The Tobacco Industry
Economic Impact Study

Methodology and Documentation
Prepared for:

REYNOLDS
A BETTER TOMORROW

Reynolds American, Inc.

By

John Dunham & Associates

July 13, 2022

The Tobacco Industry Economic Impact Study
Methodology and Documentation

The 2022 Tobacco Industry Economic Impact Study consists of four separate analyses that together document the overall economic contributions made by the tobacco industry (which includes combustible cigarettes, moist snuff, cigars, other tobacco products and non-combustible cigarettes) to the U.S. economy in 2022.

The four individual studies are:

A) The overall impact of the tobacco industry, including the production, wholesaling, and retailing of all tobacco products, including vapor products and other alternative nicotine products, on the US economy.

B) The overall impact of cigarette production, wholesaling and retailing on the US economy.

C) The overall impact of menthol cigarette production, wholesaling and retailing on the US economy.

D) The overall impact of the production, wholesaling and retailing of "flavored" tobacco products, including artificially flavored cigars, hookah tobacco, moist snuff, vapor products, and other alternative nicotine products on the US economy.

The following is a methodology of the overall industry model. It is built using a 2022 data set, and 2020 IMPLAN input-output tables. Retail and wholesale impacts are based on volumes sold in 2021, as are the tax impacts.

Prices are kept consistent across product categories in each of the four models. In other words, menthol cigarettes are priced on average the same as non-menthol products, and flavored vapor liquids and priced like those that are "tobacco flavored." While it is likely that there are cases where flavored and non-flavored products are priced differently (this is particularly likely in the case of premium large cigars), the data available did not allow for differentiation in the models.

The sources for flavor shares are documented in each model's methodology, and a final appendix contains information on the IMPLAN model methodology, which is consistent across all four models.

Any errors in the models, or reporting, are the sole responsibility of John Dunham & Associates.

The 2022 Tobacco Industry Economic Impact Study

Executive Summary:

The 2022 Tobacco Industry Economic Impact Study estimates the economic contributions made by the tobacco industry (including combustible cigarettes, moist snuff, cigars, other tobacco products and non-combustible cigarettes) to the U.S. economy in 2022. John Dunham & Associates conducted this research, which was funded by Reynolds American Inc. This work used standard econometric models first developed by the U.S. Forest Service, and now maintained by IMPLAN Inc. Data came from industry sources, government publications and Data Axle.[1]

The study measures the number of jobs in the tobacco industry, the wages paid to employees, the value added and total output. In addition, it measures the economic impact of the suppliers that support the tobacco industry, as well as those industries supported by the induced spending of direct and supplier industries.

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 tobacco industry generates output (and jobs) in hundreds of other industries, often in 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 basis, by state, by congressional district, and by state legislative districts.

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. 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.

The tobacco industry is a dynamic part of the U.S. economy, accounting for about $319.52 billion in output or about 1.31 percent of GDP.[2] It employs approximately 1,110,254 Americans who earn wages and benefits of about $72.19 billion.

Members of the industry and their employees paid $46.93 billion in federal, state, and local taxes. This does not include state and local sales taxes or excise taxes that may apply for specific retail purchases which are estimated to total $40.45 billion.

[1] 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. Data Axle verifies its data at the rate of almost 100,000 phone calls per day to ensure absolute accuracy.

[2] Based on Gross Domestic Product of $24.386 trillion for the first quarter of 2022. Available from the Bureau of Economic Analysis at: https://apps.bea.gov/national/xls/gdplev.xlsx

Summary Results

The tobacco industry (as defined in this study) includes manufacturers of combustible cigarettes, moist snuff, cigars, other tobacco products and non-combustible cigarettes, vaping products, wholesalers, and retailers that sell tobacco products such as convenience stores, supermarkets, gasoline stations, pharmacies and drug stores, warehouse clubs and supercenters, and discount tobacco stores. The tobacco industry reaches into all corners of the United States, employing 368,347 and generating $20.49 billion in wages. Tobacco businesses directly generate $155.16 billion in economic activity nationally.

Table 1 – Economic Contribution of the Tobacco Industry

	Direct	Indirect	Induced	Total
Jobs	368,347	382,424	359,483	1,110,254
Wages	$20,493,715,200	$29,419,518,200	$22,279,839,900	$72,193,073,300
Economic Impact	$155,160,862,700	$97,379,601,800	$66,983,409,600	$319,523,874,100
State and Local Taxes				$56,990,533,200
Federal Taxes				$30,394,704,600

To put the direct impact of the tobacco industry in context, it is almost the same size as the warehousing and storage industry in the United States and has a larger economic output than US hotel and motel industry. Furthermore, the tobacco industry directly employs more workers than the entirety of the bread and bakery product manufacturing industry.[3]

Other firms are related to the tobacco industry as suppliers. These firms produce and sell a broad range of items including paper, acetate, tobacco, and all of the merchandise needed to maintain tobacco businesses. In addition, supplier firms provide a broad range of services, including personnel services, financial services, advertising services, consulting services or transportation services. Finally, a significant number of people are employed in government enterprises responsible for the regulation of the industry. All told, the industry is responsible for 382,424 supplier jobs. These firms generate about $97.38 billion in economic activity.[4]

An economic analysis of the tobacco industry will also take additional linkages into account. While it is inappropriate to claim that suppliers to the industry's indirect firms are part of the industry being analyzed,[5] the spending by employees of the industry, and that of indirect firms whose jobs are directly dependent on the tobacco 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 tobacco industry. For 2022, the induced impact of the industry generates 359,483 jobs and $66.98 billion in economic impact, for a multiplier of 0.43.[6]

[3] Based on comparisons of economic output from the 2020 IMPLAN tables.

[4] Throughout this study, the term "firms" refers to physical locations. One manufacturer, for example, may have facilities in 5 or 6 locations throughout the country.

[5] These firms would more appropriately be considered as part of the indirect firm's industries.

[6] Often economic impact studies present results with exceptionally 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 indirect employees.

Table 1 presents a summary of the total economic impact of the tobacco industry in the United States. Summary tables for the United States, individual states, congressional districts, and state legislative districts are included in the output model, which is discussed in the following section.

Another 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 tobacco industry, the taxes paid by firms and their employees provide $19.47 billion to the Federal government and $27.46 billion to state and local governments including income taxes, property taxes, profits taxes, etc. In addition to these taxes, the tobacco industry also contributes $40.45 billion in federal, state and local sales and excise taxes that are paid by consumers when they purchase tobacco products. (See Table 2)

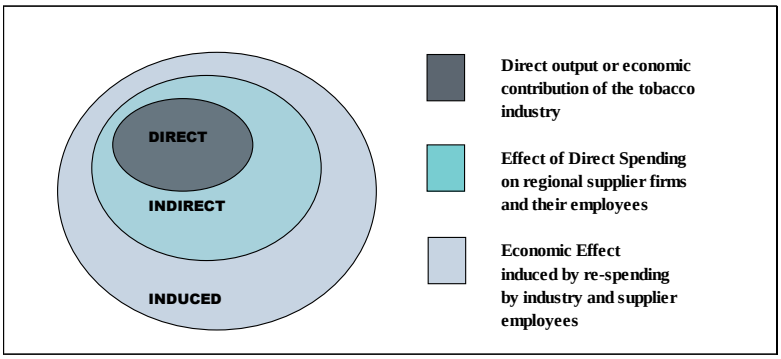
Table 2 – Fiscal Contribution of the Tobacco Industry

Tax Type	Federal	State/Local	Total
Individual Income	$5,989,434,600	$1,674,364,000	$7,663,798,600
Social Security/Social Insurance	$7,986,672,400	$111,586,100	$8,098,258,500
Property		$10,885,239,800	$10,885,239,800
Business/Employee Paid Sales Taxes		$11,900,202,700	$11,900,202,700
Corporate Income	$2,228,449,500	$821,053,400	$3,049,502,900
Other Personal and Business Taxes	$3,265,948,900	$2,070,474,700	$5,336,423,600
Federal Excise Taxes	$10,924,199,400		$10,924,199,400
State Excise Taxes		$20,059,493,200	$20,059,493,200
State Sales Taxes		$8,086,134,500	$8,086,134,500
Other Taxes		$1,381,984,900	$1,381,984,900
Total	**$30,394,704,800**	**$56,990,533,300**	**$87,385,238,100**

Economic Impact Modeling – Summary

The economic impact study begins with an accounting of the direct employment in the tobacco industry. 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, 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 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. Activities related to tobacco represent the direct effects on the economy. Indirect impacts occur when these activities require purchases of goods and services such as advertising services or merchandising material from local or regional indirect firms. Additional induced impacts occur when workers involved in direct and indirect activities spend their wages. The ratio between induced output and direct output is termed the multiplier.



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.

Once the direct impact of the industry has been calculated, the input-output methodology discussed below is used to calculate the contribution of the indirect sector and of the re-spending in the economy by employees in the industry and its indirect firms. This induced impact is the most controversial part of economic impact studies and is often quite inflated. In the case of the tobacco 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 Reynolds American Inc., Data Axle, The Tax Burden on Tobacco 2021, the Food and Drug Administration, Centers for Disease Control and Prevention (CDC), and Federal and state governments. The analysis utilizes the IMPLAN model to quantify the economic impact of the tobacco industry on the economy of the United States, as well as individual states, congressional districts, and state legislative districts.[7] 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).[8]

Table 3 – Direct Manufacturing Jobs by Product Category

Product Category	Direct Jobs	% of Total Manufacturing Jobs
Menthol Cigarette Jobs	5,115	16.93%
Non-Menthol Cigarette Jobs	9,033	29.89%
Moist Snuff (MST) Jobs	4,062	13.44%
Other Tobacco Products Jobs	5254	17.39%
E-liquid Jobs	3,743	12.39%
Vape Component Jobs	3,013	9.97%
Total	**30,220**	**100.00%**

[7] The model uses 2020 input/output accounts.

[8] The IMPLAN model is based on a series of national input-output accounts known as RIMS II. These data are developed and maintained by the U.S. Department of Commerce, Bureau of Economic Analysis as a policy and economic decision analysis tool.

Every economic impact analysis begins with a description of the industry being examined. In the case of the tobacco industry, it is defined as manufacturing, distribution and retailing of tobacco products. These are further broken out by product type (Table 3)

This will incorporate firms in the following economic sectors:

- Manufacturers: Combustible cigarettes, moist snuff, cigars, other tobacco products and/or non-combustible cigarettes, which includes products commonly referred to as "vaping" products in the United States. Rolling papers and hookah tobacco are included in this study while tobacco pipes of any kind are not.

- Wholesalers: Includes firms involved in the distribution and storage of tobacco products.

- Retailers: Includes firms involved in the sale of tobacco and vape products. This sector includes retail establishments (e.g., grocery stores, convenience stores, gas stations, tobacco stores, etc.)

The IMPLAN 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 indirect and induced impacts based on these entries. In the case of the tobacco model, direct employment in the tobacco industry is a starting point for the analysis. Direct employment is based on data provided to John Dunham & Associates by Reynolds American Inc., Data Axle and the Centers for Disease Control and Prevention as of January 2022. 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. Data Axle verifies its data at the rate of almost 100,000 phone calls per day to ensure absolute accuracy.

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 the data only cover payroll employees, they are 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 like 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, 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 legislative district level is limited by disclosure restrictions, especially for smaller sectors of the economy. This model therefore uses actual physical location data provided by Data Axle to allocate jobs – and the resulting economic activity – by physical address or when that is not available, zip code. For zips 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.

Appendix
IMPLAN Methodology[1]

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 diverse 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 distinct levels of data generally available in the United States: Federal, state and county. Most of the detailed data are available at the county level, but 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 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.

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, the Regional Purchase Coefficients (RPCs) – essential to the IMPLAN model – 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 regional differences, adjustments need to be made. Regional trade flows are estimated based on

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

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 until extensive testing takes place.

The Cigarette Industry Economic Impact Study

Methodology and Documentation Prepared for:

REYNOLDS
A BETTER TOMORROW

Reynolds American, Inc.

By

John Dunham & Associates

July 13, 2022

The 2022 Cigarette Industry Economic Impact Study

Executive Summary:

The 2022 Cigarette Industry Economic Impact Study estimates the economic contributions made by the cigarette industry, to the U.S. economy in 2022. John Dunham & Associates conducted this research, which was funded by Reynolds American Inc. This work used standard econometric models first developed by the U.S. Forest Service, and now maintained by IMPLAN Inc. Data came from industry sources, government publications and Data Axle.[2]

The study measures the number of jobs in the cigarette industry, the wages paid to employees, the value added and total output. In addition, it measures the economic impact of the suppliers that support the cigarette industry, as well as those industries supported by the induced spending of direct and supplier industries.

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 cigarette industry generates output (and jobs) in hundreds of other industries, often in 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 basis, by state, by congressional district, and by state legislative districts.

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. 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.

The cigarette industry is a dynamic part of the U.S. economy, accounting for about $192.37 billion in output or about 0.79 percent of GDP.[3] It employs approximately 686,289 Americans who earned wages and benefits of about $44.20 billion.

Members of the industry and their employees paid $28.70 billion in federal, state, and local taxes. This does not include state and local sales taxes or excise taxes that may apply for specific retail purchases which are estimated to total $33.83 billion.

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[2] 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. Data Axle verifies its data at the rate of almost 100,000 phone calls per day to ensure absolute accuracy.

[3] Based on Gross Domestic Product of $24.386 trillion for the first quarter of 2022. Available from the Bureau of Economic Analysis at: https://apps.bea.gov/national/xls/gdplev.xlsx

Summary Results

The cigarette industry (as defined in this study) includes manufacturers of cigarettes, wholesalers, and retailers that sell products such as: Convenience stores, supermarkets, gasoline stations, pharmacies and drug stores, warehouse clubs and supercenters, and discount stores. The industry reaches into all corners of the United States, employing 234,054 and generating $12.88 billion in wages. businesses directly generate $94.11 billion in economic activity nationally.

Table 1 – Economic Contribution of the Cigarette Industry

	Direct	Indirect	Induced	Total
Jobs	234,054	232,029	220,206	686,289
Wages	$12,876,602,300	$17,676,243,900	$13,647,125,300	$44,199,971,500
Economic Impact	$94,105,006,400	$57,261,804,100	$41,002,443,500	$192,369,254,000
State and Local Taxes				$40,517,654,300
Federal Taxes				$22,013,189,600

To put the direct impact of the cigarette industry in context, it is about the same size as the entire electronic computer manufacturing industry in the United States and has a larger economic output than the iron and steel mills and ferroalloy manufacturing industry in the country. Furthermore, the cigarette industry directly employs more workers than all of aircraft manufacturing industry.[4]

Other firms are related to the industry as suppliers. These firms produce and sell a broad range of items including paper, acetate, menthol, and all the merchandise needed to maintain tobacco businesses. 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 industry. All told, the industry is responsible for 232,029 supplier jobs. These firms generate about $57.26 billion in economic activity.[5]

An economic analysis of the cigarette industry will also take additional linkages into account. While it is inappropriate to claim that suppliers to the industry's indirect firms are part of the industry being analyzed,[6] the spending by employees of the industry, and that of indirect firms whose jobs are directly dependent on the 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 industry. For 2022, the induced impact of the industry generates 220,206 jobs and $41.00 billion in economic impact, for a multiplier of 0.44.[7]

[4] Based on comparisons of economic output from the 2020 IMPLAN tables.

[5] Throughout this study, the term "firms" refers to physical locations. One manufacturer, for example, may have facilities in 5 or 6 locations throughout the country.

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

[7] Often economic impact studies present results with exceptionally 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 indirect employees.

Table 1 presents a summary of the total economic impact of the cigarette industry in the United States. Summary tables for the United States, individual states, congressional districts, and state legislative districts are included in the output model, which is discussed in the following section.

Another 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 cigarette industry, the taxes paid by firms and their employees provide $11.91 billion to the Federal government and $16.79 billion to state and local governments including income taxes, property taxes, profits taxes, etc. In addition to these taxes, the cigarette industry also contributes $33.83 billion in federal, state and local sales and excise taxes that are paid by consumers when they purchase cigarettes. (See Table 2)

Table 2 – Fiscal Contribution of the Cigarette Industry

Tax Type	Federal	State/Local	Total
Individual Income	$3,667,873,300	$1,025,453,100	$4,693,326,400
Social Security/Social Insurance	$4,895,504,000	$68,425,200	$4,963,929,200
Property		$6,655,154,800	$6,655,154,800
Business/Employee Paid Sales Taxes		$7,275,652,900	$7,275,652,900
Corporate Income	$1,349,359,200	$497,160,000	$1,846,519,200
Other Personal and Business Taxes	$1,996,765,200	$1,265,969,200	$3,262,734,400
Federal Excise Taxes	$10,103,688,300		$10,103,688,300
State Excise Taxes		$16,305,132,000	$16,305,132,000
State Sales Taxes		$6,557,002,100	$6,557,002,100
Other Taxes		$867,705,300	$867,705,300
Total	**$22,013,190,000**	**$40,517,654,600**	**$62,530,844,600**

Economic Impact Modeling – Summary

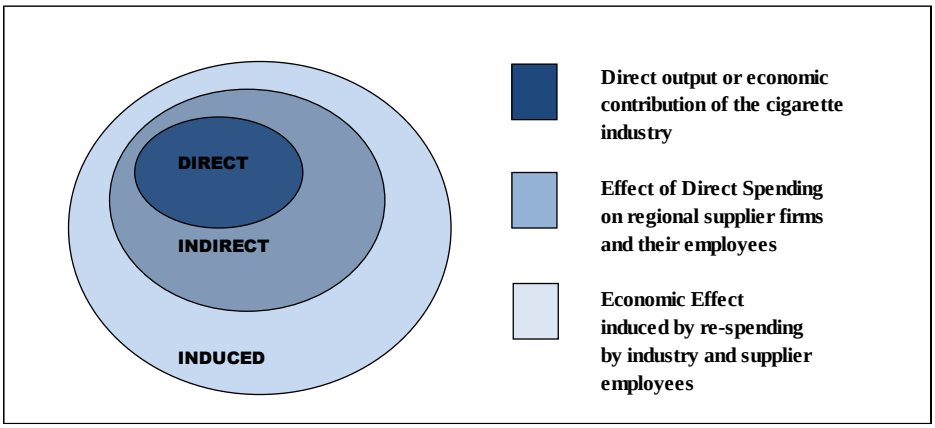
The economic impact study begins with an accounting of the direct employment in the industry. The data come from a variety of government and private sources. It is sometimes mistakenly thought that initial spending accounts for all the impact of an economic activity or a product. For example, it may 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 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. Activities related to represent the direct effects on the economy. Indirect impacts occur when these activities require purchases of goods and services such as advertising services or merchandising material from local or regional indirect firms. Additional induced impacts occur when workers involved in direct and indirect activities spend their wages. The ratio between induced output and direct output is termed the multiplier.

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.

Once the direct impact of the industry has been calculated, the input-output methodology discussed below is used to calculate the contribution of the indirect sector and of the re-spending in the economy by employees in the industry and its indirect firms. This induced impact is the most controversial part of economic impact studies and is often quite inflated. In the case of the 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 Reynolds American Inc., Data Axle, The Tax Burden on Tobacco 2021, the Food and Drug Administration, Centers for Disease Control and Prevention (CDC), and Federal and state governments. The analysis utilizes the IMPLAN model to quantify the economic impact of the industry on the economy of the United States, as well as individual states, congressional districts, and state legislative districts.[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 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]

Table 3 – Direct Manufacturing Jobs by Product Category

Product Category	Direct Jobs	% of Total Manufacturing Jobs
Menthol Cigarette Jobs	5,115	16.93%
Non-Menthol Cigarette Jobs	9,033	29.89%
Moist Snuff (MST) Jobs	4,062	13.44%
Other Tobacco Products Jobs	5254	17.39%
E-liquid Jobs	3,743	12.39%
Vape Component Jobs	3,013	9.97%
Total	**30,220**	**100.00%**

[8] The model uses 2020 input/output accounts.

[9] The IMPLAN model is based on a series of national input-output accounts known as RIMS II. These data are developed and maintained by the U.S. Department of Commerce, Bureau of Economic Analysis as a policy and economic decision analysis tool.

Every economic impact analysis begins with a description of the industry being examined. In the case of the industry, it is defined as the three components of the United States' industry. These are further broken out by product type (Table 3)

This will incorporate firms in the following economic sectors:

- Manufacturers: Cigarettes
- Wholesalers: Includes firms involved in the distribution and storage of cigarettes
- Retailers: Includes firms involved in the sale of cigarettes. This sector includes retail establishments (e.g., grocery stores, convenience stores, gas stations, stores, etc.)

The IMPLAN 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 indirect and induced impacts based on these entries. In the case of the model, direct employment in the industry is a starting point for the analysis. Direct employment is based on data provided to John Dunham & Associates, by Reynolds American Inc., Data Axle and the Centers for Disease Control and Prevention as of January 2022. 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. Data Axle verifies its data at the rate of almost 100,000 phone calls per day to ensure absolute accuracy.

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 these data only cover payroll employees, they are 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 like 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, 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 legislative district

level is limited by disclosure restrictions, especially for smaller sectors of the economy. This model therefore uses actual physical location data provided by Data Axle to allocate jobs – and the resulting economic activity – by physical address, or when that is not available, zip code. For zips 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.

Appendix
IMPLAN Methodology[1]

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 diverse 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 distinct levels of data generally available in the United States: Federal, state and county. Most of the detailed data are available at the county level, but 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 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.

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, the Regional Purchase Coefficients (RPCs) – essential to the IMPLAN model – 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 regional differences, adjustments need to be made. Regional trade flows are estimated based on

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

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 until extensive testing takes place.

The Menthol Cigarette Industry
Economic Impact Study

Methodology and Documentation
Prepared for:

REYNOLDS
A BETTER TOMORROW

Reynolds American, Inc.

By

JOHN DUNHAM
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John Dunham & Associates

July 13, 2022

The 2022 Menthol Cigarette Industry Economic Impact Study

Executive Summary:

The 2022 Menthol Cigarette Industry Economic Impact Study estimates the economic contributions made by the menthol cigarette industry, to the U.S. economy in 2022. John Dunham & Associates conducted this research, which was funded by Reynolds American Inc. This work used standard econometric models first developed by the U.S. Forest Service, and now maintained by IMPLAN Inc. Data came from industry sources, government publications and Data Axle.[2]

The study measures the number of jobs in the menthol cigarette industry, the wages paid to employees, the value added and total output. In addition, it measures the economic impact of the suppliers that support the menthol cigarette industry, as well as those industries supported by the induced spending of direct and supplier industries.

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 menthol cigarette industry generates output (and jobs) in hundreds of other industries, often in 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 basis, by state, by congressional district, and by state legislative districts.

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. 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.

The menthol cigarette industry is a dynamic part of the U.S. economy, accounting for about $69.64 billion in output or about 0.29 percent of GDP.[3] It employs approximately 245,351 Americans who earned wages and benefits of about $15.79 billion.

Members of the industry and their employees paid $10.65 billion in federal, state, and local taxes. This does not include state and local sales taxes or excise taxes that may apply for specific retail purchases which are estimated to total $11.43 billion.

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[2] 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. Data Axle verifies its data at the rate of almost 100,000 phone calls per day to ensure absolute accuracy.

[3] Based on Gross Domestic Product of $24.386 trillion for the first quarter of 2022. Available from the Bureau of Economic Analysis at: https://apps.bea.gov/national/xls/gdplev.xlsx

Summary Results

The menthol cigarette industry (as defined in this study) includes manufacturers of menthol cigarettes, wholesalers, and retailers that sell menthol products such as: Convenience stores, supermarkets, gasoline stations, pharmacies and drug stores, warehouse clubs and supercenters, and discount menthol stores. The menthol industry reaches into all corners of the United States, employing 83,181 and generating $4.53 billion in wages. Menthol businesses directly generate $34.32 billion in economic activity nationally.

Table 1 – Economic Contribution of the Menthol Cigarette Industry

	Direct	Indirect	Induced	Total
Jobs	83,181	84,635	77,535	245,351
Wages	$4,534,100,500	$6,446,868,100	$4,805,417,400	$15,786,386,000
Economic Impact	$34,321,913,200	$20,884,486,900	$14,437,755,700	$69,644,155,800
State and Local Taxes				$14,119,020,400
Federal Taxes				$7,964,484,700

To put the direct impact of the menthol cigarette industry in context, it is about the same size as the entire brewing industry in the United States and has a larger economic output than the canned fruits and vegetables manufacturing industry in the country. Furthermore, the menthol cigarette industry directly employs more workers than all of iron and steel mills and ferroalloy manufacturing industry.[4]

Other firms are related to the menthol industry as suppliers. These firms produce and sell a broad range of items including paper, acetate, menthol, and all the merchandise needed to maintain menthol tobacco businesses. 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 industry. All told, the industry is responsible for 84,635 supplier jobs. These firms generate about $20.88 billion in economic activity.[5]

An economic analysis of the menthol cigarette industry will also take additional linkages into account. While it is inappropriate to claim that suppliers to the industry's indirect firms are part of the industry being analyzed,[6] the spending by employees of the industry, and that of indirect firms whose jobs are directly dependent on the menthol 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 menthol industry. For 2022, the induced impact of the industry generates 77,535 jobs and $14.44 billion in economic impact, for a multiplier of 0.42.[7]

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4 Based on comparisons of economic output from the 2020 IMPLAN tables.

5 Throughout this study, the term "firms" refers to physical locations. One manufacturer, for example, may have facilities in 5 or 6 locations throughout the country.

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

7 Often economic impact studies present results with exceptionally 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 indirect employees.

Table 1 presents a summary of the total economic impact of the menthol cigarette industry in the United States. Summary tables for the United States, individual states, congressional districts, and state legislative districts are included in the output model, which is discussed in the following section.

Another 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 menthol cigarette industry, the taxes paid by firms and their employees provide $4.31 billion to the Federal government and $6.34 billion to state and local governments including income taxes, property taxes, profits taxes, etc. In addition to these taxes, the menthol cigarette industry also contributes $11.43 billion in federal, state and local sales and excise taxes that are paid by consumers when they purchase menthol cigarettes. (See Table 2)

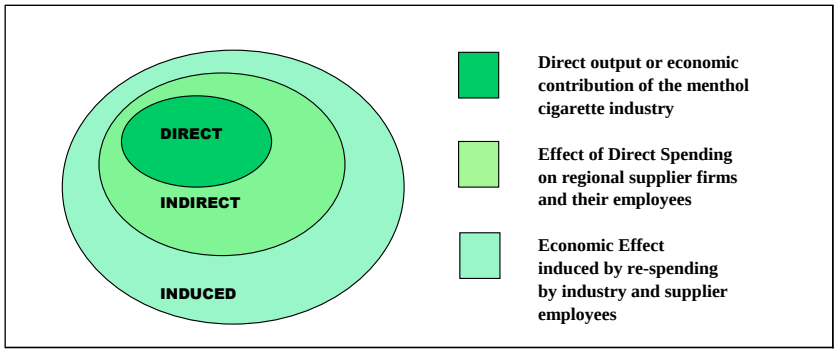
Table 2 – Fiscal Contribution of the Menthol Cigarette Industry

Tax Type	Federal	State/Local	Total
Individual Income	$1,307,314,000	$370,512,400	$1,677,826,400
Social Security/Social Insurance	$1,753,180,500	$22,391,700	$1,775,572,200
Property		$2,559,781,400	$2,559,781,400
Business/Employee Paid Sales Taxes		$2,743,096,800	$2,743,096,800
Corporate Income	$504,487,700	$184,826,900	$689,314,600
Other Personal and Business Taxes	$746,740,300	$462,069,700	$1,208,810,000
Federal Excise Taxes	$3,652,762,000		$3,652,762,000
State Excise Taxes		$5,729,688,100	$5,729,688,100
State Sales Taxes		$1,706,890,200	$1,706,890,200
Other Taxes		$339,763,400	$339,763,400
Total	**$7,964,484,500**	**$14,119,020,600**	**$22,083,505,100**

Economic Impact Modeling – Summary

The economic impact study begins with an accounting of the direct employment in the menthol industry. The data come from a variety of government and private sources. It is sometimes mistakenly thought that initial spending accounts for all the impact of an economic activity or a product. For example, 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 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. Activities related to menthol represent the direct effects on the economy. Indirect impacts occur when these activities require purchases of goods and services such as advertising services or merchandising material from local or regional indirect firms. Additional induced impacts occur when workers involved in direct and indirect activities spend their wages. The ratio between induced output and direct output is termed the multiplier.



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.

Once the direct impact of the industry has been calculated, the input-output methodology discussed below is used to calculate the contribution of the indirect sector and of the re-spending in the economy by employees in the industry and its indirect firms. This induced impact is the most controversial part of economic impact studies and is often quite inflated. In the case of the menthol 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 Reynolds American Inc., Data Axle, The Tax Burden on Tobacco 2021, the Food and Drug Administration, Centers for Disease Control and Prevention (CDC), and Federal and state governments. The analysis utilizes the IMPLAN model to quantify the economic impact of the menthol industry on the economy of the United States, as well as individual states, congressional districts, and state legislative districts.[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 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]

Table 3 – Direct Manufacturing Jobs by Product Category

Product Category	Direct Jobs	% of Total Manufacturing Jobs
Menthol Cigarette Jobs	5,115	16.93%
Non-Menthol Cigarette Jobs	9,033	29.89%
Moist Snuff (MST) Jobs	4,062	13.44%
Other Tobacco Products Jobs	5254	17.39%
E-liquid Jobs	3,743	12.39%
Vape Component Jobs	3,013	9.97%
Total	**30,220**	**100.00%**

[8] The model uses 2020 input/output accounts.

[9] The IMPLAN model is based on a series of national input-output accounts known as RIMS II. These data are developed and maintained by the U.S. Department of Commerce, Bureau of Economic Analysis as a policy and economic decision analysis tool.

Every economic impact analysis begins with a description of the industry being examined. In the case of the menthol industry, it is defined as the three components of the United States' menthol industry. These are further broken out by product type (Table 3)

This will incorporate firms in the following economic sectors:

- Manufacturers: Menthol Cigarettes.
- Wholesalers: Includes firms involved in the distribution and storage of menthol cigarettes.
- Retailers: Includes firms involved in the sale of menthol cigarettes. This sector includes retail establishments (e.g., grocery stores, convenience stores, gas stations, menthol stores, etc.)

The IMPLAN 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 indirect and induced impacts based on these entries. In the case of the menthol model, direct employment in the menthol industry is a starting point for the analysis. Direct employment is based on data provided to John Dunham & Associates, by Reynolds American Inc., Data Axle and the Centers for Disease Control and Prevention as of January 2022. 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. Data Axle verifies its data at the rate of almost 100,000 phone calls per day to ensure absolute accuracy.

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 these data only cover payroll employees, they are 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 like 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, 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 legislative district level is limited by disclosure restrictions, especially for smaller sectors of the economy. This model therefore uses actual physical location data provided by Data Axle to allocate jobs – and the resulting economic activity – by physical address, or when that is not available, zip code. For zips 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.

Appendix
IMPLAN Methodology[1]

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.

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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.

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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 until extensive testing takes place.

The Flavored Tobacco Industry Economic Impact Study

Methodology and Documentation Prepared for:

REYNOLDS
A BETTER TOMORROW

Reynolds American, Inc.

By

JOHN DUNHAM & ASSOCIATES

John Dunham & Associates

July 13, 2022

Executive Summary:

The 2022 Flavored Tobacco Industry Economic Impact Study estimates the economic contributions made by the flavored tobacco industry (including combustible cigarettes, moist snuff, cigars, other tobacco products and non-combustible cigarettes), which are not naturally or "tobacco" flavored to the U.S. economy in 2022. John Dunham & Associates conducted this research, which was funded by Reynolds American Inc. This work used standard econometric models first developed by the U.S. Forest Service, and now maintained by IMPLAN Inc. Data came from industry sources, government publications and Data Axle.[2]

The study measures the number of jobs in the flavored tobacco industry, the wages paid to employees, the value added and total output. In addition, it measures the economic impact of the suppliers that support the flavored tobacco industry, as well as those industries supported by the induced spending of direct and supplier industries.

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 flavored tobacco industry generates output (and jobs) in hundreds of other industries, often in 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 basis, by state, by congressional district, and by state legislative districts.

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. 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.

The flavored tobacco industry is a dynamic part of the U.S. economy, accounting for about $123.90 billion in output or about 0.51 percent of GDP.[3] It employs approximately 462,862 Americans who earned wages and benefits of about $29.67 billion.

Members of the industry and their employees paid $18.15 billion in federal, state, and local taxes. This does not include state and local sales taxes or excise taxes that may apply for specific retail purchases which are estimated to total $15.07 billion.

[2] 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. Data Axle verifies its data at the rate of almost 100,000 phone calls per day to ensure absolute accuracy.

[3] Based on Gross Domestic Product of $24.386 trillion for the first quarter of 2022. Available from the Bureau of Economic Analysis at: https://apps.bea.gov/national/xls/gdplev.xlsx

Summary Results

The flavored tobacco industry (as defined in this study) includes manufacturers of combustible cigarettes, moist snuff, cigars, other tobacco products and non-combustible cigarettes, vaping products, and alternative nicotine products that are artificially flavored, wholesalers, and retailers that sell flavored tobacco products such as; convenience stores, supermarkets, gasoline stations, pharmacies and drug stores, warehouse clubs and supercenters, and discount tobacco stores. The flavored tobacco industry reaches into all corners of the United States, employing 164,642 and generating $8.94 billion in wages. Flavored tobacco businesses directly generate $58.60 billion in economic activity nationally.

Table 1 – Economic Contribution of the Flavored Tobacco Industry

	Direct	Indirect	Induced	Total
Jobs	164,642	151,728	146,492	462,862
Wages	$8,938,520,100	$11,649,420,300	$9,079,581,800	$29,667,522,200
Economic Impact	$58,598,703,400	$37,998,547,500	$27,300,979,400	$123,898,230,300
State and Local Taxes				$21,731,246,000
Federal Taxes				$11,494,358,000

To put the direct impact of the flavored tobacco industry in context, it is almost the same size as the cheese manufacturing industry in the United States, and larger than the economic output of all the bread and bakery product manufacturing industry in the country. Furthermore, the tobacco industry directly employs more workers than the entirety of the semiconductor and related device manufacturing industry.[4]

Other firms are related to the flavored tobacco industry as suppliers. These firms produce and sell a broad range of items including paper, acetate, flavorings, tobacco, and all the merchandise needed to maintain tobacco businesses. In addition, supplier firms provide a broad range of services, including personnel services, financial services, advertising services, consulting services or transportation services. Finally, people are employed in government enterprises responsible for the regulation of the industry. All told, the industry is responsible for 151,728 supplier jobs. These firms generate about $38.00 billion in economic activity.[5]

An economic analysis of the flavored tobacco industry will also take additional linkages into account. While it is inappropriate to claim that suppliers to the industry's indirect firms are part of the industry being analyzed,[6] the spending by employees of the industry, and that of indirect firms whose jobs are directly dependent on the flavored tobacco 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 tobacco industry. For 2022, the induced impact of the industry generates 146,492 jobs and $27.30 billion in economic impact, for a multiplier of 0.47.[7]

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4 Based on comparisons of economic output from the 2020 IMPLAN tables.

5 Throughout this study, the term "firms" refers to physical locations. One manufacturer, for example, may have facilities in 5 or 6 locations throughout the country.

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

7 Often economic impact studies present results with exceptionally 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 indirect employees.

Table 1 presents a summary of the total economic impact of the flavored tobacco industry in the United States. Summary tables for the United States, individual states, congressional districts, and state legislative districts are included in the output model, which is discussed in the following section.

Another 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 flavored tobacco industry, the taxes paid by firms and their employees provide $7.80 billion to the Federal government and $10.35 billion to state and local governments including income taxes, property taxes, profits taxes, etc. In addition to these taxes, the flavored tobacco industry also contributes $15.07 billion in federal, state and local sales and excise taxes that are paid by consumers when they purchase flavored tobacco products. (See Table 2)

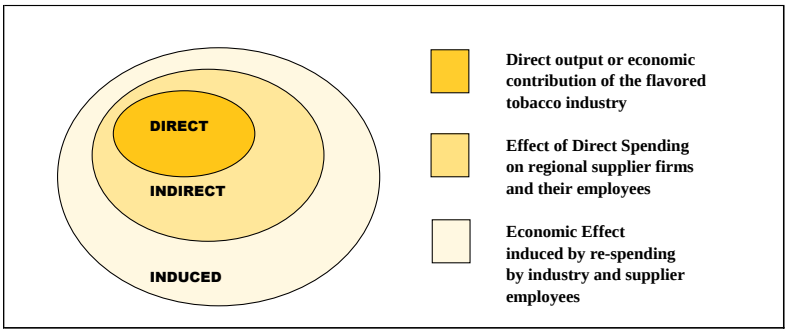
Table 2 – Fiscal Contribution of the Flavored Tobacco Industry

Tax Type	Federal	State/Local	Total
Individual Income	$2,459,480,900	$689,216,700	$3,148,697,600
Social Security/Social Insurance	$3,300,289,300	$43,565,800	$3,343,855,100
Property		$4,113,214,700	$4,113,214,700
Business/Employee Paid Sales Taxes		$4,439,905,700	$4,439,905,700
Corporate Income	$832,088,700	$306,316,600	$1,138,405,300
Other Personal and Business Taxes	$1,209,641,800	$760,777,400	$1,970,419,200
Federal Excise Taxes	$3,692,857,300		$3,692,857,300
State Excise Taxes		$7,291,190,800	$7,291,190,800
State Sales Taxes		$2,564,332,100	$2,564,332,100
Other Taxes		$761,363,000	$761,363,000
Total	**$11,494,358,000**	**$20,969,882,800**	**$32,464,240,800**

Economic Impact Modeling – Summary

The economic impact study begins with an accounting of the direct employment in the flavored tobacco industry. The data comes from a variety of government and private sources. It is sometimes mistakenly thought that initial spending accounts for all the impact of an economic activity or a product. For example, 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 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. Activities related to flavored tobacco represent the direct effects on the economy. Indirect impacts occur when these activities require purchases of goods and services such as advertising services or merchandising material from local or regional indirect firms. Additional induced impacts occur when workers involved in direct and indirect activities spend their wages. The ratio between induced output and direct output is termed the multiplier.



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.

Once the direct impact of the industry has been calculated, the input-output methodology discussed below is used to calculate the contribution of the indirect sector and of the re-spending in the economy by employees in the industry and its indirect firms. This induced impact is the most controversial part of economic impact studies and is often quite inflated. In the case of the tobacco 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 Reynolds American Inc., Data Axle, The Tax Burden on Tobacco 2021, the Food and Drug Administration, Centers for Disease Control and Prevention (CDC), and Federal and state governments. The analysis utilizes the IMPLAN model to quantify the economic impact of the flavored tobacco industry on the economy of the United States, as well as individual states, congressional districts, and state legislative districts.[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 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]

Table 3 – Direct Manufacturing Jobs by Product Category

Product Category	Direct Jobs	% of Total Manufacturing Jobs
Menthol Cigarette Jobs	5,115	16.93%
Non-Menthol Cigarette Jobs	9,033	29.89%
Moist Snuff (MST) Jobs	4,062	13.44%
Other Tobacco Product Jobs	5254	17.39%
E-liquid Jobs	3,743	12.39%
Vape Component Jobs	3,013	9.97%
Total	**30,220**	**100.00%**

[8] The model uses 2020 input/output accounts.

[9] The IMPLAN model is based on a series of national input-output accounts known as RIMS II. These data are developed and maintained by the U.S. Department of Commerce, Bureau of Economic Analysis as a policy and economic decision analysis tool.

Every economic impact analysis begins with a description of the industry being examined. In the case of the flavored tobacco industry, it is defined as the three components of the United States' tobacco industry. These are further broken out by product type (Table 3)

This will incorporate firms in the following economic sectors:

- Manufacturers: Combustible cigarettes, moist snuff, cigars, other flavored tobacco products and/or non-combustible cigarettes, which includes products commonly referred to as "vaping" products in the United States. Rolling papers and hookah tobacco are included in this study while tobacco pipes of any kind are not.

- Wholesalers: Includes firms involved in the distribution and storage of flavored tobacco products.

- Retailers: Includes firms involved in the sale of flavored tobacco and vape products. This sector includes retail establishments (e.g., grocery stores, convenience stores, gas stations, tobacco stores, etc.)

The IMPLAN 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 indirect and induced impacts based on these entries. In the case of the flavored tobacco model, direct employment in the tobacco industry is a starting point for the analysis. Direct employment is based on data provided to John Dunham & Associates by Reynolds American Inc., Data Axle and the Centers for Disease Control and Prevention as of January 2022. 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. Data Axle verifies its data at the rate of almost 100,000 phone calls per day to ensure absolute accuracy.

These figures are then adjusted to account for just the share of products that are considered to be flavored. For moist snuff, closed system vapor products and open system vapor products, the flavored share by state comes from industry shipment data for 2021 provided to JDA by RAI. The same is true for *modern oral* products. Most chewing tobacco, dry snuff, plug, and twist products are not generally flavored and make up a very small segment of the industry, so these are not included.

Data on the flavored vs. non flavored share of sales tracked by Management Science Associates Inc. was provided by RAI. These data were provided for the cigarette, modern nicotine products, and moist snuff categories of the market, as well as for the closed-system vapor sales.[10] Data on open s-system vapor products (so called e-liquids) were provided by the Vapor Technology Association (VTA) under strict non-disclosure guidelines. These products are generally sold in special adults-only vapor stores.

[10] Closed-system vapor products such as pods and disposable products contain a specific amount of nicotine vapor liquid and are not generally refillable by consumers. These products tend to be sold in convenience stores, and at other retailers where cigarettes are sold.

No data were available for the remaining segments of the tobacco market including cigars, loose smoking and pipe tobacco and less well known product types like dry snuff, plug and twist tobacco. With no data available, JDA did not break out the flavored segments for these product types even though most cigars on the market are flavored products.

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 these data only cover payroll employees, they are 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 like 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, 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 legislative district level is limited by disclosure restrictions, especially for smaller sectors of the economy. This model therefore uses actual physical location data provided by Data Axle to allocate jobs – and the resulting economic activity – by physical address or when that is not available, zip code. For zips 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.

Appendix
IMPLAN Methodology[11]

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 diverse 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 distinct levels of data generally available in the United States: Federal, state and county. Most of the detailed data are available at the county level, but 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 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.

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, the Regional Purchase Coefficients (RPCs) – essential to the IMPLAN model – 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 regional differences, adjustments need to be made. Regional trade flows are estimated based on

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

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 until extensive testing takes place.