The Baking Industry 2016 Economic Impact Study

Methodology and Documentation

Prepared for

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American Bakers Association
The Voice of the Baking Industry Since 1897

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The Economic Impact of the Baking Industry: 2016

Executive Summary

The American Bakers Association Economic Impact Study estimates the economic contributions made by the baking industry to the U.S. economy in 2016. 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 Dun & Bradstreet, Inc (D&B, Inc).

The study defines the baking industry as those firms involved in the production, importation/wholesaling, and retailing of baked goods including breads, cakes, pastries, cookies, crackers and tortillas. Pre-prepared dough and pasta 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, the value added, 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 $423.05 billion in total economic output or roughly 2.28 percent of GDP.[1] Bakers, product wholesalers and retailers directly or indirectly employed approximately 2.17 million Americans in 2016. These workers earned over $123.22 billion in wages and benefits. Members of the industry and their employees paid $53.48 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, importation/wholesaling, and retailing of baked goods and prepared dough, on the entire economy of the United States. The industry contributes about $423.05 billion in economic output or 2.28 percent of GDP and, through its production and distribution linkages, impacts firms in all

[1] Based on GDP of $18,555.37 billion. See: *Table 3. Current-Dollar Gross Domestic Product (GDP) by State, 2015:I-2016:I*, Gross Domestic Product by State, US Department of Commerce, Bureau of Economic Analysis, February 6, 2017.

536 sectors of the US economy.[2] Baking is defined by this study to include a wide range of products including: Breads, cakes, cookies, doughnuts, tortillas, crackers, prepared dough, pasta, and pretzels.[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. 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. 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 217,317 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 wholesalers distribute baked goods across the US that are produced here and import specialty baked products produced abroad.[4] We estimate that there are roughly 54,800 firms involved in the importation and distribution of baked goods throughout the country.[5] The wholesaling segment of the industry includes bakery wholesalers, and those employees whose jobs can be attributed to the sale of baked goods at other wholesalers that sell baked goods (e.g. grocery wholesalers). All told, approximately 276,442 individuals are employed as a direct result of the wholesaling 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 and food stores, and bakery outlets. 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.[6] Only the percentage of employees involved in baked goods sales are included. We estimate that there are 305,790 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, butter and fruits and nuts used in the production process, 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 625,490 supplier jobs. These firms generate about $146.55 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,[7] daily

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2 Economic sectors are based on IMPLAN sectors.

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 Based directly on data provided to John Dunham & Associates by Dun & Bradstreet, Inc. as of March 2016.

5 Physical locations.

6 There will be some ambiguity as to whether retail bakers (for example a Main Street bakery in a small town that produces breads and cakes) should be considered a retailer or a manufacturer. Companies are allowed to report multiple industries in the raw data used in this analysis. In the case of bakeries, the primary industry code is used to determine whether the company is considered a manufacturer or a retailer. Many other retail firms including variety stores, gas stations, newsstands and bookstores that sell some baked products; however, the percentage of sales from baked goods is too low to be reported by the Bureau of Labor Statistics.

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. We estimate that the induced impact of the industry is nearly $123.42 billion, and generates 740,465 jobs, for a multiplier of 0.81.[8]

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 $53.48 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
Output	$153,085,779,700	$146,545,294,400	$123,422,847,600	$423,053,921,700
Jobs	799,549	625,490	740,465	2,165,504
Wages	$44,011,429,300	$40,890,065,700	$38,320,903,500	$123,222,398,500
Taxes				$53,484,181,800

Output Model

John Dunham & Associates, Inc. produced the 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.

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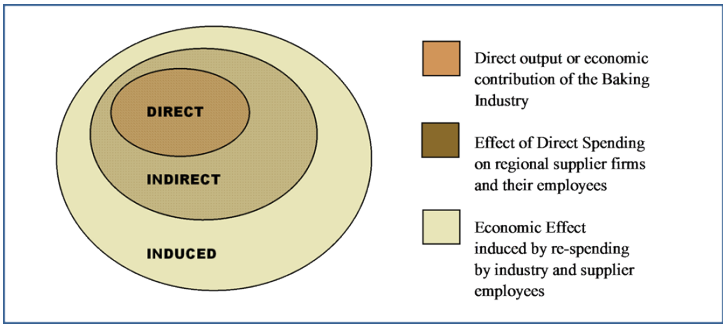
7 These firms would more appropriately be considered as part of the supplier firms' industries.

8 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, wholesaling/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 a doughnuts for example, from blending and kneading dough, to frying, 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 on the prior page 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 D&B, Inc., 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.[9] 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 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).[10]

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9 The model uses 2014 input/output accounts.

10 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

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/wholesaling and retailing of a wide range of products including: breads, cakes, cookies, doughnuts, tortillas, crackers, prepared dough, pasta, and pretzels. 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 directly on data provided to John Dunham & Associates by D&B, Inc. as of March 2016, data directly from ABA, and United States census data. D&B, Inc. data is recognized nationally as a premier source of micro industry data. Their database contains information on over 15 million businesses in the United States.[11] It is used extensively for credit reporting, and according to the vendor, encompasses about 98 percent of all business enterprises in the country. 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. Since the D&B, Inc. data are adjusted on a continual basis, staff from John Dunham & Associates scanned the data for discrepancies.

Once the initial direct employment figures have been established, they are entered into a model linked to the IMPLAN database. 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 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, D&B, Inc. data provide the basis for congressional 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

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IMPLAN Group in 1993.

[11] The D&B, Inc. information database updates over 1 million times a day, over 350 million payment experiences are processed annually, and over 110 million phone calls are made to businesses. In addition, D&B, Inc. uses a patented matching technology and over 2,000 information computer validations to ensure a high standard of data quality.

therefore uses actual physical location data provided by D&B, Inc. 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 D&B, Inc. data.

Data on the retail and wholesale sectors are all based on employment in each of the retail and wholesale areas (grocery and food stores, bakery outlets, retail bakeries, baked goods wholesalers, etc.) obtained from D&B, Inc. 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 store categories 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.[12]

IMPLAN Methodology[13]

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 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

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12 See: 2012 Economic Census, *Retail Trade: Subject Series - Product Lines: Product Lines Statistics by Industry for the U.S. and States: 2012*, January 26, 2016, US Department of Commerce, Bureau of the Census, at: https://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t

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

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 536 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 536 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.