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MINNESOTA'S DEVELOPMENT REGION SIX EAST: ITS STRUCTURE, CHANGES, AND FUTURE DIRECTIONS

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Preface

Local economies are complex and always changing. Unfortunately, the information available for analyzing a small regional economy is generally quite limited. However, the Department of Agricultural and Applied Economics at the University of Minnesota has been compiling data on Development Region Six East for almost five years. Because of several extensive studies using primary data, a fairly complete picture of the region's economy can be drawn.

This bulletin includes four major sections. The first is a description of the region's economy for 1972. Second is an analysis of the changes in employment and income between 1960 and 1970. Third, two examples, one in dairy processing and the other in manufacturing, are used to illustrate how export multipliers can trace out the regional economic impacts of changes in an individual firm's level of business. Finally, possible future constraints to growth and development of the region are discussed, with special emphasis on the labor force, transportation, agriculture, and public services.

The University of Minnesota, including the Agricultural Experiment Station, is committed to the policy that all persons shall have equal access to its programs, facilities, and employment without regard to race, creed, color, sex, national origin, or handicap. This research was partially funded by Title V of the Rural Development Act of 1972. 30¢

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by Robert A. Hoppe, K. William Easter and Jerry E. Fruin¹

Introduction

Minnesota Development Region Six East, located immediately west of the Minneapolis-St. Paul metropolitan area, was selected for study because of its unique location (see figure 1). It is typical of the ring of counties surrounding the metropolitan area. Agriculture is still very productive in the region, but trade and manufacturing are expanding and employ more people. Commuting to and from the region to the Twin Cities is a way of life. Lakes and rough land attract people for recreation and home sites. All of these characteristics combine to make the region an important gauge of the changes occurring in rural regions next to major metropolitan areas.

The region's population increased steadily between 1940 and 1970 with Kandiyohi and McLeod counties' populations increasing while Meeker and Renville counties' populations decreased (see table 1). The Minnesota state demographer suggests an increasing population for the region through the year 2000. Of the four counties, only the most agricultural county, Renville, is projected to have a decreasing population.

The Economy of Region Six East

One of the best ways to analyze and understand a region's economy is to divide it into sectors or groups of similar firms.² For example, the dairy processing plants are placed in a dairy products manufacturing sector and the trucking firms and railroads in a transportation sector. In this study, the Region

Six East economy is divided into more than 20 sectors. This allows description of the region's economy in terms of transactions among these sectors. The base year selected for the analysis is 1972 and the results are summarized in the transactions table (see table 2).³ Although the businesses included in most of the sectors are self-explanatory, detailed definitions are provided in table 3.

Table 1. Region Six East's population by county, 1940-1970 and 2000

County	Year				
	1940	1950	1960	1970	2000 (Projected)
population in thousands					
Kandiyohi	26.5	28.6	30.0	30.5	35.6
McLeod	21.4	22.2	24.4	27.7	42.3
Meeker	19.3	19.0	18.9	18.8	21.4
Renville	24.6	24.0	23.2	21.1	19.6
TOTAL	91.8	93.8	96.5	98.1	118.9

SOURCES

J.S. Hoyt, Jr., "1970 Census Final County and Community Population Data," Minnesota Economic Data, Counties and Regions, Department of Agricultural Economics, Agricultural Extension Service and Agricultural Experiment Station Cooperating, University of Minnesota, No. 19, May 1971.
Minnesota State Planning Agency, Office of the State Demographer, Minnesota Population Projections, 1970-2000 (St. Paul, November 1975).

The transactions table provides a picture of how the regional economy functions. Reading across a row gives sales by the row sector to other sectors. Reading down a column reveals purchases of the column sector from the row sectors. The total at the bottom of a column shows a sector's total purchases or expenditures, while the total at the end of a row shows a sector's total sales or revenues.⁴ The

¹ The authors are research specialist, professor, and assistant professor respectively. We wish to thank Glenn Nelson, Harold Jensen, Gordon Rose, and Lois Mann for their helpful comments. Any errors, however, are the responsibility of the authors. This research was funded by Title V of the Rural Development Act and the Minnesota Agricultural Experiment Station.

² Robert A. Hoppe, Building a Nonmetropolitan Input-Output Model: Minnesota's Region Six East. Technical Bulletin 313, Agricultural Experiment Station, University of Minnesota, 1978.

³ Although the transactions table uses data from 1972, the underlying purchase and sales relationships among the various sectors will remain fairly stable for a number of years.

⁴ Exports in the table include sales to other parts of the United States as well as foreign nations. Similarly, imports include purchases from other parts of the United States and from other nations.

Table 2. Region Six East transactions table showing purchases and sales by sector.

SECTOR NAME	1	2	3	4	5	6	7	8	9	10	11	12
(\$1000,00)												
1 CROPS	0.	35817.	0.	0.	0.	7053.	0.	0.	0.	0.	0.	534.
2 LIVESTOCK	0.	12187.	340.	0.	31499.	8649.	0.	0.	0.	0.	0.	168.
3 AG SERVICES	1568.	4645.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4 CONSTRUCTION	896.	894.	0.	400.	9.	64.	806.	693.	4.	125.	112.	7.
5 DAIRY PRODUCTS	0.	1201.	0.	0.	11109.	0.	0.	0.	0.	0.	0.	0.
6 AG.PROD.PROCESS	1915.	3128.	0.	0.	0.	235.	3.	0.	0.	0.	0.	0.
7 OTHER MFG.	909.	0.	793.	5307.	11.	1627.	2298.	206.	76.	137.	1145.	30.
8 TRANSPORTATION	51.	1518.	86.	1165.	190.	788.	590.	378.	8.	54.	1141.	14.
9 COMMUNICATIONS	403.	349.	31.	148.	31.	337.	211.	130.	29.	52.	1256.	35.
10 UTILITIES	681.	1503.	44.	237.	1004.	686.	2590.	349.	61.	437.	4016.	143.
11 TRADE	6407.	3496.	696.	666.	223.	580.	672.	161.	0.	266.	3512.	75.
12 GRAIN ELEVATORS	1665.	701.	0.	0.	0.	27.	72.	0.	0.	0.	0.	0.
13 F.I.R.E.	3580.	3208.	65.	1977.	87.	284.	254.	198.	46.	111.	1352.	45.
14 MEDICAL SERVICE	0.	0.	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.
15 EDUCATION	5054.	496.	6.	310.	93.	100.	481.	79.	10.	164.	294.	115.
16 OTHER SERVICES	141.	310.	428.	1030.	36.	658.	841.	211.	125.	90.	1767.	29.
17 HOUSEHOLDS	48063.	11309.	2384.	25948.	4470.	10248.	55947.	7060.	2427.	5641.	47177.	1873.
18 SAVINGS	14672.	7549.	754.	1505.	842.	12116.	27041.	1967.	670.	1651.	6479.	697.
19 FED.GOV'T.	1290.	414.	225.	915.	297.	2549.	3131.	838.	793.	2037.	4211.	64.
20 STATE GOV'T.	38.	37.	4.	410.	136.	468.	784.	540.	242.	219.	9225.	26.
21 LOCAL GOV'T.	3861.	379.	4.	236.	62.	69.	365.	60.	8.	125.	223.	77.
22 IMPORTS	25185.	23706.	6571.	46083.	35424.	38784.	187955.	2933.	1768.	7577.	16342.	954.
TOTALS	116380.	112846.	12431.	86336.	85524.	85319.	284042.	15804.	6267.	18684.	98252.	4888.

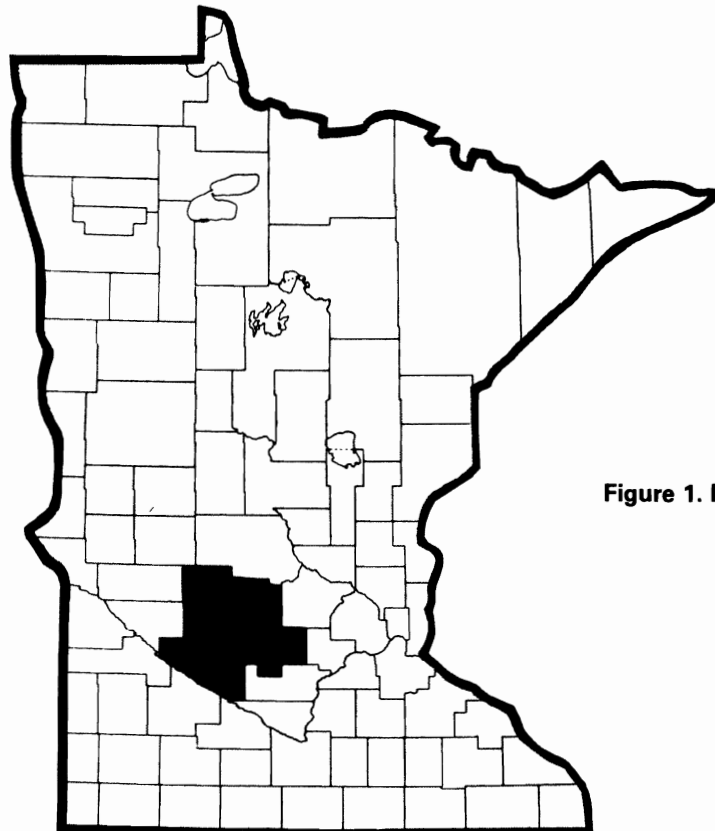


Figure 1. Development Region Six East

SECTOR NAME	13	14	15	16	17	18	19	20	21	22	23	24
	(\$1000,00)											(\$1000,00)
1 CROPS	0.	0.	0.	0.	32.	0.	0.	0.	0.	13895.	57050.	116380.
2 LIVESTOCK	0.	0.	0.	0.	1925.	0.	581.	0.	0.	0.	57095.	112846.
3 AG SERVICES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2212.	12431.
4 CONSTRUCTION	208.	22.	215.	86.	1848.	56497.	0.	95.	34.	104.	23217.	26336.
5 DAIRY PRODUCTS	0.	0.	63.	0.	1660.	0.	1069.	0.	0.	7980.	22441.	25524.
6 AG.PROD.PROCESS	0.	68.	72.	2.	3545.	0.	2686.	0.	2.	1320.	72322.	85319.
7 OTHER MFG.	151.	205.	974.	255.	4533.	476.	2042.	78.	33.	2.	262754.	284042.
8 TRANSPORTATION	0.	1.	1315.	20.	3039.	0.	0.	1.	20.	22.	5404.	15804.
9 COMMUNICATIONS	124.	113.	348.	171.	1263.	0.	0.	21.	26.	34.	1155.	6267.
10 UTILITIES	193.	126.	711.	349.	5173.	0.	0.	349.	14.	19.	0.	18684.
11 TRADE	148.	178.	256.	1846.	64423.	7564.	0.	1227.	18.	10.	5829.	98252.
12 GRAIN ELEVATORS	0.	0.	0.	0.	0.	0.	0.	0.	0.	401.	2022.	4888.
13 F.I.R.E.	710.	328.	210.	507.	14019.	0.	0.	0.	9.	0.	0.	26990.
14 MEDICAL SERVICE	6.	412.	0.	0.	16140.	0.	0.	39.	321.	145.	2664.	19731.
15 EDUCATION	146.	40.	214.	68.	6720.	0.	0.	382.	16769.	1462.	0.	33003.
16 OTHER SERVICES	531.	344.	630.	1394.	12142.	0.	0.	365.	17.	15.	2506.	23610.
17 HOUSEHOLDS	14818.	12351.	20529.	10273.	13377.	0.	0.	11577.	6829.	44882.	27715.	384900.
18 SAVINGS	4728.	1324.	3705.	1298.	17440.	0.	0.	0.	0.	0.	0.	104437.
19 FED.GOV'T.	1003.	582.	327.	487.	45825.	0.	0.	181.	0.	0.	0.	65168.
20 STATE GOV'T.	523.	56.	0.	296.	14747.	0.	0.	429.	20.	8.	0.	28209.
21 LOCAL GOV'T.	111.	30.	9.	52.	3503.	0.	0.	106.	12063.	2730.	401.	24474.
22 IMPORTS	3588.	3552.	3423.	6507.	153546.	0.	0.	3606.	2105.	1483.	0.	571092.
TOTALS	26990.	19731.	33003.	23610.	384900.	64537.	6378.	18456.	38280.	74513.	591217.	0.

Note: Detailed definitions of sectors are presented in table 3. The sectors represented by columns 1-17 are identical to those represented by rows 1-17. Columns 18-23 are defined in table 3. Column 24 presents row totals.

most important sectors in the region can be determined from these column and row totals. The key sectors include crops, livestock and other agriculturally-oriented businesses, construction, other manufacturing, trade, and government.

The importance of agriculture is reflected in the row totals for crops, livestock, and agricultural services which had sales of \$116.4 million, \$112.8 million, and \$12.4 million, respectively. In addition, businesses that processed agricultural products also had large sales. Dairy products manufacturing had sales of \$85.5 million, while other agricultural products processing sold \$85.3 million and grain elevators sold approximately \$4.9 million.⁵

Not only were the crop and livestock sectors large in terms of total sales, but they were also important inputs for other sectors, as summarized in table 4. For instance, the livestock sector used \$35.8 million worth of crops for feed. The other agricultural processing sector had purchases of \$7.1 million from crops and \$8.6 million from livestock as raw materials. The dairy products manufacturing sector had \$31.5 million of milk purchases and the livestock sector used \$12.2 million worth of feeder cat-

tle and pigs. The livestock sector produced \$1.9 million of meat and milk for home consumption by farm families. Large amounts of crops and livestock were exported, and the federal government paid \$13.9 million for participation in the farm program.

Agriculture and related business provided a substantial portion of the personal income of families in the region. Personal income includes salaries, wages, and profits of proprietorships and partnerships, as well as rents, dividends, and interest paid to individuals. Personal income from agricultural and related industries totaled \$78.4 million (see table 5). Total personal income in the region was \$384.9 million, with about 20 percent of the region's personal income coming from farms or agricultural businesses.

The other manufacturing sectors' total sales were \$284 million. Unlike crops and livestock, other manufacturing bought or sold very little locally. Total exports by the sector were \$262.8 million, or about 93 percent of total sales. Imports were about \$188 million, or approximately two-thirds of the sector's total purchases. However, other manufacturing still had an important impact in the region. The sector paid \$55.9 million to households, largely for labor. The \$55.9 million was 15 percent of the \$384.9 million of personal income collected by families in the region.

⁵ Output of the trade and grain elevator sectors is defined in terms of gross margin, or the markup on merchandise bought for resale.

Table 3. A list of Region Six East's sectors with definitions

Rows and columns (Sectors 1-17)

1. Crops: Production of grains, hay, and other plant products.
2. Livestock: Production of milk and livestock for slaughter.
3. Agricultural services: Hatcheries, veterinarians, custom crop work, and artificial insemination.
4. Construction: Repair construction, new construction, and mining.
5. Dairy products manufacturing: Processors of milk.
6. Other agricultural products: Processing of agricultural goods other than milk.
7. Other manufacturing: Manufacturing other than agricultural processing.
8. Transportation: Trucking firms, railroads, and school bus companies.
9. Communication: Radio companies and telephone companies.
10. Utilities: Electric companies, natural gas companies, and water supply companies.
11. Trade: Wholesale trade, building material stores, hardware stores, farm equipment dealers, food stores, automobile dealers, service stations, clothing stores, restaurants, bars, and other retail establishments.
12. Grain elevators: Establishments that buy grain from farmers to resell.
13. Finance, insurance, real estate: Banks, credit agencies, insurance companies, insurance agents, and firms that buy, sell or manage real estate.
14. Medical services: Hospitals, rest homes, physicians, dentists, and chiropractors.
15. Education: Private and public primary and secondary schools, area vocational technical institutes, and Willmar Community College.
16. Other services: Lawyers, amusements, repair services, business services, nonprofit membership organizations, engineering firms, accounting firms, personal services, and hotels.
17. Households: The row shows payments to individuals for the use of their labor and property while the column shows personal consumption expenditures.

Rows

18. Savings: Largely retained earnings and depreciation.
19. Federal government: Payments to governments, such as taxes, fees, fines, and intergovernmental transfers.
20. State government: Same as federal government.
21. Local governments: Same as federal government.
22. Imports: Purchases by a sector from outside Region Six East.

Columns

18. Capital formation: Regional sales for regional capital formation.
19. Inventory change: Difference between beginning and ending inventories of finished products and work in process.
20. Local governments: Expenditures by governments.
21. State government: Expenditures by governments.
22. Federal government: Expenditures by government.

Table 4. Sales of crops and livestock to other sectors.

Purchasing sectors	Sales of crops (millions of dollars)	Sales of livestock (millions of dollars)
Livestock	\$ 35.8	\$ 12.2
Agricultural services	---	.3
Dairy products manufacturing	---	31.5
Other agricultural products processing	7.1	8.6
Grain elevators	.5	.2
Households	---	1.9
Inventory change	^b	.6
Federal government	13.9	---
Exports	59.1	57.5
TOTAL	\$116.4	\$112.2

*All estimates are from the first two rows of table 2.

^bCrop inventory change is included in exports. Grain sales to elevator stock consumption of crops, sales to specialty crop processors and sales to feed manufacturers were subtracted from total crop production to obtain a residual. This residual includes inventory change and exports. Due to the lack of data no attempt was made to estimate the inventory change separately.

Construction, with sales of \$86.3 million, was another important local sector. Most of the regional sectors made relatively small payments to the construction sector. These payments were for repair work performed by construction firms. Most of the construction sector's sales (\$56.5 million) were for capital formation which represents new buildings erected in Region Six East. Finally, the construction exports of \$23.2 million were for work done outside the region by regional firms. Construction paid \$25.9 million to households, largely for labor.

The trade sector had sales to most of the other regional sectors. The largest single sale was \$64.4 million to households for items families bought at stores, restaurants, service stations, and other trade establishments. In addition it paid \$47.2 million, or 48 percent of its total payments, to households, primarily for labor. The trade sector also made a substantial payment of \$9.2 million to the state government, largely for sales taxes.

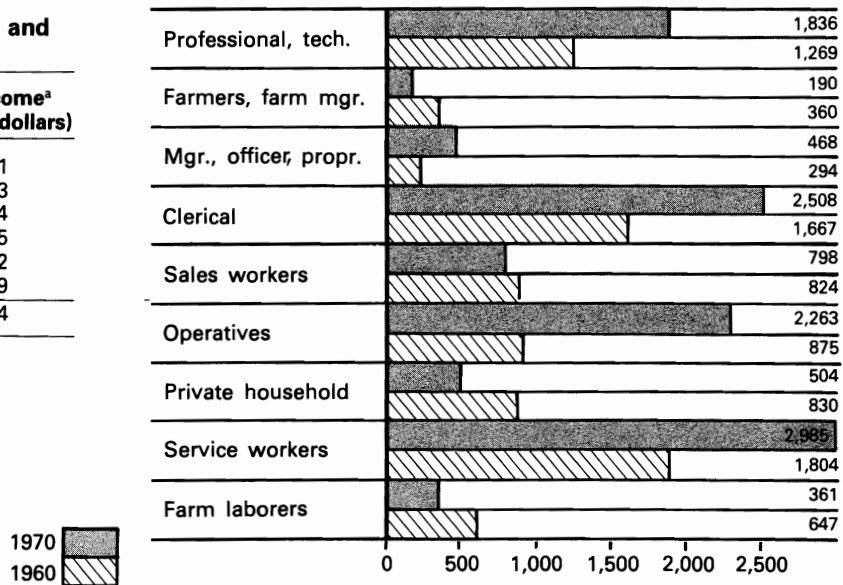
If payments to households by the other manufacturing sector and the trade sector are added together they account for \$103.1 million or 27 percent of payments to households. This is larger than the share of payments to households provided by the agriculture and related business sectors. If the construction sector is added to trade, other manufacturing and agriculture and related business sectors, they account for 54 percent of personal income collected by families in the region.

Table 5. Personal income from agriculture and related businesses.

Sector	Personal income ^a (millions of dollars)
Crops	48.1
Livestock	11.3
Agricultural services	2.4
Dairy products processing	4.5
Other agricultural products processing	10.2
Grain elevators	1.9
TOTAL	78.4

^aAll estimates are from row 17 of table 2.

Graph 1: Occupations reported by females in Region 6E for 1960 and 1970.



The importance of government in the region is also apparent in the transactions table. Total collections by local, state, and federal governments were \$24.5 million, \$28.2 million, and \$65.2 million, respectively (the row totals from table 2). Total government expenditures, represented by the government column totals, are \$18.5 million for local governments, \$38.3 million for state government, and \$74.5 million for federal government. Both state and federal payments are larger than collections while the opposite is true for local government.

The largest single entry in the local government column is a payment to households of approximately \$11.6 million. This item consists of compensation to local government employees of approximately \$5.4 million and welfare payments of approximately \$6.2 million. In this analysis, school district property taxes are paid directly to the school districts by the other sectors. Therefore, the entry at the intersection of the local government column and the education row in table 2 is quite small because the school districts' portion of the property tax is excluded.

Like local governments, the state government made substantial payments to households. The composition of the state's \$6.8 million payment to households can be broken down as follows: \$4.3 million for employee compensation, \$1.8 million for unemployment benefits, and \$.7 million for retirement payments. Two other large items in the state

government column are aids to education (\$16.8 million) and aids to local governments (\$12.1 million).

The largest entry in the federal government column is the \$44.9 million in payments to households which is over half of the federal government's expenditures of 74.5 million. The \$44.9 million includes items such as federal employee compensation, food stamps, retirement pay for former federal employees, and social security payments. The largest single item is \$19.4 million in social security benefits while federal wage payments are quite small. The other large entry in the federal government column is a payment of \$13.9 million to farmers in the region for their participation in farm programs.

Economic Changes

The above section provides a picture of region Six East's economy for 1972. However, an economy is not static; it changes over time. Past changes in the region's economy can be analyzed for clues about the future. To do this, the 1960 to 1970 rates of change in income and employment are compared for Region Six East and the state of Minnesota as a whole.⁶ As an example, the rate of change in Region

⁶ Robert A. Hoppe and Ronald J. Dorf. Analysis of Economic Changes in Region 6E, 1960-1970. Title V Report No. 9, Department of Agricultural and Applied Economics, Agricultural Experiment Station, Agricultural Extension Service, University of Minnesota, August 1976.

Six East's manufacturing employment is compared to the rate of change in the entire state. The 1960 and 1970 Census Bureau data are used, as the census is the only detailed source of information available for areas with relatively small populations such as Region Six East.

The most pronounced changes that occurred were the large number of people leaving agriculture and the large increase in manufacturing employment (see table 6). Although agricultural employment decreased by 4,623, the rate of decrease was about the same as the decrease for the state as a whole. Other manufacturing employment almost tripled, going from 1,943 employees to 5,595. This increase was more rapid than the corresponding increase for the state as a whole. The increase in employment in the trade sector was about 1,200. However, the rate of increase in trade was less than the corresponding rate for the state.

These employment changes were responsible, in part, for the income changes in Region Six East during the 1960's. The number of low income families, particularly in the rural farm population, decreased sharply (see table 7). The region's decline in families with incomes under \$4,000 occurred at a greater rate than for the state. At the other end of the income scale, the region increased its proportion of families with incomes over \$25,000 more rapidly than the state.

Total male workers residing in Region Six East decreased by 1,650 during the 1960's. This decrease was due largely to reductions in agricultural employment. However, female employment increased by 3,600 with the increase coming from a wide range of occupations, although clerical and service jobs accounted for over half of the increase (see graph 1). Male farmers were apparently migrating, retiring, or seeking off-farm employment, while women throughout the region were being employed outside the home in greater numbers. Employment could increase in non-agricultural endeavors within Region Six East without the importation of a large number of workers because of this labor pool of farmers, farm laborers, and women.

Employment data from 1970-76 suggest that the shifts in employment in Region Six East have slowed down. Employment in trade and manufacturing leveled off in the middle 1970's after sizable increases in the early 1970's. Agricultural employment was fairly stable during the early 1970's, but has shown increases in the middle 1970's. This increase is probably the result of increased sugar beet production and increased production of other crops due to high farm prices and reduced acreage diversions under federal programs during 1973-75. The acreage of sugar beets grown in the region increased significantly in 1975 due to the new sugar beet plant near Renville.

At least in Region Six East, the drastic shifts of the 1960's are apparently not continuing. If the more moderate changes are confirmed by the next

Table 6. Employment and changes by sector in Region Six East for 1960-1970.

Sector	1960	1970	Change number of persons
	Employment	Employment	
Agriculture	12,459	7,836	-4,6
Construction	2,008	2,272	2
All agricultural products processing	1,595	1,332	-2
Other manufacturing	1,943	5,595	3,6
Transportation	1,075	1,018	-
Communications	258	260	
Utilities	296	431	1
Trade	6,156	7,385	1,2
F.I.R.E. ^a	782	920	1
Education	1,585	2,263	6
Other services	4,290	5,494	1,2
Government	828	961	1
TOTALS	33,277	35,767	2,4

^a Finance, insurance, and real estate.

census, trade and manufacturing will not employ a much higher share of the region's labor force by 1980 than it did in 1970. Even though agricultural employment has shown some increases in absolute numbers, its share of employment will probably continue to drop.

The Impact of Changes in Economic Activity

The analysis of past changes provides some insights into the regional economy. However, the ability to measure the impact of proposed changes in economic activity on the region's economy is important. When a plant expands or contracts, businessmen and local community leaders are concerned about possible effects on the economy. These people know that a decision made by a business will affect the business's customers and suppliers. Unfortunately, the magnitude of the effects of a firm's decision on other businesses in the community is frequently unknown.

An input-output model can be used to trace the local effects of changes in sales by businesses. Input-output analysis uses the information shown in the transactions table to construct the export multipliers shown in table 8.

These multipliers show how much total sales in the region increase when a particular sector increases its sales to firms located outside the region by one dollar. For instance, if crop exports increase

Table 7. Changes in number of families in various income groups, 1960-1970.

Income groups	Changes by population groups			Total change
	Urban	Rural nonfarm	Rural farm	
numbers of persons				
Under \$4,000	-1,237	-1,587	-4,378	-7,202
\$4,000-4,999	-522	-663	-194	-1,379
\$5,000-5,999	-577	-308	123	-762
\$6,000-6,999	-229	50	122	-57
\$7,000-7,999	14	444	284	742
\$8,000-8,999	64	479	332	875
\$9,000-9,999	373	417	330	1,120
\$10,000-14,999	1,986	1,503	1,082	4,571
\$15,000-24,999	849	500	580	1,929
\$25,000-over	187	155	258	600
TOTAL	908	990	-1,461	437

SOURCE: Hoppe, Robert A. and Ronald J. Dorf, Analyses of Economic Changes in Region 6E, 1960-1970. Department of Agricultural and Applied Economics, Agricultural Experiment Station and Agricultural Extension Service, University of Minnesota, Title V Report 9, August 1976.

by one dollar, total sales in the region increase by \$2.17. The original one dollar increase in exports is included in the \$2.17 total sales increase.

Each export multiplier summarizes the chain reaction of local sales that occurs whenever a sector increases its exports. For example, if the livestock exports increase, more grains and forages must be fed to livestock. Thus, the crop sector will increase its sales to the livestock sector. In order for the crop sector to sell more grains and forages, fertilizer must be applied. The fertilizer manufacturers will increase their sales to the crop sector. If the fertilizer manufacturers are to produce more, they may have to purchase items from hardware stores which increases hardware sales. This chain of sales could be extended further by showing how the hardware stores' purchases induce more sales. The livestock sector also had input requirements other than feed. Each of these requirements induces its own chain reaction of local sales. The livestock export multiplier adds together all the sales stimulated by the livestock exports.

To illustrate the use of input-output models and multipliers assume the Region Six East dairy products manufacturing sector and the other manufacturing sector both experienced an increased demand for their products from outside the region. In satisfying the new demand, these two sectors each increase production by \$1 million. To estimate the impact—of the increased dairy products exports, the

dairy products manufacturing multiplier of 2.37 is multiplied by \$1 million. Thus, when dairy manufacturing increases its exports by \$1 million, total regional sales increase by \$2,370,000.

Using other information provided by the input-output model, the distribution of this increase is calculated for each sector (see table 9). Naturally, the largest impact is upon the dairy products manufacturing sector which had a \$1,157,000 sales increase. However, there are also large impacts on crops (\$155,000), livestock (\$482,000), households (\$298,000), and trade (\$83,000).

Although the above figures are only approximations, they do point out that the dairy products manufacturing sector has many direct and indirect connections with other sectors of the local economy. A large increase in output by the dairy products sector has a large impact on the rest of the region's economy. However, by the same token, a large decrease in dairy product manufacturing would also have a large negative impact on the region.

A similar calculation can be done to estimate the effects of an expansion in exports from the other manufacturing sector. One million dollars is multiplied by the other manufacturing multiplier of 1.42. The \$1,420,000 increase is then distributed among each sector (see table 10). The sectors most affected by the increase are the other manufacturing sector, households, and the trade sector.

Table 8. Region Six East export multipliers by sector.

Sector	Multipliers
1. Crops	2.17
2. Livestock	2.52
3. Agricultural services	1.74
4. Construction	1.78
5. Dairy products manufacturing	2.37
6. Other agricultural products processing	1.77
7. Other manufacturing	1.42
8. Transportation	2.11
9. Communications	1.82
10. Utilities	1.70
11. Trade	2.17
12. Grain elevators	2.23
13. F.I.R.E.	2.17
14. Medical services	2.33
15. Education	2.43
16. Other services	2.21
17. Households	1.82

NOTE: The multipliers include the original \$1 increase in exports.

SOURCE: Hoppe, Robert A., Building a Nonmetropolitan Input-Output Model: Minnesota's Region Six East, Technical Bulletin 313, Agricultural Experiment Station, University of Minnesota, 1978.

Table 9. Effects by sector of a \$1,000,000 increase in dair products manufacturing sales.

Sector	Sales increase
1. Crops	\$155,00
2. Livestock	482,00
3. Agricultural services	22,00
4. Construction	8,00
5. Dairy products manufacturing	1,157,00
6. Other agricultural products processing	19,00
7. Other manufacturing	10,00
8. Transportation	14,00
9. Communication	5,00
10. Utilities	31,00
11. Trade	83,00
12. Grain elevators	5,00
13. F.I.R.E.	34,00
14. Medical services	13,00
15. Education	16,00
16. Other services	17,00
17. Households	298,00
TOTAL	\$2,370,00

NOTE: Column does not add to total due to rounding.

As compared to the dairy products sector, expanding exports from the other manufacturing sector results in a much smaller increase in other sectors. When the other manufacturing sector expands exports, more inputs are imported and total local production increases by a lesser amount than in the dairy example. However, payments to households in the two examples are fairly close. Dairy products manufacturing's payments to households totaled \$298,000, while other manufacturing paid \$269,000 to households. This shows why multipliers must be used carefully. At first glance the multipliers strongly suggest that encouraging dairy products manufacturing is wiser than encouraging other manufacturing. If total output should be maximized, then this would be a wise decision. However, if personal income should be maximized, the choice is not as clear.⁷

Future Directions of the Region's Economy

The analysis of past changes and present conditions in the region's economy suggests a strong economy where agriculture is still important but with manufacturing and trade growing in impor-

⁷ The multipliers calculated for the region may seem small when compared to state or national input-output multipliers. However, Region Six East is adjacent to the Minneapolis-St. Paul and St. Cloud Standard Metropolitan Statistical Areas (SMSA's). A large amount of trade between the SMSA's and Region Six East would be expected. This trade reduces the size of the transactions occurring internally in the local economy and thus lowers the Region Six East multipliers.

tance. What then should people in the region be concerned about in the future?

LABOR FORCE

One concern may be the labor force, since there is no longer a large labor pool to draw on and this lack of available labor can constrain future industrial expansion. On the other hand, a commuting study shows that labor does move into the region.⁸ Commuting is from low-income, job-deficit counties to high-income counties. The direction of the commuting is, therefore, primarily from west to east towards the Twin Cities. Thus, the problem may be to provide adequate roads and vehicles to bring people to the jobs in Region Six East.

A further concern is the educational level or skills of the labor force. As manufacturing continues to require more skills, can the labor force in the region keep up? This may be a particular problem for the large number of rural housewives employed in low paying jobs starting in the 1960's. Special adult education programs may be needed to raise skills, incomes, and employment. Otherwise, if the low skill industries move to new low wage areas, Region Six East may be left with a group of unemployed workers with few skills.

⁸ Dorf, Ronald J. Home-to-Work Commuting Patterns for Region 6-E. Unpublished mimeograph, March 1975.

Table 10. Effects by sector of a \$1,000,000 increase in other manufacturing sales.

Sector	Sales increases
1. Crops	\$1,000
2. Livestock	2,000
3. Agricultural services	---
4. Construction	5,000
5. Dairy products manufacturing	1,000
6. Other agricultural products processing	3,000
7. Other manufacturing	1,013,000
8. Transportation	5,000
9. Communication	3,000
10. Utilities	16,000
11. Trade	51,000
12. Grain elevators	---
13. F.I.R.E.	13,000
14. Medical services	12,000
15. Education	7,000
16. Other services	14,000
17. Households	269,000
TOTAL	\$1,420,000

NOTE: Column does not add to total due to rounding.

TRANSPORTATION

As already suggested, the transportation system will be important for the region's continued growth. This is particularly true because of the region's close proximity to the Twin Cities. Transportation is a vital link for the region with the Twin Cities. Roads must be maintained and upgraded to keep this link open. However, a new four-lane highway from the Twin Cities into the region may be a mixed blessing. It would most likely increase the westward expansion of the Twin Cities and cause a more rapid urbanization of Region Six East, particularly McLeod and Meeker counties. As a consequence, commuter traffic would increase substantially, although it already is an important factor in the region.

Transportation of commodities is important for both agriculture and industry. The agriculture of the region is based on the ability to export products such as grain and livestock. An adequate transportation network is also necessary to move agricultural input supplies such as feed and fertilizer from trade centers to farms. Such a network is made up of low traffic density rural roads, high traffic density arterial highways, and railroads and Mississippi River barges for long-distance movement of bulk commodities.

The four east-west arterial highways connecting the region with the Twin Cities are typically of the two-lane construction of the 1930's and 1940's and are not built to freeway standards (see figure 2).

Consequently, from a safety and convenience standard, they have deficiencies. From a logistics standpoint, they are generally quite adequate to move the grain, agricultural inputs, and manufactured goods. Virtually all of the region's grain elevators and manufacturers are located on or near all-weather roads.

In contrast there is a lack of all-weather roads running north and south. Improved management of these north-south roads appears to be needed particularly during the period March 26 to May 15, when spring road restrictions limit loads to five tons on many roads. Of the several north-south state highways, only Highway 71 is unrestricted for its entire length through the region. All of the others are posted in the spring at less than the nine-ton state maximum, which means Highway 71 is heavily used. This lack of unrestricted north-south roads inhibits grain shipments from areas in the southern part of the region to livestock feeders in the northern part. The east-west orientation of highways may also cause routing of shipments of bulk commodities such as fertilizer through the Twin Cities rather than on more direct north-south routes. Improved road management, including load permits, closer monitoring and enforcement of load limits, and upgrading of specific heavily used road segments would help improve commodity flows.⁹

There are four major east-west railroads crossing the region plus a line from the Twin Cities to Hutchinson (see figure 2). In addition, a main Burlington Northern line runs northeasterly through Kandiyohi County to Duluth. This line connects with other Burlington Northern lines and provides a rail route for southwestern Minnesota to the Gulf port of Houston.

At the present time none of these railroads are being considered for abandonment. One railroad, the Chicago and Northwestern line which crosses southern Renville County, is eligible for rehabilitation under the Minnesota rail service improvement program. Upgrading of the Burlington Northern line from Hutchinson to the Twin Cities is planned. Abandonments have not been a major problem in the past. The most recent abandonment was the 112-mile Luce Line from the Twin Cities through the region to Glueck. Approximately seven small towns with elevators lost rail service and now ship by truck.

Although none of the region's railroads are candidates for abandonment at present, further consolidation of railroad companies via merger could

⁹ Young, William J., Effects of Spring Road Restrictions in Region 6E, Department of Agricultural and Applied Economics, Agricultural Experiment Station, Agricultural Extension Service, University of Minnesota, Title V Report 10, September 1976, 37 pp.

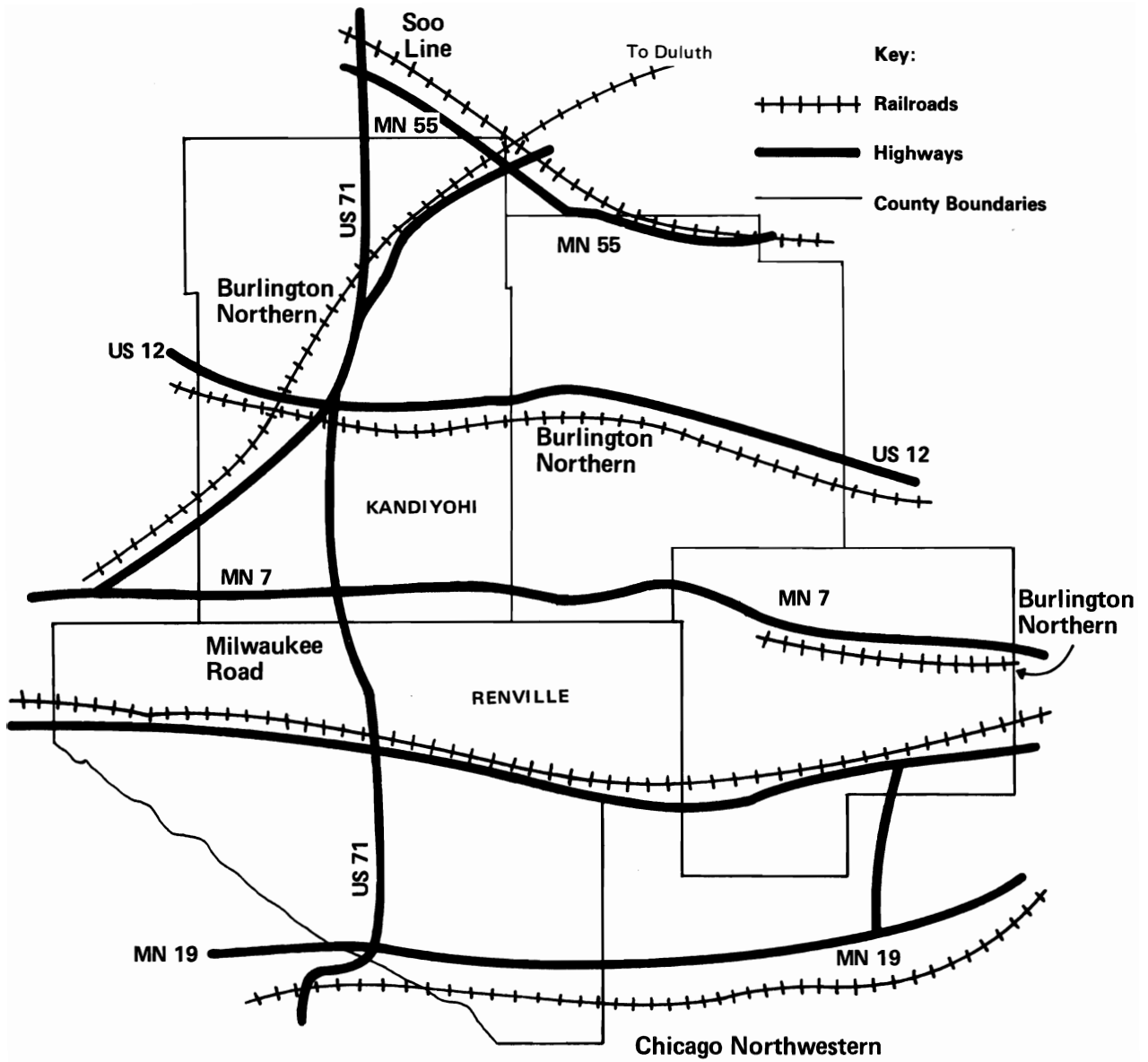


Figure 2. Major highways and railroads in Region Six East.

cause one or more of the east-west lines to be considered redundant by the surviving company and eventually proposed for abandonment. However, as long as the farmers have access to export markets by truck and barge, the abandonment of one rail line will not seriously affect the region's economy although it could cause dislocation of several businesses.

The region is only 25 to 120 miles from the river terminals at Savage. Even though barge rates vary depending upon the demand for water transportation, the combined truck-barge rate from Region Six East to the Gulf of Mexico is less than rail rates. Consequently, much of the corn and soybeans produced, but not consumed, in or near Region Six East moves to the Gulf ports by barge.

The loss of barge transportation would decrease the net revenue to Region Six East farms from corn entering the international market by 3 percent or 7¢ per bushel based on 1976 conditions. Large grain subterminals with lower multiple-car rates would increase net revenue from corn sales by only .02 percent if barge transportation was available. However, if the multiple car rates were available, but barge transportation was not, net revenue from the region's corn exports would still decrease by 2.5 percent. Waterway user charges would have a similar impact on income as net revenue for farmers would decline because of increased transportation costs. However, major shifts to other transportation modes or to other markets are not likely to occur if Congress adopts a user charge on barges of 4¢ to 6¢ per gallon of commercial fuel.

AGRICULTURE

The agricultural sector is a question mark for the region. As indicated above, agricultural employment declined drastically between 1960 and 1970. This trend seemed to have abated during the seventies and, as discussed above, employment of farm labor has increased slightly during the middle seventies. However, with the low grain and sugar prices and the expansion of urban areas, the decline is likely to start again. Offsetting future declines is the effect that the low grain prices have in stimulating livestock production, particularly dairy. This could mean a shift back to more livestock production or at least a stabilized livestock production in the region.

Agriculture and agricultural products processing made up only 26 percent of the region's employment in 1970 as compared to 42 percent in 1960. Manufacturing and trade accounted for 36 percent of the total employment in 1970, up from 24 percent

in 1960. To complicate matters, changes in one group of businesses will induce changes in others as emphasized above. Has the region adjusted to these shifts in employment from agriculture to manufacturing? Private firms have probably made the adjustment in response to changing demands and prices. However, the public sector has no similar set of signals that would indicate how it should adjust. At best it adjusts more slowly in response to the voting process through which public demands can be expressed. Thus, the question is: Have the region's public services changed in response to the changes in the region's economy? For if they have not, the lack of public services can slow the region's expansion just as surely as the lack of labor.

PUBLIC SERVICES

Future public services will have to be oriented towards a more urban population. As services become concentrated in the medium-sized towns public transportation to these towns will become even more important, particularly for the elderly and disadvantaged. For example, as doctors concentrate in the larger towns, many rural people will find themselves farther from medical care.¹⁰

People transportation in Region Six East is of necessity oriented toward the private automobile. In general, this is appropriate, as the automobile provides a very cost effective mode for filling most of the transportation needs of Region Six East residents. However, there are low-income, elderly and handicapped people, who cannot drive or who cannot afford the expense of an automobile. Transportation opportunities are quite limited for such people in many parts of Region Six East. There are only two highways served by public buses. Both run east and west and are oriented to Twin Cities traffic. There is no bus service provided on the north-south routes through the region. If people in Olivia want to get to Willmar using public transportation, they either have to go by taxi or take a bus from Olivia to the Twin Cities and take another bus to Willmar. Rail passenger service to the region exists in the form of an Amtrack train that stops every other day in Willmar and connects Willmar with the Twin Cities and cities to the northwest.

Unfortunately, the low population density and low demand, caused in part by the economy and convenience of the automobile, make it unprofitable

¹⁰ Hoppe, Robert A. and Steven Levy, "Analyzing the Adequacy of Health Services in Rural Areas," Minnesota Agricultural Economist, Agricultural Extension Service, University of Minnesota, May 1975.

to provide bus or taxi service in much of Region Six East. For example, there have been several unsuccessful attempts by private operators to provide bus service between Hutchinson and the Twin Cities, and taxi companies in small towns frequently have financial difficulties.

Various communities or groups in the region have attempted to alleviate this lack of transportation. For example, Hutchinson and Willmar each have subsidized transportation for the elderly operating among various locations in town. Additionally, various agencies in the region have programs to provide rides for people needing transportation to medical facilities or to other essential services.

Because of the substantial shifts in the structure of Region Six East's economy, new demands also have been placed on other public services within the region. Only an inventory of current public services along with a survey of needs can provide a complete picture of where gaps in public services may exist. A first step would be to take a sample survey or hold a series of town or county meetings to solicit the concerns of local people. A series of county meetings to solicit local concerns was last held in 1974 by the regional commission. The regional commission could again take the lead in organizing a survey or town meetings to reach a more complete sample of its citizens.

Summary and Conclusion

The analysis of Minnesota Development Region Six East is presented as an example of a regional economy located near a major metropolitan area. Many of the same problems and opportunities may be facing other basically rural regions and counties located near metropolitan areas. Agriculture is an important but declining source of employment, while trade and manufacturing's share of employment is expanding. Substantial commuting to jobs in trade and manufacturing make transportation an important component of the changing economy.

The relative importance of the above sectors has shifted significantly. Agriculture and agricultural processing's share of regional employment fell from 42 percent in 1960 to 26 percent in 1970. In contrast the share of employment in trade and other manufacturing jumped from 24 percent in 1960 to 36 percent in 1970. Changes like these will have impacts on the rest of the economy as discussed in the section on multipliers. One of the positive aspects of the changing economy has been a dramatic decline of families with incomes of \$6,000 and lower, particularly in the rural farm population.

During the same period there was a major decline in agricultural employment (a 4,623 decrease). Off-setting this decline was an increase in other manufacturing employment of 3,652. In addition, male workers residing in the region declined by 1,650 while female employment increased by 3,600. Thus a substantial pool of labor was available for trade and manufacturing in terms of homemakers and agricultural workers.

These shifts in employment and income suggest a changing regional economy although more recent employment data for 1970-76 indicate that these shifts may have abated. Even so, past changes of the above magnitude can present problems for local government. Have improvements in public services such as people transportation, health services and education kept pace? If not, how can such inadequacies be uncovered and removed? These questions will need to be answered by local people through their elected officials.

The information presented here can help local officials understand their regional economy and the changes that have occurred. The economic information also has limitations. For instance the last population census data was collected in 1970 and the input-output data is for 1972. Thus the information should be used as an indicator of likely trends. This bulletin is just one input into the decision-making process of local officials.

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Appendix table. Direct and indirect coefficients matrix (16 processing sectors and households endogenous).

SECTOR NAME	1	2	3	4	5	6	7	8	9	10
(DOLLARS)										
1 CROPS	1.0063409	.3659202	.0112749	.0016763	.1552233	.1213443	.0010303	.0024461	.0019687	.0016107
2 LIVESTOCK	.0087885	1.1374785	.0341326	.0039943	.4822772	.1180190	.0023919	.0058337	.0046955	.0038406
3 AG SERVICES	.0139170	.0517501	1.0015569	.0001870	.0219425	.0064924	.0001123	.0002731	.0002198	.0001798
4 CONSTRUCTION	.0130373	.0166986	.0035338	1.0087070	.0080194	.0053745	.0048317	.0499068	.0043674	.0100529
5 DAIRY PRODUCTS	.0035193	.0164180	.0021850	.0023135	1.1566991	.0029156	.0013785	.0033791	.0027156	.0022330
6 AG,PROD.PROCESS	.0231995	.0423357	.0044691	.0044043	.0187969	1.0108085	.0026353	.0064322	.0051752	.0042395
7 OTHER MFG.	.0232896	.0182930	.0719677	.0706437	.0096639	.0267813	1.0130974	.0281792	.0216800	.0159418
8 TRANSPORTATION	.0111153	.0241378	.0125924	.0195284	.0140077	.0152547	.0054189	1.0332459	.0075263	.0086840
9 COMMUNICATIONS	.0097254	.0100642	.0063229	.0053569	.0054281	.0074010	.0027246	.0135468	1.0086260	.0062216
10 UTILITIES	.0264359	.0344970	.0166559	.0153173	.0308056	.0193592	.0160839	.0401841	.0232888	1.0354161
11 TRADE	.1782878	.1504185	.1263611	.0903947	.0831305	.0715017	.0510774	.1308617	.0969359	.0932992
12 GRAIN ELEVATORS	.0144612	.0123174	.0003929	.0000680	.0052243	.0027992	.0002859	.0000804	.0000644	.0000523
13 F.I.R.E.	.0619171	.0680484	.0236806	.0436288	.0340394	.0239987	.0126877	.0431650	.0308355	.0253514
14 MEDICAL SERVICE	.0283981	.0210649	.0151183	.0193359	.0127595	.0124785	.0115361	.0282399	.0227447	.0185607
15 EDUCATION	.0574706	.0315320	.0083658	.0126846	.0164806	.0129691	.0070005	.0183694	.0120488	.0174970
16 OTHER SERVICES	.0314649	.0289276	.0526865	.0319257	.0165711	.0217885	.0141187	.0423595	.0427429	.0233393
17 HOUSEHOLDS	.6627338	.4914756	.3528590	.4512286	.2977382	.2912272	.2690799	.6591409	.5309008	.4332378

Appendix table. Direct and indirect coefficients matrix (16 processing sectors and households endogenous).

SECTOR NAME	11	12	13	14	15	16	17
(DOLLARS)							
1 CROPS	.0026162	.1245318	.0028217	.0036426	.0038389	.0025712	.0047751
2 LIVESTOCK	.0062399	.0449059	.0067301	.0080822	.0089971	.0061205	.0113922
3 AG SERVICES	.0002921	.0035258	.0003150	.0003817	.0004221	.0002866	.0005332
4 CONSTRUCTION	.0069096	.0078644	.0131511	.0071279	.0145915	.0090007	.0083750
5 DAIRY PRODUCTS	.0036107	.0038478	.0038970	.0044420	.0067530	.0035370	.0065817
6 AG,PROD.PROCESS	.0068782	.0094673	.0074208	.0120224	.0108507	.0068086	.0125486
7 OTHER MFG.	.0252463	.0202866	.0196538	.0260578	.0466481	.0249801	.0215453
8 TRANSPORTATION	.0208442	.0127850	.0092310	.0103669	.0517378	.0101935	.0147774
9 COMMUNICATIONS	.0186612	.0130985	.0102901	.0122245	.0174834	.0138174	.0087584
10 UTILITIES	.0612713	.0488836	.0264735	.0283724	.0454256	.0366653	.0304756
11 TRADE	1.1658291	.1416451	.1438517	.1666185	.1690417	.2104695	.2303805
12 GRAIN ELEVATORS	.0000847	1.0020682	.0000895	.0001127	.0001260	.0000833	.0001485
13 F.I.R.E.	.0458324	.0432360	1.0603473	.0551801	.0459562	.0545025	.0548902
14 MEDICAL SERVICE	.0302202	.0277061	.0328207	1.0584922	.0378791	.0296047	.0552077
15 EDUCATION	.0172614	.0422204	.0203351	.0189534	1.0241293	.0169255	.0246102
16 OTHER SERVICES	.0490571	.0342502	.0522428	.0542810	.0571160	1.0928598	.0511688
17 HOUSEHOLDS	.7053659	.6466781	.7605444	.8677655	.8841907	.6909466	1.2887597

