The Economic Impacts
of the
MEP of Utah
Study Year 2012

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The Estimated Economic Impacts of the MEP of Utah

Executive Summary

The Manufacturing Extension Partnership of Utah is the NIST-affiliated national Manufacturing Extension Partnership center for the state of Utah. The MEP of Utah provides assistance to small and medium-sized clients throughout the state, in the form of help modernizing their operations and becoming more competitive, productive, and efficient. The following report illustrates the economic impacts for the state of Utah, both rural and urban, derived from changes within the client manufacturing establishments (CMEs) served by the MEP of Utah in 2012.

These CMEs directly reported the changes they were able to make due to the assistance of the MEP. These figures were used as inputs in the economic modeling and forecasting program *IMPLAN*®, a program which uses the most recently available industry-level economic data from various sources to build a realistic computer model of a region's economy. *IMPLAN*® uses the techniques of input-output analysis to determine the "direct effects" (changes within the client itself), the "indirect effects" (business to business sales), and the "induced effects" (due to increases in household consumption through employee compensation). Several models were constructed to show the impacts of the reported

- 877 jobs created or retained,
  - 146 in rural counties and
  - 731 in urban counties; and the
- $182,395,000 additional or retained sales
  - $43,497,000 in rural counties and
  - $138,898,000 in urban counties
- $394,620,787 total direct impact of jobs created or retained and additional or retained sales resulting from MEP of Utah impacts

within the CMEs. It is important to note that these two types of reported effects do not represent all the impacts of the MEP of Utah, but they are the most easily measured quantitatively, lending themselves to the economic impact modeling of the MEP on the economy of the state of Utah.

The models, which are based on conservative assumptions to avoid double-counting impacts, estimate that the MEP of Utah's activities generated the following total (direct, indirect, and induced) economic impacts for Utah's economy in 2012:

- 3,152 additional jobs;
- over $603.9 million of additional industrial output;
- over $165.7 million of additional employee compensation; and
- over $14.5 million of additional indirect business taxes (taxes occurring during normal operation of the business).

The total tax revenue generated, including the additional indirect business tax listed above, is over $72 million, breaking down into

- about $30.3 million in federal taxes and
- about $17.9 million in state taxes.

Another important mention is that all the above impacts are based solely on what the clients themselves attest to as changes they were able to make directly from the assistance they received from the MEP of Utah. These reported client improvements may be maintained beyond the scope of the one-year study period for this model. If such is the case, the eventual impacts of the work done by the MEP may be even higher than is estimated here.

Figure 1. Total Impacts of the Activities of the Manufacturing Extension Partnership of Utah on the State's Economy in 2012.

	Direct	+	Indirect	+	Induced	=	Total
	(Impacts within the client companies themselves)		(Impacts in other industries from increased input demand of the client companies)		(Impacts on all industries caused by increased household expenditure due to increased employee compensation)		(Sum of Direct, Indirect, and Induced effects)
Total Output	**$ 328,263,522**		**$ 159,106,415**		**$ 116,546,242**		**$ 603,916,180**
Employment	**1,318**		**887**		**947**		**3152**
Employee Compensation	**$ 85,612,687**		**$ 44,681,026**		**$ 35,388,603**		**$ 165,682,317**
Indirect Business Taxes	**$ 3,169,254**		**$ 5,127,962**		**$ 6,222,522**		**$ 14,519,738**

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1. Introduction

1.1 General Introduction

The Manufacturing Extension Partnership (MEP) of Utah is the NIST-affiliated national Manufacturing Extension Partnership center for the state of Utah. The MEP of Utah is a non-profit organization that provides assistance to small and mid-sized clients throughout the state with services to improve productivity, expand capacity, enhance growth and increase profitability. It assesses the individual needs of a manufacturer, identifies the roadblocks to success, opportunities for improvement and growth, and helps the company to leverage private/public resources and to access a consistent set of services to maximize their potential and grow their business. The following report examines the positive economic impacts that the MEP of Utah has had on the state's economy during 2012. This is done using impact analysis, which is introduced in Section 1.2.

Section 2 gives a brief, technical introduction to *IMPLAN*®, the specific economic impact software used to examine the impacts of the MEP of Utah on the state's economy. Section 3 goes deeper into the specific methodology and assumptions used for this particular model. Section 4 discusses the results of the modeling- the specific impacts of the MEP's activities in 2011. Section 5 gives limitations and cautions that need to be taken into consideration when evaluating the results discussed in Section 4.

1.2 Impact Analysis

In looking at the economic impacts of the MEP, it is necessary to recognize that the full economic impact includes not only the actual event, but also the additional impacts caused by that one event. Often times, there is a "multiplying effect", which makes the impacts even larger than just the initial event. This idea is discussed in further detail in the following section.

Economic impacts of development are often shown in a graphical way, a table that provides the purchasing relationship between all different sectors and industries in the economy. This table is called an input-output (IO) table. The IO table is a large matrix used to describe and predict the changes in economic activity (the changes in total output) that results from changes in one or more industries within the economy (the changes in total input). An example of an input-output table is given in Fig. 1. Across the top and down the left-most column are listed the names of all the industries included in the model. The industries down the side are the "selling" industries, or "producing" industries. These industries are producing output, to be bought by other industries and final consumers. The industries listed across the top are the "purchasing" industries. These industries are purchasing the output produced by the industries listed down the left side of the table. Each box, or cell, within the table represents the amount of output sold by the industry on the left to the industry on the top, or bought by the industry on the top from the industry on the left. This number is called the input-output coefficient, or the "technical coefficient".

Borrowing an example from Thompson (2002), Figure 2 and the following description illustrate the elements of an IO table. Suppose there is $1 initially added into the table, at the point marked "START" at the top of the table (the head of the auto industry column). This dollar represents an increase in the demand for inputs of the auto industry, from an increase in output.

This dollar is filtered through and each part of the $1 flows down and emerges at the left side of the table (following the solid lines). This represents how the original $1 was divided among inputs. Specifically, for every dollar spent on manufacturing a car, 22 cents of it were spent on car body parts and molding made by firms in the plastics industry. 3 cents may be spent on car tires and brake linings made by firms in the rubber industry. These effects then produce a second set of effects (following the dashed line) and create a second flow of money. To produce the 22 cents worth of car parts demanded, the plastics industry needs to buy supplies from the plastics industry and also needs 12 cents of chemicals from the chemical firms. This type of "re-spending" could happen several times in several industries.

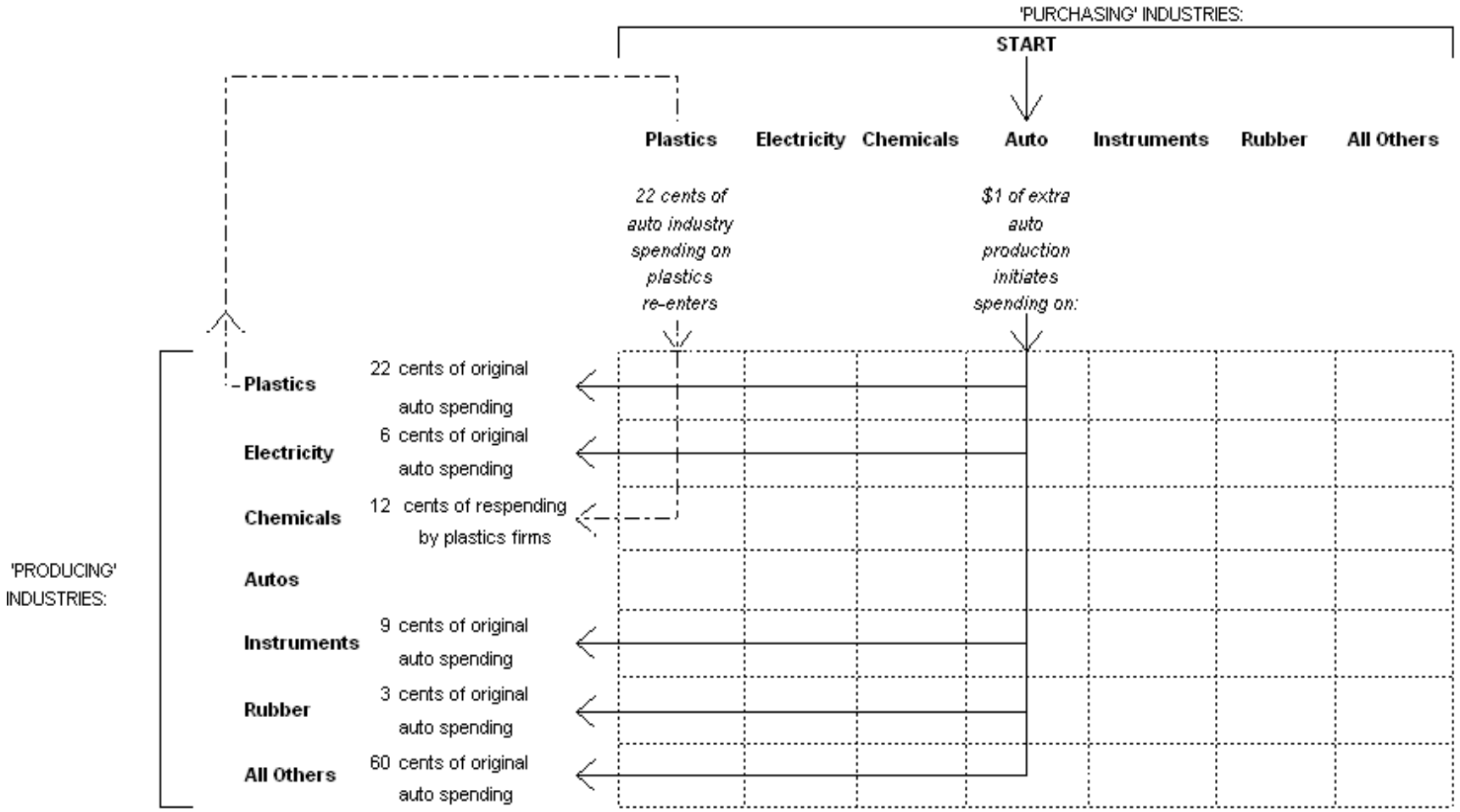
The impacts represented by the model can be separated into different categories- "direct effects" and "indirect effects". Direct effects are the initial changes in demand in the economy. These effects are illustrated in the Figure 1 by the solid line and arrows. Once this initial injection has been made, it will produce secondary effects, or indirect effects. These effects are the changes in industries due to changes in business to business purchases, and can go through several rounds. In this example, the indirect effects are illustrated by the dashed line and arrows. The direct and indirect effects are like dropping a rock in a pond of water. The direct effects are represented by the rock and the indirect effects are the ripples on the water. The technical coefficients represent the sum total of all the rounds of purchasing and producing caused by the initial injection.

IO models can be created for various factors of the economy. Commodities, industries, and institutions can all be modeled and linked to give a more accurate representation of a larger economy. For example, the U.S. Department of Commerce's Bureau of Economic Analysis compiles a set of IO tables for the U.S. economy, *Benchmark Input-Output Accounts*. This type of modeling is called a "social accounting matrix", and can take into account the effects of consumption due to additional employee compensation from the same injections in the economy described above. These are called the "induced effects". Due to the multiple "rounds", the total effect (the sum of the direct, indirect, and induced effects) of an initial injection of one dollar into the economy is actually greater than one dollar. The actual degree of change is called the "multiplier effect". There are three types of multipliers: Type I, Type II, and Type SAM.

The Type I multiplier represents the direct and indirect effects. It captures only the inter-industry effects. The Type II and Type SAM multipliers represent the direct, indirect, and induced effects, but the induced effects are calculated in different ways. Because of the addition of the induced effects, the Type II and Type SAM multipliers are often greater than the Type I multiplier. Multipliers can be calculated for various divisions of economic activity, like output and employment.

For a more detailed explanation of input-output analysis, see William Miernyk's *The Elements of Input-Output Analysis* (1965) or get information online from the Web Book of Regional Science at http://www.rri.wvu.edu/WebBook/Schaffer/index.html.

Figure 2. A simple example of modeling inter-industry relationships through the input-output table.



Source: Thompson, 2002.

2. IMPLAN® Economic Modeling

Because the models discussed in the previous section can be very large and difficult to assess by hand, several computer-based programs are available to aid in this process. For this study, *IMPLAN*® was used. It enables the user to do large, complex impact analyses on the computer. With over 1,500 public and private institutions using *IMPLAN*® (short for "IMpact analysis for PLANning"), it is a highly respected economic impact modeling and analysis program in the United States. The maintenance, updating, and improvement of *IMPLAN*® is done by the *Minnesota Implan Group* (MIG) of Stillwater, Minnesota, a spin-off company from the University of Minnesota. *IMPLAN*® has been in use since 1984 and has evolved into the current menu-driven, completely interactive microcomputer program.

MIG gathers national, state, and county-level data. These data are converted to the *IMPLAN*® data format and used to construct the IO matrices. The regional data (state and county-level data) are divided into two categories: industry basis, which includes value-added, output, and employment; and commodity basis, which includes the final demands and institutional sales.

There are two different phases in IO analysis: descriptive modeling and predictive modeling. A descriptive model includes regional economic accounts- information about the interactions in a local economy in terms of dollars flowing from purchasers to producers. Descriptive models also include information about trade flows- the movements of goods and services within a region and outside of it; and social accounting- non-industrial transactions, including tax collection. Predictive modeling uses multipliers found from the regional economic accounts to describe the economy's expected response to changes in production. For this model, we are using the *IMPLAN*® data set from 2012, the most current data set available. Because the data set is used to describe the relationships among different sectors in the economy, it is not expected that these basic relationships will change much from year to year. This is especially true for large study areas, such as we are using in this model.

There are several customization choices in *IMPLAN*® that allow for a more realistic model when working with small regions. After making assumptions about the trade flow of goods and services, the regional purchase coefficient (RPC) can be changed. The RPC describes what percent of the local demand is met by local producers. Another option that describes the flow of goods and services is the location quotient, which assumes that the more capacity a region has for production of a commodity; the more likely it is to be purchased locally. Each of these options can be changed as a whole, or for each individual commodity.

In additional to assumptions about trade flow, *IMPLAN*® allows the user to customize the study area to be as small as a zip code or as large as the nation. It also allows changes to the deflator- the index that is used to convert expenditures over time to a base year. Changes can be made to the production functions, allowing modifications to the national average-based production functions or creation of a new production function in a region. *IMPLAN*® allows for changes to the margins- the conversion of purchaser price into producer prices according to the type of customer. By-products, the split of different commodities produced by a given industry, can also be modified.

As with any IO model, *IMPLAN*® makes simplifying and useful assumptions to make predictions. The first of these is linearity with constant returns to scale. *IMPLAN*® assumes that all changes will hold to a given proportion, regardless of the size of initial change in the economy. This assumption may not be appropriate for extremely large changes in the region's economy because it does not allow for changes in the price due to changes in demand, thus disallowing for changes in technology and/or the relative prices of inputs.

The second assumption is that of a demand-driven model. *IMPLAN*® assumes that there are no supply constraints- that firms have unlimited access to whatever materials they need to raise production to meet demand. This assumption is reasonable for small to medium-sized changes in the economy. Extremely large changes, however, may lead to estimates that far exceed the available resources of the region.

There are also "fixed commodity" assumptions (price changes do not cause firms to change the mix of inputs used) and "homogenous sector output" assumptions (the proportion of different commodities produced by an industry is fixed).

Though there are some limitations with the assumptions made in *IMPLAN*®, the assumptions are reasonable and useful to a certain point of change. Thus, *IMPLAN*® is more accurate in predicting small economic changes over large economic changes.

3. Methodology

The raw data for this model was collected from a survey of the clients of MEP of Utah. This data is shown in the left part of Figure 3. The data was self-reported by this sample of client manufacturing establishments (CMEs), based on projects between MEP and the CMEs during 2012. The CMEs reported a total of 877 jobs created or retained and $182,395,000 in additional or retained sales. It is important to note that, though these two types of reported effects do not represent all the impacts of the MEP of Utah, such as changes in labor and material costs, product development, facility layout improvements, employee training, inventory reduction, etc., they are among the most significant impacts, and are a good starting point for the quantitative modeling in *IMPLAN*®.

Most economic modeling programs (including *IMPLAN*®*)* use the Bureau of Economic Analysis's *Benchmark Input-Output Accounts* to classify each industry. All federal government statistical data series are issued on a different classification system called NAICS (North American Industrial Classification System). The MEP has classified their clients based on the NAICS codes. For the most part, the NAICS codes and the *IMPLAN*® sector codes are very similar classifications. There are, however, circumstances in which a classification may be broken down into several classes in one system, but only into one class in another system. A bridge between the NAICS codes and *IMPLAN*® sectors, provided by the MIG, helps alleviate the translation issues. This bridge is included in the right part of Figure 3.

Before modeling, it is important to recognize that in *IMPLAN*®, employment and output are linked. That is, for each set of data put into the program, *IMPLAN*® assumes that there is a certain level of additional output associated with each number of additional jobs reported and assumes an additional level of employment based on the output indicated. Thus, adding jobs will also add a corresponding amount of output. From the raw data collected from the CMEs, some clients reported only additional jobs, some reported only additional sales, and some reported both. There are several reasons that clients may have reported only one. The client may have only had good information on one. There may have been an increase in their efficiency, allowing for more sales using the same number of employees. They also may have experienced a lag in hiring new employees and/or increased production and will hire additional employees over time. Because the specific reason to reporting only jobs or output is not known, several assumptions must be made.

First, the decision was made to use the numbers on employment where possible. The numbers of all additional or retained jobs were put into *IMPLAN*® and the impacts were run. For companies that reported only additional sales, and did not report additional jobs, the data for additional sales was also put directly into *IMPLAN*® to run the model.

Last, the data from companies that reported both additional jobs and additional sales need to be addressed. Because each of these companies was included in the first model, on the basis of jobs, the output related to the additional jobs these companies reported has already been accounted for. To simply run a second model with the full amount of additional reported output would be double-counting it to some degree. To correct this situation, the output that could be contributed to the number of jobs added or retained was subtracted from the additional output

Figure 3. Client Survey Data and NAICS to IMPLAN Bridge

2012	Total Jobs (Created + Retained)	Sales Increase (Created + Retained)	Rural or Urban Classification	IMPLAN Code		NAICS Code
1	0	$0	U	53	~	311412
2	0	$0	U	55	~	311511
3	55	$150,000	R	58	~	311520
4	0	$0	R	63	~	311821
5	12	$120,000	R	85	~	314992
6	40	$36,900,000	R	105	~	322121
7	2	$2,000,000	U	117	~	324122
8	6	$200,000	U	149	~	326199
9	9	$1,500,000	U	157	~	327211
10	5	$0	U	163	~	327390
11	25	$0	U	163	~	327390
12	0	$2,000,000	R	164	~	327420
13	0	$100,000	U	174	~	331318
14	2	$42,000	R	186	~	332311
15	2	$0	U	186	~	332312
16	85	$12,500,000	U	187	~	332322
17	0	$0	U	187	~	332322
18	6	$400,000	U	195	~	332710
19	5	$1,400,000	R	195	~	332710
20	0	$0	U	195	~	332710
21	1	$60,000	U	195	~	332710
22	0	$0	U	195	~	332710
23	7	$600,000	R	195	~	332710
24	14	$1,250,000	U	195	~	332710
25	1	$25,000	R	195	~	332710
26	0	$0	R	200	~	332992
27	15	$1,200,000	U	202	~	332999
28	1	$0	U	202	~	332999
29	93	$0	U	206	~	333131
30	197	$97,200,000	U	220	~	333515
31	0	$200,000	U	221	~	333519
32	0	$0	U	228	~	333921
33	0	$0	R	234	~	334111
34	0	$0	U	243	~	334413
35	0	$0	U	243	~	334413
36	1	$0	R	243	~	334413
37	7	$160,000	U	247	~	334419
38	0	$0	R	251	~	334513
39	0	$4,000,000	U	251	~	334513
40	7	$800,000	R	253	~	334515
41	1	$100,000	U	255	~	334517

42	0	$2,016,000	U	274	~	335991
43	3	$0	U	276	~	336111
44	35	$0	U	279	~	336211
45	90	$4,900,000	U	280	~	336212
46	17	$1,812,000	U	286	~	336413
47	1	$150,000	R	286	~	336413
48	2	$0	U	286	~	336413
49	0	$0	U	286	~	336413
50	0	$0	U	293	~	336992
51	0	$0	R	305	~	339112
52	20	$4,400,000	U	311	~	339920
53	0	$0	R	311	~	339920
54	85	$4,800,000	U	311	~	339920
55	10	$100,000	U	313	~	339943
56	5	$310,000	R	314	~	339950
57	10	$1,000,000	R	314	~	339950

reported by the client. (Note: as discussed before, as additional jobs are added to a model, *IMPLAN*® generates the expected amount of output that relate to this increase in jobs. Therefore, we accounted for a certain level of additional output for the companies that reported numbers for both jobs and output in the first model.) This determines what amount of the increase they reported for additional output was above that of the output already accounted for in the first model (output related to an increase in jobs). Thus, the last model was run using only the amount of output not already explained by the change in jobs. This adjustment is made to avoid overstatement of the results based on double-counting the additional output reported by the CMEs.

Because of the relationship in *IMPLAN*® between employment and output previously discussed, running this additional output will cause *IMPLAN*® to assume that there are additional jobs related to this output and additional employee compensation related to those jobs. These jobs will be above the number of additional or retained jobs reported by the CMEs, which may cause on overstatement in the numbers of jobs reported by the CMEs. The reasons that companies may have reported an increase only in output or employment were previously addressed. Each cause would have led to different results, and therefore, the decision was made to avoid assumptions about the actual basis for this. Instead, additional sales were used, with the knowledge that it may occur in an overstatement of employment. The effect of this overstatement will be noted in footnotes next to the results.

Also note, in running the *IMPLAN*® models, the model defaults were used. The study area was defined as the state of Utah.

4. Model Results

Aggregated Total Impacts

The aggregated results of the impacts of MEP involvement with CMEs are presented in this section. Information on the results of individual sectors and tax breakdown are given in the next sections (4.2 and 4.3, respectively).

Figure 4 shows the reported effects, by which sections each company reported. These have been aggregated by companies that reported only jobs, companies that reported both jobs and output, companies that reported only output, and companies that reported neither additional or retained jobs or additional or retained output. CMEs reported 877 additional or retained jobs overall. 146 of these jobs were in rural counties and 731 of them were in urban counties (Figure 7). There were 9 companies that reported only jobs, 27 companies that reported both output and jobs, and 5 CMEs that reported only a change in output. These companies contributed a total of over $256 million in output. The companies that reported an increase in output only had an output equivalent to 24.3 additional or retained jobs. For the companies that reported both output and jobs, additional reported output was equivalent to 417 additional or retained jobs. These jobs accounted for more than $139 million in output.

By using the methodology described in the previous section, the MEP of Utah's activities are likely generating the results found in Figure 9 on the state of Utah's economy. Because of the wording of the surveys, it is clear that all of these impacts would not have occurred without the assistance of the MEP of Utah. From the information reported by CMEs, there is a direct effect of over $328.2 million in output and 1,318 jobs. This would cause an indirect and induced effect of over $159.1 million and $116.5 million in output, respectively. This adds up to a total effect of over $603.9 million of output, which is the equivalent of 3,152 jobs in Utah. Figures 5 and 6 show the percentage of direct, indirect and induced effect as a part of the overall effect for output and employment, respectively. Figure 8 shows a comparison of the impacts of the MEP of Utah between 2011 and 2012.

Figure 4. Reported Effects of MEP Involvement on Client Manufacturing Establishments during 2012.

		From Jobs		Output Above Jobs	
Companies		**Jobs**	**Output**	**Output**	**Jobs**
9	**Jobs**	167			
27	**Both**	710		$139,245,478	
5	**Output**		$8,316,000		
16	**None**				
57	**Total**	**877**	**$255,375,309***	**$139,245,478**	**417**

***These are the direct effects associated with the reported numbers.**

Figure 5. Output Effects by Direct, Indirect, and Induced

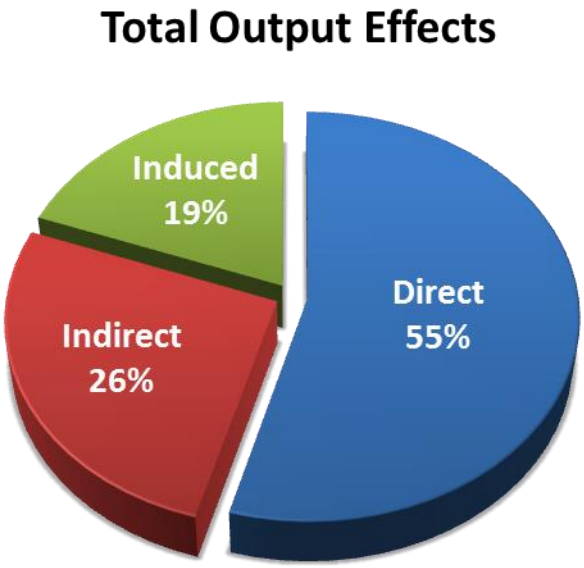
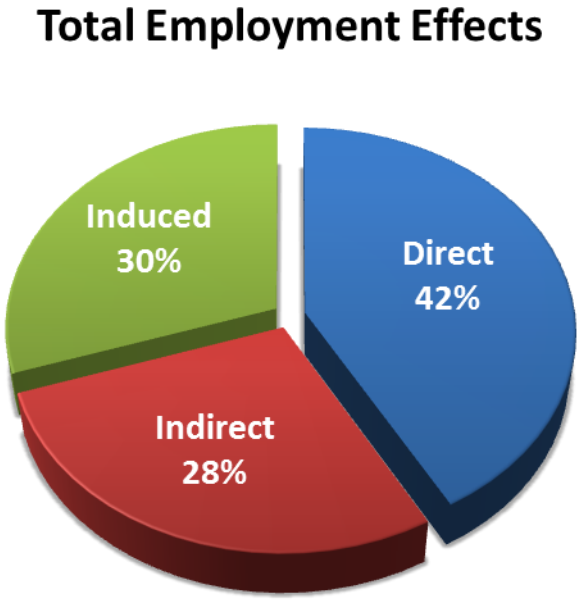


Figure 6. Employment Effects by Direct, Indirect, and Induced



*Note: The Total Employment Effects graph includes 417 jobs for companies that reported additional output not already explained by the number of additional jobs reported. See Section 3 for a detailed explanation.

Figure 7. Additional or Retained Jobs Reported by CMEs in 2012.

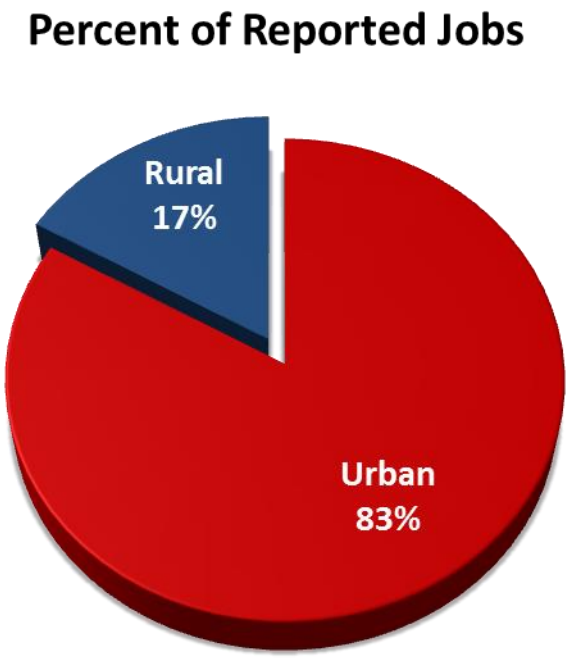


Figure 8. A comparison of the MEP of Utah's Impacts in 2010, 2011 and 2012.

Impacts	**2010**	**2011**	**2012**
Additional Jobs	4,040	4,330	3,152
Additional Industrial Output	$905 M	$897.5 M	$603.9M
Additional Employee Compensation	$176.1 M	$195 M	$165.7M
Additional Indirect Business Taxes	$20.2 M	$21.3 M	$14.5 M

*For a comprehensive report of the MEP of Utah's Impacts in 2011, see "The Economic Impacts of the MEP of Utah, Study Year 2011," prepared by Ruby Ward and Anne Whyte, Utah State University. Also note the change in methodology from the 2008 and earlier studies.

Figure 9. Results of MEP involvement during 2012 including the direct effect on clients and the induced and indirect effect on the economy.

Results of model from companies reporting only jobs, only output, and both jobs and output (based on jobs)

	Direct Effects						
	Rural	**Urban**	**Total Direct**	**Indirect**	**Induced**	**Total**	**Multiplier**
Output	$62,594,320	$192,780,989	$255,375,309	$127,150,453	$82,144,939	$464,670,702	1.82
Employment			901	707	667	2,276	2.53
Indirect Business Tax						$10,768,452	

Results of model from companies reporting both jobs and output (based on output above jobs)

	Direct Effects						
	Rural	**Urban**	**Total Direct**	**Indirect**	**Induced**	**Total**	**Multiplier**
Output	$7,565,671	$65,322,542	$72,888,213	$31,955,962	$34,401,303.0	$139,245,478	1.91
Employment			417	179	280	876	2.10
Indirect Business Tax						$3,751,286	

Total Results

	Direct Effects						
	Rural	**Urban**	**Total Direct**	**Indirect**	**Induced**	**Total**	**Multiplier**
Output	$70,159,991	$258,103,531	$328,263,522	$159,106,415	$116,546,242	$603,916,180	1.84
Employment			1318	887	947	3,152	2.39
Indirect Business Tax						$14,519,738	

4.2 Individual Sectors

These general results discussed in the previous two sections can be broken down by individual industry. Figure 10 illustrates this breakdown. It is important to note that the industries listed in Figure 10 are not the only industries that had impacts from the work of the MEP of Utah, but they are the industries that reported direct effects.

Figure 10. Results by Individual Industry (Output in Dollars, Employment in Number of Jobs)

Implan code	Industry	Jobs Reported	Output Above Jobs	Job Equivalent	Description	Direct	Indirect	Induced	Total
58	Ice cream and frozen dessert manufacturing	55	-	-	Employee Comp Impact	2,645,525.0	3,700,645.2	1,718,406.6	8,064,576.8
					Indirect Business Taxes Impact	48,315.0	416,299.0	302,165.0	766,779.0
					Total Value Added Impact	3,850,291.0	6,152,297.2	3,134,978.6	13,137,566.8
					Employment Impact	55.0	75.5	46.0	176.5
					Output Impact	20,764,190.1	16,547,318.5	5,659,349.5	42,970,858.0
85	All other textile product mills	12	-	-	Employee Comp Impact	331,189.5	159,787.8	133,095.8	624,073.1
					Indirect Business Taxes Impact	18,124.0	22,695.0	23,402.0	64,809.0
					Total Value Added Impact	430,123.6	267,293.2	242,812.7	940,229.4
					Employment Impact	12.0	3.7	3.6	19.3
					Output Impact	1,870,240.6	524,210.2	438,354.3	2,832,805.1
105	Paper mills	40	6,914,258.0	-	Employee Comp Impact	3,550,282.8	4,302,844.2	2,149,126.5	10,002,253.4
					Indirect Business Taxes Impact	317,913.0	582,565.0	377,849.0	1,278,328.0
					Total Value Added Impact	7,366,222.4	6,967,247.1	3,920,668.0	18,254,137.5
					Employment Impact	40.0	80.9	57.5	178.5
					Output Impact	29,985,740.4	15,571,280.6	7,077,717.1	52,634,738.2
117	Asphalt shingle and coating materials manufacturing	2	-	-	Employee Comp Impact	461,773.0	319,915.1	211,408.9	993,097.0
					Indirect Business Taxes Impact	11,985.0	42,029.0	37,176.0	91,188.0
					Total Value Added Impact	2,729,006.1	675,783.4	385,685.7	3,790,475.2
					Employment Impact	4.0	5.4	5.7	15.0
					Output Impact	4,900,035.6	2,151,473.8	696,218.6	7,747,728.0
149	Other plastics product manufacturing	6	-	-	Employee Comp Impact	279,171.3	124,090.1	109,485.0	512,746.5
					Indirect Business Taxes Impact	6,285.0	14,646.0	19,251.0	40,183.0
					Total Value Added Impact	442,944.2	210,249.3	199,737.8	852,931.4
					Employment Impact	6.0	2.5	2.9	11.5
					Output Impact	1,458,672.8	456,523.6	360,591.3	2,275,787.7
157	Flat glass manufacturing	9	-	-	Employee Comp Impact	457,046.4	361,603.6	224,938.9	1,043,588.8
					Indirect Business Taxes Impact	35,349.0	45,866.0	39,545.0	120,759.0
					Total Value Added Impact	669,649.1	612,507.3	410,353.5	1,692,509.9
					Employment Impact	9.0	6.8	6.0	21.8
					Output Impact	2,121,814.8	1,295,763.2	740,832.1	4,158,410.2

Implan code	Industry	Jobs Reported	Output Above Jobs	Job Equivalent	Description	Direct	Indirect	Induced	Total
163	Other concrete product manufacturing	30	-	-	Employee Comp Impact	1,471,397.0	902,966.6	648,404.0	3,022,767.6
					Indirect Business Taxes Impact	59,276.0	88,414.0	114,000.0	261,689.0
					Total Value Added Impact	1,872,595.9	1,393,017.2	1,182,892.7	4,448,505.8
					Employment Impact	30.0	17.7	17.4	65.1
					Output Impact	5,143,210.9	2,960,146.4	2,135,541.2	10,238,898.5
164	Lime and gypsum product manufacturing	0	-	4.6	Employee Comp Impact	275,198.6	376,994.6	176,697.9	828,891.1
					Indirect Business Taxes Impact	22,896.0	43,821.0	31,071.0	97,788.0
					Total Value Added Impact	501,477.0	607,322.7	322,358.9	1,431,158.7
					Employment Impact	4.6	6.3	4.7	15.7
					Output Impact	1,999,999.9	1,281,584.5	581,915.5	3,863,499.9
174	Aluminum product manufacturing from purchased aluminum	0	-	0.2	Employee Comp Impact	11,244.0	9,042.9	5,658.3	25,945.2
					Indirect Business Taxes Impact	791.0	1,254.0	994.0	3,039.0
					Total Value Added Impact	18,119.4	14,467.3	10,322.0	42,908.7
					Employment Impact	0.2	0.2	0.2	0.5
					Output Impact	100,000.0	31,845.2	18,636.6	150,481.8
186	Plate work and fabricated structural product manufacturing	4	-	-	Employee Comp Impact	257,679.9	146,474.5	109,618.9	513,773.3
					Indirect Business Taxes Impact	6,169.0	15,276.0	19,275.0	40,720.0
					Total Value Added Impact	325,375.5	230,825.0	199,982.8	756,183.3
					Employment Impact	4.0	3.2	2.9	10.1
					Output Impact	1,012,673.6	512,679.6	361,006.3	1,886,359.6
187	Ornamental and architectural metal products manufacturing	85	-	-	Employee Comp Impact	4,761,156.0	2,302,101.1	1,914,302.0	8,977,559.0
					Indirect Business Taxes Impact	136,698.0	256,026.0	336,612.0	729,336.0
					Total Value Added Impact	5,591,375.8	3,695,379.4	3,492,355.3	12,779,110.5
					Employment Impact	85.0	48.4	51.2	184.6
					Output Impact	16,888,262.1	8,125,647.4	6,304,310.7	31,318,220.2
195	Machine shops	34	651,413.4	-	Employee Comp Impact	1,999,310.2	694,246.6	728,615.8	3,422,172.6
					Indirect Business Taxes Impact	50,882.0	71,076.0	128,124.0	250,082.0
					Total Value Added Impact	2,240,659.0	1,126,350.7	1,329,255.6	4,696,265.3
					Employment Impact	34.0	15.6	19.5	69.1
					Output Impact	5,090,388.9	2,320,956.0	2,399,522.1	9,810,867.0

Implan code	Industry	Jobs Reported	Output Above Jobs	Job Equivalent	Description	Direct	Indirect	Induced	Total
202	Other fabricated metal manufacturing	16	-	-	Employee Comp Impact	906,385.3	429,405.9	362,842.6	1,698,633.8
					Indirect Business Taxes Impact	21,783.0	55,063.0	63,801.0	140,647.0
					Total Value Added Impact	1,320,198.0	721,294.9	661,948.4	2,703,441.2
					Employment Impact	16.0	8.8	9.7	34.5
					Output Impact	3,814,233.4	1,639,905.0	1,194,926.9	6,649,065.3
206	Mining and oil and gas field machinery manufacturing	93	-	-	Employee Comp Impact	7,921,616.2	6,322,822.7	3,891,574.6	18,136,013.5
					Indirect Business Taxes Impact	543,065.0	733,993.0	684,228.0	1,961,286.0
					Total Value Added Impact	10,562,847.4	9,764,848.4	7,099,459.4	27,427,155.2
					Employment Impact	93.0	127.2	104.2	324.4
					Output Impact	43,506,649.1	21,681,768.5	12,816,002.3	78,004,419.9
220	Cutting tool and machine tool accessory manufacturing	197	65,322,544.0	-	Employee Comp Impact	13,822,501.4	3,947,000.5	4,810,398.8	22,579,900.7
					Indirect Business Taxes Impact	404,102.0	421,179.0	845,889.0	1,671,169.0
					Total Value Added Impact	15,472,541.9	6,330,007.5	8,775,874.6	30,578,423.9
					Employment Impact	197.0	77.3	128.8	403.1
					Output Impact	31,877,455.2	13,697,427.0	15,841,591.8	61,416,474.0
221	Rolling mill and other metalworking machinery manufacturing	0	-	0.9	Employee Comp Impact	54,695.8	26,927.5	22,112.4	103,735.7
					Indirect Business Taxes Impact	1,598.0	3,109.0	3,889.0	8,595.0
					Total Value Added Impact	57,910.7	42,379.4	40,340.8	140,630.9
					Employment Impact	0.9	0.5	0.6	2.1
					Output Impact	200,000.0	85,011.4	72,820.5	357,831.9
243	Semiconductor and related device manufacturing	1	-	-	Employee Comp Impact	73,041.9	170,525.2	66,816.1	310,383.2
					Indirect Business Taxes Impact	9,640.0	19,295.0	11,746.0	40,682.0
					Total Value Added Impact	261,734.8	258,108.6	121,892.3	641,735.8
					Employment Impact	1.0	3.2	1.8	6.0
					Output Impact	909,164.4	513,358.8	220,062.9	1,642,586.1
247	Other electronic component manufacturing	7	-	-	Employee Comp Impact	456,551.5	245,169.1	191,412.0	893,132.6
					Indirect Business Taxes Impact	14,218.0	30,863.0	33,652.0	78,733.0
					Total Value Added Impact	543,899.4	375,359.8	349,195.9	1,268,455.1
					Employment Impact	7.0	4.7	5.1	16.8
					Output Impact	1,572,442.0	717,474.4	630,477.7	2,920,394.1

Implan code	Industry	Jobs Reported	Output Above Jobs	Job Equivalent	Description	Direct	Indirect	Induced	Total
251	Industrial process variable instruments manufacturing	0	-	13.7	Employee Comp Impact	929,732.9	640,796.0	428,176.6	1,998,705.6
					Indirect Business Taxes Impact	24,716.0	61,637.0	75,279.0	161,632.0
					Total Value Added Impact	1,162,300.5	1,017,265.9	781,131.0	2,960,697.3
					Employment Impact	13.7	12.9	11.5	38.0
					Output Impact	4,000,000.2	2,003,029.5	1,410,296.9	7,413,326.5
253	Electricity and signal testing instruments manufacturing	7	-	-	Employee Comp Impact	789,260.6	239,272.1	279,150.0	1,307,682.6
					Indirect Business Taxes Impact	19,344.0	27,208.0	49,079.0	95,630.0
					Total Value Added Impact	1,075,846.7	418,833.5	509,263.2	2,003,943.5
					Employment Impact	7.0	5.1	7.5	19.6
					Output Impact	2,481,052.6	802,303.5	919,518.7	4,202,874.9
255	Irradiation apparatus manufacturing	1	-	-	Employee Comp Impact	81,302.1	60,548.4	38,600.1	180,450.5
					Indirect Business Taxes Impact	1,319.0	6,973.0	6,786.0	15,078.0
					Total Value Added Impact	133,178.7	93,920.3	70,419.2	297,518.2
					Employment Impact	1.0	1.1	1.0	3.1
					Output Impact	466,685.6	188,195.1	127,140.1	782,020.8
274	Carbon and graphite product manufacturing	0	-	4.9	Employee Comp Impact	425,975.6	273,826.7	190,866.9	890,669.1
					Indirect Business Taxes Impact	-2,420.0	28,818.0	33,559.0	59,957.0
					Total Value Added Impact	662,869.5	453,572.7	348,202.5	1,464,644.7
					Employment Impact	4.9	4.6	5.1	14.7
					Output Impact	2,016,000.1	987,980.1	628,602.3	3,632,582.4
276	Automobile manufacturing	3	-	-	Employee Comp Impact	203,016.3	494,397.5	203,648.5	901,062.3
					Indirect Business Taxes Impact	12,698.0	65,385.0	35,770.0	113,854.0
					Total Value Added Impact	331,245.6	738,257.5	371,461.6	1,440,964.7
					Employment Impact	3.0	9.3	5.4	17.8
					Output Impact	4,758,839.5	2,098,997.5	670,877.1	7,528,714.2
279	Motor vehicle body manufacturing	35	-	-	Employee Comp Impact	1,518,040.1	1,362,410.5	781,683.1	3,662,133.6
					Indirect Business Taxes Impact	32,795.0	158,552.0	137,427.0	328,775.0
					Total Value Added Impact	1,870,536.8	2,076,855.0	1,426,051.1	5,373,442.9
					Employment Impact	35.0	26.3	20.9	82.2
					Output Impact	9,605,516.4	4,594,745.1	2,575,004.3	16,775,265.8

Implan code	Industry	Jobs Reported	Output Above Jobs	Job Equivalent	Description	Direct	Indirect	Induced	Total
280	Truck trailer manufacturing	90	-	-	Employee Comp Impact	3,405,107.5	3,728,458.8	1,937,936.5	9,071,502.7
					Indirect Business Taxes Impact	132,057.0	478,364.0	340,716.0	951,138.0
					Total Value Added Impact	3,927,932.7	5,738,659.3	3,535,440.0	13,202,032.0
					Employment Impact	90.0	74.1	51.9	216.0
					Output Impact	25,975,911.1	13,267,631.6	6,383,439.8	45,626,982.5
286	Other aircraft parts and auxiliary equipment manufacturing	20	-	-	Employee Comp Impact	1,485,365.0	1,052,760.9	688,950.4	3,227,076.2
					Indirect Business Taxes Impact	80,849.0	86,103.0	121,135.0	288,087.0
					Total Value Added Impact	2,103,717.9	1,551,830.0	1,256,879.0	4,912,426.9
					Employment Impact	20.0	20.8	18.4	59.3
					Output Impact	6,059,985.5	3,201,811.1	2,269,149.2	11,530,945.8
311	Sporting and athletic goods manufacturing	105	-	-	Employee Comp Impact	6,307,315.6	2,895,475.3	2,498,222.8	11,701,013.7
					Indirect Business Taxes Impact	200,141.0	325,225.0	439,294.0	964,660.0
					Total Value Added Impact	7,693,686.4	4,665,282.6	4,557,617.9	16,916,586.9
					Employment Impact	105.0	59.6	66.9	231.5
					Output Impact	25,234,462.6	9,677,752.8	8,226,918.9	43,139,134.3
313	Office supplies (except paper) manufacturing	10	-	-	Employee Comp Impact	634,883.8	176,156.5	219,670.5	1,030,710.8
					Indirect Business Taxes Impact	11,620.0	18,610.0	38,628.0	68,859.0
					Total Value Added Impact	1,233,116.5	284,889.1	400,756.6	1,918,762.2
					Employment Impact	10.0	3.5	5.9	19.3
					Output Impact	2,183,428.6	604,954.2	723,409.5	3,511,792.3
314	Sign manufacturing	15	-	-	Employee Comp Impact	928,567.5	205,202.5	306,332.9	1,440,102.9
					Indirect Business Taxes Impact	44,560.0	22,138.0	53,869.0	120,567.0
					Total Value Added Impact	770,296.6	333,468.0	558,862.4	1,662,627.0
					Employment Impact	15.0	4.5	8.2	27.7
					Output Impact	1,828,271.5	684,415.0	1,008,811.5	3,521,498.1

4.3 Tax Impacts

IMPLAN® models the results of various tax impacts. The indirect business taxes, reported earlier, consist primarily of excise and sales taxes paid by individuals to businesses. However, the additional local, state and federal tax generated by the MEP's activities is also interesting to note.

The additional federal tax collected is over $30.3 million, and the additional state and local tax collected is over $17.9 million (Figure 11). The total tax revenue, found in the same way as the output and employment numbers, total over $48.1 million. It is important to note that these numbers do include the indirect business taxes previously reported. For a more detailed breakdown of the tax revenue, see Figure 12.

Figure 11. Tax Impacts by Entity

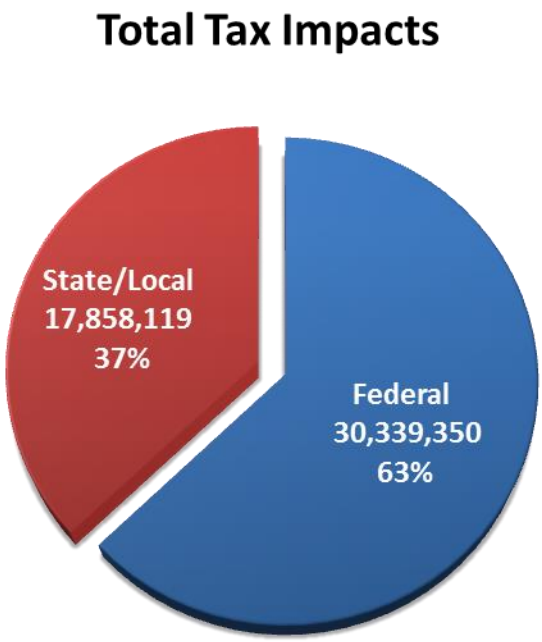


Figure 12.

2012 Total Tax Impacts							
		Employee Compensation	**Proprietary Income**	**Indirect Business Taxes**	**Households**	**Corporations**	**Totals**
Federal Government NonDefense	Social Ins Tax- Employee Contribution	6,610,397	815,644				*7,426,041*
	Social Ins Tax- Employer Contribution	8,589,248					*8,589,248*
	Indirect Bus Tax: Excise Taxes			1,080,842			*1,080,842*
	Indirect Bus Tax: Custom Duty			456,069			*456,069*
	Indirect Bus Tax: Fed NonTaxes			0			*0*
	Corporate Profits Tax					4,019,400	*4,019,400*
	Personal Tax: Income Tax				8,767,749		*8,767,749*
	Total	**15,199,646**	**815,644**	**1,536,911**	**8,767,749**	**4,019,400**	***30,339,350***
State/Local Govt NonEducation	Dividends					16,144.00	*16,144*
	Social Ins Tax- Employee Contribution	7,268					*7,268*
	Social Ins Tax- Employer Contribution	12,885					*12,885*
	Indirect Bus Tax: Sales Tax			6,622,077			*6,622,077*
	Indirect Bus Tax: Property Tax			4,509,261			*4,509,261*
	Indirect Bus Tax: Motor Vehicle Lic			218,518			*218,518*
	Indirect Bus Tax: Severance Tax			162,562			*162,562*
	Indirect Bus Tax: Other Taxes			282,469			*282,469*
	Indirect Bus Tax: S/L NonTaxes			1,187,942			*1,187,942*
	Corporate Profits Tax					543,541	*543,541*
	Personal Tax: Income Tax				3,267,655		*3,267,655*
	Personal Tax: NonTaxes (Fines- Fees				507,358		*507,358*
	Personal Tax: Motor Vehicle License				282,357		*282,357*
	Personal Tax: Property Taxes				59,316		*59,316*
	Personal Tax: Other Tax (Fish/Hunt)				178,766		*178,766*
	Total	**20,152**		**12,982,829**	**4,295,453**	**559,685**	***17,858,119***
	Total	**15,219,798**	**815,644**	**14,519,740**	**13,063,202**	**4,579,085**	**48,197,469**

5. Cautions and Limitations

There are several points to keep in mind when viewing the main impact results for 2012.

(1) These are model results, not survey results. In order to track "actual" impacts, rather than modeled impacts, it would be necessary to track the actual expenditures made by each of these individual clients, and their suppliers, and so on. This would, obviously, be very time and cost intensive, with no guarantee that the firms would supply their entire information. Therefore, these results are modeled using the average observed relationship at the state and industry levels, captured in an IO table.

The estimated impact numbers are large in comparison to the modest investment by the state into the MEP. This can generate skepticism about the methodology used to obtain these numbers. However, "large" numbers were expected before modeling even began and the overall impacts result in multipliers of 1.82 to 1.91 for output. These multipliers are fairly consistent with Utah's economy for several reasons

- The employee compensation for manufacturing employees is much higher than that of the employees of other sectors. For example, manufacturing employee compensation is, on nation average, 30% higher than that of the service industries' employees.
- This impact is in comparison to the funding provided to the MEP. In general, the MEP's assistance is to provide education and help facilitate changes in small to medium-sized businesses. Often, a small investment in knowledge can have a large effect on output.

(2) The span of *IMPLAN*® is one year, and it deals with a one-time injection into the economy. Therefore, it will underestimate the total impacts over time, due to continual retention of the reported additional jobs and sales.

(3) The model does not take into account the "opportunity costs" of the inputs, that is, the value of the other uses for the money that Utah invested in the MEP. There may have been several alternatives for the deployment of these resources, like building roads.

(4) This model evaluates only the constructive effects of the investment. It does not take into consideration any of the "destructive" effects- any decline in other in-state firms due to the increase in the clients of MEP. This "creative destruction", however, is generally viewed as a natural, and even instrumental, effect in an evolving and healthy economy.

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