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## **The Contribution of the Grape and Wine Industry to Idaho's Economy: Agribusiness and Tourism Impacts**

**John C. Foltz, Stacie Woodall, Philip R. Wandschneider,  
and R. G. Taylor**

The impact of Idaho's wine and grape industry was assessed as an agribusiness and as a tourist industry. Idaho's grape and wine industry is in its infancy, with wine sales of \$15 million from 15 wineries and growers cultivating about 1,000 acres, primarily in southwestern Idaho's Canyon County. Synthesized output multipliers for wine tourism were virtually identical to the agribusiness output multipliers (1.86 and 2.10 for Canyon County and the state of Idaho, respectively). The wine and grape industry's agribusiness impact is \$15 million in sales and 120 jobs in Idaho, and \$23 million and 140 jobs for Canyon County. In contrast, tourism expenditures stimulate other businesses in addition to the agribusiness linkages of grape and wine production. Thus, only about three-fourths of the current wine production would be required to be sold to out-of-region tourists to equal the impact of the wine and grape industry as an agribusiness industry.

**Key Words:** Idaho, impact analysis, input/output models, tourism, wine, wine agribusiness

Idaho is a new frontier of United States' wine production. Since 1993, Idaho's wine grape acreage has doubled, making it the fourth largest fruit industry in the state (USDA, 2000). But with 1,000 acres planted to wine grapes and 15 wineries scattered throughout the state, the Idaho grape and wine industry is still in its infancy. Canyon County, located in southwestern Idaho, has a unique combination of geography, climate, and soils favorable for growing wine grapes. Over 87% of Idaho's wine production (from five wineries) and 75% of the vineyards are clustered within several miles of one another in southern Canyon County. Not only are the wineries in close proximity, they are within 30 miles of Boise and 10 miles of Nampa, Idaho's two largest cities.

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Nationally, over the last three decades, the wine industry has experienced tremendous growth. In 2000, Americans spent \$19 billion on wine, up from \$17 billion in 1998, an increase of over 10% (Wine Institute, 2001). Compared to the rest of the world, the United States continues to be both a major aggregate consumer and producer of wine. Although as a country, the United States ranks 34th worldwide in per capita consumption, it ranks 3rd in total wine consumption and 4th in total production (Wine Institute). In 2000, U.S. consumers drank, on average, 2.8 gallons of wine (Wine Institute), and Idaho ranked 28th nationally in total wine consumption (Motto, Kryla, and Fisher, 2000).

In the western United States, the majority of wineries have clustered around the grape-growing regions of central and eastern Washington, western Oregon, and the nation's foremost grape and wine region, California's Napa Valley. Collectively, those states, plus New York, produce 98% of the \$20 billion in table wine produced in the United States (Shriver, 2002). As with many agricultural products, overproduction plagues the wine grape industry. Idaho is no exception. According to Robert Corbell, executive director of the Idaho Grape Growers and Wine Producers Commission, Idaho produced an excess of wine grapes in 2002 (quoted by Wilkins, 2000).

In contrast to the overproduction of grapes, wine tourism has been growing. Visitors have long flocked to the famous grape and wine regions of the world. The wineries in the grape-producing regions sell wine to a national or even international market, and correspondingly attract visitors from around the globe. Wine tourism is increasing. In 2001, New York wineries and festivals drew 3 million visitors, Missouri 1.8 million, and Ohio 1.5 million (Shriver, 2002). During 2001, New York wine tourism soared, with visits up 25% to 30% over the previous year (Gaiter and Brecher, 2002). Likewise, California's Sonoma and Napa wineries in 2001 attracted over 10 million visitors who spent \$2 billion (Gaiter and Brecher). In response, wineries have been springing up across the nation. With the addition of North Dakota in 2002, all 50 states now have wineries, and the state of Washington has been adding a new winery every 20 days since 1997 (Shriver, 2002). Idaho's Canyon County wineries have neither the national nor the international stature to be a destination attraction. However, winery tourism has been steadily gaining in popularity for day-outings for residents and out-of-state visitors alike (Woodall, Smathers, and Taylor, 2002).

As with the grape and wine industry throughout the world, Idaho's grape and wine industry has a dual economic role. Accordingly, this study assesses the impact of Idaho's wineries and vineyards both as an agribusiness industry that produces commercial wine and as a tourist industry. With the grape and wine industry serving in this dual economic capacity, a bottle of wine can have far different impacts upon the local economy depending on whether the bottle is sold to a tasting-room tourist or exported as commercial wine. Wine tourism spins off benefits for local economies, as winery visitors not only purchase wines, but also make other purchases in the local economy. We seek to broaden the perspective of researchers and Idaho policy makers through recognition of the impacts of a region's grape and wine

industry as a tourist industry as well as an agribusiness industry. For example, as industry and state officials weigh the agribusiness impact of Idaho's wine and grape industry when facing such decisions as state-supported check-off funds for research and development, we want them to recognize the impact of Idaho's grape and wine industry as a tourist attraction for local fairs and festivals or as one of a diverse package of attractions that Idaho has to offer visitors. Since industry promotion programs have both a county and a statewide focus, impacts are assessed separately for the state of Idaho and for Canyon County. State and county agribusiness and tourism impacts are then compared and contrasted.

### Methods

No industry exists in isolation. In the production of a good or service, an industry must purchase inputs and add value before selling a good or service. The entire chain of industries forms an industrial complex of linked buyers and sellers. From any one link in the chain, the industries that supply inputs are "backward-linked" industries and those to which the processed goods are sold are "forward-linked" industries. Idaho's grape and wine industry is an industrial agribusiness complex. When analyzing the impact of the grape and wine industry from an agribusiness perspective, the center of the industry is the grape grower. Backward linked to the growers are those industries which supply inputs: fertilizer, equipment, retail trade, workers, etc. Forward linked from the grape growers are those industries which use grapes as inputs in their production process: the wineries. Inclusion of forward-linked businesses in our impact analysis is based upon the degree of import substitution. Wine distributors (retail stores, wholesalers, restaurants) can be considered agribusinesses. However, if grape and wine production suddenly disappeared from Idaho, wine distributors would continue to sell other wines (produced outside of Idaho) in the state, and thus the loss of Idaho wine would have negligible effect on wine distributors. Consequently, although the wine distributors are agribusinesses, they are not included in the impacts of the wine industry on agribusiness in Idaho.

Tourism is not an industry, but rather a category of export market. To produce or export wine tourism requires the wineries and all their commensurate agribusiness backward linkages; wine tourism produces spin-off benefits for local economies as winery visitors not only purchase wines, but also make other purchases in the local economy. Those linkages are the tourism-related industries of motels, restaurants, gas stations, etc. Thus, wine tourism expenditures are an export, with the wine expenditures generating the backward linkages of agribusiness plus the other tourism-related expenditures generating backward linkages. The additional impact obtained from wine tourism versus the grape and wine industry as an agribusiness can be quantified with the multiplier analysis of a regional input/output (I/O) model.

Numerous studies have assessed the impacts of agriculture/agribusiness (e.g., Robison et al., 2000; Goodwin et al., 2002; Taylor, 2001) or the impacts of tourism (e.g., Fletcher, 1989; Styne, Propst, and Sun, 2001) upon a state or local economy. Impact studies of grape and wine industries have followed the tradition of assessing

the impact of an agricultural product as an agribusiness industrial complex. Following in the tradition of the impact of an agricultural product as an agribusiness industry, Folwell, Wandschneider, and Brown (1987) used a survey-based I/O model for analyzing the agribusiness impacts of Washington's grape and wine industry. Upon the availability of the IMPLAN database, several studies (such as Johnson and Wade, 1993; Michaud, Segarra, and Dodd, 1997) used state models to estimate the agribusiness impacts of the grape and wine impacts in Virginia and Texas, respectively. Michaud, Segarra, and Dodd (p. 13) note that "tourism expenditures associated with the Texas wine and wine grape industry may be the most promising area of future economic impact research...."

Motto, Kryla, and Fisher (2000) report the impact of the wine and grape industry in California was \$33 billion in fiscal 1998. In Washington State, Steward (2001) estimated a \$2.4 billion impact, which included the direct and indirect backward linkages of wages and employment, and other purchases suppliers make, plus the forward linkages of restaurant and hotel trade, and induced retail activity with other merchants.

In their 1997 study conducted in Texas, Michaud, Segarra, and Dodd estimated the economic impact of the Texas grape and wine industry on the Texas economy from the vineyard to the final consumer. Results showed that the total core economic impacts of the Texas grape and wine industry were \$86 million in output impacts, 1,200 jobs, \$30 million in income impacts, and \$47 million in total value-added impacts in 1996. Many of these economic impacts were attributable to the wine and wholesale trade sectors.

An industry's impact upon the economy is the product of that industry's multiplier times the exports; impact measurement therefore requires an I/O model for the economy. The precursors to regional I/O models were simplified Keynesian framework accounts that developed a single multiplier for an economic base industry. The availability of non-survey-based I/O models, in particular IMPLAN, has expanded the use of regional I/O modeling for small regional economies (Taylor et al., 2002). An I/O model is an economic representation of a regional economy that links simultaneous changes in transactions, to examine the effects of a change in one or several economic activities on an entire economy. An I/O model begins with a system of regional accounts, of economic transactions which are then cast into a model of regional economic behavior—a general equilibrium model of regional production and consumption. The I/O general equilibrium models a demand-driven economy with sectors or industries described by fixed linear expenditure functions, leaving exogenous demands to determine the level of regional output:

$$(1) \quad \mathbf{X} = (\mathbf{I} - \mathbf{A})^{-1}(\mathbf{Y}),$$

where the vector of regional output from each industry ( $\mathbf{X}$ ) is determined exogenously by the vector of exports ( $\mathbf{Y}$ );  $\mathbf{I}$  is the diagonal identity matrix, and  $\mathbf{A}$  is the  $n \times n$  matrix of fixed linear expenditure functions (domestic production budgets and consumption patterns) for each sector and industry [see Miller and Blair (1985) or

Maki and Lichty (2000) for a complete discussion]. Exports can exist at any given positive level, and local production is assumed to be able to fulfill the exogenous export demand. Therefore, the output of the economy is backward linked to exports in the demand-driven I/O model.

The *Leontief Inverse*  $(\mathbf{I} - \mathbf{A})^{-1}$ , or final-demand-to-output multiplier matrix, is a constant whose elements are total requirement coefficients composed of the direct plus indirect change in total output of sector  $i$  resulting from a unit change in exports from industry  $j$ . Column sums of the Leontief Inverse are the familiar output multiplier, interpreted as the change in total output in the entire economy per change in exports from industry  $j$ . Total requirements are composed of the direct and indirect requirements, and when households are included in the  $\mathbf{A}$  matrix, the total requirements are said to also include “induced” requirements of households (type II multiplier). For the Canyon County and Idaho state economies, the type II output and job multipliers are compiled in table 1.

By setting final demands at any level (including the current level), we can now obtain the gross local economic activity (direct, indirect, and induced) in each sector which would be required to supply that level of demand (e.g., wine exports). The grape and wine industrial complex buys goods and services from other Idaho businesses. Successive rounds of production and demand arise because suppliers need local inputs, resulting from direct purchases by the grape and wine industry. These transactions create a multiplier effect; a change in the output of the grape and wine complex generates or induces changes in the outputs of many other industries in Idaho’s economy. These reverberations gradually wane as a portion of each round of spending leaks out to savings, taxes, and imports: the greater the leakage, the smaller the multiplier.

As reported in table 1, Idaho wineries import less than other sectors of the economy; the wine production sector has a larger output multiplier of \$1.86. Thus, for every dollar of wine exported from Idaho, there is \$1.86 in direct plus indirect backward-linked sales in Idaho’s economy. Similarly, the job multiplier for wineries in Idaho means that for every \$1 million in wine exports, there is a 17.5 job backward-linked direct and indirect employment change.

### *Input/Output Data*

Survey-based I/O models are prohibitively expensive. Prior to the availability of commercial I/O databases for impact studies, Brown (1985) and Folwell, Wandschneider, and Brown (1987) used a survey-based I/O model for analyzing the Washington grape and wine industry. Upon the availability of the IMPLAN database, several studies (e.g., Johnson and Wade, 1993; Michaud, Segarra, and Dodd, 1997) employed state models to estimate grape and wine impacts. A hybrid of primary and secondary data has proven to be the best compromise for estimation of regional I/O models (Taylor et al., 2002).

Separate Idaho and Canyon County I/O models were developed with the IMPLAN database, which synthesizes regional I/O models from the national I/O model. It is

**Table 1. Output and Job Multipliers**

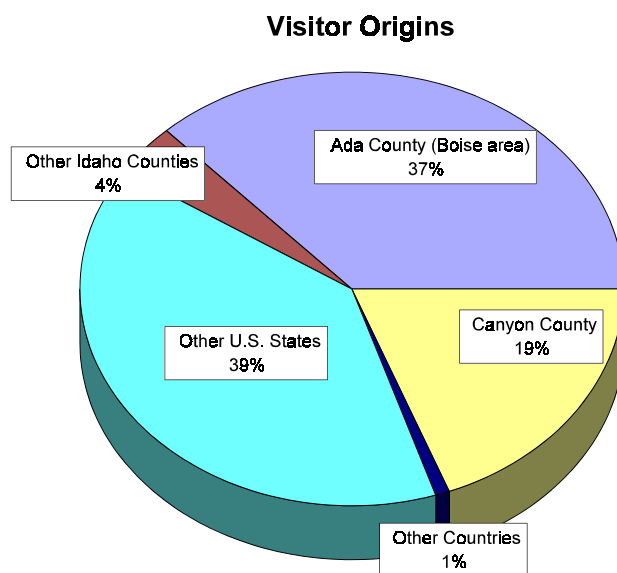
Industry	Output Multiplier (type II) (\$ output per \$ of exports)		Job Multiplier (type II) (jobs per \$ mil. exports)	
	Canyon County	Idaho	Canyon County	Idaho
Other Agriculture	1.73	1.87	20.4	21.0
Fruit Growing	1.92	2.11	20.8	24.8
Grape Growing	1.89	1.93	19.6	22.7
Wine Production	1.86	2.10	11.6	17.5
Ag Processing	1.93	2.09	13.2	15.1
Construction	1.77	1.91	17.7	18.6
Manufacturing	1.69	1.76	14.1	13.2
High Tech	1.63	1.76	10.1	11.6
Transportation, Communications & Utilities	1.91	1.85	16.6	14.4
Trade	1.92	2.03	26.6	29.2
Finance, Insurance & Real Estate	1.54	1.72	15.8	17.9
Service, Professional	2.11	2.26	31.2	29.2
Service, Nonprofessional	1.99	2.15	40.2	40.1

*Source:* I/O models.

particularly important to verify via reliable primary data those industries targeted for direct analysis—the grape and wine industries. Three general modifications, based on primary data, were made to the secondary IMPLAN database. The first was to construct a wine grape industry, absent in the IMPLAN database. The second adjustment was to balance the total output columns with total input columns for both the grape and wine sectors. The third modification was to correct the export versus local sales among the grape and wine sectors.

The wine grape industry is not a separate sector in the IMPLAN database, but aggregated into IMPLAN's "Tree Fruit" sector. Following the steps in Coupal and Holland (1995), farm enterprise budgets were used to improve the accuracy of the I/O regional model's agricultural sectors. The technical coefficients of the IMPLAN database are replaced with the technical coefficients for a "Wine Grape" sector constructed using primary data of an Idaho wine grape enterprise budget (Woodall, Smathers, and Taylor, 2002). The retail and wholesale purchases from the enterprise budget are margined to producer prices. Following margining, purchases are allocated to the corresponding I/O sectors and purged of imports, using the regional purchase coefficients available from IMPLAN. The commodity accounts can be derived by multiplying value of production estimates by the technical coefficients (Darden, Harris, and Rimbey, 1999). The last step is to subtract the grape production from IMPLAN's Tree Fruit sector.

In contrast to the Wine Grape sector, the production function from the IMPLAN database was used for the wine production sector. The production budget from



Source: Wine tourism survey, 2001.

**Figure 1. Visitor origin of Canyon County, Idaho, wine tourists**

IMPLAN's Wine sector (the wine industry column of the **A** matrix) was used to prorate the \$12.6 million in Canyon County wine sales to estimate the gross purchases by the wine industry from each sector in the Canyon County economy.

As noted above, the final modification made to the IMPLAN database was to replace IMPLAN's sales pattern for the grape and wine sectors (i.e., export versus local sales) with primary data on wine and grape sales. For Canyon County, the 1998 IMPLAN database reported a wine value of \$5 million. In contrast, our survey valued winery production closer to \$12.6 million (Idaho Grape Growers and Wine Producers Commission, 2001). Ninety-five percent of the wine grape production in Canyon County was sold to local Canyon County wineries, with the remaining 5% exported outside the county (Idaho Grape Growers and Wine Producers Commission). Therefore, it was necessary to balance the total output column with the total input for the wine grape and wine sectors (i.e., the second modification). From interviews with grape growers and wine producers, an estimated \$12.6 million of wine was sold from Canyon County wineries. Approximately \$2.6 million of wine was sold through tasting rooms. The remaining \$10 million was sold at wholesale. As shown in figure 1, 19% of the visitors to Canyon County wineries are residents of the county; thus, just over a half million dollars of the winery sales were made to households within the county. Twelve million dollars are allocated to the exports, \$525,000 to the household sector, and the remaining fraction to trade. These values replaced IMPLAN flows and column/row totals for the sectors.



*Survey Data*

Five wineries existed in Canyon County, Idaho, during the study period. A survey was constructed and sent to three of the five wineries in August 2001, and four of the five wineries in October 2001. The goal of the survey questionnaire (available from the authors on request) was to obtain information about visitor demographics, tastes and preferences, response to marketing, wine purchase decisions, and trip expenditures from which direct tourism impacts can be estimated.

*Canyon County Wine Tourism*

Canyon County wineries are not a tourism destination; wine tourists from outside Idaho are visiting Idaho for reasons other than wine tourism and visit the wineries for an enjoyable afternoon of wine tasting. Over two-thirds of wine tourists to Canyon County wineries are Idaho residents (figure 1), traveling approximately 26 miles (one-way) from the nearby Boise metropolitan area. Despite the close proximity of the wineries to the majority of visitors, the typical (modal) trip was only one per year, while the average number of trips was 2.8. As an alternate activity to wine tasting, 39% of visitors responded that they would have stayed home, while 30% would have participated in other activities such as shopping or sightseeing. Wine tasting is a frequent recreational activity—61% of the respondents indicated they had previously visited wineries in other states.

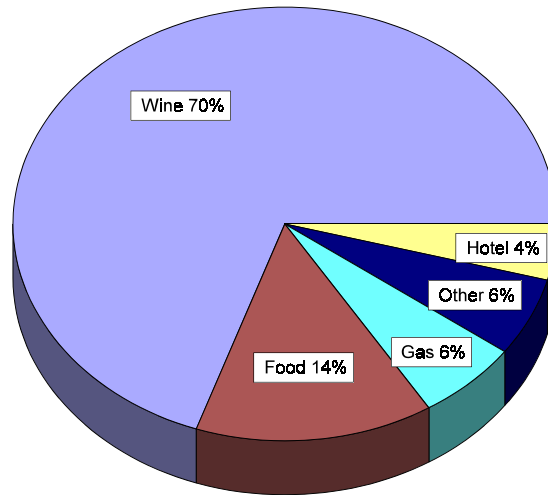
A typical Canyon County winery visitor is well educated (34% have a graduate degree) with a moderate to high income, between the ages of 36 and 49, and a household size of two people. Visitors prefer moderately priced wines, spending an average of between \$8 and \$15 on a bottle of wine, with 83% of the visitors drinking wine every week. On an outing to the Canyon County wineries, an average of \$139 was spent in the county, with 70% of this total spent on wine (figure 2). The remaining 30% of purchases were made from other businesses in Canyon County. Hence, \$42 of the purchases made during an average wine trip “spin off” to other industries in the county. To estimate total trip costs on the state level, expenditures were totaled for both Canyon County and elsewhere in Idaho or out of state. This resulted in an average state expenditure of \$170, with 58% of the total sales going directly to the wineries. On the state level, \$70 of the total expenditures were made to other businesses in the state.

*Winery Tourism Multiplier*

Since tourism is not an industry, a tourism multiplier, analogous to a multiplier for the grape or wine industry, does not exist. As shown in table 2, tourism expenditures are spread across several industries. A tourism multiplier can be synthesized as a weighted average of the multipliers of the respective sectors in a tourist’s expenditure pattern:

$$(2) \quad (I \ A)^{-1} E,$$

### In-County Expenditures



Source: Wine tourism survey, 2001.

**Figure 2. In-county expenditures for Canyon County, Idaho, wine tourists**

where  $\mathbf{E}$  is the vector of wine tourism expenditure coefficients, expressed as a percentage of total daily trip expenditures, and  $\mathbf{I}$  and  $\mathbf{A}$  are as defined previously.

The Leontief Inverse is derived above, leaving only the need for determining the wine tourism expenditure pattern to synthesize a wine tourism multiplier. The first step in calculating expenditure coefficients ( $\mathbf{E}$ ) is to map the expenditure category (figure 2) to the respective I/O sector. The “Gas” and “Other” categories were combined into “Trade,” food and lodging were grouped into “Service, Non-Professional,” and wine stayed within its own sector (table 2). Expenditures are then purged of imports, leaving the local content met by local production (table 2). For example, of the \$125 the average tourist spends per trip, 78% of this amount is met by wine produced locally. Finally, the trade expenditures are margined.

The wine tourism multiplier for Canyon County is 1.89, and for the state of Idaho 2.12. Specifically, for every (margined) dollar spent by a wine tourist from outside Canyon County, \$1.89 is directly and indirectly created in Canyon County’s economy. Therefore, for every dollar (margined dollar) a wine tourist from outside Canyon County spends, \$1.89 is created in Canyon County’s economy. Likewise, for every million dollars (margined dollars) wine tourists from outside Canyon County spend, 17.5 jobs are created in Canyon County. The output multipliers for wine tourism are virtually identical to the output multipliers for wine production. Consequently, wine tourism has an almost identical amount of local content as wine production.

**Table 2. Canyon County Wine Tourists' Margined In-County Expenditures**

Industry	% of Expenditures
Wine	78
Service, Non-Professional	19
Trade	3

*Source:* Wine tourism survey, 2001.

In contrast to the output multiplier, the employment multipliers for wine tourism are significantly greater than for wine production. For every million dollars (margined dollars) wine tourists from outside Canyon County spend, 17.5 jobs are created in Canyon County as compared to a job multiplier of 11.6 for wine production (table 1), and a job multiplier of 25 for the state of Idaho for the wine industry. Thus, wine tourism has higher direct and indirect labor content than wine production. The tourism multiplier for Idaho is larger than for Canyon County because of the greater marginal propensity to consume in Idaho (DeLong, 1998); more wine tourism travel expenses are captured within Idaho than in a single county. Since each type of tourism will have a different expenditure pattern, every type of tourism will have a different multiplier—e.g., the wine tourism multiplier will be different from a multiplier for salmon fishing.

## Results

### *Agribusiness Impacts*

The agribusiness impact can be assessed via a scenario of an economy *with* versus *without* the grape and wine industry in the state of Idaho and Canyon County. Estimating agribusiness impacts of the wine and grape industry is a straightforward application of the above methodology.

There are virtually no exports of wine grapes from Canyon County [in some years, a minor amount (approximately \$100,000) of grapes or juice is exported outside of Idaho], and all the fruit is processed at wineries within the county (and therefore within the state). Thus, without exports, the grape-growing industry has no impact. However, the wineries would not exist without the adjacent vineyards—i.e., even though the wineries are forward linked to vineyards, wine exports drive the backward linkages of the wineries which include grape production and the backward linkages associated with that portion of the wine and grape industrial complex. As ascertained from an enumeration of wineries, approximately \$12 million of wine was exported from Canyon County and about \$7 million of Canyon County wine was exported from Idaho. Canyon County wines are very popular in Idaho, and the \$5 million difference in exports was due to Canyon County wine consumption within Idaho.

**Table 3. Agribusiness Sales and Job Impact for the State of Idaho and for Canyon County**

Region	Export Change (\$ mil.)	Output Multiplier (\$ per \$)	Job Multiplier (jobs per \$)	Output Impact (\$ mil.)	Job Impact (jobs)
Canyon County	12	1.86	11.6	22.8	139
Idaho	7	2.10	17.5	14.7	123

The sales and job impacts for the grape and wine industry for the Canyon County economy and Idaho's economy are summarized in table 3. Impacts are a product of the exports times the wine industry output multiplier. County impacts are greater (\$22.8 million and 139 jobs) than the state impacts (\$14.7 million and 123 jobs).

County impacts are greater than state impacts because grape production is a non-basic business, while wineries are an export-base industry. The \$5 million of Idaho wine consumption by Idahoans are exports from the Canyon County economy perspective, but are internal transactions from the perspective of the entire state's economy. Within Idaho, purchases increase (slightly) the multipliers for the Idaho state economy but are offset by a 40% loss in exports. Idaho-produced wine that is consumed within Idaho represents within-state purchases. Because such purchases are not exports, they do not drive statewide impacts.

### *Tourism Impacts*

The spin-offs from wine tourism benefit local economies. Winery visitors not only purchase wines, but also make other purchases within the local economy. Not only do tourist dollars stimulate lodging, restaurants, and other tourist-related businesses, they also ripple to the backward-linked businesses that supply inputs to the tourism-related businesses (Zhang and Rassing, 2001).

In contrast to the straightforward evaluation of the impacts of the grape and wine industry as an agribusiness, tourism impact assessment is complicated by several factors (Loomis and Walsh, 1997). The first problem is that tourism is not an industry; hence the wine tourism multiplier was derived above. The second difficulty is price consistency. Transactions in an economy are denominated in purchaser prices, and transactions in an I/O model are denominated in producer prices (price paid at the factory door). For trade sectors, the transactions in the I/O table record only the markup or the margin. Thus, for consistency, the changes in final demands that drive impacts must also be denominated in producer prices. The expenditure pattern of wine tourists, which is denominated in purchaser prices (prices paid by final consumers), needs to be margined or converted to the producer prices before impact analysis. Expenditures by Canyon County winery visitors from the retail sectors are margined to industries and the amounts provided in the IMPLAN database (IMPLAN Group Inc., 1999).

Tourism impact studies can overstate impacts by failing to recognize the substitution for other recreational expenditures, or for that matter, any other expenditure. For example, a resident of Canyon County may attend a movie in lieu of a winery visit, and so the movie expenditure substitutes for the expenditures of the foregone winery trip. Money not spent on tourism is not necessarily lost to the economy, but is merely spent elsewhere. For this reason, expenditures made by residents of Canyon County were excluded as an export. Only winery visitation expenditures by visitors who originate from outside Canyon County are counted as new money or exports for the Canyon County economy.

The grape and wine impact analysis demonstrates: (a) the contrast of agribusiness impacts versus tourism impacts, and (b) the impact of a Canyon County wine tourism promotion or event. As with agribusiness impacts, winery tourism impacts are estimated as the product of the number of nonresident visitors' expenditure pattern (the exports) times the wine tourism multiplier.

Wine tourism and agribusiness impacts can be compared by asking: What if the entire \$12 million dollars of wine exports from Canyon County were sold to winery visitors? For every dollar of wine sales, wine tourists spend an additional 28¢ (table 2) on other items in their visit to the wineries. Thus, if we assume that the \$12 million is spent by tourists from outside Canyon County, this means that the actual change in exports is over \$15 million ( $12 \times 1.28$ ). The impact would then be \$29 million of output and 269 jobs, or a 27% output increase and a 93% job increase over the agribusiness impact. Obviously, the increase in output impacts is approximately equal to the 28% increase in tourism expenditure exports, and the increase in job impacts couples the larger jobs multiplier with the increase in tourism-related expenditure.

Turning the question around: How much wine tourism would it take to equal the agribusiness impact? The \$12 million of agribusiness wine exports from Canyon County resulted in a total impact of \$23 million (table 3). To equal this agribusiness impact, only \$9.4 million ( $12/1.28$ ) of wine would be required to be sold to tourists from outside Canyon County. Again, because the agribusiness and wine tourism multipliers are virtually equal, the disparity in impact is a consequence of the expenditures incurred by wine tourists in addition to wine purchases.

For county officials, the tourism analysis can be used to estimate the impact of a specific wine event. For example, suppose the Canyon County wineries decide to hold a "Spring Barrel Tasting" to celebrate the beginning of the tourist season. If 650 carloads of visitors attend the festival (as was the case in 2001), 527 groups (81%, figure 1) are assumed to be nonresidents. Expenditures by nonresident visitors have a \$125,000 sales impact on the county's economy and generate 1.2 jobs. If that same festival were held on the state level, the sales impact would be counted at just \$82,000, because only 40% of the visitors would be from outside the state.

## Conclusions

Idaho's grape and wine industry is in its infancy, with wine sales of \$15 million from the 15 wineries and growers cultivating about 1,000 acres, primarily in southwestern Idaho's Canyon County. The grape and wine industry is unique among agribusiness industries. The same wine, depending where and to whom it is sold, can be wine as an "agribusiness" or wine as a "tourism business," and results in different impacts to the local economies. Thus, conventional agribusiness impact analysis cannot adequately assess the impacts of the wine and grape industry. The impacts resulting from the grape and wine industry as an agribusiness are the backward linkages from wine exports, which include the backward-linked grape production. The impacts from wine as a tourism industry are again the backward linkages from wine exports sold to tourists, plus the backward linkages of the ancillary tourist expenditures generated in addition to the wine sales (gas, food, lodging, and miscellaneous). Synthesized output multipliers for wine tourism (1.89 and 2.12 for Canyon County and the state of Idaho, respectively) were virtually identical to the agribusiness output multipliers (1.86 and 2.10 wine production for Canyon County and the state of Idaho, respectively).

Winery tourism has a greater impact than wineries as an agribusiness not because the output multipliers are greater, but because a Canyon County wine tourist not only purchases wine but also makes additional trip expenditures that drive greater impacts. The impact of the wine and grape industry is \$15 million in sales and 123 jobs for Idaho, and \$23 million and 139 jobs for Canyon County. At the county level, the grape and wine agribusiness sector must export \$12 million in wine sales to produce an impact of \$22 million. However, when the wineries, as tourist attractions, sell only 75% of that amount (\$9 million), an equal economic impact is generated. Consequently, the tourism impact of the grape and wine industry has a significant advantage over other agribusiness industries. By taking advantage of the opportunity to market wineries' tourism potential rather than just an agribusiness industry, economic impact increases significantly. The spin-offs of wine tourism afford the opportunity for county and state officials to work cooperatively with the grape and wine industries, to the economic benefit of many other businesses in Idaho and Canyon County.

Tourism provides advantages for the wineries, their customers, and for local economies as well. Winery tourism builds brand loyalty, increases wine sales margins, and offers alternative distribution outlets. Moreover, winery tourism is an inexpensive source of marketing intelligence for wineries, as they receive immediate feedback from tourists. Benefits to the consumer are twofold: an opportunity to try new products at virtually no cost, and an educational experience to develop wine appreciation, create awareness, and improve knowledge of wine and the wine industry (King and Morris, 1997). From the wineries' perspective, tourism not only provides another sales outlet, but also builds brand awareness, thereby increasing sales and wine price in the faddish and fickle wine market.

In summary, conventional agribusiness impact analysis does not adequately assess the impacts of a wine and grape industry that produces both commercial wine and wine tourism. The multipliers for commercial wine and wine tourism are virtually identical. However, a bottle of wine sold to a wine tourist has more than a 25% greater impact upon the local economy over commercial wine sales. Outside of the potential for wine tourism as a marketing tool, the economic impacts of wine tourism do not accrue to the wineries, but rather to the surrounding economy. Since the increased impacts of wine tourism accrue to local businesses, it behooves government and business partnerships to promote the grape and wine industry as a tourist industry rather than an agribusiness.

## References

- Brown, C. K. (1985). "Impact of the Washington wine industry on the state economy." Unpublished M.S. thesis, Department of Agricultural Economics, Washington State University, Pullman.
- Coupal, R., and D. Holland. (1995). "On the use of farm enterprise budgets in inter-industry analysis: An example from the Washington State Wheat Study." Research Bulletin A.E. 95-10, College of Agricultural and Home Economics, Washington State University, Pullman.
- Darden, T. D., T. R. Harris, and N. R. Rimbey. (1999). "Integrating crop and livestock cost and return estimates into input/output model analysis." Paper presented at the joint annual meeting of the Society for Range Management and the American Forage and Grassland Council, Omaha, NE.
- DeLong, J. B. (1998). "The size of the multiplier and the marginal propensity to consume." University of California at Berkeley. Online. Available at <http://j-bradford-delong.net>. [Retrieved April 2002.]
- Fletcher, J. E. (1989). "Input-output analysis and tourism impact studies." *Annals of Tourism Research* 16, 514-529.
- Folwell, R. J., P. Wandschneider, and C. K. Brown. (1987). "Impact of the Washington wine industry on the state's economy." Research Bulletin No. 0995, Agricultural Research Center, College of Agricultural and Home Economics, Washington State University, Pullman.
- Gaiter, D. J., and J. Brecher. (2002, July 12). "Beating the crush." *Wall Street Journal*, pp. W1, W6.
- Goodwin, H. L., J. Popp, W. Miller, G. Vickery, and Z. Clayton-Niederman. (2002). "Impact of the agricultural sector on the Arkansas economy." Research Report No. 969, Arkansas Agricultural Experiment Station, University of Arkansas, Fayetteville.
- Idaho Grape Growers and Wine Producers Commission. (2001). "The history of wine in Idaho: Where we came from." Online. Available at <http://www.idahowine.org>. [Retrieved March 2002.]
- IMPLAN Group, Inc. (1999). *IMPLAN Professional User's Guide, Analysis Guide, and Data Guide*. Stillwater, MN: MIG, Inc.

- Johnson, T. G., and E. W. Wade. (1993). "The impact of farm wineries on Virginia's economy." Report prepared for the Virginia Winegrowers Advisory Board through Virginia Polytechnic Institute and State University, Blacksburg, VA.
- King, C., and R. Morris. (1997). "Wine tourism: A western Australian case study." *Australian and New Zealand Wine Industry Journal* 12(3), 246–249.
- Loomis, J. B., and R. G. Walsh. (1997). *Recreation Economic Decisions: Comparing Benefits and Costs*, 2nd ed. State College, PA: Venture Publishing.
- Maki, W. R., and R. W. Lichty. (2000). *Urban Regional Economics: Concepts, Tools, and Applications*. Ames, IA: Iowa State University Press.
- Michaud, M., E. Segarra, and T. Dodd. (1997). "From Texas vineyards to the final consumer: An economic impact analysis." Technical Report No. 97-1, Texas Wine Marketing Research Institute, Texas Tech University, Lubbock.
- Miller, R. E., and P. D. Blair. (1985). *Input-Output Analysis: Foundations and Extensions*. Englewood Cliffs, NJ: Prentice-Hall.
- Motto, V., K. Kryla, and M. Fisher. (2000). "Economic impact of California wine." An MKF Research Report, Motto, Kryla, & Fisher, LLP, St. Helena, CA.
- Robison, M. H., J. C. Foltz, N. L. Meyer, S. A. Wolf, and R. L. Smathers. (2000). "The role of the wheat industry in Idaho's economy." Publication No. EXT 768, Cooperative Extension System, College of Agriculture, University of Idaho, Moscow.
- Shriver, J. (2002, June 28). "A very good year for vintners." *USA Today*, p. 1D.
- Steward, P. (2001, April). "Wine industry has \$2.4 billion economic impact on Washington State." *Capital Press*, p. 26. [Press Publishing Co., Salem, OR.]
- Stynes, D., D. Propst, and Y.-Y. Sun. (2001). "Impacts of visitors to Olympic National Park." Department of Park, Recreation, and Tourism Resources, Michigan State University, East Lansing.
- Taylor, R. G. (2001). "The contribution of the agribusiness industry to Idaho's economy." Research Bulletin No. 836, Department of Agricultural Economics and Rural Sociology, University of Idaho, Moscow.
- Taylor, R. G., M. Guaderrama, T. Darden, and N. Meyer. (2002). "Modifying county input-output models." Research Bulletin No. 835, Department of Agricultural Economics and Rural Sociology, University of Idaho, Moscow.
- U.S. Department of Agriculture. (2000) "Idaho fruit tree census 1999." USDA/Agricultural Statistics Service, and Idaho Department of Agriculture, Boise, ID.
- Wilkins, D. (2002, September 27). "Vineyards in Idaho growing." *Capital Press*, pp. 1–2. [Press Publishing Co., Salem, OR.]
- Wine Institute. (2001). Wine data. Online. Available at <http://www.wineinstitute.com>. [Retrieved March 2002.]
- Woodall, S., R. Smathers, and R. G. Taylor. (2002). "The economic feasibility of growing wine grapes in Idaho." Agricultural Communication Bulletin No. 828, College of Agricultural and Life Sciences, University of Idaho, Moscow.
- Zhang, J., and C. R. Rassing. (2001). "Tourism impact studies: The case of Bornholm." Research Center of Bornholm, Bornholm, Denmark.