2023 Economic Impact of the Dietary Supplement Industry

Methodology and Documentation

Prepared for

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Executive Summary

The *2023 Economic Impact of the Dietary Supplement Industry* measures the combined impact of the manufacturing, retail, wholesale, ingredient suppliers, and direct-selling industries (hereafter dietary supplement industry) to the U.S. economy in 2023. John Dunham & Associates (JDA) conducted this research, which was funded by the Council for Responsible Nutrition (CRN). This work uses standard econometric models first developed by the U.S. Forest Service, and now maintained by IMPLAN.[1] Data comes from industry sources, government publications, and Data Axle.

The industry is defined to include not only the production of dietary supplement products, but dietary supplement wholesaling and retailing. The production process, as defined in this study, begins with ingredients (i.e., fish oils, herbs, minerals, and botanicals) being purchased by manufacturers from suppliers. Ingredients are then extracted, blended, formulated, and packaged by the manufacturer.

Once dietary supplements have been produced, they enter the second tier of the industry – the wholesaling tier. Wholesalers engage in the transportation of dietary supplements from either the producers, or from a bonded warehouse operated by importers, and the storage of products for a limited period of time.

The third tier of the industry is retailing, either through brick-and-mortar sales, as in the case of a grocery store or pharmacy, or sales from direct sales companies, such as Amway and Nu Skin.[2]

Industries become linked to each other when one industry buys from another to produce its own products. Each industry in turn makes purchases from a new mix of other industries, and so on. Employees in all industries extend the economic impact by spending their earnings. Thus, economic activity started by the dietary supplement 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" of the re-spending by employees of industry and supplier firms, is calculated using an input/output model of the United States. The study calculates the impact on a national, state, and congressional district basis.

The study also estimates taxes paid by the industry and its employees, as well as consumer sales taxes generated by the sale of dietary supplement products. 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, with manufacturers, wholesalers, and retailers each making substantial payments. Direct retail taxes include state and local sales taxes, license fees, and applicable gross receipt taxes. Manufacturers, wholesalers, and retailers pay 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.

While the firms in the dietary supplement industry, and the individuals either directly or indirectly employed by it pay the taxes outlined above, these figures do not include sales taxes that are collected form dietary supplement consumers when they purchase these products. These would be state and local sales and use taxes. There are currently as many as 11,000 separate jurisdictions that levy sales taxes in

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1 IMPLAN® model, 2021 Data, using inputs provided by the user and IMPLAN Group LLC, IMPLAN System (2023), 16905 Northcross Dr., Suite 120, Huntersville, NC 28078, www.IMPLAN.com

2 The 64,554 total US job numbers for direct sellers in this study are full-time equivalent positions. Part-time direct sellers were not included. Job numbers were calculated from the Direct Sellers Association's *2015 Growth and Outlook Report.* Accessed April 4, 2023. Available at: *http://www.dsa.org/docs/default-source/research/2015-growth-and-outlook-report-with-cross-tabs-final.pdf*

the United States, each with their own rates and rules as to what is taxed.[3] Since it is impossible to determine exactly where dietary supplements are sold, and therefore, which local jurisdictions would impose taxes, only state level sales taxes are calculated in this model. Based on the total dollar sales of supplements at the state level, the total amount of sales taxes collected in 2023 are estimated to be nearly $2.7 billion.

The dietary supplement industry is a dynamic part of the U.S. economy, accounting for about **$158.6 billion in total economic output,** or roughly 0.57 percent of GDP.[4] Dietary supplement manufacturers, ingredient suppliers, wholesalers, direct sellers, and retailers directly employed 266,342 Americans in 2023. These workers earned over $19.0 billion in wages and benefits. When supplier and induced impacts are taken into account, the dietary supplement industry is responsible for 616,762 jobs in the United States and $44.8 billion in wages, as well as $17.4 billion in Federal, state, and local taxes - not including state and local sales taxes imposed on dietary supplements.

Summary Results

The *2023 Economic Impact of the Dietary Supplement Industry* measures the economic impact of dietary supplements in the United States. The industry is defined to include ingredient suppliers, manufacturers, direct sellers, plus wholesalers and retailers. The industry contributes about $158.6 billion in total to the U.S. Economy, or 0.57 percent of GDP and, through its production and distribution linkages, impacts firms in 532 out of the 546 sectors of the US economy.[5]

Table 1 – Economic Contribution of the Dietary Supplement Industry

	Direct	Supplier	Induced	Total
Jobs (FTE)	266,342	135,834	214,586	616,762
Wages	$19,015,805,800	$11,751,533,300	$14,081,410,000	$44,848,749,100
Economic Impact	$74,244,957,000	$39,484,595,100	$44,889,201,600	$158,618,753,700
Business Taxes				$17,418,150,100
Sales Taxes				$2,670,875,300

The production process begins with ingredients being purchased by manufacturers from suppliers.[6] Ingredients are then extracted, blended, formulated, and packaged by the manufacturer. A total of 953 firms comprise the manufacturing component of the dietary supplement industry; combined with the ingredient suppliers, the production sector employs approximately 76,221 people.[7]

Once dietary supplements have been produced or imported, they enter the second tier of the industry – the wholesaling tier. Wholesalers transport dietary supplements from the producer, or a bonded warehouse operated by an importer, and may store the products for a limited period of time. The dietary supplement industry is directly responsible for approximately 8,974 jobs in the wholesaling sector.

Finally, the third tier of the industry directly sells products to the consumer. For our analysis, the retail tier is assumed to consist of firms in the following industries: supermarkets, nutrition stores, health food

[3] Fritts, Janelle, "How Many Sales Tax Jurisdictions Does Your State Have?" *Tax Foundation*, October 14, 2020, at: https://taxfoundation.org/data/all/state/state-sales-tax-jurisdictions-in-the-us-2020/

[4] Based on 2023 Q3 GDP of $27.6 trillion. See: "Gross Domestic Product (Third Estimate), Corporate Profits (Revised Estimate), and GDP by Industry, Third Quarter 2023" *Bureau of Economic Analysis.* December 21,2023. Available at: https://www.bea.gov/news/2023/gross-domestic-product-third-estimate-corporate-profits-revised-estimate-and-gdp

[5] Economic sectors based on IMPLAN sectors.

[6] Direct economic impact, located in Table 1, includes the output from ingredient suppliers. Output from ingredient suppliers amounts to about $9.4 billion, thus making total output from manufacturing, wholesaling, and retailing $74.2 billion.

[7] Throughout this study, the term "firms" actually refers to physical locations. One company, for example, may have facilities in dozens of locations throughout the country. Each of these facilities is included in the #N/A count.

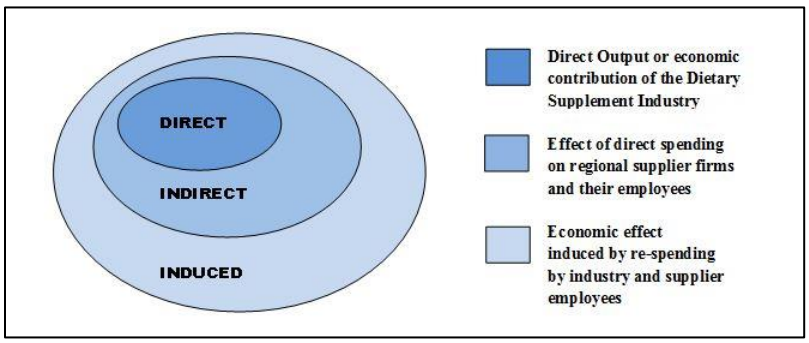
markets, mail-order catalogues, websites, direct-sellers, pharmacies, warehouse stores, and other miscellaneous retail stores. The dietary supplement industry is directly responsible for approximately 181,147 jobs in the retailing sector.

Other firms are also related to the dietary supplement industry. These supplier firms produce and sell a broad range of items including machinery, tools, parts, and other materials needed to produce dietary supplements. In addition, supplier firms can provide a broad range of services, including personnel, financial, advertising, consulting, and transportation. Finally, a number of people are employed in government enterprises responsible for the regulation of the dietary supplement industry. All told, we estimate that the dietary supplement industry is responsible for 135,834 supplier jobs. Supplier firms generate about $39.5 billion in economic activity.[8]

An economic analysis of the dietary supplement industry will also take additional linkages into account. While it is inappropriate to claim that suppliers to the industry's supplier firms are part of the industry being analyzed,[9] the spending by employees of the industry, and that of supplier firms whose jobs are directly dependent on the dietary supplement industry, should be included. This spending, on everything from housing, to food, to education and medical care, makes up what is traditionally called the "induced impact," or multiplier effect, of the dietary supplement industry. In other words, this spending, and the jobs it creates, is induced by the manufacturing and distribution of dietary supplements. We estimate that the induced impact of the industry generates 214,586 jobs and $44.9 billion in economic impact, for a multiplier of 0.60.[10]

An important part of an impact analysis is the calculation of the contribution of the industry to the public finances of the country. In the case of the dietary supplement industry, the direct taxes paid by firms and their employees provide $17.4 billion in revenue to the Federal, state, and local governments. On top of this, consumers of dietary supplements paid about $2.7 billion in state sales taxes.

Economic Impact Modeling – Summary



The economic impact study begins with an accounting of direct employment in the domestic manufacturing, wholesaling, retailing, ingredient supplying, and direct selling of dietary supplements. The data comes 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, a single economic activity leads to a

8 Zip code level employment data are supplied by Data Axle, the leading provider of business and consumer data for the top search engines and leading in-car navigation systems in North America. Data Axle gathers data from a variety of sources, by sourcing, refining, matching, appending, filtering, and delivering the best quality data. This data is then verified at a rate of almost 100,000 phone calls per day to ensure absolute accuracy.

9 These firms would more appropriately be considered as part of the supplier firm's industries.

10 Often economic impact studies present results with very large multipliers – as high as 4 or 5. These studies invariably include the firms supplying the induced 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 only to the effect of spending by direct and supplier employees.

ripple effect wherein 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 manufacture, distribute, and sell dietary supplements generate direct effects on the economy. Supplier impacts occur when these activities require purchases of goods and services such as machinery or electricity from local or regional supplier firms. Regional, or supplier, impacts occur when these activities require purchases of goods and services such as display shelves, or gasoline from local or regional suppliers. Additionally, induced impacts occur when workers involved in direct and supplier activities spend their wages in the region. The ratio between total 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 CRN model, only the most conservative estimate of the Induced Impact has been used.

Model Description and Data

This economic impact analysis was developed by JDA based on data provided by the Council for Responsible Nutrition, the Direct Selling Association, Data Axle, and Federal and state governments. The analysis utilizes the IMPLAN model in order to quantify the economic impact of the dietary supplement industry on the economy of the United States. [11] 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).[12]

Every economic impact analysis begins with a description of the industry being examined. In the case of the CRN model, the dietary supplement industry is defined as manufacturing, retail, wholesale, ingredient suppliers, and direct sellers. This will incorporate firms in the following economic sectors:

- Manufacturing employment is based on data provided by Data Axle, CRN, and a survey of CRN member companies. All told, there were 953 locations identified. Ingredient suppliers are pulled from the IMPLAN generated supplier impacts of the manufacturing industry. See the IMPLAN model and description section below.
- Wholesaling includes firms involved in the distribution and storage of dietary supplements after they leave control of the manufacturer. Exporters and importers are included in this sector as well.
- Retailing includes establishments such supermarkets, nutrition stores, health food markets, mail-order catalogues, websites, direct-sellers, pharmacies, warehouse stores, and other miscellaneous retail stores. Model limitations preclude the inclusion of military stores, colleges, or other government owned outlets as part of the retail sector.

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

[12] 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.

- ❖ Direct sellers are private citizens engaged in the direct to customer sales of dietary supplements to others as part of a multi-level-marketing franchise. Only individuals involved full-time in the marketing and sale of dietary supplements are included.

The IMPLAN model is designed to run based on the input of specific direct economic factors. It uses a detailed methodology[13] to generate estimates of the other direct impacts, tax impacts, supplier and induced impacts based on these entries. In the case of the CRN model, direct employment in the dietary supplement industry, as described above, is a base starting point for the analysis.

In the case of the manufacturing sector, direct employment is based on data provided to John Dunham & Associates by Data Axle as of July 2023, and from industry data provided by CRN and their members. Data Axle data are recognized nationally as a premier source of micro industry data. Data Axle is the leading provider of business and consumer data for the top search engines and leading in-car navigation systems in North America. Data Axle gathers data from a variety of sources, by sourcing, refining, matching, appending, filtering, and delivering the best quality data. This data is then verified at a rate of almost 100,000 phone calls per day to ensure absolute accuracy. 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 Data Axle data are adjusted on a continual basis, staff from John Dunham & Associates scanned the data for discrepancies. In addition, for cases where employment data for CRN member firms were available, Data Axle employment figures were replaced with those from the CRN.

Retail and wholesale employment data is particularly hard to find as only the percentage of a retailer's operations due to the sale of dietary supplements should be included. For example, if a grocery store sells $1,000 worth of products in total, and $100 of that is from supplements, then 10 percent of store employment should be allocated to the supplement sector. Data on the retail and wholesale sectors are all based on employment by NAICS code provided by Data Axle. In order to estimate total employment in each sector, the totals are multiplied by the share of dietary supplement sales in each of the aforementioned retail categories. The percentage of sales is derived from data maintained by the US Department of Commerce, Bureau of the Census.[14]

Limited data on the direct sale of dietary supplements through multi-level-marketing (MSM) franchises are available from the Direct Selling Association (DSA).[15] The DSA provides data on the number of individuals signed up for MSM franchises, as well as total sales by state. DSA also estimates the number of individuals operating these franchises as a business, as well as a limited breakdown of sales nationally.

Using these data as a starting point and supplementing them with data on registered MSM businesses gathered from Data Axle, JDA starts with number of individuals by state, and reallocates them based on the percentages from Data Axle.[16] According to the DSA, just 6.7 million of the direct sellers worked to build businesses. Using this as a starting point, the data are multiplied by the share of sales that are dietary supplements.[17] This provides an estimate of total MSM jobs resulting from the sale of dietary supplements. This amounted to a total of 865,079 individuals. Using data from the Bureau of Labor Statistics, the full-time share of employment in the NAICS code is then applied to the total number of

[13] See IMPLAN Methodology Section.

[14] See: 2017 Economic Census, *Retail Trade: All Sectors: Industry by Products for the U.S and States: 2017,* US Department of Commerce, Bureau of the Census, at: https://www.census.gov/data/tables/2017/econ/economic-census/naics-sector-44-45.html

[15] See: https://www.dsa.org/statistics-insights/factsheets

[16] Percentages generally mirror the DSA data, with the largest difference being 4.5 percentage points in Vermont.

[17] This data point is not available from DSA in 2023. The same ratio between wellness products and nutritional supplements that was used in 2018 is applied to the newest data, resulting in 12.9 percent of sales being supplements. This is up from 11.2 percent in 2028.

individuals, resulting in 64,552 full-time individuals involved in MSM who were considered to be *in business* selling dietary supplements.

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, 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 congressional district level estimates. Publicly available data at the district level is limited by disclosure restrictions, especially for smaller sectors of the economy. The CRN 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, for example, jobs are allocated based on the percentage of total sector jobs in each zip code. For zip codes that are broken by congressional districts, allocations are based on the percentage of total jobs physically located in each segment of the zip code. Physical locations are based on either the actual address of the facility, or the zip code of the facility, with facilities placed randomly throughout the zip code area. Supplier 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.

IMPLAN Methodology[18]

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. IMPLAN, Inc. gathers these data, converts them into a consistent format, and estimates the missing components.

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

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 in 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 a supplement is from the purchase of flavorings, then the flavorings 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 BLS model is mapped to the 544 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 544 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.