Economic Impact of the US Grocery Manufacturing Industry

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Table of Contents

Exec	cutive Summary	E-1
I.	Introduction	1
II.	Direct Economic Impact of the US Grocery Manufacturing Industry	2
III.	Total Economic Impact of the US Grocery Manufacturing Industry	6
Appe	endix: Methodology	11

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Economic Impact of the US Grocery Manufacturing Industry

Executive Summary

This report explores the impact of the grocery manufacturing industry, the largest job provider in US manufacturing, 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 employees of the industry 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 (GMA) engaged PwC to provide a report that estimates the impact of the grocery manufacturing industry on the US economy at the national level.¹ The report relies on a well-established methodology based on federal government data.

PwC estimates that total employment directly and indirectly supported by the US grocery manufacturing industry amounted to 11.1 million jobs in 2015. The grocery manufacturing industry directly and indirectly accounted for \$627.0 billion in labor income and \$1.1 trillion 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 US Grocery Manufacturing Industry, by Sector. 2015

	Direct	Indirect and Induced	Total
Total Grocery Manufacturing Industry Employment (thousands of jobs) ^a Labor Income (\$ millions) ^b Value Added (\$ millions)	2,063.5 \$121,969 \$242,664	9,000.7 \$505,076 \$833,163	11,064.2 \$627,046 \$1,075,827
Beverage Manufacturing Employment (thousands of jobs) ^a Labor Income (\$ millions) ^b Value Added (\$ millions)	96.8	449.2	546.0
	\$7,256	\$27,656	\$34,912
	\$13,650	\$47,322	\$60,972
Food Manufacturing Employment (thousands of jobs) ^a Labor Income (\$ millions) ^b Value Added (\$ millions)	1,746.1	7,116.2	8,932.6
	\$93,712	\$319,802	\$487,235
	\$165,939	\$551,342	\$808,583
Household Goods Manufacturing Employment (thousands of jobs) ^a Labor Income (\$ millions) ^b Value Added (\$ millions)	220.6	1,365.1	1,585.7
	\$21,001	\$83,898	\$104,899
	\$63,075	\$143,197	\$206,272

Source: PwC calculations using the IMPLAN modeling system (2015 database). Detail may not add to totals due to rounding.

¹ In a 2011 study, PwC estimated the grocery manufacturing industry's national economic impact in 2009.

^a Employment is defined as the number of payroll and self-employed jobs, including part-time jobs.

b 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 5.9 percent of total US employment. The industry's direct and indirect labor income represented a slightly smaller share of the US total, at 5.7 percent, and the industry's direct and indirect share of national GDP was 6.0 percent. The food manufacturing sector represents the largest share of the industry, accounting for approximately three-quarters of industry activity.

Focusing on the activities with the grocery manufacturing industry, we find that it directly generated approximately \$117,600 in value added per job in 2015. By comparison, across the entire US economy the average value added per job was approximately \$96,000.

The average labor income directly earned per job in the grocery manufacturing industry was approximately \$59,108 in 2015, compared to \$58,688 across the entire US economy. By sector, average labor income per job in the beverage manufacturing sector was \$74,960; in food manufacturing, the average was \$53,669; and in the household goods manufacturing sector, \$95,203.

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 and retailing of grocery manufacturing products.

Economic Impact of the US Grocery Manufacturing Industry

I. Introduction

This report explores the impact of the US grocery manufacturing industry, the largest job provider in US manufacturing, 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 employees of the industry 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 (GMA) engaged PwC to provide a report that estimates the impact of the grocery manufacturing industry on the US economy at the national level.² The report relies on a well-established methodology based on federal government data. Specifically, the economic impact is measured in terms of employment, value added (i.e., contribution to GDP), 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 grocery manufacturers.
- *Indirect effects* include activities of the upstream supply chain to grocery manufacturers, including contractors and other companies providing inputs to grocery manufacturing companies and their immediate suppliers.
- Induced effects reflect spending by employees of grocery manufacturers and their suppliers. Employees throughout the grocery manufacturing's 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 US grocery manufacturing.

The next section summarizes the direct impact of the grocery manufacturing industry on the US economy. The third section presents the overall impacts, and an overview of the methodology is provided in the appendix.

² In a 2011 study, PwC estimated the grocery manufacturing industry's national economic impact in 2009.

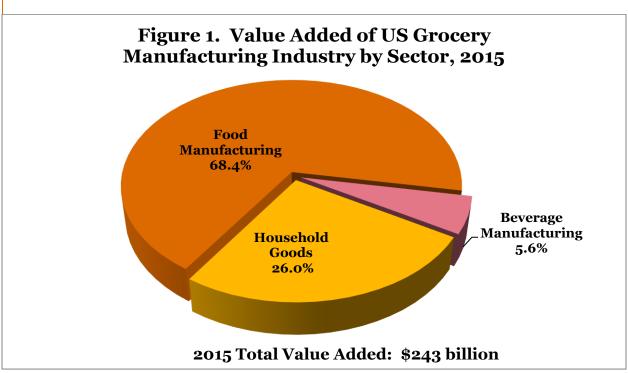
II. Direct Economic Impact of the US Grocery Manufacturing Industry

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

Sector	Industry Codes (NAICS)	Description
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 the value added contributed by each of the three sectors to the US economy. Overall, companies in the grocery manufacturing industry generated \$243 billion in value added in 2015. The food manufacturing sector was responsible for the largest share of the total, representing approximately 70 percent of total industry value added.



Source: PwC calculations using the IMPLAN modeling system (2015 database).

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.³ An industry's value added represents its contribution to GDP.

As presented in **Table 2**, below, the grocery manufacturing industry directly generated 2.1 million jobs in 2015, paying labor income of \$122.0 billion, and adding \$242.7 billion to the nation's GDP. The industry also had \$1.1 trillion in output (or sales) in 2015.

Relative to the entire US economy, the grocery manufacturing industry was directly responsible for approximately one percent of total economic activity, measured in terms of jobs, labor income, and GDP. Relative to the US manufacturing sector, the grocery manufacturing industry was directly responsible for 15.8 percent of US manufacturing employment, 11.8 percent of US manufacturing labor income, and 11.7 percent of US manufacturing GDP.

3

³ Value added differs from gross output (or sales) 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 US Grocery Manufacturing Industry, 2015

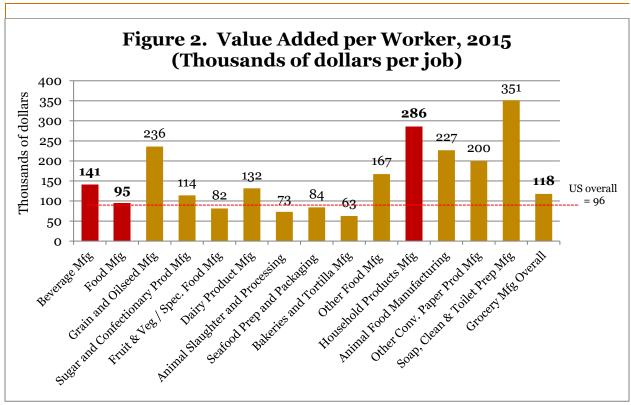
NAICS	Description	Employment ^a (Thousands of Jobs)	Labor Income ^b (\$Millions)	Value Added (\$Millions)
	m l	2.062 =	¢101.060	\$0.40.66.4
	Total	2,063.5	\$121,969	\$242,664
	Share of national total	1.1%	1.1%	1.3%
	Share of US manufacturing	15.8%	11.8%	11.7%
31211	Beverage Manufacturing	96.8	\$7,256	\$13,650
	Food Manufacturing	1,746.1	\$93,712	\$165,939
3112	Grain and Oilseed Mfg	62.1	\$5,677	\$14,640
3113	Sugar and Confectionary Product Mfg	78.8	\$4,784	\$8,982
3114	Fruit and Vegetable Preserving and Specialty Food Mfg	181.3	\$10,775	\$14,779
3115	Dairy Product Mfg	140.6	\$10,282	\$18,516
3116	Animal Slaughtering and Processing	501.6	\$24,098	\$36,603
3117	Seafood Product Preparation and Packaging	40.2	\$2,248	\$3,384
3118	Bakeries and Tortilla Mfg	525.0	\$21,547	\$32,814
3119	Other Food Mfg	216.5	\$14,302	\$36,221
	Household Products Mfg	220.6	\$21,001	\$63,075
3111	Animal Food Manufacturing	60.8	\$4,618	\$13,787
32229	Other Converted Paper Product Mfg	45.1	\$4,106	\$9,024
3256	Soap, Cleaning Compound, and Toilet Preparation Mfg	114.7	\$12,277	\$40,265

Source: PwC calculations using the IMPLAN modeling system (2015 database).

Value added represents the new value generated by businesses 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. Each job in the beverage manufacturing sector generates approximately \$141,000 in value added; each job in the food manufacturing sector generates \$95,000; and each job in the household goods sector generates \$286,000. Across the entire grocery manufacturing industry, value added per job averages \$118,000. By comparison, value added per worker across the entire US economy was approximately \$96,000 in 2015.

^a Employment is defined as the number of payroll and self-employed jobs, including part-time jobs.

^b Labor income is defined as wages and salaries and benefits as well as proprietors' income.



Source: PwC calculations using the IMPLAN modeling system (2015 database).

Since 2015, federal government data suggest that total employment in the grocery manufacturing industry has increased. The latest payroll data collected by the Bureau of Labor Statistics show that overall employment in the grocery manufacturing industry has increased by approximately 2.5 percent between June 2015 and June 2016.⁴ Over the same period, the overall US manufacturing sector experienced a decline of 0.1 percent in payroll employment.

5

 $^{^4}$ The BLS data exclude information on the self-employed. Data on self-employment in the industry are not yet available for 2015.

III. Total Economic Impact of the US 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. These indirect effects go further than the immediate suppliers to the grocery manufacturing industry. For example, the farmer who produces more 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.

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 grocery manufacturing 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 grocery manufacturers.
- Indirect effects: supply chain impacts, including activity of suppliers to grocery manufacturer suppliers.
- *Induced effects*: consumption impacts, based on spending by the employees of grocery manufacturers and their supply chain.

Table 3 presents the overall impact of the grocery manufacturing industry on the US economy. The industry directly generated 2.1 million jobs in 2015, and the overall level of economic activity directly and indirectly attributable to the industry supported 11.1 million jobs, or 5.9 percent of total US employment. Overall labor income amounted to \$627 billion (5.7 percent of the US total) and value added to \$1.1 trillion (6.0 percent of the US total).

Table 3. Economic Activity Directly and Indirectly Attributable to the US Grocery Manufacturing Industry, 2015

Item	Direct National Impact	Percent of US Economy	Total National Impact	Percent of US Economy
Employment (Thousands of Jobs) ^a	2,063.5	1.1%	11,064.2	5.9%
Labor Income (\$ millions) ^b	\$121,969	1.1%	\$627,046	5.7%
Value Added (\$ millions)	\$242,664	1.3%	\$1,075,827	6.0%

Source: PwC calculations using the IMPLAN modeling system (2015 database).

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 546,000 jobs, \$35 billion in labor income, and \$61 billion in value added in 2015.
- **Food manufacturers** directly and indirectly supported 8.9 million jobs, \$487 billion in labor income, and \$809 billion in value added.
- **Household goods manufacturing** directly and indirectly supported 1.6 million jobs, \$105 billion in labor income, and \$206 million in value added.

Each job in the grocery manufacturing industry supports an average of 4.4 additional jobs across the rest of the US economy. This "multiplier" value varies between 5.1 and 7.2 by sector. Labor income and value added multipliers for the industry are 5.1 and 4.4, respectively (see **Table 4**, below).

^a Employment is defined as the number of payroll and self-employed jobs, including part-time jobs.

b Labor income is defined as wages and salaries and benefits as well as proprietors' income.

Table 4. Economic Impact of the US Grocery Manufacturing Industry, by Sector, 2015

	70 7 10	cctor, zor,			
	Direct Impact	Indirect Impact	Induced Impact	Total Impact	Total / Direct ("multiplier") ^c
	Impact	mpact	Impact	Impact	(munipher)°
Beverage Manufacturing					
Employment (thousands) ^a	96.8	238.6	210.6	546.0	5.6
Labor Income (\$millions) b	\$7,256	\$16,999	\$10,656	\$34,912	4.8
Value Added (\$millions)	\$13,650	\$28,676	\$18,646	\$60,972	4.5
Food Manufacturing					
Employment (thousands) a	1,746.1	4,261.5	2,925.0	8,932.6	5.1
Labor Income (\$millions) b	\$93,712	\$245,660	\$147,863	\$487,235	5.2
Value Added (\$millions)	\$165,939	\$383,870	\$258,774	\$808,583	4.9
Household Goods Manufacturir	ıg				
Employment (thousands) ^a	220.6	733.1	632.0	1,585.7	7.2
Labor Income (\$millions) b	\$21,001	\$51,930	\$31,967	\$104,899	5.0
Value Added (\$millions)	\$63,075	\$87,258	\$55,939	\$206,272	3.3
Total Grocery Manufacturing					
Employment (thousands) a	2,063.5	5,233.1	3,767.6	11,064.2	5.4
Labor Income ($\$$ millions) b	\$121,969	\$314,590	\$190,487	\$627,046	5.1
Value Added (\$millions)	\$242,664	\$499,804	\$333,359	\$1,075,827	4.4

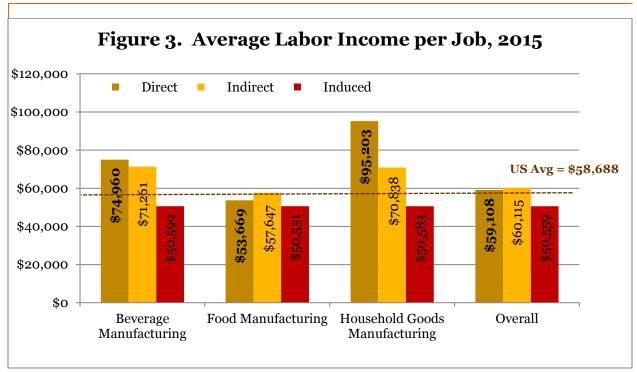
Source: PwC calculations using the IMPLAN modeling system (2015 database).

Figure 3, below, 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 \$53,669 in the food manufacturing sector to \$95,203 in the household goods sector. For the grocery manufacturing industry as a whole, average labor income per direct job was \$59,108. Average labor income in indirect and induced employment is lower. By comparison, across the entire US economy, average labor income per job was \$58,688 in 2015.

^a Employment is defined as the number of payroll and self-employed jobs, including part-time jobs.

^b Labor income is defined as wages and salaries and benefits as well as proprietors' income.

^c Economic multiplier represents the overall impact, including direct, indirect, and induced, relative to the direct impact.



Source: PwC calculations using the IMPLAN modeling system (2015 database).

The indirect and induced economic activity occurs across a broad range of other industries. Over 39 percent of the indirect employment (i.e., the employment in the grocery manufacturing industry's supply chain) is in the agricultural sector. Another 22 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**, below).

Table 5. Distribution of Indirect and Induced Activity Generated by the US Grocery Manufacturing Industry. 2015

000100	ery Manufacturing in						
Industry Impacted	Employment ^a		Labor Income ^b		Value Added		
industry impacted	Indirect	Induced	Indirect	Induced	Indirect	Induced	
Total (jobs in thousands, dollar amounts in billions)	5,233	3,768	\$315	\$190	\$500	\$333	
Agriculture, forestry and fishing	39.3%	0.6%	26.7%	0.5%	22.9%	0.4%	
Mining	1.2%	0.5%	2.4%	1.0%	2.6%	1.0%	
Utilities	0.6%	0.3%	1.5%	1.0%	2.8%	1.9%	
Construction	1.4%	1.2%	1.4%	1.4%	1.1%	1.0%	
Manufacturing	7.6%	3.2%	10.2%	5.0%	13.2%	6.5%	
Wholesale and retail trade	11.0%	16.9%	14.7%	14.0%	17.3%	13.6%	
Transportation and warehousing	9.1%	3.1%	9.6%	3.5%	8.3%	2.8%	
Information	1.2%	1.8%	2.4%	3.9%	2.7%	5.1%	
Finance, insurance, real estate, rental and leasing	5.9%	12.3%	6.1%	14.0%	10.0%	29.7%	
Services	21.6%	59.0%	23.3%	53.7%	17.8%	36.6%	
Other	1.1%	1.2%	1.7%	2.0%	1.3%	1.3%	
Total	100%	100%	100%	100%	100%	100%	

Source: PwC calculations using the IMPLAN modeling system (2015 database).

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 and distribution of grocery manufacturing products.

^a Employment is defined as the number of payroll and self-employed jobs, including part-time jobs.

^b Labor income is defined as wages and salaries and benefits as well as proprietors' income.

Appendix: Methodology

We have relied on the IMPLAN model to calculate the economic impacts of the US grocery manufacturing industry.⁵ IMPLAN is a modeling system developed for estimating economic impacts and is similar to the Regional Input-Output Modeling System developed by the US 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 US 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 within the grocery manufacturing industry.

Economic impacts are reported at 2015 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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⁵ IMPLAN is a product of IMPLAN Group, Inc.

Table 6. Sectors Included as Grocery Manufacturers

Broad Sector	Detailed Sector	NAICS Code	IMPLAN Code
Beverage Manufacturing	Soft drink and ice manufacturing	31211	106- 107
Food Manufacturing	Flour milling	311211	67
	Rice milling	311212	68
	Malt manufacturing	311213	69
	Wet corn milling	311221	70
	Soybean and other oilseed processing	311224	71
	Fats and oils refining and blending	311225	72
	Breakfast cereal manufacturing	311230	73
	Beet sugar manufacturing	311313	74
	Sugar cane mills and refining	311314	75
	Non-chocolate confectionery manufacturing	311340	76
	Chocolate and confectionery mfg from cacao beans	311351	77
	Confectionery manufacturing from purchased chocolate	311352	78
	Frozen fruits, juices and vegetables manufacturing	311411	79
	Frozen specialties manufacturing	311412	80
	Canned fruits and vegetables manufacturing	311421	81
	Canned specialties	311422	82
	Dehydrated food products manufacturing	311423	83
	Fluid milk manufacturing	311511	84
	Creamery butter manufacturing	311512	85
	Cheese manufacturing	311513	86
	Dry, condensed, and evaporated dairy product mfg Ice cream and frozen dessert manufacturing	311514	87
	Animal, except poultry, slaughtering	311520	88
	Meat processed from carcasses	311611	89
	Rendering and meat byproduct processing	311612 311613	90
	Poultry processing	311615	91 92
	Seafood product preparation and packaging	311015	92
	Bread and bakery product manufacturing	311811-2	93 94
	Frozen cakes and other pastries manufacturing	311813	94 95
	Cookie, cracker, and pasta manufacturing	311821	95 96
	Dry pasta, mixes, and dough manufacturing	311824	90 97
	Tortilla manufacturing	31183	97 98
	Roasted nuts and peanut butter manufacturing	311911	99
	Other snack food manufacturing	311919	100
	Coffee and tea manufacturing	31192	101
	Flavoring syrup and concentrate manufacturing	31193	102
	Mayonnaise, dressing, and sauce manufacturing	311941	103
	Spice and extract manufacturing	311942	104
	All other food manufacturing	31199	105
Household Goods	Dog and cat food manufacturing	311111	65
	Other animal food manufacturing	311119	66
	Sanitary paper product manufacturing	322291	152
	All other converted paper product manufacturing	322299	153
	Soap and other detergent manufacturing	325611	179
	Polish and other sanitation good manufacturing	325612	180
	Surface active agent manufacturing	325613	181
	Toilet preparation manufacturing	32562	182