and the direct and indirect requirements tables. Basically, the transaction table provides information concerning the dollar amount of goods and services required by each sector from every other sector of the economy to produce its output and how this output is then distributed among sectors. The direct requirements table shows the direct purchases per dollar of output of each sector from every other sector. This table shows only the direct or

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*William S. Coffman is research associate in agricultural economics at Texas A&M University. Bruce R. Beattie and Lonnie L. Jones are associate professors of agricultural economics at Texas A&M University. John W. Adams is associate professor of environmental studies at the University of Texas, San Antonio.

"first round" effects. The direct and indirect requirements (interdependence) table shows the total effect of an increase of one dollar output in a sector. This includes the "ripple effect" caused by the first round requirements.

In addition to the basic transaction, direct requirements and direct and indirect requirements tables, output, income and employment multipliers for the various sectors of the regional economy are presented. Output multipliers reflect the change in total regional output resulting from a dollar change in output in a particular sector. Output multipliers ranged from 1.32 for petroleum to 2.89 for the trucking and warehousing sector.

The income multipliers, which measure the change in total regional income resulting from a dollar change in income in a particular sector, ranged from 1.4 for mining to 2.8 for fruits, nuts and other irrigated crops. The highest income multipliers were found for the agricultural sectors. This is due to the fact that most agricultural inputs are purchased locally and that a considerable portion of agricultural products are processed locally.

Similarly, employment multipliers, which measure the total change in man-years of employment in the economy resulting from a change of one man-year of labor in a particular sector, ranged from 1.02 for gas service stations to 3.1 for petroleum. Highest employment multipliers were associated with manufacturing sectors.

The reader should be cautioned in the interpretation and use of these multipliers for policy and decision-making purposes. While these multipliers should be informative in this context, they should not be the

sole criterion or information on which local decision-makers should judge the desirability of efforts to maintain, encourage or discourage economic activity in various sectors. In some instances the resources and market conditions necessary to expand the existing level of economic activity in a particular sector can be an overriding consideration. For example, the relative scarcity of water and abundance of labor in the region must be taken into account. Also, expected conditions of supply and demand for the output of the various sectors of the region is of paramount importance. For example, while the multipliers associated with tourism might be relatively high, it might be easy to oversaturate the market.

Multipliers are useful tools in planning but by no means should they be the only consideration. Multipliers measure direct and *indirect* impacts of expanded or reduced economic activity in a particular sector. Direct impacts are often of equal or greater importance in making wise choices in allocating scarce resources in a local situation. For example, if increasing employment is a goal of local decision-makers, then seeking industries that are labor rather than capital intensive may be of greater consequence than seeking an industry with a high employment multiplier.

THE STUDY AREA

This report is concerned with the two extreme western counties of Texas. El Paso and Hudspeth Counties are similar in climate and topography. They also have access to water from the Rio Grande River. Economic activity is concentrated in the one population center in the

area--El Paso. The remainder of El Paso County and Hudspeth County is dominated by broad expanses of land and sparse population. Relatively little economic activity is generated in the nonurban area.

The combined population of El Paso and Hudspeth Counties was reported to be 361,683 in 1970. Of this total 2,392 were residents of Hudspeth County, all of which were classified as rural, 14,353 were rural residents of El Paso County and 344,938 were urban residents of El Paso County. The metropolitan area of El Paso accounts for 95.4 percent of the two county population [*1970 Census of the Population*].

The economy of El Paso is greatly influenced by government spending due to military installations in the area. Although this is not as great a factor as it was in the 1960's because of the military's adjustment to the end of U.S. involvement in the Indo-China conflict, the installations are still there and remain an important part of the area's economy.

Industry in the area is confined to the El Paso area. Manufacturing is important to the economy, employing 18 percent of the total work force. One-half, or 9 percent, of these are employees of the textile and apparel sector. Clothes making is of major importance to the economy because it is a labor intensive industry and the area has an ample and inexpensive source of labor. Numerous residents of Juarez, Mexico migrate daily to and from employment of the U.S. side of the border.

Industries as a general rule, tend to locate either close to their input supply or their product markets. The fact that the apparel industry imports most of its raw materials and exports most of its output would strongly suggest that the labor advantage enables them to favorably compete with their competitors not having these transportation charges.

Agricultural production in this area should not be ignored. Although the economy is dominated by the El Paso urban center, total sales by agriculture indicate that this is an important sector for a small segment of the population. The limited area available for irrigation is highly productive in the traditional crop of cotton as well as the more recent expansion into vegetables and pecans.

Finally, it should be noted that El Paso is far removed from other major population centers in Texas and New Mexico. Also, more of the El Paso trade area is in New Mexico than in Texas. El Paso serves as a major distribution point. Accordingly, it is not surprising that the transportation sectors in the study area play a relatively more important role than is typical of many regional economies (see output multipliers in Table 6).

ELEMENTS OF THE INPUT-OUTPUT MODEL

The Sectors and Sector Output

Input-output (I-O) analysis involves the modeling of dollar flows through a given economy.[1] This enables inferences to be made concerning the interdependence of the various economic activities within the economy. The economy refers to the localized geographic area that is being studied, in this case El Paso and Hudspeth Counties. This area is considered the economy and all transactions across its boundaries are considered imports and exports to that economy.

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[1]For a detailed explanation of the techniques and use of input-output analysis, see Miernyk [1965].

To construct such a model, it is necessary first to group similar economic activities into sectors. There can be as many or as few sectors as is necessary to include all of the business transactions in the economy. The degree of aggregation or disaggregation of the sectors depends, of course, on the purpose of the study. For example, since the larger study, to which this report contributes, focuses on water use, the irrigated crops subsectors of the agricultural sector are disaggregated more than is usual in most I-O models.

Sectors titles, sector gross output and sector output as a percentage of total output are presented in Table 1. The individual sectors having the greatest gross output in El Paso and Hudspeth Counties are construction, petroleum, textiles and apparel. Agriculture (Sectors 1 through 5) makes up 2.4 percent of total output of the region. Manufacturing industries (Sectors 9 through 20) comprise 38 percent of gross output. Wholesale and retail trade (Sectors 30 through 33) and service industries (Sectors 34 through 39) contribute 16 and 19 percent, respectively (Table 2).

Sector SIC Codes (Standard Industrial Classification categories, U.S. Department of Commerce) data sources, and assumptions and procedures for developing the sector gross output data are presented and discussed in the Appendix. Methods and procedures used to develop the basic transactions table for the study area are also discussed in the Appendix.

Table 1. Economic Sectors, Gross Output and Sector Output as Percent of Total Output for El Paso-Hudspeth Counties, Texas, 1967.

Sector Number	Sector Title	Gross Output ($1,000)	Percent of Total Output
1	Grain & Hay	2400.0	.17
2	Cotton	7000.0	.50
3	Other Irrigated Crops	4100.0	.29
4	Livestock, Dairy, Poultry	17700.0	1.25
5	Agr. Service & Supply	2200.0	.16
6	Mining	4700.0	.33
7	Construction	178500.0	12.62
8	Maintenance & Repair	19400.0	1.37
9	Food Processing	84400.0	5.97
10	Textiles & Apparel	166800.0	11.80
11	Lumber	6500.0	.46
12	Furniture	2200.0	.16
13	Boxes & Paper Containers	600.0	<.01
14	Printing & Publishing	12600.0	.89
15	Chemicals	5600.0	.40
16	Petroleum	176200.0	12.46
17	Rubber & Leather	7700.0	.54
18	Glass, Stone, Clay, Cement	15400.0	1.09
19	Primary & Fabri. Metals	41700.0	2.95
20	Machinery	17200.0	1.22
21	Railroad Transportation	12400.0	.88
22	Intercity Freight	23600.0	1.67
23	Trucking & Warehousing	1200.0	.01
24	Air Transportation	8300.0	.59
25	All Other Transportation	3300.0	.23
26	Communication Service	29200.0	2.07
27	Gas Utility	36500.0	2.58
28	Electric Utility	28000.0	1.98
29	Water Utility	7300.0	.52
30	General Wholesale	105300.0	7.45
31	General Retail	103600.0	7.33
32	Auto Dealers	11900.0	.84
33	Gas Service Stations	3700.0	.26
34	Eating & Drinking Places	10000.0	.71
35	FIRE*	71400.0	5.05
36	Lodging	12600.0	.89
37	Personal Services	38100.0	2.69
38	Professional Services	134700.0	9.53
		1,414,000.0	

*FIRE includes the activities of finance, insurance and real estate--includes all banks and related activities.

Table 2. Major Groupings of Economic Sector Output as Percent of Total Output for El Paso-Hudspeth Counties, Texas, 1967.

Groupings	Sectors	Percent of Total Output
Agriculture	1-5	2.37
Mining	6	.33
Construction	7-8	13.99
Manufacturing	9-20	37.94
Transportation	21-25	3.38
Utilities	26-29	7.15
Wholesale-Retail	30-33	15.88
Services	34-38	18.87

The Transactions Table

The transactions table of an I-O model (Table 3) provides a picture of input flows to an industry from various sectors and the distribution of that industry's output to other sectors. Inputs that are required by an industry, but are not available within the local economy, are recorded as imports to the economy. At the same time, all output of an industry that is not internally consumed, is exported. Thus, the transactions table of an I-O model shows linkages between sectors in terms of "purchases from" and "sales to" related industries.

The transactions table is made up of three major components--processing sectors, final demand and final payments sectors. Each processing sector (those sectors within the region that produce goods and services) is listed in the transactions table both as a row and as a column to indicate the sales and purchases among sectors. To determine the purchases of one processing sector from another, locate the sector at the top of the table and read down that column until you come to the

row of the other processing sector. For example, the irrigated cotton sector (column 2) purchased $250,940 from the agricultural services and supply sector (row 5), nothing, as one would expect, from the printing and publishing sector (row 14), $149,540 from petroleum (row 16), etc.

Similarly, to find the sales from one industry to another, find the producing sector on the left of the table and read across that row until you come to the column of the purchasing sector. For example, irrigated cotton (row 2) made substantial sales ($386,610) to textiles and apparel (column 10) but very little ($850) to agricultural service and supply (column 5). The processing sectors make up the internal or endogenous part of the table.

The household sector (39) is not always included in the processing or endogenous portion of I-O models. However, households do provide (sell) labor and management skills to other processing sectors and consume (purchase) the products of the other sectors. Thus, the household sector was considered endogenous in this study so that the effect of changes in household activity (purchasing and selling) could be reflected in the calculated multipliers.

Final demand and final payments sectors complete the transactions table. Final demand sectors are depicted as columns (columns 40-45, Table 3), while final payments are shown as rows (rows 40-41, Table 3).

Final demand sectors include those sales of goods and services produced by the processing sectors that are not internally consumed by other processing sectors. These include purchases by government, exports, net inventory change and capital formation. Government is frequently disaggregated into Federal, State and local as in the present model.

Table 3. Transactions Table, El Paso-Hudspeth Counties, Texas, 1967
(Thousands of Dollars)

No.	Name	1 Grain & Hay	2 Cotton	3 Other Irrigated Crops	4 Livestock Dairy Poultry
1	Grain & Hay	8.10	0.00	0.00	767.95
2	Cotton	0.00	12.99	0.00	0.00
3	Other Irrigated Crops	0.00	0.00	64.13	191.98
4	Livestock, Dairy, Poultry	0.25	0.74	0.43	59.91
5	Agr. Service & Supply	27.16	250.94	11.91	225.47
6	Mining	0.00	0.00	0.00	0.00
7	Construction	0.00	0.00	0.00	0.00
8	Maintenance & Repair	8.26	20.74	18.07	206.96
9	Food Processing	0.00	0.00	0.00	756.36
10	Textiles & Apparel	13.24	38.62	22.62	58.69
11	Lumber	0.00	0.00	0.00	299.63
12	Furniture	0.00	0.00	0.00	0.00
13	Boxes & Paper Containers	0.00	0.00	0.00	20.30
14	Printing & Publishing	0.00	0.00	0.00	0.88
15	Chemicals	35.88	78.72	40.57	44.13
16	Petroleum	75.83	149.54	65.84	191.96
17	Rubber & Leather	0.00	0.00	0.00	0.00
18	Glass, Stone, Clay, Cement	0.00	0.00	0.00	0.00
19	Primary & Fabri. Metals	3.59	10.48	6.13	25.72
20	Machinery	2.21	6.43	3.77	54.72
21	Railroad Transportation	0.00	0.00	0.00	0.00
22	Intercity Freight	9.19	26.82	15.71	110.32
23	Trucking & Warehousing	0.64	1.88	1.10	3.09
24	Air Transportation	0.00	0.00	0.00	0.00
25	All Other Transportation	0.00	0.00	0.00	0.00
26	Communication Services	11.52	30.32	23.33	274.04
27	Gas Utility	43.20	79.75	202.91	265.65
28	Electric Utility	45.77	83.96	149.58	31.77
29	Water Utility	0.00	0.00	0.00	11.03
30	General Wholesale	76.60	225.49	130.84	741.80
31	General Retail	8.64	26.21	14.77	55.16
32	Auto Dealers	14.05	34.66	27.89	122.84
33	Gas Service Stations	13.97	27.54	12.12	90.12
34	Eating & Drinking Places	0.00	0.00	0.00	0.00
35	FIRE	73.15	163.23	415.34	688.41
36	Lodging	0.00	0.00	0.00	0.00
37	Personal Services	2.30	3.96	18.77	18.40
38	Professional Services	1.66	4.82	2.83	34.42
39	Households	465.79	1516.91	596.26	2412.95
40	Imports	1019.90	2925.25	1504.88	7825.55
41	Value Added	439.10	1281.00	750.20	2109.79
42	Total	2400.00	7000.00	4100.00	17700.00

Table 3. (Continued)

No.	5 Agri. Service & Supply	6 Mining	7 Construc-tion	8 Mainte-nance & Repair	9 Food Pro-cessing	10 Textiles & Apparel	11 Lumber
1	0.29	0.00	0.00	0.00	326.71	0.00	0.00
2	0.85	0.00	0.00	0.00	952.59	386.61	0.00
3	0.50	0.00	0.00	0.00	556.13	0.00	1.11
4	1.03	0.00	0.00	0.00	283.85	27.64	0.53
5	93.05	0.00	4.20	0.00	0.00	9.33	0.00
6	0.13	0.00	647.96	2.69	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	12.74	1.24	958.95	77.96	1463.30	2173.80	4.81
9	1.89	0.00	8.08	1.83	2099.69	0.00	0.00
10	0.47	0.00	965.23	0.00	0.98	2179.12	4.81
11	2.36	3.38	2171.10	433.80	2.95	1.77	1218.15
12	0.00	1.01	32.32	14.67	0.00	0.00	0.00
13	0.00	0.00	0.00	3.67	106.06	44.29	0.00
14	3.30	0.23	9.88	0.00	191.51	215.25	0.00
15	9.44	4.96	311.57	95.38	31.43	6.20	24.07
16	53.79	9.80	7318.71	60.53	10.80	4.43	0.00
17	0.00	0.00	9.88	5.50	3.93	9.74	0.00
18	0.47	4.06	10754.95	490.66	83.48	2.66	0.00
19	0.00	14.94	1718.32	261.05	2.20	0.00	0.00
20	0.47	23.44	132.89	6.42	31.43	28.35	5.78
21	0.47	0.00	30.53	3.67	79.55	111.61	250.37
22	35.86	57.69	809.90	150.41	554.88	433.17	22.15
23	5.19	0.90	190.35	49.52	24.55	10.63	20.22
24	5.19	1.01	61.95	4.59	11.78	67.32	0.96
25	0.00	13.41	0.00	0.00	0.00	0.00	0.00
26	14.15	2.25	477.68	52.28	389.89	638.68	12.52
27	6.61	146.59	178.68	6.42	166.95	380.02	8.67
28	41.52	5.52	373.52	18.34	418.37	399.50	0.00
29	3.77	0.79	230.76	7.34	71.69	66.44	3.85
30	100.97	96.79	2437.78	35.77	632.46	603.24	3.85
31	16.04	5.75	533.35	41.27	0.00	0.00	0.00
32	4.91	9.77	32.47	7.72	4.86	32.91	0.00
33	1.92	0.66	174.41	43.60	165.87	22.86	0.44
34	0.00	0.00	45.38	8.43	7.90	35.62	0.55
35	58.97	5.86	5393.63	301.73	1120.55	3612.38	164.67
36	6.13	0.56	141.87	15.59	26.52	75.29	2.89
37	12.65	3.52	1328.49	84.68	374.42	1060.64	15.06
38	109.46	4.96	2215.10	615.39	145.35	1502.35	11.56
39	533.13	2822.28	59927.09	12088.66	25563.55	58579.30	2300.52
40	846.19	778.76	68085.75	3730.83	45056.60	86700.00	2156.69
41	216.08	679.88	10787.27	679.59	3437.28	7378.88	265.78
42	2200.00	4700.00	178500.00	19400.00	84400.00	166800.00	6500.00

Table 3. (Continued)

No.	12 Furniture	13 Boxes & Paper Containers	14 Printing & Publishing	15 Chemicals	16 Petroleum	17 Rubber & Leather	18 Glass, Stone, Clay, Cement
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	2.12	2.48	0.54	2.64	1.06	1.06	0.47
4	0.00	0.00	3.60	1.50	0.50	12.04	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.13	0.00	0.00	0.00	289.95
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	45.83	64.29	112.84	296.90	502.44	375.83	589.80
9	0.00	0.00	0.94	1.83	4.57	0.92	0.81
10	32.08	4.29	0.00	0.00	0.00	27.50	0.00
11	119.17	0.00	4.70	18.27	4.57	12.83	2.44
12	5.50	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	42.86	0.00	0.00	9.14	9.17	0.00
14	23.83	0.00	128.82	0.00	8.22	1.83	6.51
15	7.33	0.86	42.31	182.71	557.25	13.75	86.23
16	0.92	0.00	0.00	182.71	5070.95	0.00	173.28
17	11.92	0.00	0.00	0.00	0.00	334.58	0.00
18	19.25	0.00	6.58	9.14	49.33	0.00	1786.50
19	45.79	0.00	0.00	0.00	0.00	4.99	7.29
20	4.58	0.00	86.51	11.88	137.94	20.17	139.93
21	0.00	0.00	22.57	8.22	0.91	2.75	566.21
22	92.58	0.00	0.00	34.71	612.06	50.42	565.40
23	42.17	0.00	20.69	5.48	423.87	0.00	13.83
24	0.00	0.00	10.34	5.48	5.48	1.83	1.63
25	0.00	0.00	1.88	0.00	217.42	54.08	0.00
26	13.75	3.43	157.03	26.49	134.29	33.00	61.83
27	15.58	0.86	25.39	12.79	769.18	20.17	519.03
28	54.08	8.57	82.75	47.50	906.21	12.83	452.32
29	7.33	4.29	36.67	7.31	84.04	1.83	17.90
30	30.25	9.43	395.87	7.31	21.01	50.42	180.60
31	6.42	0.00	0.00	0.00	46.59	0.00	0.00
32	0.00	0.42	0.00	0.00	24.89	0.00	0.00
33	0.00	1.16	5.11	5.79	7.45	1.25	13.26
34	0.00	0.00	0.54	3.67	3.15	1.05	0.93
35	270.42	21.43	472.97	115.11	404.69	157.67	434.42
36	0.00	0.00	3.76	17.36	22.84	6.42	4.88
37	6.83	3.83	30.11	37.41	123.12	47.10	47.86
38	30.25	0.00	57.36	10.05	164.43	6.42	70.78
39	569.25	115.71	6205.03	1505.51	18446.73	2916.83	4611.05
40	559.44	290.39	3579.18	2613.78	134316.56	3077.60	2970.02
41	183.33	25.71	1105.79	428.45	13119.08	443.67	1784.87
42	2200.00	600.00	12600.00	5600.00	176200.00	7700.00	15400.00

Table 3. (Continued)

No.	19 Primary & Fabri. Metals	20 Machinery	21 Railroad Trans-portation	22 Intercity Freight	23 Trucking & Ware-housing	24 Air Trans-portation	25 All Other Trans-portation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.30	3.18	0.00	0.00	0.00	0.00	0.00
4	0.00	1.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	6.78	0.00	0.00	0.00	0.00	0.00	1.42
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	313.60	613.96	661.63	184.13	29.86	13.76	19.42
9	1.29	6.41	20.22	0.00	0.00	0.00	0.84
10	3.10	0.00	0.00	0.00	0.00	0.00	0.00
11	1.81	0.92	45.95	1.83	0.00	0.00	0.00
12	1.03	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	11.10	0.00	17.46	1.83	2.80	1.97	170.57
15	140.67	76.06	0.00	0.00	0.00	0.00	84.44
16	0.52	0.00	809.57	118.17	0.00	2056.82	354.66
17	0.00	259.33	0.00	0.92	0.00	0.00	0.00
18	163.90	67.81	0.00	0.00	0.00	0.00	11.82
19	1221.94	159.02	58.26	0.00	0.00	0.00	0.00
20	15.23	330.80	21.14	0.00	0.00	0.00	8.44
21	804.52	0.00	574.33	0.00	0.00	0.00	0.00
22	151.25	129.21	93.73	0.00	0.00	0.00	0.00
23	0.00	32.07	0.00	0.00	0.00	93.36	0.00
24	1.29	21.08	32.16	0.00	0.93	98.27	1.69
25	1.55	0.00	284.87	0.00	0.00	0.00	168.88
26	47.23	164.94	129.57	1157.92	16.80	102.20	27.02
27	891.76	74.22	14.70	360.93	2.80	93.36	10.98
28	14.71	159.45	31.24	505.67	66.25	246.66	32.09
29	2.58	22.91	39.51	32.98	0.93	73.70	3.38
30	110.47	175.02	924.44	1379.61	14.93	489.39	146.08
31	21.94	2.75	0.00	0.00	0.00	0.00	0.00
32	0.00	1.82	0.00	0.00	0.00	0.00	0.00
33	1.17	11.20	0.00	68.86	0.42	0.00	4.59
34	0.89	10.00	0.00	0.00	1.61	1.13	3.88
35	266.88	515.91	337.25	1226.63	293.00	25.55	194.22
36	4.39	51.32	0.00	0.00	2.80	0.98	6.76
37	20.56	566.34	152.59	647.35	6.25	44.64	79.23
38	23.49	11.00	31.24	49.47	9.33	0.00	59.11
39	12579.68	7032.11	5547.56	10609.10	588.80	2696.57	1300.41
40	23004.89	5076.38	1026.04	5294.19	19.71	1907.87	309.46
41	1869.48	1623.78	1546.55	1960.41	142.77	353.78	300.61
42	41700.00	17200.00	12400.00	23600.00	1200.00	8300.00	3300.00

Table 3. (Continued)

No.	26 Communi-cations Services	27 Gas Utility	28 Electric Utility	29 Water Utility	30 General Wholesale	31 General Retail	32 Auto Dealers
1	0.00	0.00	0.00	0.00	85.38	47.74	0.00
2	0.00	0.00	0.00	0.00	248.94	0.00	0.00
3	0.00	0.00	0.00	0.00	145.34	190.96	0.00
4	0.00	0.00	0.00	0.00	26.16	11.75	0.23
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	11.89	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	110.62	54.04	47.52	371.51	305.99	926.61	4.12
9	0.00	0.00	0.00	0.00	540.30	269.23	4.12
10	0.00	3.66	7.31	4.71	199.40	1268.52	0.00
11	46.09	0.00	0.00	2.83	54.21	243.63	0.41
12	0.00	0.00	0.00	0.00	8.27	42.12	0.41
13	0.00	0.00	0.00	0.00	2.76	4.13	0.00
14	64.53	19.24	31.07	15.09	107.51	382.37	7.00
15	18.44	18.32	0.00	77.32	69.83	145.35	4.53
16	19.36	9.16	38.38	52.80	2.76	109.01	0.00
17	0.00	0.00	0.00	0.00	9.19	46.25	0.41
18	0.00	1.83	6.40	251.76	5.51	15.69	0.00
19	0.00	0.00	0.00	3.92	180.06	108.94	2.77
20	295.00	18.32	23.76	25.46	230.64	301.44	12.36
21	34.11	9.16	70.37	0.00	3068.14	511.21	1104.18
22	27.66	22.90	31.07	0.00	1847.87	1351.93	122.78
23	0.00	8.24	10.97	0.00	123.13	73.50	0.00
24	17.52	0.00	0.00	0.00	449.33	184.99	23.07
25	0.00	0.00	8.22	0.00	0.00	0.00	0.00
26	828.75	183.20	138.91	18.86	1687.98	955.52	139.67
27	128.14	5572.89	1847.84	625.15	451.17	779.61	9.06
28	254.43	29.31	1430.20	473.34	1415.08	1537.75	39.14
29	30.42	7.33	67.63	0.00	324.36	164.35	10.30
30	112.47	119.08	29.24	175.38	633.11	527.72	1804.18
31	0.00	0.00	1.83	0.00	54.21	119.75	12.77
32	15.98	31.31	34.40	116.76	1.37	12.27	1.02
33	0.00	4.15	3.31	0.00	80.72	50.11	2.05
34	6.35	0.00	0.00	0.00	77.59	25.56	1.89
35	618.57	861.03	317.11	47.15	4414.30	4258.96	290.88
36	23.05	54.96	13.71	9.43	440.14	192.43	17.30
37	547.78	210.76	102.75	17.55	1900.08	2298.71	97.25
38	53.47	17.40	21.93	0.00	1794.57	906.79	0.00
39	8605.59	13804.90	10602.69	2757.07	56467.95	51587.34	4106.47
40	8227.23	8619.70	4245.21	1069.63	18358.40	22163.14	3571.96
41	9114.45	5919.13	8868.17	1184.29	9488.35	11771.80	509.65
42	29200.00	35600.00	28000.00	7300.00	105300.00	103600.00	11900.00

Table 3. (Continued)

No.	33 Gas Service Stations	34 Eating & Drinking Places	35 FIRE	36 Lodging	37 Personal Services	38 Profes-sional Services	39 Households
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	5.11	319.85
4	0.00	1.33	0.00	1.42	4.38	29.51	714.74
5	0.00	0.00	0.00	0.00	0.00	0.00	403.31
6	0.00	0.00	0.00	0.00	0.09	0.49	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	76.87	17.49	512.50	208.93	264.33	757.49	4606.13
9	13.80	59.77	158.96	228.00	9.24	880.35	52022.96
10	0.00	1.94	0.91	173.39	3.08	123.74	5661.30
11	0.39	21.87	5.48	1.73	11.71	72.48	213.40
12	0.39	0.97	1.83	43.35	6.16	205.06	215.08
13	0.00	0.00	0.00	0.00	0.00	0.00	35.43
14	0.00	0.97	269.50	51.15	207.03	287.26	4882.79
15	25.62	20.89	0.00	6.07	24.03	282.84	490.05
16	632.70	0.97	0.00	0.00	462.12	22.10	12241.14
17	0.39	1.46	3.65	0.87	2.46	9.72	1708.85
18	0.39	3.89	0.00	2.60	7.39	43.31	514.51
19	3.66	0.62	0.00	0.00	4.14	0.85	2160.48
20	33.51	27.21	0.00	24.27	115.27	586.90	2516.04
21	0.00	0.00	0.00	0.00	0.00	80.43	0.00
22	32.32	0.00	0.00	47.68	74.55	108.72	2252.88
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	156.22	65.89	108.44	1685.56	2409.77
25	0.00	0.00	0.00	0.00	0.00	441.94	1855.61
26	44.94	26.24	813.97	254.01	470.74	2265.39	8598.23
27	19.71	33.53	285.94	130.91	155.84	1092.48	7333.89
28	116.29	233.72	1453.45	348.51	488.61	1366.48	8261.70
29	11.83	57.34	99.58	96.23	105.36	386.26	2665.34
30	143.88	112.73	391.00	123.97	1110.31	5071.71	29553.17
31	0.00	0.00	87.70	3.47	103.51	273.12	84502.88
32	0.00	0.00	0.00	5.15	66.23	131.78	11047.35
33	4.46	14.52	35.99	6.28	29.85	179.30	2195.25
34	0.00	0.00	131.71	5.48	8.85	204.09	9405.06
35	161.62	659.38	4850.01	2160.40	1433.79	5292.68	21729.23
36	23.26	0.00	104.14	49.42	183.00	297.87	1584.02
37	13.80	297.42	1252.34	219.48	1047.91	2533.92	20689.61
38	9.46	158.41	1521.05	131.77	1394.36	8248.38	83878.69
39	1855.12	6394.07	37718.48	3340.29	21113.81	67008.81	19736.98
40	91.22	656.96	11931.47	2495.63	5720.40	23365.18	120011.44
41	384.35	1196.31	9614.15	2373.66	3362.98	11358.75	409583.56
42	3700.00	10000.00	71400.00	12600.00	38100.00	134700.00	936000.00

Table 3. (Continued)

No.	40 Federal Govern-ment	41 State Govern-ment	42 Local Govern-ment	43 Net Inventory Change	44 Capital Formation	45 Exports	46 Gross Output
1	401.17	0.00	0.00	0.00	0.00	762.66	2400.00
2	2067.44	0.00	0.00	0.00	0.00	3330.58	7000.00
3	1186.63	0.00	0.00	0.00	0.00	1424.41	4100.00
4	2676.36	0.81	0.00	0.00	0.00	13840.27	17700.00
5	0.00	0.00	0.00	0.00	0.00	1174.62	2200.00
6	0.00	76.58	0.00	0.00	0.00	3661.88	4700.00
7	49354.59	15281.83	13759.05	0.00	64469.55	35635.06	178500.00
8	271.67	44.34	49.17	0.00	0.00	1999.60	19400.00
9	2237.01	62.88	0.00	-996.82	0.00	26004.52	84400.00
10	3906.51	16.12	0.00	2382.92	0.00	149695.69	166800.00
11	87.06	24.18	0.00	259.57	291.82	817.55	6500.00
12	161.23	79.81	20.96	-13.60	78.19	1295.22	2200.00
13	63.68	4.03	0.00	2.42	46.76	205.32	600.00
14	0.00	20.96	48.37	-62.46	0.00	5471.63	12600.00
15	873.04	104.80	174.12	28.21	0.00	1362.57	5600.00
16	877.07	170.09	0.00	-7507.00	0.00	152360.50	176200.00
17	32.25	149.13	0.00	427.25	0.00	4672.31	7700.00
18	596.54	111.25	80.61	-275.47	0.00	583.23	15400.00
19	2424.84	105.60	88.67	613.47	99.96	32362.29	41700.00
20	2317.63	120.92	37.08	41.92	0.00	9359.76	17200.00
21	344.22	0.00	0.00	0.00	0.00	4722.48	12400.00
22	3330.93	16.12	0.00	0.00	0.00	10377.14	23600.00
23	0.00	0.00	0.00	0.00	0.00	44.61	1200.00
24	1647.73	8.87	32.25	0.00	0.00	1177.37	8300.00
25	213.62	0.00	0.00	0.00	0.00	38.51	3300.00
26	5339.81	222.49	310.36	0.00	0.00	2898.79	29200.00
27	2039.51	13.70	138.65	0.00	0.00	10684.81	35600.00
28	1883.12	89.48	482.87	0.00	0.00	3908.33	28000.00
29	960.10	12.90	709.40	0.00	0.00	860.26	7300.00
30	6659.45	215.24	1855.71	0.00	0.00	47641.28	105300.00
31	403.07	0.81	39.50	0.00	0.00	17219.56	103600.00
32	0.00	0.00	117.19	0.00	0.00	0.00	11900.00
33	0.00	0.00	420.24	0.00	0.00	0.00	3700.00
34	0.00	0.00	7.68	0.00	0.00	0.00	10000.00
35	399.03	4.84	517.54	0.00	0.00	6649.48	71400.00
36	0.00	0.00	20.15	66.10	0.00	9130.68	12600.00
37	1722.25	32.20	204.97	175.13	0.00	0.01	38100.00
38	11343.07	137.85	923.02	28.21	0.00	18960.85	134700.00
39	270382.06	8917.42	53082.14	0.00	0.00	56989.13	936000.00
40	-3546.17	-423.22	0.00	0.00	0.00	0.00	631234.00
41	12541.79	11010.95	0.00	0.00	0.00	0.00	561195.00
42	385198.00	36633.00	73120.00	-4830.00	64986.00	637322.00	3542429.00

Direct Requirements Table and Interdependence Table

The direct requirements table (Table 4) shows how much each sector purchases from each other sector per dollar of output. For example, for every dollar of output, the cotton sector (column 2) makes purchases of $0.03585 from agricultural service and supply (row 5); no purchases from the boxes and paper container sector (row 13) and $0.02136 from the petroleum sector (row 16).

The figure in each cell shows the amount of goods and services purchased from that sector to deliver its output to all other processing industries and to final demand. The relationships represented by these transactions could change with a major change in actual technology for that industry. For this reason, the term technical coefficient is often used interchangeably with direct requirements coefficient.

The interdependence table (Table 5) represents the total effect on the economy caused by an increase in final demand for the output of a particular sector. The immediate result of a one dollar increase in demand for the output of one industry can be seen in the direct requirements table. However, the process does not stop as a ripple effect is started. To produce that increase, the industry will increase its purchases from other industries. These industries will, in turn, have to increase their purchases. This chain reaction will continue through several iterations although the magnitude of subsequent impacts will dampen. Moreover, additional payments to households are created with each increase in industrial output. The spending of this new income induces further economic output within the area. The sum of the

Table 4. Direct Requirements Table, El Paso-Hudspeth Counties, Texas, 1967.

No.	Name	1 Grain & Hay	2 Cotton	3 Other Irrigated Crops	4 Livestock, Dairy, Poultry	5 Agri. Service & Supply
1	Grain & Hay	0.00338	0.0	0.0	0.04339	0.00013
2	Cotton	0.0	0.00186	0.0	0.0	0.00039
3	Other Irrigated Crops	0.0	0.0	0.01564	0.01085	0.00023
4	Livestock, Dairy, Poultry	0.00010	0.00011	0.00010	0.00338	0.00047
5	Agri. Service & Supply	0.01132	0.03585	0.00290	0.01274	0.04230
6	Mining	0.0	0.0	0.0	0.0	0.00006
7	Construction	0.0	0.0	0.0	0.0	0.0
8	Maintenance & Repair	0.00344	0.00296	0.00441	0.01169	0.00579
9	Food Processing	0.0	0.0	0.0	0.04273	0.00086
10	Textiles & Apparel	0.00552	0.00552	0.00552	0.00332	0.00021
11	Lumber	0.0	0.0	0.0	0.01693	0.00107
12	Furniture	0.0	0.0	0.0	0.0	0.0
13	Boxes & Paper Containers	0.0	0.0	0.0	0.00115	0.0
14	Printing & Publishing	0.0	0.0	0.0	0.00005	0.00150
15	Chemicals	0.01495	0.01125	0.00990	0.00249	0.00429
16	Petroleum	0.03160	0.02136	0.01606	0.01085	0.02445
17	Rubber & Leather	0.0	0.0	0.0	0.0	0.0
18	Glass, Stone, Clay, Cement	0.0	0.0	0.0	0.0	0.00021
19	Primary & Fabri. Metals	0.00150	0.00150	0.00150	0.00145	0.0
20	Machinery	0.00092	0.00092	0.00092	0.00309	0.00021
21	Railroad Transportation	0.0	0.0	0.0	0.0	0.00021
22	Intercity Freight	0.00383	0.00383	0.00383	0.00623	0.01630
23	Trucking & Warehousing	0.00027	0.00027	0.00027	0.00017	0.00236
24	Air Transportation	0.0	0.0	0.0	0.0	0.00236
25	All Other Transportation	0.0	0.0	0.0	0.0	0.0
26	Communication Services	0.00480	0.00433	0.00569	0.01548	0.00643
27	Gas Utility	0.01800	0.01139	0.04949	0.01501	0.00300
28	Electric Utility	0.01907	0.01199	0.03648	0.00179	0.01887
29	Water Utility	0.0	0.0	0.0	0.00062	0.00171
30	General Wholesale	0.03192	0.03221	0.03191	0.04191	0.04590
31	General Retail	0.00360	0.00360	0.00360	0.00312	0.00729
32	Auto Dealers	0.00585	0.00495	0.00680	0.00694	0.00223
33	Gas Service Stations	0.00582	0.00393	0.00296	0.00509	0.00087
34	Eating & Drinking Places	0.0	0.0	0.0	0.0	0.0
35	FIRE	0.03048	0.02332	0.10130	0.03889	0.02680
36	Lodging	0.0	0.0	0.0	0.0	0.00279
37	Personal Services	0.00096	0.00057	0.00458	0.00104	0.00575
38	Professional Services	0.00069	0.00069	0.00069	0.00194	0.04975
39	Households	0.19408	0.21670	0.14543	0.13633	0.24233
40	Imports	0.03737	0.03804	0.02616	0.06807	0.03657
41	Value Added	0.57055	0.56285	0.52386	0.49325	0.44628
42	Total	1.00000	1.00000	1.00000	1.00000	1.00000

Table 4. (Continued)

No.	13 Boxes & Paper Containers	14 Printing & Publishing	15 Chemicals	16 Petroleum	17 Rubber & Leather	18 Glass, Stone, Clay, Cement
1	0.0	0.0	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0
3	0.00413	0.00004	0.00047	0.00001	0.00014	0.00003
4	0.0	0.00029	0.00027	0.0	0.00156	0.0
5	0.0	0.0	0.0	0.0	0.0	0.0
6	0.0	0.00001	0.0	0.0	0.0	0.01883
7	0.0	0.0	0.0	0.0	0.0	0.0
8	0.10715	0.00896	0.05302	0.00285	0.04881	0.03830
9	0.0	0.00007	0.00033	0.00003	0.00012	0.00005
10	0.00715	0.0	0.0	0.0	0.00357	0.0
11	0.0	0.00037	0.00326	0.00003	0.00167	0.00016
12	0.0	0.0	0.0	0.0	0.0	0.0
13	0.07143	0.0	0.0	0.00005	0.00119	0.0
14	0.0	0.01022	0.0	0.00005	0.00024	0.00042
15	0.00143	0.00336	0.03263	0.00316	0.00179	0.00560
16	0.0	0.0	0.03263	0.02878	0.0	0.01125
17	0.0	0.0	0.0	0.0	0.04345	0.0
18	0.0	0.00052	0.00163	0.00028	0.0	0.11601
19	0.0	0.0	0.0	0.0	0.00065	0.00047
20	0.0	0.00687	0.00212	0.00078	0.00262	0.00909
21	0.0	0.00179	0.00147	0.00001	0.00036	0.03677
22	0.0	0.0	0.00620	0.00347	0.00655	0.03671
23	0.0	0.00164	0.00098	0.00241	0.0	0.00090
24	0.0	0.00082	0.00098	0.00003	0.00024	0.00011
25	0.0	0.00015	0.0	0.00123	0.00702	0.0
26	0.00572	0.01246	0.00473	0.00076	0.00429	0.00401
27	0.00143	0.00202	0.00228	0.00437	0.00262	0.03370
28	0.01428	0.00657	0.00848	0.00514	0.00167	0.02937
29	0.00715	0.00291	0.00131	0.00048	0.00024	0.00116
30	0.01572	0.03142	0.00131	0.00012	0.00655	0.01173
31	0.0	0.0	0.0	0.00026	0.0	0.0
32	0.00070	0.0	0.0	0.00014	0.0	0.0
33	0.00193	0.00041	0.00103	0.00004	0.00016	0.00086
34	0.0	0.00004	0.00066	0.00002	0.00014	0.00006
35	0.03572	0.03754	0.02056	0.00230	0.02048	0.02821
36	0.0	0.00030	0.00310	0.00013	0.00083	0.00032
37	0.00638	0.00239	0.00668	0.00070	0.00612	0.00311
38	0.0	0.00455	0.00179	0.00093	0.00083	0.00460
39	0.19285	0.49246	0.26884	0.10469	0.37881	0.29942
40	0.00827	0.00167	0.00459	0.00045	0.00516	0.11906
41	0.51856	0.37015	0.53866	0.83630	0.45214	0.18970
42	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

Table 4. (Continued)

No.	6 Mining	7 Construction	8 Maintenance & Repair	9 Food Processing	10 Textiles & Apparel	11 Lumber	12 Furniture
1	0.0	0.0	0.0	0.00387	0.0	0.0	0.0
2	0.0	0.0	0.0	0.01129	0.00232	0.0	0.0
3	0.0	0.0	0.0	0.00659	0.0	0.00017	0.00096
4	0.0	0.0	0.0	0.00336	0.00017	0.00008	0.0
5	0.0	0.00002	0.0	0.0	0.00006	0.0	0.0
6	0.0	0.00363	0.00014	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	0.00026	0.00537	0.00402	0.01734	0.01303	0.00074	0.02083
9	0.0	0.00005	0.00009	0.02488	0.0	0.0	0.0
10	0.0	0.00541	0.0	0.00001	0.01306	0.00074	0.01458
11	0.00072	0.01216	0.02236	0.00003	0.00001	0.18741	0.05417
12	0.00021	0.00018	0.00076	0.0	0.0	0.0	0.00250
13	0.0	0.0	0.00019	0.00126	0.00027	0.0	0.0
14	0.00005	0.00006	0.0	0.00227	0.00129	0.0	0.01083
15	0.00106	0.00175	0.00492	0.00037	0.00004	0.00370	0.00333
16	0.00209	0.04100	0.00312	0.00013	0.00003	0.0	0.00042
17	0.0	0.00006	0.00028	0.00005	0.00006	0.0	0.00542
18	0.00086	0.06025	0.02529	0.00099	0.00002	0.0	0.00875
19	0.00318	0.00963	0.01346	0.00003	0.0	0.0	0.02081
20	0.00499	0.00074	0.00033	0.00037	0.00017	0.00089	0.00208
21	0.0	0.00017	0.00019	0.00094	0.00067	0.03852	0.0
22	0.01227	0.00454	0.00775	0.00657	0.00260	0.00341	0.04208
23	0.00019	0.00107	0.00255	0.00029	0.00006	0.00311	0.01917
24	0.00021	0.00035	0.00024	0.00014	0.00040	0.00015	0.0
25	0.00285	0.0	0.0	0.0	0.0	0.0	0.0
26	0.00048	0.00268	0.00269	0.00462	0.00383	0.00193	0.00625
27	0.03119	0.00100	0.00033	0.00198	0.00228	0.00133	0.00708
28	0.00117	0.00209	0.00095	0.00496	0.00240	0.0	0.02458
29	0.00017	0.00129	0.00038	0.00085	0.00040	0.00059	0.00333
30	0.02059	0.01366	0.00184	0.00749	0.00362	0.00059	0.01375
31	0.00122	0.00299	0.00213	0.0	0.0	0.0	0.00292
32	0.00208	0.00018	0.00040	0.00006	0.00020	0.0	0.0
33	0.00014	0.00098	0.00225	0.00197	0.00014	0.00007	0.0
34	0.0	0.00025	0.00043	0.00009	0.00021	0.00008	0.0
35	0.00125	0.03022	0.01555	0.01328	0.02166	0.02533	0.12292
36	0.00012	0.00079	0.00080	0.00031	0.00045	0.00044	0.0
37	0.00075	0.00744	0.00436	0.00444	0.00636	0.00232	0.00310
38	0.00106	0.01241	0.03172	0.00172	0.00901	0.00178	0.01375
39	0.60048	0.33573	0.62313	0.30289	0.35119	0.35393	0.25875
40	0.00929	0.04690	0.03437	0.02273	0.00457	0.00113	0.04595
41	0.30106	0.39496	0.19298	0.55184	0.55945	0.37156	0.29167
42	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

Table 4. (Continued)

No.	19 Primary & Fabri. Metals	20 Machinery	21 Railroad Trans-portation	22 Intercity Freight	23 Trucking & Ware-housing	24 Air Trans-portation
1	0.0	0.0	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0
3	0.00001	0.00018	0.0	0.0	0.0	0.0
4	0.0	0.00006	0.0	0.0	0.0	0.0
5	0.0	0.0	0.0	0.0	0.0	0.0
6	0.00016	0.0	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	0.0
8	0.00752	0.03570	0.05336	0.00780	0.02488	0.00166
9	0.00003	0.00037	0.00163	0.0	0.0	0.0
10	0.00007	0.0	0.0	0.0	0.0	0.0
11	0.00004	0.00005	0.00371	0.00008	0.0	0.0
12	0.00002	0.0	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0	0.0
14	0.00027	0.0	0.00141	0.00008	0.00233	0.00024
15	0.00337	0.00442	0.0	0.0	0.0	0.0
16	0.00001	0.0	0.06529	0.00501	0.0	0.24781
17	0.0	0.01508	0.0	0.00004	0.0	0.0
18	0.00393	0.00394	0.0	0.0	0.0	0.0
19	0.02930	0.00925	0.00470	0.0	0.0	0.0
20	0.00037	0.01923	0.00170	0.0	0.0	0.0
21	0.01929	0.0	0.04632	0.0	0.0	0.0
22	0.00363	0.00751	0.00756	0.0	0.0	0.0
23	0.0	0.00186	0.0	0.0	0.0	0.01125
24	0.00003	0.00123	0.00259	0.0	0.00078	0.01184
25	0.00004	0.0	0.02297	0.0	0.0	0.0
26	0.00113	0.00959	0.01045	0.04906	0.01400	0.01231
27	0.02139	0.00432	0.00119	0.01529	0.00233	0.01125
28	0.00035	0.00927	0.00252	0.02143	0.05521	0.02972
29	0.00006	0.00133	0.00319	0.00140	0.00078	0.00888
30	0.00265	0.01018	0.07455	0.05846	0.01244	0.05896
31	0.00053	0.00016	0.0	0.0	0.0	0.0
32	0.0	0.00011	0.0	0.0	0.0	0.0
33	0.00003	0.00065	0.0	0.00292	0.00035	0.0
34	0.00002	0.00058	0.0	0.0	0.00134	0.00014
35	0.00640	0.02999	0.02720	0.05198	0.24417	0.00308
36	0.00011	0.00298	0.0	0.0	0.00233	0.00012
37	0.00049	0.03293	0.01231	0.02743	0.00521	0.00538
38	0.00056	0.00064	0.00252	0.00210	0.00778	0.0
39	0.30167	0.40884	0.44738	0.44954	0.49067	0.32489
40	0.06344	0.03243	0.01420	0.01293	0.00321	0.00195
41	0.53307	0.35711	0.19327	0.29447	0.13219	0.27054
42	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

Table 4. (Continued)

No.	25 All Other Trans-portation	26 Communi-cations Services	27 Gas Utility	28 Electric Utility	29 Water Utility	30 General Wholesale	31 General Retail
1	0.0	0.0	0.0	0.0	0.0	0.00081	0.00046
2	0.0	0.0	0.0	0.0	0.0	0.00236	0.0
3	0.0	0.0	0.0	0.0	0.0	0.00138	0.00184
4	0.0	0.0	0.0	0.0	0.0	0.00025	0.00011
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	0.00043	0.0	0.0	0.0	0.0	0.0	0.00011
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	0.00588	0.00379	0.00152	0.00170	0.05089	0.00291	0.00894
9	0.00025	0.0	0.0	0.0	0.0	0.00513	0.00260
10	0.0	0.0	0.00010	0.00026	0.00065	0.00189	0.01224
11	0.0	0.00158	0.0	0.0	0.00039	0.00051	0.00235
12	0.0	0.0	0.0	0.0	0.0	0.00008	0.00041
13	0.0	0.0	0.0	0.0	0.0	0.00003	0.00004
14	0.05169	0.00221	0.00054	0.00111	0.00207	0.00102	0.00369
15	0.02559	0.00063	0.00051	0.0	0.01059	0.00066	0.00140
16	0.10747	0.00066	0.00026	0.00137	0.00723	0.00003	0.00105
17	0.0	0.0	0.0	0.0	0.0	0.00009	0.00045
18	0.00358	0.0	0.00005	0.00023	0.03449	0.00005	0.00015
19	0.0	0.0	0.0	0.0	0.00054	0.00171	0.00105
20	0.00256	0.01010	0.00051	0.00085	0.00349	0.00219	0.00291
21	0.0	0.00117	0.00026	0.00251	0.0	0.02914	0.00493
22	0.0	0.00095	0.00064	0.00111	0.0	0.01755	0.01305
23	0.0	0.0	0.00023	0.00039	0.0	0.00117	0.00071
24	0.00051	0.00060	0.0	0.0	0.0	0.00427	0.00179
25	0.05118	0.0	0.0	0.00029	0.0	0.0	0.0
26	0.00819	0.02838	0.00515	0.00496	0.00258	0.01603	0.00922
27	0.00333	0.00439	0.15654	0.06599	0.08564	0.00428	0.00753
28	0.00972	0.00871	0.00082	0.05108	0.06484	0.01344	0.01484
29	0.00102	0.00104	0.00021	0.00242	0.0	0.00308	0.00159
30	0.04427	0.00385	0.00334	0.00104	0.02402	0.00601	0.00509
31	0.0	0.0	0.0	0.00007	0.0	0.00051	0.00116
32	0.0	0.00055	0.00088	0.00123	0.01599	0.00001	0.00012
33	0.00139	0.0	0.00012	0.00012	0.0	0.00077	0.00048
34	0.00118	0.00022	0.0	0.0	0.0	0.00074	0.00026
35	0.05885	0.02118	0.02419	0.01133	0.00646	0.04192	0.04111
36	0.00205	0.00079	0.00154	0.00049	0.00129	0.00418	0.00186
37	0.02401	0.01876	0.00592	0.00367	0.00240	0.01804	0.02219
38	0.01791	9.00183	0.00049	0.00078	0.0	0.01704	0.00875
39	0.39406	0.29471	0.38778	0.37867	0.37768	0.53626	0.49795
40	0.01343	0.00715	0.00307	0.00265	0.01826	0.01483	0.01322
41	0.17144	0.58674	0.40533	0.46568	0.29049	0.24962	0.31434
42	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

Table 4. (Continued)

No.	32 Auto Dealers	33 Gas Service Stations	34 Eating & Drinking Places	35 FIRE	36 Lodging	37 Personal Services	38 Profes-sional Services	39 Households
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.00004	0.00034
4	0.00002	0.0	0.00013	0.0	0.00011	0.00011	0.00022	0.00076
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00043
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	0.00035	0.02078	0.00175	0.00718	0.01658	0.00694	0.00562	0.00492
9	0.00035	0.00373	0.00598	0.00223	0.01810	0.00024	0.00654	0.05558
10	0.0	0.0	0.00019	0.00001	0.01376	0.00008	0.00092	0.00605
11	0.00003	0.00011	0.00219	0.00008	0.00014	0.00031	0.00054	0.00023
12	0.00003	0.00011	0.00010	0.00003	0.00344	0.00016	0.00152	0.00023
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00004
14	0.00059	0.0	0.00010	0.00377	0.00406	0.00543	0.00213	0.00522
15	0.00038	0.00692	0.00209	0.0	0.00048	0.00063	0.00210	0.00052
16	0.0	0.17100	0.00010	0.0	0.0	0.01213	0.00016	0.01308
17	0.00003	0.00011	0.00015	0.00005	0.00007	0.00006	0.00007	0.00183
18	0.0	0.00011	0.00039	0.0	0.00021	0.00019	0.00032	0.00055
19	0.00023	0.00099	0.00006	0.0	0.0	0.00011	0.00001	0.00231
20	0.00104	0.00906	0.00272	0.0	0.00193	0.00408	0.00436	0.00269
21	0.09279	0.0	0.0	0.0	0.0	0.0	0.00060	0.0
22	0.01032	0.00874	0.0	0.0	0.00378	0.00196	0.00081	0.00241
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	0.00194	0.0	0.0	0.00219	0.00523	0.00285	0.01251	0.00257
25	0.0	0.0	0.0	0.0	0.0	0.0	0.00328	0.00198
26	0.01174	0.01215	0.00262	0.01140	0.02016	0.01236	0.01682	0.00919
27	0.00076	0.00533	0.00335	0.00400	0.01039	0.00304	0.00811	0.00784
28	0.00329	0.03143	0.02337	0.02036	0.02766	0.01282	0.01014	0.00883
29	0.00087	0.00320	0.00573	0.00139	0.00764	0.00277	0.00287	0.00285
30	0.15161	0.03889	0.01127	0.00548	0.00984	0.02914	0.03765	0.03157
31	0.00107	0.0	0.0	0.00123	0.00028	0.00272	0.00203	0.09028
32	0.00009	0.0	0.0	0.0	0.00041	0.00174	0.00098	0.01180
33	0.00017	0.00121	0.00145	0.00050	0.00050	0.00078	0.00133	0.00235
34	0.00016	0.0	0.0	0.00184	0.00043	0.00023	0.00152	0.01005
35	0.02444	0.04368	0.06594	0.06793	0.17146	0.03763	0.03929	0.02321
36	0.00145	0.00629	0.0	0.00146	0.00392	0.00480	0.00221	0.00169
37	0.00817	0.00373	0.02974	0.01754	0.01742	0.02750	0.01881	0.02210
38	0.0	0.00256	0.01584	0.02130	0.01046	0.03660	0.06124	0.08961
39	0.34508	0.50139	0.63941	0.52827	0.26510	0.55417	0.49747	0.02109
40	0.00373	0.00484	0.01220	0.00799	0.00741	0.01266	0.01042	0.03597
41	0.33927	0.12370	0.17313	0.29377	0.37904	0.22575	0.24736	0.52983
42	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

Table 5. Interdependence Table, El Paso-Hudspeth Counties, Texas, 1967

No.	Name	1 Grain & Hay	2 Cotton	3 Other Irrigated Crops	4 Livestock, Dairy, Poultry	5 Agri. Service & Supply
1	Grain & Hay	1.00355	0.00018	0.00018	0.04403	0.00039
2	Cotton	0.00040	1.00228	0.00042	0.00092	0.00095
3	Other Irrigated Crops	0.00045	0.00047	1.01635	0.01181	0.00086
4	Livestock, Dairy, Poultry	0.00052	0.00055	0.00054	1.00395	0.00105
5	Agri. Service & Supply	0.01205	0.03771	0.00329	0.01411	1.04445
6	Mining	0.00002	0.00002	0.00002	0.00003	0.00010
7	Construction	0.0	0.0	0.0	0.0	0.0
8	Maintenance & Repair	0.00903	0.00854	0.01061	0.01806	0.01288
9	Food Processing	0.02263	0.02387	0.02422	0.06597	0.03178
10	Textiles & Apparel	0.00861	0.00877	0.00888	0.00664	0.00440
11	Lumber	0.00070	0.00072	0.00075	0.02184	0.00232
12	Furniture	0.00019	0.00020	0.00021	0.00019	0.00035
13	Boxes & Paper Containers	0.00006	0.00006	0.00006	0.00136	0.00008
14	Printing & Publishing	0.00282	0.00296	0.00336	0.00298	0.00548
15	Chemicals	0.01634	0.01257	0.01118	0.00433	0.00573
16	Petroleum	0.04113	0.03105	0.02498	0.02090	0.03655
17	Rubber & Leather	0.00081	0.00085	0.00086	0.00083	0.00108
18	Glass, Stone, Clay, Cement	0.00071	0.00071	0.00078	0.00102	0.00128
19	Primary & Fabri. Metals	0.00277	0.00282	0.00288	0.00296	0.00166
20	Machinery	0.00285	0.00290	0.00301	0.00524	0.00299
21	Railroad Transportation	0.00308	0.00308	0.00336	0.00445	0.00405
22	Intercity Freight	0.00724	0.00768	0.00727	0.01039	0.02125
23	Trucking & Warehousing	0.00059	0.00062	0.00056	0.00057	0.00284
24	Air Transportation	0.00208	0.00223	0.00238	0.00216	0.00594
25	All Other Transportation	0.00108	0.00112	0.00114	0.00106	0.00162
26	Communication Services	0.01276	0.01257	0.01537	0.02467	0.01861
27	Gas Utility	0.02957	0.02141	0.07000	0.02658	0.01500
28	Electric Utility	0.02865	0.02170	0.04941	0.01239	0.03263
29	Water Utility	0.00184	0.00192	0.00209	0.00251	0.00441
30	General Wholesale	0.05084	0.05290	0.05275	0.06344	0.07451
31	General Retail	0.03842	0.04050	0.04072	0.03704	0.05447
32	Auto Dealers	0.01059	0.00997	0.01198	0.01187	0.00872
33	Gas Service Stations	0.00704	0.00521	0.00431	0.00669	0.00260
34	Eating & Drinking Places	0.00407	0.00428	0.00447	0.00398	0.00554
35	FIRE	0.05381	0.04724	0.13367	0.06725	0.06093
36	Lodging	0.00143	0.00151	0.00166	0.00149	0.00482
37	Personal Services	0.01487	0.01503	0.02114	0.01577	0.02578
38	Professional Services	0.04159	0.04483	0.04564	0.04279	0.10955
39	Households	0.38109	0.40218	0.40532	0.36831	0.51305
40	Total	1.81627	1.83321	1.98578	1.93058	2.12065

Table 5. (Continued)

No.	6 Mining	7 Construc-tion	8 Mainte-nance & Repair	9 Food Pro-cessing	10 Textiles & Apparel	11 Lumber	12 Furniture	13 Boxes & Paper Containers
1	0.00032	0.00022	0.00033	0.00431	0.00020	0.00024	0.00025	0.00018
2	0.00073	0.00051	0.00075	0.01200	0.00278	0.00053	0.00059	0.00043
3	0.00089	0.00062	0.00095	0.00740	0.00054	0.00088	0.00168	0.00501
4	0.00089	0.00061	0.00097	0.00396	0.00072	0.00078	0.00070	0.00049
5	0.00043	0.00032	0.00047	0.00079	0.00042	0.00034	0.00033	0.00025
6	1.00005	0.00495	0.00072	0.00005	0.00003	0.00003	0.00024	0.00010
7	0.0	1.00000	0.0	0.0	0.0	0.0	0.0	0.0
8	0.00905	0.01501	1.01526	0.02331	0.01878	0.01069	0.03130	0.12173
9	0.05064	0.03475	0.05527	1.05406	0.03131	0.03915	0.03849	0.02749
10	0.00656	0.01002	0.00717	0.00383	1.01728	0.00595	0.01988	0.01139
11	0.00187	0.01596	0.02883	0.00118	0.00099	1.23173	0.06835	0.00379
12	0.00061	0.00049	0.00124	0.00024	0.00027	0.00031	1.00285	0.00031
13	0.00012	0.00009	0.00033	0.00146	0.00036	0.00009	0.00011	1.07702
14	0.00599	0.00428	0.00645	0.00569	0.00502	0.00472	0.01610	0.00340
15	0.00244	0.00339	0.00684	0.00150	0.00091	0.00571	0.00507	0.00306
16	0.01700	0.05368	0.02011	0.00943	0.00927	0.01482	0.01243	0.00901
17	0.00185	0.00130	0.00224	0.00106	0.00116	0.00139	0.00707	0.00100
18	0.00215	0.06931	0.03009	0.00234	0.00110	0.00102	0.01175	0.00427
19	0.00578	0.01180	0.01662	0.00170	0.00169	0.00217	0.02374	0.00298
20	0.00874	0.00412	0.00476	0.00259	0.00252	0.00403	0.00543	0.00225
21	0.00389	0.00618	0.00604	0.00306	0.00270	0.05210	0.00653	0.00261
22	0.01752	0.01108	0.01438	0.00993	0.00578	0.00837	0.04725	0.00407
23	0.00051	0.00152	0.00301	0.00053	0.00028	0.00406	0.01977	0.00049
24	0.00425	0.00342	0.00502	0.00248	0.00306	0.00349	0.00369	0.00242
25	0.00525	0.00174	0.00261	0.00129	0.00143	0.00293	0.00189	0.00125
26	0.01494	0.01375	0.01878	0.01341	0.01294	0.01402	0.02210	0.01511
27	0.04996	0.01432	0.01634	0.01108	0.01103	0.01209	0.02382	0.01173
28	0.01571	0.01575	0.01826	0.01459	0.01197	0.01206	0.04309	0.02616
29	0.00366	0.00394	0.00430	0.00291	0.00261	0.00360	0.00652	0.00980
30	0.05817	0.04124	0.04384	0.02997	0.02706	0.03303	0.04683	0.03821
31	0.07973	0.05657	0.08746	0.04411	0.04849	0.06055	0.06212	0.04266
32	0.01259	0.00740	0.01182	0.00612	0.00671	0.00810	0.00803	0.00665
33	0.00264	0.00281	0.00503	0.00358	0.00172	0.00202	0.00217	0.00374
34	0.00899	0.00648	0.01028	0.00517	0.00582	0.00710	0.00709	0.00500
35	0.04095	0.06350	0.06174	0.03855	0.04771	0.06515	0.17433	0.06607
36	0.00259	0.00264	0.00351	0.00175	0.00200	0.00245	0.00229	0.00159
37	0.02825	0.02766	0.03467	0.02041	0.02374	0.02483	0.02867	0.02339
38	0.08843	0.07461	0.12914	0.05191	0.06455	0.07053	0.08529	0.05253
39	0.86420	0.58825	0.93819	0.48373	0.53278	0.66596	0.64821	0.46573
40	2.41835	2.17428	2.61378	1.88147	1.90772	2.37701	2.48602	2.05336

Table 5. (Continued)

No.	14 Printing & Publishing	15 Chemicals	16 Petroleum	17 Rubber & Leather	18 Glass, Stone, Clay, Cement	19 Primary & Fabri. Metals	20 Machinery
1	0.00031	0.00018	0.00006	0.00030	0.00026	0.00017	0.00026
2	0.00068	0.00039	0.00013	0.00052	0.00059	0.00038	0.00058
3	0.00085	0.00098	0.00017	0.00081	0.00075	0.00048	0.00091
4	0.00108	0.00077	0.00017	0.00229	0.00071	0.00048	0.00081
5	0.00039	0.00025	0.00008	0.00034	0.00035	0.00024	0.00035
6	0.00006	0.00009	0.00002	0.00006	0.02136	0.00028	0.00014
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	0.01766	0.06060	0.00494	0.05819	0.05438	0.01392	0.04547
9	0.04494	0.02865	0.00975	0.03724	0.04057	0.02764	0.04157
10	0.00581	0.00369	0.00126	0.00858	0.00524	0.00364	0.00541
11	0.00166	0.00625	0.00032	0.00433	0.00257	0.00094	0.00200
12	0.00037	0.00028	0.00008	0.00033	0.00037	0.00025	0.00037
13	0.00011	0.00008	0.00008	0.00144	0.00010	0.00007	0.00012
14	1.01565	0.00339	0.00126	0.00500	0.00549	0.00351	0.00507
15	0.00473	1.03489	0.00367	0.00334	0.00800	0.00435	0.00600
16	0.01339	0.04372	1.03271	0.01188	0.02873	0.00953	0.01302
17	0.00168	0.00104	0.00035	1.04678	0.00160	0.00097	0.01753
18	0.00202	0.00421	0.00067	0.00236	1.13365	0.00546	0.00667
19	0.00240	0.00215	0.00052	0.00322	0.00355	1.03174	0.01224
20	0.01050	0.00445	0.00155	0.00558	0.01383	0.00246	1.02295
21	0.00555	0.00371	0.00064	0.00300	0.04685	0.02277	0.00327
22	0.00496	0.00988	0.00458	0.01099	0.04696	0.00684	0.01250
23	0.00199	0.00143	0.00255	0.00036	0.00148	0.00019	0.00226
24	0.00464	0.00339	0.00082	0.00329	0.00370	0.00227	0.00476
25	0.00221	0.00135	0.00177	0.00939	0.00297	0.00177	0.00196
26	0.02596	0.01364	0.00373	0.01549	0.01961	0.00917	0.02272
27	0.01490	0.01149	0.00836	0.01310	0.06051	0.03331	0.01756
28	0.02111	0.01853	0.00866	0.01311	0.04906	0.00846	0.02348
29	0.00617	0.00344	0.00118	0.00288	0.00454	0.00203	0.00442
30	0.06480	0.02293	0.00751	0.03479	0.04966	0.02446	0.04211
31	0.06929	0.04387	0.01535	0.05750	0.06261	0.04334	0.06399
32	0.00932	0.00592	0.00218	0.00771	0.00853	0.00574	0.00872
33	0.00265	0.00261	0.00054	0.00214	0.00323	0.00141	0.00283
34	0.00807	0.00576	0.00176	0.00679	0.00734	0.00493	0.00798
35	0.07622	9.04691	0.01101	0.05302	0.07233	0.02913	0.06806
36	0.00262	0.00467	0.00063	0.00275	0.00259	0.00145	0.00529
37	0.02770	0.02312	0.00615	0.02727	0.02878	0.01569	0.05766
38	0.08341	0.05321	0.01797	0.06724	0.07804	0.04858	0.07485
39	0.76172	0.48096	0.16586	0.63117	0.68687	0.47085	0.70014
40	2.31755	1.95288	1.31904	2.15460	2.55771	1.83889	2.30603

Table 5. (Continued)

No.	21 Railroad Trans-portation	22 Intercity Freight	23 Trucking & Ware-housing	24 Air Trans-portation	25 All Other Trans-portation	26 Communi-cations Services	27 Gas Utility	28 Electric Utility
1	0.00037	0.00032	0.00035	0.00026	0.00032	0.00017	0.00023	0.00021
2	0.00087	0.00075	0.00079	0.00061	0.00074	0.00038	0.00052	0.00048
3	0.00096	0.00086	0.00097	0.00067	0.00087	0.00048	0.00066	0.00060
4	0.00089	0.00081	0.00098	0.00062	0.00085	0.00049	0.00067	0.00062
5	0.00043	0.00040	0.00048	0.00030	0.00040	0.00024	0.00033	0.00030
6	0.00009	0.00004	0.00006	0.00003	0.00058	0.00002	0.00003	0.00003
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	0.06596	0.01663	0.03648	0.00943	0.01771	0.00936	0.00843	0.00817
9	0.05139	0.04595	0.05643	0.03484	0.04690	0.02768	0.03851	0.03547
10	0.00650	0.00599	0.00726	0.00458	0.00608	0.00358	0.00510	0.00486
11	0.00740	0.00135	0.00187	0.00083	0.00137	0.00267	0.00079	0.00074
12	0.00045	0.00038	0.00049	0.00028	0.00042	0.00023	0.00031	0.00028
13	0.00013	0.00011	0.00013	0.00010	0.00012	0.00006	0.00009	0.00008
14	0.00877	0.00586	0.00989	0.00445	0.06086	0.00566	0.00517	0.00535
15	0.00257	0.00129	0.00154	0.00186	0.02978	0.00145	0.00155	0.00094
16	0.08877	0.01927	0.01655	0.26846	0.13182	0.00910	0.01132	0.01184
17	0.00178	0.00166	0.00198	0.00122	0.00168	0.00114	0.00136	0.00126
18	0.00304	0.00133	0.00206	0.00132	0.00578	0.00084	0.00097	0.00121
19	0.00839	0.00241	0.00305	0.00182	0.00247	0.00150	0.00187	0.00174
20	0.00591	0.00410	0.00434	0.00303	0.00708	0.01270	0.00344	0.00355
21	1.05436	0.00461	0.00390	0.00399	0.00460	0.00317	0.00274	0.00503
22	0.01485	1.00557	0.00581	0.00532	0.00619	0.00384	0.00446	0.00463
23	0.00074	0.00036	1.00042	0.01228	0.00076	0.00021	0.00048	0.00063
24	0.00717	0.00411	0.00598	1.01500	0.00498	0.00296	0.00310	0.00282
25	0.02774	0.00208	0.00253	0.00191	1.05625	0.00126	0.00170	0.00196
26	0.02727	0.06486	0.03312	0.02382	0.02461	1.03737	0.01685	0.01540
27	0.01608	0.03251	0.02319	0.02754	0.01888	0.01337	1.19536	0.09155
28	0.01986	0.03827	0.07984	0.04516	0.02810	0.01809	0.01234	1.06416
29	0.00717	0.00495	0.00520	0.01176	0.00492	0.00309	0.00291	0.00499
30	0.11710	0.09332	0.05495	0.08578	0.08426	0.02501	0.03199	0.02744
31	0.07649	0.07081	0.08682	0.05369	0.07168	0.04291	0.05970	0.05512
32	0.01031	0.00959	0.01168	0.00741	0.00968	0.00635	0.00902	0.00876
33	0.00268	0.00525	0.00328	0.00176	0.00391	0.00139	0.00202	0.00186
34	0.00891	0.00825	0.01175	0.00635	0.00964	0.00518	0.00688	0.00632
35	0.07505	0.09518	0.30629	0.03665	0.10916	0.04555	0.05950	0.04129
36	0.00286	0.00257	0.00547	0.00212	0.00494	0.00228	0.00368	0.00231
37	0.04269	0.05540	0.04032	0.02569	0.05363	0.03526	0.02792	0.02334
38	0.09256	0.08433	0.11141	0.06132	0.10359	0.05094	0.06762	0.06231
39	0.83900	0.77732	0.95101	0.58962	0.78597	0.47136	0.65664	0.60574
40	2.69754	2.46896	2.88865	2.35189	2.70159	1.84731	2.24624	2.10338

Table 5. (Continued)

No.	29 Water Utility	30 General Wholesale	31 General Retail	32 Auto Dealers	33 Gas Service Stations	34 Eating & Drinking Places	35 FIRE	36 Lodging
1	0.00028	0.00116	0.00076	0.00039	0.00035	0.00039	0.00031	0.00031
2	0.00063	0.00314	0.00070	0.00096	0.00080	0.00088	0.00070	0.00076
3	0.00076	0.00232	0.00269	0.00095	0.00093	0.00104	0.00086	0.00077
4	0.00075	0.00116	0.00095	0.00080	0.00089	0.00118	0.00087	0.00082
5	0.00037	0.00054	0.00041	0.00038	0.00043	0.00050	0.00042	0.00032
6	0.00080	0.00004	0.00016	0.00004	0.00006	0.00005	0.00004	0.00005
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	0.06113	0.01426	0.01823	0.01398	0.03141	0.01277	0.01627	0.02571
9	0.04252	0.05625	0.04934	0.04354	0.05378	0.06436	0.05162	0.05534
10	0.00621	0.00857	0.01848	0.00577	0.00656	0.00771	0.00639	0.01877
11	0.00285	0.00196	0.00416	0.00163	0.00180	0.00391	0.00129	0.00172
12	0.00038	0.00052	0.00080	0.00039	0.00054	0.00058	0.00046	0.00379
13	0.00011	0.00015	0.00016	0.00011	0.00014	0.00014	0.00012	0.00012
14	0.00717	0.00730	0.00943	0.00608	0.00602	0.00721	0.00988	0.00932
15	0.01261	0.00214	0.00276	0.00169	0.00918	0.00371	0.00131	0.00169
16	0.02097	0.01839	0.01575	0.02016	0.19102	0.01740	0.01493	0.01244
17	0.00157	0.00191	0.00215	0.00156	0.00201	0.00224	0.00178	0.00142
18	0.04156	0.00150	0.00159	0.00122	0.00213	0.00205	0.00138	0.00199
19	0.00345	0.00445	0.00352	0.00313	0.00387	0.00292	0.00246	0.00212
20	0.00725	0.00630	0.00660	0.00484	0.01325	0.00720	0.00385	0.00510
21	0.00676	0.03397	0.00834	0.10475	0.00430	0.00394	0.00315	0.00280
22	0.00685	0.02297	0.01789	0.01803	0.01515	0.00587	0.00489	0.00808
23	0.00053	0.00154	0.00105	0.00049	0.00084	0.00036	0.00033	0.00043
24	0.00355	0.00882	0.00579	0.00638	0.00427	0.00503	0.00658	0.00890
25	0.00200	0.00305	0.00223	0.00435	0.00247	0.00263	0.00225	0.00167
26	0.01612	0.03263	0.02386	0.02835	0.02804	0.01977	0.02640	0.03414
27	0.11955	0.02046	0.02289	0.01367	0.02353	0.02159	0.01955	0.02647
28	0.08236	0.03099	0.03070	0.01929	0.05033	0.04317	0.03735	0.04523
29	1.00327	0.00695	0.00503	0.00471	0.00702	0.00996	0.00504	0.01073
30	0.05868	1.04789	0.04139	0.19221	0.07625	0.05497	0.04275	0.03962
31	0.06587	0.07922	1.07340	0.06652	0.07705	0.09010	0.07745	0.05671
32	0.02498	0.01066	0.00987	1.00887	0.01042	0.01220	0.01027	0.00816
33	0.00228	0.00338	0.00287	0.00242	1.00377	0.00436	0.00298	0.00250
34	0.00759	0.00985	0.00862	0.00782	0.00894	1.01044	0.01072	0.00725
35	0.04632	0.08811	0.08269	0.06969	0.08915	0.11604	1.11176	0.21657
36	0.00371	0.00681	0.00428	0.00421	0.00899	0.00303	0.00401	1.00616
37	0.02706	0.04787	0.04918	0.03619	0.03273	0.06280	0.04586	0.04194
38	0.07577	0.10750	0.09172	0.07706	0.09089	0.11940	0.10962	0.07952
39	0.72321	0.86444	0.79358	0.71848	0.84614	0.98966	0.83694	0.61705
40	2.48782	2.55917	2.41403	2.49111	2.70542	2.71155	2.47285	2.35651

Table 5. (Continued

No.	37 Personal Services	38 Profes-sional Services	39 Households
1	0.00035	0.00037	0.00046
2	0.00079	0.00085	0.00103
3	0.00095	0.00100	0.00131
4	0.00106	0.00115	0.00136
5	0.00045	0.00044	0.00067
6	0.00005	0.00005	0.00005
7	0.0	0.0	0.0
8	0.01708	0.01582	0.01236
9	0.05327	0.05741	0.07784
10	0.00704	0.00759	0.01001
11	0.00170	0.00206	0.00140
12	0.00066	0.00204	0.00060
13	0.00013	0.00013	0.00018
14	0.01197	0.00861	0.00875
15	0.00220	0.00380	0.00178
16	0.02896	0.01905	0.02179
17	0.00199	0.00193	0.00272
18	0.00177	0.00189	0.00164
19	0.00284	0.00266	0.00368
20	0.00848	0.00875	0.00541
21	0.00432	0.00508	0.00434
22	0.00779	0.00668	0.00715
23	0.00044	0.00055	0.00038
24	0.00784	0.01778	0.00597
25	0.00250	0.00594	0.00341
26	0.02906	0.03368	0.01991
27	0.01923	0.02494	0.01872
28	0.03084	0.02816	0.02066
29	0.00679	0.00691	0.00514
30	0.07051	0.07879	0.05504
31	0.08431	0.07976	0.12099
32	0.01277	0.01151	0.01612
33	0.00347	0.00396	0.00373
34	0.00971	0.01061	0.01381
35	0.08507	0.08668	0.05522
36	0.00770	0.00508	0.00348
37	1.05845	0.04928	0.04000
38	0.13207	1.15403	0.13338
39	0.89557	0.85259	1.33253
40	2.61019	2.59762	2.01301

results of this ripple effect depends upon the extent of interdependence among sectors of the economy; it is a combination of the direct, indirect and induced requirements of the industries in an economy.[2] The coefficients of the interdependence table estimate this interdependence and the consequent total impact of a change in a sector's final demand.

From Table 5, note that an increase in the final demand for cotton of one dollar results in $1.83321 of increased output being generated in the total economy. The distribution of this output is shown in column 2. Households receive the largest share of the increase with $0.40218 (row 39). Cotton (row 2) shows an increase of $1.00228, but this includes the assumed change in final demand. Petroleum (row 16) output increases $0.03105 from this increase in the demand for cotton.

CALCULATION AND INTERPRETATION OF MULTIPLIERS

The impact of interindustry linkages or ripple effects is probably most simply expressed in terms of what economists usually refer to as multipliers. A change in the final demand of one sector of one dollar will cause a change in the total economy of some "multiple" of the original one dollar change. Sector input-output multipliers, which estimate this aggregate impact, indicate the effect of a change in final demand, income or employment in a particular sector on output, income and employment, respectively, in the total economy.

Output Multipliers

The sum of a column of interdependence coefficients in Table 5 indicates the total direct, indirect and induced effects for output of

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[2]The interdependency table (matrix) is obtained by a mathematical procedure called matrix inversion (see Miernyk [1965, pp. 128-152]).

products of all sectors within the El Paso-Hudspeth economy generated by the delivery of one dollar to final demand by a sector. This sum is commonly referred to as the sector output multiplier.[3] For example, the sum of the column elements for the food and feed grain sector (column 1, Table 5) is $1.82. This means that a $1.00 change in final demand for products of the food and feed grain sector will cause a change in total output in the economy of $1.82.

Output multipliers for each of the 39 sectors identified in this study are presented in Table 6. The transportation sectors have the highest output multipliers (Table 6). The output multiplier is lowest for petroleum. This indicates that a relatively large share of its inputs are imported and its product exported. The primary dampening influences on sector multipliers are the payments made outside the region for imports of goods and services and other payments to the final payments sectors.

Income Multipliers

Income multipliers measure the change in total income in the economy that results from a $1.00 change in income in a particular sector. The concept of the income multiplier is that an increase in final demand for products of a sector leads to a cumulative increase in income in the economy as higher output (both direct and indirect) generates increased payments of wages, salaries and other income. This cumulative or total

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[3]The multipliers presented in this report are Type II multipliers as opposed to Type I multipliers which do not include the induced effect of increased consumer (household) expenditures. In this model households were considered endogeneous.

Table 6. Output, Income and Employment Multipliers for El Paso-Hudspeth Counties, Texas, 1967.

Sector Number	Sector Title	Output	Income	Employment
1	Grain & Hay	1.82	1.96	1.25
2	Cotton	1.83	1.86	1.13
3	Other Irrigated Crops	1.99	2.79	1.31
4	Livestock, Dairy, Poultry	1.93	2.70	1.27
5	Agri. Service & Supply	2.12	2.12	1.34
6	Mining	2.42	1.44	1.92
7	Construction	2.17	1.75	1.53
8	Maintenance & Repair	2.61	1.51	1.82
9	Food Processing	1.88	1.60	1.15
10	Textiles & Apparel	1.91	1.52	1.36
11	Lumber	2.38	1.88	1.57
12	Furniture	2.49	2.51	1.34
13	Boxes & Paper Containers	2.05	2.42	1.84
14	Printing & Publishing	2.32	1.55	1.27
15	Chemicals	1.95	1.79	1.04
16	Petroleum	1.32	1.58	3.10
17	Rubber & Leather	2.16	1.67	1.46
18	Glass, Stone, Clay, Cement	2.56	2.29	1.86
19	Primary & Fabri. Metals	1.84	1.56	2.88
20	Machinery	2.31	1.71	1.24
21	Railroad Transportation	2.70	1.88	1.26
22	Intercity Freight	2.47	1.73	1.19
23	Trucking & Warehousing	2.89	1.94	1.11
24	Air Transportation	2.35	1.82	1.20
25	All Other Transportation	2.70	2.00	1.27
26	Communication Services	1.85	1.60	1.15
27	Gas Utility	2.25	1.69	1.25
28	Electric Utility	2.10	1.60	1.41
29	Water Utility	2.49	1.92	1.20
30	General Wholesale	2.56	1.61	1.75
31	General Retail	2.41	1.59	1.16
32	Auto Dealers	2.49	2.08	1.84
33	Gas Service Stations	2.71	1.69	1.03
34	Eating & Drinking Places	2.71	1.55	1.17
35	FIRE	2.47	1.58	1.96
36	Lodging	2.36	2.32	1.21
37	Personal Services	2.61	1.62	1.17
38	Professional Services	2.60	1.71	1.11
39	Households	2.01	——	——

income change divided by the direct income change in the sector in which final demand initially increases, yield an estimate of the sector income multiplier.

The income multiplier was largest in the vegetable, fruits and nuts sector at 2.79 followed by the livestock, dairy and poultry sector at 2.70 (Table 6). An increase in output in either of these sectors sufficient for payment of one additional dollar of income would have a relatively large effect on income throughout the region. For example, if exports of vegetable fruits and nuts were to increase to an extent that one more dollar of income were paid to households in that sector, the total estimated income impact in the regional economy would be $2.79.

The relative magnitudes of the income multipliers in Table 6 reflect differences in the linkages among sectors, use of local resources and the amounts paid as income out of total output of individual sectors.

Employment Multipliers

The employment multiplier measures the total change in man-years of employment in the economy resulting from a direct change of one man-year in the labor force in a particular sector. The concept of an employment multiplier is that the requirements for labor change in a number of sectors for each change in output and employment of an individual sector. As in the case of the income multiplier, the cumulative employment change that occurs in all sectors is divided by the direct employment change to obtain the employment multiplier.

Employment multipliers for each of the 38 endogenous sectors are presented in Table 6. As expected, employment multipliers are highest in the capital intensive sectors, e.g., petroleum and primary and fabri-

cated metals sectors. This results because the direct employment effect of a capital intensive sector is relatively small, and a relatively large increase in output is required for an additional man-year to be added to the labor force of such a sector. Hence, indirect employment effect per man-year increase in direct employment is relatively large. Employment (labor) coefficients assumed in this study are presented in Table 7.

Caution should be exercised in interpreting employment multipliers. They are ratios of employment in one sector compared to that of its input suppliers and product processors. A low multiplier indicates that a producing sector's demand for labor is high compared to that of its suppliers and processors. Conversely, a high multiplier tells us that the sector's demand for labor is low compared to the demand of its input suppliers and product processors. Similar caution should be exercised in interpreting output and income multipliers.

Another potential problem with the employment multipliers is the possibility of underemployed resources and excess capacity. When these conditions exist, the magnitude of the estimated multipliers may be exaggerated.[4] This appears to be a problem particularly for the employment multipliers in the capital intensive sectors such as primary and fabricated metals processing and the petroleum refining sectors. Hence, some caution should be exercised in the interpretation and use of employment multipliers in these sectors. Nevertheless, the relative magnitude of these multipliers appears accurate and it is logical to

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[4] If significant underemployment of labor exists within the economy, expansion of employment in a sector may simply reduce underemployment rather than adding man-years of new employment.

Table 7. Manpower Coefficients for El Paso-Hudspeth Counties, Texas, 1967.

Sector Number	Sector Title	Manpower Requirement per $1,000 Output
1	Grain & Hay	.0402
2	Cotton	.0809
3	Other Irrigated Crops	.0432
4	Livestock, Dairy, Poultry	.0652
5	Agri. Service & Supply	.0843
6	Mining	.0335
7	Construction	.0312
8	Maintenance & Repair	.0365
9	Food Processing	.1086
10	Textiles & Apparel	.0347
11	Lumber	.0424
12	Furniture	.1234
13	Boxes & Paper Containers	.0246
14	Printing & Publishing	.0516
15	Chemicals	.0137
16	Petroleum	.0020
17	Rubber & Leather	.0307
18	Glass, Stone, Clay, Cement	.0461
19	Primary & Fabri. Metals	.0049
20	Machinery	.1014
21	Railroad Transportation	.0806
22	Intercity Freight	.0917
23	Trucking & Warehousing	.1572
24	Air Transportation	.0565
25	All Other Transportation	.1031
26	Communication Services	.0622
27	Gas Utility	.0628
28	Electric Utility	.0236
29	Water Utility	.0842
30	General Wholesale	.0482
31	General Retail	.1609
32	Auto Dealers	.0446
33	Gas Service Stations	.8278
34	Eating & Drinking Places	.1712
35	FIRE	.0552
36	Lodging	.0317
37	Personal Services	.0458
38	Professional Services	.0980

Source: The Texas Employment Commission, Austin--personal correspondence with Mr. Fred Roach, Department of Economics, University of New Mexico, Albuquerque.

conclude that the impact on the region's employment by a change in employment in these sectors is relatively large. The magnitude of employment multipliers for the more labor intensive sectors, such as wholesale and retail trade and the various services sectors, is consistent with expectations.

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APPENDIX

DATA SOURCES AND METHODOLOGY

Data Sources for Sector Output Totals

National I-O models utilize a four digit Standard Industrial Classification (SIC) in delineating sector categories. The SIC code identifies particular kinds of business activities included in the sector. With regional economies being specialized, all SIC categories are not represented. For this reason, many of these categories are either aggregated into a larger sector or are omitted. The sectors of this study and the related SIC codes are presented in Table A1.

Data for this study were obtained, for the most part, from published federal and state government sources. Because of the time and cost involved, little primary data was collected. Control totals (sector output) for the chosen sectors were developed for El Paso and Hudspeth Counties in Texas.

Data for the agricultural sectors (Sectors 1-5) were taken from the *1969 Census of Agriculture*. The Census lists total sales of all irrigated crops, then breaks out irrigated cotton and vegetables, fruits, nuts and miscellaneous other crops. To arrive at the total for Sector 1--food and feed grains, the value for cotton and vegetables, fruits, nuts and other irrigated crops was subtracted out. These values were then entered as the totals for the respective Sectors 2 and 3. Sector 4--livestock, dairy and poultry, was taken directly from the Census with a minor adjustment to be included in agricultural services and supply.

For agricultural service and supply--Sector 5, a disclosure problem was encountered; i.e., limited number of firms in the sector.[1]

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[1]The Census does not report information when only a few firms are involved to avoid possibly disclosing confidential information of an individual firm.

Table A1. Economic Sectors and SIC Codes for El Paso-Hudspeth Counties I-O Models.

Sector Number	Sector Title	Related SIC Codes
1	Grain & Hay	0113, 0313
2	Cotton	0112
3	Other Irrigated Crops	0122, 0123, 0119
4	Livestock, Dairy, Poultry	0235, 0135-36, 0132, 0133-34
5	Agri. Service & Supply	5962, 69, 0712-15, 19, 22-23, 0729, 31, 41
6	Mining	1311, 12, 81-82, 89, 1411, 22-23, 29, 42, 46, 52, 56, 59, 76-77, 92, 99, 101-103, 05-06, 08-09
7	Construction	1511, 1611, 21
8	Maintenance & Repair	1700
9	Food Processing	2011, 13, 15, 21-24, 26, 42, 51-52, 31-38, 91-99, 61-63, 7-72 82, 84, 86-87, 2121
10	Textiles & Apparel	2211, 21, 31, 41, 51, 53, 56, 59, 2261-62, 69, 71-72, 79, 81, 84, 91, 93-95, 97-99, 2311, 21-23, 27-29, 31, 35-37, 99, 41-42, 51-52, 61, 63, 69, 2371, 81, 84-87, 89, 91-97, 99
11	Lumber	2421, 26, 29, 31-33, 41-45, 91, 99
12	Furniture	2511-12, 14-15, 19, 21-22, 41-42, 91, 99
13	Boxes & Paper Containers	2641-47, 49
14	Printing & Publishing	2651-55, 2721, 31-32, 41, 51-53, 61, 71, 82, 89, 91, 93-94, 99
15	Chemicals	28121-24, 32-34, 91-99, 28211-17, 19, 2841-44, 51, 61, 91-93, 95, 99

Table A1. (Continued)

Sector Number	Sector Title	Related SIC Codes
16	Petroleum	2911, 51-52, 92, 99
17	Rubber & Leather	3069, 79, 3111, 31, 41-42, 51 61, 71-72, 99
18	Glass, stone, Clay, Cement	3221, 29, 31, 51, 53, 55, 59 61-62, 69, 81, 91-92, 95-97, 99, 74-75, 01, 93, 71-73, 41
19	Primary & Fabri. Metals	3312, 13, 15-17, 31-33, 39, 41, 62, 69, 91-92, 99, 3441-44, 46, 49, 71, 79
20	Machinery	3532-36, 61-62, 64-67, 69, 81-82, 86, 89, 99, 3611-13, 21-22, 24, 29, 41-42, 44, 31-36, 39, 51 61-62, 71, 74, 79, 93-94, 52, 99, 91, 3713-15, 11, 3811, 41-43, 51, 31, 61, 71, 3941-42, 49, 11, 13-14, 31, 51-53, 55, 61-64, 82-84, 87, 91, 93, 95, 99
21	Railroad Transportation	4011, 13, 21, 41
22	Intercity Freight	4131-32, 4213, 31
23	Trucking & Warehousing	4212, 14, 21-23, 24-26
24	Air Transportation	4511, 21, 82-83
25	All Other Transportation	4612-13, 19, 4111, 19, 21, 40-42 50, 71-72, 4742, 82-84, 89, 4721
26	Communication Services	4811, 21, 32-33, 99
27	Gas Utility	4922-23, 32, 9149, 9249, 9349
28	Electric Utility	4911, 31, 9151, 9251, 9351
29	Water Utility	9102, 9202, 9302, 4941, 52-53, 59, 61
30	General Wholesale	5012-14, 41-49, 52-54, 59, 4731, 5081-85, 87-88, 92, 22, 28-29, 33-34, 36-37, 39, 63-65, 72, 74, 77, 91, 93-99

Table A1. (Continued)

Sector Number	Sector Title	Related SIC Codes
31	General Retail	5211, 52, 21, 31, 41, 51, 5311, 31, 99, 5411, 21, 31, 41, 51, 62, 99, 5611, 21, 31, 41, 51, 61, 71, 81, 99, 5712-15, 19, 22, 32-33, 5912, 21, 32-33, 42-43, 52-53, 91-92, 99, 71, 82, 84, 93-97, 99, 41, 51
32	Auto Dealers	511, 21, 31, 7549, 31, 34-35, 38-39, 42
33	Gas Service Stations	554
34	Eating & Drinking Places	5812-13
35	FIRE	6011-59, 6112-61, 6312-99, 6411, 6211-81, 6512-61, 6611, 6711-99
36	Lodging	7011, 21, 41, 31-32
37	Personal Services	3111, 8931, 7211-18, 31, 41, 51, 61, 71, 99, 7813-18, 21, 7395, 7221, 7331-32, 39, 7311-13, 19, 7832-33, 7911, 29, 32-33, 41-43, 45, 49, 7523, 25, 7512-13, 19, 7622-23, 29, 7631, 41, 92, 94, 99
38	Professional Services	8011, 21, 31, 41, 61, 71-72, 92 99, 8211, 8221-22, 31, 41-42, 99, 8911, 7361, 7391, 8921, 7341-42, 49, 51, 92-94, 96-99, 73, 8999, 8411, 21, 8611, 21, 31, 41, 51, 61, 71, 99, 8811,

Based on state data, seven percent of the total of Sectors 1, 2, 3 and 4 was used as the value for Sector 5.

Sector output for mining (Sector 6) was taken from the *1967 Census of Mineral Industries*.

Construction information was available from the *1967 Census of Manufacturers*. For the purpose of this study, all construction activity, with the exception of maintenance and repair, was aggregated into one sector (Sector 7). Maintenance and repair is a separate sector (Sector 8). Data for Sectors 5-25 (manufacturing and transportation activities) were also taken from the *1967 Census of Manufacturers*. In cases where statistical data was not available due to disclosure problems, numbers of employees in the study region were multiplied by corresponding output per employee from Texas State data. In those cases where numbers of employees were not published, knowledgeable people in the region were consulted to obtain an estimate of employee numbers.

Communication and utilities (Sectors 26-29) were valued as reported by the *1967 Business Statistics*. All wholesale trade was aggregated into one sector (Sector 30). Total sales was taken from the *1967 U. S. Census of Wholesale, Retail and Selected Service*. Total sales was deflated to obtain an estimate of value added.[2]

The control totals for Sectors 35 (FIRE--finance, insurance and real estate), 36 (lodging), 37 (personal service) and 38 (professional services), were all taken from the *1967 Census of Wholesale, Retail and Selected Services*.

Since households was an endogenous sector in the George-Richards model, a control total had to be developed for Sector 39. The *1967 Census of Population* showed that of the 428,771 people residing in the ten counties, 361,683 lived in the counties of this study, or 84.35

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[2]The wholesale and retail trade sectors resell products they have purchased, so the total sales value would be incorrect as a control total. An estimate of value added is the desired figure. The deflators used were: wholesale, .1950; retail, .3183; auto dealers, .1226, gas service stations, .1288; eating and drinking places, .3404.

percent. Since the households sector represents purchases by (products bought) and payments to (wages) residents, 84.35 percent of the ten-county regional total was used.

Methodology

Compressing and Scaling Down

The number of sectors in the *Upper Rio Grande Valley-Texas Inter-industry Study* [George and Richards] was greater than that desired for this study. The larger ten county model included 67 endogenous sectors, whereas for the two county model only 39 sectors were desired. Using existing computer programs, a compress routine was applied to the data used in the ten county regional model. The purpose of this was to generate a regional (ten county) model with the desired number of sectors. The data obtained from this program was then used along with the control totals to generate an I-O model for El Paso and Hudspeth Counties. The program developed by Mustafa and Jones was employed to generate a 37 endogenous sector[3] model for the two-county region. This program takes the control totals for a regional model (El Paso-Hudspeth) and scales-down the transactions matrix by applying location quotients to the larger (10 county--Upper Rio Grande) model. Specifically, the program provides a method for estimating subregional interindustry transactions, technical and interdependence coefficients and sector multipliers from a larger input-output model and other secondary data. The program may be adapted for use in estimating regional input-output models for any region, number of sectors, or base year. The base year need not be the same as that of the larger input-output table [Mustafa and Jones].

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[3]Subsequently the irrigated crop sector was disaggregated into three sectors yielding the desired 39 sector model (see next section).

Disaggregation of Irrigated Crops

The original ten county study had all irrigated crops as a single sector. Thus, when the transactions table for the El Paso-Hudspeth Counties model was generated, it contained 37 sectors with irrigated food and feed grain, cotton, and vegetables, fruits, nuts and other irrigated crops aggregated into one sector. To complete the 39 x 39 table, row 1 and column 1 had to be disaggregated into three rows and columns.

The general procedure for disaggregation was as follows:

I. For the column (i.e., purchases by irrigated agriculture from other sectors), an allocation was made based on the purchasing pattern exhibited in the High Plains Study [Osborn and McCray, 1972]. The allocation logic was as follows:

Step 1. The average direct requirement coefficient ($\bar{X}_i$) for all irrigated crop categories (3) in the High Plains was calculated as

$$\bar{X}_i = \frac{\sum_{j=1}^{3} X_{ij}}{3}$$

where

X_{ij} = direct requirement ($purchases/$output) by the j^{th} irrigated crop from the i^{th} sector

$i = 1, 2, \ldots, 39$

$j = 1, 2, 3$

Step 2. The individual crop direct requirement as a proportion of the average (W_{ij}) was calculated as

$$W_{ij} = \frac{X_{ij}}{\bar{X}_i}$$

where

$$0 \leq W_{ij} < 1 \text{ and } \sum_{j=1}^{3} > 1$$

Step 3. The direct requirements coefficient (C_{ij}) for the three desired irrigated crops subsectors for the El Paso-Hudsepth model were estimated by multiplying the composite ("average") direct requirement coefficient ($\bar{C}_i$) for El Paso-Hudspeth by the appropriate W_{ij} based on the High Plains coefficients; i.e.,

$$C_{ij} = W_{ij} \bar{C}_i$$

Note: The assumption of step 1 through 3 is that a composite ("average") figure can be disaggregated if, for a "comparable situation", the composite and its component parts are know.

Step 4. The C_{ij} were then used to disaggregate the column entries (purchases by all irrigated crops from other sectors) into the desired three subsectors by

$$C_{ij} P_i = P_{ij}$$

where

P_i = purchases by all irrigated crops from the i^{th} sector

P_{ij} = estimated purchases by j^{th} irrigated crop from the i^{th} sector.

Step 5. Since the procedure does not gurantee that $\sum_{j=1}^{3} P_{ij} = P_i$ the three new column entries (P_{ij}'s) were adjusted to force the equality by increasing or reducing each P_{ij}

in proportion to their respective control totals (i.e., in proportion to their relative share of total irrigated crop output).

II. For the row (i.e., sales by irrigated crops to other sectors) the allocation was judgemental. The sales pattern by irrigated agriculture to other sectors was not consistent in many instances between the High Plains and Upper Rio Grande studies. The Upper Rio Grande model shows sales (generally of relatively small magnitude) to numerous sectors not shown in the High Plains model. Allocation of sales by irrigated crops are shown in Table A2.

Table A2. Disaggregation of Sales by Irrigated Crops Sector to Irrigated Crop Subsectors.

Sales by Irrigated Crops to:	Basis of Allocation	Percent of Total Sales Allocated to: Food & Feed Grains	Cotton	Vegetables Fruit, Nuts & Other
4. Livestock	High Plains*	80.0	---	20.0
5. Agri. Service & Supply	Proportional**	17.8	51.9	30.3
9. Food Processing	Proportional**	17.8	51.9	30.3
10. Textiles & Apparel	High Plains*	---	100.0	---
11. Lumber	Judgemental†	---	---	100.0
12. Furniture	Judgemental†	---	---	100.0
13. Boxes & Paper Containers	Judgemental†	---	---	100.0
14. Printing & Publishing	Judgemental†	---	---	100.0
15. Chemicals	Judgemental†	---	---	100.0
16. Petroleum	Judgemental†	---	---	100.0
17. Rubber & Leather	Judgemental†	---	---	100.0
18. Glass, Stone, Clay, Cement	Judgemental†	---	---	100.0
19. Primary & Fabri. Metals	Judgemental†	---	---	100.0
20. Machinery	Judgemental†	---	---	100.0
30. General Wholesale	Proportional**	17.8	51.9	30.3
31. General Retail	High Plains*	20.0	---	80.0
38. Professional Services	Judgemental†	---	---	100.0
39. Households	Judgemental†	---	---	100.0

*Based on percentage of individual irrigated crop sales of total sales to that particular sector from the High Plains model.

**Based on percentage of individual irrigated crop output (sales) of total irrigated crop output for El Paso and Hudspeth Counties.

†The only conceivable irrigated crop that might be sold directly from agriculture to these sectors would seemingly be vegetables, fruits and nuts.