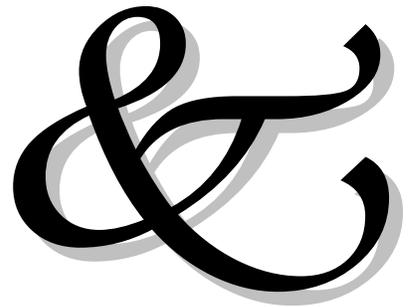


**VOLUME THREE
APPENDICES**

**Section D
Structural Analysis of the
St. Croix County Economy**

APPENDIX D



Structural Analysis of the St. Croix County Economy: With Insights to Economic Development Strategies

August 1996

INTRODUCTION

The development of a sound comprehensive planning policy must be based on a solid understanding of the regional economy. To help guide the future direction of economic growth and development in St. Croix County the University of Wisconsin-Extension has undertaken a number of economic studies to help local decision makers gain such insights.

The first of these studies, "The Contribution of Manufacturing to the St. Croix County Economy," was intended to shed light on recent historical patterns in the performance of the manufacturing sector of the county's economy.¹ The overriding conclusion to that study is that manufacturing is becoming increasingly important to the county's economy, contrary to national trends. The intent of this study is to build upon the manufacturing study by dissecting

the county's economy and describe in detail one possible strategy for economic development and growth for the county.

The study is composed of five parts beyond these introductory comments. First, we will briefly describe the analytic model of the St. Croix County economy used in this study. Next, a detailed discussion of the current structure of the economy is presented. We then consider one possible use of the economic model of St. Croix County to develop a refined set of economic development strategies. In particular we explore how the model can be used to identify specific areas to promote the economic development strategy of import substitution. A selection of economic multipliers for the county are then provided and discussed. We close the paper with a brief summary of the study's findings and policy implications.

INTRODUCTION TO MODELING STRUCTURE

To gain insights into the structure of the county's economy requires the adoption of some type of methodological approach. While there are many methods of regional (e.g., county) economic analysis, a common and widely used approach is that of regional input-output modeling. The prominence of input-output modeling is based on several factors. It is an excellent descriptive tool showing in detail the structure of a regional economy. It provides important information on individual sectors, behavior, and interactions within and between regional economies. It also shows the relative importance of sectors in terms of their contribution to the local economy (e.g., manufacturing). This descriptive aspect of input-output is particularly important because it allows policy makers to develop a better understanding of the local economy which is so important to crafting sound comprehensive plans and economic development policy.

Input-output models of regional economies are helpful to the user because they provide a means to predict how the economy will respond to external changes, planned or unplanned.

Therefore, it is a useful tool in prescriptive exercises where alternative policies must be evaluated based on the relative merits of alternative outcomes.

An input-output model can best be described as a "snapshot" of the economy detailing the sales and purchases of goods and services between all sectors of the economy for a given period of time. Business output (sales) can be purchased by other businesses as inputs, households for final consumption, or exported outside of the region (in this case St. Croix County). Business inputs (purchases) are either from other businesses within the region, are purchased from households (labor), or imported from outside the region. The input-output model allows these linkages to be described empirically. In this study, the Micro-IMPLAN (IMpact PLANning) computer modeling system is used to create the input-output model for the St. Croix County economy.ⁱⁱ All figures are for 1993. The full model for St. Croix County is composed of 181 separate sectors. For reporting purposes, several versions of the model, varying by size, will be used.

STRUCTURE OF THE ST. CROIX COUNTY ECONOMY

For descriptive analysis we have elected to detail four aspects of the county's economy. First, a brief discussion of sources of income by business sector will be presented. Second, we will explore the destination of individual sector sales. Six broad categories of sales will be used: 1) sales to other businesses within the county; 2) sales directly to households for consumption; 3) exports out of the county, but within the US; 4) exports out of the US (foreign exports); 5) changes in capital inventory;ⁱⁱⁱ and 6) sales to the government. Third, a brief discussion of the contribution of business sectors to county exports will be presented. Finally, we will detail the purchases of individual sectors in their business operations. Three categories of purchases will be used: 1) purchases from other county businesses; 2) purchases from households (labor); and 3) imports. Particular attention will be paid to the nature of imports later in this report.

For reporting brevity, a scaled down version of the St. Croix County input-output model is employed. All business sectors are consolidated into nine reporting sectors including: 1) agriculture; 2) mining; 3) construction; 4) manufacturing; 5) transportation, communication, and utilities; 6) trade (wholesale/retail); 7) FIRE (finance, insurance and real estate); 8) services; and finally 9) government. This grouping follows the standard one-digit Standard Industrial Classification (SIC) codes.

Results of the first part of the analysis, sources of income by business sector, is reported in Figure 1. Consistent with the results of the first study in this series

of reports, manufacturing accounts for 30.3 percent of income, or about \$285 million. Trade (whole/retail) and services each account for 16 percent, or about \$150 million each, followed by FIRE (finance, insurance and real estate) at 13.4 percent, or \$126 million. Government accounts for 7.5 percent of total income as determined by the St. Croix County input-output model, or \$71 million, closely followed by construction with 7.2 % or \$68 million. Agriculture and TCU (transportation, communications and utilities) account for 4.3 percent, \$40 million and 5.2 percent, \$49 million respectively. Mining is a relatively small part of the county economy. Total income within the county for 1993 is just short of \$1 billion at \$940 million. While these data do not lend insight into the structure of the county's economy in light of the input-output model, they do aid us in weighing the ramifications of subsequent sectoral analysis reported below.

Businesses in St. Croix County can be grouped into two broad categories based on their types of customers (Table 1). The first broad grouping are businesses that sell primarily to local (in county) customers. For example, the transportation, communications and utilities sector (TCU) sells 50.1 percent of its products to other businesses within the county and 21.2 percent to county households. Given the nature of transportation services and utilities, this makes intuitive sense. Trade, FIRE (finance, insurance and real estate), and service businesses are also locally focused selling majority of their products to local households. Likewise St. Croix County

construction companies tend to conduct most of their business within the county.

The second broad grouping are businesses that tend to export their products to consumers outside the county. For example, agriculture sells 75.9 percent of its products to customers outside of the county, but within the US, and 3.7 percent outside of the US. Slightly more than 16 percent of agricultural sales are to other industries within the county. Examples of the latter would include local vegetable farmers selling their crops to Friday Canning, or local dairy farmers selling milk directly to Cady Cheese. Other sectors falling into this "export" oriented category includes mining (98.7 percent exported) and manufacturing (80.7 percent exports).^{iv} These export sales represent injections of money into the county's economy. Indeed, based on the model results, a total of \$924 million, or 49.5 percent of total sales of all county businesses, is exported out of the county. As demonstrated in Figure 2, manufacturing accounts for 72.3 percent all exports out of the county, or about \$667 million dollars. The next closest sector in terms of dollar volume is agriculture at \$88 million, or 9.5 percent of total exports out of the county.

In addition to the destination (local vs. export) of a firm's sales, the nature of their expenditures in producing their product or service is equally important. As outlined above, firms are assumed within the input-output model to have three major categories of expenditures: 1) purchases from other county businesses; 2) purchases from households (labor); and 3) imports. Unlike the nature of business sales reported in Table 1, there does not appear to be a clear grouping of

businesses by expenditure type (Table 2). For the economy overall, 15.4 percent, or about \$293 million, of all inputs are purchased from other businesses located in St. Croix County. Nearly 50 percent, or \$940 million, of all local business purchases are from local household in the form of labor.^v The remaining inputs into the operations of local businesses are imported into the county, to the tune of some \$667 million.

Using the county totals as a reference, patterns across individual business sectors starts to become apparent. For example, the trade and government sectors are particularly labor intensive at 76.6 and 97.3 percent, respectively, of total business expenditures going to county households. Manufacturing, agriculture and construction appear to be the least labor intensive with slightly more than one third of total expenditures going to households. The largest purchaser of other county business products and services, on a percentage basis, is TCU (transportation, communication and utilities) which purchases 21.2 percent of its inputs from local businesses. Manufacturing follows closely at 19.5 percent of its purchases being from local businesses.

While exports represents injections of money into the local economy, imports of goods and services used in the production process represents leakages of money. Of the \$1.9 billion in total business expenditures in the county, 35.1 percent, or \$665 million is lost to the county's economy in the form of purchases of imports. Manufacturing imports nearly 50 percent (48.7%) of all its inputs in terms of dollars spent. Agriculture is close behind at 47.5 percent, and construction importing 42

percent of all the inputs used in its production process.

The nature of the imports, however, can take one of two forms. First, for many production processes, the good or service required simply is not available locally. These imports are said to be non-competitive imports. Second, some of the goods and services imported into the county for use by businesses are available within the county, but for various reasons, businesses are choosing to make their purchased form non-local businesses. These imports are said to be competitive imports. The input-output model for St. Croix County allows us to examine these competitive and non-competitive imports in great detail and can be used to target industries for the economic development strategy of import substitution. Indeed, the next section of

this report will go into great detail outline specifics for the county.

Consistent with the previous study in this series, manufacturing appears to play a dominate role in the St. Croix County economy. The high level of both exports out of the county as well as imports into the county demonstrates the trend toward a global economy and the influences that the larger national/international economy can and does have on the St. Croix economy. The analysis also suggests that the St. Croix County economy is clearly composed of two components: those with customers primarily outside the county (i.e., exports), specifically agriculture and manufacturing, and those that service local needs, such as trade and services.

IMPORT SUBSTITUTION AS AN ECONOMIC DEVELOPMENT STRATEGY

There are essentially two ways that a regional economy can grow: either it can increase its production for sales to the outside world (i.e., exports) or produce for itself what it would otherwise buy from the outside (i.e., minimize imports). Historically, regional economic development policies have tended to pursue the former while overlooking the latter. The growth of manufacturing in St. Croix County is an excellent example of the former type of development strategy. The large volume of imports identified in section III of this report suggests that there is significant potential to pursue the latter development policy of import minimization through import substitution.

Given the detailed structure of the St. Croix County input-output model, great insight can be gained into the nature of imports and the viability of import substitution as a development strategy. The analysis provided here uses a three step process to identify targeted industries and specific local business opportunities to substitute local production for imports. First, using the county input-output model we are able to estimate the dollar volume of competitive imports to a specific business sector. Recall that competitive imports are goods and services imported into the county for use by businesses which are available within the county, but for various reasons, businesses are choosing to make their purchased form non-local businesses. Second, using a combination of local business expenditure patterns and an estimate of local purchase shares, we are able to estimate the amount of business expenditures that are local and imported.

For example, if a business requires \$1 million worth of a certain input and the local purchase share is estimated to be .25, this implies that \$250,000 worth of the input is purchased locally, the remaining \$750,000 worth of the input is imported into the county. There are three basic reasons why the local purchase share might be less than 1.00. First, it could be the local supply of the input in question is simply not sufficient to satisfy the needs of the buying company and the company is forced to look outside for additional purchases. Second, the company purchasing the input may not be aware of the local availability of the input, hence looks outside the county for the good or service. Third, the purchasing company may be aware of a local supplier, and supply is sufficient, but concerns over price/quality forces the purchasing company to look outside the county.

The third step in our process attempts to address the first of the three reasons for non local purchases just identified. Specifically, using the detailed estimates of the St. Croix County input-output model, we estimate the level of local supply and availability of the input in question.

In terms of development policy there are three potential avenues of action given this information. First, if the demand for the input is sufficiently large and is not locally available, there may be opportunities for new business formation. Second, if the purchaser of the input is unaware of a local supplier, simple networking may be appropriate. Third, if the issue is price/quality of the locally available input, the development officer

might be able to help negotiate terms of a contract.

A listing of St. Croix County industries by level of competitive imports is presented in Table 3. For reporting purposes we have limited the listing of industries to those with more than \$1 million in competitive imports. The first column of the table is simply a numerical identifier of the industry, followed by the name of the industry and the dollar amount of competitive imports. At the top of the list is the sector referred to as prepared feed, with just over \$100 million dollars in competitive imports. The next highest is the industry producing motors and generators at \$37 million, followed by miscellaneous plastic products. For illustrative purposes we have selected three sectors that have a high level of competitive imports for further analysis. These are prepared feeds, miscellaneous plastic products and banking (Table 4).

For prepared feeds, the largest single purchased input is soybean oil (commodity number 87) at \$28 million.^{vi} Given a local purchase share of 0.0 implies that none of the input soybean oil is purchased within the county. Turning attention to Table 5, we see that while there is some production of soybean oil in the county, the level of production (\$8300) is insufficient to meet the needs of the prepared feed industry within the county. The potential for import substitution with this commodity input seems limited.

If we look at input commodity prepared feed itself (commodity number 78), we see that firms within the prepared feed industry buy inputs from each other, to the tune of \$21 million. This intra-industry transactions might

reflect individual firms specializing in one particular process and selling intermediate inputs to each other. But the level of intra-industry activity for prepared feeds within St. Croix County is limited with less than two percent of the \$21 million expenditure taking place in the county. Examination of the level of output for the industry within the county reveals that total production is \$125.5 million, of which \$125 million is exported out of the county (Table 5). In this example, it appears that there may be significant opportunities to substitute local production for imports, specifically, networking within the industry itself. While the input-output analysis suggests some potential, the actual feasibility of this specific situation requires additional analysis beyond the scope of the input-output model.^{vii}

Turning attention to the second example, miscellaneous plastic products, we see that \$34 million dollars in imports are competitive (Table 3). Given the detailed expenditure pattern of this industry in Table 4, we see that the single largest input into this industry is plastic materials and resin (commodity number 191) at \$14 million. The local purchase share, 1.6 percent, suggests that only \$222,000 of this input is purchased locally, with the remaining imported from outside the county. Examining the level of local production of plastic materials and resin, we see that only \$273,000 worth of this commodity is produced within the county. Given the local purchases of \$222,000, local production of \$273,000, and zero exports, suggests that nearly all of the locally produced commodity is purchased by local plastic firms. Given the amount of demand by the plastics industry in the county for this

commodity might suggest additional business opportunities.

Another input used by the plastics industry in the county is paperboard containers and boxes (commodity number 164), at \$1.4 million. The local purchase share is estimated to be 3.4 percent, for local sales of \$49,000, with the remainder of this commodity input being imported. If we examine the local supply of paperboard containers and boxes, we see that \$307,000 worth of the commodity is available, with none being exported. While the potential for import substitution is limited, the potential for expansion of the industry producing this commodity for sale to local businesses (e.g., plastics companies) is significant.

The strategy of import substitution is not limited to manufacturing industries. Indeed, examination of the banking industry in the county reveals that this industry purchases more than \$20 million in competitive imports (Table 3). Examining the detailed expenditure pattern for the banking industry reveals that its largest non-labor input is services from other banks (Table 4). Two inputs that are perhaps more interesting include security and commodity brokers (commodity number 458) and computer and data processing services (commodity number 475). For security and commodity brokers, banks within the

county purchase \$4.5 million, of which 5.4 percent, or \$246,000, is purchased locally. The local security and commodity brokers sector has \$797,000 worth of sales which is nearly all local. Again, while import substitution may appear limited, there may be potential for expansion of the local brokerage industry to service local banks.

For computer and data processing service, banks within the county purchase \$3.3 million, of which 6.3 percent, or \$209,000, is purchased locally. The computer and data processing service industry within St. Croix County has total sales of \$1.1 million of which is nearly all local. As with brokerage services, there may be potential for the local computer and data processing industry to expand, again to service the needs of local banks.

Again, we must reiterate that the analysis presented here does not speak to the feasibility of this development strategy, but only service as a means of pointing to potential opportunities. For example, with the banking industry banking laws and regulations may prohibit the level of interaction with any one brokerage firm. Alternatively, the ability of the local computer and data processing industry may be insufficient to meet the needs of local banks. The feasibility of these specific development strategies requires much further analysis beyond the scope of input-output analysis.

ECONOMIC MULTIPLIERS FOR THE COUNTY

When assessing the economic impact of a change in the County's economy it is important to recognize the interdependency among the different sectors within the local economy. The creation of new opportunities in one sector will likely impact the activities of other sectors. Upon acknowledgement of such economic linkages, a basic question arises: to what extent will changes in one sector affect the level of activity in the overall economy? The Input-Output model of St. Croix County allows us to estimate the level of these changes by computing a collection of economic multipliers.

An economic multiplier is a numerical measure assessing the total change in economic activity resulting from an initial change in any one particular sector of the economy. Suppose that the employment multiplier for dairy is 1.5. This implies that for every new job in dairying, total employment in the local economy will increase by one and one-half jobs. The total number of new jobs represents the initial new job plus an induced additional one-half job. A decrease in employment opportunities would have the same impact but in the form of declining employment.

An additional use of economic multipliers centers on the multiplier's use as a measure of the sector's linkage with the overall local economy. A larger value of the multiplier indicates that the sector is more closely linked or tied to the larger economy. A smaller multiplier indicates a looser connection between that sector and the rest of the economy.

The value of the multiplier as a measure of sectoral linkage comes to light

when assessing economic development policy options. In particular, if the policy goal is job creation, development policy should be targeted toward those sectors which are more tightly linked to the rest of the economy. Sectors that are more closely linked to the rest of the economy will contribute significantly more in terms of job creation throughout the rest of the economy. Conversely, sectors that are weakly linked may not contribute much to the rest of the economy. The economic development strategy of import substitution outlined above is a means to strengthen these linkages.

The St. Croix County input-output model provides a set of three separate multipliers:

Output Multiplier: The output multiplier for industry *i* measures the sum of direct and indirect requirements from all sectors needed to deliver one additional dollar unit of output of *i* to final demand.

Income Multiplier: The income multiplier measures the total change in income throughout the economy from a dollar unit change in final demand for any given sector.

Employment Multiplier: The employment multiplier measures the total change in employment due to a one unit change in the employed labor force of a particular sector.

While multipliers may be used to assess the impact of changes on the economy, it is important to note that such a practice leads to limited impact information. A more complete analysis is not based on a single multiplier, but rather, on the complete model. A general

discussion of the proper, and inappropriate, uses of multipliers is presented in an appendix to this text.

Again, for reporting purposes, a third version of the St. Croix County input-output model is reported. Specifically, a partially aggregated model to the two digit Standard Industrial Classification (SIC) scheme is employed. Here the full 181 sector model is reduced to 52 sectors. The output, income and employment multiplier for each of the 52 sectors is reported in Table 6.

Consider first the output multiplier which captures the total change in business sales resulting from the change in the level of activity for any one business or industry. The output multiplier for the general category of food and kindred manufacturing, is 1.362 as compared to hotels and lodging which has an output multiplier of 2.763. This would suggest that food and kindred manufacturing firms are less "connected" to the rest of the county's economy than hotels and lodging. If we recall the analysis of prepared feeds in the previous section, the extremely large dollar volume of competitive imports suggest significant leakages from the local economy. In short, the greater the leakages (i.e., imports) the lower the degree of "connectness" or linkage to the rest of the local economy, and this is captured by the relatively small output multiplier.

Turning attention to income multipliers which capture the total change in local income resulting from new income being generated in the local economy due to increases, or decreases, in business activity. Consider for example, miscellaneous plastics (sector number 220) which has an income multiplier of 1.618. Every dollar of

additional income earned in this sector due to increased levels of business activity generates an additional 62 cents in income through the multiplier effect. Compared to 2.322 for production agriculture (sector number 1), the plastics industry does not appear to be as "connected" or linked to the local economy as does farming. This raises two points. First, the degree of linkage with an income multiplier is directly related to the spending patterns of local employees, not necessarily the expenditure patterns of the business itself. Second, the income multiplier is influenced to a large extent by the wage structure within the industry. Generally, but not necessarily, higher wage sectors tend to have higher income multipliers. But the interaction between wages levels and employee expenditure patterns is sufficiently complex to preclude any broad generalization. Consider, legal services (sector number 494) which is generally considered a high income sector, but it has an income multiplier of only 1.284. Clearly there is a more complex dynamics occurring than can be captured by a simple single measure multiplier.

Employment multipliers capture the total change in employment resulting from a change in industry employment. It is important to note that employment within the St. Croix County input-output model does not distinguish between full- and part-time employment. Hence, care must be used when interpreting employment multipliers. Consider real estate (sector number 461) which has an employment multiplier of 2.754, which given the discussions outlined in the appendix to this report is unusually high, particular in light of the small output and income multipliers. A cursory

examination of the real estate industry in St. Croix County reveals that there are a very large number of part-time real estate agents who may not be particularly active. Within the structure of the input-output model, high levels of employment relative

to low output and income levels rests in high employment multipliers and low output and income multipliers. Again, by using economic multipliers to help better phrase the questions can lend insight into the structure of a local industry.

CONCLUSIONS

Analysis of the economy of a given area can help decision makers to formulate effective comprehensive plans, land use policies, and economic development strategies.

Various methods have been used for economic analysis. The use of input-output models is an effective tool for examining the structure of a regional economy such as St. Croix County, offering several features. It provides descriptive information on the individual sectors of the county economy and shows the relative importance of each sector as a contributor to the total county economy. Through the use of multipliers, an input-output model of the county economy also provide a means to predict how the county economy will respond to external changes. This latter feature is particularly helpful in evaluating the relative merits of alternative policies under consideration by county and local officials.

The structural analysis of the county economy reveals that the manufacturing, trade, and services, and finance, insurance and real estate sectors provide the most income. Exports are led by manufacturing, with agriculture in second place. Business activities that export sales

are important because they bring money into the county economy.

Purchases from outside the county economy represent leakages, and the data indicate that 35 percent of all business purchases are from outside the county. The largest exporting sectors are also the largest importing sectors: manufacturing and agriculture. Import substitution is offered as one strategy for growth of the county economy. Three businesses with high imports are examined for the possible application of import substitution: prepared feeds manufacturing, plastic product manufacturing, and banking. The input-output model of the county economy suggests possible import substitution activities for feasibility analysis.

Multipliers for various types of business activities provide an indicator of those businesses that are most linked to the county economy. Three types of multipliers are examined: total income, employment, and total output. The analysis indicates that there exists a broad range of multiplier values in the St. Croix County economy. The specific multipliers for 52 sectors are presented.

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Table 1. St Croix County Sales by Industry (1993)

	Sales to other County Industries	Sales to Households	Domestic Exports	Foreign Exports	Capital/ Inventory	Government Purchases
AG	16.3%	3.6%	75.9%	3.7%	0.2%	0.4%
Mining	1.3%	0.0%	97.3%	1.4%	0.0%	0.0%
Constr	28.9%	0.0%	7.1%	0.0%	45.6%	18.4%
Manuf	9.0%	1.4%	68.0%	12.7%	8.7%	0.2%
TCU	50.1%	21.2%	20.3%	4.5%	1.8%	2.1%
Trade	15.5%	65.7%	10.9%	3.4%	3.1%	1.4%
FIRE	16.4%	51.6%	27.8%	2.4%	0.3%	1.5%
Serives	17.5%	62.3%	18.6%	0.3%	0.0%	1.2%
Govt	5.3%	2.3%	0.0%	0.1%	0.0%	92.3%

Source: Micro-IMPLAN, computations by the authors.

Table 2. St Croix County Purchase by Industry (1993)

	Purchases from other County Industries	Purchases from Households (labor)	Imports
AG	15.8%	36.7%	47.5%
Mining	17.4%	47.8%	34.8%
Constr	19.5%	38.5%	42.0%
Manuf	16.9%	34.5%	48.7%
TCU	21.2%	58.2%	20.6%
Trade	9.3%	76.6%	14.2%
FIRE	17.4%	62.7%	19.9%
Serives	12.8%	65.3%	21.9%
Govt	1.2%	97.3%	1.5%

Source: Micro-IMPLAN, computations by the authors.

QUATTRO PRO BAR GRAPH TO BE SUBSTITUTED IN PRODUCTION

Figure 1 Contribution to County Economy as measured by Income (TVA)

AG	4.3%	\$40,209,300
Mining	0.1%	\$1,153,300
Constr	7.2%	\$67,973,400
Manuf	30.3%	\$285,030,200
TCU	5.2%	\$48,603,600
Trade	16.0%	\$150,472,600
FIRE	13.4%	\$125,951,600
Serives	16.0%	\$150,022,200
Govt	7.5%	\$70,653,200
		\$940,069,400

QUATTRO PRO BAR GRAPH TO BE SUBSTITUTED IN PRODUCTION

Figure 2 Contribution to County Economy as measured by Exports

AG	9.5%	\$87,992,100
Mining	0.3%	\$2,388,700
Constr	1.4%	\$12,654,800
Manuf	72.3%	\$667,675,600
TCU	2.2%	\$20,709,400
Trade	3.0%	\$28,162,600
FIRE	6.6%	\$60,901,600
Serives	4.7%	\$43,518,900
Govt	0.0%	\$48,800
		\$924,052,500

Table 3. Level of Competitive Imports for St. Croix County Industries (1993)

	Competitive Imports
78 Prepared Feeds, N.E.C	\$100,626,800
357 Motors And Generators	\$37,330,070
220 Miscellaneous Plastics Produc	\$34,409,470
1 Dairy Farm Products	\$34,369,960
335 Packaging Machinery	\$28,674,140
56 Maintenance And Repair Other	\$23,469,540
347 Refrigeration And Heating Equ	\$21,155,390
456 Banking	\$20,632,860
454 Eating & Drinking	\$16,384,520
62 Cheese, Natural And Processed	\$15,035,430
67 Canned Fruits And Vegetables	\$15,022,590
378 Electronic Components, N.E.C.	\$14,283,470
49 New Industrial And Commercial	\$14,254,660
48 New Residential Structures	\$13,379,060
492 Hospitals	\$11,395,430
479 Automobile Repair And Service	\$10,949,360
461 Owner-occupied Dwellings	\$10,219,740
330 Food Products Machinery	\$10,051,000
179 Commercial Printing	\$9,915,280
103 Food Preparations, N.E.C	\$9,342,220
435 Motor Freight Transport And W	\$9,274,610
311 Construction Machinery And Eq	\$8,472,670
334 Blowers And Fans	\$7,116,270
169 Die-cut Paper And Board	\$6,934,170
354 Industrial Machines Nec.	\$5,818,340
285 Sheet Metal Work	\$5,542,210
54 New Government Facilities	\$5,259,850
55 Maintenance And Repair, Resid	\$5,029,690
283 Metal Doors, Sash, And Trim	\$5,013,730
168 Bags, Paper	\$4,952,450
3 Ranch Fed Cattle	\$4,491,700
50 New Utility Structures	\$4,025,730
294 Metal Stampings, N.E.C.	\$4,005,680
462 Real Estate	\$3,924,930
51 New Highways And Streets	\$3,600,280
372 Telephone And Telegraph Appar	\$3,236,800
296 Metal Coating And Allied Serv	\$3,216,730
13 Hay And Pasture	\$3,102,110
490 Doctors And Dentists	\$3,038,880

383 Electrical Equipment, N.E.C.	\$2,995,000
504 Labor And Civic Organizations	\$2,967,620
500 Social Services, N.E.C.	\$2,879,980
5 Cattle Feedlots	\$2,760,640
447 Wholesale Trade	\$2,609,390
451 Automotive Dealers & Service	\$2,552,850
166 Paper Coated & Laminated Nec	\$2,279,660
494 Legal Services	\$2,196,820
444 Gas Production And Distributi	\$2,172,470
441 Communications, Except Radio	\$1,901,880
2 Poultry And Eggs	\$1,793,290
483 Motion Pictures	\$1,672,590
284 Fabricated Plate Work	\$1,610,780
59 Sausages And Other Prepared M	\$1,565,890
224 Shoes, Except Rubber	\$1,456,860
306 Fabricated Metal Products, N.	\$1,447,700
507 Accounting, Auditing And Book	\$1,434,810
491 Nursing And Protective Care	\$1,430,290
493 Other Medical And Health Serv	\$1,379,440
460 Insurance Agents And Brokers	\$1,299,210
65 Fluid Milk	\$1,283,200
205 Adhesives And Sealants	\$1,273,280
244 Ready-mixed Concrete	\$1,252,590
52 New Farm Structures	\$1,244,230
137 Millwork	\$1,223,770
449 General Merchandise Stores	\$1,208,300
278 Hardware, N.E.C.	\$1,140,620
457 Credit Agencies	\$1,086,330
12 Feed Grains	\$1,082,350
7 Hogs, Pigs And Swine	\$1,069,830
379 Storage Batteries	\$1,045,480
157 Wood Partitions And Fixtures	\$1,044,980
508 Management And Consulting Ser	\$1,042,760

Table 4. Detailed Expenditure Patterns for Selected St. Croix County Industries

Prepared Feeds nec (1993)

Commodity	Gross Input	Local Purchase Share	Local Purchases	Imports
87	\$27,961,100	0.0000	\$0	\$27,961,100
78	\$21,033,210	0.0192	\$404,258	\$20,628,952
195	\$11,066,110	0.0612	\$676,693	\$10,389,417
12	\$7,120,510	0.0954	\$679,439	\$6,441,071
13	\$6,276,690	0.1105	\$693,323	\$5,583,367
72	\$4,862,300	0.0005	\$2,383	\$4,859,917
89	\$4,013,190	0.0131	\$52,533	\$3,960,657
435	\$3,283,770	1.0000	\$3,283,770	\$0
447	\$3,119,930	0.6733	\$2,100,586	\$1,019,344
60	\$2,148,740	0.0090	\$19,317	\$2,129,423
86	\$2,143,750	0.0000	\$0	\$2,143,750
202	\$1,986,280	0.0000	\$20	\$1,986,260
70	\$1,856,720	0.0008	\$1,541	\$1,855,179
190	\$1,820,060	0.0064	\$11,667	\$1,808,393
90	\$1,709,490	0.0926	\$158,333	\$1,551,157
433	\$1,686,890	0.0993	\$167,542	\$1,519,348
469	\$1,006,220	0.6307	\$634,653	\$371,567

Miscellaneous Plastic Products

Gross Commodity	Local Inputs	Local Purchase Share	Local Purchases	Imports
191	\$13,929,800	0.0159	\$221,820	\$13,707,970
220	\$3,980,300	0.0077	\$30,460	\$3,949,850
435	\$2,327,160	1.0000	\$2,327,160	\$0
447	\$2,303,810	0.6733	\$1,551,100	\$752,710
190	\$2,078,060	0.0064	\$13,310	\$2,064,750
56	\$1,659,060	1.0000	\$1,659,060	\$0
443	\$1,534,590	0.0983	\$150,890	\$1,383,700
164	\$1,428,260	0.0343	\$48,950	\$1,379,310
331	\$1,268,250	0.7800	\$989,180	\$279,070

Banking

Commodity	Gross Input	Local Purchase Share	Local Purchases	Imports
456	\$4,857,270	0.5701	\$2,769,130	\$2,088,140
458	\$4,527,360	0.0543	\$245,690	\$4,281,680
475	\$3,332,490	0.0627	\$208,810	\$3,123,680
462	\$2,030,390	0.4510	\$915,690	\$1,114,700
56	\$1,901,260	1.0000	\$1,901,260	\$0
508	\$1,771,470	0.2617	\$463,590	\$1,307,880
513	\$1,532,990	0.7021	\$1,076,260	\$456,730
435	\$1,308,980	1.0000	\$1,308,980	\$0
441	\$1,217,830	0.4018	\$489,330	\$728,500
459	\$1,206,040	0.0359	\$43,340	\$1,162,700
507	\$1,094,710	0.6490	\$710,460	\$384,240
474	\$1,052,410	0.6635	\$698,270	\$354,140

St. Croix County Commodity Supply and Export (1993)

Commodity	Supply	Exports
1 Dairy Farm Products	\$48,591,200	\$44,205,000
2 Poultry And Eggs	\$3,838,600	\$3,406,100
3 Ranch Fed Cattle	\$9,577,700	\$7,568,100
4 Range Fed Cattle	\$463,800	\$67,100
5 Cattle Feedlots	\$6,809,700	\$6,592,400
6 Sheep, Lambs And Goats	\$91,800	\$71,800
7 Hogs, Pigs And Swine	\$2,589,800	\$2,087,500
8 Other Meat Animal Products	\$7,800	\$7,800
9 Miscellaneous Livestock	\$972,600	\$257,900
11 Food Grains	\$142,600	\$135,500
12 Feed Grains	\$8,052,500	\$5,821,800
13 Hay And Pasture	\$13,705,300	\$11,404,500
16 Fruits	\$1,541,300	\$355,700
18 Vegetables	\$2,300,000	\$187,200
21 Oild Bearing Crops	\$2,786,800	\$2,145,400
23 Greenhouse And Nursery Produ	\$1,222,300	\$268,100
24 Forestry Products	\$670,900	\$670,900
25 Commercial Fishing	\$63,700	\$50,700
26 Agricultural, Forestry, Fish	\$1,069,400	\$0

27	Landscape And Horticultural	\$3,463,700	\$1,901,000
38	Natural Gas & Crude Petroleu	\$3,200	\$3,200
40	Dimension Stone	\$1,364,500	\$1,359,400
41	Sand And Gravel	\$1,123,400	\$1,115,800
46	Nonmetallic Minerals	\$4,400	\$4,400
47	Misc. Nonmetallic Minerals,	\$17,000	\$17,000
48	New Residential Structures	\$33,525,500	\$0
49	New Industrial And Commercia	\$36,979,900	\$1,213,800
50	New Utility Structures	\$9,950,500	\$0
51	New Highways And Streets	\$9,093,200	\$0
52	New Farm Structures	\$2,632,500	\$0
53	New Mineral Extraction Facil	\$185,800	\$0
54	New Government Facilities	\$10,422,900	\$0
55	Maintenance And Repair, Resi	\$13,736,000	\$2,244,700
56	Maintenance And Repair Other	\$60,469,400	\$9,196,200
58	Meat Packing Plants	\$196,100	\$0
59	Sausages And Other Prepared	\$2,754,800	\$0
60	Poultry Processing	\$54,900	\$0
61	Creamery Butter	\$271,900	\$239,900
62	Cheese, Natural And Processe	\$31,139,300	\$19,695,500
63	Condensed And Evaporated Mil	\$1,188,600	\$627,800
64	Ice Cream And Frozen Dessert	\$375,900	\$242,100
65	Fluid Milk	\$11,987,200	\$7,985,700
66	Canned Specialties	\$439,000	\$438,300
67	Canned Fruits And Vegetables	\$31,613,300	\$31,548,000
68	Dehydrated Food Products	\$479,900	\$478,000
69	Pickles, Sauces, And Salad D	\$1,214,300	\$1,212,700
70	Frozen Fruits, Juices And Ve	\$775,900	\$772,800
71	Frozen Specialties	\$1,513,000	\$1,504,700
72	Flour And Other Grain Mill P	\$105,500	\$102,700
73	Cereal Preparations	\$1,900	\$1,800
74	Rice Milling	\$57,400	\$57,100
75	Blended And Prepared Flour	\$112,200	\$111,400
76	Wet Corn Milling	\$4,600	\$4,400
77	Dog, Cat, And Other Pet Food	\$838,700	\$836,800
78	Prepared Feeds, N.E.C	\$125,583,400	\$125,027,400
79	Bread, Cake, And Related Pro	\$840,100	\$12,800
80	Cookies And Crackers	\$59,700	\$59,100
81	Sugar	\$43,400	\$43,300
82	Confectionery Products	\$129,000	\$129,000
83	Chocolate And Cocoa Products	\$545,500	\$545,400
85	Salted And Roasted Nuts & Se	\$33,000	\$33,000
87	Soybean Oil Mills	\$8,300	\$8,300
88	Vegetable Oil Mills, N.E.C	\$3,800	\$2,100
89	Animal And Marine Fats And O	\$95,000	\$41,800
90	Shortening And Cooking Oils	\$331,300	\$85,200
93	Wines, Brandy, And Brandy Sp	\$28,700	\$28,600
95	Bottled And Canned Soft Drin	\$987,200	\$982,200
96	Flavoring Extracts And Syrup	\$506,100	\$505,600
97	Canned And Cured Sea Foods	\$11,000	\$11,000
98	Prepared Fresh Or Frozen Fis	\$8,400	\$8,300
99	Roasted Coffee	\$87,800	\$51,000
100	Potato Chips & Similar Snack	\$142,300	\$106,800
102	Macaroni And Spaghetti	\$24,300	\$22,000
103	Food Preparations, N.E.C	\$24,458,300	\$21,175,700
108	Broadwoven Fabric Mills And	\$10,100	\$10,000
109	Narrow Fabric Mills	\$15,400	\$15,300
117	Carpets And Rugs	\$4,400	\$4,400
119	Coated Fabrics, Not Rubberiz	\$70,100	\$70,100
121	Nonwoven Fabrics	\$23,200	\$23,200
123	Textile Goods, N.E.C	\$5,000	\$5,000
124	Apparel Made From Purchased	\$309,700	\$24,200

125	Curtains And Draperies	\$238,400	\$4,500
126	Housefurnishings, N.E.C	\$20,700	\$0
127	Textile Bags	\$10,200	\$0
128	Canvas Products	\$9,200	\$0
130	Automotive And Apparel Trimm	\$7,800	\$0
132	Fabricated Textile Products,	\$33,100	\$0
133	Logging Camps And Logging Co	\$355,300	\$109,500
134	Sawmills And Planing Mills,	\$685,500	\$67,800
135	Hardwood Dimension And Floor	\$26,000	\$26,000
136	Special Product Sawmills, N.	\$2,700	\$0
137	Millwork	\$3,493,900	\$2,090,900
138	Wood Kitchen Cabinets	\$133,800	\$400
139	Veneer And Plywood	\$15,000	\$12,100
140	Structural Wood Members, N.E	\$16,600	\$15,600
141	Wood Containers	\$6,500	\$5,800
142	Wood Pallets And Skids	\$4,200	\$3,300
143	Mobile Homes	\$3,000	\$3,000
144	Prefabricated Wood Buildings	\$7,800	\$7,800
145	Wood Preserving	\$3,500	\$3,000
146	Reconstituted Wood Products	\$11,200	\$9,500
147	Wood Products, N.E.C	\$698,700	\$163,800
148	Wood Household Furniture	\$54,100	\$0
149	Upholstered Household Furnit	\$7,400	\$6,100
150	Metal Household Furniture	\$14,000	\$7,400
151	Mattresses And Bedsprings	\$28,800	\$19,000
152	Wood Tv And Radio Cabinets	\$3,100	\$2,800
153	Household Furniture, N.E.C	\$23,500	\$22,600
154	Wood Office Furniture	\$3,337,300	\$236,900
155	Metal Office Furniture	\$223,400	\$162,900
156	Public Building Furniture	\$60,900	\$54,300
157	Wood Partitions And Fixtures	\$3,728,200	\$1,509,800
158	Metal Partitions And Fixture	\$110,200	\$95,700
159	Blinds, Shades, And Drapery	\$27,500	\$27,500
160	Furniture And Fixtures, N.E.	\$65,400	\$63,300
162	Paper Mills, Except Building	\$223,800	\$223,800
163	Paperboard Mills	\$67,500	\$67,500
164	Paperboard Containers And Bo	\$306,700	\$0
165	Paper Coated & Laminated Pac	\$192,000	\$192,000
166	Paper Coated & Laminated Nec	\$5,003,600	\$4,980,500
167	Bags, Plastic	\$843,700	\$835,200
168	Bags, Paper	\$7,907,900	\$7,801,100
169	Die-cut Paper And Board	\$11,877,000	\$11,733,900
170	Sanitary Paper Products	\$33,500	\$33,500
171	Envelopes	\$45,700	\$45,700
172	Stationery Products	\$600,600	\$600,300
173	Converted Paper Products, N.	\$157,700	\$157,700
174	Newspapers	\$978,600	\$824,900
175	Periodicals	\$29,800	\$5,900
176	Book Publishing	\$457,600	\$233,200
177	Book Printing	\$212,400	\$209,200
178	Miscellaneous Publishing	\$55,300	\$44,800
179	Commercial Printing	\$15,610,600	\$14,855,300
180	Manifold Business Forms	\$106,000	\$90,900
181	Greeting Card Publishing	\$25,700	\$22,600
182	Blankbooks And Looseleaf Bin	\$72,600	\$65,500
183	Bookbinding & Related	\$31,000	\$30,500
184	Typesetting	\$1,381,500	\$1,286,700
185	Plate Making	\$117,300	\$81,700
186	Alkalies & Chlorine	\$8,300	\$7,700
187	Industrial Gases	\$15,900	\$14,500
188	Inorganic Pigments	\$6,000	\$5,500
189	Inorganic Chemicals Nec.	\$54,200	\$42,500

190 Cyclic Crudes, Interm. & Ind	\$101,300	\$53,300
191 Plastics Materials And Resin	\$273,200	\$0
192 Synthetic Rubber	\$7,400	\$0
194 Organic Fibers, Noncellulosi	\$13,900	\$0
195 Drugs	\$1,435,700	\$82,100
196 Soap And Other Detergents	\$16,400	\$0
197 Polishes And Sanitation Good	\$65,500	\$18,000
198 Surface Active Agents	\$12,200	\$11,200
199 Toilet Preparations	\$32,100	\$0
200 Paints And Allied Products	\$73,300	\$73,300
201 Gum And Wood Chemicals	\$1,300	\$0
202 Nitrogenous And Phosphatic F	\$9,500	\$9,500
204 Agricultural Chemicals, N.E.	\$80,500	\$80,200
205 Adhesives And Sealants	\$2,232,400	\$1,133,100
206 Explosives	\$8,700	\$0
207 Printing Ink	\$112,100	\$0
209 Chemical Preparations, N.E.C	\$120,900	\$0
210 Petroleum Refining	\$5,100	\$1,600
211 Paving Mixtures And Blocks	\$44,100	\$0
212 Asphalt Felts And Coatings	\$3,900	\$2,800
213 Lubricating Oils And Greases	\$11,800	\$5,900
215 Tires And Inner Tubes	\$35,900	\$35,900
216 Rubber And Plastics Footwear	\$1,900	\$1,900
217 Rubber And Plastics Hose And	\$71,100	\$71,000
218 Gaskets, Packing And Sealing	\$18,200	\$18,200
219 Fabricated Rubber Products,	\$238,600	\$238,400
220 Miscellaneous Plastics Produ	\$72,418,500	\$72,233,100
221 Leather Tanning And Finishin	\$5,000	\$5,000
222 Footwear Cut Stock	\$4,500	\$3,700
223 House Slippers	\$3,200	\$3,200
224 Shoes, Except Rubber	\$2,884,400	\$2,884,400
226 Luggage	\$4,000	\$4,000
228 Personal Leather Goods	\$3,200	\$2,700
229 Leather Goods, N.E.C	\$37,700	\$36,600
230 Glass And Glass Products, Ex	\$89,200	\$0
231 Glass Containers	\$9,200	\$0
232 Cement, Hydraulic	\$12,000	\$12,000
233 Brick And Structural Clay Ti	\$6,200	\$6,200
236 Structural Clay Products, N.	\$1,200	\$1,200
240 Porcelain Electrical Supplie	\$39,700	\$39,700
241 Pottery Products, N.E.C	\$101,500	\$101,400
242 Concrete Block And Brick	\$2,567,000	\$2,559,900
243 Concrete Products, N.E.C	\$1,395,900	\$1,394,100
244 Ready-mixed Concrete	\$2,912,700	\$2,909,500
245 Lime	\$5,300	\$5,300
246 Gypsum Products	\$7,200	\$7,200
247 Cut Stone And Stone Products	\$6,000	\$6,000
248 Abrasive Products	\$744,500	\$743,800
249 Asbestos Products	\$13,200	\$13,200
250 Minerals, Ground Or Treated	\$6,100	\$6,100
251 Mineral Wool	\$20,300	\$20,300
252 Nonclay Refractories	\$11,000	\$11,000
253 Nonmetallic Mineral Products	\$23,500	\$23,500
254 Blast Furnaces And Steel Mil	\$79,300	\$72,500
255 Electrometallurgical Product	\$1,000	\$1,000
256 Steel Wire And Related Produ	\$4,200	\$4,000
259 Iron And Steel Foundries	\$47,000	\$46,800
261 Primary Aluminum	\$2,700	\$2,700
262 Primary Nonferrous Metals, N	\$5,900	\$5,800
264 Copper Rolling And Drawing	\$57,500	\$54,500
265 Aluminum Rolling And Drawing	\$38,600	\$33,700
266 Nonferrous Rolling And Drawi	\$29,000	\$28,700

267 Nonferrous Wire Drawing And	\$519,800	\$472,900
268 Aluminum Foundries	\$281,500	\$230,300
269 Brass, Bronze, And Copper Fo	\$441,300	\$418,300
270 Nonferrous Castings, N.E.C.	\$71,900	\$68,400
271 Metal Heat Treating	\$44,600	\$42,400
272 Primary Metal Products, N.E.	\$20,200	\$19,200
273 Metal Cans	\$61,900	\$56,800
274 Metal Barrels, Drums And Pai	\$16,600	\$16,600
275 Cutlery	\$3,800	\$3,600
276 Hand And Edge Tools, N.E.C.	\$102,000	\$97,600
277 Hand Saws And Saw Blades	\$26,700	\$26,200
278 Hardware, N.E.C.	\$3,724,800	\$3,348,700
279 Metal Sanitary Ware	\$39,700	\$39,700
280 Plumbing Fixture Fittings An	\$34,300	\$34,300
281 Heating Equipment, Except El	\$519,500	\$519,400
282 Fabricated Structural Metal	\$181,800	\$181,700
283 Metal Doors, Sash, And Trim	\$11,813,700	\$11,760,100
284 Fabricated Plate Work	\$5,198,200	\$5,150,000
285 Sheet Metal Work	\$12,228,800	\$12,155,500
286 Architectural Metal Work	\$134,200	\$134,200
287 Prefabricated Metal Building	\$52,400	\$52,400
288 Miscellaneous Metal Work	\$283,200	\$283,100
289 Screw Machine Products And B	\$119,300	\$114,200
290 Iron And Steel Forgings	\$10,800	\$10,500
291 Nonferrous Forgings	\$1,300	\$1,300
292 Automotive Stampings	\$519,000	\$497,100
293 Crowns And Closures	\$53,700	\$53,300
294 Metal Stampings, N.E.C.	\$9,522,700	\$5,474,800
295 Plating And Polishing	\$1,418,700	\$988,300
296 Metal Coating And Allied Ser	\$5,824,900	\$5,824,900
297 Small Arms Ammunition	\$1,500	\$1,500
298 Ammunition, Except For Small	\$6,400	\$6,400
299 Small Arms	\$4,500	\$4,500
300 Other Ordnance And Accessori	\$4,800	\$4,800
301 Industrial And Fluid Valves	\$250,100	\$236,100
302 Steel Springs, Except Wire	\$12,800	\$12,600
303 Pipe, Valves, And Pipe Fitti	\$210,200	\$200,900
304 Miscellaneous Fabricated Wir	\$388,100	\$267,200
305 Metal Foil And Leaf	\$114,200	\$102,400
306 Fabricated Metal Products, N	\$3,444,800	\$2,958,200
307 Steam Engines And Turbines	\$200,700	\$109,800
308 Internal Combustion Engines,	\$637,400	\$0
309 Farm Machinery And Equipment	\$2,466,500	\$444,900
310 Lawn And Garden Equipment	\$45,700	\$0
311 Construction Machinery And E	\$16,650,000	\$14,528,800
312 Mining Machinery, Except Oil	\$119,000	\$118,900
313 Oil Field Machinery	\$22,300	\$22,300
314 Elevators And Moving Stairwa	\$6,000	\$6,000
315 Conveyors And Conveying Equi	\$746,600	\$740,000
316 Hoists, Cranes, And Monorail	\$131,800	\$131,300
317 Industrial Trucks And Tracto	\$90,500	\$90,400
318 Machine Tools, Metal Cutting	\$475,900	\$117,900
319 Machine Tools, Metal Forming	\$131,300	\$0
320 Industrial Patterns	\$244,600	\$244,700
321 Special Dies And Tools And A	\$4,757,600	\$1,170,000
322 Power Driven Hand Tools	\$22,900	\$13,600
323 Rolling Mill Machinery	\$1,376,200	\$530,600
324 Welding Apparatus	\$139,900	\$128,800
325 Metalworking Machinery, N.E.	\$189,000	\$186,500
326 Textile Machinery	\$22,900	\$22,900
327 Woodworking Machinery	\$24,800	\$0
328 Paper Industries Machinery	\$201,300	\$48,100

329 Printing Trades Machinery	\$763,000	\$295,900
330 Food Products Machinery	\$29,982,100	\$14,940,300
331 Special Industry Machinery N	\$2,462,500	\$1,068,800
332 Pumps And Compressors	\$122,000	\$122,000
333 Ball And Roller Bearings	\$39,800	\$39,800
334 Blowers And Fans	\$20,912,600	\$20,912,500
335 Packaging Machinery	\$67,969,800	\$37,658,900
336 Power Transmission Equipment	\$474,200	\$474,200
337 Industrial Furnaces And Oven	\$36,500	\$36,500
338 General Industrial Machinery	\$2,117,200	\$2,117,200
339 Electronic Computers	\$698,100	\$529,700
340 Computer Storage Devices	\$1,363,600	\$421,900
341 Computer Terminals	\$97,400	\$82,200
342 Computer Peripheral Equipmen	\$263,800	\$232,000
343 Calculating And Accounting M	\$6,600	\$0
344 Typewriters And Office Machi	\$56,600	\$0
345 Automatic Merchandising Mach	\$4,800	\$0
346 Commercial Laundry Equipment	\$32,200	\$18,300
347 Refrigeration And Heating Eq	\$50,966,300	\$39,959,700
348 Measuring And Dispensing Pum	\$9,500	\$2,700
349 Service Industry Machines, N	\$1,598,900	\$947,300
350 Carburetors, Pistons, Rings,	\$11,700	\$11,700
351 Fluid Power Cylinders & Actua	\$60,900	\$60,900
352 Fluid Power Pumps & Motors	\$122,100	\$122,100
353 Scales And Balances	\$48,000	\$1,500
354 Industrial Machines Nec.	\$15,163,000	\$15,162,800
355 Transformers	\$28,100	\$23,800
356 Switchgear And Switchboard A	\$1,755,600	\$908,100
357 Motors And Generators	\$87,010,000	\$72,116,800
358 Carbon And Graphite Products	\$6,700	\$6,500
359 Relays & Industrial Controls	\$734,800	\$461,100
360 Electrical Industrial Appara	\$281,100	\$246,800
361 Household Cooking Equipment	\$113,700	\$113,700
362 Household Refrigerators And	\$64,600	\$64,600
364 Electric Housewares And Fans	\$276,900	\$276,900
366 Household Appliances, N.E.C.	\$3,100	\$3,100
367 Electric Lamps	\$3,100	\$3,100
368 Wiring Devices	\$353,800	\$353,300
369 Lighting Fixtures And Equipm	\$120,300	\$120,300
370 Radio And Tv Receiving Sets	\$526,800	\$152,300
371 Phonograph Records And Tape	\$3,873,800	\$3,749,700
372 Telephone And Telegraph Appa	\$9,892,500	\$5,514,200
373 Radio And Tv Communication E	\$226,200	\$206,700
374 Communications Equipment Nec	\$46,300	\$45,800
375 Electron Tubes	\$23,600	\$14,300
376 Printed Circuit Boards	\$169,100	\$11,000
377 Semiconductors And Related D	\$383,300	\$0
378 Electronic Components, N.E.C	\$29,253,400	\$21,591,800
379 Storage Batteries	\$2,925,200	\$2,082,100
380 Primary Batteries, Dry And W	\$49,200	\$0
381 Engine Electrical Equipment	\$340,200	\$0
382 Magnetic & Optical Recording	\$229,500	\$0
383 Electrical Equipment, N.E.C.	\$6,917,800	\$4,039,400
385 Truck And Bus Bodies	\$1,800	\$1,800
386 Motor Vehicle Parts And Acce	\$2,765,600	\$2,765,600
387 Truck Trailers	\$25,400	\$5,900
390 Aircraft And Missile Engines	\$84,300	\$66,200
391 Aircraft And Missile Equipme	\$630,500	\$630,500
392 Ship Building And Repairing	\$13,500	\$13,500
393 Boat Building And Repairing	\$805,400	\$802,400
394 Railroad Equipment	\$10,700	\$10,700
395 Motorcycles, Bicycles, And P	\$8,500	\$8,500

397	Travel Trailers And Camper	\$30,300	\$30,200
398	Tanks And Tank Components	\$13,800	\$13,800
399	Transportation Equipment, N.	\$25,500	\$25,500
400	Search & Navigation Equipmen	\$643,600	\$639,800
401	Laboratory Apparatus & Furni	\$13,200	\$13,200
402	Automatic Temperature Contro	\$30,100	\$29,800
403	Mechanical Measuring Devices	\$503,600	\$280,200
404	Instruments To Measure Elect	\$310,100	\$300,600
405	Analytical Instruments	\$46,100	\$45,600
406	Optical Instruments & Lenses	\$81,700	\$19,200
407	Surgical And Medical Instrum	\$291,000	\$0
408	Surgical Appliances And Supp	\$929,800	\$107,600
409	Dental Equipment And Supplie	\$1,800	\$1,700
410	X-ray Apparatus	\$17,800	\$0
411	Electromedical Apparatus	\$1,299,300	\$714,900
412	Ophthalmic Goods	\$392,300	\$61,400
413	Photographic Equipment And S	\$99,400	\$99,400
414	Watches, Clocks, And Parts	\$20,000	\$19,800
417	Jewelers Materials And Lapid	\$5,200	\$5,200
418	Musical Instruments	\$303,500	\$303,400
420	Games, Toys, And Childrens V	\$59,600	\$59,500
421	Sporting And Athletic Goods,	\$67,400	\$67,400
422	Pens And Mechanical Pencils	\$73,100	\$73,000
423	Lead Pencils And Art Goods	\$428,400	\$419,800
424	Marking Devices	\$81,200	\$81,200
425	Carbon Paper And Inked Ribbo	\$12,100	\$12,100
426	Costume Jewelery	\$15,300	\$15,300
427	Fasteners, Buttons, Needles,	\$21,700	\$21,700
428	Brooms And Brushes	\$46,300	\$46,300
429	Signs And Advertising Displa	\$336,400	\$330,500
430	Burial Caskets And Vaults	\$1,400	\$1,400
432	Manufacturing Industries, N.	\$41,800	\$41,800
433	Railroads And Related Servic	\$726,400	\$107,900
434	Local, Interurban Passenger	\$1,621,000	\$0
435	Motor Freight Transport And	\$57,099,500	\$19,969,500
436	Water Transportation	\$366,200	\$131,300
437	Air Transportation	\$107,200	\$0
439	Arrangement Of Passenger Tra	\$613,400	\$273,400
440	Transportation Services	\$527,900	\$63,700
441	Communications, Except Radio	\$12,169,000	\$256,500
442	Radio And Tv Broadcasting	\$100,800	\$0
443	Electric Services	\$3,165,100	\$2,400
444	Gas Production And Distribut	\$3,854,900	\$19,300
445	Water Supply And Sewerage Sy	\$254,700	\$0
446	Sanitary Services And Steam	\$1,959,500	\$0
447	Wholesale Trade	\$60,541,900	\$6,522,900
448	Building Materials & Gardeni	\$8,825,500	\$2,199,900
449	General Merchandise Stores	\$12,992,400	\$3,400
450	Food Stores	\$15,102,300	\$4,800
451	Automotive Dealers & Service	\$32,239,000	\$9,545,300
452	Apparel & Accessory Stores	\$1,109,900	\$300
453	Furniture & Home Furnishings	\$3,336,500	\$1,000
454	Eating & Drinking	\$52,703,000	\$10,080,400
455	Miscellaneous Retail	\$10,946,200	\$2,900
456	Banking	\$57,034,000	\$22,019,600
457	Credit Agencies	\$3,210,800	\$321,000
458	Security And Commodity Broke	\$796,900	\$8,000
459	Insurance Carriers	\$1,644,300	\$26,300
460	Insurance Agents And Brokers	\$8,748,200	\$8,269,400
461	Owner-occupied Dwellings	\$95,744,900	\$28,723,500
462	Real Estate	\$33,718,400	\$1,542,700
463	Hotels And Lodging Places	\$6,509,900	\$8,700

464 Laundry, Cleaning And Shoe R	\$477,400	\$0
465 Portrait And Photographic St	\$415,400	\$0
466 Beauty And Barber Shops	\$3,375,800	\$676,200
467 Funeral Service And Cremator	\$631,200	\$0
468 Miscellaneous Personal Servi	\$808,700	\$0
469 Advertising	\$15,988,200	\$18,900
470 Other Business Services	\$4,815,900	\$15,400
471 Photofinishing, Commercial P	\$306,700	\$2,000
472 Services To Buildings	\$1,980,300	\$5,800
474 Personnel Supply Services	\$10,110,100	\$4,697,600
475 Computer And Data Processing	\$1,103,900	\$7,800
476 Detective And Protective Ser	\$48,500	\$200
478 Automobile Parking And Car W	\$343,400	\$0
479 Automobile Repair And Servic	\$23,053,100	\$3,652,000
480 Electrical Repair Service	\$84,000	\$200
481 Watch, Clock, Jewelry And Fu	\$69,300	\$800
482 Miscellaneous Repair Shops	\$3,429,900	\$1,445,200
483 Motion Pictures	\$4,629,100	\$10,200
484 Theatrical Producers, Bands	\$508,700	\$600
485 Bowling Alleys And Pool Hall	\$488,800	\$0
487 Racing And Track Operation	\$8,798,000	\$6,424,000
488 Amusement And Recreation Ser	\$3,651,100	\$4,200
489 Membership Sports And Recrea	\$1,149,200	\$0
490 Doctors And Dentists	\$28,048,300	\$800
491 Nursing And Protective Care	\$17,506,300	\$10,021,300
492 Hospitals	\$45,478,500	\$1,800
493 Other Medical And Health Ser	\$8,546,400	\$740,200
494 Legal Services	\$23,669,900	\$8,242,300
495 Elementary And Secondary Sch	\$1,335,100	\$0
499 Child Day Care Services	\$2,662,700	\$534,300
500 Social Services, N.E.C.	\$8,173,600	\$0
501 Residential Care	\$2,019,000	\$0
503 Business Associations	\$1,241,800	\$0
504 Labor And Civic Organization	\$10,862,200	\$5,006,800
506 Engineering, Architectural S	\$3,475,700	\$2,300
507 Accounting, Auditing And Boo	\$5,907,100	\$2,069,800
508 Management And Consulting Se	\$2,929,700	\$48,900
509 Research, Development & Test	\$19,400	\$0
512 Other State And Local Govt E	\$296,200	\$0
513 U.S. Postal Service	\$5,345,400	\$40,600
517 Scrap	\$1,711,400	\$1,677,000
519 Federal Government - Militar	\$3,159,500	\$0
520 Federal Government - Non-mil	\$1,606,000	\$0
522 State & Local Government - E	\$13,044,500	\$0
523 State & Local Government - N	\$48,684,800	\$0
525 Domestic Services	\$1,089,800	\$0

Table 6. St. Croix County Economic Multipliers (1993)

	TIO	Tot INC	Employment
1 AGG AGRICULTURE PRODUCTION	1.846	2.322	1.789
24 AGG AG SERVICES, FOR & FISHER	2.336	2.186	1.698
40 AGG NON-METAL MINING	1.488	1.618	2.303
48 AGG CONSTRUCTION	1.568	1.827	2.305
59 AGG FOOD & KINDRED MFG	1.362	2.019	1.744
124 AGG APPAREL MFG	1.614	1.824	1.733
133 AGG LUMBER & WOOD PRODUCTS MF	1.684	1.939	2.054
154 AGG FURNITURE & FIXTURE MFG	1.569	1.524	1.889
166 AGG PULP AND PAPER MFG	1.395	1.642	1.889
174 AGG PRINTING AND PUBLISHING	1.451	1.487	1.821
195 AGG CHEMICALS AND ALLIED	1.330	1.520	2.207
220 Miscellaneous Plastics Produc	1.410	1.618	1.978
224 Shoes, Except Rubber	1.651	1.870	1.658
241 AGG GLASS, CLAY AND STONE MFG	1.517	1.671	2.083
268 AGG PRIMARY METALS MFG	1.491	1.597	1.833
278 AGG FABRICATED METAL PRODUCTS	1.521	1.704	2.011
309 AGG NON-ELECTRICAL MACHINERY	1.482	1.602	2.099
356 AGG ELECTRONIC EQUIPMENT	1.588	1.859	2.106
393 Boat Building And Repairing	1.556	1.767	1.966
403 AGG SCIENTIFIC INSTRUMENTS	1.535	1.628	2.057
418 AGG MISCELLANEOUS MFG	1.695	1.904	1.960
433 Railroads And Related Service	1.587	1.468	2.124
434 Local, Interurban Passenger T	2.449	1.872	1.596
435 Motor Freight Transport And W	1.803	1.782	2.011
436 Water Transportation	1.434	2.133	2.365
439 AGG TRANSPORTATION SERVICES	1.894	1.851	1.736
441 AGG COMMUNICATIONS	1.541	1.601	2.427
443 AGG UTILITIES	1.341	1.412	2.125
447 Wholesale Trade	1.571	1.433	1.632
448 AGG RETAIL TRADE	2.241	2.146	1.653
456 Banking	1.570	1.915	2.508
457 Credit Agencies	1.968	2.242	1.847
458 Security And Commodity Broker	1.645	1.633	1.736
459 Insurance Carriers	1.830	2.012	2.153
460 Insurance Agents And Brokers	1.694	1.578	1.785
461 AGG REAL ESTATE	1.301	1.277	2.754
463 Hotels And Lodging Places	2.763	2.403	1.620
464 AGG PERSONAL SERVICES	2.637	2.349	1.638
469 AGG BUSINESS SERVICES	2.080	1.744	1.638
478 AGG AUTOMOTIVE SERVICES	1.513	1.812	2.014
480 AGG REPAIR SERVICES	1.849	1.717	1.686
483 Motion Pictures	1.670	2.221	1.606
484 AGG AMUSEMENT SERVICES	1.225	2.683	1.863
490 AGG HEALTH SERVICES	1.821	1.658	1.671
494 Legal Services	1.425	1.284	1.727
495 Elementary And Secondary Scho	1.521	1.562	1.793
499 AGG SOCIAL SERVICES	1.320	1.345	1.769
501 AGG MEMBERSHIP & NON-PROFIT O	1.268	1.321	1.748
506 AGG CONSULTING & RESEARCH	1.886	1.928	1.873
512 AGG STATE & LOCAL GOVERNMENT	2.038	1.587	1.584
513 AGG FEDERAL CIVILIAN	1.694	1.511	1.710
519 Federal Government - Military	3.378	2.340	1.585

APPENDIX D-1

MISUSES AND EVALUATION OF ECONOMIC MULTIPLIERS¹

Multipliers are often misused or misunderstood. Problems frequently encountered in applying multipliers to community change include: (1) using different multipliers interchangeably; (2) double counting; (3) pyramiding; and (4) confusing multipliers with other economic measurements, such as turnover and value added. Please note that if IMPLAN is used to generate the multipliers used in the analysis, many of the concerns outlined in this appendix are moot.

MISUSES OF MULTIPLIERS

(1) Interchanging Multipliers. As mentioned earlier, multipliers can be estimated for changes in business output, household income, and employment. These different multipliers are sometimes mistakenly used interchangeably. This should not be done, as the sizes of the multipliers are different—and they measure totally different types of activity.

(2) Double Counting. Unless otherwise specified, the direct effect or initial change is included in all multiplier calculations. Consider, for example, a mining business multiplier of 2.20. The 2.20 represents 1.00 for the direct effect, and 1.20 for the indirect effects. The direct effect is thus accounted for by the multiplier and should not be added into the computation (double counted). A \$440,000 total impact resulting from an increase of \$200,000 in outside income (using the above 2.20 multiplier) includes \$200,000 direct spending, plus \$240,000 for the indirect effects. The multiplier effect is sometimes thought to refer *only* to the indirect effect. In this case, the initial impact is added to the multiplier effect, and is thereby counted twice—yielding an inflated estimate of change.

(3) Pyramiding. A more complicated error in using multipliers is pyramiding. This occurs when a multiplier for a nonbasic sector is used, in addition to the appropriate basic sector multiplier.

For example, sugar beet processing has been a major contributor to exports in many western rural counties. Assume the local sugar beet processing plant were closed, and local officials wanted to determine the economic effect of the closing, as well as the subsequent effect upon local farmers. The multiplier for the sugar beet processing sector includes the effect upon farms raising sugar beets, because the sugar beet crop is sold to local processors and not exported. Therefore, the processing multiplier should be used to measure the impact of changes in the sugar industry on the total economy. The impact estimate would be pyramided if the multiplier for farms, whose effects had already been counted, were added to processing.

Double counting and pyramiding are particularly serious errors because they result in greatly inflated impact estimates. If inflated estimates are used in making decisions about such things as school rooms or other new facilities, the results can be very expensive, indeed.

(4) Turnover and Value Added. Economic measurements incorrectly used for multipliers also result in misleading analysis. Two such examples are turnover and value added. Turnover refers to the number of times money changes hands within the community. In Figure 1, for example, the initial dollar "turns over" five times; however, only part of the initial dollar is respent

This material is based on the reported prepared by Eugene Lewis, Russ Youmans, George Goldman, and Garnet Premer, "Economic Multipliers: Can A Rural Community Use Them?" Western Rural Development Center, Oregon State University, Corvallis, OR. WREP 24, October, 1979.

each time it changes hands. Someone confusing turnover with multiplier might say the multiplier is 5, when the multiplier is actually only 1.66.

Value added reflects the portion of a product's total value or price that was provided within the local community. The value added would consider the value of a local raw product—like wheat delivered to the mill—and subtract that from the total wholesale value of the flour, then figure the ratio between the two. With cleaning losses, labor, bragging, milling, etc., the wholesale value may represent several times the value of the raw product and may be a fairly large number.

EVALUATING MULTIPLIERS

The determination of whether a multiplier is accurate can be a complicated procedure requiring time, extensive research, and the assistance of a trained economist. On the other hand, there are several questions that anyone who uses multipliers should ask. Essentially the test of accuracy for a multiple is: *How closely does that multiplier estimate economic relationships in the community being considered?*

(1) Is the multiplier based on local data, or is it an overlay? Often, multipliers are used that were not developed specifically from data for that area. These multipliers are *overlaid* onto the area on the assumption that they will adequately reflect relationships in the economy. An example would be using the mining multiplier from a county in northwestern Wyoming to estimate a mining impact in northeastern Nevada.

A multiplier is affected by the economy's *geographic location* in relation to major trade centers. Areas where the trade center is outside the local economy have smaller multipliers than similar areas containing trade centers. Geographic obstacles enroute to trade centers also affect a local economy. Multipliers for small plains towns are smaller than those for apparently comparable mountain towns, since plains residents usually do not face the same travel obstacles as mountain residents. More services will characteristically develop in the mountain area because of the difficulty in importing services; the larger services base will lead to a larger multiplier effect.

The *size* of the economy will influence multiplier size. A larger area generally has more businesses; thus, a given dollar is able to circulate more times before leaking than would be the case in a smaller area.

Two economies with similar population and geographic size may have quite different multipliers, depending on their respective economic structures. For example, if two areas have similar manufacturing plants, but one imports raw materials and the other buys materials locally, then the manufacturing multiplier for the two areas would be quite different.

The overlaying practice, when used appropriately, can save money and time—and produce very acceptable results. However, an area's dollar flow patterns may be so unique that overlaying will not work. Also, it is often difficult to find a similar area where impact studies have been completed so that multipliers can be borrowed readily. It is, however, worth checking.

(2) Is the multiplier based on primary or secondary data? Usually, there is more confidence in a multiplier estimated from data gathered in the community, as opposed to published or already-collected data.

Primary data collection is expensive and time consuming. Recent research has indicated that, in some cases, there is little difference between multipliers estimated by primary or secondary data. In fact, primary data multipliers are not necessarily better than secondary data multipliers. While the type of secondary data needed for estimating multipliers may be available from existing sources, the format and/or units of measurement may not permit some multipliers to be estimated. The resulting adjustments made to use the existing data may cause errors. If

secondary data is used, it may be advisable to consult individuals familiar with the data regarding its use.

(3) Aggregate versus disaggregate multipliers. As mentioned earlier in this publication, disaggregate multipliers are much more specific and therefore generally more trustworthy than aggregate multipliers. The accuracy required, and the time and money available most likely will determine whether the model will be aggregate or disaggregate. In many cases, an aggregated rough estimate may be sufficient.

(4) If you are dealing with an employment multiplier, is it based on number of jobs or full-time equivalent (FTE)? Employment multipliers are often considered to be the most important multipliers used in impact analysis. This is because changes in employment can be transmitted to changes in population, which in turn affect social service needs and tax base requirements. Employment multipliers can be calculated on the basis of number of jobs or on FTE. One FTE equals one person working full-time for one year.

When multipliers are calculated on a number-of-jobs basis, comparisons between industries are difficult because of different definitions of part-time workers. For example, part-time work in one industry might be four hours per day, while in another it might be ten hours per week. If calculations were based on number of jobs, a comparison of multipliers would be misleading. The conversion of jobs to FTE also helps adjust for seasonal employment in industries such as agriculture, recreation, and forestry.

(5) What is the base year on which the economic model was formulated? Inflation can affect multipliers in two ways: (1) through changes in the prices of industry inputs, and (2) through changes in the purchasing patterns produced by inflation. Each input-output multiplier assumes that price relationships between sectors remain constant over time (at least for the period under consideration). In other words, the studies estimating multipliers assume that costs change proportionally: utility prices change at nearly the same rate as the cost of food, steel, and other commodities. If some prices change drastically in relation to others, then purchasing patterns and multipliers will likely change.

Marketing patterns change slowly, however, and while they must be considered, they usually do not present a major problem unless the multiplier is several years old. The rate of growth in the local area will influence the period of use for the multipliers.

(6) What can a multiplier do? The multipliers discussed here are static in nature, as are most multipliers encountered by local decision-makers. Static means that a multiplier can be used in "if/then" situations; they do not project the future. For example, *if* a new mine that employs 500 people comes into the country, *then* the total employment increase would be the employment multiplier times 500. A static model cannot be used to make projections about the time needed for an impact to run its course, or about the distribution of the impact over time. Static multipliers only indicate that *if* X happens, *then* Y will eventually occur.

(7) How large is the impact in relation to the size of the affected industry on which the multiplier is based? Dramatic changes in an industry's scale will usually alter markets, service requirements, and other components of an industry's spending patterns. Assume a mining sector employment multiplier of 2.0 had been developed in a rural economy having 132 FTE. If a mine were proposed several years later with an estimated 300 FTE, the multiplier of 2.0 would probably not accurately reflect the change in employment because of the scale of the project relative to the industry existing when the multiplier was developed. In essence, the new industry would probably change the existing economic structure in the local area.

(8) Who calculated the multiplier—and did the person or agency doing the calculation have a vested interest in the result? Multipliers are calculated by people using statistics, and as such, there is always the opportunity to adjust the size of the multiplier intentionally. Before accepting the results of a given multiplier, take time to assess the origin of the data. Studies conducted by individuals or firms having a vested interest in the study's results deserve careful examination.

(9) Is household income included as a sector similar to the business sectors in the local economic model? The decision to include household income in the model depends upon whether or not the household sector is expected to react similarly to other sectors when the economy changes, or whether personal income is largely produced by outside forces. Discussion of this issue is too lengthy for this publication, but the important point is that multipliers from models that include household sectors are likely to be larger than those from models without household sectors.

i. Janke, James and Deller, Steven C. 1995. "The Contribution of Manufacturing to the St. Croix County Economy." Center for Community Economic Development, Department of Agricultural Economics, University of Wisconsin-Madison/Extension. Staff Paper No. 95.2, (August), 23p.

ii. For more details see Deller, Steven C., Sumathi, N.R., and Marcouiller, David. 1993. "Regional Economic Models for the State of Wisconsin: An Application of the Micro-IMPLAN Modeling System." Center for Community Economic Development, Department of Agricultural Economics, University of Wisconsin-Madison/Extension. Staff Paper No. 93.6, (November), 38p.

iii. Changes to capital inventory includes new construction as well as changes in business inventories.

iv. Mining is a very small part of the county's economy and is primarily gravel and sand extraction.

v. Note that this \$940 million is identical to the discussion of county income reported in Figure 1.

vi. See Table 5 for a listing of commodity number and commodity name.

vii. This would require a detailed analysis of the specifics of the prepared feed industry within the county including interviews of company owners and plant managers.