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# Economic Impact of the U.S. Grocery Manufacturing Industry

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# Economic Impact of the U.S. Grocery Manufacturing Industry

## Executive Summary

This report explores the impact of the grocery manufacturing industry, in terms of its direct impact on the economy and its impact on other sectors of the economy. The industry produces a variety of products, purchasing intermediate inputs from other parts of the economy and transforming them for final consumption. The industry's employees and its suppliers spend incomes earned in this production throughout the economy. The overall economic impact of the industry includes these separate components.

The Grocery Manufacturers Association engaged PwC to provide a report that estimates the impact of the grocery manufacturing industry on the U.S. economy at the national level. The report relies on a well-established methodology based on federal government data.

PwC estimates that total employment directly and indirectly supported by the U.S. grocery manufacturing industry amounted to 10.8 million jobs in 2009. The grocery manufacturing industry directly and indirectly accounted for \$518 billion in labor income and \$903.6 billion in value added (also referred to as gross domestic product, or GDP). Table E-1 summarizes these results.

**Table E-1. Economic Impact of the U.S. Grocery Manufacturing Industry, by Sector, 2009**

	Direct	Indirect and Induced	Total
<b><i>Total Grocery Manufacturing Industry</i></b>			
Employment (thousands of jobs) <sup>a</sup>	1,722.6	9,092.7	10,815.3
Labor Income (\$ millions) <sup>b</sup>	\$94,307	\$424,213	\$518,519
Value Added (\$ millions)	\$172,892	\$730,741	\$903,633
<b><i>Beverage Manufacturing</i></b>			
Employment (thousands of jobs) <sup>a</sup>	100.1	506.3	606.4
Labor Income (\$ millions) <sup>b</sup>	\$6,739	\$27,642	\$34,380
Value Added (\$ millions)	\$8,660	\$48,420	\$57,081
<b><i>Food Manufacturing</i></b>			
Employment (thousands of jobs) <sup>a</sup>	1,424.0	7,116.2	8,540.2
Labor Income (\$ millions) <sup>b</sup>	\$71,477	\$319,802	\$391,280
Value Added (\$ millions)	\$118,847	\$551,342	\$670,189
<b><i>Household Goods Manufacturing</i></b>			
Employment (thousands of jobs) <sup>a</sup>	198.5	1,470.2	1,668.7
Labor Income (\$ millions) <sup>b</sup>	\$16,091	\$76,769	\$92,860
Value Added (\$ millions)	\$45,384	\$130,979	\$176,363

Source: PwC calculations using the IMPLAN modeling system (2009 database). Detail may not add to totals due to rounding.

<sup>a</sup> Employment is defined as the number of payroll and self-employed jobs, including part-time jobs.

<sup>b</sup> Labor income is defined as wages and salaries and benefits as well as proprietors' income.

Overall employment directly and indirectly attributable to the industry represented 6.3 percent of total U.S. employment. The industry's direct and indirect labor income represented a slightly smaller share of the U.S. total, at 5.9 percent, and the industry's direct and indirect share of national GDP was 6.4 percent. The food manufacturing sector represents the largest share of the industry, accounting for approximately three-quarters of industry activity.

The industry directly generated approximately \$100,000 in value added per job in the industry in 2009. By comparison, across the U.S. economy the average value added per job was just below \$82,000.

The average labor income directly earned per job in the industry was approximately \$54,750 in 2009, compared to \$51,200 across the entire economy. By sector, average labor income per job in the beverage manufacturing sector was \$67,300; in food manufacturing, the average was \$50,200; and in the household goods manufacturing sector, \$81,075.

These results were calculated using the IMPLAN model, an input-output model based on federal government data. The estimates in this report do not reflect the additional economic impact of capital expenditures by the industry, nor downstream impacts such as transportation or wholesaling of grocery manufacturing products.

# Economic Impact of the U.S. Grocery Manufacturing Industry

## I. Introduction

This report explores the impact of the U.S. grocery manufacturing industry, in terms of its direct impact on the economy and its impact on other sectors of the economy. The industry produces a variety of products, purchasing intermediate inputs from other parts of the economy and transforming them for final consumption. The industry's employees and its suppliers spend incomes earned in this production throughout the economy. The overall economic impact of the industry includes these separate components.

The Grocery Manufacturers Association engaged PwC to provide a report that estimates the impact of the grocery manufacturing industry on the U.S. economy at the national level. The economic impact is measured in terms of employment, value added, and labor income. For each measure, the direct, indirect, and induced impacts of the industry are calculated.

- Direct effects include activities directly attributable to grocery manufacturing, such as the employees and output of manufacturers.
- Indirect effects include activities of upstream suppliers to grocery manufacturers, including contractors and other companies providing inputs to grocery manufacturing companies. Indirect effects also include the activity of suppliers to these companies.
- Induced effects reflect spending by employees of grocery manufacturers and their suppliers. Employees throughout the supply chain receive incomes associated with the direct and indirect activities, a portion of which will be consumed. This consumption causes additional economic activity attributable to U.S. grocery manufacturing.

The next section summarizes the direct impact of the grocery manufacturing industry on the U.S. economy. The third section presents the overall impacts, and the final section provides an overview of the methodology.

## II. Direct Economic Impact of the U.S. Grocery Manufacturing Industry

For purposes of analyzing the economic impact of the grocery manufacturing industry, we have separated the industry into its three primary sectors: beverage manufacturing, food manufacturing, and household products manufacturing. The table below summarizes the composition of these sectors.

**Table 1. Industry Definition**

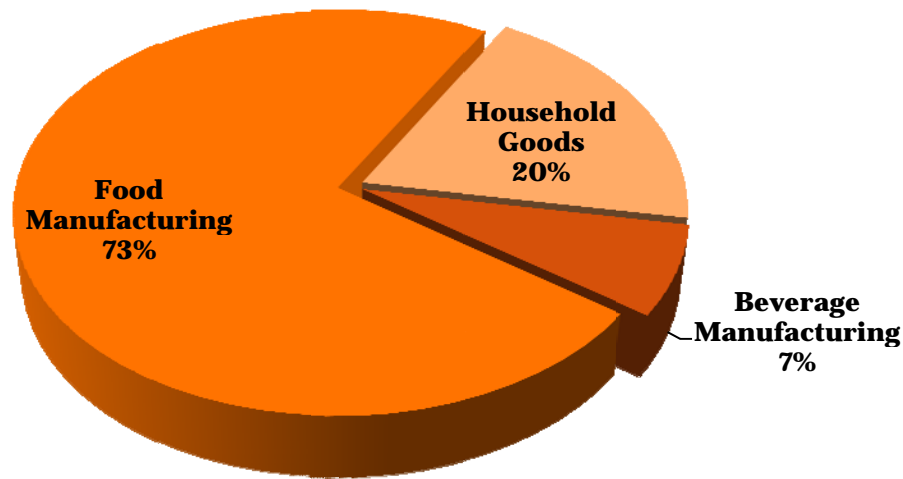
<b>Sector</b>	<b>Industry Codes (NAICS)</b>	<b>Description</b>
Beverage Manufacturing	31211	Manufacturers of nonalcoholic beverages; excludes manufacturers of alcoholic beverages and tobacco products.
Food Manufacturing	3112-9	Companies that transform livestock and agricultural products into products for intermediate and final consumption, excludes animal food manufacturing.
Household Goods Manufacturing	3111; 32229; 3256	Companies that manufacture household paper products, soaps, and toilet preparations; includes animal food manufacturing

Figure 1 below presents total output across the three sectors. Overall, companies in the industry generated \$948 billion in gross output in 2009. Gross output is a national income accounting measure that corresponds to total sales by the companies in the industry.<sup>1</sup> The food manufacturing sector was responsible for the largest share of the total, representing approximately three-quarters of total industry output.

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<sup>1</sup> The cost to consumers would reflect the manufacturing costs from Figure 1 plus wholesale, retail, and transportation margins on grocery manufacturer products.

**Figure 1. Gross Output of U.S. Grocery Manufacturing Industry by Sector, 2009**



**2009 Gross Output: \$948 billion**

Source: PwC calculations based on IMPLAN model.

The economic activity of the industry can be measured using three separate metrics: employment, labor income, and value added, as defined below.

- **Employment:** The number of payroll and self-employed jobs (including part-time jobs), averaged over the year.
- **Labor income:** The wages, salaries and benefits paid to employees and proprietors' income for the self-employed.
- **Value added:** The total output of each sector less the associated value of intermediate inputs. The sum of the value added across all sectors in the economy is GDP.<sup>2</sup>

As presented in Table 2 below, the grocery manufacturing industry directly generated slightly more than 1.7 million jobs in 2009, paying labor income of \$94.3 billion, and adding \$172.9 billion to the nation's GDP.

Relative to the entire economy, the grocery manufacturing industry was directly responsible for approximately one percent of total U.S. economic activity, measured in terms of jobs, labor income, and GDP. Relative to the U.S. manufacturing sector, the grocery manufacturing industry was directly responsible for 14.3 percent of U.S. manufacturing employment, 10.7 percent of manufacturing labor income, and 10.7 percent of value added.

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<sup>2</sup> Value added differs from gross output presented in Figure 1 because it excludes the value of intermediate goods that are embedded in the final sales of each industry. The value of intermediate inputs could be counted multiple times if output of one segment of the grocery manufacturing industry serves as an input for another segment.

**Table 2. Direct Economic Activity of the U.S. Grocery Manufacturing Industry, 2009**

NAICS	Description	Employment <sup>a</sup> (Thousands of Jobs)	Labor Income <sup>b</sup> (\$Millions)	Value Added (\$Millions)
	<b>Total</b>	<b>1,722.6</b>	<b>\$94,307</b>	<b>\$172,892</b>
	Share of national total	1.0%	1.1%	1.2%
	Share of U.S. manufacturing	14.3%	10.7%	10.7%
<b>31211</b>	<b>Beverage Manufacturing</b>	<b>100.1</b>	<b>\$6,739</b>	<b>\$8,660</b>
	<b>Food Manufacturing</b>	<b>1,424.0</b>	<b>\$71,477</b>	<b>\$118,847</b>
3112	Grain and Oilseed Mfg	60.8	\$4,620	\$12,018
3113	Sugar and Confectionary Product Mfg	69.1	\$3,978	\$6,466
3114	Fruit and Vegetable Preserving and Specialty Food Mfg	179.9	\$9,523	\$15,061
3115	Dairy Product Mfg	133.2	\$8,694	\$14,185
3116	Animal Slaughtering and Processing	508.8	\$20,787	\$23,342
3117	Seafood Product Preparation and Packaging	38.1	\$1,749	\$1,901
3118	Bakeries and Tortilla Mfg	269.9	\$11,994	\$16,402
3119	Other Food Mfg	164.3	\$10,132	\$29,473
	<b>Household Products Mfg</b>	<b>198.5</b>	<b>\$16,091</b>	<b>\$45,384</b>
3111	Animal Food Manufacturing	52.7	\$3,424	\$9,201
32229	Other Converted Paper Product Mfg	46.0	\$3,731	\$10,673
3256	Soap, Cleaning Compound, and Toilet Preparation Mfg	99.7	\$8,936	\$25,510

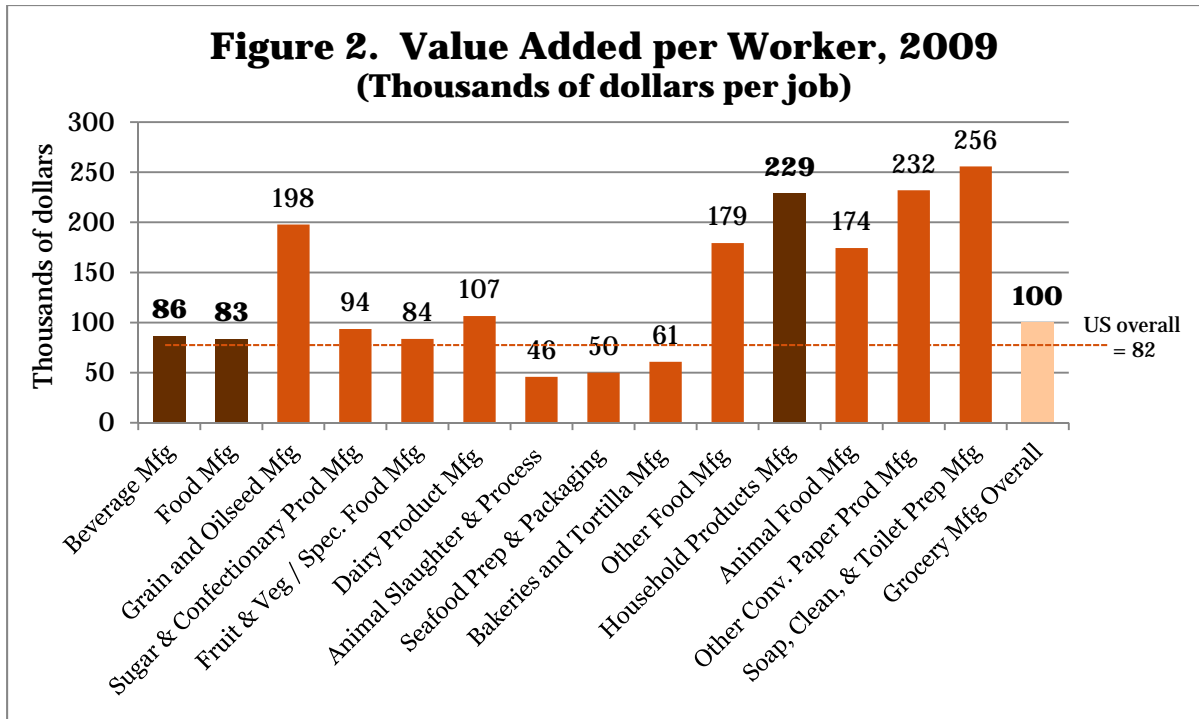
Source: PwC calculations using the IMPLAN modeling system (2009 database).

<sup>a</sup> Employment is defined as the number of payroll and self-employed jobs, including part-time jobs.

<sup>b</sup> Labor income is defined as wages and salaries and benefits as well as proprietors' income.

Value added represents the new value generated by business in the economy. Value added includes the labor income earned by workers, profits earned by companies, and taxes paid to the government. The role of labor in generating value varies across the industry. Figure 2 presents value added per job for the major subsectors of the industry, a measure of labor productivity. Each job in the beverage manufacturing sector generates approximately \$86,000 in value added; each job in the food manufacturing sector generates \$83,000; and each job in the household goods sector generates \$229,000. Across the entire industry, value added per job averages \$100,000. By comparison, value added per worker across the entire U.S. economy was approximately \$82,000 in 2009.





Source: PwC calculations using the IMPLAN modeling system (2009 database).

Since 2009, federal government data suggest that total employment in the industry has declined slightly. Payroll data collected by the Bureau of Labor Statistics show that overall employment in the grocery manufacturing industry has decreased by approximately 0.9 percent between August 2009 and August 2011.<sup>3</sup>

### III. Total Economic Impact of the U.S. Grocery Manufacturing Industry

The total economic impact of the grocery manufacturing industry also includes its impact on other parts of the economy through its *indirect* and *induced* impacts. For example, production in the food manufacturing industry creates demand for supplies from industries as varied as farmers growing agricultural inputs and paper manufacturers supplying cardboard boxes. And these indirect effects go further than the immediate suppliers to the grocery manufacturing industry. For example, the farmer who sees higher demand for his crop increases his purchases of fertilizer and other farm supplies. Similarly, the box manufacturer increases purchases of materials from its suppliers. Although the food manufacturing industry does not directly purchase fertilizer or wood pulp, its suppliers do -- as a result, the economic impact of the grocery manufacturing industry encompasses its entire supply chain.

<sup>3</sup> The BLS data exclude information on the self-employed. Data on self-employment in the industry are not yet available for 2011.

In addition to the supply chain impacts described above, there are consumption impacts on other sectors of the economy. The food production industry also creates demand for labor. Employees receive incomes, leading to consumption by households. All the industries that sell goods to households are affected.

As this description illustrates, the food production industry has a “ripple effect” that reverberates throughout the economy. Economists have built models to measure these impacts, and they are summarized in economic multipliers. Employment multipliers measure how many jobs in total would be gained for each job in the grocery manufacturing industry. Similar multipliers exist for labor income and value added.

To quantify these linkages, we rely on the IMPLAN model, an input-output (I-O) model based on federal government data. The overall impact of grocery manufacturing can be separated into three components:

- Direct effects: activities directly attributable to grocery manufacturing, such as the employees and output of manufacturers.
- Indirect effects: supply chain impacts, including activity of suppliers to grocery manufacturer suppliers.
- Induced effects: consumption impacts, based on spending by manufacturers and supplier employees.

Table 3 presents the overall impact of the grocery manufacturing industry on the U.S. economy. The industry directly generated 1.7 million jobs in 2009, and the overall level of economic activity directly and indirectly attributable to the industry supported 10.8 million jobs, or 6.3 percent of total U.S. employment. Overall labor income amounted to \$518.5 billion (5.9 percent of the U.S. total) and value added to \$903.6 billion (6.4 percent of the U.S. total).

**Table 3. Economic Activity Directly and Indirectly Attributable to the U.S. Grocery Manufacturing Industry, 2009**

Item	Direct National Impact	Percent of U.S. Economy	Total National Impact	Percent of U.S. Economy
Employment (Thousands of Jobs) <sup>a</sup>	1,722.6	1.0%	10,815.3	6.3%
Labor Income (\$ millions) <sup>b</sup>	94,307	1.1%	518,519	5.9%
Value Added (\$ millions)	172,892	1.2%	903,633	6.4%

Source: PwC calculations using the IMPLAN modeling system (2009 database).

<sup>a</sup> Employment is defined as the number of payroll and self-employed jobs, including part-time jobs.

<sup>b</sup> Labor income is defined as wages and salaries and benefits as well as proprietors' income.

Focusing on the major sectors of the grocery manufacturing industry, the food manufacturing sector represents approximately three-quarters of the industry's activity.

- Beverage manufacturing directly and indirectly supported over 606,000 jobs, \$34 billion in labor income, and \$57 billion in value added in 2009.

- Food manufacturers directly and indirectly supported 8.5 million jobs, \$391 billion in labor income, and \$670 billion in value added.
- Household goods manufacturing directly and indirectly supported 1.7 million jobs, \$93 billion in labor income, and \$176 million in value added.

Each direct job in the grocery manufacturing industry supports an average of 6.3 total jobs across the entire economy including direct, indirect and induced economic impacts. This "multiplier" value varies between 6.0 and 8.4 by sector. Labor income and value added multipliers for the industry are 5.2 and 5.5, respectively (see Table 4).

**Table 4. Economic Impact of the U.S. Grocery Manufacturing Industry, by Sector, 2009**

	Direct Impact	Indirect Impact	Induced Impact	Total Impact	Total / Direct ("multiplier") <sup>c</sup>
<b><i>Beverage Manufacturing</i></b>					
Employment (thousands) <sup>a</sup>	100.1	258.5	247.8	606.4	6.1
Labor Income (\$ millions) <sup>b</sup>	\$6,739	\$16,586	\$11,056	\$34,380	5.1
Value Added (\$ millions)	\$8,660	\$28,751	\$19,669	\$57,081	6.6
<b><i>Food Manufacturing</i></b>					
Employment (thousands) <sup>a</sup>	1,424.0	4,303.2	2,813.0	8,540.2	6.0
Labor Income (\$ millions) <sup>b</sup>	\$71,477	\$194,368	\$125,434	\$391,280	5.5
Value Added (\$ millions)	\$118,847	\$328,160	\$223,182	\$670,189	5.6
<b><i>Household Goods Manufacturing</i></b>					
Employment (thousands) <sup>a</sup>	198.5	802.4	667.8	1,668.7	8.4
Labor Income (\$ millions) <sup>b</sup>	\$16,091	\$46,982	\$29,787	\$92,860	5.8
Value Added (\$ millions)	\$45,384	\$77,982	\$52,997	\$176,363	3.9
<b><i>Total Grocery Manufacturing</i></b>					
Employment (thousands) <sup>a</sup>	1,722.6	5,364.1	3,728.6	10,815.3	6.3
Labor Income (\$ millions) <sup>b</sup>	\$94,307	\$257,937	\$166,276	\$518,519	5.5
Value Added (\$ millions)	\$172,892	\$434,893	\$295,848	\$903,633	5.2

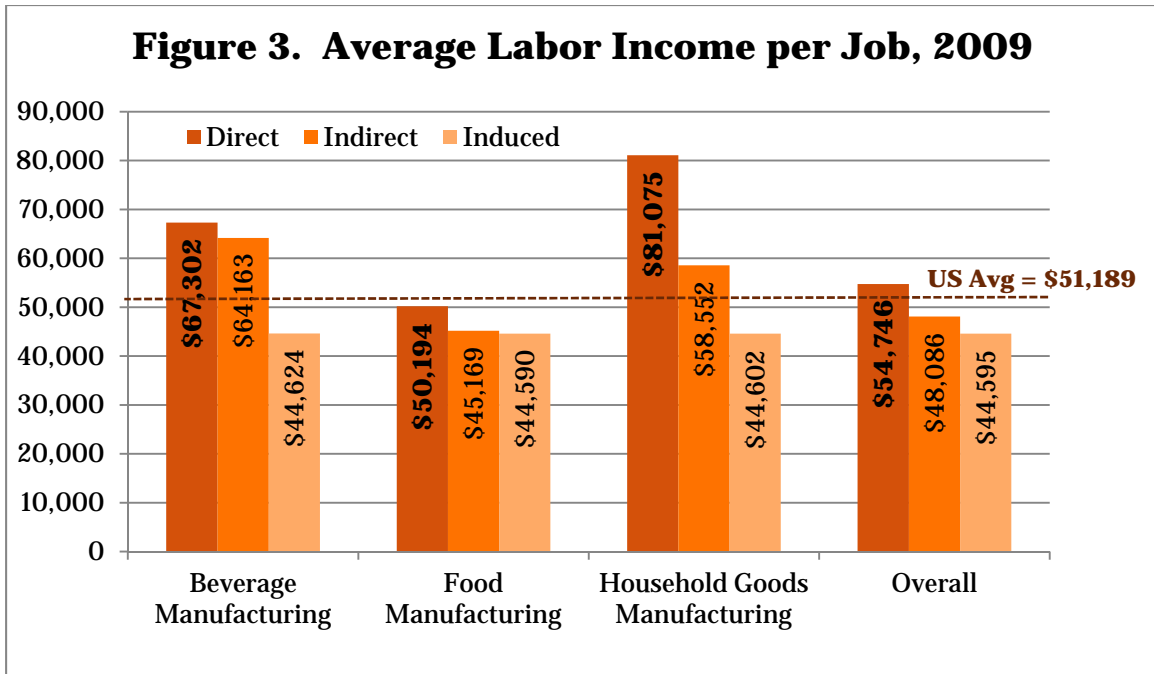
Source: PwC calculations using the IMPLAN modeling system (2009 database).

<sup>a</sup> Employment is defined as the number of payroll and self-employed jobs, including part-time jobs.

<sup>b</sup> Labor income is defined as wages and salaries and benefits as well as proprietors' income.

<sup>c</sup> Economic multiplier represents the overall impact, including direct, indirect, and induced, relative to the direct impact.

Figure 3 presents the average labor income per job attributable to the grocery manufacturing industry. Labor income from direct employment in the industry, including wages and salaries and other forms of compensation and proprietors' income, ranges from \$50,194 in the food manufacturing sector to \$81,075 in the household goods sector. Across the entire grocery manufacturing industry, average labor income per direct job was \$54,746. Average labor income in indirect and induced employment is lower. By comparison, across the entire U.S. economy, average labor income per job was \$51,189 in 2009.



Source: PwC calculations using the IMPLAN modeling system (2009 database).

The indirect and induced economic activity occurs across a broad range of other industries. Almost 35 percent of the indirect employment (i.e., the employment in the industry's supply chain) is in the agricultural sector. Another 24 percent is in the services sector. Induced activity, the spending by workers of their earnings, is concentrated in the services, wholesale, and retail sectors of the economy (see Table 5).

**Table 5. Distribution of Indirect and Induced Activity Generated by the U.S. Grocery Manufacturing Industry, 2009**

Industry Impacted	Employment <sup>a</sup>		Labor Income <sup>b</sup>		Value Added	
	Indirect	Induced	Indirect	Induced	Indirect	Induced
<b>Total (jobs in thousands, dollar amounts in billions)</b>	<b>5,364</b>	<b>3,729</b>	<b>\$257.9</b>	<b>\$166.3</b>	<b>\$434.9</b>	<b>\$295.8</b>
Agriculture, forestry and fishing	34.7%	0.6%	15.9%	0.6%	14.5%	0.4%
Mining	1.1%	0.4%	2.2%	0.9%	2.7%	1.1%
Utilities	0.8%	0.4%	2.1%	1.1%	4.6%	2.2%
Construction	1.2%	0.9%	1.2%	1.0%	0.8%	0.7%
Manufacturing	8.1%	3.4%	12.4%	5.6%	14.1%	6.5%
Wholesale and retail trade	10.3%	19.6%	15.1%	16.6%	15.3%	15.4%
Transportation and warehousing	8.9%	2.8%	9.8%	3.1%	7.9%	2.4%
Information	1.8%	2.1%	3.5%	4.0%	3.5%	4.4%
Finance, insurance, real estate, rental and leasing	7.7%	13.3%	6.3%	14.2%	13.2%	31.9%
Services	24.4%	55.1%	29.8%	50.6%	22.5%	34.1%
Other	1.1%	1.4%	1.8%	2.3%	1.0%	1.0%

Source: PwC calculations using the IMPLAN modeling system (2009 database).

<sup>a</sup> Employment is defined as the number of payroll and self-employed jobs, including part-time jobs.

<sup>b</sup> Labor income is defined as wages and salaries and benefits as well as proprietors' income.

While beyond the scope of the current study, the grocery manufacturing industry generates additional economic activity not captured in the figures above. First, economic multipliers only capture current production and do not include the impacts of capital spending made by different industries. Investment by grocery manufacturers in new capital equipment and structures generates additional economic activity. Second, the figures above do not include the activity associated with the transportation of grocery manufactures to wholesalers and retailers.

## IV. Methodology

We have relied on the IMPLAN model to calculate the impacts of the grocery manufacturing industry.<sup>4</sup> IMPLAN is a modeling system developed for estimating economic impacts and is similar to the Regional Input-Output Modeling System developed by the U.S. Department of Commerce. The model is primarily based on government data sources.

IMPLAN is built around an “input-output” table that relates the purchases that each industry has made from other industries to the value of the output of each industry. To meet the demand for goods and services from an industry, purchases are made in other industries according to the patterns recorded in the input-output table. These purchases in turn spark still more purchases by the industry's suppliers, and so on. Additionally, employees and business owners make personal purchases out of the additional income that is generated by this process, further increasing demand that ripples through the economy. Multipliers describe these iterations. The Type I multiplier measures the direct and indirect effects of a change in economic activity. It captures the inter-industry effects only, i.e., industries buying from local industries. The SAM (Social Accounting Matrix) multiplier captures the direct and indirect effects. In addition, it also reflects induced effects (i.e., changes in spending from households as income increases or decreases due to the changes in production).

Economic multipliers are often used to measure the overall change in production that would result from a marginal increase in a particular industry. For example, a value added multiplier converts a \$1 million increase in output of the grocery manufacturing industry into the total change in value added throughout the supply chain. Because some suppliers of U.S. grocery manufacturers might rely on grocery manufacturers for inputs, a marginal change in the grocery manufacturing industry could lead to an additional change in grocery manufacturing activity attributable to the goods it provides its suppliers throughout the economy. For example, a supplier to the grocery manufacturing industry may purchase food and beverages for use in its break room.

While this impact is appropriate to include when modeling a marginal change, when evaluating the overall impact of the industry, these indirect, own-industry impacts should be excluded to prevent double-counting. Therefore, we have adjusted the IMPLAN model results to exclude any indirect or induced effects taking place in the grocery manufacturing industry.

Economic impacts are reported at 2009 levels based on three primary segments of the industry: beverage manufacturing, food manufacturing, and household goods manufacturing. These segments include the sub-sectors (defined by North American Industrial Classification, or NAICS, codes) provided in the table below.

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<sup>4</sup> IMPLAN is a product of MIG, Inc.

**Table 6. Sectors Included as Grocery Manufacturers**

<b>Sector</b>	<b>Detailed Sector</b>	<b>NAICS Code</b>
<b>Beverage Manufacturing</b>	Soft drink and ice manufacturing	31211
<b>Food Manufacturing</b>	Flour milling and malt manufacturing	31121
	Wet corn milling	311221
	Soybean and other oilseed processing	311222-3
	Fats and oils refining and blending	311225
	Breakfast cereal manufacturing	311230
	Sugar cane mills and refining	311311-2
	Beet sugar manufacturing	311313
	Chocolate and confectionery mfg from cacao beans	31132
	Confectionery manufacturing from purchased chocolate	31133
	Nonchocolate confectionery manufacturing	31134
	Frozen food manufacturing	31141
	Fruit and vegetable canning, pickling, and drying	31142
	Fluid milk and butter manufacturing	311511-2
	Cheese manufacturing	311513
	Dry, condensed, and evaporated dairy product mfg	311514
	Ice cream and frozen dessert manufacturing	311520
	Animal (except poultry) slaughter/rendering/processing	311611-3
	Poultry processing	311615
	Seafood product preparation and packaging	3117
	Bread and bakery product manufacturing	31181
	Cookie, cracker, and pasta manufacturing	31182
	Tortilla manufacturing	31183
	Snack food manufacturing	31191
	Coffee and tea manufacturing	31192
	Flavoring syrup and concentrate manufacturing	31193
	Seasoning and dressing manufacturing	31194
	All other food manufacturing	31199
<b>Household Goods</b>	Dog and cat food manufacturing	311111
	Other animal food manufacturing	311119
	Sanitary paper product manufacturing	322291
	All other converted paper product manufacturing	322299
	Soap and cleaning compound manufacturing	32561
	Toilet preparation manufacturing	32562