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378.775
S67
284

April 1988

No. 284

THE EXPORT POTENTIAL OF
SERVICE-PRODUCING INDUSTRIES:
SURVEY RESULTS

by

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THE EXPORT POTENTIAL OF
SERVICE-PRODUCING INDUSTRIES

In recent years, technological innovations and the increasing importance of the international marketplace have combined with other factors, changing the orientation of the American labor force from manufacturing to services.^{1/} Manufacturing firms have become increasingly automated, with some shifting the labor intensive portions of their production processes to countries with relatively large supplies of cheap labor such as Mexico and South Korea. Throughout this structural change, manufacturing output as a percentage of GDP has remained relatively constant, indicating some substitution of capital for labor in production processes.^{2/}

Looking at the U.S. as a whole it is quite evident that employment in manufacturing has slowly declined, while employment in service-producing industries is on the rise. Manufacturing employment declined at slightly more than 1% per year on average (approximately 230,000 employees) over the 1977-1984 period, while annual employment growth in service-producing industries ranged from about 1.8% for wholesale trade to 4.3% for personal, business, health and professional services. By 1984 more than two-thirds of the U.S. labor force were employed in service-producing industries.^{3/}

^{1/} For purposes of this analysis, "service-producing" industries include Standard Industrial Classifications (SICs) 4-9 or, industries involved in transportation and communications; finance, insurance and real estate; personal and business services; and health and professional services. Government services are excluded.

^{2/} "Manufacturing Shares in Real GDP and Employment," Chart 1-1, in the 1987 Economic Report of the President.

^{3/} U.S. Bureau of the Census (annual 1977-1984) County Business Patterns.

This structural change in the U.S. economy has fueled much debate over consequences in terms of both jobs and the nation's economic stability. The debate centers on two related issues: (1) the perceived substitution of low wage/skill service-producing jobs for high-paying manufacturing jobs, and (2) the loss of the U.S. industrial base. While the first issue is important, perhaps even more crucial is the loss of economic growth which is generated by export sales of manufactured, agricultural and mined products. The solution to this loss of the export base has divided those interested in economic development. While some advocate a "reindustrialization" effort, pushing more resources into stemming the loss of manufacturing jobs, others advocate looking closer at opportunities inherent in the service-producing sector. Unfortunately, without either increased national and international demand for American manufactured products or a return to less capital intensive methods of manufacturing production, few opportunities are seen for increasing the manufacturing sector's share of America's labor force.

This analysis focuses on alternatives to "reindustrialization." Three questions will be addressed:

- (1) Which service-producing industries have the potential to export?^{4/}
- (2) What are the characteristics of these industries in terms of proportion of sales which are exported, forward and backward linkages, locational choice, labor needs, and public policy considerations?
- (3) How do service-producing industries with export potential differ from a selected group of industries which are part of the manufacturing base?

^{4/} "Export" as used in this study is defined by sales outside of the region. "Region" is used in a general sense to describe the local area, state, upper midwest, or United States as a whole.

Hopefully a comprehensive analysis of these questions will provide those involved with economic development policy a clearer picture of the opportunities available to differing communities and regions.

CHOICE OF SERVICE-PRODUCING INDUSTRIES

A nonsurvey method was used to identify service-producing industries with export potential. Analysis of secondary data led to a choice of industries based on three criteria.

1. Footloose Industry

An important characteristic of industries targeted for economic development is lack of close geographic ties to specific markets or industries. This is particularly true in rural areas which may not be proximate to specialized markets and may not have the resources to target more than one type of firm. Thus, before beginning the analysis of export potential it was decided to exclude all locally oriented or "residential" industries. Residential is used here to describe industries with locations determined primarily by proximity to customers. Retail trade, consumer services, some non-profit organizations and local government are considered residential services (Stanback, et al., 1981).

Although some researchers consider wholesale trade to have export potential, the literature indicates that wholesalers tend to have close geographic ties to manufacturing (Pinkovitz, Pulver and Smith, 1979). Therefore, wholesale trade was excluded from consideration. Also excluded were tourist related industries, banking services, and educational services, even though they are often recipients of external funds. Tourist related industries and educational services were excluded because of the way sales are made. Rather than a service shipped and sold out of state, out of state

customers travel to the state where their purchases occur. This makes measurement of export sales a difficult task. Banking services and other activities (such as gambling) were thought too regulated to be footloose in locational choice.

2. High Projected Employment Growth

Service-producing industries operating in only a few states and those expecting to add fewer than 50,000 new jobs nationally over the 1984-95 period were eliminated.^{5/} This effectively removed from consideration both specialized insurance and credit industries and water based transportation.

3. High Difference in Location Quotients Across States

Location quotients measure a region's share of national employment in a given industry and are fairly good indicators of deviation from the national average. The location quotient used in this analysis differs slightly from the traditional employment base. Specifically, this measure uses the region's national income share as the denominator, more accurately reflecting the production share to consumption share basis for location quotients. This modified location quotient is:

$$LQ_{ir} = (E_{ir}/E_{in})/(Y_r/Y_n)$$

where E - employment,

Y - income,

i - industry,

r - region (state), and

n - nation (United States)

^{5/} As calculated under the assumption of moderate economic growth by the U.S. Department of Labor, Bureau of Labor Statistics, 1985. 50,000 is a completely arbitrary figure.

The first ratio consists of the region's national employment share in industry i to the region's national income share. The numerator is considered a proxy for the region's share of national production while the denominator is considered a proxy for the region's share of national consumption. This implies that if a region's production share in a given industry is more than its consumption share (location quotient > 1), the region must be exporting any excess. Alternatively, a region with a production share less than its consumption share (location quotient < 1) in a given industry must be importing those products or services.

Several assumptions underlie use of location quotients. Using employment in location quotients assumes that productivity does not vary across states or industries. Using personal income in this measure implicitly assumes that one dollar's purchasing power is equal in all geographic locations. Although this should probably have been modified by a cost-of-living index, no such state level index is available. Using the location quotient also assumes equal consumer tastes and preferences across regions, an absence of any cross-hauling of goods and services, and a balanced international trade in the base economy.

One problem with ratios like the location quotient is the potential for over- or under-estimation. Because industrial employment totals in each region must add to 100%, one very large industry may distort percentages in other industries. In addition, if the aforementioned assumptions do not hold, under- or over-estimation of the export potential of a given industry or region may result. Problems of this type are not explicitly addressed in this study, but should be kept in mind when interpreting location quotient results.

The next step is to describe how this location quotient measure can be used to estimate export potential. First, the location quotients are calculated for each service-producing industry meeting the first two criterion at the three- and four-digit Standard Industrial Classification (SIC) level in each state. For each industry the minimum location quotient is subtracted from the maximum, and this difference is then ranked from high to low with the highest difference indicating highest export potential. If one state has a very high location quotient in a certain industry and another a very low location quotient in the same industry, given the earlier assumptions, one would expect to see the state with the high location quotient exporting that good or service. The state with the low location quotient is considered an importer. The hypothesis is that the greater the difference in state location quotients within an industry, the higher the potential to export.

In order to chose those service-producing industries with the highest export potential a minimum location quotient difference equal to that of a fast growing manufacturing industry (SIC 2750, commercial printing) was established. This minimum is slightly higher than the location quotient difference for retail food stores (SIC 5400) but lower than the location quotient differences for most manufacturing industries. Establishment of this minimum led to the identification of fifteen three- and four-digit service-producing SICs which can be considered to have export potential. Three additional SICs, 7310, advertising; 7392, management, consulting and public relations; and 8910, engineering and architectural services were added to the list because of their prominence in international services exports (Koepke, 1986).

For purposes of this study, eighteen service-producing industries have been identified as potentially exportable, fifteen through the location quotient difference method and three through their role in international trade. These industries are listed in Table 1.

MANUFACTURING INDUSTRIES SELECTED FOR COMPARISON

In order to compare the characteristics of service-producing and manufacturing industries, it was decided to survey a representative group of manufacturers. Manufacturing industries to be surveyed were chosen using three criteria. First, at least one of the industries had to have played a major role in the traditional economic base of the upper midwest region (defined as the states of Illinois, Iowa, Michigan, Minnesota, and Wisconsin). Industries falling under this description are SIC 2600, Paper and Allied Products; SIC 3510, Engines and Turbines; and SIC 3710, Automobiles. Much of the recent research on regional economic development has focused on high technology industries. Thus, the second criteria is that at least one industry must be considered "high tech." The "high tech" industries are SIC 3570, Office, Computing and Accounting Machines; SIC 3660, Communication Equipment; and SIC 3670, Electronic Components and Accessories. Third, it was decided to include at least one manufacturing industry with rapid employment growth expected over the next 10 years.^{6/} These industries are SIC 2750, Commercial Printing and SIC 3070, Miscellaneous Plastics Products. Eight industries were chosen to represent the manufacturing sector. These are also listed in Table 1.

^{6/} Again, this is 1984-95 employment growth as projected by the BLS assuming moderate economic growth.

TABLE 1: Industries Surveyed

Description	SIC Code	Projected Employment Change (000) ^{1/}	Number of Observations	Return Rate (%)	Survey as a % of total estab. in Region
<u>Manufacturing</u>					
Paper and Allied Products	2600	-18.00	48	42.1	12.9
Commercial Printing	2750	97.16	50	42.0	0.45
Miscellaneous Plastics Products	3070	167.29	41	32.7	1.1
Engines and Turbines	3510	9.11	23	23.4	14.6
Office, Computing, & Accounting Machines	3570	299.50	26	25.5	4.1
Communication Equipment	3660	169.93	32	28.4	4.7
Electronic Components and Accessories	3670	173.20	46	38.1	4.1
Automobiles	3710	-34.04	36	32.4	2.3
<u>Service-Producing</u>					
Air Transportation	4510	60.43	26	22.0	3.0
Radio and TV Broadcasting	4830	52.23	43	33.8	3.0
Security and Commodity Brokers	6210	94.87	36	30.9	1.1
Medical Services & Health Insurance	6320	54.70	29	29.5	2.0
Fire, Marine, & Casualty Insurance	6330	134.02	40	47.6	26.1
Advertising	7310	43.44	41	34.8	0.73
Mailing, Reproductive, & Stenographic Services	7330	92.35	38	33.9	0.37
Employment Agencies	7361		48	41.5	1.3
Temporary Help Supply Services	7362	546.60 ^{2/}	37	30.0	2.4
Computer Programming & Software	7372		41	36.6	1.8
Data Processing Services	7374	675.60 ^{3/}	28	26.6	1.4
Computer Related Services	7379		55	46.5	6.8
Research & Development Laboratories	7391		38	34.9	5.9
Management, Consulting, & Public Relations	7392		48	35.2	0.53
Equipment Rental & Leasing	7394	801.40 ^{4/}	24	20.5	0.40
Commercial Testing Laboratories	7397		47	39.3	6.6
Health and Allied Services	8090	164.00	32	39.0	5.0
Engineers and Architects	8910	325.49	62	45.5	0.73

^{1/} U.S. Dept. of Labor, Bureau of Labor Statistics. "Employment of Wage and Salary Workers by Industry 1984 and Projected 1995 Alternatives" (November 1985).

^{2/} Total for SIC 736.

^{3/} Total for SIC 737.

^{4/} Total for SIC 739.

THE SURVEY

Very little data describing service-producing industries is published for at least two reasons. First, the wide variation in types of employment and type and quality of services output make their measurement very difficult. Second, following traditional economic base theory there is a general perception that service-producing industries feed from rather than generate economic growth. While it is important to know as much as possible about industries which lead the economy, industries perceived as auxiliary, namely those in the service-producing sector, have been virtually ignored.

In order to gather data thought necessary to answer the research questions, establishments within the upper midwest were surveyed using an instrument specifically designed to obtain data necessary to meet research objectives. Some questions were drawn from other surveys, particularly when the findings of other, similar, studies differed. An example would be evidence from the Puget Sound region (Beyers, Alvine, and Johnsen, 1985) indicating that the level of exports from the region is not affected by establishment size while in the New England region Ashton and Sternal (1979) found evidence supporting the opposite conclusion. To address this controversy, the survey instrument contains questions designed to measure firm size by both annual sales and number of employees. Four export sales categories are defined. These are: percent of sales made outside the (1) local area, (2) state, (3) upper midwest region, and (4) United States.

Scope of the Survey

The survey questionnaire was mailed to approximately 3600 establishments located within the upper midwest region. An initial stratified sample was drawn with 50% of the establishments located in Wisconsin and the other 50%

in the surrounding states of Illinois, Iowa, Michigan, and Minnesota. One hundred thirty establishments in each SIC were mailed a cover letter explaining the study's aims, followed by a questionnaire a week later. A second sample was drawn to compensate for the large proportion of bad addresses in some SICs.^{7/} Mailings to each establishment followed the method outlined in Dillman (1978). Nonrespondents were sent a reminder postcard approximately two weeks after the questionnaire was mailed. This was followed at two week intervals by a second copy of the questionnaire and a second reminder postcard.

All mailings occurred during the summer months, perhaps accounting for the relatively low return rates.^{8/} Because the survey was mailed to the establishment rather than to a particular person within the establishment, this may have additionally contributed to the low return rate. Wisconsin's return rate was 40.9% and the surrounding state's was 29.3%. Table 1 summarizes the choice of industries and survey process. Column 1 lists descriptions of each SIC. Column 2 lists SICs selected for the survey, while column 3 gives the projected 1984-95 employment growth in the United States (in thousands of employees). Column 4 shows the number of establishments in each SIC returning a completed survey instrument. Column 5 translates this information into a survey return rate for each SIC, and column 6 lists the proportion of total establishments in each SIC participating in the survey.

^{7/} Establishment's names were purchased from Aldata List Co., Apple Valley, MN. Names were drawn from telephone yellow pages and business marketing lists. The sample drawn for this survey had approximately 11% bad addresses.

^{8/} return rate = usable returns/net sampled, where net sampled = (total sampled - bad addresses - wrong SICs)

This is measured as the ratio of completed surveys to total number of establishments in each SIC in the upper midwest region.

The survey method contains at least two potential sources of bias. First, the survey instrument's title "Upper Midwest Export Markets Survey" may have deterred nonexporters from completing the questionnaire. Several establishment representatives telephoned to ask whether, as nonexporters they should complete the survey. Although these people were encouraged to participate in the study, it is not known how many actually did, just as it is not known how many nonexporters simply did not telephone or participate. Second, because more Wisconsin firms were surveyed than from in the rest of the region, sample selection bias may result, especially if Wisconsin's firms are not similar in characteristics and behavior to those firms in the rest of the upper midwest. To account for the stratified sampling, observations were weighted to reflect the composition of the population as a whole.^{9/}

The survey fairly successfully gathered data necessary to carry out the research objectives. Most surveys returned were complete, although some were unusable because the establishment's SIC category was incorrectly assigned. This was a particularly acute problem in SIC 4510, Air Transportation. Fourteen completed survey questionnaires were unusable due to the conflict between the establishment's designated SIC and the purchased mailing list's SIC classification. Similar problems were encountered in other SICs.

^{9/} The weighting factor is the inverse of each sic and state's share of total firms. Algebraically, $W_h = n_h/N_h$ where n_h is the number of usable, returned survey questionnaires in stratum h and N_h is the total number of firms in stratum h.

THE RESULTS

Survey results provide a view of the service-producing industries' role in regional economic development. Within each sector and each SIC the proportion of sales made outside a region and inputs purchased within the region emphasize the importance of both forward and backward linkages. Service-producing industries generally export less but purchase a larger proportion of inputs within the region than do manufacturing industries. This gives service-producers the potential to create regional impacts essentially identical to those of manufacturing industries with high exports and low intraregional inputs purchases.

Exports of Goods and Services

Traditional export base theory indicates that only manufacturing firms can export out of the state, while service-producing firms exist only to serve manufacturers and final consumers. Table 2 documents average and median levels of export activity by export classification for both industrial sector and SIC, and shows a surprisingly large variation in export activity for manufacturers in each export category. Average exports outside the local area range from a low of 17.4% (SIC 2750, Commercial Printing) to a high of 77.3% (SIC 2600, Paper and Allied Products), averaging 44.2% for the selected industries within the sector. Commercial Printing (SIC 2750) is at the low end of activity in each export category. Exports outside the state range from 10.4% (SIC 2750) to 66.8% for SIC 2600, Paper and Allied Products, while exports outside the region range from 5.2% (SIC 2750) to 46.9% (SIC 3570, Office and Computing Machines). Out of state sales average 32.7% for the selected manufacturing industries. International exports are quite low, ranging from 0.2% (SIC 2750) to 8.5% for SIC 3570, Office and Computing

TABLE 2: Percent of Sales Exported by SIC, 1986

SECTOR	% of sales made outside local area*		% of sales made out of state		% of sales made out of region		% of sales made out of U.S.	
	MEAN	MEDIAN	MEAN	MEDIAN	MEAN	MEDIAN	MEAN	MEDIAN
Manuf.	44.2	83.0	32.7	60.0	19.8	25.0	1.5	0.0
Svc- Prod.	31.7	25.0	20.9	5.0	12.0	0.0	0.7	0.0
SIC								
2600	77.3	95.5	66.8	85.0	41.4	50.0	2.3	0.0
2750	17.4	10.0	10.4	0.0	5.2	0.0	0.2	0.0
3070	59.1	80.0	40.9	40.0	22.1	10.0	1.1	0.0
3510	70.8	98.0	56.3	66.0	42.0	40.0	5.8	1.0
3570	66.0	98.0	55.7	85.0	46.9	70.0	8.5	1.0
3660	60.3	85.0	53.1	50.0	42.8	20.0	4.2	0.0
3670	68.9	90.0	60.4	64.5	43.0	45.0	3.3	0.0
3710	67.0	90.0	43.5	69.0	24.0	30.0	3.2	0.0
4510	42.5	50.0	26.1	10.0	11.1	0.0	0.2	0.0
4830	32.6	20.0	15.9	10.0	9.5	2.0	1.2	0.0
6210	31.6	15.0	20.1	5.0	13.0	0.0	0.7	0.0
6320	6.3	8.0	3.4	0.0	2.6	0.0	0	0.0
6330	81.1	95.0	48.4	50.0	26.5	15.0	0.3	0.0
7310	27.6	15.0	19.8	0.0	14.4	0.0	0	0.0
7330	6.8	5.0	3.9	0.0	3.1	0.0	0	0.0
7361	21.5	20.0	15.8	0.0	11.5	0.0	0.0	0.0
7362	13.5	3.0	9.2	0.0	2.8	0.0	0.6	0.0
7372	42.1	40.0	27.9	10.0	22.9	0.0	0.1	0.0
7374	22.3	20.0	17.7	5.0	10.9	0.0	0.07	0.0
7379	32.7	20.0	25.4	3.0	17.3	0.0	0.9	0.0
7391	75.6	95.0	65.4	72.5	47.3	45.0	5.1	0.0
7392	45.9	40.0	34.0	10.0	19.5	0.0	1.1	0.0
7394	18.1	5.0	11.8	0.0	4.0	0.0	0	0.0
7397	46.7	50.0	25.6	10.0	19.0	0.0	1.8	0.0
8090	32.0	27.5	19.7	5.0	13.8	0.0	5.6	0.0
8910	26.1	15.0	14.8	0.0	4.8	0.0	0.2	0.0

* The "local area" is defined as within a fifty mile radius of the establishment location.

Machines. However, except for Commercial Printing (SIC 2750), all the manufacturing industries make 59% or more of their sales outside the local area, selling 40% or more of their output outside of their state. Establishments within five of the eight manufacturing industries average more than 40% of their sales outside the region.

A slightly wider variation of export activity is seen in the service-producing industries. Sales outside the local area range from a low of 6.3% for SIC 6320, Medical Services and Health Insurance to a high of 81.1% for SIC 6330, Fire, Marine, and Casualty Insurance, averaging 31.7% for the selected service-producing industries. Out of state sales range from a low of 3.4% (again SIC 6320) to a high of 65.4% (SIC 7391, Research and Development Laboratories), with a 20.9% average for out of state sales in the selected service-producing industries.

Median figures indicate that out-of-state exports are skewed in most industries but more so in the service-producing industries than in manufacturing. There appear to be a few relatively large exporters in each service-producing SIC, while most other establishments either don't export at all or export very little. Exceptions include establishments in SIC 6330, Fire, Marine and Casualty Insurance and SIC 7391, Research and Development Laboratories. In Fire, Marine and Casualty Insurance the median's close proximity to the mean indicates a fairly uniform distribution of establishments. In Research and Development Laboratories the median is larger than the mean, indicating more than half of these establishments have higher than average export activity. Average sales outside of the region range from 2.6% (SIC 6320) to 47.3% (SIC 7391), and international exports are quite low, ranging from 0% (for many industries) to 5.6% for SIC 8090, Health

and Allied Services. Manufacturing establishments do tend to have higher export sales (regardless of how "export" is defined), but many service-producing establishments are also engaged in export activity.

Location of Sources of Inputs

While it is important to look at output, perhaps equally important is the location of input sources. High export sales do not automatically create local economic activity unless some of the export dollars earned are spent locally. Table 3 shows the proportion of nonlabor expenditure made within the state and proportion of total expenditures allocated to labor (assumed to be a local/state input).

With the exception of SIC 2750, Commercial Printing and SIC 3660, Communication Equipment, manufacturing establishments purchase less than 55% of their inputs within the state, devote on average less than 40% of their total expenditures to labor. Average in-state input purchases range from 22.9% for SIC 3510, Engines and Turbines, to 85.0% for SIC 2750, Commercial Printing while expenditures devoted to labor range from 22.9% for SIC 2600, Paper and Allied Products to 39.1% for SIC 3670, Electronic Components.

In contrast, service-producers (with the exception of SIC 7379, Computer Related Services) purchase most inputs within the state. In-state, nonlabor input purchases range from a low of 45.9% for SIC 7379, Computer Related Services to a high of 97.9% for SIC 6320, Medical Services and Health Insurance, averaging 74.3% for the selected service-producers as a whole. Labor costs range from 28.5% (SIC 7394, Equipment Rental and Leasing) to 67.2% (SIC 6330, Fire, Marine and Casualty Insurance) of total expenditures. Labor costs for the selected service-producers as a whole average 43.3% of total expenditures.

TABLE 3: In-State Expenditures by SIC, 1986

SECTOR	% of expenditures (excl. labor) <u>made in state</u>		% of total expenditures allocated <u>to labor</u>	
	MEAN	MEDIAN	MEAN	MEDIAN
Manufacturing	61.5	35.0	30.0	27.5
Service-Producing	74.3	90.0	46.3	50.0
SIC				
2600	29.1	28.5	22.9	20.0
2750	85.0	98.0	32.2	30.0
3070	48.3	35.0	26.9	25.0
3510	22.9	25.0	27.5	20.0
3570	45.7	35.0	24.4	20.0
3660	53.5	70.0	33.0	30.0
3670	39.7	30.0	39.1	29.0
3710	27.8	15.0	29.1	30.0
4510	66.3	80.0	35.1	40.0
4830	78.6	92.5	50.7	55.5
6210	52.6	77.5	35.6	40.0
6320	97.9	100.0	67.2	53.0
6330	61.6	70.0	36.6	28.0
7310	83.3	90.0	43.7	40.0
7330	87.5	100.0	38.8	28.0
7361	92.1	100.0	52.1	60.0
7362	86.3	100.0	60.5	65.0
7372	61.9	70.0	62.9	60.0
7374	55.2	75.0	44.0	50.0
7379	45.9	20.0	43.8	43.0
7391	69.4	75.0	43.4	50.0
7392	73.0	100.0	45.2	40.0
7394	65.8	75.0	28.5	27.5
7397	74.6	75.0	48.1	50.0
8090	57.8	55.0	42.5	50.0
8910	84.9	100.0	61.5	61.5

High levels of export activity and weaker ties to state input markets may indicate that manufacturers have much the same impact on state economy as do those service-producers with relatively lower export sales but stronger ties to state and local input markets. To illustrate, representative establishments in SIC 2600, Paper and Allied Products and SIC 6330, Fire, Marine and Casualty Insurance are compared. Median establishments in each of these two SICs sold between \$20 million and \$50 million in 1986. Assuming this median average is "representative," the establishments described made approximately \$35 million in sales. If it is further assumed that the establishments' profits are 10% of their total sales, then total expenditures for each would be \$31.5 million. Looking first at forward linkages, the average establishment in the paper industry made 66.8% of its sales out of state, while the insurance industry made only 48.4% of its sales out of state. Translated into dollars, the representative paper company earns \$23.4 million from export sales while the insurance company earns only \$16.9 million. Turning to the impact of backward or input source linkages, this difference is reversed. The representative insurance company devotes 36.6% of its expenditures to labor and purchases 61.6% of nonlabor inputs within the state. In contrast the representative paper company, devotes 22.9% of expenditures to labor and makes only 29.1% of nonlabor input purchases within the state. This translates into approximately \$7.7 million in out of state expenditures for the insurance company and \$17.2 million in out of state expenditures for the paper company. Net in-state flow of earnings from insurance company export sales is \$9.3 million, actually higher than the paper company's net in-state flow of earnings of \$6.1 million. Division of net in-state flow of earnings by total export earnings

of retained export monies (REM). This coefficient is .263 for the paper company and .547 for the insurance company. This implies that approximately 55% of every dollar of out of state sales made by the insurance company remains in the state compared with only 26% of every dollar of export sales made by the paper company. Although the paper company makes a larger proportion of its sales in out of state markets, export sales dollars earned by the insurance company have a larger potential impact on the state's economic development. All manufacturers and service-producers' impacts on regional economic growth are depicted in Table 4, illustrating the service-producers' ability to lead in the economic development process.^{10/}

In Table 4 REM coefficients are negative for several industries, in general indicating large purchases of machinery and equipment. Exceptions are SIC 6210, Security and Commodity Brokers, and SIC 7330, Mailing, Reproductive and Steno Services. In SIC 6210, the products exchanged are share of stocks, bonds and other investment options. Brokerage firms tend to have many branches to capture local markets. Most sales are therefore made at the local level while inputs (e.g. stock shares) are purchased at an out of state stock exchange. Firms in SIC 7330 are, for the most part, very small (less than \$100,000 in median annual sales) and probably locally oriented. This SIC does include blueprint and photocopy services which require purchase of expensive equipment.

^{10/} REM coefficients are shown only to illustrate the potential impact of a representative firm in each industry on the state economy. Any use of these coefficients to draw conclusions concerning potential for import substitution is not valid as the content of nonlabor inputs is not known.

TABLE 4: Impact of Out of State Sales by SIC, 1986

	(1) Total Out of State Sales	(2) Total Out of State Expenditures	(3) Export Dollars Remaining in State (1)-(2)	(4) Coefficient of Retained Export Monies (REM) (3)/(1)
Manufacturing	981,000	729,000	252,000	.256
Service- Producing	156,750	93,150	63,600	.405
SIC				
2600	23,380,000	17,230,500	6,149,500	.263
2750	78,000	68,850	9,150	.117
3070	1,227,000	1,020,403	206,597	.168
3510	4,222,500	3,773,081	449,419	.106
3570	1,671,000	1,108,372	562,628	.337
3660	1,593,000	841,185	751,815	.472
3670	1,812,000	991,513	820,487	.453
3710	3,262,500	3,455,312	-192,812	-.059
4510	783,000	591,300	191,700	.245
4830	119,250	71,550	47,700	.400
6210	603,000	823,500	-220,500	-.366
6320	102,000	18,900	83,100	.815
6330	16,940,000	7,668,864	9,271,136	.547
7310	148,500	63,450	85,050	.573
7330	3,900	6,840	-2,940	-.754
7361	55,300	11,970	43,330	.784
7362	276,000	145,800	130,200	.471
7372	83,700	38,070	45,630	.545
7374	53,100	67,770	-14,670	-.276
7379	190,500	205,200	-14,700	-.077
7391	490,500	116,775	373,725	.762
7392	102,000	39,960	62,040	.608
7394	35,400	66,150	-30,750	-.869
7397	76,800	35,640	41,160	.536
8090	147,750	164,025	-16,275	-.110
8910	44,400	16,740	27,660	.623

Sectoral Sales Dependency

Economic base theory also emphasizes the service-producing establishments' dependence on manufacturers. Even if service-producers are not geographically tied to manufacturers, they may depend on manufacturers as the primary market for services produced. Table 5 shows average and median sales to five customer categories--service-producers, government, manufacturers, consumers, and others--for each SIC. Most establishments within the manufacturing sector sell only a small proportion of their output to the government, consumers and others. SIC 3710, Automobiles is the exception with 22.8% of sales on average going to consumers. Other manufacturers appear to be the dominant customer group for manufacturers, ranging from 27.3% for SIC 2750, Commercial Printing to 77.8% for SIC 3670, Electronic Components. In sales to service-producers SIC 2750, Commercial Printing, is the exception with 48.3% of sales made to service-producers versus 27.3% of sales made to manufacturers. The second highest percentage of sales by manufacturers are made to service-producers (with the already noted exception of SIC 2750). These range from 7.9% for SIC 3670, Electronic Components to 48.3% for SIC 2750, Commercial Printing.

Service-producing industries apparently sell little to government or others, and sales to consumers dominate in SIC 6210, Security and Commodity Brokers, SICs 6320 and 6330, Insurance industries, and SIC 7394, Equipment Rental and Leasing, as expected. Service-producers generally have a more pronounced tendency to sell to other service-producers although most make a sizeable proportion of their sales to manufacturers as well. On average, sales to service-producers range from 2.8% for SIC 6210, Security and Commodity Brokers to 48.8% for SIC 7361, Employment Agencies to 60.3% for SIC

TABLE 5: Percent of Sales to Each Customer Category by SIC, 1986

SECTOR	<u>% of sales to service-producers</u>		<u>% of sales to government</u>		<u>% of sales to manufacturers</u>		<u>% of sales to consumers</u>		<u>% of sales to others</u>	
	MEAN	MEDIAN	MEAN	MEDIAN	MEAN	MEDIAN	MEAN	MEDIAN	MEAN	MEDIAN
Manuf.	34.3	6.5	5.4	0.0	48.8	50.0	10.8	0.0	4.1	0.0
Svc-Prod.	37.1	25.0	5.9	0.0	23.6	5.0	28.6	0.0	4.8	0.0
SIC										
2600	26.2	9.0	3.8	0.0	51.2	45.0	8.2	0.0	10.6	0.0
2750	48.3	40.0	5.4	1.0	27.3	20.0	15.3	10.0	2.6	0.0
3070	27.5	7.5	3.5	0.0	64.7	77.5	1.4	0.0	2.6	0.0
3510	25.9	20.0	10.3	0.0	34.7	10.0	15.1	0.0	13.6	0.0
3570	30.3	5.0	4.1	2.0	47.2	50.0	14.2	0.0	3.5	0.0
3660	27.8	20.0	8.8	1.0	48.8	30.0	13.0	0.0	1.5	0.0
3670	7.9	0.0	10.3	0.0	77.8	95.0	0.5	0.0	3.4	0.0
3710	15.3	5.0	7.0	0.5	46.2	10.0	22.8	0.5	8.8	0.0
4510	47.8	40.0	2.8	0.0	39.3	50.0	9.8	0.0	0.3	0.0
4830	60.3	82.5	1.2	0.0	10.4	1.0	26.2	0.0	1.9	0.0
6210	2.8	0.0	6.1	0.0	2.9	0.0	84.9	95.0	8.8	0.0
6320	6.5	0.0	1.0	0.0	4.0	0.0	87.1	98.0	1.3	0.0
6330	27.8	10.0	0.9	0.0	5.2	0.0	57.9	85.0	8.2	0.0
7310	54.6	60.0	1.6	0.0	33.5	10.0	9.5	0.0	0.6	0.0
7330	42.2	60.0	0.5	0.0	24.0	2.0	32.4	5.0	0.9	0.0
7361	48.8	30.0	3.1	0.0	38.1	4.0	9.9	0.0	0.08	0.0
7362	26.9	10.0	8.0	0.0	31.4	20.0	25.9	0.0	7.8	0.0
7372	45.6	60.0	5.6	0.0	31.8	20.0	13.4	0.0	3.7	0.0
7374	57.8	50.0	5.0	0.0	16.3	10.0	6.0	0.0	14.9	0.0
7379	38.6	32.5	8.6	1.5	26.4	14.0	24.3	5.0	2.1	0.0
7391	32.3	0.0	8.9	0.0	46.6	50.0	2.0	0.0	10.2	0.0
7392	43.2	40.0	6.9	0.0	39.5	22.5	7.5	0.0	2.9	0.0
7394	24.4	10.0	1.7	0.0	8.6	2.2	64.5	60.0	0.9	0.0
7397	33.5	10.0	6.2	0.0	30.8	22.0	25.4	1.0	4.2	0.0
8090	38.2	4.0	1.5	0.0	10.5	0.0	30.5	0.0	19.3	0.0
8910	32.3	20.0	17.2	0.0	22.6	2.0	21.5	8.0	6.6	0.0

4830, Radio and TV Broadcasters. Nearly 3% of sales by SIC 6210, Security and Commodity Brokers are made to manufacturers on average, contrasted with 47% of SIC 7391, Research and Development Laboratories' sales.

Manufacturers then appear to depend on other manufacturers for marketing for their products and, to a lesser extent, upon service-producing industries. Service-producers tend to sell more to other service-producers. To confirm this, when the survey asked whether the establishment's current location was "chosen primarily because of proximity to a manufacturing establishment," more manufacturers (10.5%) than service-producers (4.7%) answered "yes."

Distribution of Employees

Table 6 also shows each SIC's mean and median number of full and part time employees. Manufacturing industries appear to hire more full time and fewer part time employees per establishment than do service-producing industries. This may imply that economies of scale can be realized with fewer employees in the service-producing sector than in the manufacturing sector. Table 7 provides an alternative view, showing both number and percentage of establishments in each sales class by SIC. As expected, SICs with low median employment also fall into a relatively low median sales class and vice versa.

A more interesting survey question concerns each SIC's proportion of workers which must have post-high school education or training. The importance of education in service-producing employment is dramatically illustrated in Table 6's last column. Nearly all the manufacturing industries require less than 50% of their work force to have training beyond the high school level, on average. Exceptions are the three high-tech (and

TABLE 6: Full and Part Time Employees and Educational Needs by SIC, 1986

SECTOR	Number of full-time employees		Number of part-time employees		% of employees who must have post-h.s. training	
	MEAN	MEDIAN	MEAN	MEDIAN	MEAN	MEDIAN
Manuf.	135.6	28	3.5	2	35.7	20.0
Svc-Prod.	50.6	6	19.1	2	61.3	80.0
SIC						
2600	668.3	197	12.7	3	22.1	20.0
2750	10.2	7	1.4	1	45.3	20.0
3070	56.7	25	3.3	2	15.8	10.0
3510	494.0	30	15.1	2	24.1	10.0
3570	238.1	37	3.0	2	59.7	62.5
3660	432.2	26	9.1	3	50.8	50.0
3670	66.8	28	1.7	2	53.0	25.0
3710	202.4	70	2.3	1	32.3	9.0
4510	22.5	14	3.5	3	41.2	50.0
4830	27.5	17	6.7	5	53.2	50.0
6210	21.6	6	1.0	1	73.0	87.5
6320	65.1	6	5.8	1	39.3	37.5
6330	390.3	105	37.8	5	31.7	25.0
7310	14.9	5	2.5	2	67.7	83.0
7330	6.8	1	3.7	1	49.0	100.0
7361	8.6	4	16.3	1	59.7	80.0
7362	79.0	8	367.5	2	37.6	29.0
7372	61.0	3	6.2	1	80.4	100.0
7374	14.0	4	2.0	2	54.0	80.0
7379	24.7	5	3.4	1	63.9	77.5
7391	13.3	6	2.3	2	78.3	95.0
7392	15.4	3	4.2	1	72.9	100.0
7394	12.9	4	2.7	1	48.0	25.0
7397	35.8	7	8.1	2	76.3	85.0
8090	33.4	9	16.0	5	61.4	75.0
8910	58.6	4	3.0	1	70.8	80.0

TABLE 7: Distribution of Establishments by Sales Class by SIC, 1986

SIC	Sales Class							
	<\$100,000 %	\$100,000 -500,000 %	\$500,000 -1 mil %	\$1-5 mil %	\$5-10 mil %	\$10-20 mil %	\$20-50 mil %	>\$50 mil %
2600	0	0.8	8.9	12.8	0	10.5	25.8	41.2
2750	13.0	49.7	20.0	14.5	1.0	1.0	0.5	0.5
3070	0.6	23.0	13.0	41.9	13.0	6.5	0.6	1.2
3510	0	8.9	11.4	24.1	24.1	6.4	12.7	12.6
3570	12.1	6.9	0.9	46.6	12.1	6.9	6.9	7.8
3660	1.6	4.1	25.4	33.2	22.5	6.2	0	7.0
3670	0.5	15.8	14.8	38.9	8.4	11.3	6.9	3.4
3710	1.2	6.7	17.1	24.4	18.3	7.3	12.8	12.2
4510	9.4	9.4	1.9	39.6	11.4	9.4	0	18.8
4830	7.3	31.9	12.4	34.7	9.4	4.3	0	0
6210	1.0	17.4	8.9	23.7	14.8	7.9	8.9	17.4
6320	2.4	15.7	57.7	18.7	1.2	0	1.2	3.0
6330	0	0	0	5.4	5.4	18.9	27.9	42.3
7310	19.3	21.2	18.7	14.5	12.6	4.2	1.3	8.4
7330	58.1	22.1	7.0	7.0	0	0	0	5.8
7361	26.4	48.3	9.2	14.7	0.9	0	0	0.4
7362	19.7	20.9	9.1	28.2	7.4	7.4	0	7.4
7372	52.5	27.6	12.2	0.9	0	0	0.5	6.3
7374	38.7	35.1	15.0	9.4	0	1.2	0	0.6
7379	12.5	28.2	12.1	24.3	15.0	3.9	3.6	0.4
7391	14.6	34.9	20.9	21.4	1.0	6.8	0	0.5
7392	25.6	32.6	14.0	18.2	9.3	0	0	0.4
7394	13.0	44.3	10.7	31.3	0	0.8	0	0
7397	23.9	45.8	9.9	7.0	0	4.2	9.2	0
8090	9.8	33.7	25.0	15.2	1.1	5.4	9.8	0
8910	27.5	39.9	10.7	12.6	7.8	0	1.0	0.5

high projected employment growth) industries, SIC 3570, Office and Computing Machines; SIC 3660, Communication Equipment; and SIC 3670, Electronic Components and Accessories. In contrast, most of the labor force of service-producing industries must have some post-high school education. Exceptions are in the sales and part time oriented industries--SIC 4510, Air Transportation; SICs 6320 and 6330, Insurance; and SIC 7362, Temporary Help Supply Services. Now more than ever all levels of government in the U.S. must concentrate on providing affordable, high quality education and training programs. The jobs of the future will require a more well educated labor force than in the past.

Regional Distribution

Information on spatial distribution of service-producing establishments provides regional policy makers with some idea regarding types of industries their region will likely attract. Table 8 documents the distribution of establishments surveyed, placing their location into one of four categories:^{11/} (1) urbanized portion of an SMSA county, (2) nonurbanized portion of an SMSA county, (3) county adjacent to an SMSA county and, (4) county not adjacent to an SMSA county (i.e. a remote rural county). The selected manufacturers and service-producers are more urban oriented in locational choice than employment in all industries. Of the service-producing industries, SIC 6210, Security and Commodity Brokers; SICs 6320 and 6330, Insurance companies; and establishments involved with SIC 4830, Radio and TV Broadcasting appear most likely to locate in rural counties. In contrast, SIC 4510, Air Transportation; SICs 7361 and 7362, Employment

^{11/} As defined by the U.S. Bureau of the Census, Census of the Population (1980).

TABLE 8: Distribution of Establishments by Degree of Urbanization
by SIC, 1986

SIC SECTOR	SMSA- urban %	SMSA- nonurban %	Adjacent to SMSA %	Rural %
Manuf.	75.0	9.7	10.7	4.6
Svc- Prod	76.4	7.3	7.2	9.1
SIC				
2600	63.7	10.5	11.3	14.5
2750	86.0	7.0	7.0	0
3070	62.1	13.7	18.9	5.3
3510	62.0	13.9	11.4	12.7
3570	86.2	0.9	6.9	6.0
3660	89.1	6.9	1.6	2.4
3670	83.7	4.0	12.3	0
3710	50.6	22.0	10.3	17.1
4510	100.0	0	0	0
4830	56.5	10.1	15.4	18.0
6210	68.0	7.9	2.0	22.1
6320	36.0	0.6	4.8	58.6
6330	65.8	10.8	9.9	13.5
7310	73.5	10.2	3.8	12.5
7330	75.0	0	12.8	12.2
7361	94.5	0	0.9	4.6
7362	92.0	6.2	1.8	0
7372	85.1	1.4	1.8	11.8
7374	83.1	1.3	8.1	7.5
7379	80.3	11.1	5.0	3.6
7391	89.8	2.0	8.2	0
7392	89.9	9.3	0.8	0
7394	78.4	0	12.6	9.0
7397	67.6	9.9	12.7	9.9
8090	81.5	1.1	13.1	4.3
8910	63.7	16.2	10.7	9.4

Services; SIC 7391, Research and Development Laboratories; and SIC 7392, Management, Consulting and Public Relations have overwhelming urban biased locational choice.

Service-producing industries in the urbanized portions of SMSAs export on average 21.8% out of state, while rural service-producers export on average only 16.7% out of state (see Table 9). Manufacturing industries exhibit the opposite behavior, averaging 72.1% in rural establishments' out of state sales, as contrasted with 27.7% out of state sales for those in

TABLE 9: Out of State Sales and In-State Expenditures by Sector and Degree of Urbanization, 1986

	% of sales made out of state		% of expenditures (excl. labor) made in state		% of total expenditures allocated to labor	
	MEAN	MEDIAN	MEAN	MEDIAN	MEAN	MEDIAN
<u>Manufacturing</u>						
Urbanized Place	27.7	40.0	67.6	40.0	32.2	28.0
SMSA- Nonurban	42.6	71.5	48.6	40.0	24.2	30.0
Adj to SMSA	41.9	75.0	50.8	16.0	21.6	25.0
Rural	72.1	85.0	20.0	20.0	27.9	25.0
<u>Service-Producers</u>						
Urbanized Place	21.8	5.0	74.0	90.0	46.6	50.0
SMSA- Nonurban	28.1	0.0	78.3	100.0	51.9	50.0
Adj to SMSA	9.3	0.0	79.5	90.0	41.4	41.0
Rural	16.7	0.0	69.5	90.0	43.5	50.0

urbanized places. Again however, the backward linkages cannot be ignored. On average rural manufacturers purchase approximately 20% of their inputs within the state and devote 28% of total expenditures to labor. Rural service-producers purchase an average of 70% of their inputs within the state, while 44% of total costs are devoted to labor. Comparison of inputs purchases for urban service-producers and manufacturers yield similar results. Rural service-producers may have slightly lower out of state sales, but their close ties to the local community may enhance their actual aid to rural economic development.

Characteristics of Exporters

One of this study's objectives was to examine the characteristics of exporting establishments, comparing the size, establishment type and locational characteristics of service-producers who export with those of high export manufacturers. For illustration purposes "high exporters" are defined as those establishments with 50% or more of sales out of state. As shown in Table 10, 18.7% of the service-producing establishments surveyed sell more than 50% of their output out of state. In contrast, 33.2% of the selected manufacturers fall into the high export category. Regional offices are most likely to be in this category. Eighty-one percent of manufacturing and 40.5% of service-producing regional offices are high exporters. Firms least likely to be high exporters are single entities. Headquarters are also likely to be high exporters. Thirty-five percent of service-producing and 60% of manufacturing headquarters make 50% or more sales out of state. Manufacturing branch plants are far more likely to be high exporters (49.4%) than are service-producing branch plants (14.3%). This appears to confirm an earlier survey of business services in the New England region, where

TABLE 10: Size and Establishment Type of Firms With More Than 50% Of Sales Out Of State By Sector, 1986

	Manufacturing (N=147) <u>% of firms</u>	Service-Producing (N=115) <u>% of firms</u>
Firms With Out of State Sales >50% as a Percentage of All Firms	33.2	18.7
Establishment Type		
Single	25.2	14.3
Headquarters	59.9	35.3
Branch Plant	49.4	14.3
Regional Office	80.8	40.5
1986 Sales (in thousands)		
< 100	4.2	2.8
100-499	4.1	13.7
500-999	11.9	36.5
1,000-4,999	53.4	12.2
5,000-9,999	45.6	25.3
10,000-19,999	88.3	47.4
20,000-49,999	64.8	57.4
> 50,000	87.2	52.3
Location		
SMSA-urban	27.2	19.5
SMSA-nonurban	47.9	28.5
Adjacent to SMSA	43.9	5.8
Rural	75.5	13.7
Ownership		
Local	27.0	15.3
State	36.4	17.5
U.S.	58.1	31.9
International	98.6	67.3

Ashton and Sternal (1978) found that firms affiliated with a corporate organization having offices outside the region were more likely to sell in interregional and international markets.

The third section in Table 10 shows distribution of high export establishments by 1986 annual sales class, with percentages shown as percents of total firms surveyed within each sales class for each industrial sector. For example, of the selected service-producing industries with sales of less than \$100,000 in 1986, 2.8% were high exporters. In contrast, 87.2% of manufacturers and 52.3% of service-producers with 1986 annual sales of \$50 million or more made more than 50% of their sales out of state. Based on the New England study's results, firms with high annual sales would be expected to export a high proportion of those sales. There appear to be two tiers of exporting firms. While very small firms are unable or unwilling to compete in export markets, medium and large firms (in terms of annual sales) appear quite active in export markets. For manufacturers, firms with annual sales between \$1 million and \$5 million are involved in export activity as are service-producers in the \$500,000 to \$1 million in annual sales range.

High export service-producing industries tend to locate in SMSA counties. Approximately 20% of the establishments in the urban and nonurban portions of SMSAs sell more than 50% of their output out of state (see Table 10). Rural areas are a bit lower, with only 13.7% of service-producing firms considered as high exporters. Strikingly different behavior is observed for manufacturing industries. Seventy-five percent of manufacturers located in rural areas are considered high exporters, compared with only 27.2% of urban manufacturers. However, as indicated previously, rural service-producers tend to purchase a larger proportion of inputs within the state than do rural

manufacturers, somewhat offsetting the impact of a much smaller proportion of high export firms.

Firms with the majority of their ownership held internationally are most likely to be high exporters. This is particularly evident in the manufacturing sector where 98.6% of internationally owned firms make 50% or more of sales out of state. Sixty-seven percent of internationally owned service-producing establishments fall into the high export category. As might be expected, locally owned firms are least likely to be high exporters. Twenty-seven percent of high export manufacturing firms and 15.3% of high export service-producing firms are locally owned.

PUBLIC POLICY CONCERNS

One of the goals of this research is to identify public policies which are important to service-producing firms and to see whether or not these policies differ from those thought important by manufacturers. Table 11 provides an initial look at this area, documenting the policies identified as important by establishments surveyed. As the majority of establishments chose either not to answer the policy questions the sample size for this question is fairly small.

Manufacturing and service-producing firms seem to share the same concerns. In terms of the second question, although the majority of respondents complained about high taxes and the complexity of government regulation, these answers are the norm for businesses. The more interesting policies are those which may not have been a concern to a large proportion of respondents, but do appear to be areas in which changes in public policy are possible. An example might be government support of local/state businesses. Many firms wrote lengthy statements to the effect that the state governments

Q: Please list specific areas where public assistance has been helpful.

MANUFACTURING: (N=126)

Tax credits or lower taxes (3.9%)
 Government support for training programs/job service (3.1%)
 Chamber of commerce or local development group activities (3.1%)
 Local support of local businesses/availability of local financing (3.1%)

SERVICE-PRODUCING: (N=301)

Chamber of commerce or local development group activities (3.3%)
 Help from an educational institution (3.3%)
 Tax credits or lower taxes (2.6%)
 Business to business listing (2.3%)
 Domestic marketing/advertising effort by the state (2.3%)
 New, clearer government regulations (2.3%)
 Public provision of demographic, market, and economic data (2.3%)
 Availability of good transportation infrastructure/upkeep of existing infrastructure (2.3%)

Q: Are there specific areas where you think public assistance would be helpful to your firm?

MANUFACTURING: (N=142)

Lower (more competitive) taxes (16.1%)
 Less government regulation (9.8%)
 Small business loans/financing (8.4%)
 Education and grants in sales and marketing (6.3%)
 Domestic and international export promotion (5.6%)
 Government support of local/state businesses and of minority owned businesses (5.6%)

SERVICE-PRODUCING: (N=334)

Lower (more competitive) taxes (9.2%)
 Less government regulation (7.7%)
 Government support of local/state businesses and of minority owned businesses (5.0%)
 Education and grants in sales and marketing (4.1%)
 Public education/awareness of available public assistance (4.1%)
 Domestic and international export promotion (3.8%)

purchase their product or service inputs from out of state firms without considering in-state producers. These firms felt that government officials thought of in-state products/services as inferior and did not take the time to thoroughly investigate in-state alternatives.

CONCLUSIONS

Results of this survey of selected manufacturing and service-producing establishments indicate that some service-producers do make a sizeable proportion of their sales to out of state customers. Establishments within these selected service-producing industries do not, in general, chose their location to be close to manufacturers though the majority do choose to locate in an urbanized area. In general, service-producers in this survey purchase a larger proportion of inputs within the state and allocate a larger proportion of their expenditures to labor costs than do the selected manufacturing firms. The variation in export levels across industries is nearly the same for manufacturers as for service-producers, due to the influence of SIC 2750, Commercial Printing. On average, the service-producing establishments made 20.9% of sales out of state (Table 2), slightly lower than the 34% documented in the Puget Sound study (Beyers, Alvine and Johnsen, 1985). This is not surprising as the Puget Sound area is a regional hub of economic activity and the broad upper midwest region is not. Average exports would most likely be higher if the survey had concentrated on the larger metropolitan areas located within the region in the same sense as the Puget Sound study.

On average the manufacturing industries surveyed tend to be larger than the service-producing industries in terms of both number of employees and annual sales. Service-producers appear to hire fewer full time and more part

time employees per establishment than do manufacturing industries, perhaps indicating the realization of economies of scales at a much smaller size in service-producing industries.

Manufacturers and, to a lesser extent, service-producers are dependent upon manufacturing industries as customers. Service-producers in general tend to sell the largest proportion of their output to other service-producing industries. Exceptions are SICs 6320 and 6330, Insurance companies, SIC 6210, Security and Commodity Brokers, and SIC 7394, Equipment Rental and Leasing whose largest sales are to individual consumers. Few sales in either sector are made to governments.

In terms of policy recommendations state and local policy makers should realize that service-producing industries can be leaders in economic development rather than merely following the lead of manufacturers. The location of state and local government input purchases and their impact on regional economic development should be considered an essential part of the decision making process. Public education and technical assistance with marketing strategies or other business problems would probably be useful to service-producers and manufacturers alike. In addition, since service-producing industries require better educated employees, investments in public education and training are critical.

In terms of further research, information regarding the locational choice of service-producers would be helpful to those states and communities involved in regional development efforts. Matching needs of the targeted industry with the characteristics and needs of the developing region would greatly enhance the efficiency of the regional development process.

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