

**Economic Impact Evaluation of Global Marketing Support Services – An Exports Assistance Program on the Economy of Arkansas**

**Sreedhar Upendram<sup>1</sup>, Preston La Ferney<sup>2</sup>, Wayne Miller<sup>3</sup>, Jennie Popp<sup>4</sup> and Daniel Rainey<sup>4</sup>**

*Selected Paper prepared for presentation at the Southern Agricultural Economics Association Annual Meeting, Tulsa, Oklahoma, February 14-18, 2004*

**January 2004**

1- Graduate Student:sreedhar@agecon.ksu.edu, Kansas State University, Manhattan; 2-University Professor, 3- Professor, 4-Assistant Professor, University of Arkansas, Fayetteville.

*Copyright 2004 by [Sreedhar Upendram, Preston La Ferney, Wayne Miller, Jennie Popp and Daniel Rainey]. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.*

## **Abstract**

This study determines the impact of Global Marketing Support Services (GMSS) - an exports assistance program in assisting 13 small and medium sized businesses to export. The total impact of exports (direct, indirect and induced effects) on added value, employment, labor income and tax impacts in Arkansas are estimated using Impact Analysis for Planning (IMPLAN).

Keywords: Impact analysis, exports assistance, economic impacts. JEL Code: O180

## **Background**

Arkansas export sales of merchandise for the year 2000 totaled \$ 2.1 Billion. This represents an increase of 13.1% from 1999 export sales and an increase of 86% export sales from 1993. In 2001, about 70% of the exports came from small to medium sized businesses that had fewer than 500 employees. Roughly 70% of the total exporters accounted for about 25% of the state's total exports. Exports bring secure and high-paying jobs to the economy. Exports indirectly generate jobs and increase wages in supporting industries. How many jobs are created? What is the increase in wage income? Which industries pay the highest wage? How many jobs are created for a dollar increase in export sales? What is the value addition to the economy due to export sales? This study answers all of these questions while evaluating the impacts of increased exports on the Arkansas economy at the county and state levels via GMSS exports assistance program.

Global Marketing Support Services (GMSS): GMSS is an outreach program of The University of Arkansas and was created to help small to midsize businesses compete effectively in international trade and explore global opportunities. GMSS was established in 1993 as a joint service unit of the University of Arkansas' Dale Bumpers College of Agriculture, Food and Life Sciences and the Division of Agriculture Cooperative Extension Service. GMSS has provided full service assistance to more than 50 companies and partial service to more than 100 companies competing effectively in international trade by providing training, consulting, networking and customized market research.

The GMSS economic impact analysis is intended to assess the effects of various changes within the Arkansas economy as a result of GMSS programs over a period of three years from 1999 to 2001. The contribution of GMSS towards bringing new money or capital into the Arkansas economy would be

measured in terms of income earned in payment for exported goods and services, new employment generated and new product demands created. The increase in demand results in successive rounds of spending or re-spending and the resulting additional income generated within the economy. There are many and varied reasons to conduct economic impact assessment, depending upon the particular program to be evaluated. The two main reasons why we wish to conduct economic impact assessment of GMSS are - to ensure accountability, document value created and to enhance overall management effectiveness of the GMSS program.

It is believed that GMSS contributes significantly to the economy of Arkansas in market research and export assistance. Since no means of assessing the economic impacts of GMSS has been developed, this study is aimed at evaluating the economic impact of GMSS on the economy of Arkansas. The objectives of this research are to study the impacts of GMSS in terms of employment, wage income and value added on the economy of Arkansas. GMSS not only contributes to the economy through its exports assistance program but also impacts the supporting industries that provide goods and services to the firm and the businesses that sell goods and services to the households. Two hypotheses tested in this study are that GMSS has had no significant impact on the economy of Arkansas and GMSS will have no impact on the economy of Arkansas if there were an increase in export sales or increase in employment or increase in employee wages for the firms that benefited from GMSS services.

Economic impacts of GMSS are likely best captured through Input-Output (I-O) analysis. I-O analysis is basically a matrix of the flow of goods and services among the various sectors of an economy, taking into considerations the direct and indirect relationships among the sectors. The uniqueness of I-O analysis lies in its ability to trace these relationships and measure the effects of the anticipated changes in individual sectors. In this study IMPLAN system is used to evaluate the economic impacts of GMSS on the Arkansas economy.

## Data and methods

The primary data for this study is obtained from a survey of 13 small to medium sized businesses in Arkansas. The 2000 county and state data files (latest available) in the IMPLAN serve as secondary data. The survey collects information from the firms on increases in export sales and employment over a period of 3 years from 1998 to 2001. The survey obtains subjective information about the geographic location of the firm, the quality of services received from GMSS and other benefits that the firm gained as a result of GMSS services. In addition to this, the survey obtains input from the firm about other businesses, which could benefit from GMSS services besides inquiring about additional areas of interests of the firm. All the firms, which respond to the survey, are assured about the confidentiality of the information and that the information is only for research purposes to evaluate the performance of GMSS.

The data obtained from the firms is tabulated as follows:

**Table 1. Data for Impact Analysis - Export Sales, Employment & GMSS Share in 2001**

GMSS Client	Increase in Export	GMSS share in Export	Total Increase in Jobs	GMSS Share in Job Increase	GMSS Percentage Contribution
	Sales	Sales	#	#	%
	\$	\$			
Pickling Firm	81,548	24,464	0.3	0.1	30
Cookies & Crackers Firm	1,166,170	349,851	8	2.4	30
Hardwood Firm	2,000,000	2,000,000	21.6	21.6	100
Wooden Access. Firm	378,707	113,612	4.4	1.3	30
Woodworking Firm	244,048	73,214	2.3	0.7	30
Drug Firm	63,400	63,400	0.5	0.5	100
Candles Company	8,706,613	1,741,323	32.6	6.5	20
Industrial Fluids Firm	720,084	216,025	1.6	0.5	30
Air pumps Firm	9,275,296	1,855,059	38	7.6	20
Lab Equipment Firm	314,098	94,229	1.4	0.4	30
Sporting Goods Firm	6,000,000	1,800,000	53.9	16.2	30
<b>Total</b>	<b>28,949,964</b>	<b>8,331,178</b>	<b>165</b>	<b>57.8</b>	

The 13 firms included in this analysis are categorized in 11 IMPLAN sectors. Sector 80 includes two firms in the same county and sector 332 includes 2 firms in 2 different counties. The products that each firm produces are also cited in the table.

IMPLAN uses this data and estimates impacts based on Leontief's Input-Output technique. This enables us to measure the direct impacts of increased exports on the industry and indirect impacts on the supporting

industries. IMPLAN is based on the Leontief Input-Output (I-O) methodology. Leontief I-O technique provides a relatively straightforward methodology to quantify and help understand the flow of economic linkages and to assess the extensive impacts throughout an economic system. I-O analysis is basically a matrix of the flow of goods and services among the various sectors of an economy, taking into considerations the direct and indirect relationships among the sectors.

A production function shows where an industry spends, and in what proportions to generate each dollar of output. Through algebraic manipulation of the A matrix, we derive the multipliers. The resulting equation is:

$$X = (I-A)^{-1} * Y$$

Where X = Total industry output

I = Identity matrix

A = A matrix

Y = Final demand

This can also be interpreted as

$$\Delta X = (I-A)^{-1} * \Delta Y$$

Or change in total industry output = (I-A)<sup>-1</sup>\*Change in final demand.

The model shows how the output will change with a given change in final demand. The (I-A) inverse is the matrix of multipliers known as the Leontief inverse.

A Multiplier summarizes the total impact that can be expected from a change in given economic activity. Multipliers measure the economic impact of a change in final demand, earnings or employment in an economy. A multiplier is computed by the ratio of total change to the induced initial change. The four types of multipliers that are used to estimate the economic impacts are Output, employment, value added and income multipliers. Output multipliers are the total value of production in all sectors of the economy that is necessary in order to satisfy a dollar's worth of final demand for the sector's output. Employment multipliers – measures total change in employment resulting from an initial change in employment. Value added multipliers – estimates additional value added to product as a result of economic activity. Income

multiplier translates the impacts of final demand spending changes into changes in income received by households.

For impact analysis type II multipliers were used to incorporate household income and expenditure in the model. IMPLAN derives the type II multipliers from the regional transaction table, which explains the inter-industry purchase and sale of goods and services, value-added payments, imports and exports, final demand, total industry outlays and total industry output in the economy. In addition to the inter-industry effects, the type II multiplier also takes into account the income and expenditure of households. The household income row and the household expenditure columns are treated as an industry and included in the Leontief inversion. This internalizes the household sector, including the induced or household spending effects into the model. The type II multiplier indicates that for a one-dollar change in final demand for the individual firm, increases occur in inter-industry economic activity and incomes of the people employed producing the output of the individual firm increases. These people spend their income on personal consumption, which leads to increased demands from local industries.

IMPLAN generated Regional Purchase Coefficients (RPCs) were used in the impact analysis. RPCs predict how much local production is actually used locally. The RPCs are assumed to be maximum implying combined state's default RPCs will be at least equal to the maximum of the individual state RPCs.

The primary data obtained through customer satisfaction survey and telephone interviews were used as inputs to estimate the combined economic impacts of increase in export sales in 13 firms on Arkansas. The impacts of GMSS on the economy of Arkansas via assistance to 13 firms were estimated using IMPLAN by the following method:

1. The study area for the combined impact analysis of 13 firms was the state of Arkansas. The study area data of Arkansas using 2000 IMPLAN datasets was built.
2. For each of the 13 firms, the appropriate sector was chosen from the 528 IMPLAN industrial sectors.
3. For each of the 13 firms, the increase in export sales and increase in employment values were incorporated in the IMPLAN model.

4. For each of the 13 firms, the year 2001 in which the increase in export sales and employment occurred was selected and the local purchase coefficients were selected to be 100%.
5. All the firms were then grouped as GMSS impact to obtain the combined impacts of increase in export sales in 13 firms.
6. Type II multiplier was selected to compute the impact reports to incorporate household income and expenditure in the IMPLAN model thereby capturing the induced effect in addition to direct and indirect effects.
7. The increase in export sales in the 13 firms create new jobs, increase labor income and added value in the 13 firms as direct effects and create new jobs, increase labor income, value added and output in supporting industries as indirect effects.
8. Two analyses were run to capture the total impact of increased in export sales on the economy of Arkansas and to separate out the GMSS impacts from the total impacts.
9. The impact reports, which are based on the type II multiplier, were calculated in 2000 dollars and were inflated to report the results in 2001 values.
10. The percentage of direct and supporting industry effects were calculated to examine the direct effects and multiplier effects of increase in export sales in 13 firms on the economy of Arkansas.
11. The direct, indirect, induced effects and total impacts of employment, labor income, value added and output as a result of increase in export sales on the economy of Arkansas were examined.

## **Analysis and Results**

Two types of economic impacts were analyzed in this study:

1. GMSS Economic Impact: Economic impact analysis for a GMSS client firm (for which the best primary data were available) was estimated and then the percentage of the impact attributed to GMSS was determined on the county economy was estimated based on the case study.
2. A combined impact of a group of 13 GMSS client firms on the economy of Arkansas was estimated, and then the percentage of the impact attributed to GMSS was determined.

The first type of analysis is done for the Sporting Goods firm and the impacts are estimated in terms of changes in total employment, total labor income and total value added as a result of increase in exports resulting from GMSS' exports assistance to the firms in their respective counties.

### **Sporting Goods Firm Impacts**

The Sporting Goods firm reported an increase of \$ 6 million in exports and an increase of 58 employees for the year 2001 in the customer satisfaction survey. However, the firm attributed an increase of \$ 1.8 million in exports and an increase of 17 employees to GMSS services for the year 2001. The \$ 6 million increase in export sales and an increase of 58 employees were used as inputs to estimate the impacts of increase in export sales on the economy of the county. The economic impacts of GMSS via assistance to the Sporting Goods firm were estimated using the \$ 1.8 million increase in export sales and an increase of 17 employees. The appropriate industrial sector for Sporting Goods – sector 421 in IMPLAN - was chosen and the impact reports were inflated to 2001 values. The output of the Sporting Goods sector for Arkansas in the year 2001 was \$ 138.3 million, with an employment of 1,262 employees. These employees were paid \$ 28.6 million as wages and were responsible for \$ 53.3 million added value to the county economy.

The total impacts for this increase in export sales and employment increase were estimated using the IMPLAN model. The results of the analysis are tabulated as follows:

**Table 2: Economic Impacts of Increase in Export Sales by Sporting Goods Firm on the county economy, 2001**

	<b>Employment</b>		<b>Labor Income</b>		<b>Added Value</b>	
	<b>Number of Jobs</b>	<b>% Total Impact</b>	<b>\$</b>	<b>% Total Impact</b>	<b>\$</b>	<b>% Total Impact</b>
Direct Effects	58	68.3	1,194,046	60.3	2,132,582	62.3
Indirect Effects	15	17.2	492,919	24.9	755,393	22.1
Direct + Indirect Effects	72	85.5	1,686,965	85.2	2,887,975	84.3
Induced Effects	12	14.5	294,120	14.8	537,253	15.7
<b>Total Impact</b>	<b>84</b>	<b>100.0</b>	<b>1,981,085</b>	<b>100.0</b>	<b>3,425,228</b>	<b>100.0</b>



By increasing export sales with the help of GMSS, the Sporting Goods firm was responsible for creating 84 jobs in the county. Proprietors and employees received \$1.9 million in additional income as a result of increase in export sales. By increasing export sales, the Sporting Goods firm added value of \$ 3.4 million to the county economy in 2001. Sporting Goods was responsible for a total tax impact of \$ 873,584, of which, \$ 619,323 constitutes Federal tax and \$ 254,261 constitutes State tax.

Most of the impact reported above is the result of the Sporting Goods firm's direct impact on the economy. The firm added 58 employees, or 4.5% of the total employment for the Sporting Goods sector in the county. The proprietors and employees of the firm received an additional \$ 1.2 million in labor income, or 4% of total labor income for this industry. The firm added value of \$ 2.1 million, or 4% of the total added value of this sector in the Arkansas economy in 2001.

Industries that provide inputs and services to the Sporting Goods firm and businesses that sell goods and services to households hired an additional 27 employees to meet the increased demand for their goods and services. These firms provided an additional \$ 787,039 in labor income and \$ 1.3 million in added value to the economy of the county.

The additional jobs, wages and added value were created in the Wholesale Trade, Miscellaneous Retail, Owner-occupied Dwellings, Health Services and Transportation and other sectors as a result of increase in export sales. The following table lists the business sectors, which benefited most in employment, labor income and value added as a result of increased exports by the Sporting Goods firm in Arkansas.

**Table 3: Economic Impacts of Increased Exports by Sporting Goods Firm on Industries in terms of Employment, Labor Income and Value Added, 2001**

Industry	Employment		Labor Income		Value Added	
	Number of Jobs	% Total	\$	% Total	\$	% Total
Agriculture	0.2	0.2	2,991	0.2	4,405	0.1
Mining	0	0.0	640	0.0	1,661	0.0
Construction	0.9	1.1	25,364	1.3	27,821	0.8
Manufacturing	59.8	70.9	1,266,690	63.9	2,228,494	65.1
Transportation & Utilities	1.4	1.7	57,361	2.9	92,680	2.7
Trade	9.5	11.3	322,158	16.3	524,844	15.3
Finance, Insurance & Real Estate	1.9	2.3	52,789	2.7	248,902	7.3
Services	10.1	12.0	235,335	11.9	274,632	8.0
State and Local Government	0.3	0.4	16,096	0.8	20,130	0.6
Other	0.2	0.2	1,660	0.1	1,660	0.0
<b>Total</b>	<b>84.3</b>	<b>100.0</b>	<b>1,981,084</b>	<b>100.0</b>	<b>3,425,229</b>	<b>100.0</b>

Over 63% of the increased economic activity as a result of \$ 6 million increase in export sales occurred in the manufacturing industries. Between 11% and 15% of the increase in economic activity occurred in the sectors trading the products of Sporting Goods. Between 8% and 12% of the increase in economic activity occurred in the businesses providing Services in the county. About 10% of the increase in economic activity occurred in sectors such as Finance, Transportation & Utilities, Construction and other sectors.

The contribution of GMSS in increasing export sales for the Sporting Goods firm was 30% of the total impact i.e. GMSS was responsible for an increase of \$ 1.8 million in export sales directly. This was partly because the Sporting Goods firm was exporting their products overseas before they took exports assistance from GMSS. Therefore, the Sporting goods firm attributes 30% of the increase in exports sales to GMSS.

GMSS was responsible for creating 25.3 jobs in the County. The proprietors and employees received \$ 594,326 in additional income and added value of over \$ 1 million in added value to the economy of the County. The impacts of GMSS assistance in exports are tabulated as follows:

**Table 4: Economic Impacts of GMSS via Assistance to the Sporting Goods firm, 2001**

	<b>Employment</b>		<b>Labor Income</b>		<b>Added Value</b>	
	<b>Number of jobs</b>	<b>% Total impact</b>	<b>\$</b>	<b>% Total impact</b>	<b>\$</b>	<b>% Total impact</b>
Direct effects	17.3	68.4	358,214	60.3	639,774	62.3
Indirect effects	4.3	17.0	147,876	24.9	226,618	22.1
Direct + indirect effects	21.6	85.4	506,090	85.2	866,392	84.3
Induced effects	3.7	14.6	88,236	14.8	161,176	15.7
<b>Total impact</b>	<b>25.3</b>	<b>100.0</b>	<b>594,326</b>	<b>100.0</b>	<b>1,027,568</b>	<b>100.0</b>

Over 60% of the increased economic activities as a result of the \$ 1.8 million increase in export sales occurred in the Sporting Goods firm (Table 7). Between 17% and 25% of the increase in economic activity occurred in the businesses supplying goods and services to the Sporting Goods firm. Another 15% of the increase in economic activity occurred in businesses supplying goods and services to the new employees of the Sporting Goods firm and supplying businesses.

#### **GMSS Impact Analysis and Results for 13 Firms**

The second type of impact analysis conducted in this study is a combined analysis of 13 firms categorized in 11 IMPLAN sectors that GMSS assisted to increase their exports. The firms that were chosen were assisted significantly by GMSS in exporting their products. This analysis was done at the state level to determine the combined impacts of GMSS services on the economy of Arkansas for the 13 firms in terms of change in employment, labor income and total value added. These impacts are further distinguished as direct effects, indirect effects and induced effects.

GMSS helped numerous firms in exports assistance, among which 13 firms have had substantial impacts on the economy of Arkansas and data were available on their export operations. The impacts of these 13 firms were estimated and combined to determine an initial estimate of the quantitative impacts of GMSS on the economy of Arkansas in 2001.

The impacts of GMSS on the local economy via assistance to these 13 firms were estimated using IMPLAN. These percentages are shown in Tables 4 and 12. The employment and export sales information obtained from the firms through the customer satisfaction survey and telephonic interviews was used as an input for this analysis. Appropriate industrial sectors in IMPLAN were chosen for each of the firms and the impact reports were inflated to 2001 values. All these impacts were then added to obtain the impact estimates of GMSS across the state of Arkansas. The results of this analysis are formulated in the following table:

**Table 5: Economic Impacts of Increased Exports by 13 Firms in Arkansas, 2001**

13 Firms	Employment		Labor Income		Added Value	
	Number of Jobs	% Total Impact	\$	% Total Impact	\$	% Total Impact
Direct Effects	164.6	45.8	5,237,213	49.0	9,069,192	51.0
Indirect Effects	103	28.7	3,230,311	30.2	4,882,230	27.4
Direct + Indirect Effects	267.6	74.5	8,467,524	79.1	13,951,422	78.4
Induced Effects	91.5	25.5	2,230,656	20.9	3,846,493	21.6
<b>Total Impact of 13 firms</b>	<b>359.1</b>	<b>100.0</b>	<b>10,698,180</b>	<b>100.0</b>	<b>17,797,915</b>	<b>100.0</b>

By increasing export sales with the help of GMSS, the 13 firms were responsible for creating 359 jobs in Arkansas. Proprietors and employees received \$ 10.7 million in additional income as a result of this increase in export sales. By increasing export sales, the 13 firms added \$ 17.8 million to the Arkansas economy in 2001. The 13 firms are responsible for a total tax impact of \$ 4,050,064, of which \$ 2,876,305 constitutes Federal taxes and \$ 1,173,759 constitutes State taxes.

Most of the impact reported above is the result of the 13 firms' direct impact on the economy. The 13 firms added 164.6 employees, or about 2% of the total employees in the 11 sectors in Arkansas in year 2001. The

proprietors and employees of the 13 firms received an additional \$ 5.2 million in labor income, or 2.2% of the total labor income for the 11 sectors in Arkansas. The 13 firms added value of \$ 9 million, or 2.2% of the total added value of 11 sectors in the Arkansas economy in 2001.

Industries that provide inputs and services to the Sporting Goods firm and businesses that sell goods and services to households hired an additional 195 employees to meet the increased demand for their goods and services. These firms provided an additional \$ 5.4 million in labor income and \$ 8.7 million in added value to the Arkansas economy. The additional jobs, wages, added value and output were created in the Wholesale Trade, Motor Freight Transportation, Maintenance and Repair, Paperboard Containers and Boxes, and Computer and Data Processing Services sectors as a result of increase in export sales.

The total employment impacts of 13 firms as a result of increase in export sales are tabulated as follows:

**Table 6: Total Employment Impacts of 13 Firms, Arkansas, 2001**

<b>13 Firms Employment</b>	<b>Direct</b>	<b>Indirect</b>	<b>Induced</b>	<b>Total</b>	<b>% of Total Impact</b>
Pickling Firm	0.3	0.3	0.2	0.8	0.2
Cookies & Crackers Firm	8.0	4.1	3.7	15.8	4.4
Hardwood Firm	21.6	10.5	9.7	41.8	11.6
Wooden Accessories Firm	4.4	1.8	1.7	7.9	2.2
Woodworking Firm	2.3	1.0	1.1	4.4	1.2
Drug firm	0.5	0.1	0.2	0.8	0.2
Candles Company	32.6	33.1	25.1	90.8	25.3
Industrial Fluids Firm	1.6	2.5	1.6	5.7	1.6
Air pumps Firm	38.0	28.1	26.5	92.6	25.8
Lab Equipment Firm	1.4	1.6	1.1	4.1	1.1
Sporting Goods firm	53.9	19.8	20.7	94.4	26.3
<b>Total</b>	<b>164.6</b>	<b>102.9</b>	<b>91.6</b>	<b>359.1</b>	<b>100.0</b>
<b>% Impacts</b>	<b>45.8</b>	<b>28.7</b>	<b>25.5</b>	<b>100.0</b>	

The 13 firms were responsible for 164.6 employees, or 45.8% of the total employment generated while the supporting industries added 194.5 employees, or 54.2% of the total employment added to the economy of Arkansas in 2001. Among the 13 firms, the Sporting Goods firm generated the highest employment, followed by Air Pumps firm and Candles company. The Pickling and the Drug firm among the 13 firms generated the least employment. The labor income impacts of the 13 firms are as follows:

**Table 7: Total Labor Income Impacts of 13 Firms, Arkansas, 2001**

<b>13 Firms Labor Income</b>	<b>Direct</b>	<b>Indirect</b>	<b>Induced</b>	<b>Total</b>	<b>% of Total</b>
	\$	\$	\$	\$	<b>Impact</b>
Pickling Firm	7,129	9,893	4,494	21,516	0.2
Cookies & Crackers Firm	219,697	122,676	89,828	432,201	4.0
Hardwood Firm	559,640	346,717	237,269	1,143,626	10.7
Wooden Accessories Firm	102,930	56,323	41,934	201,187	1.9
Woodworking Firm	72,595	30,419	27,128	130,142	1.2
Drug firm	15,144	4,109	5,025	24,278	0.2
Candles Company	1,292,322	1,021,527	610,742	2,924,591	27.3
Industrial Fluids Firm	61,565	82,081	37,971	181,617	1.7
Air pumps Firm	1,562,584	892,717	645,481	3,100,782	29.0
Lab Equipment Firm	49,733	50,138	26,378	126,249	1.2
Sporting Goods firm	1,293,874	613,711	504,407	2,411,992	22.5
<b>Total</b>	<b>5,237,213</b>	<b>3,230,311</b>	<b>2,230,657</b>	<b>10,698,181</b>	<b>100.0</b>
<b>% Impacts</b>	<b>49.0</b>	<b>30.2</b>	<b>20.9</b>	<b>100.0</b>	

Proprietors and employees of the 13 firms were paid an income of \$ 5.2 million, or 49% of the total labor income added to the economy of Arkansas. Proprietors and employees in the supporting industries were paid additional income of \$5.4 million, or 51% of the total labor income added to the economy of Arkansas in 2001. Among the 13 firms, proprietors and employees the in Air Pumps firm were paid the most income followed by the Candles Company and Sporting Goods firm. The Proprietors and employees in Pickling firm were paid least income among the 13 firms. The added value impacts of the 13 firms are as follows:

**Table 8: Total Added Value Impacts of 13 Firms, Arkansas, 2001**

<b>13 Firms Value Added</b>	<b>Direct</b>	<b>Indirect</b>	<b>Induced</b>	<b>Total</b>	<b>% of Total</b>
	\$	\$	\$	\$	<b>Impact</b>
Pickling Firm	27,178	15,078	7,749	50,005	0.3
Cookies & Crackers Firm	456,503	186,241	154,897	797,641	4.5
Molding Company	624,901	527,708	409,141	1,561,750	8.8
Wooden Accessories Firm	131,623	85,664	72,309	289,596	1.6
Woodworking Firm	86,906	47,254	46,779	180,939	1.0
Drug Firm	27,938	5,952	8,665	42,555	0.2
Candles Company	3,205,179	1,504,701	1,053,150	5,763,030	32.4
Industrial Fluids Firm	83,738	147,885	65,476	297,099	1.7
Air pumps Firm	2,057,615	1,367,555	1,113,053	4,538,223	25.5
Lab Equipment Firm	56,702	69,472	45,485	171,659	1.0
Sporting Goods Firm	2,310,909	924,719	869,789	4,105,417	23.1
<b>Total</b>	<b>9,069,192</b>	<b>4,882,229</b>	<b>3,846,493</b>	<b>17,797,914</b>	<b>100.0</b>
<b>% Impacts</b>	<b>51.0</b>	<b>27.4</b>	<b>21.6</b>	<b>100.0</b>	

The 13 firms added a total of \$ 9 million, or 51% of total added value to the economy of Arkansas. The supporting industries added value of \$8.6 million or 49% of the total added value by the 13 firms to the economy of Arkansas in 2001. Among the 13 firms, the most value was added by the Candles company followed by the Air Pumps and Sporting Goods firms. The Drug firm added the least value among the 13 firms to the economy of Arkansas in 2001.

The increase in export sales in 13 firms had notable impacts on the economy of Arkansas in generating new employment, increased labor income and added value. However, the impacts generated cannot be attributed completely to GMSS services.

The total impacts in the 13 firm analyses that could be attributed to GMSS are as follows:

**Table 9: Economic Impacts of GMSS on the Arkansas Economy, 2001**

GMSS Impacts	Employment		Labor Income		Added Value	
	Number of jobs	% of Total Impacts	\$	% of Total Impacts	\$	% of Total Impacts
Pickling Firm	0.3	0.3	6,455	0.2	15,001	0.3
Cookies and Crackers Firm	4.7	3.9	129,660	3.8	239,292	4.4
Hardwood Firm	41.8	35.0	1,143,626	33.3	1,561,750	28.6
Wooden Accessories Firm	2.3	1.9	60,117	1.7	86,534	1.6
Woodworking Firm	1.3	1.1	39,042	1.1	54,282	1.0
Drug Firm	0.8	0.7	24,278	0.7	42,555	0.8
Candles Company	18.1	15.1	584,917	17.0	1,152,606	21.1
Industrial Fluids Firm	1.7	1.4	54,485	1.6	89,130	1.6
Air Pumps Firm	19.0	15.9	635,371	18.5	929,912	17.0
Lab Equipment Firm	1.2	1.0	37,874	1.1	51,496	0.9
Sporting Goods Firm	28.3	23.7	723,597	21.0	1,231,626	22.6
<b>Total GMSS Impact</b>	<b>119.5</b>	<b>100</b>	<b>3,439,422</b>	<b>100</b>	<b>5,454,184</b>	<b>100</b>

GMSS was responsible for an addition of 119.5 jobs to the economy of Arkansas in 2001. The proprietors and employees of the 13 firms were paid \$ 3.4 million in income. The 13 firms added value of 5.4 million as a result of exports assistance by GMSS to the 13 firms. A major portion of GMSS impacts were observed through exports assistance to Hardwood firm, Sporting Goods firm, Air pumps firm and Candles

company. The GMSS impacts account for about a third of the total impacts of increased export sales by the 13 firms in Arkansas in 2001.

The results of the individual firm analysis indicate that the Sporting goods firm and supporting industries had significant impact in creating new jobs, increasing labor income and adding value in the counties as a result of increase in export sales. The Sporting goods firm and supporting industries added 84 new jobs. The proprietor and employees of the Sporting goods firm and supporting industries received an additional \$ 2 million as income and added value of over \$ 3.4 million to the local county. The direct impacts of the individual firm were greater than the indirect impacts. Wholesale trade and transportation sectors were by far the most benefited supporting industries for all the firms due to indirect impacts.

The results of the combined impact analysis indicates that the 13 firms and supporting industries had significant impacts on the economy of Arkansas in creating new jobs, increasing labor income and adding value as a result of increase in export sales. The 13 firms and supporting industries were responsible for an addition of over 359 jobs. The proprietors and employees of the 13 firms and supporting industries received an additional income of over \$ 10.6 million and added value of about \$ 17.8 million to the economy of Arkansas. The employment and labor impacts were dominant in supporting industries for the 13 firms and the value added impacts were dominant in 13 firms than the supporting industries. The impacts generated were proportionate to the increases in export sales, i.e. a firm, which had high increase in export sales, generated greater impacts and a firm which had low increase in export sales generated smaller impacts. Wholesale trade, transportation, maintenance and repair sectors were the most benefited supporting industries.

The results of impact analysis of GMSS from the individual firm analysis and combined impact of a group of 13 GMSS clients indicate that GMSS through export assistance is having significant measurable impacts on the economy of Arkansas. The employment, labor income and value added impact generated by GMSS via exports assistance rejects our second hypothesis that GMSS has had no significant impacts on the economy of Arkansas.



The following conclusions are drawn from the study:

1. Even relatively small increase in export sales can have measurable (through IMPLAN) economic impacts on the Arkansas economy.
2. Some economic sectors in Arkansas have greater potential than others to impact the economy through given levels of increase in export sales.
3. GMSS is having significant measurable impact on the Arkansas economy through its export education and assistance programs.
4. GMSS likely can increase its overall impact on the Arkansas economy by working more closely with those firms whose products have the greatest potential economic impacts to create new jobs, increase labor income and add value per dollar of export sales, as indicated in the sensitivity analysis of this study.

This study not only provides an estimate of impacts of actual increases in exports from selected Arkansas businesses in 2001, but also establishes a methodology for making quantitative estimates of the economic impacts of public and private export enhancement programs in Arkansas. The difficulty and cost of deriving the estimates are minimal, due to the availability of IMPLAN.

## References

1. Allen, R.I.G. and W.F.Gossling: *Estimating and projecting Input-Output Coefficients, Input-Output Publishing Company, England, 1975.*
2. Chenery, Hollis B. and Paul G. Clark: *Interindustry Economics, John Wiley & Sons, Inc., New York, 1967.*
3. Elrod, R.H.: *Development and use of updated Input-Output tables in economic forecasting and planning – Ph.D. Thesis, Clemson University, 1969.*
4. Fulton, George A., Grimes, Donald R., Baum, Alan L.: *Industrial location decisions and their impact on the Michigan Economy: The Mazda Automobile Assembly Case, Paper presented to the Economic and Social Outlook Conference at the University of Michigan at Ann Arbor, November 15-16, 1984.*
5. Global Marketing Support Services: *Brochure, 2002.*
6. Goodwin, Jr. H.L., Jennie Popp, Wayne Miller, Gina Vickery, and Z. Clayton-Niederman: *Impact of the Agricultural sector on the Arkansas Economy, October, 2002.*
7. Great Basin research Business and Economics research group: *Economic impact analysis: A technical analysis of Economic impact analysis theory, methodology, and the development of Input-Output models.*
8. Hamilton, J.R., Whittlesay, N.K., Robison, M.H., Ellis, J.: *Economic impacts, value added, and benefits in regional project analysis, American Journal of Agricultural Economics, Vol.73, 1991.*
9. Holland, D. and Pirniquie, F.: *Some procedures for estimating goods and service trade between regions using the trade reports from IMPLAN, Ag Econ Series 00-3, July 2000.*
10. Horton, G.A.: *An introduction to econometric forecast model concepts and economic impact analysis techniques'.*
11. Horton, G.A.: *An Introduction to Input-Output models and Economic impact analysis.*  
*Websource: [www.state.nv.us/cnr/ndwp/forecast/econ\\_pg3.htm](http://www.state.nv.us/cnr/ndwp/forecast/econ_pg3.htm)*
12. Horton, G.A.: *Economic impact analysis – Comparisons and contrasts: Input-Output models and Econometric forecast models.*  
*Websource: [www.state.nv.us/cnr/ndwp/forecast/econ\\_pg5.htm](http://www.state.nv.us/cnr/ndwp/forecast/econ_pg5.htm)*

13. Horton, G.A.: *Forecasting and Economic Impact analysis*.  
*Websource: [www.state.nv.us/cnr/ndwp/forecast/econ\\_pg6.htm](http://www.state.nv.us/cnr/ndwp/forecast/econ_pg6.htm)*
14. Hughes, D.W.: *Multiplier analysis of agriculture in Louisiana's economy, Louisiana Agriculture, Vol.37, No.2, 1994.*
15. Hughes, D.W. and Litz, Vaneska N.: *Rural-Urban economic linkages for agriculture and food processing in the Monroe, Louisiana, functional economic area, Journal of Agricultural and Applied Economics, Vol.28, No.2, 1996.*
16. Hughes, David W. and Bairak, Roman I.: *Evaluating the impact of agricultural exports on the Louisiana economy, Louisiana Agricultural Center, Bulletin No. 852, May1996.*
17. Leontief, Wassily: *Input-Output Economics, Oxford University Press, New York, 1986.*
18. Link, A.N.: *Economic impact assessments: Guidelines for conducting and interpreting assessment studies, 1996.*
19. Lynch, Tim: *Analyzing the economic impact of transportation using RIMS II, IMPLAN and REMI, Center for Economic forecasting and analysis, October 2000.*
20. Miernyk, William H.: *Element of Input-Output Analysis, New York, 1965.*
21. Minnesota Implan Group, Inc., IMPLAN Knowledge base: *BEA/ RIMS data versus IMPLAN software system; a comparison, 2000.*
22. Miller, R.E., and P.D.Blair: *Input-Output analysis: Foundations and Extensions, Prentice-Hall Inc., New Jersey, 1985.*
23. Miller, W.P. and Armbuster, T.: *Economic multipliers: How Communities can use them for planning.*
24. Miller, W.P. and Armbuster, T.: *Economic impact analysis for Arkansas communities.*
25. Olson, Doug and Scott Lindall: *IMPLAN Professional Software Version 2.0, User's, Analysis, and Data Guide, Minnesota IMPLAN Group, Inc., 1725 Tower Drive West, Suite 140, Stillwater, MN 55082, [www.implan.com](http://www.implan.com), 2<sup>nd</sup> Edition-June, 2000.*
26. Regional Economic Models, Inc.: *REMI Policy Insight User guide Version 5.1.*
27. Shideler, D. and Fikkert, B.: *Creating occupation projections using Input-Output analysis, Chalmers Center for Economic Development, 2001.*

28. Soong, B., Doeksen, G.A., Woods, M.D. and Schreiner, D.: *Multiplier analysis for agriculture and other industries, OSU Extension Facts F –821, Oklahoma State University Cooperative Extension Service.*
29. U.S. Department of Commerce: *Regional Multipliers – A User Handbook for the Regional Input-Output Modeling System (RIMSII), 1997.*
30. Wagner, J.E., Deller, S.C. and Alward, G.: *Estimating economic impacts using industry and household expenditures, Journal of the Community Development Society, Vol.23, No.2, 1992.*
31. Watkins, T.: *Input-Output Analysis, 1998.*  
*Websource: [www.sjsu.edu/faculty/watkins/inputoutput.htm](http://www.sjsu.edu/faculty/watkins/inputoutput.htm)*
32. Weisbrod, G.: *Economic impact analysis – Using the right tools, 1998.*
33. Weisbrod, G. and Weisbrod, B.: *Measuring economic impacts of projects and programs, Economic Development Research Group, 1997.*
34. Weisbrod, Glen: *REMI and I-O models compared, REMI News, No.4, 1990.*
35. Treyz, George I.: *Policy analysis applications of REMI economic forecasting and simulation models, International Journal of Public Administration, Vol.18, Issue: 1, Pages: 13-42, 1995.*