

**The Economic Impact of a Sales Ban
on Flavored Vapor Products on
the Economies of the United States
and the States Comprising the Ninth
Circuit**

Prepared for the
Vapor Technology Association

by

John Dunham & Associates



November 9, 2022

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Executive Summary. John Dunham & Associates (JDA) was asked by the Vapor Technology Association to analyze the impact on the U.S. and state economies of flavor sales bans covering all non-tobacco flavored vapor products. JDA's analysis builds on the economic impact study that it previously conducted in 2021 which assessed the full economic impact of the vapor products industry. This report examines the impact of a national flavor ban on the U.S. economy, the impact of a ban limited to the Ninth Circuit jurisdictions on the U.S. economy, and the impact of a ban on the economies of the nine states comprising the Ninth Circuit.

The nicotine vapor industry is an important, dynamic part of the U.S. economy which reaches into all corners of the United States, directly employing 66,364 Americans and generating \$2.74 billion in wages, and \$8.09 billion in economic activity nationally. When we assessed the full economic impact of this industry, we determined that it creates more than 133,000 jobs, paying over \$7.0 billion in wages and benefits, while generating more than \$22

billion in economic output. In addition, there are 11,920 full-time equivalent jobs created by vapor product sales at traditional retailers like supermarkets, convenience stores, drug stores, and department stores.

Because sales of flavored vapor products are such a large part of the industry's sales to adult consumers, particularly in the independent vapor product distribution chain, a flavor ban would have a devastating effect on the vapor sector if such a ban were implemented nationally, or via a complete patchwork of state or local bans, and it would have a dramatic impact even if limited to the states comprising the Ninth Circuit.

A national flavor ban implemented federally, or implemented state by state or municipality by municipality, would cause the loss of 99,158 full-time equivalent (FTE) jobs, the loss of \$5,258,906,715 in wages and benefits, and the loss of \$16,449,776,269 to the U.S. economy.

More importantly, if all states and localities were allowed to ban flavored vaping products, the independent vapor segment of the market would cease to exist in any meaningful way since the vast majority of the 9,847 independent vapor shops in the country (which currently generate 53,212 full-time equivalent jobs) would likely have to close. No business can continue to exist were it to lose 74.6 percent of its revenue.

Further, if the scope of the Ninth Circuit ruling was limited to the nine states comprising the Ninth

Circuit, over 14,030 FTE positions would be lost.¹ Collectively, the economies of these nine states would be over \$2.5 billion smaller than they would be if flavored vapor products continue to be sold.

At the same time, while some sales and jobs would shift to states outside of the Ninth Circuit, a flavor ban limited to the nine states comprising the Ninth Circuit would still result in the loss of 10,925 FTE jobs across the entire US economy and the overall loss to the US economy would be \$2.1 billion.

Vapor Industry Economic Impact Study: In 2021, John Dunham & Associates (JDA) conducted the 2021 Vapor Industry Economic Impact Study of the Vapor Industry which estimated the economic contributions made by the nicotine vapor industry (which includes e-liquids, coils, box mods and other nicotine vapor products) to the U.S. economy.² (The 2021 study followed up and expanded upon a similar study we first conducted in 2018.)

JDA's research was funded by the Vapor Technology Association. This study used standard econometric models first developed by the U.S. Forest Service, and now maintained by IMPLAN Inc. Data

¹ Note that due to data limitations, the model does not include US territories that might be covered under a Ninth Circuit ruling.

² The *2021 Economic Impact Study of the Vapor Industry*, Prepared for the Vapor Technology Association, John Dunham & Associates, September 20, 2021, at <https://vaportechnology.org/vaping-impact/> (hereinafter, the "2021 Study").

came from industry sources, government publications and Data-Axle.³

The study measures the number of jobs in the nicotine vapor 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 vapor 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 nicotine vapor 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.

³ 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.

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.

Economic Impact of the Vapor Products Industry. The nicotine vapor industry is an important and dynamic part of the U.S. economy. The vapor industry (as defined in this study) includes manufacturers of e-liquids, coils, box mods and other nicotine vapor products, wholesalers, and retailers that sell vapor products such as vape stores, tobacco shops, convenience stores, supermarkets, gasoline stations, pharmacies and drug stores, warehouse clubs and supercenters. The vapor industry reaches into all corners of the United States, directly employing 66,364 and generating \$2.74 billion in wages. Vapor businesses directly generate \$8.09 billion in economic activity nationally. See Table 1.

Other firms are related to the vapor industry as suppliers. These firms produce and sell a broad range of items including e-liquid, coils, batteries, and all of the merchandise needed to maintain vapor 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, we estimate that the industry is responsible for 28,098 supplier jobs. These firms generate about \$6.88 billion in economic activity.⁴

An economic analysis of the vapor 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 vapor 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 vapor industry. For 2021, the induced impact of the industry generates 39,111 jobs and \$7.12 billion in economic impact, for a multiplier of 0.88.⁶

Total Economic Impact. When direct, indirect and induced job creation are taken together, the total

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 very large multipliers - as high as 4 or 5. These studies invariably include the firms supplying the induced industries as part of the induced impact. JDA believes this is not an appropriate definition of the induced impact and thus limits this calculation only to the effect of spending by direct and indirect employees.

impact of the nicotine vapor products industry is significant in that it generates 133,573 jobs paying \$7,003,246,000 in wages and benefits. Further, the nicotine vapor products industry accounts for about \$22.09 billion in economic output or about 0.10 percent of GDP. Table 1 presents a summary of the total economic impact of the nicotine vapor industry in the United States.⁷

Table 1. Economic Impact of the Vapor Industry.

| | Jobs | Wages | Economic Impact |
|--------------|----------------|------------------------|-------------------------|
| Direct | 66,364 | \$2,741,178,400 | \$8,087,436,700 |
| Indirect | 28,098 | \$2,018,273,300 | \$6,879,165,500 |
| Induced | 39,111 | \$2,243,794,900 | \$7,124,240,600 |
| Total | 133,573 | \$7,003,246,600 | \$22,090,842,800 |

Small Business Impact. The majority of the vapor products industry is made up of small businesses. Our study found that the independent businesses of the vapor industry total 10,527 firms. The majority of those firms are independent retail vape shops and blending vape shops (which also manufacture e-liquids). Table 2 identifies the breakdown of firms within the industry.

⁷ The 2021 Economic Impact Study of the Vapor Industry, Prepared for Vapor Technology Association, John Dunham & Associates, September 20, 2021, at : <https://vaportechnology.org/vaping-impact/>.

Table 2. Distribution of Firms by Type

| Firm Type | No. | % of Total |
|------------------------|---------------|-------------------|
| Vape shop | 8,328 | 81.19% |
| Blending vape shop | 1,519 | 14.81% |
| E-liquid manufacturer | 208 | 2.03% |
| Wholesaler | 140 | 1.36% |
| Component manufacturer | 45 | 0.44% |
| Coil manufacturer | 7 | 0.07% |
| Online retail | 10 | 0.10% |
| Total | 10,257 | 100.00% |

Of the 66,364 direct jobs generated by the industry, about 53,212 jobs are held by people working for the 9,847 independent retail and blending vape shops located across the country.

Fiscal Impact. Another important part of an impact analysis is the calculation of the contribution of the industry to the public finances of the country.

Table 3. Fiscal Contribution of the Nicotine Vapor Industry.

| Tax Type | Federal | State/Local | Total |
|----------------------------|----------------|--------------------|---------------|
| Individual Income | \$536,380,600 | \$139,348,000 | \$675,728,600 |
| Social Security/ Insurance | \$724,359,100 | \$11,879,300 | \$736,238,400 |

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| | | | |
|-------------------------------------|------------------------|------------------------|------------------------|
| Property | | \$499,667,200 | \$499,667,200 |
| Business/ Employee Paid Sales | | \$544,313,900 | \$544,313,900 |
| Corporate Income | \$70,087,700 | \$30,681,800 | \$100,769,500 |
| Personal & Business | \$149,384,100 | \$125,900,000 | \$275,284,100 |
| Federal Excise | \$0 | | \$0 |
| State Excise | | \$905,923,800 | \$905,923,800 |
| State Sales | | \$681,311,700 | \$681,311,700 |
| Other State and Local | | \$295,097,600 | \$295,097,600 |
| Total | \$1,480,211,500 | \$3,234,123,300 | \$4,714,334,800 |

As set forth in Table 3 above, in the vapor industry, the taxes paid by firms and their employees provide \$1.48 billion to the federal government and \$3.23 billion to state and local governments including income taxes, property taxes, profits taxes, etc. These figures also include state and local sales and excise taxes that are paid by consumers when they purchase vapor products. These sales-based taxes total \$1.88 billion. (See Table 3).

Impact of a National Flavor Ban. When previously analyzing the effect of a national flavor ban in 2019, JDA determined that the majority of the nearly 13,000 small vape shop retailers would close.⁸ Based on this updated analysis in 2022, were all

⁸ *The Economic Impact of a Ban on Flavored Vapor Products*, John Dunham & Associates, November 21, 2019, available at <https://vaportechnology.org/vaping-impact/>.

states and localities allowed to ban the sale of flavored vapor products, the impact on the economy would be \$16,449,776,269, with \$6,029,469,895 in direct sales losses. Because our analysis applies to only nicotine vapor products, the full impact of any blanket ban on all flavored tobacco products would be larger when losses of traditional combustible tobacco products are calculated.

Based on a survey of the 3 largest distributors in the independent vapor distribution chain, 93.6 percent of sales nicotine vaping products are of menthol flavored (7.9%) and other flavored (85.7%) vapor products, and just 6.4 percent are tobacco flavors. These data should be more representative of the total market than scanner data (which are discussed below) since well more than half of all vapor sales are of open-systems (or e-liquids) and are made at dedicated vapor and tobacco retailers.

Using these breaks, were all states and localities allowed to ban both flavored products, adults who prefer these products will react in one of three ways: (1) stop vaping altogether and return to smoking cigarettes or another tobacco product; (2) switch to vaping tobacco flavored products; or (3) seek their favored flavors from states or jurisdictions where they are still available, from the black market or make them at home.

JDA's modeling suggests that a large portion of consumers would react by purchasing unregulated products over the black market or make their own flavored e-liquids. However, government sponsored research (that does not include this option) concludes

that there would be a large shift toward tobacco flavored products. Based on these data it would be likely that the current 6.4 percent share of tobacco flavored products would increase to about 25.4 percent of pre-ban sales. Overall, sales would fall to roughly \$2,057,967,509, resulting in a net sales loss of \$6,029,469,895. See Table 4.

Table 4. Projected Losses with Total Flavor Ban

| Flavor Type | Current Sales % | Post Ban % | Current Sales | Post Ban Sales |
|-------------|-----------------|------------|-----------------|-----------------|
| Flavored | 85.7% | 0.0% | \$6,927,698,881 | \$0 |
| Menthol | 7.9% | 0.0% | \$641,333,786 | \$0 |
| Tobacco | 6.4% | 100.0% | \$518,404,738 | \$2,057,967,509 |
| Total | 100.0% | 100.0% | \$8,087,437,404 | \$2,057,967,509 |

Based on this changed behavior, JDA's model estimates that a total U.S. flavor ban would lead to a loss of nearly 99,160 jobs, \$5,258,906,715 in wages in benefits, and about \$16,449,776,269 in economic activity.

Table 5. Impact of a National Flavor Ban

| | | | | |
|---------------|---------------|---------------|---------------|----------------|
| Current | Direct | Supplier | Induced | Total |
| Jobs | 66,357 | 28,089 | 39,109 | 133,555 |
| Wages | \$2.7 billion | \$2.0 billion | \$2.2 billion | \$7.0 billion |
| Output | \$8.1 billion | \$6.9 billion | \$7.1 billion | \$22.1 billion |
| | | | | |
| <i>Change</i> | Direct | Supplier | Induced | Total |
| Jobs (Lost) | (49,178) | (20,824) | (29,156) | (99,158) |

| | | | | |
|------------------|--------------------|--------------------|--------------------|---------------------|
| Wages (Lost) | (\$2.1 billion) | (\$1.5 billion) | (\$1.7 billion) | (\$5.3 billion) |
| Output (Lost) | (\$6.0 billion) | (\$5.1 billion) | (\$5.3 billion) | (\$16.4 billion) |

Importantly, the independent vapor segment of the market would cease to exist in any meaningful way and the impact might even be larger since the vast majority of the 9,847 independent vapor shops in the country (which currently generate 53,212 full-time equivalent jobs) would likely have to close. No business can continue to exist were it to lose nearly three-quarters of its revenue. Fixed costs, such as rent, insurance, electricity and interest still must be paid, and represent at least 23.0 percent of a retail store's operating budget.

Impact of a Flavor Ban Limited to the Ninth Circuit. Applying our model to the states which comprise the Ninth Circuit only, we found that the overall cost of the ban in these nine states would be the loss of 10,925 FTE positions across the entire US economy.⁹ These jobs would have paid \$702,261,072 in wages and benefits. The overall cost to the US economy would be \$2,108,722,133. These losses take into account the impact of increased cross-border sales from states where flavored vapor products are not banned; in addition, they also account for lost sales that had previously been purchased by consumers in other states from outlets in the states comprising the Ninth Circuit.

⁹ *The 2021 Economic Impact Study of the Vapor Industry*, Prepared for: Vapor Technology Association, John Dunham & Associates, September 20th, 2021, at: <https://vaportechnology.org/vaping-impact/>

Table 6 below shows the economic impact on the U.S. if all flavored vapor products are banned only in the states comprising the Ninth Circuit.

Table 6: Impact of the US Economy of a Flavor Ban Limited to Ninth Circuit States

| Current | Direct | Supplier | Induced | Total |
|---------------|-----------------|-----------------|-----------------|-----------------|
| Jobs | 66,357 | 28,089 | 39,109 | 133,555 |
| Wages | \$2.7 billion | \$2.0 billion | \$2.2 billion | \$7.0 billion |
| Output | \$8.1 billion | \$6.9 billion | \$7.1 billion | \$22.1 billion |
| | | | | |
| <i>Change</i> | Direct | Supplier | Induced | Total |
| Jobs (Lost) | (5,125) | (2,473) | (3,327) | (10,925) |
| Wages (Lost) | (\$263 million) | (\$212 million) | (\$227 million) | (\$702 million) |
| Output (Lost) | (\$830 million) | (\$600 million) | (\$678 million) | (\$2.1 billion) |

State by State Losses. Looking at the nine states in a vacuum, the total loss in jobs would be over 14,030 FTE positions, paying \$801.0 million in wages and benefits. The economies of these nine states would be over \$2.5 billion smaller than they would be if flavored and menthol vapor products continue to be sold.¹⁰ Tables 7a – 7i below show the economic impact on the economy of each state within the Ninth Circuit if all these states and/or their local governments were authorized under Ninth Circuit precedent to ban flavored vapor products.

¹⁰ Prepared for the Vapor Technology Association by John Dunham & Associates, 2022. See methodology section,

Alaska. In the state of Alaska, total job loss would be approximately 162 FTE positions, paying \$7.8 million in wages and benefits, and the economic output of the Alaska economy would be diminished by nearly \$22.2 million if flavor vapor products could not be sold. See Table 7a.

| Table 7a: Impact on the Alaska economy of a Ninth Circuit flavor ban | | | | |
|-----------------------------------------------------------------------------|---------------|---------------|---------------|----------------|
| Current | Direct | Supplier | Induced | Total |
| Jobs | 134 | 38 | 61 | 233 |
| Wages | \$5,030,787 | \$2,720,745 | \$3,440,583 | \$11,192,115 |
| Output | \$10,668,899 | \$10,659,993 | \$10,576,612 | \$31,905,505 |
| Change | Direct | Supplier | Induced | Total |
| Jobs (Lost) | (93) | (27) | (43) | (162) |
| Wages (Lost) | (\$3,488,854) | (\$1,890,550) | (\$2,387,694) | (\$7,767,098) |
| Output (Lost) | (\$7,413,445) | (\$7,407,256) | (\$7,339,952) | (\$22,160,653) |

Arizona. In the state of Arizona, total job loss would be approximately 3,080 FTE positions, paying \$149.9 million in wages and benefits, and the economic output of the Arizona economy would be diminished by over \$463.0 million if flavor vapor products could not be sold. See Table 7b.

| Table 7b: Impact on the Arizona economy of a Ninth Circuit flavor ban | | | | |
|------------------------------------------------------------------------------|--|--|--|--|
|------------------------------------------------------------------------------|--|--|--|--|

15a

| Current | Direct | Supplier | Induced | Total |
|------------------|-----------------|----------------|----------------|-----------------|
| Jobs | 1,516 | 655 | 911 | 3,082 |
| Wages | \$59,711,548 | \$41,889,909 | \$48,296,757 | \$149,898,214 |
| Output | \$179,951,524 | \$132,241,005 | \$150,823,443 | \$463,015,971 |
| Change | Direct | Supplier | Induced | Total |
| Jobs (Lost) | (908) | (392) | (524) | (1,825) |
| Wages (Lost) | (\$33,405,920) | (\$25,091,780) | (27,807,172) | (\$86,304,872) |
| Output (Lost) | (\$107,789,779) | (\$79,211,492) | (\$86,837,579) | (\$273,838,850) |

California. In the state of California, where the majority of e-liquid manufacturers of the independent vapor products industry are based, total job loss would be approximately 6,925 FTE positions, paying \$445,565,776 in wages and benefits, and the economic output of the California economy would be diminished by \$1,497,332,882 if flavored vapor products could not be sold. See Table 7c.

| Table 7c: Impact on the California economy of a Ninth Circuit flavor ban | | | | |
|---------------------------------------------------------------------------------|-----------------|-----------------|-----------------|-----------------|
| Current | Direct | Supplier | Induced | Total |
| Jobs | 6,015 | 3,254 | 4,289 | 13,559 |
| Wages | \$349.3 million | \$289.5 million | \$300.3 million | \$939.2 million |
| Output | \$1.11 billion | \$877.4 million | \$944.4 million | \$2.93 billion |

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| Change | Direct | Supplier | Induced | Total |
|------------------|----------------------|----------------------|----------------------|----------------------|
| Jobs (Lost) | (3,173) | (1,717) | (2,035) | (6,925) |
| Wages (Lost) | (\$150.4 million) | (\$152.7 million) | (\$142.5 million) | (\$445.6 million) |
| Output (Lost) | (\$586.4 million) | (\$462.8 million) | (\$448.0 million) | (\$1.497 billion) |

Hawaii. In the state of Hawaii, total job loss would be approximately 240 FTE positions, paying \$11.7 million in wages and benefits, and the economic output of the Hawaii economy would be diminished by over \$36.2 million if flavor vapor products could not be sold. See Table 7d.

| Table 7d: Impact on the Hawaii economy of a Ninth Circuit flavor ban | | | | |
|-----------------------------------------------------------------------------|----------------|---------------|----------------|----------------|
| Current | Direct | Supplier | Induced | Total |
| Jobs | 191 | 62 | 104 | 357 |
| Wages | \$8,248,442 | \$4,153,542 | \$5,772,213 | \$18,174,197 |
| Output | \$22,031,808 | \$13,617,410 | \$19,013,608 | \$54,662,826 |
| Change | Direct | Supplier | Induced | Total |
| Jobs (Lost) | (128) | (42) | (67) | (237) |
| Wages (Lost) | (\$5,172,842) | (\$2,795,402) | (\$3,708,632) | (\$11,676,875) |
| Output (Lost) | (\$14,827,766) | (\$9,164,739) | (\$12,216,195) | (\$36,208,699) |

Idaho. In the state of Idaho, total job loss would be approximately 620 FTE positions, paying \$26.4 million in wages and benefits, and the economic output of the Idaho economy would be diminished by just over \$99.0 million if flavor vapor products could not be sold. See Table 7e.

| Table 7e: Impact on the Idaho economy of a Ninth Circuit flavor ban | | | | |
|----------------------------------------------------------------------------|----------------|----------------|----------------|----------------|
| Current | Direct | Supplier | Induced | Total |
| Jobs | 481 | 218 | 269 | 968 |
| Wages | \$19,599,260 | \$12,404,705 | \$13,526,744 | \$45,530,709 |
| Output | \$66,479,906 | \$41,915,296 | \$46,175,688 | \$154,570,890 |
| Change | Direct | Supplier | Induced | Total |
| Jobs (Lost) | (321) | (145) | (156) | (622) |
| Wages (Lost) | (\$10,312,117) | (\$8,262,588) | (\$7,850,755) | (\$26,425,461) |
| Output (Lost) | (\$44,281,270) | (\$27,919,150) | (\$26,799,798) | (\$99,000,218) |

Montana. In the state of Montana, total job loss would be approximately 333 FTE positions, paying nearly \$15.6 million in wages and benefits, and the economic output of the Montana economy would be diminished by almost \$51.9 million if flavor vapor products could not be sold. See Table 7f.

| Table 7f: Impact on the Montana economy of a Ninth Circuit flavor ban | | | | |
|------------------------------------------------------------------------------|--------|----------|---------|-------|
| Current | Direct | Supplier | Induced | Total |
| Jobs | 207 | 89 | 125 | 421 |

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| | | | | |
|---------------|----------------|----------------|----------------|----------------|
| Wages | \$8,840,845 | \$4,963,950 | \$6,101,658 | \$19,906,453 |
| Output | \$24,163,040 | \$20,986,697 | \$20,336,550 | \$65,486,288 |
| Change | Direct | Supplier | Induced | Total |
| Jobs (Lost) | (165) | (71) | (98) | (333) |
| Wages (Lost) | (\$6,851,068) | (\$3,951,588) | (\$4,774,726) | (\$15,577,381) |
| Output (Lost) | (\$19,235,161) | (\$16,706,611) | (\$15,913,945) | (\$51,855,717) |

Nevada. In the state of Nevada, total job loss would be approximately 890 FTE positions, paying \$42.4 million in wages and benefits, and the economic output of the Nevada economy would be diminished by over \$147.5 million if flavor vapor products could not be sold. See Table 7g.

| Table 7g: Impact on the Nevada economy of a Ninth Circuit flavor ban | | | | |
|-----------------------------------------------------------------------------|----------------|----------------|----------------|-----------------|
| Current | Direct | Supplier | Induced | Total |
| Jobs | 672 | 279 | 357 | 1,307 |
| Wages | \$29,706,673 | \$18,844,667 | \$19,229,908 | \$67,781,247 |
| Output | \$92,583,535 | \$61,787,851 | \$63,533,144 | \$217,904,530 |
| Change | Direct | Supplier | Induced | Total |
| Jobs (Lost) | (469) | (195) | (223) | (887) |
| Wages (Lost) | (\$17,224,163) | (\$13,158,200) | (\$12,033,654) | (\$42,416,017) |
| Output (Lost) | (\$64,646,017) | (\$43,143,075) | (\$39,757,647) | (\$147,546,739) |

Oregon. In the state of Oregon, total job loss would be approximately 1,210 FTE positions, paying \$61.8 million in wages and benefits, and the economic output of the Oregon economy would be diminished by nearly \$181.0 million if flavor vapor products could not be sold. See Table 7h.

| Table 7h: Impact on the Oregon economy of a Ninth Circuit flavor ban | | | | |
|-----------------------------------------------------------------------------|----------------|----------------|----------------|-----------------|
| Current | Direct | Supplier | Induced | Total |
| Jobs | 813 | 372 | 497 | 1,683 |
| Wages | \$33,210,088 | \$25,815,377 | \$27,457,876 | \$86,483,341 |
| Output | \$91,122,511 | \$76,654,288 | \$83,471,289 | \$251,248,088 |
| <hr/> | | | | |
| Change | Direct | Supplier | Induced | Total |
| Jobs (Lost) | (588) | (269) | (355) | (1,212) |
| Wages (Lost) | (\$23,541,572) | (\$18,662,724) | (\$19,632,888) | (\$61,837,184) |
| Output (Lost) | (\$65,875,246) | (\$55,415,726) | (\$59,683,511) | (\$180,974,484) |

Washington. In the state of Washington, total job loss would be approximately 1,850 FTE positions, paying \$103.4 million in wages and benefits, and the economic output of the Washington economy would be diminished by over \$300.9 million if flavor vapor products could not be sold. See Table 7i.

| Table 7i: Impact on the Washington economy of a Ninth Circuit flavor ban | | | | |
|---------------------------------------------------------------------------------|--|--|--|--|
|---------------------------------------------------------------------------------|--|--|--|--|

20a

| Current | Direct | Supplier | Induced | Total |
|------------------|-----------------|---------------|----------------|-----------------|
| Jobs | 1,284 | 472 | 698 | 2,454 |
| Wages | \$58,317,380 | \$36,809,622 | \$43,638,924 | \$138,765,926 |
| Output | \$151,774,396 | \$115,040,782 | \$132,520,298 | \$399,335,476 |
| Change | Direct | Supplier | Induced | Total |
| Jobs (Lost) | (973) | (358) | (520) | (1,851) |
| Wages (Lost) | (\$42,988,308) | (27,895,398) | (\$32,517,462) | (\$103,401,168) |
| Output (Lost) | (\$115,019,036) | (87,181,238) | (\$98,747,250) | (\$300,947,524) |

A ban on these products in the states comprising the Ninth Circuit would encourage consumers to react in some combination of four different ways. Some, though likely very few, would stop consuming any vapor products. A larger percentage would switch from flavored vapor products to unflavored (or *tobacco flavored*) products. Some consumers would stop vaping and return to smoking combustible cigarettes or begin to consume other flavored products such as cigars or moist snuff. Finally, the models and data from other states that have banned these products suggest that many consumers would simply turn to sources outside of the jurisdiction of the nine states. These could be other states, Federal jurisdictions such as military bases, or simply purchase their products on-line.¹¹

¹¹ The lower impact in the nine states suggest that many consumers who reside in other states currently purchase these flavored vapor products from sources in the states comprising the Ninth Circuit. A ban would eliminate these sales as well.

Fiscal Impact on U.S. and State Economies.

Not only would a ban lead to losses in employment and economic output, but taxes at both the state and federal levels would fall as well. Lost job and corporate activity would lead to reductions in taxes paid by businesses and workers. This includes reductions in income taxes, profits taxes, social security payments, and even property taxes. Table 8 outlines the estimated federal and state tax losses resulting from the bans examined in this report.

Table 8: Estimated fiscal impacts of a flavor ban

| Jurisdiction | Federal Tax Differential | State Tax Differential |
|---------------------|---------------------------------|-------------------------------|
| Alaska | (\$1,306,032) | (\$1,353,332) |
| Arizona | (\$17,400,828) | (\$15,703,817) |
| California | (\$93,004,827) | (\$82,834,190) |
| Hawaii | (\$2,246,365) | (\$3,464,653) |
| Idaho | (\$5,530,267) | (\$6,516,876) |
| Montana | (\$2,744,112) | (\$2,371,124) |
| Nevada | (\$9,413,609) | (\$10,547,088) |
| Oregon | (\$11,843,372) | (\$7,888,585) |
| Washington | (\$22,310,368) | (\$37,959,963) |
| United States | (\$140,590,266) | (\$96,915,324) |

Small Business Closures. Finally, while large national companies and integrated tobacco companies that also produce vapor products will be impacted, smaller companies, including adult-only vapor retailers in the nine states comprising the Ninth Circuit will bear most of the brunt of the economic losses. Due to the fact that a large portion of their

inventory comprises flavored vaping products, it is likely that all of these small businesses would have to close following a ban on flavored vapor products. Table 9 sets forth the number of specialty vape shops in each of the states comprising the Ninth Circuit.

Table 9: Specialty Vape Shops in the Ninth Circuit (2021)

| Jurisdiction | Specialty Vape Shops |
|---------------------|-----------------------------|
| Alaska | 15 |
| Arizona | 192 |
| California | 609 |
| Hawaii | 32 |
| Idaho | 78 |
| Montana | 26 |
| Nevada | 101 |
| Oregon | 101 |
| Washington | 202 |

Demand Model Methodology. JDA’s Regulatory Assessment Model (RAM) is an updated version of a multi-market demand model first developed by the American Economics Group (AEG) under contract with Philip Morris. It was completely rebuilt by Dr. Hyeyeon Park in 2001, and its structure was updated by JDA in 2019. The model was presented to the National Conference of State Legislatures, Senior Fiscal Analysts Seminar in Portland Maine, on September 4, 1999, where it was well received. In fact, at that time many state fiscal analysts asked if the model could be made available to them as a forecasting tool. The results from the model were also presented to the Tax Foundation

Excise Tax Seminar, held in Jacksonville, Florida, on January 12, 2001, as part of a larger discussion on the economic impact of tobacco taxes.

Since then, the RAM model has been modified to work with nearly any product or market. It is designed to measure product sales in a multi-state market structure with differential pricing.

The general methodology is a two-stage estimation of the demand equation linked to a non-linear programming model of import and export patterns. Data for the model comes from the 2021 Economic Impact Model of the Vapor Industry, as well as from the US Census Bureau, the Bureau of Economic Analysis, US Department of Labor and JDA research. Caliper Corporation was used to estimate distances between states.

Estimates on what sales should be in each state are developed first. In this case, both demand and prices come directly from the Impact model. If cross-border sales were observable, the calculations would be complete; however, since they are not, the model must estimate them through non-linear programming techniques that solve the 51 demand functions simultaneously.

The model adjusts the cross-price elasticities between states to balance the actual sales with expected demand. Demand elasticities are calculated

using a logarithmic demand curve with a base of -0.671 which is an average for vapor products.¹²

Once the linear program model balances, the model can be *shocked* with either new prices or demand values. By rebalancing the model following the shock, it is possible to calculate demand response estimates across all states (as well as cross-border sales changes).

Revenue and job impacts can then be estimated through linear extrapolation.

Explanation of Economic Impact Terms

Direct Impact Categories: The direct impacts of this study were divided up into the categories of the vapor industry. The vapor industry (as defined in this study) includes manufacturers of E-liquids, coils, box mods and other vape products, wholesalers, and retailers that sell vapor products such as: Vape shops, convenience stores, supermarkets, gasoline stations, pharmacies and drug stores, warehouse clubs and supercenters, and discount tobacco stores.

What is Meant by the Term *Direct Impact*”? Direct Impacts are those jobs, wages or economic output solely attributable to the industry defined for the study; in this case manufacturers of E-liquids, coils, box mods and other vape products, wholesalers, and retailers that sell vapor products such as; vape shops, convenience stores, supermarkets, gasoline stations,

¹² See: Gallaway, Michael, et. al., *Short-run and long-run industry-level estimates of US Armington elasticities*, North American Journal of Economics and Finance, March 2003.

pharmacies and drug stores, warehouse clubs and supercenters, and discount tobacco stores. These are the jobs that one can count. If one were to go to a manufacturing facility and count the number of people working there, that would be the direct employment (although there may be many more people working than there are jobs since many people work only part time). JDA uses direct employment at manufacturing facilities, offices, retail locations and other sites that are defined to be part of the industry to calculate all of the other effects presented in the study. For example, if a company facility employs 500 people, JDA then uses the IMPLAN model to calculate how much in wages and output those 500 employees create.

What is Meant by the Term *Indirect*? Indirect is the term used in economic impact studies to define those effects that result from firms in the defined (or Direct) industry purchasing goods and services from other industries. JDA defines these as supplier impacts in its models. For example, when an e-liquid manufacturer pays rent on its warehouse to their landlord, or when they hire a trucking company to deliver products, or purchasing vapor products from a lab or warehouse, they are creating indirect effects in the real estate sector or trucking sector of the economy.

In the case of wholesalers, retailers and others that handle products through a supply chain, the value of the goods moving through a warehouse or a store are not counted as indirect impacts; only those goods and services used to provide the wholesale or retail service are included. When a wholesaler pays

an electric bill for its facility, or a retailer buys paper for its store, indirect impact is created. Whereas, when a vapor product wholesaler buys e-liquid from a manufacturer, this transaction is not considered in the supplier impact.

What is Meant by the Term *Induced*? Induced effects are the response by the economy that occur through re-spending of income received by payments made to employees and business owners measured in the direct and supplier parts of the economy. When people work for a retail location selling vapor products or for firms that supply goods and services to the industry, they receive wages and other payments. This money is recirculated through their household spending inducing further local economic activity. Economists call these induced impacts the multiplier effect of an activity or industry.

Examples of induced effects are the jobs created in a diner located outside of a vape component factory or retail store where people purchase sandwiches for lunch, or at the gas station where they purchase fuel for their commute, or even in neighborhoods, where workers purchase houses, go to restaurants or visit the movie theater.

What is Meant by the Term *Job*? Jobs are a measure of the annual average of monthly jobs in each industry as defined by the Quarterly Census of Employment and Wages put out by the Bureau of Labor Statistics. Jobs in our models are derived independently and do not match jobs reported by government entities in that the model defines the industry differently, and because it includes

proprietors and other employees not eligible for unemployment benefits, and data from more firms and facilities than are surveyed by the government.

Jobs are measured in full-time equivalent units.

What is Meant by the Term *Economic Output* or *Economic Impact*? JDA uses output in its models as a general measurement of economic impact because it is the broadest and most comparative measure. Output can basically be considered similar to final sales; however, it differs due to the fact that it also includes adjustments in inventories and does not include certain taxes. In general, output represents the value of industry production for the model year calculated in terms of producer prices. Output differs depending on the industry being measured. In the case of the vapor industry, output is similar to gross sales for vapor product manufacturers. For retailers and wholesalers, output does not represent sales, but rather is similar to the accounting measure of gross margin. Simply put, output in the case of retailing can be seen as total sales revenue minus the cost of goods sold. This is similar to the wholesale or retail markup on a product.

What is Meant by the Term *Taxes Paid*? This economic impact study measures the vapor industry's total tax contributions. The model includes information on income received by the Federal, state and local governments, and produces estimates for the following taxes at the Federal level: Corporate income; payroll, personal income, estate and gift, and excise taxes, customs duties; and fines, fees, etc. State and local tax revenues include estimates of: Corporate

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profits, property, sales, severance, estate and gift and personal income taxes; licenses and fees and certain payroll taxes.

The model represents taxes paid during the model year.