The Baking Industry 2023 Economic Impact Study

Methodology

Prepared for

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By

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The Economic Impact of the Baking Industry, 2023

Executive Summary

The American Bakers Association Economic Impact Study estimates the economic contributions made by the baking industry to the U.S. economy in 2023. John Dunham & Associates conducted this research, which was funded by the American Bakers Association (ABA). This work used standard econometric models first developed by the U.S. Forest Service, and now maintained by the Minnesota IMPLAN Group. Data came from industry sources, government publications and Data Axle.

The study defines the baking industry as those firms involved in the production, distribution/importation, and retailing of baked goods including breads, cakes, pies, pastries, cookies, crackers, tortillas, pretzels, cereal and granola bars, baking mixes, and other bakery products. Pre-prepared dough and frozen bakery products manufacturers are also included in the definition of the industry. The study measures the number of jobs in this sector, the wages paid to employees, and total output.

Industries are linked to each other when one industry buys from another to produce its own products. Each industry in turn makes purchases from a different mix of other industries, and so on. Employees in all industries extend the economic impact when they spend their earnings. Thus, economic activity started by the baking industry generates output and jobs in hundreds of other industries, often in sectors and states far removed from the original economic activity. The impact of supplier firms and the induced impact created by employees spending their earnings is calculated using an input/output model of the United States. The study calculates the impact of bakers nationally, by state, and by congressional district.

The study also estimates taxes paid by the industry and its employees. Federal taxes include industry-specific excise and sales taxes, business and personal income taxes, FICA, and unemployment insurance. State and local tax systems vary widely. Direct retail taxes include state and local sales taxes, license fees, and applicable gross receipt taxes. The baking industry pays real estate and personal property taxes, business income taxes, and other business levies that vary in each state and municipality. All entities engaged in business activity generated by the industry pay similar taxes.

The baking industry is a dynamic part of the U.S. economy, accounting for about $533.18 billion in total economic output or roughly 2.01 percent of GDP.[1] Bakers, product distributors and importers, and retailers directly, or indirectly, support approximately 2.18 million American jobs in 2023. These workers earned over $143.56 billion in wages and benefits. Members of the industry and their employees paid $49.07 billion in direct federal, state and local taxes, not including state and local sales taxes imposed on baked goods.

Summary Results

The Economic Impact of the Baking Industry study measures the impact of the baking industry, as defined by the production, distributing/importing, and retailing of baked goods and prepared dough, on the entire economy of the United States. The industry contributes about $533.18 billion in economic output, or 2.01 percent of GDP, and, through its production and distribution linkages, impacts firms in all 524 sectors of the US economy.[2] Baking is defined by this study to include a wide range of products including: breads,

[1] Based on GDP of 26,530 billion. See: Gross Domestic Product (third estimate), Corporate Profit (Revised Estimate), and GDP by Industry, First Quarter 2023. US Department of Commerce, Bureau of Economic Analysis, June 29, 2023.

[2] Economic sectors are based on 2021 IMPLAN sectors.

cakes, pies, pastries, cookies, crackers, tortillas, pretzels, cereal and granola bars, pre-prepared dough, frozen bakery products, baking mixes, and other bakery products.[3]

Baked goods production includes not only companies that directly manufacture products for sale at on-site locations, but commercial bakeries that provide products to grocery stores, convenience stores and other retail bake shops. Direct distribution and bakery outlet locations owned by manufacturing companies are also included. Additionally, central commissaries that produce dough or semi-finished products for chain retailers are included; however, chain retail operations (for example a chain doughnut shop or chain sandwich store) are not.[4] The production of baked goods is not limited to large manufacturing facilities. Small retail bakers that produce bread, cakes, pastries, etc. on premise are included in the production portion of this study. All told, these firms, large and small, employ 617,802 people in manufacturing or baking operations, sales, packaging, and direct distribution.

Once baked goods have been produced, they must be distributed to stores throughout the country. Domestic distributors move baked goods across the county and import specialty baked products produced abroad;[5] however distribution facilities that belong to the baked goods manufacturers are included as part of the manufacturing sector and are not included in the distribution category. The distribution segment of the industry includes bakery distributors, as well as those employees whose jobs can be attributed to the distribution of baked goods at companies that distribute other items in addition to baked goods (e.g. grocery distributors). All told, approximately 51,395 individuals are employed as a direct result of the distribution of baked goods.

Finally, the baking industry includes thousands of retailers that directly sell products to the consumer. These include a wide range of retailers including grocery stores. Grocery stores sell hundreds of goods, so in order to represent the retail portion of the baked goods industry in these firms, a percent of baked goods sales is applied to employment. Bakery outlets are also included, however, bakery outlets that are owned by baked goods manufacturers are included as part of the manufacturing sector and are not included in the retail category. Retailers do not include restaurants (even if they bake products on premises); however, centralized commissary bakeries, used by chain retailers, are included as part of the manufacturing sector. We estimate that there are 119,852 people employed selling baked goods and related products in the United States.

Other firms are related to the baking industry as suppliers. These firms produce and sell a broad range of items including flour, sugar, and butter used in the production process, as well as fuel, packaging materials, sales displays or machinery. In addition, supplier firms provide a broad range of services, including personnel services, financial services, advertising services, consulting services or transportation services. Finally, a number of people are employed in government enterprises responsible for the regulation of the baking industry. All told, we estimate that the baking industry is responsible for 752,593 supplier jobs. These firms generate about $212 billion in economic activity.

An economic analysis of the baking industry will also take additional linkages into account. While it is inappropriate to claim that suppliers to the supplier firms are part of the industry being analyzed,[6] daily

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[3] Data in this analysis includes information on companies producing a wide range of baked goods for sale both on site (in the case of stand-alone bakers) or for sale in general retail outlets like grocery stores. Central commissaries that produce dough and semi-finished products for chain retailers are also included, but the baking operations of chain retailers (for example a chain doughnut shop) are not.

[4] As per ABA request all Krispy Kreme shops were included in the study as part of the manufacturing process.

[5] Based directly on data provided to John Dunham & Associates by Data Axle as of March 2023.

[6] These firms would more appropriately be considered as part of the supplier firms' industries.

spending by employees of the baking industry, and those of supplier firms whose jobs are directly dependent on baked product sales and production, should surely be included. This spending on everything from housing, to food, to educational services and medical care makes up what is traditionally called the "induced impact" or multiplier effect of the baking industry. In other words, this flow of money, and the jobs it creates is induced by the production, distribution and sale of cakes, breads, dough and other related products included in the definition of the baking industry. We estimate that the induced impact of the industry is nearly $134.35 billion, and generates 635,272 jobs, for a multiplier of 0.72.[7]

An important part of an impact analysis is the calculation of the contribution of the industry to the public finances of the community. In the case of the baking industry, the traditional direct taxes paid by the firms and their employees provide nearly $49.07 billion in revenues to the federal, state and local governments. These figures do not include state and local sales taxes paid on baked goods purchases themselves.

Table 1 below presents a summary of the total economic impact of the industry in the United States. Summary tables for each state are included in the Output Model, which is discussed in the following section.

Economic Contribution of the Baking Industry

	Direct	Supplier	Induced	Total
Jobs	789,054	752,593	635,272	2,176,919
Wages	$42,820,248,400	$57,287,078,100	$43,457,461,100	$143,564,787,600
Output	$186,829,219,600	$211,998,485,000	$134,354,273,900	$533,181,978,500
Taxes				$49,065,429,700

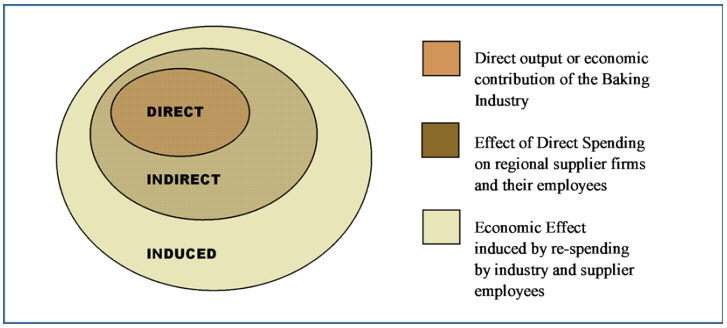
Output Model

John Dunham & Associates, Inc. produced The Baking Industry 2023 Economic Impact Study for the American Bakers Association (ABA). The analysis consists of a number of parts, each of which will be described in the following sections of this document. These include data, models, calculations, and outputs. These components were linked together into an interactive system that allows ABA to examine the links between the various parts of the industry and to produce detailed output documents on an as-needed basis. As such, there is no book – no thick report – outlining the impact of the industry, but rather a system of models and equations that can be continuously queried and updated.

[7] Often, economic impact studies present results with very large multipliers – as high as 4 or 5. These studies invariably include the firms supplying the supplier industries as part of the induced impact. John Dunham & Associates believes that this is not an appropriate definition of the induced impact and as such limits this calculation to only the effect of spending by direct and supplier employees.

Economic Impact Modeling – Summary

The Economic Impact Study begins with an accounting of the direct employment in the domestic manufacture of baked goods and related products, distributing and importing, and retailing sectors. The data come from a variety of government and private sources.



It is sometimes mistakenly thought that initial spending accounts for all of the impact of an economic activity or a product. For example, at first glance it may appear that consumer expenditures for a product are the sum total of the impact on the local economy. However, one economic activity always leads to a ripple effect whereby other sectors and industries benefit from this initial spending. This inter-industry effect of an economic activity can be assessed using multipliers from regional input-output modeling.

The economic activities of events are linked to other industries in the state and national economies. The activities required to produce bread for example, from mixing and kneading the dough, to baking, to quality control, to shipping generate the direct effects on the economy. Regional (or indirect) impacts occur when these activities require purchases of goods and services such as flour or electricity from local or regional suppliers. Additional, induced impacts occur when workers involved in direct and indirect activities spend their wages. The ratio between induced economic and direct impact is termed the multiplier. The framework in the chart above illustrates these linkages.

This method of analysis allows the impact of local production activities to be quantified in terms of final demand, earnings, and employment in the states and the nation as a whole.

Once the direct impact of the industry has been calculated, the input-output methodology discussed below is used to calculate the contribution of the supplier sector and of the re-spending in the economy by employees in the industry and its suppliers. This induced impact is the most controversial part of economic impact studies and is often quite inflated. In the case of the ABA model, only the most conservative estimate of the induced impact has been used.

Model Description and Data

This analysis is based on data provided by Data Axle, ABA and the federal government. The analysis utilizes the Minnesota IMPLAN Group Model in order to quantify the economic impact of the baking industry on the economy of the United States.[8] The model adopts an accounting framework through which the relationships between different inputs and outputs across industries and sectors are computed. This model can show the impact of a given economic decision – such as a factory opening or operating a sports

[8] The model uses 2021 input/output accounts.

facility – on a pre-defined, geographic region. It is based on the national income accounts generated by the US Department of Commerce, Bureau of Economic Analysis (BEA).[9]

Every economic impact analysis begins with a description of the industry being examined. In the case of the ABA model, the baking industry is defined as the production, importation/distribution and retailing of a wide range of products including breads, cakes, cookies, doughnuts, tortillas, crackers, prepared dough, pretzels, and other related items listed above in the definition of the baking industry. Restaurants are not included in the analysis even if some baking is done on premise.

The IMPLAN Group model is designed to run based on the input of specific direct economic factors. It uses a detailed methodology (see IMPLAN Methodology section) to generate estimates of the other direct impacts, tax impacts and supplier and induced impacts based on these entries. In the case of the American Baking Association Economic Impact Model, direct employment in the baking industry is a base starting point for the analysis. Direct employment is based on data provided to John Dunham & Associates by Data Axle as of March 2023, data directly from ABA, and United States census data. Data Axle data is recognized nationally as a premier source of micro industry data.

This data is gathered at the facility level; therefore, a company with a manufacturing plant, warehouse and sales office would have three facilities, each with separate employment counts. The primary sources of data are the American Bakers Association's member lists and data downloaded from Data Axle. After merging the datasets, multiple stages of cleaning were performed, focusing on removing duplicate records, removing defunct facilities and companies, and correcting inaccurate data where possible. Data is checked against company websites, social media accounts, review sites, news articles, and/or Google Maps location data. Employment estimates generally come from member lists and the Data Axle data; however, certain businesses were able to provide direct estimates, and in other cases employment could be determined through news articles. Where no data was available, employment is estimated by taking median job numbers for similar product manufacturers.

Once the initial direct employment figures have been established, they are entered into a model linked to the IMPLAN database.[10] The IMPLAN data are used to generate estimates of direct wages and output. Wages are derived from data from the U.S. Department of Labor's ES-202 reports that are used by IMPLAN to provide annual average wage and salary establishment counts, employment counts and payrolls at the county level. Since this data only covers payroll employees, it is modified to add information on independent workers, agricultural employees, construction workers, and certain government employees. Data are then adjusted to account for counties where non-disclosure rules apply. Wage data include not only cash wages, but health and life insurance payments, retirement payments and other non-cash compensation. It includes all income paid to workers by employers.

Total output is the value of production by industry in a given state. It is estimated by IMPLAN from sources similar to those used by the BEA in its RIMS II series. Where no Census or government surveys are

[9] RIMS II is a product developed by the U.S. Department of Commerce, Bureau of Economic Analysis as a policy and economic decision analysis tool. IMPLAN was originally developed by the US Forest Service, the Federal Emergency Management Agency and the Bureau of Land Management. It was converted to a user-friendly model by the Minnesota IMPLAN Group in 1993.

[10] IMPLAN® model, 2021 Data, using inputs provided by the user and IMPLAN Group LLC, IMPLAN System (2021), 16905 Northcross Dr., Suite 120, Huntersville, NC 28078, www.IMPLAN.com.

available, IMPLAN uses models such as the Bureau of Labor Statistics Growth model to estimate the missing output.

The model also includes information on income received by the federal, state, and local governments, and produces estimates for the following taxes at the federal level: corporate income, payroll, personal income, estate and gift, and excise taxes, customs duties; and fines, fees, etc. State and local tax revenues include estimates of: corporate profits, property, sales, severance, estate and gift and personal income taxes; licenses and fees and certain payroll taxes.

While IMPLAN is used to calculate the state level impacts, Data Axle data provide the basis for legislative district level estimates. Publicly available data at the county and congressional district level is limited by disclosure restrictions, especially for smaller sectors of the economy. Our model therefore uses actual physical location data provided by Data Axle in order to allocate jobs – and the resulting economic activity – by physical address or when that is not available, zip code. For zip codes entirely contained in a single congressional district, jobs are allocated based on the percentage of total sector jobs in each zip. For zips that are broken by congressional districts, allocations are based on the percentage of total jobs physically located in each segment of the zip. Physical locations are based on either actual address of the facility, or the zip code of the facility, with facilities placed randomly throughout the zip code area. All supplier and indirect jobs are allocated based on the percentage of a state's employment in that sector in each of the districts. Again, these percentages are based on Data Axle data.

Data on the retail and distribution sectors are all based on employment in each of the areas (grocery stores, baked goods distributors, etc.) obtained from Data Axle. In order to estimate total employment in each sector, the totals are multiplied by the share of baked goods and related product goods sales in each of the retail or distribution category where baked goods make up a sizable share of overall sales. The percentage of sales is derived from data maintained by the US Department of Commerce, Bureau of the Census.[11]

IMPLAN Methodology[12]

Francoise Quesnay one of the fathers of modern economics, first developed the analytical concept of inter-industry relationships in 1758. The concept was actualized into input-output analysis by Wassily Leontief during the Second World War, an accomplishment for which he received the 1973 Nobel Prize in Economics.

Input-Output analysis is an econometric technique used to examine the relationships within an economy. It captures all monetary market transactions for consumption in a given period and for a specific geography. The IMPLAN model uses data from many different sources – as published government data series, unpublished data, sets of relationships, ratios, or as estimates. The Minnesota IMPLAN group gathers this data, converts it into a consistent format, and estimates the missing components.

There are three different levels of data generally available in the United States: federal, state and county. Most of the detailed data is available at the county level, and as such there are many issues with disclosure, especially in the case of smaller industries. IMPLAN overcomes these disclosure problems by combining

[11] U.S. Census Bureau, 2017 Economic Census, "All Sectors: Industry by Products for the U.S. and States: 2017," data accessed January 2021. Available online at: https://data.census.gov/cedsci/table?q=ECNNAPCSIND2017.EC1700NAPCSINDPRD&n=42&tid=ECNNAPCSIND2017.EC1700NAPCSINDPRD&hidePreview=true

[12] This section is paraphrased from IMPLAN Professional: Users Guide, Analysis Guide, Data Guide, Version 2.0, MIG, Inc., June 2000.

a large number of datasets and by estimating those variables that are not found from any of them. The data is then converted into national input-output matrices (Use, Make, By-products, Absorption and Market Shares) as well as national tables for deflators, regional purchase coefficients and margins.

The IMPLAN Make matrix represents the production of commodities by industry. The Bureau of Economic Analysis (BEA) Benchmark I/O Study of the US Make Table forms the bases of the IMPLAN model. The Benchmark Make Table is updated to current year prices, and rearranged into the IMPLAN sector format. The IMPLAN Use matrix is based on estimates of final demand, value-added by sector and total industry and commodity output data as provided by government statistics or estimated by IMPLAN. The BEA Benchmark Use Table is then bridged to the IMPLAN sectors. Once the re-sectoring is complete, the Use Tables can be updated based on the other data and model calculations of interstate and international trade.

In the IMPLAN model, as with any input-output framework, all expenditures are in terms of producer prices. This allocates all expenditures to the industries that produce goods and services. As a result, all data not received in producer prices is converted using margins which are derived from the BEA Input-Output model. Margins represent the difference between producer and consumer prices. As such, the margins for any good add to one. If, for example, 10 percent of the consumer price of cakes is from the purchase of flour, then the flour margin would be 0.1.

Deflators, which account for relative price changes during different time periods, are derived from the Bureau of Labor Statistics (BLS) Growth Model. The 224 sector BLS model is mapped to the 546 sectors of the IMPLAN model. Where data are missing, deflators from BEA's Survey of Current Businesses are used.

Finally, one of the most important parts of the IMPLAN model, the Regional Purchase Coefficients (RPCs) must be derived. IMPLAN is derived from a national model, which represents the "average" condition for a particular industry. Since national production functions do not necessarily represent particular regional differences, adjustments need to be made. Regional trade flows are estimated based on the Multi-Regional Input-Output Accounts, a cross-sectional database with consistent cross interstate trade flows developed in 1977. These data are updated and bridged to the 546 sector IMPLAN model.

Once the databases and matrices are created, they go through an extensive validation process. IMPLAN builds separate state and county models and evaluates them, checking to ensure that no ratios are outside of recognized bounds. The final datasets and matrices are not released before extensive testing takes place.