# Food Manufacturing Industry in South Carolina:
# An Analysis of the Size, Structure, and Performance

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## Abstract

Food manufacturing industries are traditionally considered to be a significance force of economic development of rural areas. By locating their establishments in a particular region, they create employment opportunities and increase demand for agricultural commodities grown in the region. South Carolina has a very diverse agriculture. A wide variety of agricultural commodities is grown in the state, including grains (soybeans, corn, wheat, oats), fruits, vegetables and nuts (peaches, melons, tomatoes, cucumbers, peanuts), poultry and eggs, livestock and dairy (USDA NASS 2014). A diverse agricultural sector creates incentives for food manufacturing companies to locate their establishments in this area. In addition, it encourages agricultural producers to get involved in food manufacturing businesses. Food manufacturing industries are important sectors of the South Carolina economy.

The objective of this research is to evaluate the size, structure and economic performance of food manufacturing industry in South Carolina during the period of 2000-2012. The analysis is conducted using a number of key economic indicators reported by the US Census Bureau Economic Census surveys. The analyzed economic indicators include the number of establishments, number of employees, annual payroll, value added and value of shipments. The results have implications for the food industry and policy decision-making process, as they provide evidence on the current and projected economic performance of food manufacturing industries in South Carolina.

**Keywords:** food manufacturing, economic performance, economic ratio analysis, value added.

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## Data and Definitions

The analysis of economic performance of food manufacturing industries is conducted using the US Economic Census survey data (geographic series reports compiled on a five year basis) for 2002, 2007 and 2012. The analyzed food manufacturing industries include animal food manufacturing (NAICS 3111), grain and oilseed milling (NAICS 3112), sugar and confectionary product manufacturing (NAICS 3113), fruit and vegetable preserving and specialty food manufacturing (NAICS 3114), dairy product manufacturing (NAICS 3115), animal slaughtering and processing (NAICS 3116), bakeries and tortilla manufacturing (NAICS 3118) and other food manufacturing (NAICS 3119).[1] The following economic indicators are used in the analysis: number of establishments, number of employees, annual payroll, value of shipments, value added, cost of materials and capital expenditures.

*An establishment* is a single physical location at which business is conducted; it may or may not be identical with a company (firm or enterprise). *The number of employees* includes all full-time and part-time employees on the payrolls. *The annual payroll* includes the gross earnings of all employees on the payroll paid in the calendar year. *The value of shipments* includes the received or receivable net selling values, "Free on Board" (FOB) plant (exclusive of freight and taxes), of all products shipped (primary and secondary) as well as all miscellaneous receipts (i.e. contract work performed for others). *Cost of materials* refers to direct charges actually paid or payable for items consumed or put into production during the year; in particular, it includes the cost of materials and fuel consumed. *Capital expenditures* represent the total new and used capital expenditures reported by establishments in operation; these are the expenditures related to new and used machinery and equipment as well as permanent additions and major alterations to manufacturing establishments. *The value added* is an indicator traditionally used to characterize the economic performance of food manufacturing industries. It is the difference between the value of shipments and costs of materials, supplies, containers, fuel, plastic, purchased electricity and contract work. The value added avoids the duplication resulting from the use of products of some establishments as materials by others.

## Methodology

The analysis includes two stages. At the first stage, an analysis of the size, structure and economic development trends of food manufacturing industries is conducted. This analysis uses the following economic indicators: number of establishments, number of employees, annual payroll, value added and value of shipments. At the second stage, six ratios characterizing the effectiveness of economic performance of food industries are calculated using the economic indicators already mentioned and cost of materials and capital expenditures. These ratios include: the ratio of value added to the number of employees ($ value added per employee), the ratio of the number of employees to the number of establishments (i.e. the number of employees per establishment (plant)), and the shares of annual payroll, cost of materials, capital expenditures

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[1] One industry is excluded from the analysis due to a data confidentiality issue, this is a seafood product preparation and packaging (NAICS 3117).

and value added in the total value of shipments.[2] The ratios used in the analysis were used in previous studies that focused on evaluating economic performance of food manufacturing industries (Connor et al. 1985; Capps et al. 1988; Connor 1988; Christy and Connor 1989; Salin et al. 2002; Huang 2003; Bolotova 2008; Bolotova and Asiseh 2009).

## Results

In 2012 there were 200 food manufacturing establishments located in South Carolina and approximately seventeen-thousand people employed in food manufacturing industries. As compared to 2002, the number of establishments decreased by 13%, but the number of employees remained approximately the same. All food manufacturing industries as a group generated $6.6 billion of value of shipments and $3.0 billion of value added in 2012. As compared to 2002, while value of shipments increased by almost 9%, value added decreased by almost 8%. Increasing cost of materials was likely to be a factor explaining a decrease in value added and an increase in value of shipments over time. Individual food manufacturing industries follow different trends.[3]

An analysis of the structure of the South Carolina food manufacturing industry in terms of value of shipments indicates the following.[4] Animal slaughtering and processing is the largest industry, with the share of almost 33% in the total value of shipments generated by all food manufacturing industries as a group. Fruits and vegetables processing is the second largest industry, with the share of 21.5% in the total value of shipments. It is followed by bakeries and tortilla manufacturing (13.5%), other food manufacturing (11%) and dairy product manufacturing (8%). Animal food manufacturing and grain and oilseed milling contribute 6.7% and 6.1% to the total value of shipments generated by all industries as a group.

The economic performance ratios are summarized in Table 1 (see Appendix). The ratios are calculated for all industries as a group and for individual industries. The ratios are expected to vary across different industries due to the specifics of production technology and the type of marketing and pricing strategies. The ratio of number of employees to the number of establishments is seventy-six for all food manufacturing industries considered as a group. It varies from 20–25 employees per establishment in grain and oilseed milling and animal food manufacturing, respectively, to 165 and 226 employees per establishment in animal slaughtering and processing and fruits and vegetables processing, respectively. The ratio of value added to the number of employees is 188 for all food manufacturing industries considered as a group. This ratio varies from $100 and $140 per employee in animal slaughtering and processing and bakeries and tortilla manufacturing, respectively, to $512 and $718 per employee in grain and oilseed milling and animal food manufacturing, respectively.

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[2] For a more convenient interpretation some of the ratios are multiplied by 100% and are expressed as shares. In the case of economic indicators measured in monetary units (annual payroll, value added and value of shipments), the 2002 and 2005 $ values are converted into the 2012 $ values using various producer price indices (PPI).

[3] An analysis of a number of individual food manufacturing industries over time is not possible due to a data confidentiality issue. Some of the economic indicators are not reported for one or more years for some industries.

[4] The industry structure is based on 2002 data, the only year in which all industries are represented in the survey.

The share of annual payroll in value of shipments is 11.5% for all food manufacturing industries considered as a group. The grain and oilseed milling and animal food manufacturing are characterized by the lowest shares, 4.3% and 5.2%, respectively. Bakeries and tortilla manufacturing and animal slaughtering and processing are characterized by the highest shares, 18.3% and 15.8%, respectively.

The cost of materials, in particular cost of agricultural commodities used in food manufacturing, represents a significant share in the total value of shipments. The share of cost of materials in value of shipments is 45.6% for all food manufacturing industries considered as a group. Dairy product manufacturing has the largest share among the analyzed industries, 73.7%. It is followed by grain and oilseed milling (62.8%) and animal slaughtering and processing (54.6%). Capital expenditures represent a rather small share in the total value of shipments. The share of capital expenditures in value of shipments is approximately 2% for all food manufacturing industries considered as a group. The combined share of annual payroll, cost of materials and capital expenditures in the total value of shipments is 59% for all food manufacturing industries considered as a group. The combined share of annual payroll and cost of materials is approximately 57%.

The share of value added in value of shipments is 54.4% for all food manufacturing industries considered as group. Dairy product manufacturing and grain and oilseed milling have the lowest shares, 25.8% and 35.6%, respectively. The industries with the highest shares include fruits and vegetables processing (87.3%) and bakeries and tortilla manufacturing (54.3%).

A methodology used in the analysis and the results can be used in a number of ways. First, the economic performance of an individual establishment or a group of establishments belonging to the same company can be compared to the average economic performance characterizing a particular industry. Consequently, if required, production and marketing strategies may be modified to improve economic performance of the analyzed establishment(s). Second, the results on the industries' performance may be used when the decisions on whether to expand the existing food manufacturing operations are made. This type of information may be used by the decision-makers who consider getting involved in food manufacturing businesses. Thirdly, financial institutions operating in the region may utilize the results in their decision-making process. Finally, policy decision-makers may use this information during the process of development and evaluation of various agricultural and food promotion programs.

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# Appendix

**Table 1.** The Ratios of Economic Performance: Food Manufacturing Industries in South Carolina, 2002.

| Industry | Ratio of number of employees to number of establishments | Share of annual payroll in value of shipments (%) | Ratio of value added to number of employees ($ per employee) | Share of cost of materials in value of shipments (%) | Share of capital expenditures in value of shipments (%) | Share of value added in value of shipments (%) |
|---|---|---|---|---|---|---|
| *Food manufacturing* | *76* | *11.5* | *188* | *45.6* | *1.9* | *54.4* |
| Animal food manufacturing | 25 | 5.2 | 718 | 50.2 | 1.0 | 49.7 |
| Grain and oilseed milling | 20 | 4.3 | 512 | 62.8 | 0.9 | 35.6 |
| Fruits and vegetables preserving | 226 | 7.4 | 435 | 12.7 | 1.2 | 87.3 |
| Dairy product manufacturing | 71 | 6.3 | 168 | 73.7 | 4.3 | 25.8 |
| Animal slaughtering and processing | 165 | 15.8 | 100 | 54.6 | 1.9 | 46.1 |
| Bakeries and tortilla manufacturing | 37 | 18.3 | 140 | 45.5 | 2.6 | 54.3 |
| Other food manufacturing | 49 | 9.6 | 204 | 49.8 | 1.9 | 49.8 |