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ECONOMIC IMPORTANCE OF EXPORT-PRODUCING INDUSTRY IN MINNEAPOLIS-ST. PAUL METROPOLITAN REGION

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REGIONAL ECONOMIC IMPACT FORECASTING AND SIMULATION

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Summary and Conclusions

The seven-county St. Paul-Minneapolis Metropolitan Region provides jobs for 53 percent of the Minnesota work force and it accounts for 60 percent of personal earnings from this employment. The export-producing industries -- those industries selling goods and services to residents outside the seven-county region -- are the economic base which supports the concentration of jobs and earnings in this region.

Economic importance of export-producing industry is measured in several ways, including net exports and the employment and value added associated with these exports. By any measure of importance, manufacturing is a leading export-producing activity in the Metropolitan Region, as shown below:

Exporting Industry	Net Exports	Value Added	Employment
Construction	13%	8%	7%
Food prod. mfg.	8	5	3
Other mfg.	34	48	36
Transportation	11	12	14
Utilities	1	1	0
Trade	23	26	40
Total	100%	100%	100%

Food products manufacturing accounts for 20 percent of the net exports of manufacturing industry outputs but less than 20 percent of the corresponding value added and employment associated with these exports. Wholesale and retail trade, on the other hand, is an important source of "basic" jobs in the regional economy.

Export-producing industries are characterized by an above-average level of value added per worker. In 1971, average value added per worker in the seven-county Metropolitan Region was $13,962, but for exports the average value was $14,529. This difference is reduced with the aggregation of many individual industries into the 38 industry grups cited in this report. A more detailed industry breakdown would show an even larger difference between the value added per worker in the export-producing industries and all other industries in the region. This helps support a high level of value added per worker and high earnings per worker. This favorable trade-off, in value added terms, demonstrates the importance of interregional trade with both imports and exports contributing to a region's economic and social well-being.

Interindustry transactions for two industry clusters -- agriculture and food products manufacturing and machinery, except electrical, manufacturing -- were used to illustrate the importance both exports and imports in the industry clusters and the regional economy, as follows:

Sector	Agr. & Food Prod. Mfg.	Machinery, Exc. Elect.	Other Industry	All Industry
		(mil.dol.)		
Final sales:				
Local	477	56	6,841	7,374
RON	707	1,174	4,747	6,628
Total	1,184	1,230	11,588	14,002
Intermediate (industry) Purchases:				
Local	270	151	3,746	4,167
RON	555	138	3,482	4,173
Total	825	289	7,228	8,340
Final Purchases:				
Local	477	56	6,841	7,374
RON	280	111	1,322	1,713
Total	757	167	8,163	8,807
Gross Output	1,453	1,380	15,337	18,170

Exports of regional industry totaled $6.6 billion while imports from rest-of-Nation totaled $5.9 billion.

Exports and imports between local and rest-of-Nation differed between the two industries. The agriculture and food products manufacturing cluster was less export-dependent but more import-dependent than the machinery manufacturing cluster. The final demand sectors, however, were less import-dependent in agriculture and food products than machinery. Imports of agricultural and food products from rest-of-Nation exceeded their exports from the Metropolitan Region while the exports of machinery products greatly exceeded their imports from rest-of-Nation. For other industry, exports and imports were nearly equal. The machinery industry, as a net exporting industry, accounted for much of the region's positive trade balance in 1971.

Summary economic accounts for the Metropolitan Region show total industry sales to local final demand sectors of nearly $7.4 billion, while total industry purchases of primary inputs were over $9.8 billion, as follows:

Purchasing Sector	Local: Intermediate	Local: Primary	Imports from Rest of Nation	Total
	(mil. dol.)			
Local:				
Intermediate	4,167	9,830	4,173	18,170
Final, total	7,374	1,225	1,713	10,312
Household	5,489	0	1,395	6,884
Business	983	0	301	1,284
Government	902	1,225	0	2,144
Rest of Nation:				
Exports	6,628	0	0	6,628
Total	18,170	11,055	8,886	35,110

The summary data also show a government sector contribution to gross regional product of more than $1.2 billion. Thus, the economic activity which generated a gross regional product of $11.1 billion and a regional gross output of $18.2 billion, also resulted in $6.6 billion of exports to, and $5.9 billion of imports from, rest-of-Nation industries. Because of apparant underestimation of non-commodity producing industry output, actual gross regional product and regional gross output were larger than estimated and, hence, the positive trade balance also was larger than estimated.

ECONOMIC IMPORTANCE OF EXPORT-PRODUCING INDUSTRY IN MINNEAPOLIS-ST. PAUL METROPOLITAN REGION

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Export-producing industry is the community economic base. It brings "outside" dollars into a community which circulate among those businesses and sectors trading with one another. It also determines the economic character of a community as measured by its earnings per worker and income per capita.

Study region

The Minneapolis-St. Paul Metropolitan Region in this study is identical to the seven county (Anoka, Carver, Dakota, Hennepin, Ramsey, Scott and Washington) Metropolitan Council Region. About half of all Minnesotans live here and more than half -- 52.6 percent in 1975 -- work here (1,2). Total earnings of the employed region work force were $10.5 billion, or 59.5 percent of the State total, while the personal income of its resident population was $12.7, or 55.7 percent of the State total(3). The larger percentage for earnings in the region results, in part, from the earnings of commuters which are not included in the resident personal income.

Export-producing industries contribute not only to economic vitality and viability of the Minneapolis-St. Paul Region, but, also, to the Minnesota economy in its growth and development. Many of the Metropolitan Region exporting industries ship goods to markets outside Minnesota. Some of these industries, such as meat packing, acquire production inputs from the rest of the state for storage and processing here before shipment to national and world markets.

Study approach

The study focus on export-producing industry depends on the availability of industry data which show the portion of industry sales and purchases acquired locally and the portion acquired outside the region. The 1971 Metropolitan Council Input-Output Study meets this need by providing this data for 92 industries and six final demand sectors (Table 1).

Use of the 1971 industry data is confined largely to the preparation of a base year for the study of the economic growth and development of the seven-county region. Work in progress, if completed, would provide a 214-industry input-output table for 1972 and 1977 base years and subsequent forecast years. Until this work is completed, however, the 1971 industry data tables are the appropriate ones for use in this study.

The 95-industry listing in Table 1 conforms with the industry listing in the 1970 Minnesota input-output computer model used in recently completed study of the economic importance of the mineral industry in Minnesota (4). Industry comparisons can be made between the two data series for the two base years with the exception of the three industries which are combined with two other industries (i.e., No. 36 with No. 35 and Nos. 81 and 82 with No. 80). These comparisons must be left to the reader inasmuch as the currently active input-output models are based on 1972 and 1977, rather than the 1970, industry data.

Findings based on the 1971 Metropolitan Council input-output tables are presented under four major headings. First, 1971 and 1972 economic indicators -- population, employment and earnings -- for the seven-county area and the state are compared. Second,the 1971 interindustry transactions are presented in terms of both input purchases and output

Table 1. Minnesota Standard Industrial Classification System for Metropolitan Council Region (1971) and State (1972,1977) Comparisons: 95 Industry.

Industry No.	Industry Title	Metropolitan Council	MN 214-Ind.	Standard Industrial Classification System (1967 Edition)
1.	Live. & Livst. Prod.	1	1-4	013,014,019,02(exc.0254),pt.0729
2.	Crop Agr.	2	5-17	01
3.	For. & Fish Prod.	3	18	081-4,091,097
4.	Agr.,For.,Fish. Serv.	4	19	0254,07(exc.074),085,092
5.	Iron & Ferr. Mining	5	20	1011,106
6.	Nonfer. Ores Mining	6	21,22	102-105,108,109
7.	Coal Mining	7	23	11,12
8.	Crude Pet. & Nat. Gas	8	23	1311,1321
9.	Stone,Clay Min. & Qu.	9	24	141,142,144,145,148,149
10.	Chem. & Fert. Mineral Min.	10	26	147
11.	New Construction	11	27-32	138,pt.15,pt.16,pt.17,pt.6561
12.	Maint. & Repair Const.	12	33	pt.15,pt.16,pt.17
13.	Ordnance & Acces.	13	34,35	19
14.	Food & Kindred Prod.	14.1	40-47,55-58,64-70	20(exc.201,204,208)
15.	Meat Products	14.2	36-39	201
16.	Grain Mill Products	14.3	48-54	204
17.	Beverages	14.4	59-63	208
18.	Tobacco Manufacturers	15	71	21
19.	Broad & Narrow Fab.,Yarn	16	72,73	221-224,226,228
20.	Misc. Text. Goods & Floor	17	74,75	227,229
21.	Apparel	18	76	225,23(exc.239),3992
22.	Mis. Fab. Text. Prod.	19	77	239
23.	Lumber & Wood Prod., exc.	20	78-84	24(exc.244)
24.	Wooden Containers	21	85	244
25.	Household Furniture	22	86,87	251
26.	Other Furn. & Fixtures	23	88,89	25(exc.251)
27.	Paper & Allied Prod.	24	90-93	26(exc.265)
28.	Paperboard Containers & Box.	25	94	265
29.	Printing & Pub.	26.1	95	27(exc.2751,2752)
30.	Commercial Printing	26.2	96,97	2751,2752
31.	Chem. & Sel. Chemical Prod.	27	98-100	281(exc.2819),286,287,289
32.	Plastics & Syn. Materials	28	101,102	292
33.	Drugs, Clean. & Toilet Prep.	29	103,104	283,284
34.	Paints & Allied Products	30	105	285
35.	Petroleum Refining	pt.31	106	291,299
36.	Petr.& Related Ind.	pt.31	107	295
37.	Rubber & Misc. Plastics	32	108-110	30
38.	Leather Tan. & Ind. Leather	33	111	311,312
39.	Footwear & Other Lea. Prod.	34	112	31(exc.331,312)
40.	Glass & Glass Products	35	113	321,322,325
41.	Stone & Clay Products	36	114-120	324-329
42.	Primary Iron & Steel Manuf.	37	121,122	331,332,3391,3399
43.	Primary Nonfer. Metals Man.	38	123-125	28195,33,334-336,3392
44.	Metal Containers	39	126	3411,3491
45.	Heating,Plumb. & Fab. Struc.	40	127,128	343,344
46.	Screw Mach. Products	41	129-131	345,346
47.	Other Feb. Metal Prod.	42	132	342,347-349(exc.3491)
48.	Engines & Turbines	43	133	351
49.	Farm Mach. & Equip.	44	134	352
50.	Cons.,Mining,Oil Field Mach.	45	135	3531,3532,3533
51.	Materials Handling Mach.	46	136	3534-3537
52.	Metalworking Mach & Equip.	47	137	354

Industry No.	Industry Title	Metro-politan Council	MN 214-Ind.	Standard Industrial Classification System (1967 Edition)
53.	Special Ind. Mach. & Equ.	48	138	355
54.	General Ind. Mach. & Equ.	49	139	356
55.	Machine Shop Products	50	140	359
56.	Office & Acct. Mach.	51.1	142,143	357(exc.3571)
57.	Computing & Related Mach.	51.2	141	3571
58.	Service Indus. Machinery	52	145,146	358
59.	Elec. Trans. & Dis. Equip.	53	147	361,362
60.	Household Appliances	54	148	363
61.	Elec. Lighting & Wiring	55	149-151	364
62.	Radio,TV & Comm. Equip.	56	152-154	365,366
63.	Electronic Components & Acc.	57	155	367
64.	Misc. Elec. Mach.,Equip.	58	156	369
65.	Motor Vehicles & Equip.	59	157	371
66.	Aircraft & Parts	60	158-161	372
67.	Other Transportation Equip.	61	162	373-375,379
68.	Prof.,Sci. & Con. Inst.	62.1	168-170	3821,3822,3841,3842,3843,387
69.	Engineering & Sci. Ins.	62.2	172-174	3811
70.	Optical,Opth. & Photo. Eq.	63	178,179-181	383,385,386
71.	Misc. Manufacturing	64	175	39(exc.3992)
72.	Trans.,exc.Rail,Air,High.	65.1	176	44,46,47(exc.473,474)
73.	Railroads & Rel. Serv.	65.2	177	40,474
74.	Local,Surb. & Inter. Pass.	65.3	179	41
75.	Motor Freight Trans. & Wrhs	65.4	182	42,473
76.	Air Transportation	65.5	179	45
77.	Comm.,exc.Radio & TV Broad.	66	182	481,492,489
78.	Radio & TV Broadcasting	67	183	483
79.	Electric Utilities	pt.68	184	pt.491,pt.493
80.	Gas Utilities	pt.68	185	492,pt.493
81.	Water & Sanitary Serv.	pt.68	186	494-497,pt.493
82.	Wholesale Trade	69.1	187	50(exc.Manuf. Sales Offices)
83.	Retail Trade	69.2	188,200	52-59,7396
84.	Finance & Insurance	70	189-191	60-64,67
85.	Real Estate & Rental	71	192,193	65(exc.pt.6561),66
86.	Hotels & Lodg. Places	72	194-196	70,72,76*exc.7694 & pt.7699)
87.	Business Services	73	197-199	73(exc.7396),7694,pt.7699,81, 89(exc.8921)
88.	Automobile Repair & Serv.	75	201	75
89.	Amusements	76	202,203	78,79
90.	Med.,Ed. Serv.,& Non. Or.	77	204-209	0722,80,82,84,86,8921
91.	Federal Govt. Enterprises	78	210,211	---
92.	State & Local Gov. Enter.	79	212,213	---
93.	Business Traver, Enter.	81	---	---
94.	Office Supplier	82	---	---
95.	Scrap, Used & Second	83	214	---
96.	Subtotal	1-83	1-214	---

Columns:

97. Personal Consumption Expenditures
98. Gross Private Capital Formation
99. Change in Business Inventory
100. Exports to Rest of Nation
101. Federal Government Purchases
102. State & Local Government Purchases
103. Gross Output

Rows:

97. Household
98. Imports
99. Value Added
100. Gross Outlay

disbursements. Third, interregional trade and import dependence of the Metropolitan Region economy are discussed. Finally, economic impacts of regional export-producing industries are identified and assessed.

Economic Development Indicators

Employment

Employment, earnings, income and population are the principal economic indicators for comparing the Minneapolis-St. Paul Metropolitan Region with the State for the two base years, 1971 and 1972. The first of these indicators -- employment -- provides an initial measure of differentiation between the Region and the State. More than half of the State's work force in each of the industries listed in Table 2 is employed in the Metropolitan Region except for the industries directly related to agriculture, mining and timber production and, also, state and local government and military.

Industry employment increased from the recession year 1971 to 1972 in both the Region and the rest-of-State, with the larger increase in the rest-of-State. Thus, the Region share of total Minnesota employment declined slightly in several industries while overall employment rose.

Earnings and income

Total earnings of the employed workforce in the Metropolitan Area are generally higher relative to the State totals than total employment. As shown in Table 3, more than half of total industry earnings were reported for the employed work force in the Metropolitan Region in each of the 11 major industry groups, except agriculture, mining and military.

Personal contributions and residence adjustment (for commuting) reduce total earnings for the resident employed work force. Thus, the

Table 2. Total employed workforce in specified industry and total population, Metropolitan Council Region andMinnesota, 1971 and 1972. 1/

Industry	Metro Region I-O No.	Metropolitan Region		Minnesota		Metro Reg. as Prop. of Minn.	
		1971	1972	1971	1972	1971	1972
		(thou.)	(thou.)	(thou.)	(thou.)	(pct.)	(pct.)
Agr.,For.,Fish.	1-4	10.0	9.9	153.7	151.9	7	7
Mining	5-10	1.7	2.0	15.5	14.7	11	14
Construction	11,12	41.4	41.2	70.8	73.4	58	56
Manufacturing, Total	13-71	206.7	213.7	332.4	344.0	62	62
Food Prod.	14-17	20.9	21.6	50.3	52.1	42	41
Textile Prod.	19,20	1.4	1.4	2.7	2.8	52	50
Apparel	21,22	4.1	4.2	8.8	9.1	46	46
Lumber, Furn.	23-26	3.6	3.8	11.9	12.3	30	31
Paper Prod.	27,28	17.1	17.5	25.8	26.7	66	64
Printing & Pub.	29,30	24.2	25.0	33.8	35.0	72	71
Chemicals	31-34	7.0	7.2	8.8	9.1	80	79
Petroleum Ref.	35,36	1.5	1.6	2.2	2.3	68	70
Primary Metals	42,43	4.2	4.4	8.5	8.8	49	50
Fabricated Metals	44-47	21.5	22.3	30.1	31.1	71	72
Mach.,exc. Electr.	48-58	51.2	53.1	69.5	71.9	74	74
Electrical Mach.	59-64	16.4	16.9	23.8	24.6	70	70
Motor Vehicles	65	3.8	4.0	5.1	5.2	75	76
Trans.,exc. Motor	66	3.9	4.1	8.5	8.8	46	47
Misc. Manuf.	13,14, 37-41, 67,71	25.7	26.7	42.7	44.2	70	60
Trans.,Comm.,Util.	72-81	62.5	62.9	92.5	96.0	68	66
Trade	82,83	217.1	221.9	353.4	375.1	61	59
Fin.,Ins.,Real Est.	84,85	54.9	56.7	73.6	77.3	75	73
Services	86-90	158.0	170.9	272.7	304.4	58	56
Government, Total	---	127.4	131.1	257.1	260.8	50	50
Fed. Civilian	91,other	19.3	18.9	30.9	30.3	62	62
State & Local	92,other	106.8	111.1	222.5	227.4	48	49
Military	---	1.3	1.1	3.7	3.0	35	37
Total Workforce	---	879.7	910.3	1,621.7	1,697.6	54	54
Total Population	---	1,891.1	1,891.6	3,854.0	3,876.1	49	49

1/ Based on unpublished data from U.S. Department of Commerce, Regional Economic Information System, 1977.

Table 3. Total earnings of employed workforce in specified industry, Metropolitan Council Region and Minnesota, 1971 and 1972. 1/

Industry	Metropolitan Region		Minnesota		Metro Reg. as Prop. of Minn.	
	1971	1972	1971	1972	1971	1972
	(mil.$)	(mil.$)	(mil.$)	(mil.$)	(pct.)	(pct.)
Agr., For., Fish.	41.8	43.4	806.1	979.0	5.2	4.3
Mining	14.2	16.3	147.9	155.2	9.6	10.5
Construction	572.3	552.8	871.5	859.1	65.7	64.3
Manufacturing	2,072.5	2,299.7	2,952.0	3,257.7	70.2	70.6
Tran.,Comm.,Util.	691.3	751.0	919.7	1,026.8	75.2	73.1
Trade	1,585,7	1,627.0	2,320.8	2,410.2	68.3	67.5
Fin.,Ins.,Real Est.	518.9	549.9	647.1	689.8	80.2	79.7
Services	1,150.1	1,197.5	1,730.2	1,853.2	66.5	64.6
Government, Total	1,058.7	1,182.4	1,895.9	2,108.6	55.8	56.1
Fed. Civilian	198.2	210.5	314.3	335.5	63.1	62.7
State & Local	826.8	936.9	1,500.5	1,690.2	55.1	55.4
Military	33.6	35.0	81.1	82.6	41.4	42.4
Total Earnings	7,705.4	8,220.8	12,297.1	13,339.4	62.7	61.6
Less: Personal Contr.	377.3	413.4	564.2	625.9	66.9	66.0
Met Earnings, By Work	7,328.1	7,807.4	11,691.1	12,713.5	62.5	61.4
Plus: Residence Adj.	-257.3	-282.4	-41.9	-40.8	----	----
Net Earnings, By Res.	7,070.8	7,525,0	11,691.1	12,672.7	60.5	59.4
Plus: Transfer Pay.	1,261.6	1,327.2	2,247.9	2,330.8	56.1	56.7
Plus: Property Inc.	771.0	836.2	1,625.1	1,771.1	47.4	47.2
Total Personal Income	9,103.4	9,683.3	15,564.1	16,774.6	58.5	57.7

1/ Based on unpublished data from U.S. Department of Commerce, Regional Economic Information System, 1977.

net earnings of the Metropolitan Region work force were approximately 60 percent of the State totals. Proportionately lower transfer payments and property income further reduced this percentage for the Metropolitan Region resident population.

The higher earnings per worker in the Metropolitan Region than the State as a whole is documented in Table 4. Only in agriculture and mining were earnings lower than the industry average in the Metropolitan Region. The overall average for the Metropolitan Region was even higher than the corresponding industry averages because of its disproportionate share of employment in high earnings industries.

Gross regional product

Gross regional product is presented as a summary statistic of overall economic well-being. This statistic includes income payments to primary economic units -- household, business and government. It represents, also, the final product of the region, adjusted for imports. According to the 1971 Metropolitan Council input-output tables, the gross regional product was slightly more than $11 billion.[1/]

Sales to, and purchases from, local and rest-of-nation industries and sectors are summarized for each of the principal economic accounts, i.e., production (business), consumption (household and government), capital accumulation, and rest-of-world, in Table 5. The production account shows the intermediate, i.e., local inter-industry, sales (column) and purchases (row). Local industry produced an intermediate product of nearly $4.2 billion and a final product of nearly $7.4 billion while exports totaled $6.6. Personal consumption and government expenditures

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1/ As shown later, this figure probably underestimates the actual gross regional product by as much as 12 percent (see, p.28).

Table 4. Earnings per worker in specified industry, Metropolitan Region and Minnesota, 1971.

Industry	Metropolitan Region	Minnesota	Metropolitan Region as Proportion of Minnesota
	(dol.)	(dol.)	(pct.)
Agr., For., Fish.	4,180	5,245	80
Mining	8,353	9,542	88
Construction	13,824	12,309	112
Manufacturing	10,027	8,881	113
Tran., Comm., Util.	11,061	9,943	111
Trade	7,304	6,567	111
Fin., Ins., Real Est.	9,452	8,792	108
Services	7,279	6,345	115
Government, Total	8,310	7,374	113
Fed. Civilian	10,269	10,172	101
State & Local	7,742	6,744	115
Military	25,846 1/	21,919 1/	118
Average	8,759	7,583	116

1/ Including income payments to related personnel.

Table 5. Summary income and product accounts, Metropolitan Council Region, 1971.

Purchasing Sectors	Local Inter-mediate	Local Primary	Imports from Rest of Nation	Total
		($1,000)		
Local:				
Intermediate	4,167,073	9,829,258 1/	4,173,274	18,169,605
Final, total	7,374,319	1,225,416	1,712,600	10,312,335
Personal consumption expenditures	5,489,499	0	1,394,643	6,884,142
Gross private fixed investment	982,631	0	301,340	1,283,971
Federal government purchases	135,124	268,416 2/	16,617	420,167
State and local government	767,065	957,000 2/	0	1,724,065
Rest of Nation:				
Exports	6,628,213	0	0	6,628,213
Total	18,169,605	11,054,674	5,885,874	35,110,153

1/ Including purchases of $4,766,000 (Ind. No. 42) from household industry in rest of nation and net reduction in imports of $2,464,000 (Ind. Nos. 21, 25, 50 and 71).

2/ Estimated gross regional product originating in government sector, less value added by government enterprises.

were, respectively $6.9 billion and $2.1 billion while private investment was nearly $1.3 billion. The total final product was less than the gross regional product because of an excess (of $0.7 billion) in exports over imports.

Because the 1971 Metropolitan Region input-output tables include producing industries exclusive of the government sector, the value added by these industries (of $9.8 billion) is less than the regional gross product. The additional value added by government, which has not been accounted for in the input-output tables, must be included in the regional income and product accounts.

Interindustry and Intersectoral Transactions

Interindustry transactions refer to the sales and purchases among the 92 industries represented in the Metropolitan Council Input-Output Study. Intersectoral transactions refer to the sales of final product and purchases of primary inputs from the principal economic units -- household, business and government. For ease of presentation, the 92 industries are now reduced to 38 industries, as shown in Table 6. The 38 industries include the three agricultural and the four food products manufacturing industries listed in Table 1. The two-digit Standard Industrial Classification (SIC) code was used in grouping the remaining manufacturing industries, while trade and service industries were more broadly aggregated.[2/]

Input purchases

Input purchases of the 38 industries are summarized in Table 7.

2/ A 92 industry listing of interindustry and intersectoral transactions is presented in Appendix Table A.1.

Table 6. Minnesota Standard Industrial Classification System for Metropolitan Council Region and State Comparisons.

Industry No.	Industry Title	Metro Council I-O	Minn. 214-Ind. (A)	Standard Industrial Classification System (1972 Edition)
1.	Livestock Prod.	1	1-4	02
2.	Crop Agr.	2	5-17	01
3.	Forestry,Fish.,Ag.Serv.	3,4	18,19	07,08,09
4.	Mining	5-10	20-26	10-14
5.	Construction	11,12	27-32	15-17
6.	Ordnance	13	34,35	348,3761,3975
7.	Meat Products	15	36-39	201
8.	Grain Mill Prod.	16	48-54	204
9.	Beverages	17	59-63	208
10.	Other Food Prod., Tob.	14,18	40-47, 55-58, 64-71	202,203,205-207,209
11.	Textile Prod.	19,20	72-75	22
12.	Apparel	21,22	76,77	23
13.	Lumber & Wood Prod.	23,24	78-85	24
14.	Furniture	25,26	86-89	25
15.	Paper & Allied	27,28	90-94	26
16.	Printing & Publ.	29,30	95-97	27
17.	Chem. & Allied	31-34	98-105	28(exc.28195)
18.	Petro. Refining	35,36	106,107	29
19.	Rubber & Misc.	37	108-110	30
20.	Leather Prod.	38,39	111,112	31
21.	Glass,Stone,Clay	40,41	113-120	32
22.	Primary Metals	42,43	121-125	33,3463,3463,28195
23.	Fabricated Metals	44-47	126-132	34(exc.3462,3463)
24.	Machinery	48-58	133-144	35
25.	Electrical Mach.	59-64	145-155	36
26.	Transportation Eq.	65-67	156-161	37
27.	Eng.,Scient. Instr.	68,69	162-171	38
28.	Misc. Mfg.	70,71	172-174	39
29.	Transportation	72-76	175-181	40-42,44-47
30.	Communication	77,78	182,183	48
31.	Elec.,Gas, Water Util.	79-81	184-186	49
32.	Wholesale Trade	82	187,200	50,51
33.	Retail Trade	83	188	52-59,7396
34.	Fin.,Ins., Real Estate	84,85	189-193	60-67
35.	Hotels, Pers. Bus. Serv.	86-89	194-199, 201-203	70,72,73,75,76,78,79
36.	Prof. Services	90	204-209	0722,80,82,84,86,8921
37.	Govern. Enterprise	91,92	210-213	---
38.	Scrap, Used & Second	93-95	214	---
39.	Total	1-95	1-214	---

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TABLE 7. OUTPUT DISBURSEMENTS AND INPUT PURCHASES OF SPECIFIED INDUSTRY, METRO, 1971.

INDUSTRY NO. TITLE	INPUT PURCHASES: GROSS OUTPUT ($1000)	INPUT PURCHASES: INTERMEDIATE ($1000)	INPUT PURCHASES: VALUE ADDED ($1000)	INPUT PURCHASES: TOTAL IMPORTS ($1000)	OUTPUT DISBURSEMENTS: INTERMEDIATE DEMAND ($1000)	OUTPUT DISBURSEMENTS: FINAL DEMAND ($1000)	EXPORTS: ALLOCATED U.S. NET ($1000)	EXPORTS: RON ($1000)	EXPORTS: TOTAL ($1000)
1LIVESTOCK	78849.	14282.	21531.	43036.	35245.	13608.	0	29996.	29996.
2CROP AGR.	52690.	10950.	29257.	12483.	49362.	3328.	0	0	0
3FOR.,FISH.	1188.	432.	410.	346.	386.	802.	0	0	0
4MINING	14558.	3072.	8073.	3413.	14899.	-341.	0	0	0
5CONSTRUCTI	2062815.	902881.	698339.	461595.	134413.	1392110.	0	536292.	536292.
6ORDNANCE	329162.	55217.	195029.	78916.	1408.	5382.	0	322372.	322372.
7MEAT PRODU	425900.	93825.	79007.	253068.	69777.	153890.	0	202233.	202233.
8GRAIN MILL	118408.	22939.	30697.	64772.	32359.	21210.	0	64839.	64839.
9BEVERAGES	262971.	57156.	111100.	94715.	23070.	24885.	0	215016.	215016.
10OTHER FOOD	513262.	74950.	165816.	272496.	59011.	259003.	0	195248.	195248.
11TEXTILE PR	6061.	2194.	2258.	1609.	3698.	2363.	0	0	0
12APPAREL	57159.	3922.	27774.	25463.	9486.	7315.	0	40358.	40358.
13LUMBER & W	95717.	8087.	39413.	48217.	91508.	4209.	0	0	0
14FURNITURE	29595.	7795.	15464.	6336.	20863.	4732.	0	4000.	4000.
15PAPER & AL	389021.	79910.	155483.	153628.	127987.	3402.	0	257632.	257632.
16PRINTING &	464100.	60203.	315943.	87954.	237153.	33733.	0	193214.	193214.
17CHEM.& ALL	352282.	19567.	223088.	109627.	80079.	6330.	0	265873.	265873.
18PETRO.REFI	249224.	44070.	40090.	165064.	131783.	74000.	0	43441.	43441.
19RUBBER & M	111240.	3672.	68960.	38608.	50876.	12699.	0	47665.	47665.
20LEATHER PR	14435.	5476.	6730.	2229.	3537.	380.	0	10518.	10518.
21GLASS,STON	107258.	20038.	51234.	35986.	100352.	2706.	0	4200.	4200.
22PRIMARY ME	96700.	16585.	60200.	15149.	82893.	724.	0	13083.	13083.
23FABRICATED	406775.	63763.	206136.	136876.	294753.	6921.	0	105101.	105101.
24MACHINERY	1378468.	203054.	907538.	267876.	151129.	53709.	0	1173630.	1173630.
25ELECTRICAL	410380.	61433.	234504.	114443.	97931.	14063.	0	298386.	298386.
26TRANSP.EQU	416938.	141365.	125301.	150272.	92185.	34554.	0	290199.	290199.
27ENG.,SCIEN	177018.	32376.	101874.	42768.	19637.	5224.	0	152157.	152157.
28MISC.MFG.	136347.	24295.	82638.	29414.	63900.	11312.	0	61135.	61135.
29TRANSPORTA	792643.	198690.	458898.	135055.	29416.	174821.	0	588406.	588406.
30COMMUNICAT	253952.	24265.	206313.	23374.	144699.	109253.	0	0	0
31ELEC.,GAS,	612478.	50855.	286341.	275282.	119455.	404602.	0	88421.	88421.
32WHOLESALE	1443678.	436933.	686960.	319785.	373619.	592059.	0	478000.	478000.
33RETAIL TRA	1503279.	192709.	1176142.	134428.	72917.	1038653.	0	391709.	391709.
34FIN.,INS.,	2828539.	476922.	2020321.	331296.	403546.	2117513.	0	307480.	307480.
35HOTELS,PER	1535752.	539915.	790699.	205138.	701653.	589196.	0	244903.	244903.
36PROF.SERVI	93511.	15156.	74865.	3490.	14363.	75442.	0	2706.	2706.
37GOV'T ENTE	177509.	31424.	117018.	29067.	61031.	115478.	0	0	0
38SCRAP,USED	166695.	166695.	0	0	166694.	1.	0	0	0
39TOTAL	18166557.	4167073.	9821444.	4173274.	4167073.	7371271.	0	6628213.	6628213.

Intermediate purchases are the inputs acquired from local industries. Inputs acquired from industries outside the Region are listed under imports. Total intermediate input purchases were split about evenly between local and non-local industries.

Income payments to resource owners for primary inputs are equivalent to the value added by productive activity in the Region. These income payments totaled more than $9.8 billion in 1972 (as noted earlier in Table 4). They accounted for 54 percent of total outlays of the 38 producing industries.

Among the major industry groups, manufacturing accounts for almost one-third of total value added. The next largest group is finance, insurance and real estate, which accounts for slightly more than 20 percent of the total . Retail and wholesale trade is a close third, and agriculture and food products manufacturing account for less than five percent of the total. These and the remaining percentages for the eight industry groups are listed as follows:

Industry	Proportion of Total
Agr., for., fish.	0.5%
Mining	0.0
Construction	7.1
Food prod. mfg.	3.9
Other mfg.	29.2
Tran., comm., util.	9.7
Trade	19.0
Fin., ins., real est.	20.6
Services	10.0
Total	100.0%

Thus, the four commodity-producing industry groups (i.e., agriculture, mining, construction and manufacturing) accounted for slightly more than 40 percent of the value added in the Metropolitan Region while the four non-commodity producing industries accounted for nearly 60 percent of the total.

Output disbursements

Output disbursements of the 38 industries in Table 7 are differentiated by type of purchase (i.e., intermediate or final) and by location of purchaser (i.e., local or export). Total disbursement of outputs for intermediate use differ from total purchases of inputs for intermediate use, industry by industry. Input purchases and output purchases are in balance only in the aggregate.

Total exports represent the exports of the individual industries which make up the 92 industry groups listed in Table 1 and which are further aggregated into the 39 industry groups listed in Table 6. Thus, exports may be listed for a given industry even though, in balance, imports of the given industry output may exceed its exports.

Each industry has a unique export-import balance. The livestock industry, for example, imports more than it exports while the food products manufacturing industry exports more than it imports. For the combined agricultural-food products manufacturing industry groups, imports (of $740,916,000) exceed exports (of $707,332,000) by $33,584,000. For all Metropolitan Region industry, however, exports (of $6,628,213,000) exceed imports of intermediate inputs (of $4,173,274,000) and, also, total imports (of $5,885,874,000), as shown in Table 5.

Interregional Trade

Trade with the rest of Nation is important to the Minneapolis-St. Paul Metropolitan Region economy in two important dimensions. First, exports to the rest-of-Nation account for income payments to local producers from rest of Nation purchases which are equivalent to approximately one-third of the total value of locally-produced goods and services. These income payments, in turn, provide the "basic" dollars which circulate in the local economy and which are available to purchase goods and services from rest-of-Nation producers. Second, imports from rest-of-Nation producers make possible an exchange of low-value for high-value goods and services. This exchange contributes to the above-average income levels of Metropolitan Region residents.

Excess Supply

Exports to rest-of-Nation markets are represented by the excess supply of industry gross output, as shown in Table 8. Excess supply is the excess of gross output over total requirements of a given industry output. It denotes the value of the outshipments of locally-produced goods and services.

An excess supply of output is indicated for almost every industry in Table 7. This occurs because of the aggregation of many individual industry groups into fewer industry groups, first, to the 92 industry groups listed in Table 1 and, finally, to the 38 industry groups listed in Table 6. This aggregation, however, does not change the value of all industry output, nor the total value added by the primary inputs.

A net excess supply exists for an industry when excess supply exceeds deficit supply for a given industry. In the 38-industry breakdown in Table 8, excess supply is greater than the deficit supply (i.e., imports of the given industry output) in 14 industry groups. In the 92-industry breakdown (Appendix Table A.2), excess supply is greater than deficit supply in 32 industry groups. Aggregation thus reduces the percentage of all industry groups with net exports to rest-of-Nation

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TABLE 8. GROSS OUTPUT, TOTAL REQUIREMENTS, AND EXCESS AND DEFICIT SUPPLY OF SPECIFIED INDUSTRY OUTPUT, METRO, 1971.

INDUSTRY NO.	INDUSTRY TITLE	EMPLOYMENT	GROSS OUTPUT	TOTAL REQUIREMENT 1	EXCESS SUPPLY 2 TOTAL	EXCESS SUPPLY PROPORTION OF GROSS OUTPUT	DEFICIT SUPPLY 3 TOTAL	DEFICIT SUPPLY PROPORTION OF TOTAL REQUIREMENT	OUTPUT DEMAND MULTIPLIER 4/
		(NO.)	(THOUS. DOL.)	(THOUS. DOL.)	(THOUS. DOL.)	(PCT.)	(THOUS. DOL.)	(PCT.)	
1	LIVESTOCK	2367	78849.	171235.	29996.	38.042	122382.	71.470	1.532
2	CROP AGR.	1502	52690.	415099.	0	0	362409.	87.307	1.395
3	FOR.,FISH.	401	1188.	18813.	0	0	17625.	93.685	1.399
4	MINING	451	14558.	405682.	0	0	391124.	96.411	1.451
5	CONSTRUCTI	41296	2062815.	1562294.	536292.	25.998	35771.	2.290	1.612
6	ORDNANCE	10555	329162.	7330.	322372.	97.937	540.	7.367	1.303
7	MEAT PRODU	6014	425900.	263069.	202233.	47.484	39402.	14.978	1.391
8	GRAIN MILL	1621	118408.	105777.	64839.	54.759	52208.	49.357	1.734
9	BEVERAGES	4072	262971.	139800.	215016.	81.764	91845.	65.697	1.478
10	OTHER FOOD	10878	513262.	624708.	195248.	38.041	306694.	49.094	1.649
11	TEXTILE PR	282	6061.	82182.	0	0	76121.	92.625	1,260
12	APPAREL	4438	57159.	290518.	40358.	70.607	273717.	94.217	1.176
13	LUMBER & W	2983	95717.	181342.	0	0	85625.	47.217	1.469
14	FURNITURE	1782	29595.	181672.	4000.	13.516	156077.	85.911	1.325
15	PAPER & AL	21660	389021.	265710.	257632.	66.226	134321.	50.552	1.413
16	PRINTING &	17392	464100.	292986.	193214.	41.632	22100.	7.543	1.311
17	CHEM.& ALL	5138	352282.	360712.	265873.	75.472	274303.	76.045	1.275
18	PETRO.REFI	1861	249224.	296885.	43441.	17.431	91102.	30.686	1.296
19	RUBBER & M	3739	111240.	171333.	47665.	42.849	107758.	62.894	1.145
20	LEATHER PR	926	14435.	50999.	10518.	72.865	47082.	92.319	1.390
21	GLASS,STON	2583	107258.	279345.	4200.	3.916	176287.	63.107	1.316
22.	PRIMARY ME	3329	96700.	379444.	13083.	13.529	295827.	77.963	1.246
23	FABRICATED	14118	406775.	578101.	105101.	25.838	276427.	47.816	1.310
24	MACHINERY	40160	1378468.	454192.	1173630.	85.140	249354.	54.901	1.249
25	ELECTRICAL	24019	410380.	595530.	298386.	72.710	483536.	81.194	1.283
26	TRANSP.EQU	5035	416938.	566950.	290199.	69.602	440211.	77.645	1.432
27	ENG.,SCIEN	9371	177018.	61440.	152157.	85.956	36579.	59.536	1.275
28	MISC.MFG.	4391	136347.	173586.	61135.	44.838	98374.	56.672	1.329
29	TRANSPORTA	38339	792643.	375169.	588406.	74.233	170932.	45.561	1.339
30	COMMUNICAT	10494	253952.	310193.	0	0	56241.	18.131	1.182
31	ELEC.,GAS,	6937	612478.	585444.	88421.	14.437	61387.	10.486	1.208
32	WHOLESALE	60663	1443676.	966410.	478000.	33.110	732.	.076	1.578
33	RETAIL TRA	143463	1503279.	1111570.	391709.	26.057	0	0	1.234
34	FIN.,INS.,	50007	2828539.	2879951.	307480.	10.871	358892.	12.462	1.476
35	HOTELS,PER	71175	1535752.	1673639.	244903.	15.947	382790.	22.872	1.550
36	PROF.SERVI	80707	93511.	93201.	2706.	2.894	2396.	2.571	1.584
37	GOV'T ENTE	115339 5/	177509.	177509.	0	0	0	0	1.322
38	SCRAP,USED	5548 6/	166695.	274398.	0	0	107703.	39.251	1.968
39	TOTAL	815910	18166557.	17424218.	6628213.	36.486	5885874.	33.780	-----

1/ Gross output less export to Rest of Nation.

2/ Rest of Nation industry net purchases of specified Minn. industry* output.

3/ Metro industry net purchases of specified Rest of Nation *industry output.

4/ Adjusted for imports from Region 7W.

5/ Total state, local and federal government employment.

6/ Household workers.

intermediate and final markets. Aggregation, of course, combines individual industries with excess supply and deficit supply balances without reducing the excess supply and deficit supply totals.

Deficit supply

A deficit supply denotes a deficit of local industry output relative to total requirements. This deficit is equivalent to the value of imports from a specified rest-of-Nation industry. This differs, of course, from the value of imports of a specified Metropolitan Region industry (as shown in Table 7), which refers to given industry purchases from rest-of-Nation. Deficit supply refers to a given rest-of-Nation industry disbursement to all Metropolitan Region industries and final demand sectors.

Total deficit supply in Table 8 is greater than total imports in Table 7 by the amount of rest-of-Nation industry output disbursements to Metropolitan Region final demand sectors. This amount ($1,712,600,000 in 1971) is listed in Table 5. The deficit supply estimates thus show the level of particular industry outputs from the rest-of-Nation which are acquired by local industry. The individual industries from which the imports are acquired have been combined with individual export-producing (i.e., excess supply) industries, as noted earlier. Thus, for a given industry group -- in either the 92-industry or the 38-industry groupings -- both an excess supply and a deficit supply is usually indicated,

Output demand multipliers and total industry employment are included, also, in Table 8. The output demand multipliers correlate with the relative levels of local industry purchases -- the higher the proportion of locally-produced inputs, the higher the demand multiplier. Employment, on the other hand, correlates with the level of industry output, given the industry output per worker.

Output per worker varies widely among industries, especially between the commodity-producing industries (i.e., agriculture, forestry, fisheries; mining; construction; and manufacturing) and the non-commodity-producing industries (i.e., transportation, communication, utilities; trade; finance, insurance, real estate; services; and government). For the commodity-producing industries, the producer value of material input is included in the value of gross output. For the non-commodity-producing industries, the invoice cost of resale items are excluded. Thus, for the trade sector, only the gross trade margins, rather than the retail value of goods sold, is indicated in the input-output tables. However, the value of energy inputs in the utilities sector is included in the value of gross output.

Economic Impact Analysis

The Metropolitan Council Region input-output tables provide a basic data source for economic impact analysis. In this report, the export-producing industries are identified as the principal determinants of potential growth and development of the regional economy.

Export-producing industry

Alternate estimates of the importance of export-producing industry to the Metropolitan Region economy are presented in Table 9. Economic importance is represented here in terms of total economic impact as measured by the value of exports to rest-of-Nation markets.

To simplify this presentation, export-producing industries with a positive net export (i.e., excess supply greater than deficit supply) were identified as the basic industries of the Metropolitan Region.

Table 9. Alternate estimates of export-producing industry, Metropolitan Council Region, 1971.

No.	Title	Net Exports: Total (mil.dol.)	Net Exports: Proportion of Total (pct.)	Value Added: Total (mil.dol.)	Value Added: Proportion of Total (pct.)	Employment: Total (thou.)	Employment: Proportion of Total (pct.)
5.	Construction	500.5	13.3	169.4	8.2	10.0	7.0
6.	Ordnance	321.8	8.5	190.7	9.2	10.3	7.2
7.	Meat Prod.	162.8	4.3	30.2	1.5	2.3	1.6
8.	Grain Mill.	12.6	0.3	3.3	0.2	0.2	0.1
9.	Beverages	123.2	3.3	52.2	2.5	1.9	1.3
15.	Paper & Allied	123.3	3.3	48.3	2.4	0.7	0.5
16.	Printing & Pub.	171.1	4.5	116.5	5.6	6.4	4.4
24.	Machinery	924.5	24.5	608.5	29.3	26.9	18.9
27.	Eng., Scient.	115.6	3.1	66.5	3.2	6.1	4.3
29.	Transportation	417.5	11.1	241.7	11.6	20.2	14.1
31.	Utilities	27.0	0.7	12.6	0.6	0.3	0.2
32.	Wholesale	477.3	12.7	227.1	10.9	20.1	14.0
33.	Retail Trade	391.7	10.4	306.5	14.8	37.4	26.2
36.	Prof. Services	0.3	0.0	0.2	0.0	0.0	0.0
	Total	3,769.1	100.0	2,074.7	100.0	142.8	100.0

This does not preclude the listing of all industries in the excess supply column in Table 8 (or Table A.2) as contributing to the economic base. Rather, a positive trade balance for the individual industry in a given industry group was cancelled by a larger negative trade balance by another industry in the same industry group. Only those industry groups with a positive trade balance would be included, therefore, in the summary listing.

According to the net trade balances listed in Table 9, the machinery, except electrical, industry accounted for the largest share -- 24.5 percent -- of the net exports. Food products manufacturing accounted for 7.9 percent of the total. All manufacturing industry accounted for 51.8 percent of the total trade balance. Next largest industry group was construction, with 13.3 percent of the total, and wholesale and retail trade, with 12.7 percent and 10.4 percent of the total, respectively.

When employment and value added measures associated with the production of the positive trade balances are used to determine the economic importance of each export-producing industry, a somewhat different ranking of industries can be derived. The non-commodity-producing sectors increase in importance while the commodity-producing sectors decline in importance. The commodity-producing sectors are important in acquiring the "first", or "basic", dollar for the regional economy, while the non-commodity-producing sectors are sepecially important in creating the "basic" jobs for the regional work force.

A second measure of the economic importance of export-producing industries in the Metropolitan Region economy is its level of trade with the rest-of-Nation. For the Minneapolis-St. Paul Metropolitan Region, a high level of trade makes possible a higher level of earnings per person. Compare, for example, the 1971 value added per worker in the Metropolitan Region of $13,962 with the value added per worker for the Region's exports and the value added per worker of the remaining industry output which is supplemented by imports from corresponding rest-of-Nation industries. The derived value added per worker for the 1971 exports is $14,529, while the derived value per worker for the non-export industry output is $13,816 -- a difference of $713. This difference would be larger if individual industry exports were compared with individual industry imports.

Import substitution

To the extent that import substitution occurs in the high, rather than low, value added industries, this strategy offers an alternative, or, perhaps, complementary, approach to the economic growth and development of the Metropolitan Region. Import substitution among the low value added industries, while not increasing earnings, or gross regional product per worker, may create additional jobs in occupational groups with above-average unemployment. The broadening of the range of occupational choice thus would reduce total social costs without necessarily increasing average earnings per worker in the Metropolitan Region.

Opportunities for import substitution are indicated, in part, in the import matrix of the 92-industry input-output table. Imports of intermediate inputs from rest-of-Nation industries totaled $4,143,274,000, as noted earlier in Tables 5 and 7. Imports of final products totaled $1,712,600,000. Imports from rest-of-Nation industries thus fall into either one or both categories of input purchases depending upon the nature of the input and its use in the destination region.

Two industry clusters in the Metropolitan Region illustrate the use of the 1971 input-output tables in assessing import substitution opportunities. In the first of the two industry clusters -- agriculture and food products manufacturing -- both local interindustry transactions and imports from and exports to rest-of-Nation industries were estimated for each output-disbursing and input-purchasing industry. These transactions are summarized for the four agriculture industries and the four food products manufacturing industries, which are listed in both the 95-industry and the 38-industry groupings in this study (Table 10).

Output-disbursements for the eight agriculture-related industries in the Metropolitan Region totaled $1,453,268,000 in 1971. Of this total, $209,910,000 of output was purchased by the local producing sectors while local final purchases were $476,726,000 and exports to rest-of-Nation markets were $707,332,000. Thus exports were 49 percent of total sales. Local final purchases were 33 percent of total sales.

Imports of the eight agriculture-related industries were $955,494,000 in 1971. Of this total, intermediate input purchases were $554,877,000, while local final purchases were $280,336,000 or 29 percent of total purchases. Imports of agriculture-related intermediate inputs thus were $152,455,000 less than the total value of agriculture-related exports, but together with imports for final use, total imports were $248,162,000 more than total exports. Agricultural products -- dairy farm, poultry and egg, meat animal, food grains, nuts, fruits and vegetables, among others -- were $502,416,000,or 53 percent of the total agriculture-related imports. Final local purchases from the four rest-of-Nation food products manufacturing industries were $241,788,000 or 25 percent of total agriculture-related imports.

Because of geographic specialization in both agricultural production and food products manufacturing, exports and imports of the eight agriculture-related industry outputs are large and they are likely to remain large. New opportunities for import substitution depend on the

Table 10. Output disbursements and input purchases of specified agriculture and food products manufacturing industry, Metropolitan Council Region, 1971.

Industry No.	Industry Title	All Disburse-ments	Local Purchases: Intermediate 1	2	3	4	14	15	16	17	Other	Total	Final: Pers. Cons. Exp.	Gross Private Fix. Cap.	Govern-ment	Total	Exports to Rest-of-Nation
			($1,000)														
Local Industry:																	
1.	Livestock	78,849	3,213	827	8	124	26,735	0	624	0	3,714	35,245	13,111	0	497	13,608	29,996
2.	Other Agr.	52,690	3,132	205	2	80	8,884	33,622	62	0	3,375	49,362	4,769	0	-1,441	3,328	0
3.	For.,Fish. Prod.	59	0	0	0	0	43	0	0	0	3	46	3,510	0	-3,497	13	0
4.	Agr.,For.,Fish. Serv.	1,129	20	32	0	0	0	0	0	0	288	340	1,475	0	-686	789	0
14.	Food Prod., Exc.	13,262	1,885	1	2	0	7,807	450	0	827	48,039	59,011	197,324	1,400	60,279	259,003	195,248
15.	Meat Prod.	425,900	0	0	0	22	0	36,088	32	0	32,635	69,777	144,572	900	8,418	153,890	202,233
16.	Grain Mill.	118,408	0	0	0	0	9,993	126	15,053	5,109	21,411	32,359	18,799	0	2,411	21,210	64,839
17.	Beverages	262,971	0	0	0	0	250	0	0	829	21,991	23,070	17,383	2,300	5,202	24,885	215,076
	Subtotal	1,453,268	8,250	1,065	12	226	53,462	70,286	15,771	6,765	131,456	269,910	400,943	4,600	71,183	476,726	707,332
Other Industry		16,716,337	6,032	9,885	12	182	21,488	23,539	17,168	50,391	3,751,133	3,897,163	5,088,556	978,031	831,005	6,897,413	5,920,881
Total, Local		18,169,605	14,282	10,950	24	408	74,050	93,825	32,939	57,156	3,882,589	4,167,073	5,489,499	982,631	902,189	7,374,319	6,628,213
Rest-of-Nation Industry:																	
1.	Livestock	122,382	10,943	2,815	0	0	95,191	0	0	0	11,332	120,281	2,101	0	0	2,101	0
2.	Other Agr.	362,408	20,405	1,335	5	275	37,204	219,077	18,652	3,365	28,081	328,399	34,010	0	0	34,010	0
3.	For., Fish. Prod.	2,816	0	0	2	0	355	0	0	0	24	379	2,437	0	0	2,437	0
4.	Agr., For., Fish.Serv.	14,809	1,307	2,077	4	0	0	0	0	0	11,421	14,809	0	0	0	0	0
14.	Food Prod., Exc.	269,623	8,706	3	0	0	0	42	0	104,219	21,799	134,369	134,854	0	0	134,854	0
15.	Meat Prod.	39,402	0	0	0	0	0	0	0	0	12,302	12,302	27,100	0	0	27,100	0
16.	Grain Mill.	52,208	0	0	0	0	0	0	0	3,170	49,038	52,208	0	0	0	0	0
17.	Beverages	91,845	0	0	0	0	0	0	0	164	11,847	12,011	79,834	0	0	79,834	0
	Subtotal	955,494	41,411	6,227	11	275	132,750	219,119	18,652	110,918	135,844	554,877	280,336	0	0	280,336	0
Other Industry		3,217,780	1,625	6,256	2	58	139,746	33,949	46,120	16,203	3,296,514	3,618,397	1,114,207	0	16,617	1,601,216	0
Total RON		5,885,874	43,036	12,483	13	333	272,496	253,068	64,772	94,715	3,432,358	4,173,274	1,394,643	301,340	0	1,712,600	0
Value Added		9,828,674	21,531	29,257	22	388	165,816	79,007	20,697	111,100	9,390,856	9,828,674	0	0	0	0	0
All Purchases		33,884,153	78,849	52,690	59	1,129	513,262	425,900	118,408	262,971	16,705,803	18,169,021	6,884,192	1,283,971	918,805	9,086,919	6,628,213

location economics of each individual industry. For the livestock slaughtering industry, for example, plant location is oriented towards the livestock production because of large weight loss in processing. For the meat processing industry, plant location is oriented towards the consumer markets because of high product transportation and distribution costs.

The pattern of exports and imports of the second industry cluster -- machinery, except electrical, manufacturing -- differ sharply from the agriculture-related industries. First, this industry cluster, unlike food products manufacturing, involves production of both consumer and capital goods. Also, location relationships with input suppliers and final markets differ sharply.

Local interindustry transactions and interregional trade in the machinery, except electrical, manufacturing industry cluster are summarized in Table 11. In 1971 total industry output disbursements were only slightly less than the total output of the agriculture and food products manufacturing industry cluster. Imports from this industry cluster also were much less than imports from the rest-of-Nation agriculture-related industry cluster, as shown below:

	Agriculture & Food Prod. Manufacturing	Machinery, Exc. Electrical, Manufacturing
	(mil. dol.)	
Intermediate sales	269.9	151.1
Final sales, total	1,184.0	1,229.4
Local	476.7	55.7
RON	707.3	1,173,7
Total Sales	1,453.3	1,380.5
Int. purchases, total	1,025.4	473.0
Local	284.5	205.1
RON	740.9	267.9
Value added	427.9	907.5
Total Purchases	1,453.3	1,380.5

Table 11. Output disbursements and input purchases of specified machinery, except electrical, manufacturing industry, Metropolitan Council Region, 1971.

No.	Title	All Disburse-ments	Local Purchases: Intermediate 48	49	50	51	52	53	54	55	56	57	58	Other	Total	Final: Pers. Cons. Exp.	Gross Private Fix.Cap.	Govern-ment	Total	Exports to Rest-of-Nation
								($1,000)												
	Local Industry:																			
48.	Engines, Turbines	40,754	90	1,256	1,501	0	0	0	315	0	0	0	0	4,491	7,653	1,653	777	1,475	3,336	[illegible]
49.	Farm Machinery	96,844	0	13	0	0	0	0	0	0	1	0	0	948	962	722	-2,703	2,023	42	[illegible]
50.	Construction, Mining	124,486	0	358	3,664	0	0	0	0	260	0	0	0	9,589	13,871	0	1,398	1,356	2,754	[illegible]
51.	Materials Handling	22,579	0	15	313	39	20	0	0	0	0	0	0	5,179	5,566	0	492	1,439	1,931	[illegible]
52.	Metalworking Mach.	58,196	54	191	0	7	0	106	1,480	0	37	611	0	5,572	8,058	171	1,049	124	1,344	[illegible]
53.	Special Ind. Mach.	44,786	0	79	0	0	0	793	0	23	1	0	0	4,471	5,367	418	979	1,028	2,425	[illegible]
54.	General Industrial	125,686	41	1,017	0	0	0	0	1,709	0	46	624	0	8,384	11,821	0	3,387	1,073	4,460	[illegible]
55.	Machine Shop Prod.	45,299	31	423	0	15	0	2,121	93	0	0	22,658	5	11,079	36,420	140	-1,500	2,759	1,399	[illegible]
56.	Office & Account.	17,404	0	0	40	0	0	56	0	0	952	416	0	8,757	10,221	1,127	191	727	2,045	[illegible]
57.	Computing & Rel.	604,164	0	0	0	0	0	43	0	0	11	16,917	0	1,616	18,582	0	7,527	25,655	33,182	[illegible]
58.	Service Industry	200,260	0	0	0	0	0	0	0	0	0	413	2,113	30,082	32,608	176	857	1,748	2,781	[illegible]
	Subtotal	1,380,458	216	3,352	5,518	61	20	3,119	3,597	283	1,048	41,639	2,118	90,168	151,128	3,838	12,454	39,407	55,699	[illegible]
	Other Industry	16,789,147	3,290	11,484	17,025	6,046	3,650	5,717	5,717	2,649	1,415	47,980	23,330	3,873,851	4,015,444	5,485,661	970,177	862,732	7,318,620	[illegible]
	Total, Local	18,169,605	3,506	14,836	22,549	6,107	3,670	8,836	8,836	2,932	2,463	89,619	25,440	3,964,019	4,167,073	5,489,499	982,631	902,189	7,374,319	6,628,213
	Rest-of-Nation Industry:																			
48.	Engines, Turbines	23,660	214	3,044	2,779	0	0	0	154	0	0	858	0	7,611	14,660	0	9,000	0	9,000	0
49.	Farm Machinery	8,955	0	3,322	0	0	0	0	0	0	0	0	0	5,633	8,955	0	0	0	0	0
50.	Construction, Mining	30,178	0	1,046	15,376	0	0	0	0	0	0	0	0	6,792	23,214	0	6,964	0	6,964	0
51.	Materials Handling	22,069	0	29	2,663	354	9	0	0	0	0	0	0	9,014	12,069	0	10,000	0	10,000	0
52.	Metalworking Mach.	30,900	0	365	0	0	1,627	0	1,432	1,183	0	10	0	6,811	10,428	1,500	18,972	0	20,472	0
53.	Special Ind. Mach.	24,461	0	53	0	0	0	0	0	0	0	0	0	2,492	2,545	0	21,916	0	21,916	0
54.	General Industrial	45,207	214	3,650	51	0	0	0	2,221	0	0	1,566	13,017	9,106	29,825	0	15,382	0	15,382	0
55.	Machine Shop Prod.	15,973	10	191	0	5	0	713	31	0	0	7,896	10	7,117	15,973	0	0	0	0	0
56.	Office & Account.	3,888	0	0	0	0	0	0	0	6	0	283	0	2,599	2,888	1,000	0	0	1,000	0
57.	Computing & Rel.	14,508	0	0	0	0	0	0	0	0	0	14,508	0	0	14,508	0	0	0	0	0
58.	Service Industry	29,555	0	0	0	0	0	0	0	0	0	273	0	2,632	2,905	9,660	16,940	0	26,650	0
	Subtotal	249,354	438	11,700	20,869	354	1,636	713	3,838	189	0	25,394	13,027	59,812	137,970	12,160	99,224	0	111,384	0
	Other Industry	5,630,520	11,552	14,627	20,649	4,257	7,756	2,768	16,614	5,155	114	73,630	32,596	3,845,586	4,035,304	1,382,483	202,116	16,617	1,601,216	0
	Total RON	5,885,874	11,990	26,327	41,518	4,611	9.392	3,481	20,452	5,344	114	99.024	45,623	3,905,398	4,173,274	1,394,643	301,340	16,617	1,712,600	0
	Value Added	9,828,674	25,258	55,690	58,419	11,861	45,134	32,469	82,138	37,023	14,827	415,521	129,197	8,921,237	9,828,674	0	0	0	0	0
	All Purchases	33,884,153	40,754	98,653	122,486	22,579	58,196	44,786	125,686	45,299	17,404	604,164	200,260	16,788,754	18,169,021	6,884,192	1,283,971	918,805	9,086,919	6,628,213

The summary data show the larger export sales of the machinery than of the agriculture-related industry cluster as a measure of industry specialization. Value added by the machinery industry cluster also is much larger while the transfers of imports to this industry cluster are much smaller than that in the agriculture-related industry cluster. The import purchases of the machinery industry cluster roughly equal the imports from the corresponding rest-of-Nation industry.

Access to a highly detailed industry breakdown -- even more detailed than the 92-industries listed in Table 1 -- would help in assessing import substitution opportunities, provided detailed industry import tables included the industries of origin and destination of imports from, and exports to, rest-of-Nation industries. In addition, these data are needed for a more recent base year, for example, 1977.

Data base assessment

A final note on the quality of the data base in the 1971 Metropolitan Council Input-Output Study. Earlier in this report, possible underestimation of employment and value added was cited. The basis for observed underestimation is documented in Table 10.

The U.S. Department of Commerce Regional Economic Information System (REIS) reports larger employment levels than shown in the Metropolitan Council Input-Output Study for seven of the eight major industry groups. The largest differences occur among the non-commodity-producing industries. The overall difference in the employment estimates is about 63,800 -- or 7 percent of the REIS employment level.

Value added estimates also differ in the two data sources. These differences are much larger, however, than differences in the employment

Table 12. Alternate estimates of employment and value added, Metropolitan Council Region, 1971.

Industry	Metro. Region I-O No.	Employment: Metro I-O (thou.)	Employment: Reg. Econ. Infor. Sys. 1/ (thou.)	Employment: Metro. as Prop. of REIS (pct.)	Value Added: Metro I-O (mil.dol.)	Value Added: Reg.Econ. Infor. Sys. 2/ (mil.dol.)	Value Added: Metro. as Prop. of REIS (pct.)
Agr., For., Fish.	1-4	4.3	10.0	43	51	56	91
Mining	5-10	0.5	1.7	29	8	41	20
Construction	11,12	41.3	41.4	100	698	707	99
Manufacturing	13-71	196.3	206.7	95	3,246	2,992	108
Trans., Comm., Util.	72-81	55.8	62.5	89	952	1,302	73
Trade	82,83	204.1	217.1	94	1,863	2,536	73
Fin., Ins., Real Est.	84,85	50.4	54.9	92	2,020	2,181	93
Services	86-90	147.9	158.0	94	866	1,347	64
Government, Total	---	115.3	127.4	91	1,226	1,217	101
Total	---	815.9	879.7	93	10,930	12,379	88

1/ Based on unpublished data from: U.S. Department of Commerce, Regional Economic Information System, 1977.

2/ Based on Metropolitan Region to Minnesota earnings and Minnesota industry value added estimates.

estimates. Again, the non-commodity-producing industry groups show the largest differences. For total value added, the Metropolitan Council Input-Output Study estimate is 12 percent below the REIS estimate. Underestimation of employment and value added totals in the Metropolitan Council Input-Output Study supports the view that gross otuput levels also are underestimated. This would not affect industry output multiplier values, provided the underestimation reduces all output levels. Insofar as some industry output levels are reduced more than others, and import-export balances are modified, industry output multiplier values will change, also.

References Cited

1. Maki, Wilbur R. Regional Economic Forecasts for Water and Land Resource Planning II. Forecast Series: Minnesota. Staff Paper Series P79-37, Department of Agricultural and Applied Economics, University of Minnesota, St. Paul. October 1979.

2. Maki, Wilbur R., Gregory H. Michaels, Leonard A. Laulainen, Jr. and Mason Chen. Employment Trends and Projections for Minnesota and Its Substate Development Regions, Station Bulletin 531, Agr. Exp. Sta., University of Minnesota, St. Paul. 1979.

3. Maki, Wilbur R. Income Trends and Projections for Minnesota and Substate Development Regions. Station Bulletin 537, Agr. Exp. St., University of Minnesota, St: Paul. 1980.

4. Maki, Wilbur R. Economic Effects of Mineral Resource Development in Northeast Minnesota. Staff Ppaer Series P80-3, Department of Agriculutral and Applied Economics, University of Minnesota, St. Paul. January 1980.

5. Metropolitan Council of the Twin Cities Area. The Structure of the Twin Cities' Economy: An Input-Output Perspective. Metropolitan Council, Metropolitan Square Building, St. Paul. March 1976.

TABLE A.1. OUTPUT DISBURSEMENTS AND INPUT PURCHASES OF SPECIFIED INDUSTRY, METRO, 1971.

INDUSTRY	INPUT PURCHASES				OUTPUT DISBURSEMENTS				
							EXPORTS		
NO. TITLE	GROSS OUTPUT	INTERMEDIATE	VALUE ADDED	TOTAL IMPORTS	INTERMEDIATE DEMAND	FINAL DEMAND	ALLOCATED U.S. NET	RON	TOTAL
	($1000)	($1000)	($1000)	($1000)	($1000)	($1000)	($1000)	($1000)	($1000)
1LIVESTOCK,	78849.	14282.	21531.	43036.	35245.	13608.	0	29996.	29996.
2OTHER AGRI	52690.	10950.	29257.	12483.	49362.	3328.	0	0	0
3FORESTRY A	59.	24.	22.	13.	46.	13.	0	0	0
4AGRICULTUR	1129.	408.	388.	333.	340.	789.	0	0	0
5IRON AND F	0	0	0	0	0	0	0	0	0
6NONFEROUS	0	0	0	0	0	0	0	0	0
7COAL MININ	0	0	0	0	0	0	0	0	0
8CRUDE PETR	0	0	0	0	0	0	0	0	0
9STONE AND	14558.	3072.	8073.	3413.	14899.	-341.	0	0	0
10CHEMICALS,	0	0	0	0	0	0	0	0	0
11NEW CONSTR	1725850.	819173.	500526.	416151.	0	1240665.	0	485185.	485185.
12MAINTENANC	336965.	83708.	197813.	55444.	134413.	151445.	0	51107.	51107.
13ORDNANCE,	329162.	55217.	195029.	78916.	1408.	5382.	0	322372.	322372.
14FOOD, KIND	513262.	74950.	165816.	272496.	59011.	259003.	0	195248.	195248.
15MEAT PROD	425900.	93925.	79307.	253068.	69777.	153890.	0	202233.	202233.
16GRAIN MILL	118408.	22939.	30697.	64772.	32359.	21210.	0	64839.	64839.
17BEVERAGES	262971.	57156.	111100.	94715.	23070.	24885.	0	215016.	215016.
18TOBACCO	0	0	0	0	0	0	0	0	0
19BROAD, NAR	1085.	239.	433.	413.	563.	522.	0	0	0
20MISC TEXTI	4976.	1955.	1825.	1196.	3135.	1841.	0	0	0
21APPAREL	38881.	1485.	17983.	19413.	3895.	1628.	0	33358.	33358.
22MISC. FABRI	18278.	2437.	9791.	6050.	5591.	5687.	0	7000.	7000.
23LUMBER & W	93881.	7570.	38680.	47631.	89700.	4181.	0	0	0
24WOODEN CON	1836.	517.	733.	586.	1808.	28.	0	0	0
25HOUSEHOLD	13010.	2714.	5983.	4313.	11928.	1082.	0	0	0
26OTHER FURN	16585.	5081.	9481.	2023.	8935.	3650.	0	4000.	4000.
27PAPER, ALLI	306657.	54588.	123683.	128386.	55574.	2600.	0	248483.	248483.
28PAPERBOARD	52364.	25322.	31800.	25242.	72413.	802.	0	9149.	9149.
29PRINTING,	248041.	27030.	181955.	39056.	34726.	23055.	0	184260.	184260.
30COMMERCIAL	216059.	33173.	133988.	48898.	202427.	4678.	0	8954.	8954.
31CHEMICALS,	69026.	4051.	39565.	25410.	35485.	2176.	0	31365.	31365.
32PLASTICS,	20079.	1834.	11201.	7044.	5663.	247.	0	14169.	14169.
33DRUGS, CLE	222898.	8571.	151967.	62360.	10056.	2480.	0	210362.	210362.
34PAINTS, AL	40279.	5111.	20355.	14813.	28875.	1427.	0	9977.	9977.
35PETROLEUM	249224.	44070.	40090.	165064.	131783.	74000.	0	43441.	43441.
36PETROLEUM	0	0	0	0	0	0	0	0	0
37RUBBER, MI	111240.	3672.	68960.	38608.	50876.	12699.	0	47665.	47665.
38LEATHER TA	4259.	2668.	1580.	11.	2136.	5.	0	2118.	2118.
39FOOTWEAR,	10176.	2808.	5150.	2218.	1401.	375.	0	8400.	8400.
40GLASS, GLA	23423.	4990.	8786.	9647.	18918.	305.	0	4200.	4200.
41STONE, CLA	83835.	15048.	42448.	26339.	81434.	2401.	0	0	0
42PRIMARY IR	60755.	11365.	32441.	12183.	54722.	103.	0	5930.	5930.
43PRIMARY NO	35945.	5220.	27759.	2966.	28171.	621.	0	7153.	7153.
44METAL CONT	39143.	1938.	15707.	21498.	23394.	-799.	0	16548.	16548.
45HEATING, P	188109.	19808.	89606.	78695.	170205.	3713.	0	14191.	14191.
46SCREW MACH	106692.	28915.	58169.	19608.	44154.	794.	0	61744.	61744.
47OTHER FABR	72831.	13102.	42654.	17075.	57000.	3213.	0	12618.	12618.
48ENGINES, T	40754.	3506.	25258.	11990.	7653.	3336.	0	29765.	29765.
49FARM MACHI	96853.	14836.	55690.	26327.	962.	51.	0	95840.	95840.
50CONSTRUCTI	122487.	22549.	58420.	41518.	13871.	755.	0	107861.	107861.
51MATERIALS	22579.	6107.	11861.	4611.	5566.	1931.	0	15082.	15082.
52METALWORKI	58196.	3670.	45134.	9392.	8058.	1344.	0	48794.	48794.
53SPECIAL IN	44786.	8836.	32469.	3481.	5367.	2425.	0	36994.	36994.
54GENERAL IN	125686.	23096.	82138.	20452.	11821.	4460.	0	109405.	109405.
55MACHINE SH	45299.	2932.	37023.	5344.	36420.	1399.	0	7480.	7480.
56OFFICE AND	17404.	2463.	14827.	114.	10221.	2045.	0	5138.	5138.
57COMPUTING	604164.	89619.	415521.	99024.	18582.	33182.	0	552400.	552400.
58SERVICE IN	200260.	25440.	129197.	45623.	32608.	2781.	0	164871.	164871.
59ELECTRIC T	114500.	14660.	69153.	30687.	15299.	600.	0	98601.	98601.
60HOUSEHOLD	99686.	11002.	49411.	39273.	9691.	558.	0	89437.	89437.
61ELECTRIC L	50421.	8423.	29575.	12423.	16314.	6799.	0	27309.	27309.
62RADIO, TEL	23169.	4536.	12775.	5858.	17106.	5000.	0	1063.	1063.
63ELECTRONIC	61230.	12387.	38598.	10245.	32542.	441.	0	28247.	28247.
64MISC ELECT	61374.	10425.	34992.	15957.	6979.	666.	0	53729.	53729.
65MOTOR VEHI	407339.	139220.	118525.	149594.	83570.	33570.	0	290199.	290199.
66AIRCRAFT A	2218.	265.	1902.	51.	2118.	100.	0	0	0
67OTHER TRAN	7381.	1880.	4874.	627.	6497.	884.	0	0	0
68PROF., SCIE	81866.	9467.	54201.	18198.	9182.	3100.	0	69584.	69584.
69ENGINEERIN	95152.	22909.	47673.	24570.	10455.	2124.	0	82573.	82573.
70OPTICAL, O	47863.	6957.	34521.	6385.	7291.	8597.	0	31975.	31975.
71MISCELLANE	88484.	17338.	48117.	23029.	56609.	2715.	0	29160.	29160.
72TRANSPORTA	23528.	3199.	18802.	1527.	2033.	2827.	0	18668.	18668.
73RAILROADS	219838.	69026.	141701.	9111.	0	24905.	0	194933.	194933.
74LOCAL, SUB	60856.	22005.	35590.	3261.	4965.	41224.	0	14667.	14667.
75MOTOR FREI	302390.	54830.	199010.	48550.	0	39918.	0	262472.	262472.
76AIR TRANSP	186031.	49630.	63795.	72606.	22418.	65947.	0	97666.	97666.
77COMMUNICAT	214988.	8802.	184541.	21645.	105735.	109253.	0	0	0
78RADIO AND	38964.	15463.	21772.	1729.	38964.	0	0	0	0
79ELECTRIC S	612478.	50855.	286341.	275282.	119455.	404602.	0	88421.	88421.
80GAS SERVIC	0	0	0	0	0	0	0	0	0
81WATER AND	0	0	0	0	0	0	0	0	0
82WHOLESALE	1443678.	436933.	686960.	319785.	373619.	592059.	0	478000.	478000.
83RETAIL TRA	1503279.	192709.	1176142.	134428.	72917.	1038653.	0	391709.	391709.
84FINANCE AN	1001149.	234918.	548513.	217718.	195941.	497728.	0	307480.	307480.
85REAL ESTAT	1827390.	242004.	1471808.	113578.	207605.	1619785.	0	0	0
86HOTELS, PER	275861.	101587.	162031.	12243.	49877.	160702.	0	65282.	65282.
87BUSINESS A	786398.	357749.	380584.	48065.	536244.	71314.	0	178840.	178840.
88AUTO REPAI	377299.	35300.	202349.	139650.	98982.	278317.	0	0	0
89AMUSEMENTS	96194.	45279.	45735.	5180.	16550.	78863.	0	781.	781.
90MEDICAL, E	93511.	15156.	74865.	3490.	14363.	76442.	0	2706.	2706.
91FEDERAL GO	101045.	10442.	71261.	19342.	32512.	68533.	0	0	0
92STATE AND	76464.	20982.	45757.	9725.	28519.	47945.	0	0	0
93BUSINESS T	90015.	90015.	0	0	89987.	28.	0	0	0
94OFFICE SUP	69010.	69010.	0	0	67047.	1963.	0	0	0
95SCRAP, USE	7670.	7670.	0	0	9660.	-1990.	0	0	0
96SUB-TOTAL	18186557.	4167073.	9821444.	4173274.	4167073.	7371271.	0	6628213.	6628213.

TABLE A.2. GROSS OUTPUT, TOTAL REQUIREMENTS, AND EXCESS AND DEFICIT SUPPLY OF SPECIFIED INDUSTRY OUTPUT, METRO, 1971.

INDUSTRY					EXCESS SUPPLY		DEFICIT SUPPLY		
NO.	TITLE	EMPLOYMENT	GROSS OUTPUT	TOTAL REQUIREMENT 1/	TOTAL 2/	PROPORTION OF GROSS OUTPUT	TOTAL 3/	PROPORTION OF TOTAL REQUIREMENT	OUTPUT DEMAND MULTIPLIER 4/
		(NO.)	(THOUS. DOL.)	(THOUS. DOL.)	(THOUS. DOL.)	(PCT.)	(THOUS. DOL.)	(PCT.)	
1	LIVESTOCK,	2367	78849.	171235.	29996.	38.042	122382.	71.470	1.532
2	OTHER AGRI	1502	52690.	415099.	0	0	362409.	87.307	1.395
3	FORESTRY A	28	59.	2875.	0	0	2816.	97.948	1.403
4	AGRICULTUR	373	1129.	15938.	0	0	14839.	92.916	1.399
5	IRON AND F	0	0	1126.	0	0	1126.	100.000	1.000
6	NONFERCUS	0	0	1868.	0	0	1868.	100.000	1.000
7	COAL MININ	0	0	58197.	0	0	58197.	100.000	1.000
8	CRUDE PETR	0	0	309730.	0	0	309730.	100.000	1.000
9	STONE AND	457	14558.	34458.	0	0	19900.	57.751	1.451
10	CHEMICALS,	0	0	303.	0	0	303.	100.000	1.000
11	NEW CONSTR	37951	1725850.	1240665.	485185.	28.113	0	0	1.631
12	MAINTENANC	3345	336965.	321629.	51107.	15.167	35771.	11.122	1.392
13	ORDNANCE,	10555	329162.	7330.	322372.	97.937	540.	7.367	1.303
14	FOOD, KIND	10878	513262.	587637.	195248.	38.041	269623.	45.883	1.649
15	MEAT PROD	6014	425900.	263069.	202233.	47.484	39402.	14.978	1.391
16	GRAIN MILL	1621	118408.	105777.	64839.	54.759	52208.	49.357	1.734
17	BEVERAGES	4072	262971.	139800.	215016.	81.764	91845.	65.697	1.478
18	TOBACCO	0	0	37071.	0	0	37071.	100.000	1.000
19	BROAD, NAR	103	1085.	44226.	0	0	43141.	97.547	1.172
20	MISC TEXTI	179	4976.	37956.	0	0	32980.	86.890	1.310
21	APPAREL	3446	38881.	247617.	33358.	85.795	242094.	97.770	1.186
22	MISC. FABRI	992	18278.	42901.	7000.	38.297	31623.	73.712	1.143
23	LUMBER & W	2887	93881.	178009.	0	0	84128.	47.261	1.468
24	WOODEN CON	96	1836.	3333.	0	0	1497.	44.914	1.507
25	HOUSEHOLD	735	13010.	113718.	0	0	100708.	88.559	1.352
26	OTHER FURN	1047	16585.	67954.	4000.	24.118	55369.	81.480	1.306
27	PAPER,ALLI	14588	306657.	165199.	248483.	81.030	107025.	64.786	1.317
28	PAPERBOARD	7072	82364.	100511.	9149.	11.108	27296.	27.157	1.611
29	PRINTING,	9323	248041.	77280.	184260.	74.286	13499.	17.468	1.265
30	COMMERCIAL	8069	216059.	215706.	8954.	4.144	8601.	3.987	1.364
31	CHEMICALS,	1230	69026.	154054.	31365.	45.439	116393.	75.553	1.254
32	PLASTICS,	397	20079.	93595.	14169.	70.566	87685.	93.686	1.309
33	DRUGS, CLE	2770	222898.	72482.	210362.	94.376	59946.	82.705	1.259
34	PAINTS, AL	741	40279.	40581.	9977.	24.770	10279.	25.330	1.311
35	PETROLEUM	1961	249224.	296885.	43441.	17.431	91102.	30.686	1.296
36	PETROLEUM	0	0	0	0	0	0	0	0
37	RUBBER, MI	3739	111240.	171333.	47665.	42.849	107758.	62.894	1.145
38	LEATHER TA	169	4259.	5892.	2118.	49.730	3751.	63.663	1.699
39	FOOTWEAR,	757	10176.	45107.	8400.	82.547	43331.	96.063	1.321
40	GLASS, GLA	414	23423.	64403.	4200.	17.931	45180.	70.152	1.470
41	STONE, CLA	2169	83835.	214942.	0	0	131107.	60.995	1.287
42	PRIMARY IR	2193	60755.	237301.	5930.	9.761	182476.	76.896	1.279
43	PRIMARY NO	1136	35945.	142143.	7153.	19.900	113351.	79.744	1.182
44	METAL CONT	686	39143.	70532.	16548.	42.276	47937.	67.965	1.263
45	HEATING, P	6632	188109.	238703.	14191.	7.544	64785.	27.140	1.327
46	SCREW MACH	3644	106692.	91319.	61744.	57.871	46371.	50.779	1.260
47	OTHER FABR	3156	72831.	177547.	12618.	17.325	117334.	66.086	1.344
48	ENGINES, T	630	40754.	34643.	29765.	73.036	23660.	68.295	1.316
49	FARM MACHI	3073	96853.	9963.	95840.	98.954	8955.	89.837	1.343
50	CONSTRUCTI	4306	122487.	44804.	107861.	88.059	30178.	67.356	1.426
51	MATERIALS	796	22579.	29566.	15082.	66.797	22069.	74.643	1.366
52	METALWORKI	2638	58196.	40302.	48794.	83.844	30900.	76.671	1.180
53	SPECIAL IN	1505	44786.	32253.	36994.	82.602	24461.	75.841	1.240
54	GENERAL IN	2271	125686.	61489.	109405.	87.046	45207.	73.522	1.266
55	MACHINE SH	3833	45299.	53792.	7480.	16.513	15973.	29.694	1.132
56	OFFICE AND	605	17404.	16154.	5138.	29.522	3888.	24.068	1.119
57	COMPUTING	20446	604164.	66272.	552400.	91.432	14508.	21.892	1.224
58	SERVICE IN	5524	200260.	64944.	164871.	82.328	29555.	45.508	1.255
59	ELECTRIC T	5223	114500.	100568.	98601.	86.114	84669.	84.191	1.302
60	HOUSEHOLD	1593	99686.	95232.	89437.	89.719	84983.	89.238	1.319
61	ELECTRIC L	2793	50421.	69782.	27309.	54.162	46670.	66.880	1.305
62	RADIO, TEL	1226	23169.	117908.	1063.	4.588	95832.	81.251	1.283
63	ELECTRONIC	4698	61230.	171075.	28247.	46.133	138092.	80.720	1.253
64	MISC ELECT	2962	61374.	40965.	53729.	87.544	33320.	81.338	1.310
65	MOTOR VEHI	3347	407339.	463050.	290199.	71.243	345910.	74.703	1.559
66	AIRCRAFT A	393	2218.	66604.	0	0	64386.	96.670	1.116
67	OTHER TRAN	1295	7381.	37296.	0	0	29915.	80.210	1.201
68	PROF.,SCIE.	4012	81866.	38810.	69584.	84.997	26528.	68.354	1.246
69	ENGINEERIN	3994	95152.	22633.	82573.	86.780	10051.	44.414	1.307
70	OPTICAL, O	1365	47863.	29125.	31975.	66.805	13237.	45.449	1.268
71	MISCELLANE	4391	88484.	144461.	29160.	32.955	85137.	58.934	1.329
72	TRANSPORTA	1439	23528.	14062.	18668.	79.344	9202.	65.439	1.200
73	RAILROADS	10878	219838.	24905.	194933.	88.671	0	0	1.256
74	LOCAL, SUB	3946	60856.	164908.	14667.	24.101	118719.	71.991	1.526
75	MOTOR FREI	14225	302390.	39918.	262472.	86.799	0	0	1.327
76	AIR TRANSP	7851	186031.	131376.	97666.	52.500	43011.	32.739	1.409
77	COMMUNICAT	9472	214988.	262825.	0	0	47837.	18.201	1.136
78	RADIO AND	1022	38964.	47368.	0	0	8404.	17.742	1.611
79	ELECTRIC S	6937	612478.	585444.	88421.	14.437	61387.	10.486	1.208
80	GAS SERVIC	---	0	0	0	0	0	0	——
81	WATER AND	---	0	0	0	0	0	0	——
82	WHOLESALE	60663	1443678.	966410.	478000.	33.110	732.	.076	1.578
83	RETAIL TRA	143463	1503279.	1111570.	391709.	26.057	0	0	1.234
84	FINANCE AN	40451	1001149.	883665.	307480.	30.713	189996.	21.501	1.525
85	REAL ESTAT	9956	1827390.	1996286.	0	0	168896.	8.461	1.220
86	HOTELS,PER	21329	275861.	240024.	65282.	23.665	29445.	12.268	1.467
87	BUSINESS A	33576	786398.	950079.	178840.	22.742	342521.	36.052	1.687
88	AUTO REPAI	7938	377299.	386119.	0	0	8823.	2.284	1.498
89	AMUSEMENTS	8332	96194.	97417.	781.	.812	2004.	2.057	1.584
90	MEDICAL, E	80707	93511.	93201.	2706.	2.894	2396.	2.571	1.213
91	FEDERAL GO	115339 5/	101045.	101045.	0	0	0	0	1.206
92	STATE AND	5548 6/	76464.	76464.	0	0	0	0	1.437
93	BUSINESS T	0	90015.	181895.	0	0	91880.	50.513	2.162
94	OFFICE SUP	0	69010.	84833.	0	0	15823.	18.652	2.226
95	SCRAP, USE	0	7670.	7670.	0	0	0	0	1.516
96	SUB-TOTAL	815910	18166557.	17424218.	6628213.	36.486	5885874.	33.780	——

1/ Gross output less export to Rest of Nation.

2/ Rest of Nation industry net purchases of specified Minn. industry* output.

3/ Metro industry net purchases of specified Rest of Nation *industry output.

4/ Adjusted for imports from Region 7W.

5/ Total state, local and federal government employment.

6/ Household workers.