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ANALYZING LOCAL INDUSTRIAL DEVELOPMENT POTENTIAL

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THE REGION'S EXPORT/IMPORT BASIS

by

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Report #1

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This paper represents the first in a series of reports to be completed for Peoples Community Enterprises of Duluth. The purpose of this work is to employ a large scale simulation model, known as SIMLAB, in an attempt to increase the effectiveness of capital seed monies generated by PCE for use in expanding local industry. These reports will concentrate on the data derived from both the regional input/output system which forms the basis for SIMLAB and results from actual simulation runs using SIMLAB.

The model used for this study was first developed by Wilbur Maki and others at the University of Minnesota, St. Paul campus [2] and [3]. SIMLAB is basically a large scale input/output based computer laboratory model which simulates economic and demographic activity for a particular region. Originally developed by Maki for the entire State of Minnesota, SIMLAB has more recently been constructed for Region 3 alone. It is this latter version of the model that our study will employ.

The input/output framework and the simulation model are based on a regional data base which includes Duluth, rather than on data for the city alone. The early reports in this series will examine information derived from those input/output tables that have a bearing on economic development within Duluth. These reports will attempt to identify those industries and elements of interindustry trade that characteristically show promise for future development.

Later, results of simulation runs will be reported along with an explanation of the procedure used to modify these results, so that analysis can be made on a Duluth area basis rather than a Region 3 basis. A technical description of the model itself is not warranted at this point. For the interested reader, an excellent discussion of the structure and uses of SIMLAB is included in the USER'S GUIDE by Richard Lichty and others [1].

An input/output system essentially provides a picture of a functioning economy at a certain point in time. When properly analyzed, the data contained in

a well developed system can identify key elements within a reference economy from a variety of viewpoints. A basic premise of input/output analysis is that in a fully functioning economy, each sector is related to every other sector through a demand and supply network. Each sector, as well as the entire regional economy, has total requirements which can be translated into dollar values. Each industry within a region has a measurable output, whether it be in the form of services, goods or raw materials. In order to produce such a level of output, they require a certain level of inputs, which again may take the form of goods, services, raw materials, or resources.

This report is designed to identify those industries which show strong potential in the region's future. The Tables in this report are designed to identify and compare regional industries on a 214 sector excess/deficit supply basis. Analysis of the information in these tables will help highlight those sectors showing characteristics of possible export base strength (including expansion of existing but small industries) and those which are likely candidates for import substitution.

A strong regional economy is often typified by a strong export base. An export base refers to those industries which export a portion of their output to industrial or consumer markets outside the region. When one considers Duluth and the northeastern Minnesota regional economy; our export base is built around the taconite, tourism, timber and transportation industries. The concepts of export base and import substitution are very important to understanding the tables which follow in this report.

Not all goods, services and raw materials required either as intermediate inputs by local industry or by final demanders are produced locally. Those that are not must be imported. While exports represent outflow of goods and

services from the region, they create an inflow in the form of value added for virtually all levels of the economy, as illustrated in northeast Minnesota by the mining industry. Imports, on the other hand, present exactly the opposite picture. The substitution of output from either expanded industries which presently exist within our region, or from the development of new industries for previously imported goods not only provides direct effects on the region's value added, but such substitution increases the value of the region's multipliers as well.

Table 1 is a 214 sector breakdown of the industries within Region 3 in the year 1977. The first column,"Gross Output", gives the dollar value of output for all producers in that sector. The second column, "Total Requirements", represents the dollar value of output which that particular industry must produce to meet regional levels of intermediate and final demand. When Total Requirements exceed Gross Output, a deficit supply (shortage) exists resulting in importation of the deficit. Both import requirements and the percentage of total requirements that are imported appear in Columns 5 and 6 under the heading Deficit Supply.

Those sectors which produce output above and beyond the final demand induced needs of the region show an excess supply which is exported from the region. Here again the table gives both the dollar value for the total excess, shown in Column 3, and the percentage of the sector's output that is above local requirements for Region 3, shown in Column 4. Column 5 represents the purchases made by a particular sector in our region from industries located outside Region 3.

Table 2 is set up in the same fashion for the seventy-five industry breakdown that is contained in SIMLAB. Both tables are constructed for the year 1977, the base year for the simulation system.

Excess/Deficit Supply Analysis

As mentioned earlier, expanding the region's export base presents excellent potential for the local economy, and one way of attaining this potential is through local investment. Export base expansion can take two forms; the first involving the creation of a new industry within the region that previously did not exist. The small but rapidly growing waferboard industry represents just such an example in our area. The second requires the enlargement of those regional industries which presently export a portion of their output, or of those whose output is primarily consumed locally but which could be expanded to include export production.

Any discussion of local industrial expansion, must include a consideration of the relative regional market and national conditions for each particular industry. In the case of export base expansion, both present national market conditions and future outlook are extremely important factors which must be examined. While a regional industry may exhibit strong characteristics for export capacity enlargement; overcapicity, lagging demand or import competition on the national level, make local expansion implausible.

Looking at columns 3 and 4 in Table 1, it is possible to determine which sectors show promise for export base industry expansion. The following discussion of selected industrial sectors represents only the authors summary of the information contained in Tables 1 and 2. It is by no means a complete listing of the industries with expansion potential. Those sectors which seem to exhibit characteristics conducive to expansion, for either export or import substitution purposes have been marked with an (*) asterisk in the Tables.

Beginning with the textile industry, two sectors; 59-Miscellaneous Textile and 60-Hosiery and Knitwear, exhibit strength in production for export. Both export approximately half (51% and 47% respectively) at their total output, with the other half going to meet regional needs.

Another industry with undoubtedly the strongest potential for expansion in our region is forest products. Sectors 63 to 85 are all included under the forest products heading, and of these, at least seven show very strong export characteristics. With the exception of the pulp and paper industry, Logging has the largest gross output of all the wood products industries. As of 1977, all but 10.9% of logging's output was being consumed locally. The possibilities for expansion in this sector are very high. As new industrial uses are uncovered for our abundance of harvestable hard and soft wood (such as waferboard, orientated-strand board, hardwood furniture blanks, etc.) regional consumption should continue to grow. Also, the market for timber and wood products outside the region is returning to its prerecession levels.

The Hardwood Floor industry (sector 65) is much smaller in scale than logging but presents another excellent case for possible expansion. Sectors 71 and 72, the Wood Pressings and Wood Pallets and Skids industries respectively, are two more prime examples of existing export based industries with expansion potential. The Wood Pallets industry, for instance, is able to export over 80% of its' output and still meet local demands. With increased capacity, and growth in the national market, this export percentage could rise even higher. Other forest product industries showing strong growth and export potential include sectors 73-Particleboard, 74-Wood Products N.E.C., and 75-Wood Containers.

Import substitution offers alternate possibilities for regional industrial investment. As compared to expanding export based industries, this alternative more often requires the introduction of a new industry to the region or the expansion (conversion) of a small existing one. Columns 5 and 6 identify those sectors within the region which show this type of potential.

Two industries stand out from a viewpoint of resource utilization. Given improvement in market demand, sector 12(Copper Ores) would be a logical choice

for development and would eventually become part of the region's industrial export base. It is probably worth mentioning that both this industry and sector 14 are set up as hypothetical industries in the SIMLAB model and a variety of analysis can conceivably be done on them.

In the preceding discussion concerning the Wood Products industry, the careful observer may have noticed that while the region's logging industry exports some of its products, the sawmill industry does not have sufficient capacity to meet regional demands. Table 1 shows a deficit supply amounting to nearly 40% for sector 64-Sawmills and Planers. Little development has occured in this key industry since 1977, due in part to the recent recession. Given the wood resources of this region and the continued growth of the intermediate use forest-products industries (eg. waferboard), investment in this sector would seem appropriate.

The Electrometallurgical, Engineering-Scientific Equipment and Mechanical-measuring Device industries (sectors 114, 162, 163 respectively) each represent areas with development promise in terms of import substitution. Two related industries that show potential for this type of expansion are sector 140-Machine Shops and sector 161-Other Transportation Equipment. Presently, nearly one-half of all the required output from machine shops must be imported. Expansion here, in connection with development of sector 161, exhibits strong possibilities.

Thinking in terms of import/export balances is somewhat more difficult when one considers the service industries, which in Table 1 begin with sector 175. Consider the medical service sector. While the industry does not actually export a product, every time a patient comes from outside the region for treatment, there is an inflow of dollars to the region's economy. Such activity functions in exactly the same way as an exported industrial product.

Five service sectors in particular show up in Table 1 as industries with presently strong regional bases and having substantial but limited export bases.

They include sectors 194, 200, 204, 205, 206; the Hotel industry, Eating and Drinking establishments, and the Medical Service sectors. Both Local Transit and Truck Transportation (sectors 176, 177) show deficit regional supplies; two areas for potential development.

Finally, it is interesting to highlight the Wholesale and Retail Trade industry. Expansion in Retail Trade from an export base standpoint is certainly plausible, while expansion in the Wholesale Trade industry might create a substitute for some of the more than 26% of the total which is supplied outside the region.

As previously mentioned, this discussion centered on only a selected group of industries from the 214 sector breakdown. Table 2 was compiled on a more aggregated basis, presenting the excess/deficit supply figures on a 75-sector breakdown rather than 214. Once again, the sectors which show developmental characteristics have been highlighted in Table 2.

TABLE 1 GROSS OUTPUT, TOTAL REQUIREMENTS, AND EXCESS AND DEFICIT SUPPLY OF SPECIFIED INDUSTRY OUTPUT, ARROWHEAD, 1977.

NO.	INDUSTRY TITLE	GROSS OUTPUT	TOTAL REQUIREMENT [1]	EXCESS SUPPLY [2] TOTAL	EXCESS SUPPLY [2] PROPORTION OF GROSS OUTPUT	DEFICIT SUPPLY [3] TOTAL	DEFICIT SUPPLY [3] PROPORTION OF TOTAL REQUIREMENT
		(THOUS. DOL.)	(THOUS. DOL.)	(THOUS. DOL.)	(PCT.)	(THOUS. DOL.)	(PCT.)
1	DAIRY FARM	14215.	43551.	0	0	29336.	67.360
2	POULTRY AN	6151.	14111.	0	0	7960.	56.409
3	MEAT ANIMA	17722.	105539.	0	0	87817.	83.208
4	FOOD, FEED	5434.	21663.	0	0	16229.	74.915
5	VEGETABLES	167.	10700.	0	0	10533.	98.439
6	SUGAR CROP	0.	402.	0	0	402.	100.000
7	OIL-BEARIN	224.	5920.	0	0	5696.	96.216
8	OTHER CROP	2899.	19622.	0	0	16723.	85.226
9	FOR. AND F	2704.	18152.	0	0	15448.	85.104
10	AGR., FOR.	3920.	4889.	0	0	969.	19.828
11	IRON ORES	906037.	12526.	893511.	98.618*	0	0
12	COPPER ORE	1.	1000.	0	0	999.	99.900*
13	OTHER NONF	-0.	4482.	0	0	4482.	100.000
14	COAL&PEAT	1.	34154.	0	0	34153.	99.997
15	OIL AND GA	0.	93698.	0	0	93698.	100.000
16	STONE AND	4091.	15795.	0	0	11704.	74.099
17	CHEM. AND	0.	3996.	0	0	3996.	100.000
18	NEW RES. B	156597.	150545.	6052.	3.865	0	0
19	NEW NONRES	91293.	88435.	2858.	3.131	0	0
20	NEW PUBLIC	51308.	46674.	4634.	9.032	0	0
21	NEW HIGHWA	22160.	17358.	4802.	21.671	0	0
22	ALL OTHER	12997.	10623.	2374.	18.263	0	0
23	WELL DRILL	169320.	16635.	152685.	90.176	0	0
24	MAINT. AND	112213.	132461.	0	0	20248.	15.286
25	COMPLETE G	0.	4353.	0	0	4353.	100.000
26	OTHER ORDN	0.	3854.	0	0	3854.	100.000
27	MEAT PACKI	132292.	65171.	67121.	50.737	0	0
28	SAUSAGES A	39483.	11941.	27542.	69.756	0	0
29	POULTRY DR	15795.	10316.	5479.	34.690	0	0
30	POULTRY AN	0.	1266.	0	0	1266.	100.000
31	CREAMERY B	1724.	1305.	419.	24.318	0	0
32	CHEESE, NA	0.	6627.	0	0	6627.	100.000
33	CONDENSED	0.	5231.	0	0	5231.	100.000
34	ICE CREAM	16498.	2658.	13840.	83.891	0	0
35	FLUID MILK	76366.	23509.	52857.	69.215	0	0
36	CANNED FR.	-0.	9542.	0	0	9542.	100.000
37	FROZEN FR.	83472.	9610.	73862.	88.488	0	0
38	OTHER PRES	0.	7773.	0	0	7773.	100.000
39	FR.,FRZ.,C	11155.	4281.	6874.	61.622	0	0
40	FLOUR AND	-0.	5000.	0	0	5000.	100.000
41	CEREAL PRE	-0.	3362.	0	0	3362.	100.000
42	BLENDED AN	-0.	1518.	0	0	1518.	100.000
43	DOG, CAT A	-0.	4018.	0	0	4018.	100.000
44	PREPARED F	5925.	7778.	0	0	1853.	23.822
45	RICE MILLI	1652.	1474.	178.	10.765	0	0
46	WET CORN M	-0.	7078.	0	0	7078.	100.000
47	BREAD, CAK	15312.	14768.	544.	3.555	0	0
48	COOKIES AN	4809.	3603.	1206.	25.086	0	0
49	SUGAR	-0.	5567.	0	0	5567.	100.000
50	CONFECT. A	299.	7732.	0	0	7433.	96.133
51	ALCOHOLIC	0.	23803.	0	0	23803.	100.000
52	SOFT DRINK	43133.	12135.	30998.	71.866	0	0
53	FLAV. EXT.	0.	6611.	0	0	6611.	100.000
54	FATS & OIL	-0.	12459.	0	0	12459.	100.000
55	MISC.FOOD	12949.	17609.	0	0	4660.	26.462
56	TOBACCO MA	-0.	15196.	0	0	15196.	100.000
57	FABRIC AND	0.	23860.	0	0	23860.	100.000
58	FLOOR COVE	-0.	6139.	0	0	6139.	100.000
59	MISC. TEXT	7362.	3534.	3828.	51.994*	0	0
60	HOSIERY AN	18568.	9728.	8840.	47.610*	0	0
61	APPAREL MF	15607.	38972.	0	0	23365.	59.954
62	FABRICATED	14029.	7049.	6980.	49.757	0	0
63	LOGGING	68616.	61109.	7507.	10.941*	0	0
64	SAWMILLS A	19608.	31176.	0	0	11568.	37.105*
65	HARDWOOD F	2749.	1065.	1684.	61.273*	0	0
66	SPECIAL PR	1.	458.	0	0	457.	99.781
67	MILLWORK A	7379.	9989.	0	0	2610.	26.129
68	VENEER AND	1301.	7236.	0	0	5935.	82.020
69	STRUC.WOOD	275.	1447.	0	0	1172.	80.998
70	PREFAB. WO	3470.	3338.	132.	3.793	0	0
71	WOOD PRESS	8036.	2820.	5216.	64.909*	0	0
72	WOOD PEL.&	9230.	1788.	7442.	80.625*	0	0

73	PARTICLEBO	2579.	882.	1697.	65.820*	0	0	
74	WOOD PROD.	28555.	4635.	23920.	83.768*	0	0	
75	WOOD CONTA	802.	427.	375.	46.757	0	0	
76	WOOD HOUSE	1972.	10109.	0	0	8137.	80.493	
77	OTHER HOUS	206.	3777.	0	0	3571.	94.546	
78	WOOD OFFIC	863.	842.	21.	2.402	0	0	
79	OTHER FURN	511.	9093.	0	0	8582.	94.380	
80	PULP MILLS	1.	40232.	0	0	40231.	99.998	
81	PAPER MILL	437132.	22724.	414408.	94.802*	0	0	
82	PAPERBOARD	1.	13026.	0	0	13025.	99.992	
83	CONV.PAPER	1495.	24498.	0	0	23003.	93.897	
84	BLDG. PAPE	4107.	1098.	3009.	73.277	0	0	
85	PAPERBOARD	8075.	23620.	0	0	15545.	65.812	
86	NEWSPAPER	4648.	17630.	0	0	12982.	73.635	
87	PERIODICAL	16721.	19586.	0	0	2865.	14.626	
88	MISC. PRIN	33302.	27887.	5415.	16.261	0	0	
89	IND., INOR	13322.	53420.	0	0	40098.	75.062	
90	AGR. CHEMI	29604.	9206.	20398.	68.904	0	0	
91	MISC. CHEM	10730.	24419.	0	0	13689.	56.058	
92	PLASTIC AN	-0.	10814.	0	0	10814.	100.000	
93	SYNTHETIC	0.	5057.	0	0	5057.	100.000	
94	DRUGS	-0.	17964.	0	0	17964.	100.000	
95	CLEAN., TO	-0.	20304.	0	0	20304.	100.000	
96	PAINTS	1091.	7850.	0	0	6759.	86.102	
97	PETROLEUM	225811.	192751.	33060.	14.641	0	0	
98	PAVING AND	10437.	7325.	3112.	29.814	0	0	
99	TIRES AND	2197.	18884.	0	0	16687.	88.366	
100	MISC. RUBB	1433.	5750.	0	0	4317.	75.077	
101	PLASTIC PR	4410.	25932.	0	0	21522.	82.994	
102	LEATHER TA	-0.	496.	0	0	496.	100.000	
103	FOOT., OTH	162.	7595.	0	0	7433.	97.867	
104	GLASS	-0.	10228.	0	0	10228.	100.000	
105	HYDRAULIC	0.	9387.	0	0	9387.	100.000	
106	BRICK AND	-0.	1275.	0	0	1275.	100.000	
107	OTHER STRU	2043.	1954.	89.	4.338	0	0	
108	POTTERY AN	0.	1922.	0	0	1922.	100.000	
109	CONCR. BLO	6588.	5959.	629.	9.549	0	0	
110	CONCR. BLO	10777.	15236.	0	0	4459.	29.264	
111	LIME, GYP.	847.	3792.	0	0	2945.	77.665	
112	MISC. STON	44543.	13986.	30557.	68.600	0	0	
113	BLAST FURN	37191.	52640.	0	0	15449.	29.348	
114	ELECTROMET	1.	523.	0	0	522.	99.809*	
115	ST.WIRE &	1.	6548.	0	0	6547.	99.985	
116	COLD FIN.	1.	2461.	0	0	2460.	99.959	
117	STL. PIPE	1.	2999.	0	0	2998.	99.967	
118	IR.&STL. F	3768.	20666.	0	0	16898.	81.767	
119	IR.&STL. F	12573.	8886.	3687.	29.323	0	0	
120	METAL HEAT	1.	599.	0	0	598.	99.833	
121	PRIM.METAL	1.	472.	0	0	471.	99.788	
122	PRIM.COPPE	1.	623.	0	0	622.	99.840	
123	OTHER PRIM	394.	14685.	0	0	14291.	97.317	
124	PRIM.ALUM.	1675.	7335.	0	0	5660.	77.163	
125	OTHER PRIM	3140.	4145.	0	0	1005.	24.245	
126	METAL CONT	-0.	12753.	0	0	12753.	100.000	
127	HEATING AN	484.	4559.	0	0	4075.	89.383	
128	FABRICATED	7089.	44883.	0	0	37794.	84.206	
129	SCREW MACH	0.	4100.	0	0	4100.	100.000	
130	METAL STAM	6437.	8273.	0	0	1836.	22.190	
131	CUTLERY HD	29666.	10168.	19498.	65.725	0	0	
132	OTHER FAB.	8143.	29939.	0	0	21796.	72.801	
133	ENGINES	1853.	15304.	0	0	13451.	87.892	
134	FARM MACHI	26711.	19333.	7378.	27.620	0	0	
135	CONT. AND	44586.	50077.	0	0	5491.	10.965	
136	MAT. HAND.	20243.	10958.	9285.	45.870	0	0	
137	METALWORKI	2994.	16826.	0	0	13832.	82.206	
138	SPECIAL IN	2881.	14255.	0	0	11374.	79.790	
139	GEN. INDUS	1659.	24918.	0	0	23259.	93.342	
140	MACHINE SH	3017.	5923.	0	0	2906.	49.061*	
141	ELEC. COMP	0.	15290.	0	0	15290.	100.000	
142	CAL. AND A	-0.	1113.	0	0	1113.	100.000	
143	OFFICE MAC	-0.	4361.	0	0	4361.	100.000	
144	SERVICE IN	4248.	16590.	0	0	12342.	74.395	
145	ELEC. TRAN	1822.	11804.	0	0	9982.	84.564	
146	ELEC. INDU	0.	10351.	0	0	10351.	100.000	
147	HOUSEHOLD	150.	13917.	0	0	13767.	98.922	
148	ELECTRIC L	2752.	12561.	0	0	9809.	78.091	
149	RADIO AND	-0.	7738.	0	0	7738.	100.000	
150	TELEPHONE	-0.	10703.	0	0	10703.	100.000	
151	RADIO AND	143.	14387.	0	0	14244.	99.006	
152	ELECTRON T	14.	734.	0	0	720.	98.093	
153	SEMICONDUC	-0.	2432.	0	0	2432.	100.000	
154	OTHER ELEC	0.	3316.	0	0	3316.	100.000	
155	MISC. ELEC	798.	7996.	0	0	7198.	90.020	
156	MOTOR VEHI	9062.	157585.	0	0	148523.	94.249*	
157	AIRCRAFT	0.	25585.	0	0	25585.	100.000	
158	BOAT BUILD	297.	10705.	0	0	10408.	97.226	
159	RAILROAD E	0.	10113.	0	0	10113.	100.000	
160	MOTOR CYCL	0.	1102.	0	0	1102.	100.000	

161	OTHER TRAN	116.	10697.	0	0	10581.	98.916
162	ENG., SCIE	0.	2960.	0	0	2960.	100.000*
163	MECH-MEASU	-0.	5265.	0	0	5265.	100.000*
164	AUTO., TEM	-0.	1247.	0	0	1247.	100.000
165	SURG., MED	-0.	2984.	0	0	2984.	100.000
166	SURG., APP	184.	3399.	0	0	3215.	94.586
167	DENTAL EQU	231.	1369.	0	0	1138.	83.123
168	OPTICAL IN	87.	1961.	0	0	1874.	95.563
169	OPHTHAL. G	1259.	1010.	249.	19.813	0	0
170	PHOTOGR. E	2427.	13325.	0	0	10898.	81.786
171	WATCHES AN	0.	1406.	0	0	1406.	100.000
172	JEWELRY AN	0.	5338.	0	0	5338.	100.000
173	MUSIC. INS	3734.	8112.	0	0	4378.	53.967
174	OTHER MISC	18025.	12411.	5614.	31.148	0	0
175	RAILROAD T	131345.	45152.	86193.	65.623*	0	0
176	LOCAL TRAN	5300.	13642.	0	0	8342.	61.149
177	TRUCK TRAN	25834.	70050.	0	0	44216.	63.120*
178	WATER TRAN	15540.	20082.	0	0	4542.	22.618*
179	AIR TRANSP	7567.	32073.	0	0	24506.	76.407
180	PIPELINE T	0.	5562.	0	0	5562.	100.000
181	TRANS. SER	1388.	5272.	0	0	3884.	73.672
182	COMM. EXC.	50431.	67845.	0	0	17414.	25.667
183	RADIO AND	13275.	7402.	5873.	44.244	0	0
184	ELECTRIC U	149025.	124474.	24551.	16.474	0	0
185	GAS UTILIT	66973.	80520.	0	0	13547.	16.824
186	WATER AND	14622.	9807.	4815.	32.927	0	0
187	WHOLESALE	190660.	258919.	0	0	68259.	26.363*
188	RETAIL TRA	302926.	248599.	54327.	17.934*	0	0
189	BANKING	50658.	58210.	0	0	7552.	12.974
190	CRED. AGEN	15261.	22439.	0	0	7178.	31.989
191	INSURANCE	35003.	74226.	0	0	39223.	52.843
192	OWNER-OCC.	175399.	175399.	0.	.000	0	0
193	REAL ESTAT	218138.	353419.	0	0	135281.	38.278
194	HOTELS, LO	30795.	16516.	14279.	46.369*	0	0
195	PERS., REP	28978.	32505.	0	0	3527.	10.852
196	BARBER AND	5031.	6580.	0	0	1549.	23.537
197	MISC. BUS.	34444.	111317.	0	0	76873.	69.058
198	ADVERTISIN	3133.	6655.	0	0	3522.	52.921*
199	MISC. PROF	54435.	75459.	0	0	21024.	27.862
200	EATING, DR	128694.	101444.	27250.	21.174*	0	0
201	AUTO. REPA	46808.	59564.	0	0	12756.	21.416
202	MOTION PIC	4367.	10979.	0	0	6612.	60.223
203	AMUSE., RE	8950.	16820.	0	0	7870.	46.790
204	DOCTORS, D	72887.	60249.	12637.	17.338*	0	0
205	HOSPITALS	84690.	66487.	18203.	21.494*	0	0
206	OTHER MED.	47633.	33082.	14551.	30.549*	0	0
207	EDUCATION	11848.	24802.	0	0	12954.	52.229
208	NONPROF. O	35952.	30754.	5198.	14.458	0	0
209	SOCIAL SER	1760.	4402.	0	0	2642.	60.015
210	POST OFFIC	15842.	18057.	0	0	2215.	12.268
211	OTHER FED.	4895.	10217.	0	0	5322.	52.092
212	LOCAL GOV.	0.	2665.	0	0	2665.	100.000
213	OTHER STAT	35064.	37091.	0	0	2027.	5.465
214	SCRAP, USE	4877.	5922.	0	0	1045.	17.643
215	TOTAL INTE	5511802.	5300729.	2239747.	40.635	2028673.	38.272

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TABLE 2 GROSS OUTPUT, TOTAL REQUIREMENTS, AND EXCESS AND DEFICIT SUPPLY OF SPECIFIED INDUSTRY OUTPUT, ARROWHEAD, 1977.

NO.	INDUSTRY TITLE	GROSS OUTPUT	TOTAL REQUIREMENT [1]	EXCESS SUPPLY [2] TOTAL	EXCESS SUPPLY [2] PROPORTION OF GROSS OUTPUT	DEFICIT SUPPLY [3] TOTAL	DEFICIT SUPPLY [3] PROPORTION OF TOTAL REQUIREMENT
		(THOUS. DOL.)	(THOUS. DOL.)	(THOUS. DOL.)	(PCT.)	(THOUS. DOL.)	(PCT.)
1	DAIRY & PO	20366.	57662.	0	0	37296.	64.680
2	MEAT AN. &	17722.	105539.	0	0	87817.	83.208
3	FOOD, FEED	5434.	21663.	0	0	16229.	74.915
4	OTHER CROP	3290.	36644.	0	0	33354.	91.022
5	FOREST., F	2704.	18152.	0	0	15448.	85.104
6	AGR.,FOR.,	3920.	4889.	0	0	969.	19.828
7	IRON & FER	906037.	12526.	893511.	98.618*	0	0
8	NONFERROUS	1.	5482.	0	0	5481.	99.982*
9	COAL & PEA	1.	34154.	0	0	34153.	99.997
10	STONE,CLAY	4091.	15795.	0	0	11704.	74.099
11	OTHER MINI	0.	97694.	0	0	97694.	100.000
12	NEW CONSTR	503675.	330270.	173405.	34.428	0	0
13	MAIN. & RE	112213.	132461.	0	0	20248.	15.286
14	ORDNANCE	0.	8207.	0	0	8207.	100.000
15	MEAT PRODU	187570.	88693.	100142.	53.389	1266.	1.427
16	DAIRY PROD	94588.	39330.	67116.	70.956	11858.	30.151
17	CANNED,FRO	94627.	31206.	80736.	85.321	17315.	55.487
18	GRAIN MILL	7577.	30228.	178.	2.347	22829.	75.522
19	BAKERY PRO	20121.	18370.	1751.	8.701	0	0
20	ALCH. BEV.	43133.	42549.	30998.	71.866	30414.	71.480
21	MISC. FOOD	13248.	58563.	0	0	45315.	77.378
22	TEXTILE GO	7362.	33534.	3828.	51.994	30000.	89.461
23	APPAREL, F	48204.	55749.	15821.	32.820	23365.	41.912
24	LOGGING	68616.	61109.	7507.	10.941*	0	0
25	SAWMILLS	22358.	32698.	1684.	7.534	12024.	36.774*
26	PARTICLEBO	2579.	882.	1697.	65.820*	0	0
27	OTHER WOOD	59048.	31681.	37084.	62.804*	9717.	30.672
28	FURNITURE	3552.	23821.	21.	.584	20290.	85.176
29	PULP & PAP	442736.	101577.	417417.	94.281*	76259.	75.074
30	PAPERBOARD	8075.	23620.	0	0	15545.	65.812
31	PRINTING &	54671.	65102.	5415.	9.905	15846.	24.340
32	CHEM. & AL	54747.	149034.	20398.	37.259	114685.	76.952
33	PETR. REF.	236248.	200076.	36172.	15.311	0	0
34	RUBBER PRO	8040.	50566.	0	0	42526.	84.100
35	LEATHER PR	162.	8091.	0	0	7929.	97.998
36	GLASS, STO	64798.	63740.	31274.	48.264	30216.	47.405
37	PRIMARY FE	37195.	65171.	0	0	27976.	42.927
38	IRON $ STE	16343.	30623.	3687.	22.558*	17967.	58.671*
39	PRIMARY CO	395.	15308.	0	0	14913.	97.420
40	OTHER PRIM	4815.	11480.	0	0	6665.	58.056
41	FABRICATED	51819.	114674.	19498.	37.627*	82353.	71.815*
42	FARM MACHI	26711.	19333.	7378.	27.620	0	0
43	MACHINE SH	3017.	5923.	0	0	2906.	49.061
44	OTHER NON.	74216.	132338.	9285.	12.511	67407.	50.936
45	COMP., OFF	0.	20763.	0	0	20763.	100.000
46	SERV. IND.	4248.	16590.	0	0	12342.	74.395
47	ELECTRICAL	5679.	95937.	0	0	90258.	94.081
48	MOTOR VEHI	9062.	157585.	0	0	148523.	94.249
49	OTHER TRAN	413.	58203.	0	0	57790.	99.290
50	PROF., SCI	415.	18628.	0	0	18213.	97.772*
51	OPTICAL, O	3773.	16295.	249.	6.611	12771.	78.376
52	MISC. MFG.	21759.	25860.	5614.	25.803	9716.	37.570
53	RAILROAD T	131345.	45152.	86193.	65.623	0	0
54	LOCAL TRAN	5300.	13642.	0	0	8342.	61.149
55	TRUCK TRAN	25834.	70050.	0	0	44216.	63.120
56	AIR TRANS.	7567.	32073.	0	0	24506.	76.407
57	OTHER TRAN	16928.	30916.	0	0	13988.	45.246
58	COMMUNICAT	63706.	75247.	5873.	9.220	17414.	23.143
59	ELECTRIC U	149025.	124474.	24551.	16.474	0	0
60	GAS UTILIT	66973.	80520.	0	0	13547.	16.824
61	WATER & SA	14622.	9807.	4815.	32.927	0	0
62	WHOLESALE	190660.	258919.	0	0	68259.	26.363*
63	RETAIL TRA	302926.	248599.	54327.	17.934*	0	0
64	FINANCE, I	100922.	154875.	0	0	53953.	34.837
65	REAL ESTAT	393537.	528818.	0.	.000	135281.	25.582
66	HOTELS, PE	64804.	55601.	14279.	22.035*	5076.	9.129
67	BUSINESS S	92012.	193431.	0	0	101419.	52.432*
68	EAT.&DRINK	128694.	101444.	27250.	21.174*	0	0
69	AUTOMOBILE	46808.	59564.	0	0	12756.	21.416
70	MOTION PIC	13317.	27799.	0	0	14482.	52.095
71	HEALTH SER	205210.	159818.	45392.	22.120*	0	0
72	EDUC., NON	49560.	59957.	5198.	10.488	15595.	26.011

73	FED. GOV'T	20737.	28275.	0	0	7538.	26.659
74	STATE & LO	35064.	39756.	0	0	4692.	11.802
75	SCRAP, USE	4877.	5922.	0	0	1045.	17.643
76	SUB-TOTAL	5511802.	5300729.	2239747.	40.635	2028673.	38.272

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