

**2022 Economic Impact Study of the Ohio Wine and Grape Industries**

**Prepared for:**



**By**



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November 23, 2022**

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## Executive Summary

The 2022 Ohio Wine and Grape Industries Economic Impact Study estimates the economic contributions made by the wine and grape industries to the Ohio economy in 2022. John Dunham & Associates (JDA) conducted this research, which was funded by the Ohio Grape Industries Committee (OGIC). This work uses standard econometric models first developed by the U.S. Forest Service and now maintained by IMPLAN, LLC. Data came from OGIC, the Alcohol and Tobacco Tax and Trade Bureau (TTB), the Ohio Department of Liquor Control, Ohio State University 2022 Ohio Grape Grower Survey additional industry sources, government publications, and DataAxle.<sup>1</sup>

The study defines the Ohio wine and grape industries as winegrape growing, grape jam, jelly, and juice production, wine production, Ohio wine wholesaling, Ohio wine retailing (on/off-premise), wine tourism, wine research and education, wine advertising and marketing, and wine and winegrape growing associations in the state of Ohio.<sup>2</sup>

The first tier of the wine and grape industry is comprised of vineyards, wineries, and grape juice, jelly, and jam producers. Vineyards cultivate and grow grape varieties across the state. There are five designated viticultural areas in Ohio: Grand River Valley, Isle St. George, Lake Erie, Loramie Creek, and Ohio River Valley. Wineries in turn, use these fruits, as well as other fruits from both Ohio and other states, to produce wine. Other grapes are used by manufacturers to produce grape juice, jelly, and jam. Once the wine is produced and packaged, it is either sold through a winery's retail outlets, like tasting rooms and winery owned restaurants, or it moves through the second tier of the industry – the wine wholesalers.

A wine wholesaler is licensed and authorized to purchase Ohio wine from wineries or importers and from producers for resale. They warehouse, store, and transport purchases, reselling their wine, grape juices, jams and jellies to the third tier; the retailer.

The third tier, wine retailing, purchases Ohio wine, grape juices, jams, and jellies from the wholesaler and is responsible for reselling these products to consumers. Retailers also have the right to purchase wine for further distribution directly from the manufacturer. This tier is made up of on-premise retailers such as restaurants, bars, sports stadiums, etc., and off-premise retailers like liquor stores and wine shops.

In addition to the three tiers of the industry, the study includes the economic impact of wine-related tourism on the economy, wine-related associations, advertising and marketing, and research and educational organizations that help develop, promote, and support the wine and grape industries in Ohio.

The study measures various factors of the Ohio wine and grape industries including the number of jobs, the wages paid to employees, the total output, and estimates the taxes paid by the industries and its employees. In addition, it assesses the economic impact of suppliers to the Ohio wine and grape industries, as well as those industries supported by the induced spending of both the direct and supplier industries.

Every industry inevitably makes purchases from a mix of different industries - thus, economic activity within one industry always extends beyond its origins, through means such as employee spending. The economic activity started by the wine and grape industries generates output and jobs in hundreds of other industries, often in states far removed from the site of the original operation. The impact of supplier firms

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<sup>1</sup> DataAxle is the leading provider of business and consumer data for the top search engines and leading in-car navigation systems in North America. DataAxle gathers data from a variety of sources, by sourcing, refining, matching, appending, filtering, and delivering the best quality data. DataAxle verifies its data at the rate of almost 100,000 phone calls per day to ensure absolute accuracy.

<sup>2</sup> Throughout this study, all references to the “wine and grape industries” include the production of grape jams, jellies and juices, the production, wholesaling, and retailing of wine and similar vinified products, tourism, wine associations, marketing and advertising, and research and education organizations.

and the “induced impact” of the re-spending by employees of industry and supplier firms are calculated using an input-output model of the United States. The study calculates the impact at the state, Congressional, state legislative and county levels.

## **Economic Impact Results**

The Ohio wine and grape industries impact study includes vineyards, wineries, grape juice, jelly and jam producers, Ohio wine wholesaling, and Ohio wine retailing. In addition, the study includes the economic impact of wine-related tourism on the economy, of wine-related associations, advertising and marketing, and research and educational organizations that help develop, promote, and support the wine industry in Ohio.

The wine and grape industries in Ohio directly create 25,133 jobs, generating \$987.8 million in wages, \$3.8 billion in economic activity in the state.

The full economic impact of the wine and grape industries extends beyond the initial direct impacts. In order for the industries to conduct business, they require goods and services which must be purchased from other industries. This additional economic impact is referred to as the supplier impact. Examples of the supplier impacts created by the wine and grape industries include businesses purchasing farming equipment and supplies, paying rent to landlords, buying packaging materials, hiring consultants, drivers, lawyers, and even creating government jobs responsible for the regulation or licensing of wine businesses.

Furthermore, the induced impact is created when the people employed by the direct and supplier sectors spend their wages. These expenditures can be captured in businesses such as restaurants, retail shops, health care providers, and educational services. The overall economic impact of the wine industry in Ohio is presented in Table 1 below.

**Table 1**  
**Ohio Wine and Grape Industries Economic Impact**

	Jobs	Wages	Output
Wineries	1,636	\$49,914,800	\$544,496,800
Jams, Jellies & Juice Jobs	1,888	\$204,443,200	\$1,392,885,400
Vineyards	160	\$2,187,700	\$9,635,000
Wholesaling	1,143	\$108,268,400	\$372,397,300
On-Premise Retailing	8,074	\$231,203,700	\$539,457,000
Off-Premise Retailing	4,117	\$137,376,000	\$340,548,300
Tourism	8,065	\$250,849,700	\$629,228,200
Advertising & Marketing	23	\$1,303,600	\$3,173,900
Research & Education	20	\$1,757,100	\$4,440,200
Associations	7	\$537,900	\$1,461,500
<b>Total Direct Impact</b>	<b>25,133</b>	<b>\$987,842,100</b>	<b>\$3,837,723,600</b>
<b>Total Supplier Impact</b>	<b>7,641</b>	<b>\$526,740,800</b>	<b>\$1,579,369,900</b>
<b>Total Induced Impact</b>	<b>7,625</b>	<b>\$422,173,800</b>	<b>\$1,280,537,400</b>
<b>Total Impact</b>	<b>40,399</b>	<b>\$1,936,756,700</b>	<b>\$6,697,630,900</b>

### *Vineyards*

Ohio is home to five American Viticultural Areas: Grand River Valley, Isle St. George, Lake Erie, Loramie Creek, and Ohio River Valley. AVAs are official grape growing regions that have been designated by the Alcohol and Tobacco Tax and Trade Bureau. In Ohio, both inside and outside of these AVAs, there are 53

standalone vineyards planting grape-bearing vines.<sup>3</sup> It is estimated that the vineyards directly employ an estimated 160 full-time equivalent (FTE) people growing winegrapes.<sup>4</sup> These jobs pay a total of \$2.2 million in wages while contributing \$9.6 million in economic activity to the state.

### *Wineries*

Wineries in the state may grow winegrapes and other fruits in their own vineyards and orchards or they may purchase winegrapes and fruit juice from growers located both in Ohio and other states. Wineries then continue the vinification process of crushing, pressing and fermenting the fruits, aging, and bottling and cellaring the wine. Wineries in Ohio may sell directly to consumers through their tasting rooms and on-site restaurants or self-distribute to local retail licensees. The impact of these activities is included in the wineries impact and is not included in the wholesale and retail economic impacts to avoid double counting. Ohio's 323 wineries employ 1,636 FTE employees, and pay more than \$49.9 million in wages and benefits. These firms directly generate \$544.5 million in economic activity in the state. Of Ohio's 323 wineries, 179 are standalone wineries while 144 are considered to be wineries with vineyard operations.

As in many states, the number of wineries in Ohio has been growing. The last economic impact study of the Ohio wine and grape industries estimated that there were 265 wineries in the state in 2016.<sup>5</sup> The data for 2022 show a total of 323 wineries in Ohio, a 22 percent increase.<sup>6</sup> In the 2016 analysis, it was reported that the average winery had about 4 FTE employees. This has increased to 5 FTE employees, suggesting that many of the new and expanding wineries in Ohio are larger operations, producing more wine and hiring more workers.

Ohio is a leading producer of American wine. Based on data from the Wine America Economic Impact Study, Ohio is the 7th largest wine producing state, with over \$503.0 million in economic output.<sup>7</sup>

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<sup>3</sup> The 2021 Ohio Grape Grower Survey, conducted by Ohio State University, surveyed 207 potential grape growing companies. After making several adjustments to the survey frame, OSU calculated that there were 178 vineyard operations operating in Ohio in 2021. For this study, 197 grape vineyard operations were verified by JDA including both standalone vineyards and winery with vineyard operations. These data are for 2022.

<sup>4</sup> Some of these jobs may be double counted in the winery impacts. Limited data available makes it difficult to estimate the impact from vineyards that are owned and operated by wineries. The impact of winery owned vineyards is already captured in the winery economic impact.

<sup>5</sup> *The Economic Impact of Ohio Wine and Wine Grapes– 2016*, prepared for the Ohio Grape Industries Committee, Frank, Rimerman + Co., LLP, August 2017. [https://ohiograpeweb.cfaes.ohio-state.edu/sites/grapeweb/files/imce/pdf\\_events/Ohio-2016-Economic-Impact-Report-FINAL.pdf](https://ohiograpeweb.cfaes.ohio-state.edu/sites/grapeweb/files/imce/pdf_events/Ohio-2016-Economic-Impact-Report-FINAL.pdf)

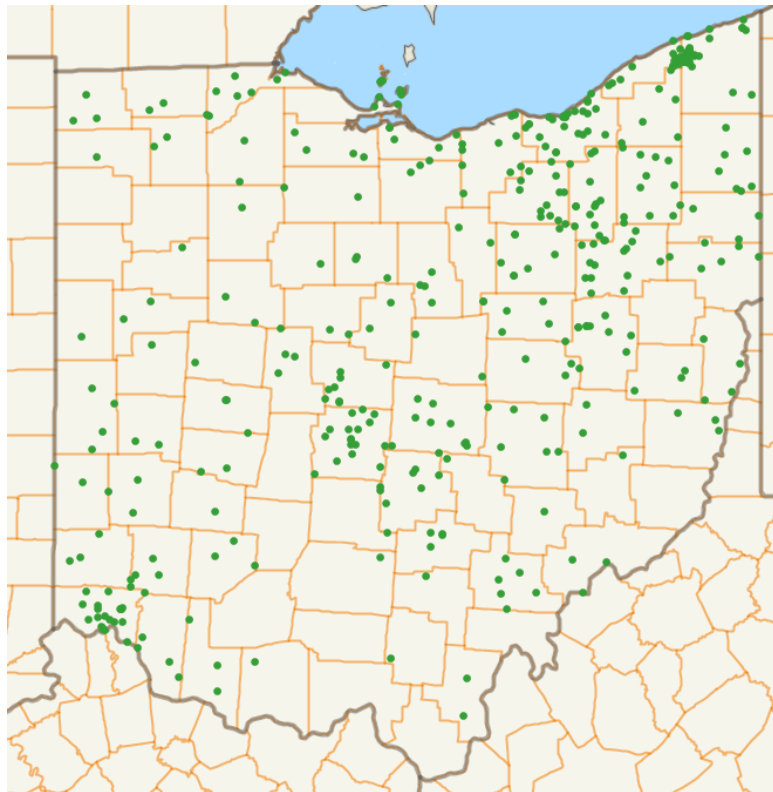
<sup>6</sup> Throughout this study, the company or location counts refer to the number of facilities. For example, a single winery may have multiple facilities throughout the state. Each of these facilities is included in the count.

<sup>7</sup> *Wine America Economic Impact*, John Dunham & Associates, Florida 2022.

**Table 2**  
**Wine Economic Output by State 2022**

Rank	State	Wine Economic Output
1	California	\$16,876,769,000
2	Washington	\$1,450,699,300
3	Oregon	\$1,342,645,200
4	New York	\$1,182,423,600
5	Texas	\$659,837,700
6	Virginia	\$653,780,800
7	Ohio	\$503,016,400
8	Pennsylvania	\$488,836,600
9	Michigan	\$404,186,800
10	Illinois	\$399,787,400
	United States	\$27,299,929,400

**Figure 1**  
**Location of Ohio Wineries**



*Juice, Jam and Jelly Producers*

Welch's and J.M. Smucker are among the many grape juice, jam, and jelly producers that have a presence in the state of Ohio. In total there are 21 grape juice, jam, and jelly producers employing 1,888 people, paying them \$204.4 million in wages, and generating \$1.4 billion in economic activity in Ohio.

### *Ohio Wine Wholesaling*

Traditionally, most wine is sold through what is called the three-tier system, whereby producers sell to wholesalers, who in turn sell to retailers. Wine wholesalers in Ohio are responsible for the safe distribution of Ohio produced wine. Ohioans love wine and the strong wholesaling industry in the state reflects that. Wine wholesalers directly employ 1,143 people, paying them \$108.3 million in wages, and generating \$372.4 million in economic activity in Ohio.

### *Ohio Wine Retailing*

The third-tier, retailing, is responsible for selling wine to consumers. The retailing tier is made up of on-premise retailers such as restaurants, bars, sports stadiums, etc., and off-premise retailers like liquor stores and wine shops. These businesses are selling Ohio wine, out of state wine, and foreign, imported wine. In Ohio, the retail of Ohio wine directly creates 12,191 jobs in the on- and off-premise retail and hospitality sectors. These jobs pay about \$368.6 million in wages and benefits, and contribute \$880.0 million in economic activity to the state.

**Table 3**  
**Economic Impact of Wine Retailers in Ohio**

	<b>Jobs</b>	<b>Wages</b>	<b>Output</b>
On-Premise	8,074	\$231.2 million	\$539.5 million
Off-Premise	4,117	\$137.4 million	\$340.5 million
<b>Total Impact</b>	12,191	\$368,579,700	\$880,005,300

### *Wine-Related Tourism*

Wineries and vineyards are an attractive destination for Ohioans and out-of-state visitors. These tourists not only create business for the wineries and vineyards they visit, but they also spend millions on lodging, food, transportation, and other retail purchases. The economic impact of spending from these visitors is an important aspect of the overall wine industry. JDA estimates that about 706,850 people made over 2,327,150 visits to Ohio wineries and vineyards.<sup>8</sup> In addition to spending in the wineries and vineyards on wine, food, events, etc., these people spent an estimated \$789.8 million in the Ohio economy. The economic activity created by these visitors directly generates about 8,065 FTE jobs, paying about \$250.8 million in wages and benefits, and contributing \$629.2 million in economic activity to the state.

<sup>8</sup> Typically, people visit more than one winery while in the area. See tourism methodology for more details.



**Table 4**  
**Economic Impact of Wine Tourism in Ohio**

	Jobs	Wages	Output
Retail	1,049	\$34,700,100	\$88,965,400
Transportation	26	\$4,431,900	\$7,451,500
Entertainment	950	\$31,730,200	\$50,128,300
Accommodation	2,093	\$78,347,800	\$186,290,100
Restaurants	3,946	\$101,639,800	\$296,392,900
<b>Total Direct Impact</b>	<b>8,064</b>	<b>\$250,849,700</b>	<b>\$629,228,200</b>
<b>Total Supplier Impact</b>	<b>1,408</b>	<b>\$90,657,100</b>	<b>\$264,510,100</b>
<b>Total Induced Impact</b>	<b>1,720</b>	<b>\$95,184,300</b>	<b>\$288,715,500</b>
<b>Total Impact</b>	<b>11,192</b>	<b>\$436,691,200</b>	<b>\$1,182,453,800</b>

#### *Advertising and Marketing*

Approximately a dozen wine festivals are held each year, which provide Ohio wineries with the opportunity to market and promote their wines. These advertising and marketing efforts are critical to helping the Ohio wine industry grow and distinguish itself from other wine states. Approximately 23 people were employed in the business of advertising and marketing Ohio wines, receiving about \$1.3 million in wages and generating \$3.2 million in economic activity.

#### *Wine Research and Education*

The wine industry in Ohio is also supported by research and education organizations which are involved in applied activities to protect and improve grape cultivation and vinification. These organizations are responsible for spreading sound business practices as well as promoting new, innovative techniques to further the development of the Ohio wine industry. Approximately 20 people were employed in Ohio based research and education organizations, receiving about \$1.8 million in wages and generating \$4.4 million in economic activity. And this does not include the valuable benefits that come from better viticulture and vinification activities.

#### *Wine-related Associations*

The promotion and protection of the wine industry is supported by trade and other membership associations. These associations are charged with advocating, creating sound public policies, and hosting events to advance the interests of the wine industry. They directly employ approximately 7 jobs, paying about \$537,900 in wages and generating \$1.5 million in economic activity.

#### *Supplier firms*

The supplier impact created by the wine and grape industries includes goods and services from a multitude of different sectors. These are purchases of varied goods such as farm equipment, supplies, tools, cash registers, and promotional materials. Services such as consulting, banking, legal, and marketers are also a part of the supplier impact. In the case of the wine and grape industries, government jobs are created in government agencies responsible for the regulation of wine and vineyard related businesses. An estimated 7,641 supplier jobs overall are created by the wine industry, paying \$526.7 million in wages, and generating about \$1.6 billion in economic activity.

**Table 5**  
**Supplier Impact of the Wine and Grape Industries in Ohio**

<b>Sector</b>	<b>Jobs</b>	<b>Wages</b>	<b>Output</b>
Agriculture	267	\$4,726,400	\$22,512,700
Mining	6	\$463,300	\$4,278,300
Construction	72	\$4,946,900	\$16,790,200
Manufacturing	395	\$33,150,100	\$217,971,400
Transportation & Communication	1,351	\$100,040,800	\$306,367,600
Wholesaling	1,011	\$90,930,700	\$260,522,000
Retailing	171	\$6,762,800	\$19,160,000
Finance, Insurance, & Real Estate	1,077	\$42,669,000	\$277,910,300
Travel & Entertainment	418	\$12,444,900	\$27,565,300
Business & Personal Services	2,701	\$213,017,500	\$398,152,400
Government	172	\$17,588,400	\$28,139,700
Other	0	\$0	\$0
<b>Total Impact</b>	<b>7,641</b>	<b>\$526,740,800</b>	<b>\$1,579,369,900</b>

*Induced Impacts*

The induced impact is created by the expenditure of wages earned by employees in the direct and supplier sectors. These jobs are dependent on the wine industry in Ohio and would not exist if not for it. Businesses included in the induced impact include everything from restaurants and retailers to physicians' offices and universities. The induced impact of the wine and grape industries creates 7,625 jobs, paying \$422.2 million in wages, and generating about \$1.3 billion in economic activity.

**Table 6**  
**Induced Impact of the Wine and Grape Industries in Ohio**

<b>Sector</b>	<b>Jobs</b>	<b>Wages</b>	<b>Output</b>
Agriculture	40	\$675,300	\$3,609,000
Mining	4	\$184,200	\$2,271,300
Construction	53	\$3,437,800	\$11,811,900
Manufacturing	91	\$7,146,500	\$48,067,600
Transportation & Communication	429	\$31,438,000	\$109,693,700
Wholesaling	186	\$18,768,000	\$63,333,000
Retailing	1,150	\$41,621,700	\$116,012,900
Finance, Insurance, & Real Estate	929	\$51,495,200	\$408,921,300
Travel & Entertainment	1,011	\$29,304,900	\$75,432,300
Business & Personal Services	3,438	\$221,052,200	\$410,751,800
Government	68	\$6,839,500	\$15,310,200
Other	226	\$10,210,500	\$15,322,400
<b>Total Impact</b>	<b>7,625</b>	<b>\$422,173,800</b>	<b>\$1,280,537,400</b>

*Fiscal Impacts*

An important part of an impact analysis is the calculation of the contribution of the industry to the public finances of the state and country. 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, on the other hand, vary widely. Direct taxes include state sales taxes, license fees, and applicable gross receipt taxes. Private 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. In addition to this, consumers pay millions in federal, state and local sales and excise taxes when they purchase wine at both on- and off-premise establishments.

In the case of the wine and grape industries, the business taxes paid by firms operating in the wine and grape industries and their employees provide \$198.7 million to the federal government and \$313.6 million to state and local governments. Firms and employees in the wine tourism industry provide \$87.7 million to the federal government and \$53.8 million to state and local governments. In addition, the consumption of wine throughout the state generated \$87.7 million from on and off premise sales and state and local excise taxes, and \$2.2 million in federal excise taxes.

**Table 7**  
**Fiscal Impact of the Wine and Grape Industries in Ohio**

	<b>Wine and Grape Industries Business Taxes</b>	<b>Wine Tourism Business Taxes</b>	<b>Consumption Taxes</b>
State & Local	\$313,552,200	\$53,838,500	\$87,655,200
Federal	\$198,681,100	\$87,657,700	\$2,151,400
Total	\$512,233,300	\$141,496,200	\$89,806,600

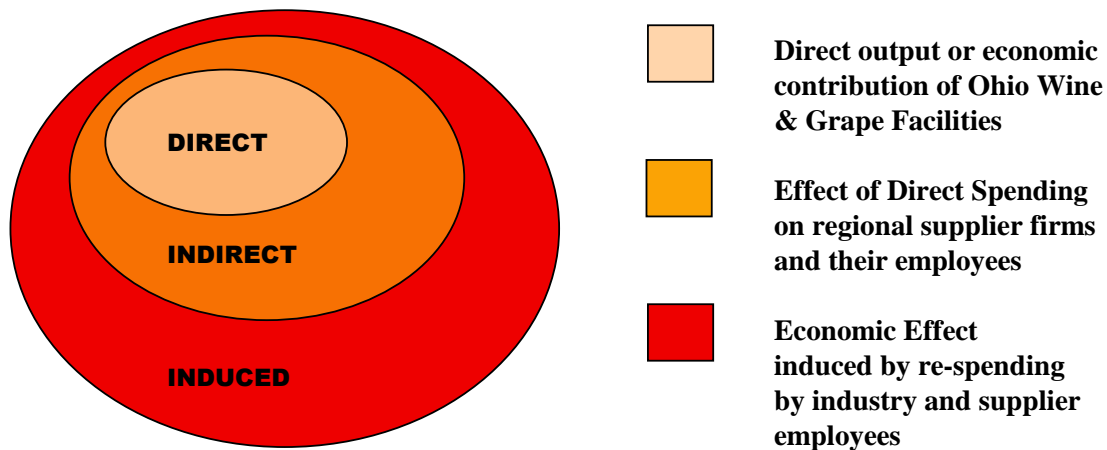
## Study Methodology

### Model Development

The Economic Impact Study begins with an accounting of the direct employment in the Ohio wine and grape industries. 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 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.

**Figure 2**  
**Graphical Description of Economic Impact Modeling**

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The economic activities of events are linked to other industries in the state and national economies. Activities related to the wine and grape industries represent the direct effects on the economy. Indirect impacts occur when these activities require purchases of goods and services such as advertising services or fertilizer 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 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 indirect sector and 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 this 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 Ohio Grape Industries Committee (OGIC), the Alcohol and Tobacco Tax and Trade Bureau (TTB), the Ohio Department of Liquor

Control, Ohio State University 2022 Ohio Grape Grower Survey, additional industry sources, government publications, and DataAxle. The analysis utilizes the IMPLAN model in order to quantify the economic impact of the Ohio wine and grape industries on the economy of Ohio.<sup>9</sup> 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 winery opening or vineyard sales – 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).<sup>10</sup>

Direct employment for the industry is calculated using data from the OGIC and DataAxle. Where DataAxle data was unavailable, direct employment was replaced with a median calculated by business type (winery, vineyard, 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 this model, direct employment in the Ohio wine and grape industries is a starting point for the analysis. Direct employment is based on data provided to JDA by DataAxle as of July 2022. DataAxle data are recognized nationally as a premier source of micro-industry data. DataAxle is the leading provider of business and consumer data for the top search engines and leading in-car navigation systems in North America. DataAxle gathers data from a variety of sources by sourcing, refining, matching, appending, and filtering. This data is then verified at a 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 the U.S. Department of Labor’s ES-202 reports. IMPLAN uses this data 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. In short, it includes all income paid to workers by employers.

For some industries like wine manufacturing, total output is the value of production by industry in a given state. For other industries like retailing and wholesaling, total output measured similarly to gross margin. Both types of output are estimated by IMPLAN from sources similar to those used by the Bureau of Economic Analysis (BEA) in its RIMS II series. Where no Census or government surveys are available, IMPLAN uses models such as the Bureau of Labor Statistics’ growth model to estimate the missing output.

The model also includes information on income received by the federal, state and local governments and produces estimates for the following taxes at the federal level: corporate income, payroll, personal income, estate and gift, and excise taxes, customs duties, fines, and 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.

Indirect taxes paid due to the consumption of wine in Ohio are also included in the analysis. This is based on estimates of output by in Ohio provided by the IMPLAN analysis. These figures – while mostly separate from the reported taxes paid – contain very small double counts. This is because individuals

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<sup>9</sup> The model uses 2020 input/output accounts.

<sup>10</sup> 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.

employed by the industry or its suppliers purchase wine, and the sales taxes on alcoholic beverages as well as certain state excise taxes paid by these people are already included in the direct taxes section.

The data used to develop direct employment figures by sector is described in detail below.

### Vineyards

The economic impact of vineyards in Ohio is based on provided by OGIC, Ohio State University 2022 Ohio Grape Grower Survey, and DataAxle.

### Wineries

The economic impact of wineries is based on data provided by OGIC, licensing data from TTB and the Department of Liquor Control, DataAxle, and other industry sources. Wineries include those facilities that produce their own, brand name wines, winery owned retail outlets, facilities contracted to produce wines for other companies, and companies marketing their own wine brand, but not producing the wine itself, so-called virtual wineries.<sup>11</sup>

Based on these combined datasets, it is estimated that there are about 179 active wineries in the State of Ohio. DataAxle employment figures are used to estimate the jobs in each facility. Where no DataAxle data was available, median job figures were used.

### Ohio Wine Wholesaling

Traditionally, most wine is sold through what is called the three-tier system, whereby producers sell to wholesalers, who in turn sell to retailers. Considering that Ohio wineries produced upwards of 1.2 million gallons in a 12-month period, wholesalers are a vital part of the industry, transporting and distributing across the country. Wholesalers and wholesale importers in this study are handling not only Ohio wine, but also distributing wine made in neighboring states and across the globe.

Data for these wholesale activities comes from DataAxle, client-provided data, Alcohol Wholesaler Permit Lists from the TTB, the Ohio Liquor Control Commission, and the Wine and Spirits Wholesalers of America (WSWA).

### Ohio Wine Retailing

The third tier, retailing, is responsible for selling wine to consumers through on- and off-premise businesses such as restaurants, bars, and liquor stores. Retail sales that are occurring at winery owned facilities such as tasting rooms or restaurants within the winery's premises are not included in this impact. These impacts are captured in the winery sector.

Employment data were gathered at the zip code level from DataAxle. The Economic Census of Retail Trade by Product Line<sup>12</sup> and U.S. Department of Commerce – Bureau of Economic Analysis – Personal

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<sup>11</sup> There are companies that are licensed as wineries for marketing purposes only. These companies might consist of just a single individual or small group of individuals who have simply developed a label and have sales agreements with restaurants or distributors. The actual wine is produced under contract with either a larger branded winery, or at a so-called custom crush facility that provides all of the labor and equipment. Both custom crush facilities and the companies that market this wine are included in this analysis as wineries.

<sup>12</sup> *2020 Economic Census - Retail Trade: Subject Series - Product Lines: Product Lines Statistics by Industry for the U.S. and States: 2020*, United States Census Bureau.

Consumption Expenditures by Type of Product<sup>13</sup> is used to determine the type of off-premise stores that sell wine as well as the percent of sales at each store type that is due to the sale of wine. IMPLAN Use data and U.S. Department of Commerce – Bureau of Economic Analysis – Personal Consumption Expenditures by Type of Product is used to determine the type of on-premise stores that sell wine as well as the percent of sales at each store type that is due to the sale of wine.

### Wine Research and Education

The research and education sector is defined as organizations that are involved in applied research and educational programs which facilitate the development and advancement of knowledge and enable wineries, grape growers, and other wine-related industries to improve and protect the quality of their goods and services. Data for wine research and educational organizations was provided by the OGIC.

### Wine-related Associations

The promotion and protection of the Ohio wine industry is supported by trade and other membership associations. These associations are charged with advocating, creating sound public policies, and hosting events to advance the interests of the Ohio wine industry. Data for wine associations was provided by the OGIC.

### Wine-related Tourism

One of the important elements of the impact of wineries on the Ohio economy is their attractiveness to tourists. Every year, thousands of people visit wine-growing regions across the state in part to visit, or even stay at, wineries, learn about wine, and sample different wines. In order to estimate the economic impact of these visits, it was first necessary to calculate the number of visitors to the state's «Wineries» wineries. This was done at the county level based on an econometric model that used detailed data calculated by key wine producing counties as a means of estimating visitors per winery. A function was developed that estimated the number of visits per winery based on the number of wineries in each of the 88 counties in Ohio that produce wine. This relies on the idea of economic clustering, which suggests that a larger grouping of wineries would attract more visitors to each winery than a smaller grouping. The tendency of locational clustering of similar types of firms has been documented by economists since at least the beginning of the twentieth century. British academic Stephen Brown described the rule of 'retail compatibility,' which explains how retail businesses, such as restaurants, know that two compatible firms in close proximity will show an increase in business volume directly proportionate to the incidence of consumer interchange between them.<sup>14</sup> This concept was confirmed by a study by Andrei Rogers who found that the clustered spatial pattern exhibited by consumer goods retailers appears to contradict a common hypothesis that these stores tend to repel one another.<sup>15</sup>

While Rogers suggests that population densities have a lot to do with the clustering, there is the significant economic theory that suggests that the tendency of activities to a cluster is related more to competitive characteristics than to generalized demographic characteristics.<sup>16</sup>

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<sup>13</sup> Table 2.4.5U *Personal Consumption Expenditures by Type of Product*, U.S. Department of Commerce – Bureau of Economic Analysis.

<sup>14</sup> See: DeFranco, Laurence, William Lilley III, and John Dunham, *The Case of the Transient Taxpayer: How Tax-Driven Price Differentials for Commodity Goods Can Create Improbable Markets*, *Business Economics*, July 1998.

<sup>15</sup> See: Rogers, Andrei, *A Stochastic Analysis of the Spatial Clustering of Retail Establishments*, *Journal of the American Statistical Association*, December 1965.

<sup>16</sup> See: Braid, Ralph, *Spatial Price Competition with Consumers on a Plane, at Intersections, and Along Main Roadways*, *Journal of Regional Science*, Vol 33, No. 2, 1993.

Using this model JDA calculates that a winery existing alone in a county would receive just over 5,400 visitors in a year and that the number of annual tourist visitors would rise linearly at a rate of about 6 additional visits per year for each additional winery in the county. As such, a county with 5 wineries would see just roughly 27,223 visits, while one with 30 wineries would report nearly 54,718.

Multiplying out the number of visits across the 88 counties in Ohio with wineries gives a total of nearly 2,327,150 million unique tourist visits. These are people specifically visiting the Ohio wine producing counties with wineries. The bulk of these are local visitors attending an event, having dinner or just stopping by to purchase a bottle of wine. No state specific data are available to estimate the number of wineries each individual visitor goes to on a trip, however, an extensive survey of wineries in Napa California, suggests each person visits on average about 3.2 wineries, so dividing visits by 3.2 gives an estimate of just over 706,850 actual wine related visitors going to wineries across the state.<sup>17</sup>

Once the number of visitors was calculated, spending propensities using data as broken into 24 industries based on percentages derived from the US Department of Commerce, Bureau of Economic Analysis.<sup>18</sup> These were in turn, combined into aggregate categories for processing with the IMPLAN model. As such, rather than basing the direct tourism impact on jobs (as with the rest of the study), it is based on estimated visitor spending on key tourism categories.

### IMPLAN

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.

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 (those eligible for unemployment insurance), it is modified to add information on those who are not, such as independent workers, agricultural employees, and construction workers. Data is then adjusted to account for counties where non-disclosure rules apply. Wage data includes not only cash wages, but health and life insurance payments, retirement payments, and other non-cash compensation as well. They include 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,

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<sup>17</sup> See: *2014 Napa Valley Visitor Profile: Report of Findings*, prepared by Destination Analysts for Visit Napa Valley, March 2015, at <http://sodacanyonroad.org/docs/Napa%20Valley%202014%20Visitor%20Profile%20Study%20-%20Final%20Report%20of%20Findings.pdf>. These were the only data available on visits per person that we have been able to find.

<sup>18</sup> U.S. Travel and Tourism Satellite Accounts, US Department of Commerce, Bureau of Economic Analysis, at: [http://www.bea.gov/industry/tourism\\_data.htm](http://www.bea.gov/industry/tourism_data.htm). The following categories were used in the analysis: Traveler accommodations, food services and drinking places, domestic passenger air transportation services, international passenger air transportation services, passenger rail transportation services, passenger water transportation services, interurban bus transportation, interurban charter bus transportation, urban transit systems and other transportation services, taxi service, scenic and sightseeing transportation services, automotive rental, other vehicle rental, automotive repair services, parking lots and garages, highway tolls, travel arrangement and reservation services, motion pictures and performing arts, spectator sports, participant sports, gambling, all other recreation and entertainment, gasoline, retail sales, food stores.



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 as well as licenses, fees, and certain payroll taxes.

### IMPLAN Methodology<sup>19</sup>

Input-output analysis, for which Wassily Leontief received the 1973 Nobel Prize in Economics for, 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 gathers this data, converts them into a consistent format, and estimates the missing components.

There are three different levels of data generally available in the United States: federal, state, and county. Most of the detailed data 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 estimating variables that are not found in the merged data. The data are 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 basis 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 are converted using margins derived from the BEA Input-Output model. Margins represent the difference between a producer and consumer prices. As such, the margins for any good add up 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 particular regional differences, adjustments need to be made. Regional trade flows are estimated based on the Multi-Regional Input-Output Accounts, a cross-sectional database with consistent cross interstate trade flows developed in 1977. These data are updated and bridged to the 546 sector IMPLAN model.

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<sup>19</sup> This section is paraphrased from IMPLAN Professional: Users Guide, Analysis Guide, Data Guide, Version 2.0, MIG, Inc., June 2000.

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.

### **About John Dunham & Associates**

Firms can better manage any issue by developing facts-based economic materials and messaging tools. At John Dunham & Associates, we partner with organizations and provide strong analysis, as well as unique, credible messages and tools for use in business operations, lobbying, government affairs, and litigation support.

The project team is led by John Dunham. Mr. Dunham has over 30 years of experience in conducting cost-benefit modeling, industry analysis, economic research and excise tax and fiscal analysis. He has developed demand models and forecasting tools for dozens of industries and has extensive experience in modeling for both government and Fortune 500 companies.

John Dunham and JDA have produced hundreds of separate studies, economic models and position papers and performed hundreds of market research, economic impact, and financial analyses for the government, corporate and non-profit sectors. This research was used for tort settlements, real estate developments, and legislative actions throughout the country.