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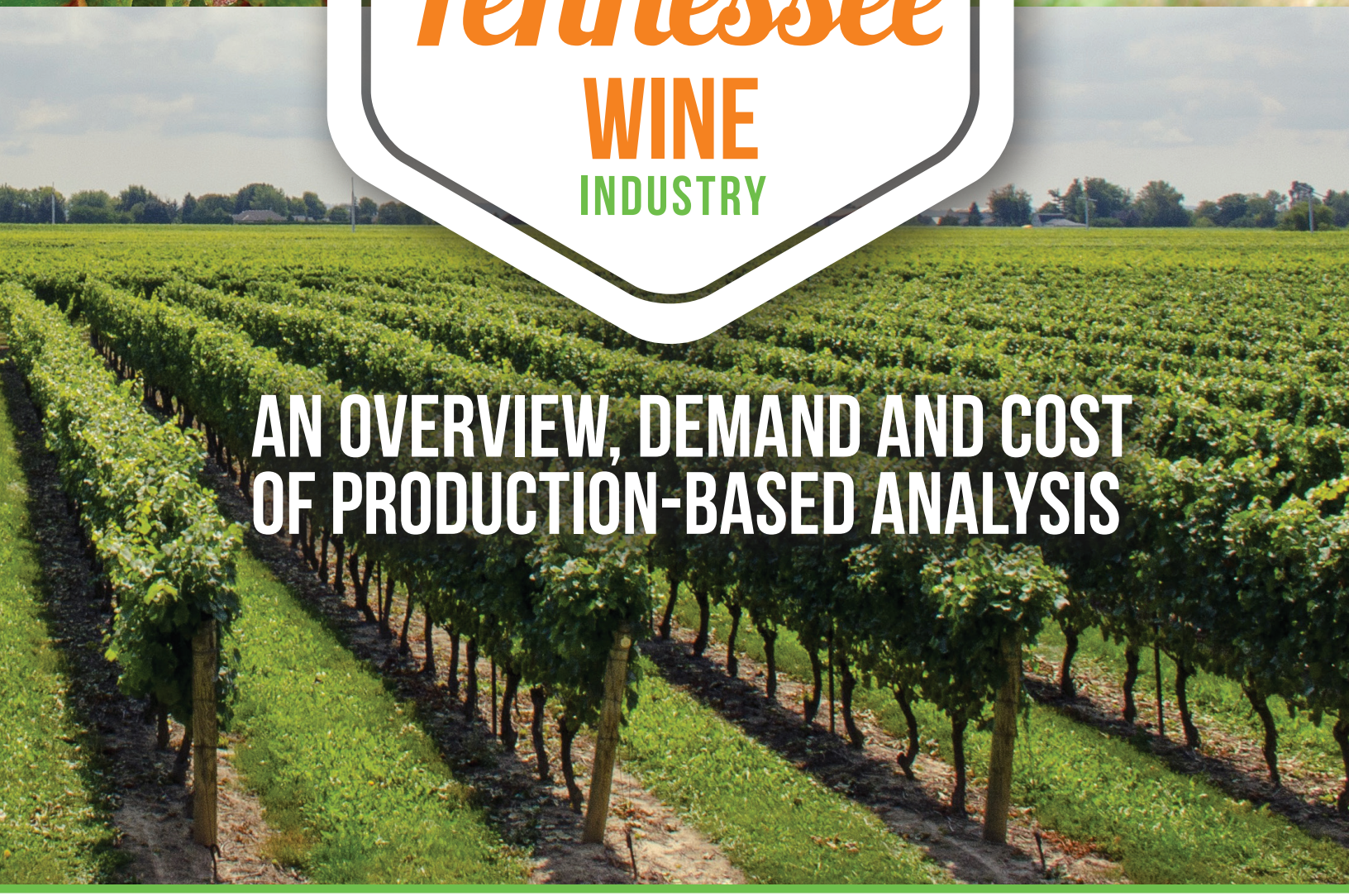
Growth Prospects for the Tennessee WINE INDUSTRY



AN OVERVIEW, DEMAND AND COST OF PRODUCTION-BASED ANALYSIS

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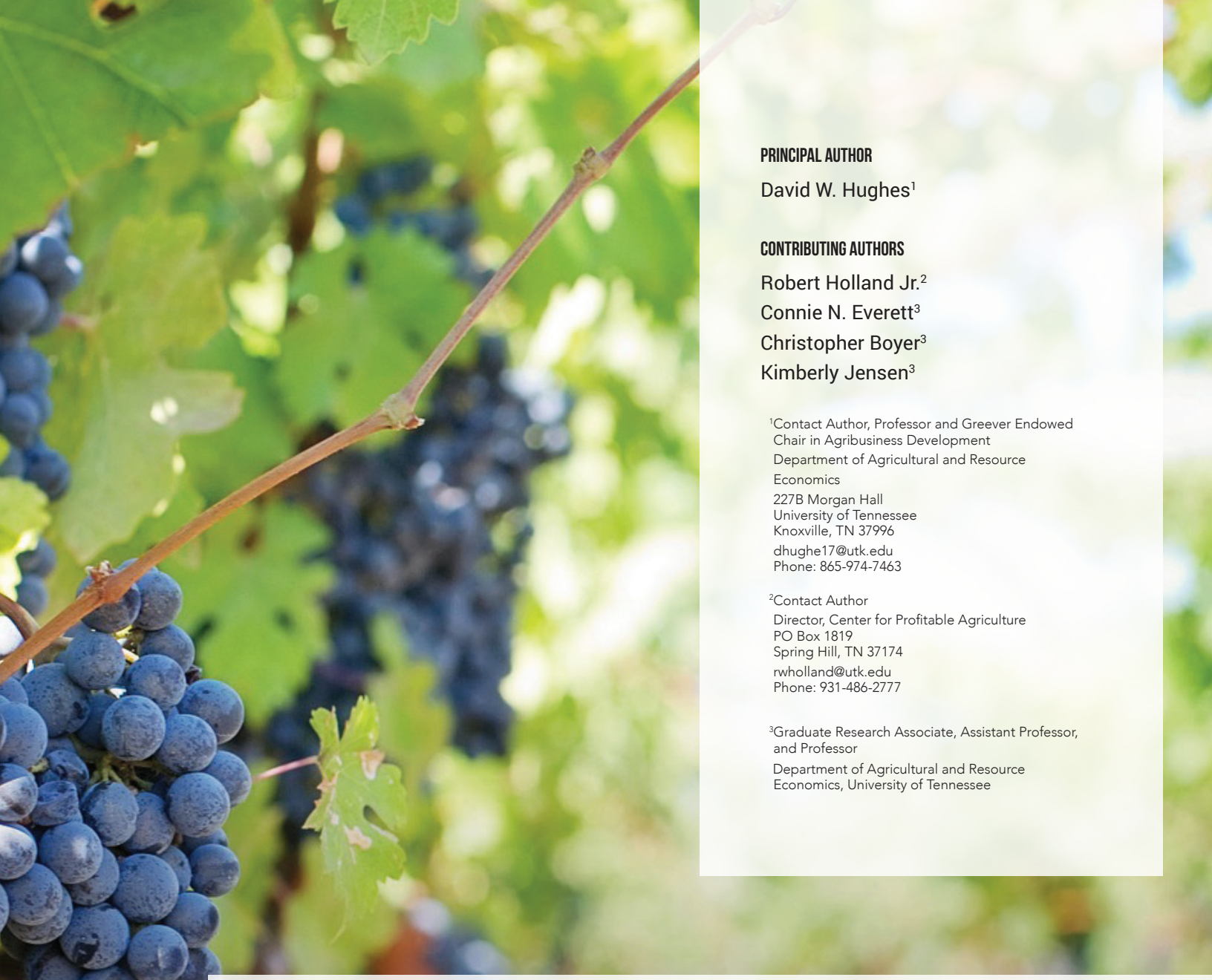

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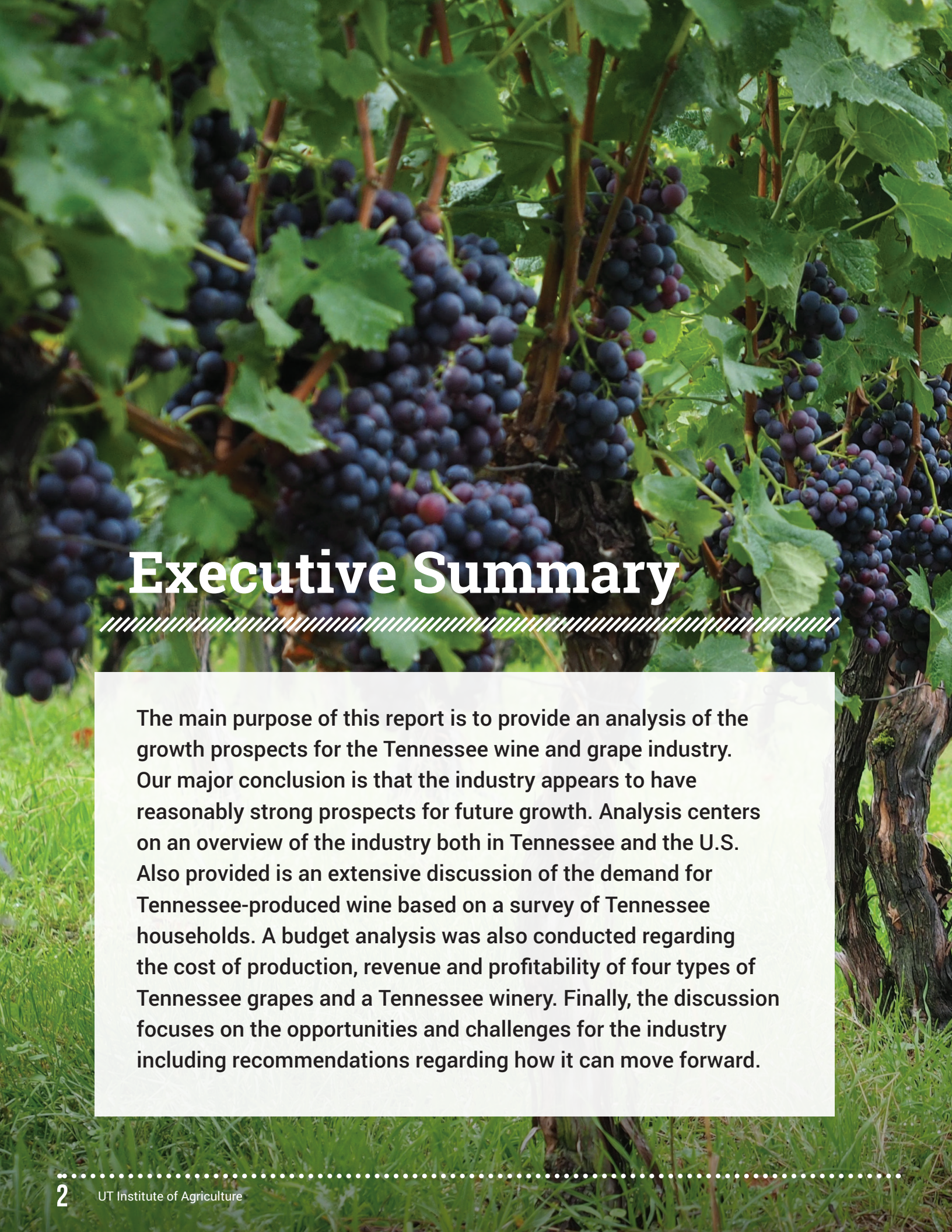


Executive Summary

The main purpose of this report is to provide an analysis of the growth prospects for the Tennessee wine and grape industry. Our major conclusion is that the industry appears to have reasonably strong prospects for future growth. Analysis centers on an overview of the industry both in Tennessee and the U.S. Also provided is an extensive discussion of the demand for Tennessee-produced wine based on a survey of Tennessee households. A budget analysis was also conducted regarding the cost of production, revenue and profitability of four types of Tennessee grapes and a Tennessee winery. Finally, the discussion focuses on the opportunities and challenges for the industry including recommendations regarding how it can move forward.

Major findings discussed in Chapter 2 include strong growth in the wine industry nationally, but particularly in Tennessee. Although still smaller than the wine industry in neighboring states such as Virginia, employment growth in the Tennessee wine industry has exceeded the employment growth rate in all examined neighboring states in recent years. Census of Agriculture based data also indicates a pronounced increase in grape acreage.

Provided in Chapter 3 is an analysis of survey data obtained from 528 Tennessee households where wine is consumed. Survey results present several challenges for the Tennessee wine industry, such as availability and lack of knowledge for some consumers. However, the overall picture derived from the analysis of this survey data is generally a positive one for the industry as Tennessee wines were viewed in a generally positive manner. Many consumers indicated that they would be willing to pay a premium for Tennessee wine. Factors, such as the growing interest in local foods, are seen as driving much of the consumer interest in Tennessee wines.

Discussed in Chapter 4 is the cost of production, revenue and profitability for three grape varieties (Cayuga White, Vidal Blanc and Chambourcin) for Muscadine grapes, and for a winery in Tennessee. Results indicate that it is profitable to grow each type of grape for commercial production and that an in-state winery is also profitable. Results from the budget analysis are consistent with the industry growth trends and reinforce our conclusion regarding future growth.

Examined in Chapter 5 are challenges and opportunities regarding the prospects for the future growth of the Tennessee grape and wine industry. Challenges include attitudes regarding alcohol consumption (including legal barriers), regional rivalries, uninformed in-state consumers, and support for research and marketing. A changing legal environment, growth of local foods, regional efforts and a strong industry association are opportunities. The growth of the craft beer and craft spirits industries is an opportunity and a challenge. Opportunities outweigh challenges in terms of the ability of the Tennessee wine and grape industry to move forward. With respect to moving forward, recommendations include developing a statewide wine trail and obtaining American Viticultural Areas (AVAs) status at the regional level. Recommendations also include ways of enhancing consumer awareness and addressing perceptions regarding quality and enhancing access to Tennessee-produced wines.

Chapter 1 Introduction

The main purpose of this report is to provide an analysis of the growth prospects for the Tennessee wine and grape industry. In this regard, our analysis centers on an overview of the industry both for Tennessee and the U.S. Also provided is an extensive discussion of the demand for Tennessee-produced wine based on a survey of Tennessee households. Budget analyses were also conducted regarding the cost of production, revenue and profitability of four types of Tennessee grapes and a Tennessee winery. Finally, a particularly important part of the discussion centers on the opportunities and challenges for the industry and certain recommendations regarding how it can move forward.

The executive summary is presented at the beginning of the report. It includes a brief synopsis of report findings including several recommendations regarding ways to facilitate future growth.

Provided in Chapter 2 is a trend analysis regarding the prospects for growth of the Tennessee and U.S. wine industries. Data and information comparing the state industry to counterparts in neighboring states with significant industries are also emphasized. National trends regarding wine consumption are also evaluated, as are challenges and opportunities for the industry.

Provided in Chapter 3 is an analysis of the demand for Tennessee wine. This analysis is based on survey data obtained from 528 Tennessee households where wine is consumed (conducted by Qualtrics, a data survey and analytics business) from September 12 through September 18, 2015. Survey questions centered on the various aspects of consumer preferences and behavior regarding wine in general, with an emphasis on consumer knowledge regarding Tennessee-produced wines. Survey respondents were also asked questions regarding their socioeconomic status (such as gender and household income level). Finally, the survey data was used in conducting econometric analysis regarding the factors that influence the likelihood of survey residents purchasing Tennessee wine, specifically their willingness to pay (WTP) for Tennessee wine.

The Tennessee wine industry faces several challenges and opportunities with respect to boosting future growth.

Chapter 4 contains an examination of the cost of production, revenue and profitability for two white grape varieties (Cayuga White, Vidal Blanc), a red wine grape (Chambourcin), Muscadine grapes, and for a winery in Tennessee.

Discussed in Chapter 5 are the challenges and opportunities faced by the Tennessee wine and grape industry regarding the prospects for its future growth. With respect to challenges and opportunities, and also based on our analysis in previous chapters, a set of ideas for moving the industry forward are also discussed.

The Tennessee wine industry faces several challenges and opportunities with respect to boosting future growth. Challenges include attitudes regarding alcohol consumption (including legal barriers), regional rivalries, lack of knowledge regarding the industry by in-state consumers, and support for research and marketing activities. Opportunities or strengths include a changing legal environment, growth of local foods, regional efforts and a strong industry association. Several of these topics, such as the changing legal environment and regionalism, are opportunities with a flipside challenge. Further, because the growth of the craft beer and craft spirits industries is an intertwined challenge and opportunity, and because we are unsure as to which aspect is dominant, the challenge and opportunity associated with that topic are discussed together. In terms of moving forward, specific recommendations are made concerning ways to grow the industry.

Chapter 2 Overview of the Tennessee and U.S. Wine Industries

INTRODUCTION

Provided here is a trend analysis regarding the prospects for growth of the Tennessee and U.S. wine industries. Data and information comparing the state industry to counterparts in neighboring states with significant industries are also emphasized. National trends regarding wine consumption are evaluated as are challenges and opportunities for the industry. Based on a variety of sources, the prospects for future growth of the industry appear to be positive.

GRAPE ACREAGE

An evaluation of grape acreage data for Tennessee indicates growing production that is relatively new and relatively small both in total and on a per farm basis. Based on the 2007 and 2012 Census of Agriculture, Tennessee has seen a marked increase in grape acreage from 580 to 905 acres (56.0 percent) (Table 2.1). On a percentage basis, this increase compares favorably to the growth in grape acreage experienced nationally and in neighboring states (with noteworthy levels of production) with Virginia having the next largest percentage increase at 34.2 percent. However, Tennessee had fewer farms (343) reporting grape acreage than any of the states listed in Table 2.1 and, with the exception of Kentucky, had markedly less acreage than any of the listed states. For example, North Carolina had 874 farms in production, over 1.5 times the number for Tennessee, and Virginia had 4,371 acres in production, well over four times the level of acreage in Tennessee.

Table 2.1. Grape Acreage and Farms in Tennessee, Selected Neighboring States and Nationally.

State	Farms	Acres	Acres per Farm	% Bearing Acres	% Acre Change 2012 vs. 2007
Tennessee	343	905	2.64	71.3%	56.0%
North Carolina	874	3,392	3.88	79.2%	6.5%
Virginia	660	4,371	6.62	85.4%	34.2%
Kentucky	411	626	1.52	73.2%	1.3%
Georgia	387	1,941	5.02	90.5%	17.9%
United States	27,878	1,139,146	40.86	91.6%	8.3%

Source: U.S. Census of Agriculture, 2007 and 2012

56%

Tennessee has seen a marked increase in grape acreage from 580 to 905 acres. (Based on the 2007 and 2012 Census of Agriculture).

Further, once again with the exception of Kentucky, Tennessee has relatively low levels of acreage per producing farm. In the examined neighboring states, on average there were 3.9 acres per farm in North Carolina, 6.6 acres per farm in Virginia, and 5.0 acres per farm in Georgia versus 2.6 acres per farm in Tennessee (Table 2.1). Tennessee also has a relatively large amount of "coming on line" or new production as shown by the percentage of bearing acres. For Tennessee, 71.3 percent of all acres were bearing, while among the other states with data shown in Table 2.1, the percentage of bearing acres ranged from 73.2 percent for Kentucky to 90.5 percent for Georgia.

WINERY DATA

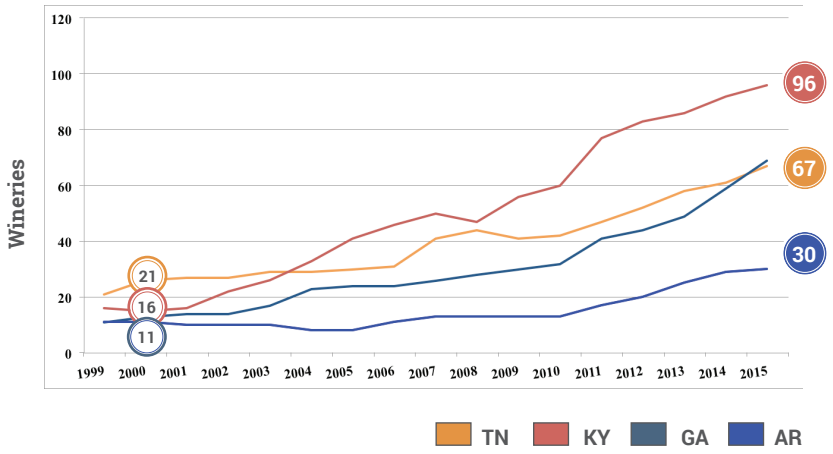
Based on data provided by the U.S. Department of the Treasury, 67 bonded wineries operate in Tennessee as of October 2015.[1] This number has grown from a base of 21 bonded wineries in the state in 1999 (Figure 2.1 and Figure 2.2). Our analysis indicates a wine industry that is small (and composed of many small producers, although one producer has 120 acres of grapes based

[1]By Federal Government Statute, wineries must maintain a surety bond with respect to the collection of excise taxes on sold wine. For more details, see Alcohol, Tobacco and Firearms regulations Title 27, Part 24 (2015). Bonded wineries also include producers of hard cider.

on Madlom, 2014) but growing as shown in Figure 2.1 and Figure 2.2. Not only based on the number of wineries shown in Figure 2.1 and Figure 2.2, but also on the grape acreage data presented in Table 2.1, and on employment and wage data reported in subsequent figures, we group examined neighboring states into the two categories of peer states and aspirational states. Peer states (Arkansas, Georgia and Kentucky) have wine industries that are comparable in size to Tennessee while aspirational states (North Carolina, Missouri and Virginia) have wine industries that are markedly larger than the Tennessee wine industry.

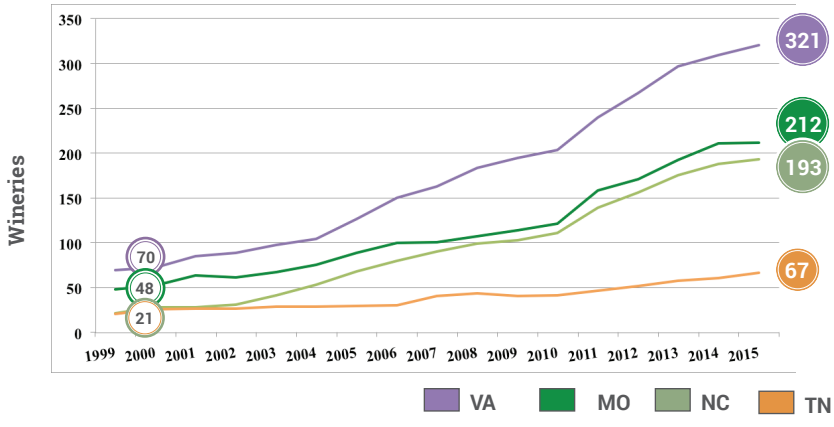
The Tennessee wine industry directly provides employment for **464** workers.

Figure 2.1. Number of Bonded Wineries, Tennessee versus Peer Neighboring States, 1999-2015.



Source: U.S. Department of the Treasury.

Figure 2.2. Number of Bonded Wineries, Tennessee versus Aspirational Neighboring States, 1999-2015.



Source: U.S. Department of the Treasury.

From 2004 through 2012, the Tennessee wine industry grew in a relatively steady manner. Growth accelerated starting in 2013 and continued through the first half of 2015 as increases in reported employment and wages outstripped growth rates for the industry nationally and in all neighboring states. It is our view that with proper support, these growth trends and other elements (such as strong industry leadership) along with our budget and demand analysis indicate that the Tennessee wine industry could ultimately match the size found in the aspirational states of North Carolina and Missouri and perhaps even Virginia.

Based on employment data for wineries paying into the unemployment insurance pool and reasonable assumptions regarding non-hired workers and the relationship between employment and total revenue (or total value of sales), we estimate that the Tennessee wine industry directly provides employment for 464 workers (including self-employed owner-operators) with an annual value of gross sales between $40 million and $60 million.[2] Based on production data provided by the Tennessee Farm Winegrowers Alliance for 2011, prices for grapes as reported by the USDA for 2011 (Perez and Plattner, 2012), grapes' share of industry revenue based on national IMPLAN data, growth since 2011, our-industry-based budget (discussed in Chapter 4), and the 2012 Census of Agriculture data, we estimate that the value of Tennessee grapes used in Tennessee wines is close to $5.0 million.[3] Grapes shipped in from other states may form a significant part of the basis for wine produced in Tennessee. However, an industry standard is that wine labeled as produced in the state must be composed of at least 51

[2] IMPLAN (IMpact Analysis for PLANning) is a system for constructing an input-output model of a regional economy.

[3] Assuming 905 acres of production based on the Census of Agriculture data, grapes valued at $5 million would mean total revenue of $5,525 per acre (assuming all Tennessee grapes went into Tennessee wine production).

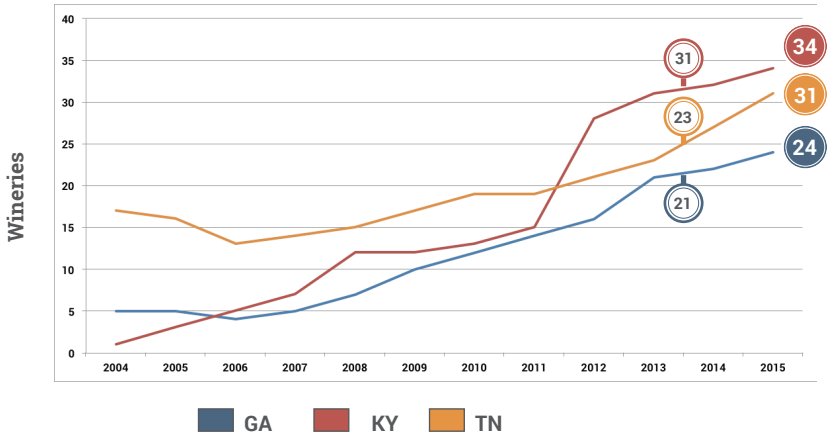
[4] As stated earlier there are many more than 31 wineries in the state but the majority does not report covered employment, that is, hired workers eligible for worker uninsurance claims (UI Program coverage). While the UI program (the associated data used here) covers 97 percent of U.S. employees, it can be problematic, especially for agricultural-based enterprises. "Major exclusions from UI coverage include self-employed workers, most agricultural workers on small farms, all members of the Armed Forces, elected officials in most states, most employees of railroads, some domestic workers, most student workers at schools, and employees of certain small nonprofit organizations" (Bureau of Labor Statistics, 2014b). Any contract works would also not be credited as winery employees. The lack of reporting by 36 wineries is indicative of the smaller size of these operations.

percent grapes from in-state vineyards. This standard undoubtedly limits the level of out-of-state grapes used by Tennessee wineries. Discussions with industry leaders indicate that the use of in-state grapes predominates in the Tennessee wine industry. Further, as discussed in more detail in our discussion regarding the demand for Tennessee wines, the desire to consume local foods in general is an important determining factor in the decision to consume Tennessee wines (Chapter 3). Hence, the use of primarily in-state grapes is an important factor in the future growth of the Tennessee wine industry.

Many wineries probably provide revenue-enhancing services such as hosting weddings or selling wine-related items to consumers. For example, a review of the Tennessee Department of Agriculture website indicates that at least 11 wineries host weddings and several wineries host festivals, meetings and other events. Wineries may also retail wine-related and other items in their gift shops. Based on discussions with industry leaders, published reports and location of the industry, tourists are an important market, especially in the Sevier-Gatlinburg area of the state or for larger operations close to interstates or other major arteries of interstate travel (Madlom, 2014).

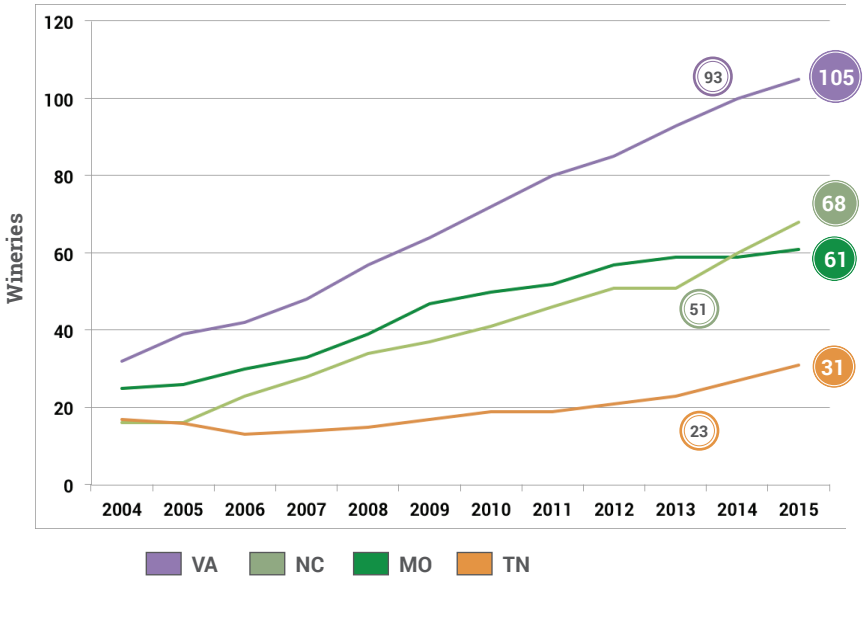
Reported employment indicates strong growth for the Tennessee wine industry with especially strong growth starting in 2013. As shown in Figures 2.2 through 2.9, the growth in covered employment was consistent until 2013. Starting in 2013, growth in covered employment and wages in the state has surged. The number of wineries reporting hired labor (as covered by the federal workers uninsured claims program) has increased by 35.3 percent from 17 in 2004 to 23 in 2013 to 31 by the middle of 2015 (an increase of 82.4 percent from 2004) (Figure 2.3 and Figure 2.4).[4] Total annual employment at these reporting establishments has increased from 98 jobs in 2004 to 190 jobs in 2013 to a quarterly average of 379 jobs by the middle of 2015 (a 286.9 percent increase from 2004) (Figure 2.5 and Figure 2.6).

Figure 2.3. Growth in Number of Establishments Reporting Covered Employment, Tennessee Wineries and Peer Neighboring States, 2004-2015.



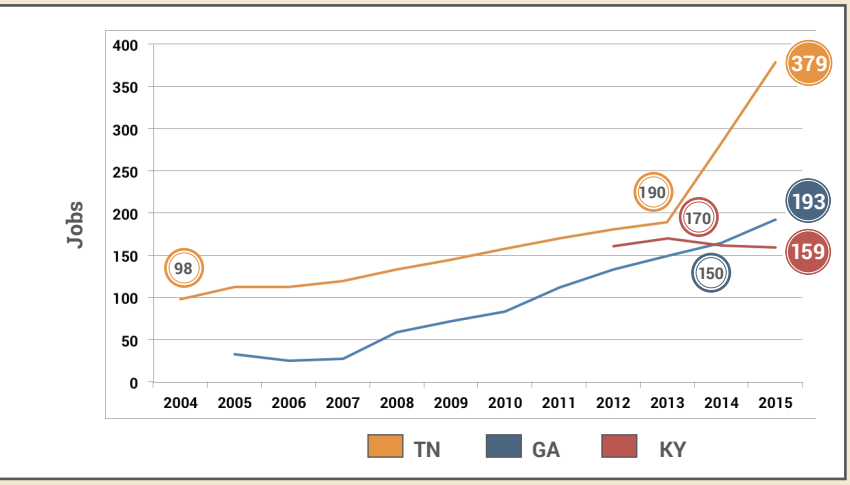
Source: U.S. Bureau of Labor Statistics.
Note: Values for 2015 are for the first two quarters

Figure 2.4. Growth in Number of Establishments Reporting Covered Employment, Tennessee Wineries and Aspirational Neighboring States, 2004-2015.



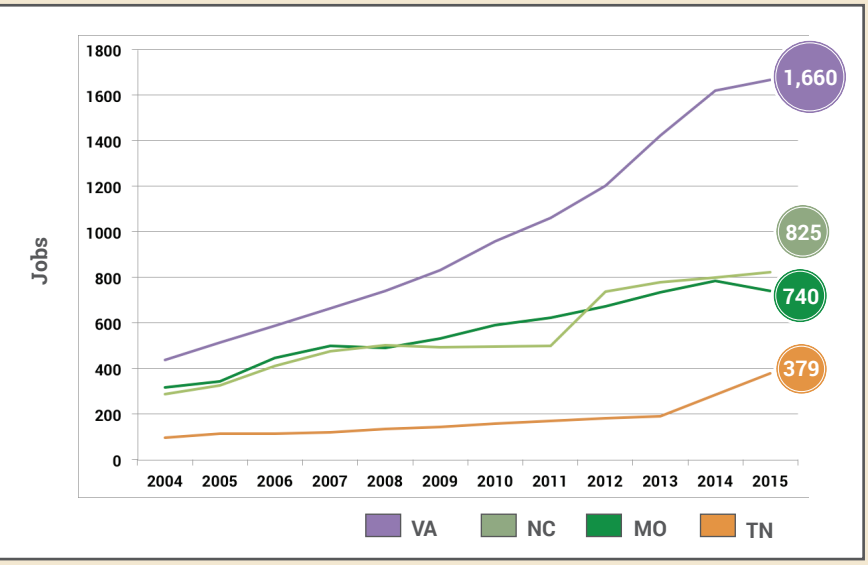
Source: U.S. Bureau of Labor Statistics.
Note: Values for 2015 are for the first two quarters.

Figure 2.5. Growth in Covered Employment, Tennessee Wineries and Peer Neighboring States, 2004-2015.



Source: U.S. Bureau of Labor Statistics.

Figure 2.6. Growth in Covered Employment, Tennessee Wineries and Aspirational Neighboring States, 2004-2015.



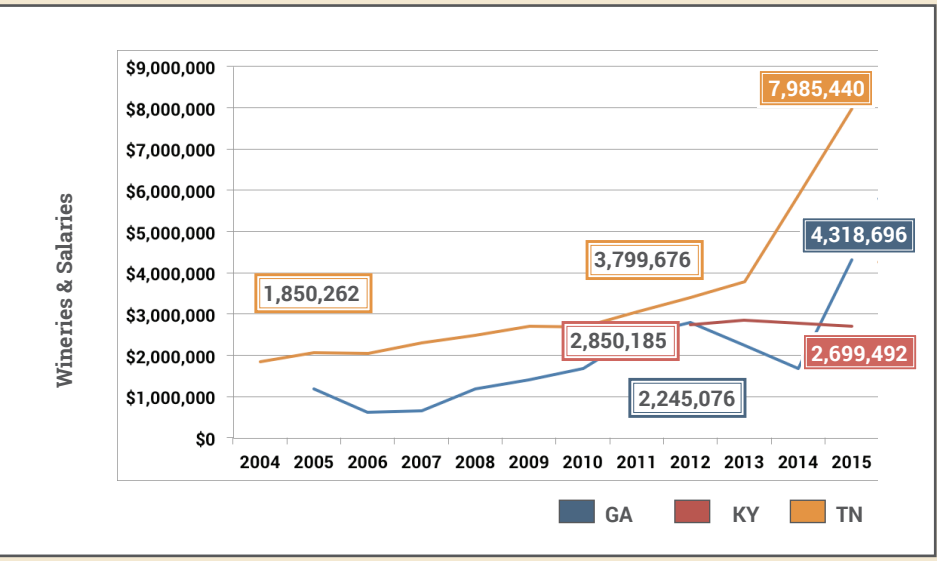
Source: U.S. Bureau of Labor Statistics.

While Tennessee has fewer bonded wineries than neighboring states such as Kentucky (Figure 2.1), covered employment in Tennessee exceeds covered employment in these states. Growth in covered employment in recent years has especially outstripped that found in these other states more recently as shown in Figure 2.3. For example, Tennessee covered employment was only 12.4 percent (20 jobs) larger than that reported for the Kentucky industry in 2012 (181 jobs versus 161 jobs), but by 2015 that value exceeded those reported by Kentucky by 138.2 percent (220 more jobs or 379 Tennessee jobs versus 159 Kentucky jobs). Covered employment in Tennessee was 35.1 percent larger (47 more jobs) than that reported for the Georgia industry in 2012 (181 jobs versus 134 jobs) but exceeded that found for Georgia by 186 jobs (or 96.8 percent) in 2015 (379 jobs versus 193 jobs for Georgia). Growth (although not levels) in covered employment in Tennessee has been more in-line with aspirational neighboring states (Figure 2.4).

Reported wages and salary data strongly reinforces the recent growth in the Tennessee industry. In fact, such data implies that Tennessee may be on its way to being comparable in size with the aspirational states. For example, in 2004, wages paid by covered Tennessee wineries were $1.9 million a value that had increased to a projected $7.9 million by 2015 (Figure 2.7 and Figure 2.8).[5] Removing the effects of inflation (i.e., reporting in what economist term "real dollars," in this case 2004 dollars), the value of wages paid in 2015 are projected at $6.5 million in 2004 dollars. (A 351 percent increase in real terms from 2004 through 2015, i.e., when we remove the impact of general inflation on wages and salaries.) Starting in 2013, growth in the Tennessee industry has been especially pronounced. As a basis of comparison, wages and salaries paid by Tennessee wineries were 33.3 percent larger than wages and salaries paid by wineries in Georgia ($3.80 million versus $2.850 million) and 69.2 percent larger than in Kentucky in 2012 ($3.8 million versus $2.2 million) (Figure 2.7). By 2015, wages and

[5] Data reported for the first two quarters of 2015 was used to estimate (project) wages paid for the entire year.

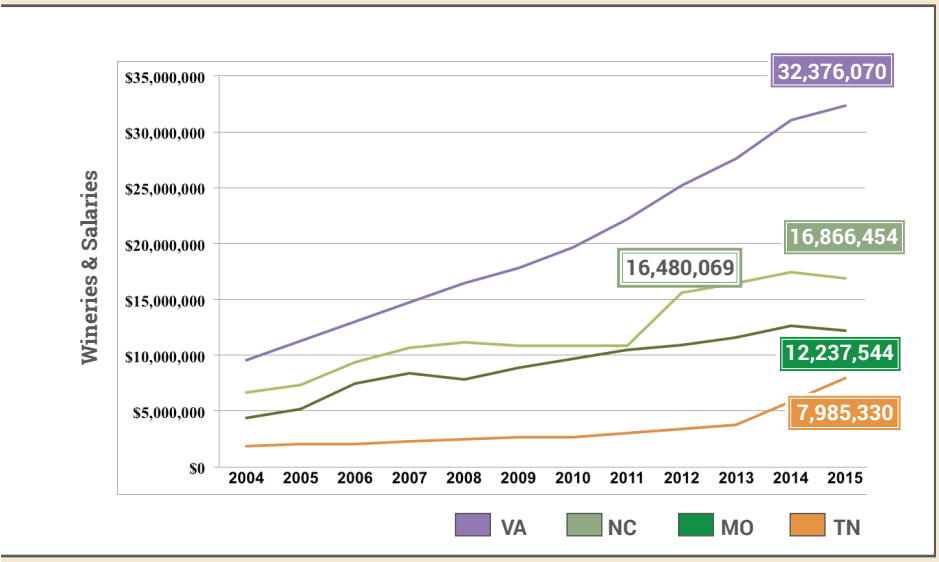
Figure 2.7. Growth in Wages and Salaries Paid to Covered Employment, Tennessee Wineries and Peer Neighboring States, 2004-2015.



Source: U.S. Bureau of Labor Statistics.
Note: Values for 2015 are for the first two quarters.

salaries paid by Tennessee wineries virtually tripled the amount paid by their counterparts in Kentucky ($7.9 million versus $2.7 million) and were 84.9 percent larger than those paid by their counterparts in Georgia ($7.9 million versus $4.3 million). In comparison to the neighboring states with larger industries, in 2013, wages and salaries payed by North Carolina wineries were 4.3 times those paid by the Tennessee wine industry ($16.480 million versus $3.80 million). By 2015, North Carolina wages and salaries were 2.1 times those paid by their Tennessee counterparts (Figure 2.8) ($16.9 million for North Carolina versus $7.9 million for Tennessee). The Tennessee wine industry has had a growth rate in real (i.e., inflation adjusted) wages and salaries from 2013 to 2015 of 250.9 percent that exceeded the real growth rate for all neighboring states and those found for the entire U.S. industry as shown in Table 2.2. The values in the table also show the recent dramatic increase in growth in the Tennessee wine industry versus the industry in selected neighboring states and the U.S.

Figure 2.8. Growth in Wages and Salaries Paid Covered Employment, Tennessee Wineries and Aspirational Neighboring States, 2004-2015.



Source: U.S. Bureau of Labor Statistics.
Note: 2005-2007 values for Virginia and 2010-2011 values for North Carolina are interpolated. Values for 2015 are for the first two quarters.

Table 2.2. Growth Rate in Real (Inflation-Adjusted) 2015 Covered Wages and Salaries versus 2004 for Tennessee and Selected Neighboring States Wine Industry.

State	2013 Growth versus 2004	2015 Growth versus 2004
Tennessee	71%	250.9%
North Carolina	106.9%	106.6%
Virginia	141.4%	175.8%
Kentucky	120.9%	126.6%
Georgia	63.2%	206.4%
United States	**27.0%**	**42.7%**

Note: Kentucky excluded due to lack of data in 2004 and subsequent years. Values reported for Georgia are based on 2005.

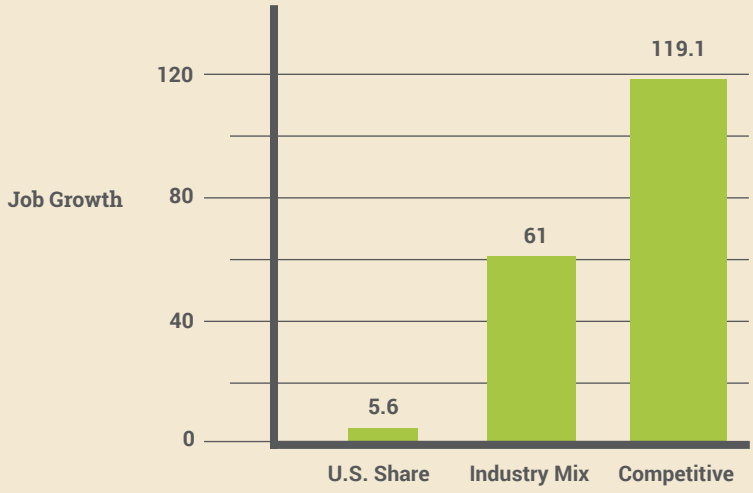
Despite the recent growth, the wine industry in many neighboring states remains markedly larger than the Tennessee industry. Based on the same data source, as of 2015, wineries in Missouri and North Carolina each had covered employment levels that were approximately twice that of Tennessee while covered employment in Virginia stood at 1,669 jobs, over four times greater than the level for Tennessee (Figure 2.6).

SHIFT-SHARE ANALYSIS

Shift-share is a technique widely used by regional economists to break down trends in a regional economy for a specific industry based on trends for the overall U.S. economy and trends for the same national industry. In this case, shift-share analysis is used to divide the change in covered employment from 2004-2014 in the Tennessee wine industry (185.7 jobs) based on the change in covered employment in the U.S. economy in general and the change in the U.S. wine industry both over that same period. Accordingly, the formula provides three outcomes, specifically the U.S. share, the industry mix effect and the competitive effect. The U.S. share indicates how much growth the Tennessee wine industry would have growing at the same rate as overall U.S. job growth from 2004 through 2014. The industry mix outcome indicates how much employment in the Tennessee wine industry would have grown if it had the same growth rate as the national wine industry. Finally, the competitive effect indicates the level of growth in employment in the Tennessee wine industry above and beyond (in this case) the other two effects. A positive competitive effect demonstrates especially strong growth. As shown in Figure 2.9, the change in covered employment in the Tennessee wine industry from 2004 through 2014 was 185.7 jobs (from 98 jobs in 2004 to 284 jobs in 2014). Had the Tennessee wine industry grown at the same rate as the overall U.S. economy, the Tennessee wine industry would have added only 5.6 jobs (or the employment level would have only been around 104 jobs in 2014). Had the Tennessee wine industry grown at the same rate as the U.S. wine industry, the Tennessee wine industry would have added 61 jobs from 2004 through 2014 (or covered employment in the Tennessee wine industry would have been 159 jobs). Fortunately, covered job growth in the Tennessee wine industry greatly outstripped covered employment growth in the general U.S. economy and the U.S. wine industry. Employment growth in the Tennessee wine industry above and beyond both of these trends resulted in 119 additional jobs in the Tennessee industry. These results indicate that the growth in the Tennessee wine industry over this period occurred against a backdrop of slow employment growth in the entire U.S. economy (i.e., the period encompasses the Great Recession and the subsequent slow recovery in employment). Results also indicate that growth in the Tennessee industry greatly exceeded the growth recorded by the industry nationally.

Employment growth in the Tennessee wine industry above and beyond both of these trends resulted in 119 additional jobs in the Tennessee industry.

Figure 2.9. Shift-Share Analysis: Employment Growth in Tennessee Wineries with Reported Hired Workers 2004-14.



Source: Calculations by the author based on data provided by U.S. Bureau of Labor Statistics.

LOCATION OF THE TENNESSEE INDUSTRY

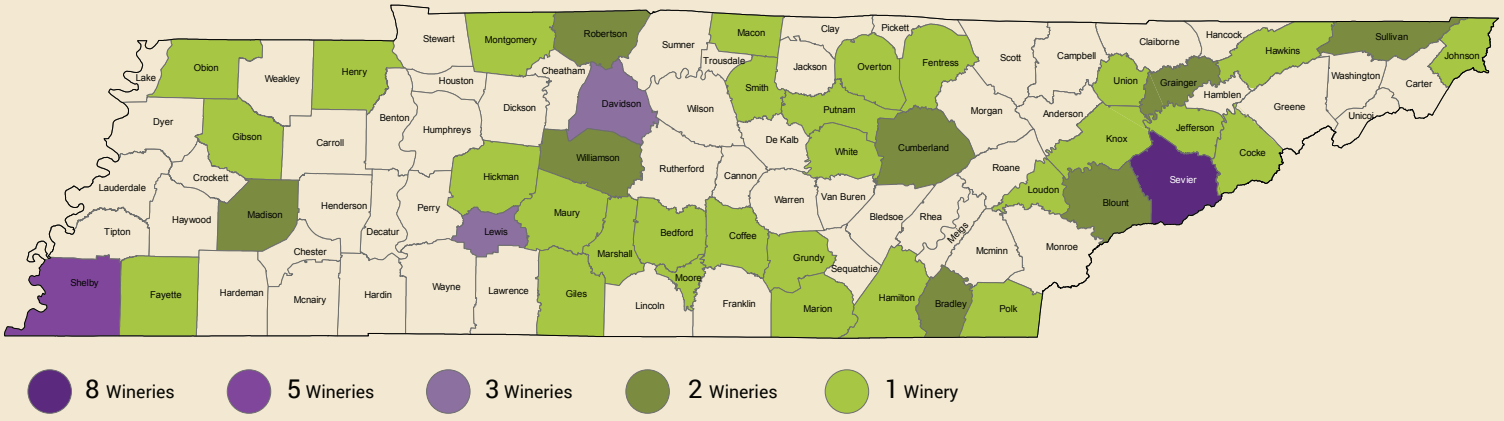
As shown in Figure 2.10 and based on U.S. Treasury data for bonded wineries as of January 2016, 43 out of the 95 counties in Tennessee have at least one winery. The industry is also well represented in each of the three major geographical sections of the state. As we can see, a major concentration is found in Sevier County with eight (12.8 percent of the listed total) of the reported wineries located in this county as of 2015. Shelby County is second with five operations, while Davidson County and Lewis County are tied for third with three operations. Nine counties have two operating wineries based on this Treasury data. Covered employment data also indicates that Sevier County is a center of industry activity with six (19.4 percent of the 31 wineries reporting covered employment in Tennessee as of July 2015) wineries reporting 87 jobs as of June 2015 (16.1 percent of covered employment reported by all Tennessee wineries in that month) and $0.5 million in covered wages for that quarter (20.4 percent of state covered wages). As of the second quarter of 2015, the industry in Lewis County (which previously lacked the sufficient number of wineries with covered employment to report) reported three wineries with covered employment of nine jobs. There is apparently a concentration (geographical clustering) of the industry centering on Sevier County and nearby counties, and in a more general manner in central Tennessee. As discussed in the opportunity section, a review of the literature indicates that clustering of wineries has possible benefits for future growth of the industry at the state and regional (sub-state) levels.

43 out of the **95** counties in Tennessee have at least one winery

NATIONAL WINERIES

The value of and quantity of wine production nationally has also continued to grow in total and on a per capita basis. The growth in the U.S. wine industry also bodes well for the Tennessee wine industry. The total volume of wine produced in the U.S. has increased by 69.7 percent from 221.2 million 9-liter cases in 1998 to 375.4 million 9-liter cases in 2014 (Figure 2.11) (Wine Institute). The value of wine sales has grown from $17.0 billion in 1999 to $38.1 billion in 2015 (Figure 2.12), an increase of 61.4 percent in real terms after removing the impact of general inflation. As shown in Figure 2.11, the increase in the level of consumption in terms of quantity has been steady. The increase in consumption in value terms has also been fairly steady except for declines in value from 2007-2009 due to the national recession (Figure 2.12). On a per capita basis, consumption has increased

Figure 2.10. Number of Wineries per County in Tennessee as of January 2016.



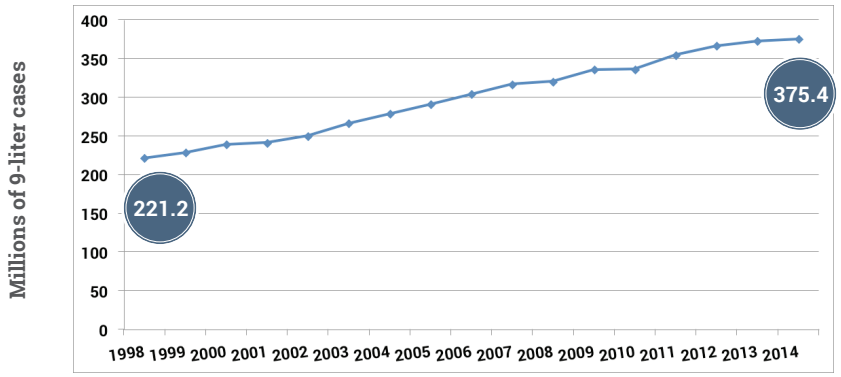
Source: U.S. Department of the Treasury

by 43.6 percent (at a 2.3 percent annual compound rate) from 1.9 gallons in 1998 to 2.8 gallons in 2014 (Figure 2.13). According to a report issued by Standard and Poor (Agnese, 2014), on-premises sales accounted for 43.6 percent of total retail wine sales in 2013 with growth from the 2012 and 2011 levels. The report also indicates that lower priced domestic wines will continue to grow in sales. The report highlights the growth in consumption by Millennial age buyers (people obtaining young adulthood around the year 2000 or later) especially in higher end wines (costing at least $20 a bottle). In this regard, the Wine Market Council states that 51 percent of Millennials consume wine at least once a month. Such buyers also seek convenience in their consumption of wine. Wine prices per bottle are concentrated in the $11-$20 range and the $20-$30 range based on information provided by Wine Vine Analytics.[6] In our budget analysis for a typical Tennessee winery, we assume a price of $15 per bottle sold directly to the consumer based on these data sources and discussions with industry leaders. Extension economists in Virginia (Ferreira and Ferreira, 2013) found that average prices for wine in that state ranged from just under $18 a bottle to close to $26 per bottle depending on variety (with individual prices showing a fair amount of variation going below $15 in several cases).

Further, the growth in the number of bonded wineries in the U.S. has also increased dramatically since 1999. As shown in Figure 2.14, the number of bonded wineries nationally has grown from 2,674 in 1999 to 10,827 in 2015 (a 304.9 percent increase).

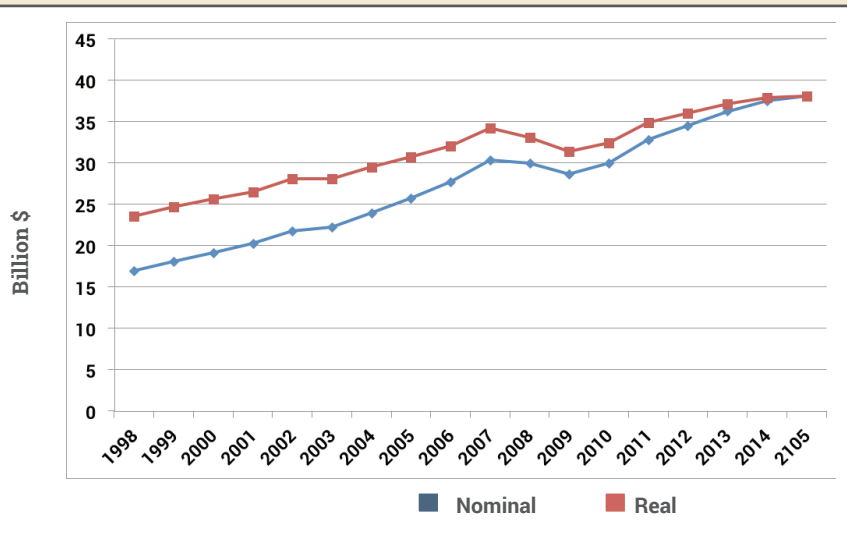
[6] Wines Vines Analytics is a webpage maintained by Wines & Vines, an industry publication and data source for winemaking, wine marketing and grape-growing in North American (Wines Vines Analytics. 2016).

Figure 2.11. Growth in Total U.S. Wine Consumption, 1998-2014, (millions of 9-liter cases).



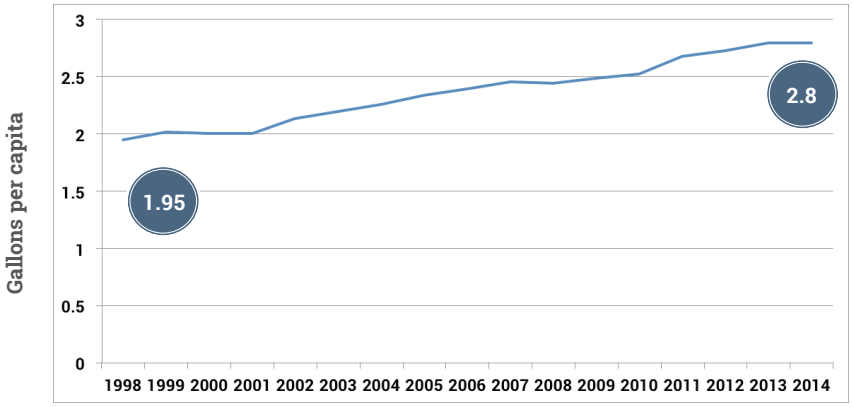
Source: Wine Institute.

Figure 2.12. Growth in the Value of U.S. Wine Consumption, 1998-2015 Nominal and Real, Billion $.



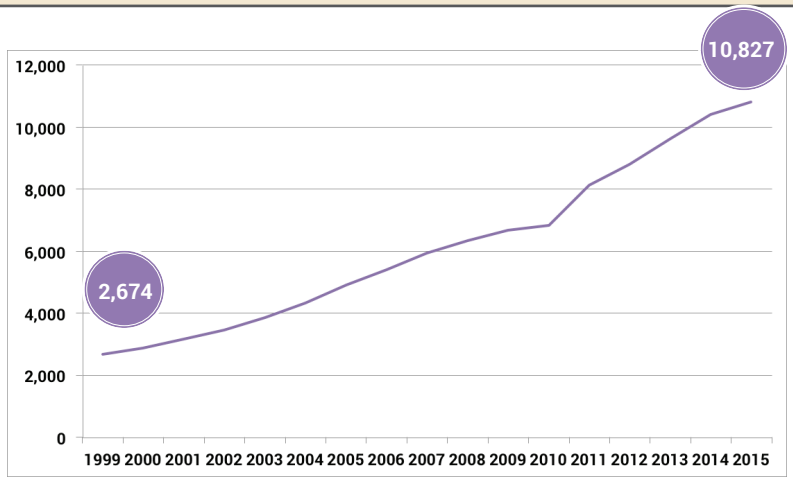
Source: Wine Institute and Wines Vines Analytics.

Figure 2.13. Growth in U.S. Per Capita Wine Consumption, 1998-2014, (Gallons per Person).



Source: Wine Institute.

Figure 2.14. Number of Bonded Wineries in the U.S., 1999-2015.



Source: U.S. Department of the Treasury.

NEW TRENDS

There are several new trends in the U.S. wine industry. These new elements center not only on the use of new technologies in marketing and growing grapes but also on the developing urban wine industry and on internet-based sales.

According to Vorn Dick (2014), a winery can be considered urban if it is located in a place with a population of at least 2,500 and if it processes grapes into wine through the custom crush, do it yourself (DIY) or proprietary models. Urban wine operations also typically include some or all of other elements including entertainment, gastro-experience, education and wine tourism (oenotourism).

Custom crush consists of customized production for clients who source their own grapes; DIY adds the element of being involved in the winemaking process in varying degrees (Vorn Dick). Lot sizes range from a few bottles to multiple barrels for both concepts. Proprietary focuses on sourcing grapes from specific vineyards and on processing and labeling the wine exclusively based on the vineyards in question. Originally, the focus in the proprietary model was on sourcing grapes locally to reduce transportation cost and spoilage and to maintain quality control by working directly with the vineyards. More recently, the model has expanded to include grapes from distant locations, but quality control issues have arisen in at least some cases as a result. Entertainment typically is in the form of music but other forms of entertainment occur as well; the gastro-experience is the linking of specific wines to specific foods often in a restaurant setting, with education centering on increasing consumer knowledge regarding fine wine. Vorn Dick also argues that the movement is similar in many respects to the growing craft beer and craft spirits industries.

Another new trend is the marketing of bargain wine sales (wine flash deals) through the internet. Subscribers to flash deal sites receive an email notification regarding short-term purchases (usually 24-72 hours) for wine to be sold at deep discounts (Andrejcak, 2012). This segment of the wine industry has benefited from the move to more favorable wine shipping laws; consumer increased willingness to purchase through internet-based businesses; and at least from 2007 into 2010, the downturn in the U.S. economy when the market for higher quality wine was reduced. Industry experts indicate it is a way for wineries to build a reputation for their product, primarily through increased exposure to wine enthusiasts. It is also a way to build membership in a wine club (where buyers are periodically provided with access to a specific set of wines). Critics have argued that it may not build membership in a wine club and can harm rather than enhance the reputation of a winery. Proponents reply that it is a way to introduce customers to buying wine online and, hence, can expand the consumer base especially with Millennial consumers (Andrejcak; Lefevere, 2011).

A more interesting trend is the use of new technology in growing grapes, specifically the use of drones for scouting and possibly spraying vineyards and the use of laser technology in mapping new locations for vineyards.

Perhaps a more interesting trend is the use of new technology in growing grapes, specifically the use of drones for scouting and possibly spraying vineyards and the use of laser technology in mapping new locations for vineyards. Vineyards are starting to use drone-based technology for a variety of tasks (Shaban, 2015) under so-called Section 333 exemptions (FAA, 2016). These tasks include locating problem spots early and pest management. A near-infrared camera attached to a drone can be used to provide data regarding soil moisture, sunlight absorption and grape ripeness. It can be used to look for early signs of disease and for damage by pests. For example, one report indicates that drones are being used in Burgundy to look for early signs of the Flavescence Dorée, a tiny leafhopper, which can do enormous damage if unchecked. Early detection by drones has the potential to reduce the need for a huge amount of worker effort to check for the pest. It can also mean reduced application of pesticides because of early detection (Bell, 2015). This technology can also be used to indicate the optimal time to harvest. Vineyard managers see drone-based technology as a way to lower cost and worker effort by reducing, for example, the need to physically examine numerous vines (as in the Burgundy example), to reduce chemical use, and to enhance the quality of grape production. Finally researchers at the University of California at Davis are evaluating

drones for spraying vineyards, in particular for hilly locations that are difficult to reach by ground or with piloted planes (Bailey, 2013).

Finally, laser mapping is being employed in England to assist in identifying the optimal locations for growing grapes (Arthur, 2015). Laser mapping provides data regarding variations in slope and aspect (physical direction). It can be used to delineate areas that drain poorly or well or that are more or less subject to frost. It can also be used to estimate the amount of light received by an area; combined with weather data, it can be used in predicting plant access to light and heat.

Production technologies, such as drones and laser mapping, are in their early stage of development. Further, very large operations are the early adopters because of their large total cash flow and greater need due to having large vineyards. Still, such technologies will play a role in the grape and wine industry in general with implications for the Tennessee industry in the future. Further, newer consumer-based trends such as urban wineries already exist in Tennessee, and internet sales may have implications for the future growth of the Tennessee wine industry.

The industry has experienced extremely strong growth over the last few years.

SUMMARY AND CONCLUSION

The Tennessee wine industry continues to grow although it remains smaller than its counterparts in several neighboring states. This growth is reflected in both grape acreage and winery production. At least part of the industry is geared toward providing on-site services as well as producing and selling wine. Many of the wineries are small and have not been in business for a long period of time. While examined neighboring states have experienced strong growth in their wine industry, none have grown more rapidly than the Tennessee industry in recent years. Wine consumption and production trends remain strong nationally and are projected to continue to remain strong in part due to consumption patterns of younger consumers (individuals in their 20s and 30s). New marketing and production technologies continue to affect the industry nationally and have implications for the Tennessee industry.

Despite its small size, the industry has experienced extremely strong growth over the last few years. Based on this rapid growth and on recent changes in the legal environment, the Tennessee wine and grape industry may be poised to join the ranks of neighboring states with larger industries such as North Carolina and Virginia.

Chapter 3 Demand for Tennessee Wine

INTRODUCTION

Provided here is an analysis of the demand for Tennessee wine. This analysis is based on survey data obtained from 528 Tennessee households where wine is consumed (conducted by Qualtrics, a data survey and analytics business) from September 12 through September 18, 2015. Survey questions centered on the various aspects of consumer preferences and behavior regarding wine in general with an emphasis on consumer knowledge regarding Tennessee-produced wines. Survey respondents were also asked questions regarding their socioeconomic status (such as gender and household income level). Finally, the survey data was used in conducting econometric analysis regarding the factors that influence the likelihood of survey residents purchasing Tennessee wine, specifically their willingness to pay (WTP) for Tennessee wine.

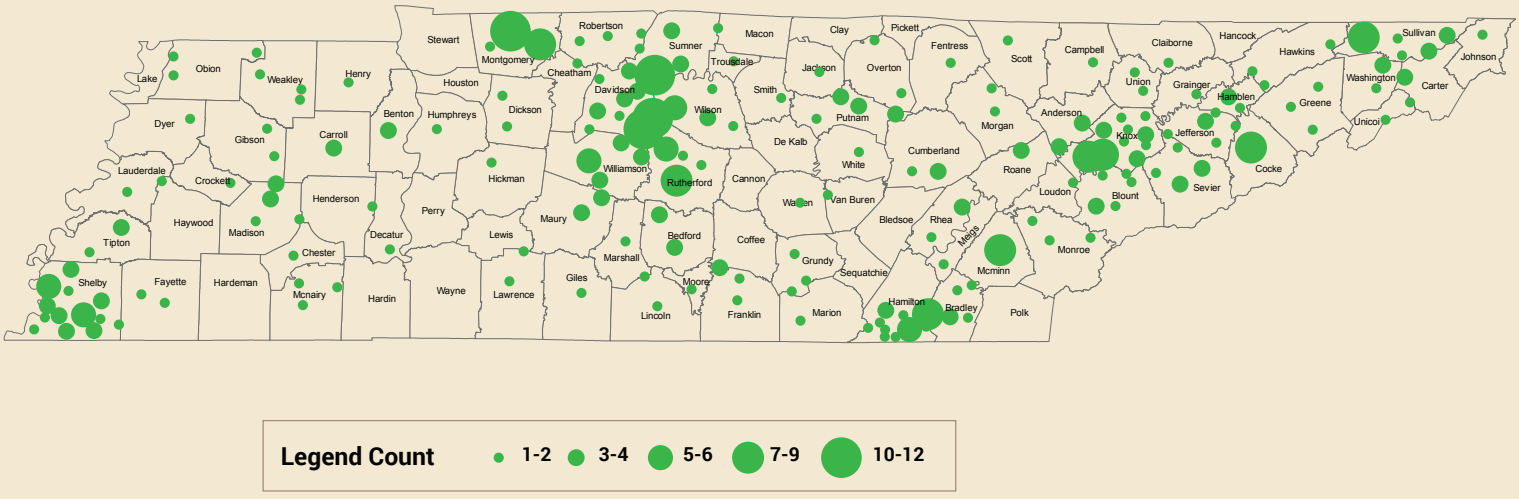
Survey results present several challenges for the Tennessee wine industry, such as availability and lack of knowledge for some consumers. However, the overall picture derived from the analysis of this survey data is generally a positive one for the industry. Tennessee wines were viewed in a generally positive manner. Many consumers indicated that they would be willing to pay a premium for Tennessee wine. Factors such as the growing interest in local foods are seen as driving much of the consumer interest in Tennessee wines.

Many consumers indicated that they would be willing to pay a premium for Tennessee wine.

SOCIOECONOMIC PROFILE OF SURVEY RESPONDENTS

The average age of respondents was 40 years old. Approximately 72 percent of the respondents were female and nearly 37 percent of the study sample held a bachelor's degree or higher. Roughly 45 percent of the respondents participating in the study had yearly household incomes of greater than $49,999. About 8 percent of the respondents were located in a county that had more than three wineries. The majority of respondents lived in metropolitan areas as shown in Figure 3.1, but rural areas were also well represented in the survey.

Figure 3.1. Residency of Survey Respondents.



WINE PREFERENCES IN GENERAL

Consumer responses concerning wine consumption patterns in general centered on factors that influenced their buying patterns, including for whom, how often and where wine purchases are made.

Survey respondents were asked who they typically buy wine for, how often they make such purchases, where they made such purchases, and whether they purchased by the bottle or the case (all for at home consumption). Respondents primarily purchased wine for themselves (373 respondents or 70.6 percent of those responding to the question) followed by for family members (140 respondents or 26.5 percent) (Figure 3.2). Survey respondents primarily purchased wine on a monthly basis (236 respondents or 44.7 percent) followed by weekly (169 respondents or 32.0 percent) and a more distant every six months (92 or 17.4 percent) (Figure 3.3). Virtually all survey respondents (504 or 95.8 percent) purchased wine by the bottle as opposed to the case (22 respondents or 4.2 percent). In terms of where they usually purchased wine, the overwhelming number of respondents indicated such purchases were made at a liquor store (78.1 percent or 409 respondents), followed by at a winery or vineyard (63 respondents or 12.0 percent) (Figure 3.4). A relatively small number of respondents indicated they usually purchased wine from a warehouse-type operation (47 respondents or 9.0 percent) or from the internet (only five respondents). As opposed to their typical buying behavior, a much larger number of respondents (203) had purchased directly from a winery or vineyard at least once in the past year while 126 had purchased wine at a warehouse-type outlet and 36 respondents had purchased through the internet at least once in the past 12 months (Figure 3.5).

Figure 3.2. For Whom Do You Typically Purchase Wine?

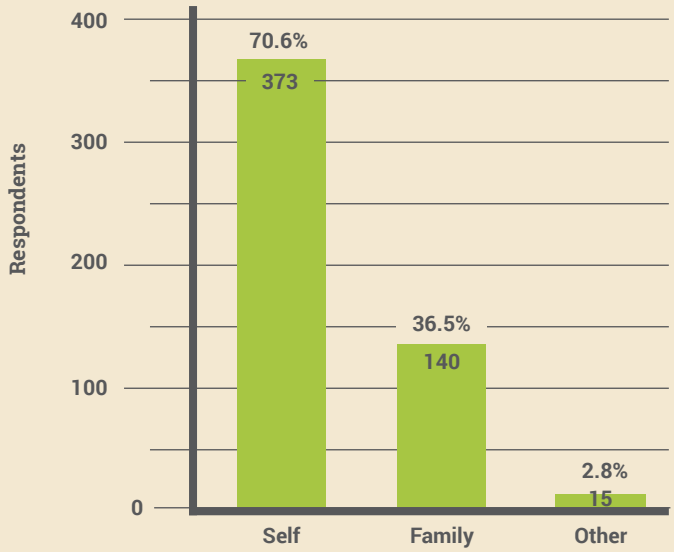


Figure 3.3. Frequency of Survey Respondents Purchasing Wine.

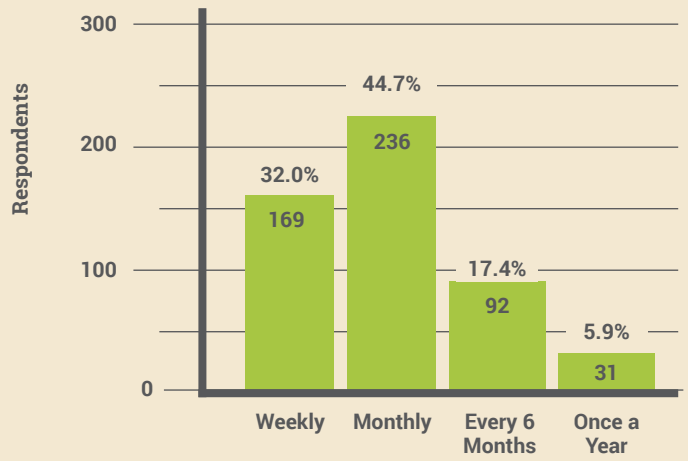


Figure 3.4. Where Survey Respondents Usually Shop for Wine.

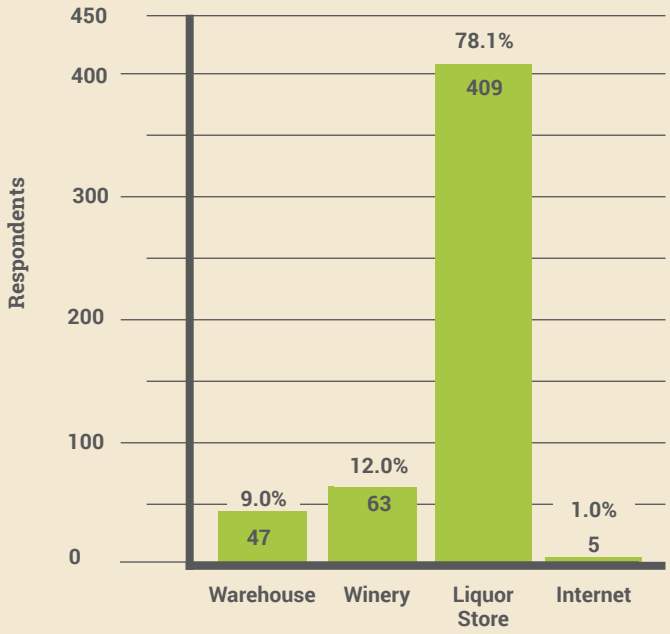
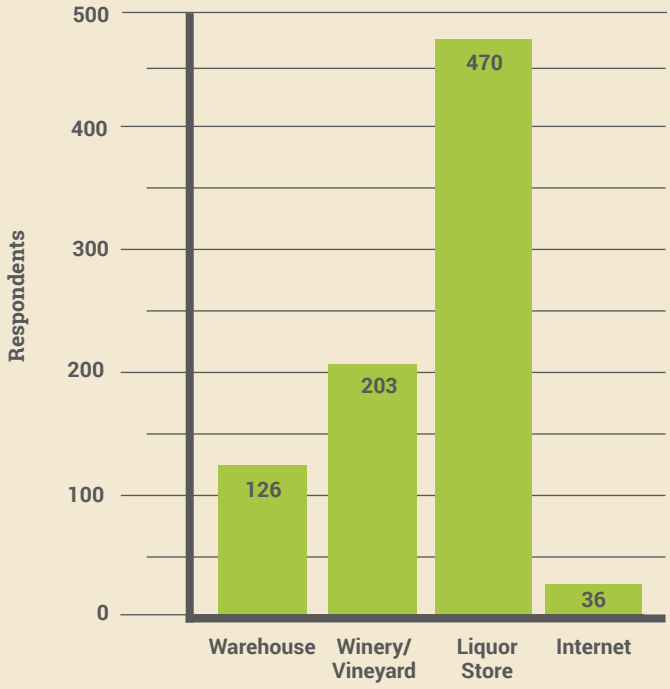


Figure 3.5. Where Survey Respondents Have Shopped for Wine at Least Once in Past 12 Months.



With regard to factors that influence their purchasing decisions, survey respondents were asked to rate nine factors as very important, important, somewhat important and not important. The nine factors were wine taste or flavor, availability, reputation, grapes grown in an environmentally sustainable manner, age, low price, store personnel advice, local production and bottle appearance.[7]

Among the factors that influence consumer wine purchasing decisions, taste was by far the most important with 465 respondents (88.9 percent of individuals holding an opinion regarding the question) indicating that taste was very important (Figure 3.6). Availability was the second most important factor, with 200 respondents (38.5 percent) seeing availability as very important and an additional 222 respondents (42.7 percent) seeing it as important and only a few respondents (22) seeing it as not important (Figure 3.7). Given the limited access to wine in Tennessee retail establishments (which is easing to some degree), the relatively large importance placed on availability is an important finding. Reputation of the wine was viewed as the third most important factor, with 134 respondents (26.1 percent) seeing it as very important and an additional 196 respondents (38.1 percent) seeing reputation as important (Figure 3.8). Interestingly because of possible industry policy ramifications, sustainably grown grapes was seen as the fourth most important factor, with 115 respondents (22.5 percent) seeing it as very important and an additional 156 respondents (30.6 percent) seeing it as important (Figure 3.9). Age of the wine, a factor similar to reputation, was viewed as the fifth most important factor, with 105 respondents (20.3 percent) seeing age as very important and an additional 146 respondents (28.3 percent) seeing it as important (Figure 3.10). However, a significant share of respondents (102 or 19.8 percent) felt that age did not influence their wine buying decisions. Low price was seen as the sixth most important attribute in the wine buying decision, with 81 respondents (15.5 percent) seeing it as very important and an additional

[7] Three of the questions (locally produced, age of the wine, and sustainably grown grapes) were asked with respect to characteristics of wine that are identified on labels.

178 respondents (34.2 percent) seeing it as important while 39.2 percent (204) felt low price was somewhat important (Figure 3.11). On the other hand, approximately only one in ten of survey respondents (11.1 percent) felt that low price was not important. Store personnel advice was seen as the seventh most important factor, with 93 respondents (18.2 percent) seeing it as very important and an additional 164 respondents (32.0 percent) seeing such advice as important (Figure 3.12). Locally produced was viewed as the eighth most important factor, with 73 respondents (14.1 percent) seeing it as very important and an additional 147 respondents (28.3 percent) seeing it as important (Figure 3.13). On the other hand, 145 respondents (27.9 percent) saw locally produced as not important in their purchasing decision. Bottle appearance was by far the least important factor in wine buying decisions; only 37 respondents saw it as very important while 199 respondents (39.6 percent) felt bottle appearance was not important in such decisions (Figure 3.14).

Figure 3.6. Importance of Taste in Wine Purchase Decision for Home Consumption.

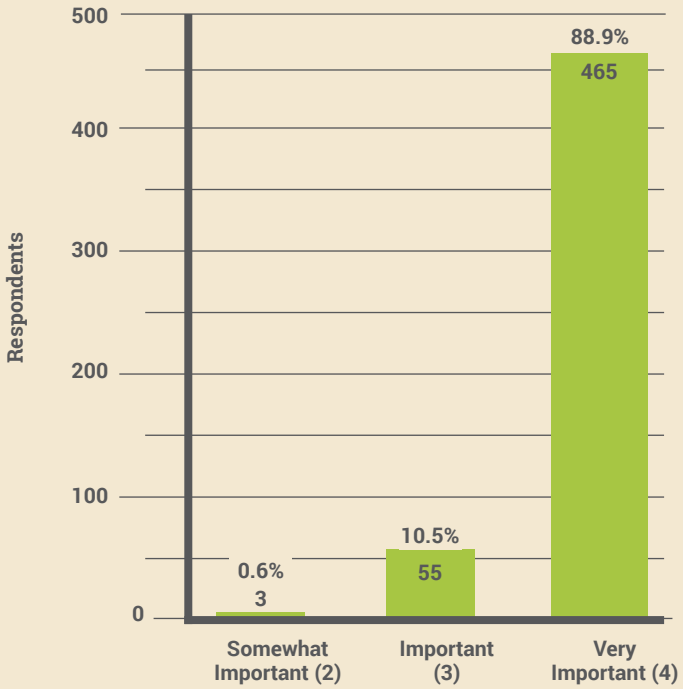


Figure 3.7. Importance of Availability in Wine Purchasing Decision for Home Consumption.

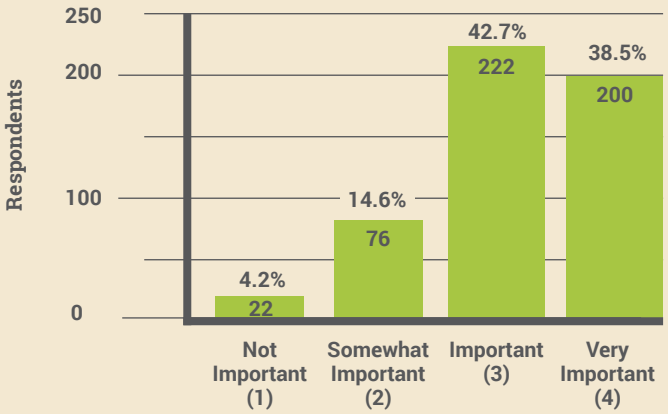


Figure 3.8. Importance of Reputation in Wine Purchasing Decision for Home Consumption.

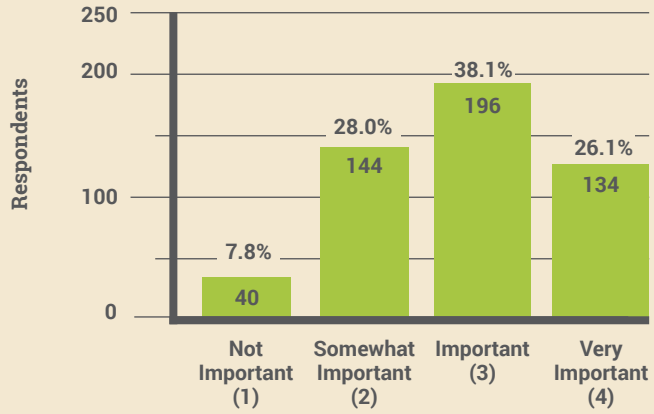


Figure 3.9. Importance of Sustainably Grown Grapes in Wine Purchasing Decision for Home Consumption.

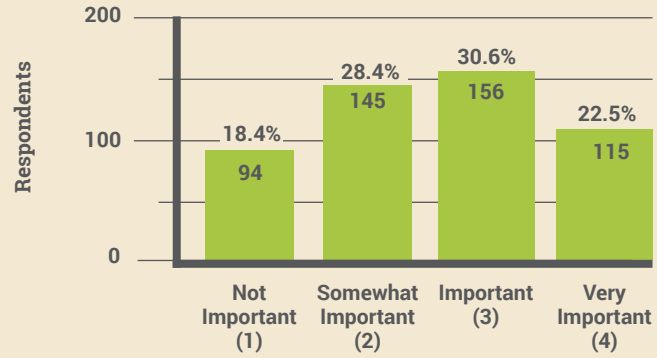


Figure 3.10. Importance of Wine Age in Wine Purchasing Decision for Home Consumption.

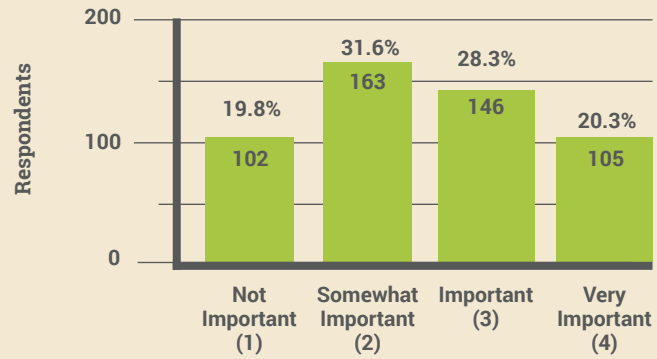


Figure 3.11. Importance of Low Price in Wine Purchasing Decision for Home Consumption.

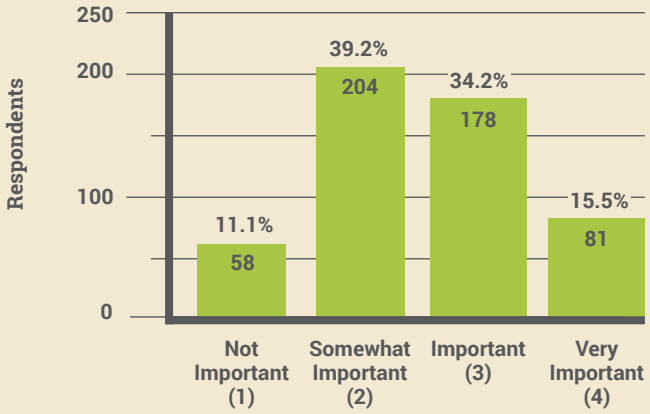


Figure 3.12. Importance of Advice by Store Personnel in Wine Purchasing Decision for Home Consumption.

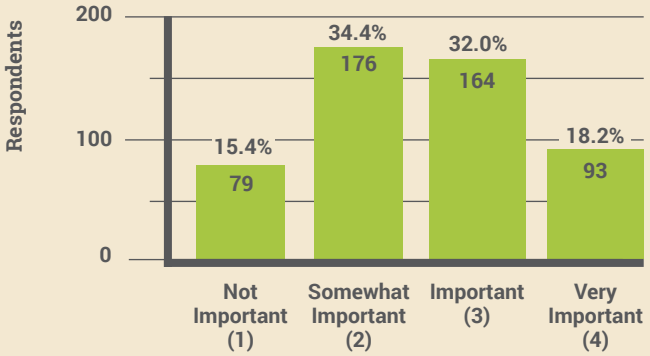


Figure 3.13. Importance of Locally Produced in Wine Purchasing Decision for Home Consumption.

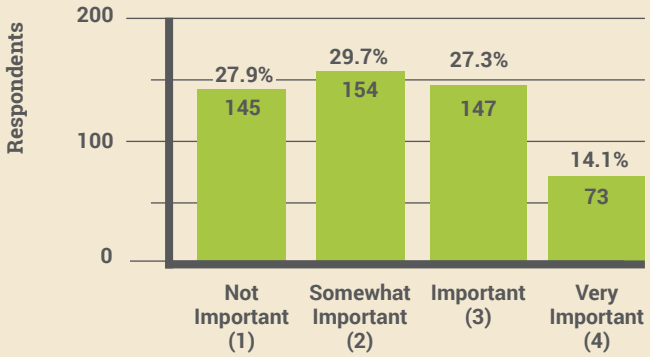


Figure 3.14. Importance of Bottle Appearance in Wine Purchasing Decision for Home Consumption.

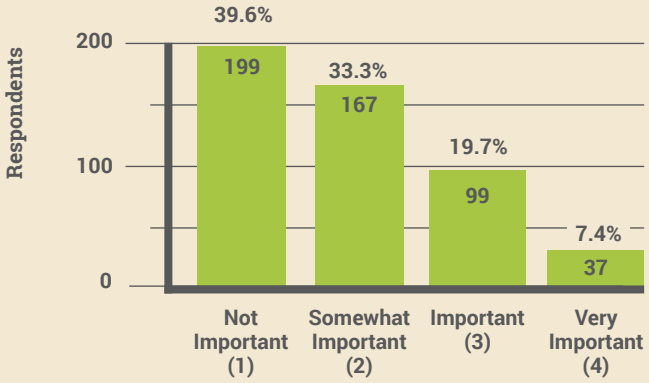
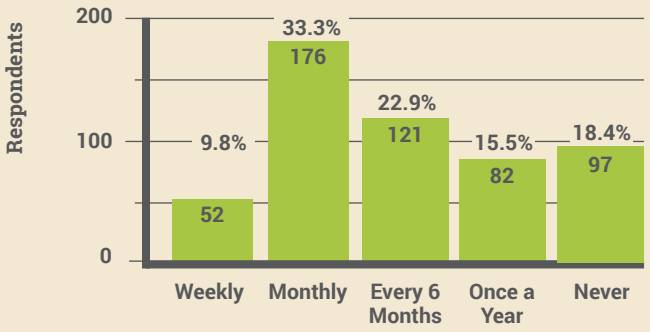


Figure 3.15. Frequency of Survey Respondents Purchasing Tennessee Wine.



PREFERENCES WITH REGARD TO TENNESSEE WINE

Surveyed consumers were asked if it is easy to find Tennessee wine where they primarily shop for wine and how often they purchase Tennessee wine. They were asked about the outlets where they would like to purchase Tennessee wine. Survey respondents were also asked their opinion regarding factors that influence their decision to purchase Tennessee wine, reasons they might not purchase Tennessee wine, and their knowledge regarding Tennessee wine.

Survey respondents were asked to indicate whether they purchased Tennessee wine weekly, monthly, every six months, once a year or never. Among the 528 respondents to the question, 176 (33.3 percent) indicated they purchased Tennessee wine monthly followed by the 121 respondents (22.9 percent) who purchased Tennessee wine every six months and 82 respondents (15.5 percent) who purchased Tennessee wine once a year (Figure 3.15). Only a few respondents purchased Tennessee wine on a weekly basis (52 respondents or 9.8 percent), while 97 (18.4 percent) indicated they never buy Tennessee wine.

33.3% indicated they purchased Tennessee wine monthly followed by the **22.9%** who purchased Tennessee wine every six months.

As we indicate elsewhere in this document, consumer access to the product (or product availability) is a major issue with regard to growing the Tennessee wine industry. In response to the question "is it easy to find Tennessee wines at the store where you primarily shop for wine," 56.7 percent (299) of all respondents indicated "yes" while 228 respondents (43.3 percent) indicated "no" (Figure 3.16). The relatively large number of no responses confirms our hypothesis that consumer access is a problem. Highlighting this issue is the previously discussed importance placed on availability as the second most important product attribute (Figure 3.7) by survey respondents.

Figure 3.16. Survey Respondents: Is it Easy to Find Tennessee Wine Where You Shop for Wine?

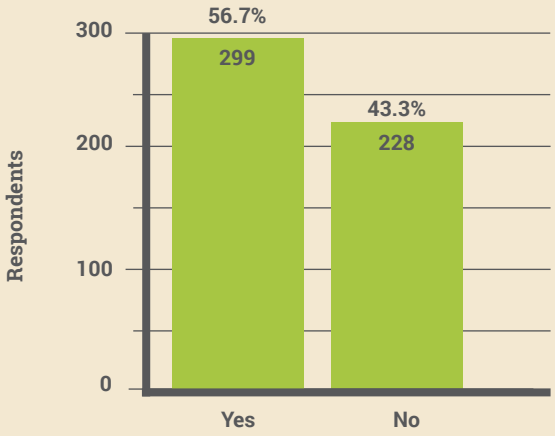
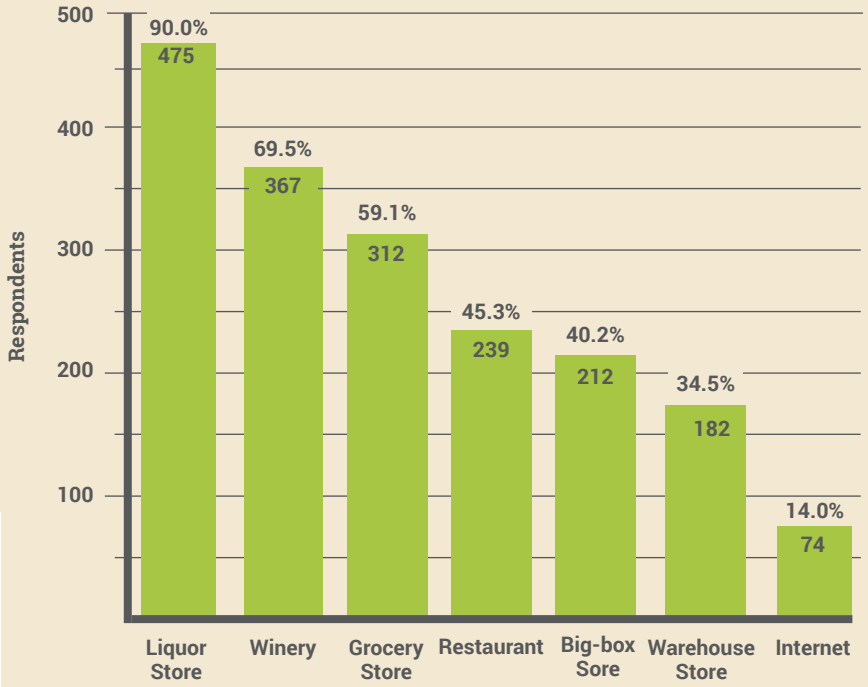


Figure 3.17. Importance of Taste in Wine Purchase Decision for Home Consumption.

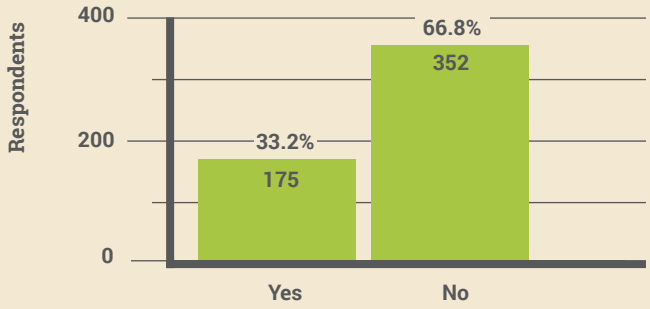


In terms of where they would like to purchase Tennessee wines, 475 respondents (90.0 percent among the 528 surveyed respondents) indicated they would like to make their purchases at the liquor store, while 367 respondents (69.5 percent) indicated that buying at the winery would be one of their preferred venues (Figure 3.17). The result for wineries reinforces the current direct sales strategy followed by Tennessee wineries. Among the respondents, 312 (well over half or 59.1 percent of the 528 surveyed individuals) indicated they would like to purchase wine at a grocery store. This result implies that the increased access at grocery stores starting in July 2016 (as promulgated under Tennessee Senate Bill No. 837) means meeting a major consumer preference regarding where they would like to purchase Tennessee wine. Further, many (212) respondents (but less than half of all surveyed individuals at 40.2 percent) stated they would like to be able to purchase Tennessee wine at big-box type stores (such as Target) while a slightly smaller number (182 or 34.5 percent) stated they would like to make such purchases at warehouse type stores (e.g., Costco). Based on Tennessee Senate Bill 837, both big box stores and warehouse type stores may be eligible to sell wine if they "derive at least 20 percent of their taxable sales from the sale of food and food ingredients" (P. 1). Accordingly, these avenues may also be a means of enhancing access to Tennessee wines.

Respondents indicated a fairly strong for the desire to have Tennessee wines in restaurants.

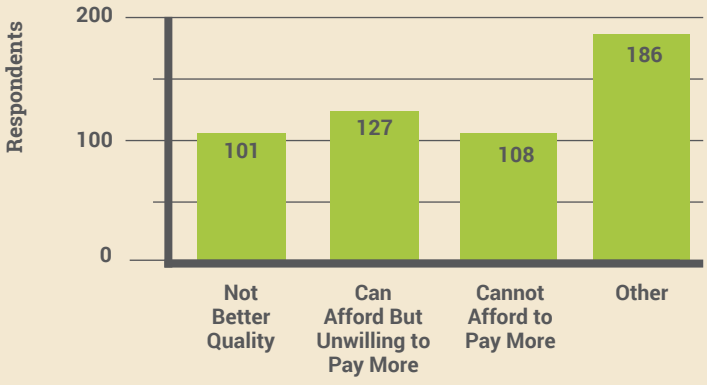
Preferences were also expressed for buying Tennessee wine at restaurants by 239 respondents (45.3 percent or slightly less than half of the surveyed individuals) (Figure 3.17). While some restaurants serve Tennessee wine (and the Tennessee Department of Agriculture has an associated promotional program), based on discussions with industry leaders this is not a widespread practice for Tennessee restaurants. In fact, when asked if they had purchased Tennessee wine by the glass in a restaurant, bar or pub within the last six months only 33.2 percent of respondents (175) indicated yes (Figure 3.18). The fairly strong indication by survey respondents for the desire to have Tennessee wines in restaurants, and similar establishments and the lack of actual consumption in such venues implies that Tennessee wine drinkers would like to see more in-state wines in restaurants and that this is another way for the state industry to grow. Finally, a relatively small number of surveyed individuals (74 or 14.0 percent) indicated they would like to purchase Tennessee wines through the internet.

Figure 3.18. In the Past 6 Months Have You Purchased Tennessee Wine by the Glass in a Restaurant, Bar or Pub?



In terms of reasons why they might not purchase Tennessee wines, 101 survey respondents felt that they do not believe that Tennessee wines were better quality wines (Figure 3.19). Among the survey respondents, 108 felt that they could not afford to pay more for Tennessee wines, while 127 additional respondents felt that they could afford to pay more for Tennessee wines but were unwilling to pay a higher price for such wines. These latter two questions are based on the assumption, of course, that Tennessee wines cost more than wines produced in other locations.

Figure 3.19. Reasons Survey Respondents Do Not Purchase Tennessee Wine.



We also analyzed specific written responses regarding why survey respondents might not consider purchasing Tennessee wines. The responses fell into the four categories of lack of availability, cost, lack of knowledge and preference (Figure 3.20). Examples of statements belonging to the lack of availability category included “have never had the opportunity” and “I don’t see it in the liquor store.” Examples in the cost category are “can’t afford it” and “too expensive.” Examples in the lack of knowledge categories include responses such as “not sure which are from Tennessee,” “never knew we had it” and “no

knowledge of it but will be considered in the future." Examples in the preference category include statements such as "I like California wines and Washington wines better" and "have an Italian favorite." Among the 87 written responses, lack of knowledge was the largest category with 35 (40.2 percent of the 87) written responses followed fairly closely by availability with 29 responses (33.3 percent). Among the remaining responses were those in the cost (11 or 12.6 percent) and preference (12 or 13.8 percent) categories. It is noteworthy that the largest issues based on this analysis are lack of availability and lack of knowledge. Both areas are subject to changes in the state legal environment and to marketing efforts by the industry and others. Specifically, increased access to Tennessee wine in grocery stores and other venues should help address the lack of availability issue. Marketing efforts can be employed to help address the lack of knowledge concerning Tennessee wines.

Wine trails can serve as an effective means of promoting a wine industry at the regional or state level.

The issue of a lack of knowledge regarding Tennessee wines arises most forcefully when survey respondents were asked directly regarding such knowledge. Among the 528 respondents to the question, 186 (or 35.2 percent) indicated "not at all" when asked to indicate their knowledge regarding Tennessee wines. More optimistically, 258 (48.9 percent) indicated they were somewhat knowledgeable (Figure 3. 21). However, a relatively small number (63 or 11.9 percent) stated they were knowledgeable, while only 21 respondents (4.0 percent) felt that they were extremely knowledgeable regarding Tennessee wines. The lack of familiarity with Tennessee wines is seen in other survey results. For example, as discussed in Chapter 5, a wine trail is a group of wineries and usually other hospitality oriented businesses and other assets connected by a roadway or other transportation corridor in a geographically defined area. Wine trails can serve as an effective means of promoting a wine industry at the regional or state level. Only 21.4 percent of respondents (113) indicated that they knew about the various regional wine trails in Tennessee. In our view, these results also highlight the need to educate Tennessee wine consumers about Tennessee wines.

Figure 3.20. Survey Response: Categories of Written Reasons by Respondents Concerning Why They Might Not Buy Tennessee Wine.

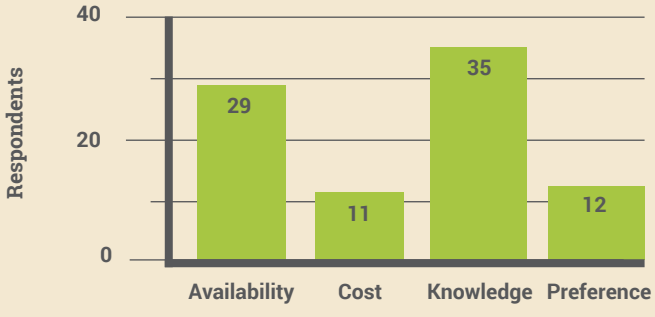


Figure 3.21. I Am Knowledgeable About Tennessee Wines.

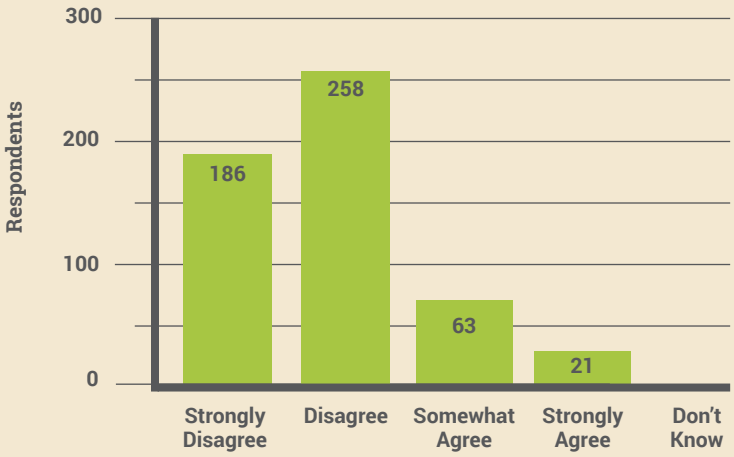


Figure 3.22. Survey Response: I Know More About Where Tennessee Wine Comes From.

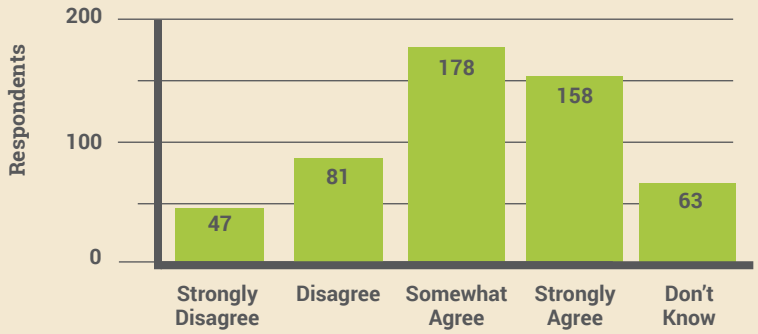


Figure 3.23. How Would You Rate Your Knowledge of California Wine?

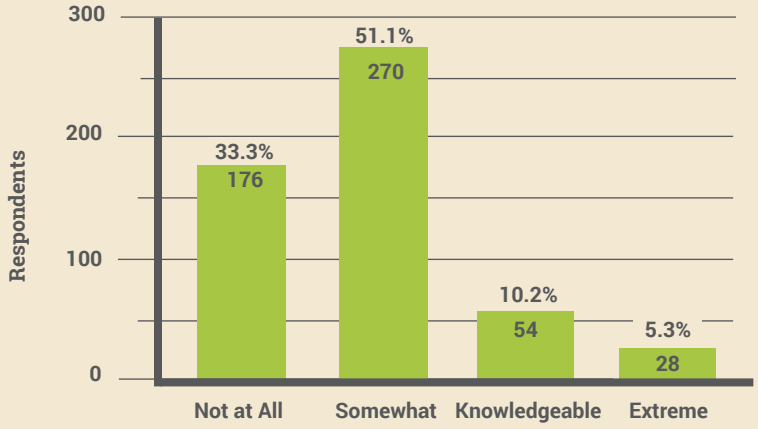
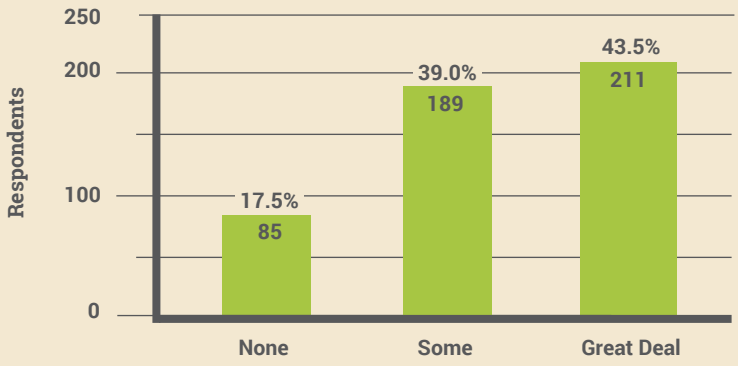


Figure 3.24. Degree of Influence: Direct Purchase from Winery or Grower in the Decision to Buy Tennessee Wines.



Similarly, survey respondents were also asked to indicate their level of agreement (strongly agree, somewhat agree, somewhat disagree, strongly disagree, or don't know) with the influence of six factors on their decision to buy Tennessee wine. In response to the statement, "I know more about where Tennessee wine comes from (as compared to other wines)," 178 respondents (33.8 percent of the 527 responding to the statement) indicated some agreement, while 158 respondents (30.0 percent) stated they strongly agreed with the statement (Figure 3.22). Alternatively, 81 respondents (15.4 percent) disagreed and 47 respondents strongly disagreed with the statement while 63 respondents (12.0 percent) indicated that they didn't know. This set of survey results implies that consumers possess some knowledge regarding Tennessee wines but that lack of such knowledge is an issue.

As a basis of comparison, survey respondents were also asked to indicate their level of knowledge regarding California wines (as of 2015 according to Wines Vines Analytics (2016), California wineries are responsible for 88 percent of U.S. wine production in terms of volume). Respondents' knowledge of California wines closely tracked their knowledge of Tennessee wines. For example, 270 respondents (51.1 percent of respondents to the question) indicated they were somewhat knowledgeable regarding California wines while 176 respondents (33.3 percent) indicated they were not at all knowledgeable about California wines (Figure 3.23). Only 15.5 percent of survey respondents (82) stated they were either

knowledgeable or extremely knowledgeable. Compared to the very similar results found for Tennessee wines, this set of results also implies that many Tennessee wine drinkers may lack a working knowledge regarding the provenance of wine in general.

Tennessee consumers were also asked to indicate how important certain considerations were in their decision to purchase Tennessee wine. The experience of purchasing directly from a winery or grower had a great deal of influence on the decision of 211 respondents (or 43.5 percent of the 485 respondents with an opinion) while 189 of the respondents (39.0 percent) felt that it could have some influence and 85 respondents (17.5 percent) saw no influence on their decision (Figure 3.24). Being able to visit a winery or vineyard had a great deal of influence for 252 respondents (over half of the 497 with an opinion at 50.7 percent) while 154 (31.0 percent) felt that it had some influence and 91 respondents (18.3 percent) felt it had no influence on their decision (Figure 3.25). The variety of Tennessee wine types had a great deal of influence for 237 respondents (48.6 percent of the 488 with an opinion) while 185 (37.9 percent) felt that it had some influence and 66 respondents (13.5 percent) stated it had no influence on their decision (Figure 3.26). The results to these questions reinforce the wisdom of the direct sales strategy that is employed by Tennessee wineries. However, the responses to the former two questions also present a challenge if the industry seeks to move more into indirect and off-site retailing, especially with respect to grocery stores and possibly big-box and warehouse outlets.

Figure 3.25. Degree of Influence for Visiting Winery or Grower in the Decision to Buy Tennessee Wines.

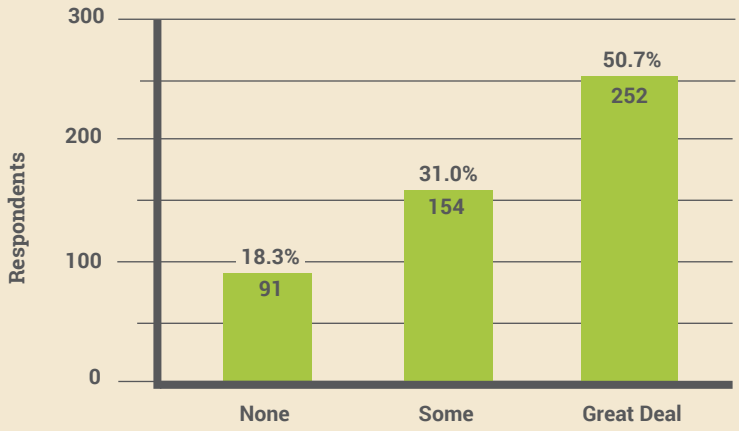


Figure 3.26. Degree of Influence for Variety of Types of Wine in Decision to Buy Tennessee Wines.

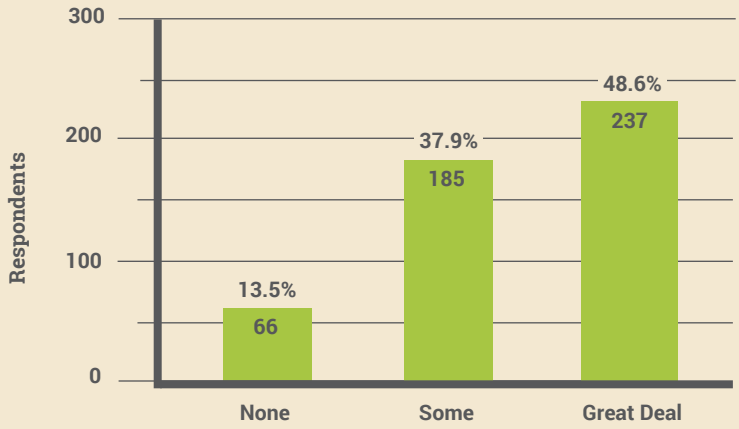


Figure 3.27. Surveyed Consumers Response: Tennessee Wine Tastes Better than Other Wine.

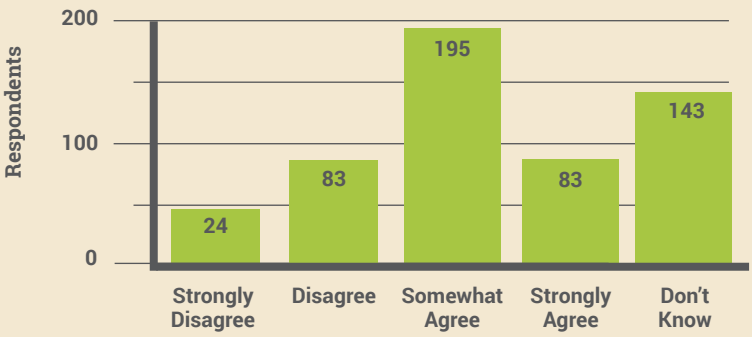
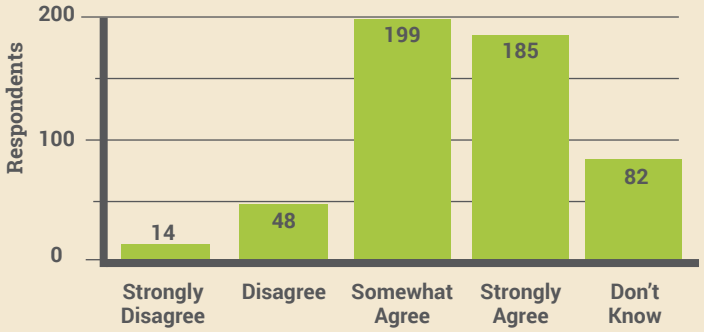


Figure 3.28. The Price of Tennessee Wine Compares Favorably to Other Wines.



Survey respondents were also asked to indicate their level of agreement (strongly agree, somewhat agree, somewhat disagree, strongly disagree or don't know) with the influence of six factors on their decision to buy Tennessee wine. In response to the statement, "I believe Tennessee wine tastes better than out-of-state wine," 195 respondents (36.9 percent of the 528 respondents to the statement) indicated some agreement while 83 respondents (or 15.7 percent) indicated they either disagreed or strongly agreed with the statement (Figure 3.27). Further, 143 respondents (27.1 percent) indicated they didn't know, thus reinforcing our finding that lack of familiarity is an issue for the Tennessee wine industry. Still, a slight majority of respondents had at least a somewhat positive picture concerning the taste of Tennessee wines versus wine made elsewhere.

Tennessee wine industry should consider promoting use of in-state grapes in bottle labels and in their advertising efforts.

In response to the statement, "I believe the price of Tennessee wine compares favorably to other wines," 199 respondents (37.7 percent of the 528 respondents to the statement) indicated some agreement while 185 respondents (35.0 percent) stated they strongly agreed with the statement (Figure 3.28). Only 62 respondents (11.8 percent) either disagreed or strongly disagreed with the statement while 82 respondents (15.5 percent) indicated that they didn't know. This set of survey results implies that in terms of price and given their knowledge of the industry, Tennessee wine drinkers may have a fairly positive view regarding the Tennessee wine industry.

The last three statements are indicative of possible broader social benefits due to consuming Tennessee wines as they influence consumer behavior. In response to the statement, "By buying Tennessee wine I am supporting the state's economy", 337 respondents (63.9 percent of the 527 respondents to the statement) indicated strong agreement while 149 respondents (28.3 percent) stated they somewhat agreed with the statement (Figure 3.29). Only 26 respondents (4.9 percent) either disagreed or strongly disagreed with the statement while only 15 respondents (2.8 percent) indicated that they didn't know. This set of survey results implies that respondents are aware that they are supporting the state economy in general when purchasing Tennessee wine. These results also imply that a desire to support the state economy may positively influence the decision to purchase Tennessee wine.

In response to the statement, "By buying Tennessee wine I am supporting grape growers in my state," 346 respondents (65.7 percent of the 527 respondents to the statement) indicated strong agreement while 147 respondents (27.9 percent) stated they somewhat agreed with the statement (Figure 3.30). Only 22 respondents (4.1 percent) either disagreed or strongly disagreed with the statement while only 12 respondents (2.3 percent) indicated that they didn't know. This set of survey results implies that respondents are aware that they are supporting state grape growers when purchasing Tennessee wine. Similar to the prior set of results, these results imply that a desire to support state farmers influences the decision to purchase Tennessee wine in a positive way. Accordingly, the Tennessee wine industry should consider promoting use of in-state grapes in bottle labels and in their advertising efforts in general. The result is consistent with the finding of Carpio and Isengildina-Massa (2010) that consumers support local foods in large part because it benefits local farmers. The result is also consistent with the econometrics results discussed later in this chapter indicating support of local foods in general as a major rational for the willingness to pay for Tennessee wine.

Figure 3.29. Purchasing Tennessee Wine Makes Me Feel That I Support the State's Economy.

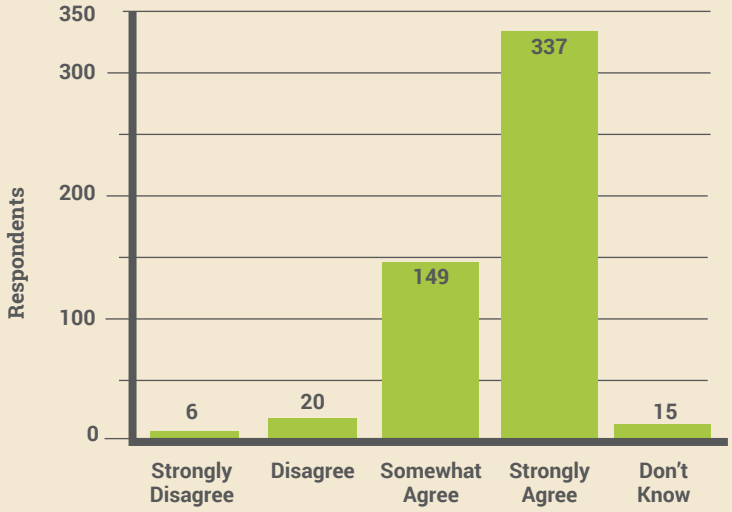


Figure 3.30. Purchasing Tennessee Wine Makes Me Feel That I Support State Grape Growers.

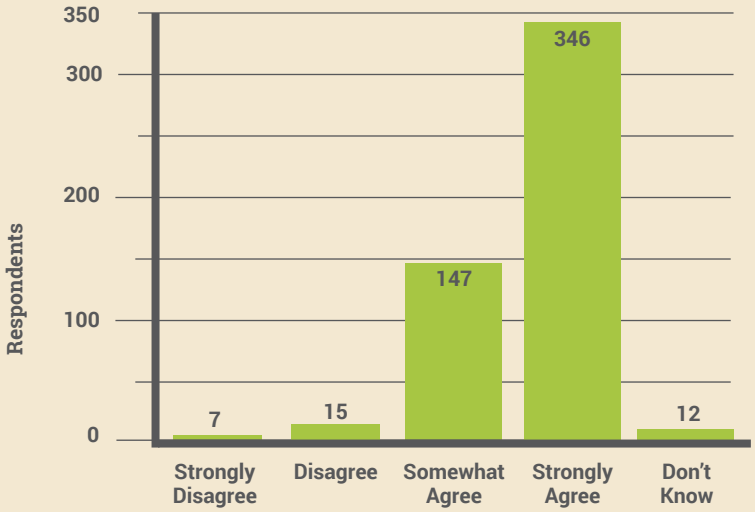


Figure 3.31. The Price of Tennessee Wine Compares Favorably to Other Wines.

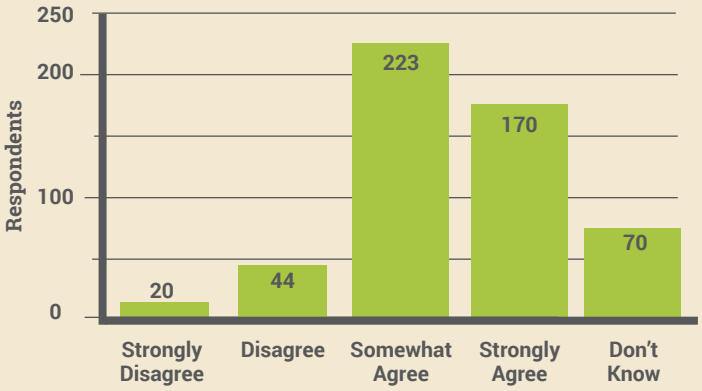
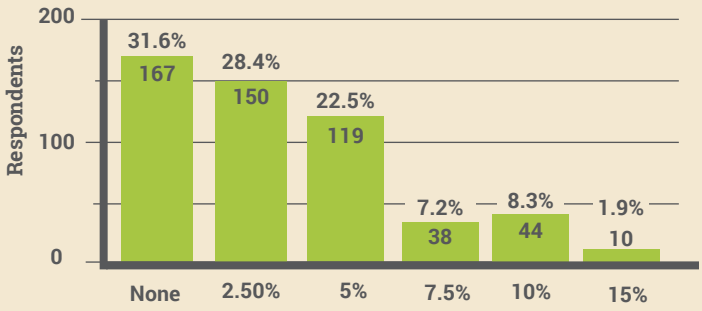


Figure 3.32. I Am Willing to Pay a Percent Price Premium for Tennessee-Grown Foods Vs. Foods Grown Elsewhere.



In response to the statement, "Buying Tennessee wine is better for the environment due to shorter transport distances," 223 respondents (42.3 percent of the 527 responding to the statement) indicated some agreement while 170 respondents (32.8 percent) stated they strongly agreed with the statement (Figure 3.31). Only 64 respondents (12.1 percent) either disagreed or strongly disagreed with the statement while 70 respondents (13.3 percent) indicated that they didn't know. This set of survey results implies that at least to some degree, this concern about the environment is a positive influence regarding the decision to purchase Tennessee wine. Coupled with the result concerning sustainable grape production expressed by survey respondents (as shown in Figure 3.9), this results implies that a significant share of Tennessee wine drinkers hold environmental concerns. Consistent with the literature (as discussed in Chapter 5), these survey results together imply that a quality-enhancement-based training program with an emphasis on sustainable (i.e., environmentally friendly) grape production methods could grow the industry and perhaps even support price premiums for sustainably grown grapes and the wines produced with such grapes.[8]

A significant share of Tennessee wine drinkers hold environmental concerns.

Survey respondents were also asked to indicate their willingness to pay a premium for food grown or raised in Tennessee. On average, respondents were willing to pay 3.5 percent more for food grown in Tennessee. Among the respondents, 361 or 68.4 percent of all respondents were willing to pay a premium at some level (Figure 3.32). Among the various levels for such a premium, 150 respondents (28.4 percent) were willing to pay a 2.5 percent premium while 119 respondents (22.5 percent) were willing to pay a 5 percent premium. For greater premium levels, 38 respondents (7.2 percent) were willing to pay a 7.5 percent premium, 44 respondents (8.3 percent) were willing to pay a 10 percent premium, and 10 respondents (1.9 percent) were willing to pay a 15 percent for food grown in Tennessee.

[8] The results to this question in no way indicate that shorter transportation leads to environmental benefits, only that consumers perceive this as a possible benefit. Further, as discussed in Chapter 5, any marketing effort based on environmental sustainability must be based on the actual implementation of sustainable practices to be successful.

A very important component of the survey and the resulting analysis is the willingness to pay for Tennessee wines. In this part of the analysis, survey respondents were presented with what economists call a "choice experiment." In such experiments, survey respondents are offered a hypothetical choice between two products with various attributes such as price. Certain attributes are held the same, while other attributes are allowed to vary.

In this study, survey respondents were presented a hypothetical buying scenario where a Tennessee wine is compared to a California wine with size, quality and flavor the same between the two wines but where price varies. Specifically, the price of the Tennessee wine is varied in the set of choices offered to survey respondents from a base price of $12 to a set of "scale prices" ($10, $14 and $18) versus a California wine with a base price of $12. (The same set of experiments was conducted for a red wine and a white wine.) Justifying our choice of price levels, the base price and scale prices used here are very similar to the findings of a price analysis study of Virginia wines in which red and white Virginia wines were determined to be sold at either a "super-premium" price ($10-$13.99) or an "ultra-premium" price (greater than $14) market segment (Ferreira and Ferreira 2013). These price tiers were also found to be consistent with wines of comparable reputation in which niche branding and product loyalty was not considered in the pricing (Jarvis and Goodman 2005). Further, Tennessee industry experts suggested a selling price of $15 for use in our budget analysis of a Tennessee winery (see Chapter 4), a value also consistent with the prices used here. Because we are varying the price of the Tennessee wine in question, the results of the choice experiment provide a means for estimating the willingness to pay for Tennessee wine and specifically the factors that may drive that decision.

The results of the choice experiments by the survey respondents were then analyzed with a probability-based regression equation (a probit model) based on independent variables (such as socioeconomic data) supplied by the respondents in other parts of the survey. The purpose of the analysis is to assess how various attributes and beliefs of the survey respondents influence their choice regarding the willingness to pay for Tennessee wines. Descriptions of these independent variables included in the analysis are presented in Table 3.1 along with our hypothesis regarding how we think the variable in question should influence the willingness to pay for Tennessee wine. For example, as shown in that table, we would expect a survey respondent with a more positive view of local foods in general to be willing to pay more for Tennessee wine as compared to a wine produced elsewhere.

As shown in Table 3.1, price (PRICE) is hypothesized to be a significant and negatively influencing consumers purchasing of Tennessee-labeled wine. A negative coefficient for price reflects the inverse relationship between price and quantity demanded, or, as the price of Tennessee-labeled wine increases, fewer consumers are expected to purchase Tennessee-labeled wine. A respondent who purchases wine less than once a month (FREQ) was expected to positively impact the likelihood of purchasing Tennessee-labeled wine. This person was assumed to purchase wine for special occasions and would be willing to pay a premium for a Tennessee-labeled wine. If a respondent purchased wine from a winery or vineyard in the past year (LOC), this person was hypothesized to be positively correlated with consumers' likelihood of purchasing

Table 1. Descriptions and Summary Statistics of Dependent and Independent Variables

Variable	Description	Hypothesized Sign	Mean
Dependent Variable			
WINE	= 1 if a consumer chooses to buy Tennessee-labeled wine in the choice experiment		0.695
Independent Variable			
PRICE	Average price respondents were willing to pay for Tennessee wine	-	13.367
FREQ	= 1 if the respondent purchases wine less often than once a month	+	0.223
LOC	= 1 if the respondent had purchased wine from a winery/vineyard in the past year	+	0.394
LOW	= 1 if respondents rated low price as an important factor when purchasing wine	+	0.497
TASTE	= 1 if respondents rated taste/flavor as an important factor when purchasing wine	+	0.986
APPEAR	= 1 if respondents rated bottle appearance as an important factor when purchasing wine	+	0.271
LOCAL	= 1 if respondents rated “locally produced” as an important factor when purchasing wine	+	0.433
SUSTAIN	= 1 if respondents rated sustainably grown grape as an important factor when purchasing wine	+	0.538
RED	= 1 if the respondent prefers red wine	+/-	0.421
WHITE	= 1 if the respondent prefers white wine	+/-	0.358
NO	= 1 if the respondent has no preference	+/-	0.221
AGE	Age of respondent	-	40.306
GENDER	= 1 if the respondent was female	-	0.726
EDU	= 1 if the respondent had a bachelor’s degree or higher	+/-	0.366
INC	= 1 if the respondent had an annual household income of $50,000 or higher	+	0.448
CLUSTER	= 1 if the respondent was located in a county with three or more wineries	+	0.082
METRO	= 1 if the respondent was located in a zip code that is classified as metro by the USDA ERS	+	0.759

Tennessee-labeled wine. Those making wine purchases at vineyards might be more likely to pay a premium for the specific wine labels.

A respondent that rated low price (LOW) as an important factor in purchasing wine was expected to negatively impact the probability of purchasing Tennessee-labeled wine (Table 3.1). This person is making a purchasing decision based on price and not labels. If taste or flavor (TASTE) and bottle appearance (APPEAR) were important to a respondent, they were hypothesized to positively influence the purchasing of Tennessee-labeled wine. Studies have concluded that taste, freshness and nutrition have a positive impact on consumers' willingness to pay for local products (Darby et al. 2006; Brooker et al. 1988). Studies have also found that bottle appearance can impact consumers' willingness to pay for a bottle of wine (Steiner 2000; Combris et al. 1997).

A respondent that rated locally produced (LOCAL) as an important factor in purchasing wine was expected to positively impact willingness to pay for Tennessee-labeled wine (Table 3.1). Also, a respondent that rated sustainable (SUSTAIN) grown grape production as an important factor in purchasing wine was expected to have a greater probability of purchasing Tennessee-labeled wine. There are a number of studies that find consumers having a preference for locally produced foods and goods that are sustainably produced (Vecchio 2013; Martinez et al. 2010; Low et al. 2015; Willis et al. 2013; Darby et al. 2006). There was a level of uncertainty regarding consumers partiality towards red wine (RED), white wine (WHITE), or no preference toward either (NO) and how that would impact consumers' willingness to pay for Tennessee-labeled wine.

Age (AGE) was hypothesized to have a negative association with consumers' willingness to pay premiums for Tennessee-labeled wine (Table 3.1). Older consumers are less likely to favor and/or purchase locally produced goods (Adalja et al. 2013; Willis et al. 2013; Nganje et al. 2011). Being a female (GENDER) is hypothesized to increase willingness to pay for Tennessee-labeled wines since studies find that females are more inclined to pay higher prices for local foods than their male counterparts (Willis et al. 2013; Govindasamy and Italia 1999; James, Richard and Rossman 2009). If the respondent has an income of over $50,000 per year (INC), it was hypothesized to have a positive impact with consumers' willingness to pay for Tennessee-labeled wine. Prior research revealed that as the consumers' level of education increases and/or level of income increases, they are more inclined to pay premiums for local foods (Willis et al. 2013; Nganje, Hughner, and Lee 2011). A respondent with a bachelor's degree or higher (EDU) was unknown how they would impact willingness to pay for Tennessee-labeled wine. Studies have found mixed results regarding the impact of education on purchasing locally produced goods (Loureiro and Hine 2002; Brooker et al. 1988; Misra, Huang, and Ott 1991).

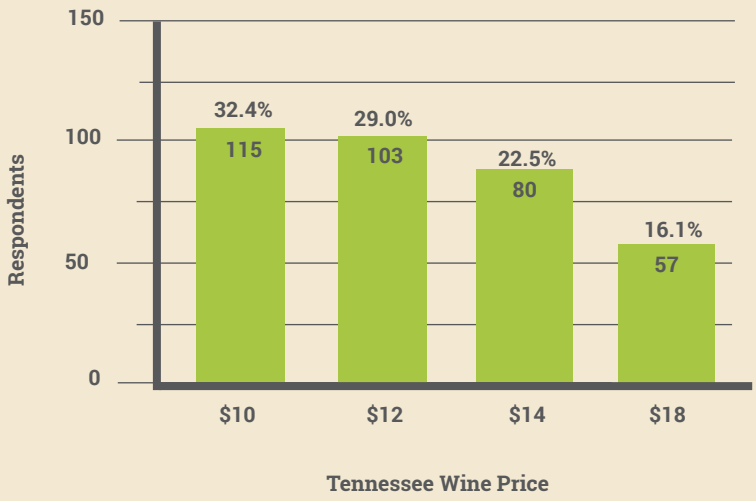
There are a number of studies that find consumers having a preference for locally produced foods and goods that are sustainably produced.

A respondent that lived in a county that had three or more wineries located within its borders (CLUSTER) was thought to be more likely to purchase Tennessee-labeled wine (Table 3.1). Additionally, a respondent that lived in a metropolitan area (METRO) as defined by the U.S. Office of Budget and Management based on U.S. Census data (USDA Economic Research Service, 2013) was more likely to purchase Tennessee-labeled wine. Overall, Tennessee consumers were hypothesized to have a positive willingness to pay for Tennessee-labeled wines based on existing research of consumers' interest and willingness to pay for locally produced goods (Hu et al. 2012; Burnett et al. 2011; Martinez et al. 2010; Willis et al. 2013; Carpio and Isengildina-Massa 2009).

WILLINGNESS TO PAY RESULTS

Summary statistics, hypothesized signs and the definitions of variables included in the analysis are provided in Table 3.2. The majority of respondents (70 percent) indicated that they would prefer the Tennessee-labeled wine over the alternative bottle. The average price respondents were willing to pay for the Tennessee-labeled wine was $13.68. The percentages of respondents choosing Tennessee wine at the differing prices are shown in Figure 3.33. The greatest percentage of consumers chose Tennessee wine when the price was lower than or at

Figure 3.33 Survey Respondents Choice of Tennessee Wine at Various Prices.



base price. In comparison to the California wine, 103 respondents (29 percent of the 355 respondents who chose Tennessee wine at any price) chose Tennessee wine at the base price of $12, while 32.4 percent (115) chose Tennessee wine at $10. When the given price was $14, 22.5 percent (80) of the respondents chose Tennessee wine, while 16.1 percent (57) of the respondents chose Tennessee wine at the highest given price of $18.

Estimated coefficients and marginal effects of the variables included in the probit model are provided in Table 3.2.[9] As expected, the sign for PRICE was negative, denoting that as the price of Tennessee-labeled wine increased, consumers were more inclined to choose the wine listed at the base price of $12 per bottle. A $1 increase in the price of Tennessee wine resulted in the probability of the consumer purchasing that wine to decrease by 4 percent. Consumers who purchased wine less than once a month were 11 percent less likely to choose Tennessee-labeled wine.

[9] Marginal effects are the change in the probability of the willingness to pay for Tennessee wine, with a small change in the variable of interest (factors that either increase or decrease the probability of consumers paying a premium for Tennessee wine).

Table 3.2. Estimated Coefficients and Marginal Effects from the Probit Model for Tennessee-Labeled Wine.

Variable[a]	Estimated Coefficient	Marginal Effects
Intercept	2.092**	-
PRICE	-0.149***	-0.044***
FREQ	-0.379**	-0.111**
LOC	0.120	-
LOW	-0.360**	-0.105**
TASTE	1.171	-
APPEAR	-0.127	-
LOCAL	0.566***	0.167***
SUSTAIN	-0.054	
RED	-0.331*	-0.097*
WHITE	-0.0591	-
AGE	0.002	-
GENDER	-0.288*	-0.085*
EDU	-0.359**	-0.106**
INC	-0.014	-
CLUSTER	0.1729	-
METRO	-0.101	-
INC	= 1 if the respondent had an annual household income of $50,000 or higher	
CLUSTER	= 1 if the respondent was located in a county with three or more wineries	
METRO	= 1 if the respondent was located in a zip code that is classified as metro by the USDA ERS	
Likelihood Ratio	<0.001	
McFadden's R2	0.689	
Percent correctly classified	0.654	

[a] Single, double and triple asterisks represents p-values less than 0.10, 0.05, 0.001, respectively.

Conversely, consumers who purchased wine more often than once a month were more likely to purchase Tennessee wine. This is counter to the hypothesized effect of purchasing frequency; however, a possible explanation for this is that the more frequent buyer has a greater appreciation for attributes of Tennessee-produced wine. The more important a consumer rated low price as a factor in their wine purchases decreased the likelihood of a consumer buying Tennessee-labeled wine by 10 percent. The sign on the variable for locally produced was significant and positive. This result indicated that a preference to buy locally produced wine in general has a positive effect on the willingness to pay for Tennessee wines. The desire for locally produced goods and the resulting price premium is seen in a number of previous studies (Vecchio 2013; Martinez et al. 2010; Low et al. 2015; Willis et al. 2013; Darby et al. 2006). As the consumers' preference for buying local farm products increased, they were 17 percent more likely to purchase Tennessee-labeled wine. If the consumers prefer red wines, they were 10 percent less likely to purchase Tennessee-labeled wine.

Demographic variables had little influence on the probability of consumers purchasing Tennessee wine. An unexpected result was that females were 8.5 percent less likely to purchase the Tennessee-labeled wine compared to males. Studies on local foods have shown females more inclined than their male counterparts to pay higher prices for local foods (Willis et al. 2013; Govindasamy and Italia 1999). Though previous studies have found age and income to impact the purchase of local products (Willis et al. 2013; Nganje, Hughner, and Lee 2011; Govindasamy and Italia 1999), these findings indicate that income and age were not significant. The sign on the education variable was significant and negative, suggesting those with a bachelor's degree or greater were 11 percent less likely to purchase Tennessee wine than those with less education. Estimates regarding the influence of education on purchasing local foods varies across studies; however, Loureiro and Hine (2002); Brooker et al. (1988); and Misra, Huang, and Ott (1991) found education to have a negative correlation with willingness to pay for local foods. The results from the

Table 3.3. Estimated Willingness to Pay (WTP) Premiums for Particular Attributes from the Probit Model.

Variable	Tennessee Wine
Mean Willingness to Pay	$14.04
Purchasing Frequency	−$2.54
Low Price	−$2.42
Locally Produced	$3.80
Red	−$2.22
Gender	−$1.93
Education	−$2.41

analysis suggest there was no correlation between respondents living in areas classified as metro and the purchasing of Tennessee wine. Similarly, we find that there was no significant correlation between the cluster counties and the buying of Tennessee wines.

A consumer who purchased wine less often than once a month was willing to pay $2.54/bottle less than the base price of $12, or $9.46/bottle for the Tennessee-labeled wine. If a consumer considered low price as an important factor in the decision to purchase wine, this person was willing to pay $2.42/bottle less, or $9.58/bottle for Tennessee-labeled wine. However, the consumer who placed importance on locally produced goods was willing to pay a price premium of $3.80/bottle over the base price. This suggests that wine producers could benefit from selling their wine at venues that emphasize locally produced goods, such as certain grocery store chains or locally owned stores. A consumer who more frequently purchases red wine was willing to pay $2.22/bottle less than the base price. Also, female consumers and consumers with an education level of bachelor's degree or higher were willing to pay $1.93/bottle and $2.41/bottle less than the base price, respectively.

Consumer's willingness to pay estimations for variables found to be significant in the probit model are included in Table 3.3. The overall average price consumers were willing to pay for Tennessee-labeled wine was $14.04/bottle.

Relative to the base price of wine presented in the choice experiment, consumers were willing to pay a $2.04/bottle premium for Tennessee-labeled wine. While Tennessee is not known for wine production, results from this study suggest a Tennessee-labeled wine could bring a 17 percent premium relative to an alternative U.S. made wine, suggesting that Tennessee consumers find value in grapes and wine produced in their state.

Velandia et al. (2014) examined participation in two Tennessee Department of Agricultural product marketing programs (Pick Tennessee Products and Tennessee Farm Fresh) for state vegetable and fruit farmers where products are labeled as grown in Tennessee. Participation in these programs by farmers was limited. However, our results suggest that Tennessee grape and wine producers could benefit from premiums received from labeling their grapes or wine as Tennessee grown or made. Such labeling efforts could occur through participation in a state marketing effort or perhaps through other marketing vehicles. University of Tennessee Extension and Tennessee State University Cooperative Extension Program along with the Tennessee Department of Agriculture and other appropriate state agencies could work to increase awareness of the state-sponsored marketing programs or other appropriate marketing programs with Tennessee grape growers.

Efforts should be made to build on the willingness to support Tennessee grape growers and wineries and the state economy.

SUMMARY AND CONCLUSIONS

In summation, our analysis of the responses made by surveyed Tennessee wine consumers has several key findings. First, availability or access is an issue for both at-home and entertainment-type venues. While the opening of the grocery store market in July 2016 should help, access is still limited and survey results highlight the importance of that limitation. Second, survey results imply that many Tennessee wine consumers possess little or no knowledge regarding the industry. Marketing efforts need to be enhanced by the industry and by appropriate state agencies and other appropriate entities. Third, our analysis of survey results indicates some concerns about quality of Tennessee wines. Efforts need to be made to ensure that a quality product is produced by the industry through appropriate training efforts. Still, the stronger finding is that despite their limited knowledge in some cases, Tennessee wine in general has a good reputation with many Tennessee wine consumers. Similarly, many consumers indicated a willingness to pay a premium for Tennessee wines, especially consumers with a strong interest in local foods. Efforts should be made to build on the willingness to support Tennessee grape growers and wineries and the state economy in general.

Chapter 4 Cost of Growing Grapes and Making Wine

INTRODUCTION

Provided here is an examination of the cost of production, revenue and profitability for four varieties of grapes and for a winery in Tennessee. Study results are based on the assumptions inherent in this study, including excellent management, for all four grape types [Muscadine, Cayuga White, Vidal Blanc (both white wine grapes), and Chambourcin (a red wine grape)] examined here. These results indicate that it is profitable to grow each variety for commercial production. Under key assumptions including excellent management, study results also indicate that a winery is profitable. Together the results for grape and wine production support our conclusion from the overview sector that the Tennessee wine and grape industry has the potential for future growth. It is also consistent with the evidence of strong growth of the industry as also discussed in the overview section and elsewhere in this document.

PROFITABILITY OF GROWING GRAPES

A 10-acre grapevine operation was assumed for all four varieties examined in this study based on consultations with industry experts. The 10 acres is markedly larger than the 3.5-acre average found for grapes grown in Tennessee in 2012. However, a 10-acre operation is not, by any means, an excessively large operation by industry standards and is the direction in which industry experts believe farm size should move. Excellent management is also assumed, resulting in both strong yields and high-quality grapes that are not discounted for quality issues.[10] Grape production is a risky venture, but it is also a potentially profitable one.

Grape production is a risky venture, but it is also a potentially profitable one.

Budget values for Muscadine production are based on Carpio et al. (2008) for North Carolina adjusted for conditions in Tennessee and updated based on assignment to appropriate producer price indexes for materials and equipment and on labor costs recorded for Tennessee farm operations ($12.45 per hour including benefits).[11] Original budget values for the three bunch grapes are based on Tang et al. (2014) for New York. These values are markedly adjusted for conditions in Tennessee and updated based on appropriate producer price indexes for materials and equipment and also on the same labor costs recorded for Tennessee farm operations and on adjusted values from Carpio et al. for general costs. Costs for lime and fertilizer for all four varieties were based on values taken from University of Tennessee published budgets for 2015 and for fescue for 2007 (adjusted

[10] Quality of grapes is very important in producing quality wine; hence, quality of production is as important as quantity of production in fetching a reasonable price and sufficient total revenue to insure profitability.

[11] The per hour rate was based on the value taken from Carpio adjusted for increases over time based on changes in mean annual pay for farmworkers and laborers for crop, nursery and greenhouses as reported by the U.S. Bureau of Labor Statistics.

to 2015) using application rates determined to be appropriate for a grape operation. Activities were extensively adjusted on all four production budgets based on advice provided by Tennessee grape industry experts. Custom hire machine harvest was assumed for all four operations at a rate of $107 per ton based on an updated value from Carpio et al.

Profitability is measured as total revenue (prices received for grapes times yield) minus total cost of production excluding land and management, or profitability equals net returns over time to management and land for the four grape varieties examined here. Annual and cumulative net returns are examined over a 20-year time planning horizon for each variety. To account for the time value of money, an interest rate of 5.5 percent is employed to discount future net returns. The break-even year and internal rate of return are also estimated for each variety based on our estimates of net returns.[12]

COSTS, YIELDS AND SELLING PRICES

Muscadines can be profitably grown in parts, but not all, of Tennessee. Sustained temperatures of under 10 degrees Fahrenheit result in vine kill. Hence, commercial production is generally not recommended for higher elevations or for much of the northern parts of the state (i.e., the parts of the state where lows of less than 10 degrees are common). Still, Muscadines are a common grape in Tennessee and industry experts see Muscadine production as an important component of the future of the state wine industry.

Muscadine cost estimates are based on Carpio et al. (2008). The evaluation is based on 10 acres of grape production based in a double Geneva trellis system with irrigation. Carpio

[12] Discounting provides a means of evaluating net returns across investments where the timing of such returns differs. Discounting is based on the time value of money, meaning investors would prefer to have money now than later (and, hence, money now has greater value than money to be received later) and a risk premium (the additional return demanded by investors because the future return might not occur). The internal rate of return is the discount rate at which present value of net returns would be zero. A larger value indicates greater profitability in comparing investments.

et al. found this to be the most profitable — yet most expensive system — among four Muscadine production systems (single wire with and without irrigation and double curtain with and without irrigation) that they examined. Muscadine production practices were reviewed with industry experts. Material costs and equipment costs were adjusted based on the producer price index. Labor costs were adjusted based on salary and wages for farmworkers and laborers, crop, nursery and greenhouse workers through May 2014 (U.S. Department of Labor, 2015). The values used in our estimates are based on the assumption of excellent management leading to 10 tons per acre of grape produced by the fourth year of production and continuing over the life of the investment (20 years). For Muscadine grapes following Carpio and in consultation with Tennessee industry experts, a marketable yield is assumed to start in the second year of production at 1.2 tons per acre (or 12 percent of full production) with 3.7 tons per acre (or 37 percent of full production) in the third year of production.

Bunch grape costs are based on adjusted values from Tang (2014). For each of the three bunch grape varieties, the evaluation is based on 10 acres of grape production based on an unirrigated single wire trellis system. For the three bunch grape varieties, a marketable yield of 3.0 tons per acre (or 40 percent of full production) is achieved in the third year for Cayuga White with a full marketable yield of 7.5 tons per acre starting in the fourth year of production. For Chambourcin and Vidal Blanc, a marketable yield of 2.0 tons per acre (or 40 percent of full production) is achieved in the third year for with a full marketable yield of 5 tons per acre starting in the fourth year of production for both varieties. For all four varieties, full production is also assumed for years 4 through 20 of production. Prices for marketable grapes (also vetted by industry experts) are assumed to be $900 per ton for Muscadine grapes, $920 per ton for Cayuga White, and $1,035 per ton for both Vidal Blanc and Chambourcin.

Annual per acre profits were

$4,895

in years 4-20.

Establishment costs were based on material costs for trellis construction for all four varieties plus material cost for the irrigation system for Muscadines. These establishment costs were treated as an amortized cost over the 20-year life of the investment for each variety.[13] The amortization charge is included in the total costs per acre estimates provided in Tables 4.1 through 4.3. Costs of labor and equipment use were accounted for in the initial pre-production period (i.e., year 0) as one-time charges.

For Muscadine grapes, annual per acre cost of production was highest in the year of establishment at $5,225 followed by years 4-20 at $4,105 (Table 4.1). As grape production came on line, a slight annual profit was made in year 3, at $115 per acre. Annual per acre profits were $4,895 in years 4-20.

Table 4.1. Per Acre Annual Costs of Growing Muscadine Grapes for Commercial Production in Tennessee.

Year	Yield (Tons Per Acre)	Total Cost ($ Per Acre)	Total Revenue ($ Per Acre)	Net Returns ($ Per Acre)
0	0.0	5,225	0	(5,225)
1	0.0	3,959	0	(3,959)
2	1.2	2,874	1,125	(1,749)
3	3.7	3,215	3,330	115
4-20	10.0	4,105	9,000	4,895

[13] Given the profitability of their operation, grape producers may opt to pay off the loan early to reduce interest payments.

For Cayuga White grapes, annual per acre cost of production was highest in year one at $3,085 followed by per acre cost in the year of establishment, and then by years 4-20 at $2,067 (Table 4.2). As grape production came on line, an annual profit was made in year 3, at $1,296 per acre. Annual per acre profits were $4,835 in years 4-20.

For Chambourcin grapes and Vidal Blanc grapes, annual per acre cost of production was highest in year one at $3,085 followed by per acre cost in the year of establishment, and then by years 4-20 at $1,798 (Table 4.3). As grape production came on line, an annual profit was made in year 3, at $713 per acre. Annual per acre profits were $3,377 in year 4-20.

Results from the crop budgets for growing four grape varieties for use in wine production indicate growing grapes is a sustainable investment that is profitable over time.

FINANCIAL ANALYSIS

Financial estimates in terms of total costs per acre, total revenue per acre, net returns to land and management per acre (after accounting for variable and fixed costs), accumulated net returns per acre, and present value of net returns per acre based on a 5.5 percent discount rate are provided in Table 4.4 for all four types of grapes. Also provide in the table is the breakeven year (where discounted profits over time exceed zero) and the total net present value and internal rate of return (i.e., the discount rate at which total accumulated long-run profits would be zero) over the 20-year planning horizon used in this study. Profitability is examined based on net returns to land and management. This assumption means that we assume that the land is already owned by the farmer in question.

Results from the crop budgets for growing four grape varieties for use in wine production indicate growing grapes is a sustainable investment that is profitable over time. Based on our analysis, Muscadine production shows a slight net profit of $115 per acre in the third year of production and an annual profit of $4,895 per acre in years 4 through 20. On a per acre basis, the total accumulated net return is $72,397 per acre. At a discount rate of 5.5 percent per year, the total net present value of Muscadine production over the 20-year planning horizon is $34,839. The breakeven year of production is year 6 (where all discounted costs are covered and true long run profitability ensues). The internal rate of return is 25.6 percent.

Table 4.2. Per Acre Annual Costs of Growing Cayuga White Grapes for Commercial Production in Tennessee.

Year	Yield (Tons Per Acre)	Total Cost ($ Per Acre)	Total Revenue ($ Per Acre)	Net Returns ($ Per Acre)
0	0.0	2,212	0	(2,212)
1	0.0	3,085	0	(3,085)
2	0.0	802	0	(802)
3	3.0	1,465	2,761	1,296
4-20	7.5	2,067	6,902	4,835

Table 4.3. Per Acre Annual Costs of Growing Chambourcin Grapes and Vidal Blanc Grapes for Commercial Production in Tennessee.

Year	Yield (Tons Per Acre)	Total Cost ($ Per Acre)	Total Revenue ($ Per Acre)	Net Returns ($ Per Acre)
0	0.0	2,212	0	(2,212)
1	0.0	3,085	0	(3,085)
2	0.0	802	0	(802)
3	2.0	1,357	2,070	713
4-20	5.0	1,798	5,175	3,377

Table 4.4. Financial Analysis of Per Acre Net Returns of Growing Muscadine, Cayuga White, Chambourcin and Vidal Blanc Grapes for Commercial Production in Tennessee.

Financial Concept	Financial Concept	Muscadine	Cayuga White	Vidal Blanc-Chambourcin
Breakeven Year	Year 6	Year 5	Year 5	(2,212)
Accumulated Net Return	$72,397	$284,699	$174,496	(3,085)
Net Present Value	$34,839	$77,397	$52,028	(802)
Internal Rate of Return[1]	25.6%	40.2%	31.3%	713

[1]At 5.5% discount rate.

Based on our analysis, Cayuga White production shows a net profit of $1,296 per acre in the third year of production and an annual profit of $4,835 per acre in years 4 through 20. On a per acre basis, the total accumulated net return is $284,699 per acre. At a discount rate of 5.5 percent per year, the total net present value of Cayuga White production over the 20-year planning horizon is $77,397. The breakeven year of production is year 5. The internal rate of return is 40.2 percent.

Similarly, Vidal Blanc and Chambourcin production both have an estimated net profit of $2,070 per acre in year 3 and an annual profit of $5,175 per acre in the fourth through 20th years of production. For both Vidal Blanc and Chambourcin on a per acre basis, the total accumulated net return is $174,469 per acre. At a discount rate of 5.5 percent per year, the total net present value of Vidal Blanc and Chambourcin production over the 20-year planning horizon is $52,028 per acre. The breakeven year of production is year 5. The internal rate of return is 31.3 percent for both grapes.

PROFITABILITY OF A WINERY OPERATION

Cost of production, revenue and profitability were also evaluated for a wine-making operation. The operation was assumed to produce 20,000 gallons, or 100,000 bottles, with original values primarily taken from a publication produced by Iowa State University Extension and Outreach in 2007. These values were also adjusted for inflation based on the appropriate producer price index. Other costs (bottles, laboratory supplied, insurance, all adjusted by the appropriate producer price index value and an annual maintenance rate) are taken from Kenkel et al. (2008) and from the Tennessee Alcoholic Beverages and Beer Tax Guide (2015) for certain taxes and fees. Property taxes are estimated based on rates provided by the Tennessee Comptroller of the Treasury Division of Property Assessments (2015). Practices and cost estimates were also extensively adjusted based on consultations with Tennessee wine industry experts. Annual and cumulative net returns are examined over a 20-year time planning horizon. Grapes were assumed to be purchased at a price of $1,150 per ton and $900,000 in financing was assumed to start the operation (Table 4.5). To account for the time value of money, an interest rate of 5.5 percent is employed to discount future net returns. Production costs were evaluated across four categories receiving, fermentation-storage, refrigeration and cellar, and tasting room.

Table 4.5. Costs, Revenue and Profitability of a 20,000-Gallon Tennessee Winery.

Cost, Revenue Category	$
Labor Costs, Including Benefits	$408,000
Purchased Grapes Costs	$161,000
Other Variable Costs	$342,895
Total Variable Costs	$911,895
4-20	5.0
Total Revenue	**$1,410,000**
Gross Margin	**$492,465**
Fixed Cost	$178,260
Debt Service	$80,928
Profit	**$238,917**

Once again based on consultations with Tennessee wine industry experts, a price of $15 a bottle is assumed with a sale leakage rate of 6 percent (for free tastings and waste) in an on-site tasting room setting (where the winery retains total revenue from sales made to final buyers). This set of assumptions leads to estimated annual revenue of $1,410,000. Total variable cost on an annual basis was estimated at $911,895, annual fixed cost was estimated at $178,260, and annual debt service payment was estimated to be $80,928. Annual profit was determined to be $238,917 with a rate of return of 16.9 percent. Based on the assumptions used in our study, a well-run Tennessee winery would be expected to be a profitable venture, assuming on-site retail of their product.

The breakeven point for the price of wine was $12.45 per bottle. Tennessee wines have the opportunity for being sold in many Tennessee grocery stores starting this summer (2016). Assuming a markup of 50 percent for retail, wholesale and transportation, this would mean the retail price at a grocery store would need to be $24.90 for a zero profit. This higher price level implies that Tennessee wines that will be marketed through grocery stores or liquor will need to be: 1) either of a quality that would bring a price of approximately $25 or higher per bottle; 2) produced by a markedly larger facility than the one examined here where economics of size would mean significantly lower per bottle costs of production; or 3) that costs of production could be lowered through acquisition of used, as opposed to new equipment or by other means.

Profitability of production is a key aspect in determining the ability of the Tennessee wine and grape industry to grow.

SUMMARY AND CONCLUSIONS

Profitability of production is a key aspect in determining the ability of the Tennessee wine and grape industry to grow. Budget analysis regarding the cost of production for producing four varieties of grapes in Tennessee and a Tennessee winery indicated profitability under excellent management and other assumptions such as vineyard size. Reiterating, these results are supportive of our conclusion regarding the potential for future growth of the industry and is consistent with the strong growth that has been especially evident in the last few years.

Chapter 5. Challenges, Opportunities and Moving Forward

INTRODUCTION

The Tennessee wine and grape industry faces several challenges and opportunities regarding the prospects for future growth. With respect to challenges and opportunities, and based on our analysis in previous chapters, we discuss a set of ideas for moving the industry forward.

CHALLENGES AND OPPORTUNITIES

The Tennessee wine industry faces several challenges and opportunities with respect to boosting future growth. Challenges include attitudes regarding alcohol consumption (including legal barriers), regional rivalries, lack of knowledge regarding the industry by in-state consumers, and support for research and marketing activities. Opportunities or strengths include a changing legal environment, growth of local foods, regional efforts and a strong industry association. Several of these topics, such as the changing legal environment and regionalism, are opportunities with a flipside challenge. Further, because the growth of the craft beer and craft spirits industries is an intertwined challenge and opportunity and because we are unsure as to which aspect is dominant, the challenge and opportunity associated with that topic are discussed together.

CONTINUING ATTITUDES REGARDING ALCOHOL CONSUMPTION INCLUDING LEGAL BARRIERS

Despite recent improvements in the legal environment in the state, challenges still remain for the industry in terms of attitudes held by Tennessee residents. Such attitudes affect the legal environment for selling wine in the state. Such attitudes can also influence levels of funding and support provided to the Tennessee wine industry by various governmental entities.

Tennessee residents consume relatively low levels of wine as compared to the rest of the U.S. (Table 5.1). The state ranks 39th in estimated average wine consumption (per resident 14 years and older or "per modified adult") at 1.94 gallons among the 50 states and the District of Columbia (National Institute on Alcohol Abuse and Alcoholism, 2015). Nationally, average wine consumption is 3.26 gallons or 68 percent larger than the 1.94 gallons estimated for Tennessee. Regionally, average consumption of wine in the entire South is 36 percent larger at 2.64 gallons than that estimated for Tennessee. In comparison to the neighboring peer states examined in this study, average consumption is 25 percent higher in Tennessee than in Kentucky and Arkansas (both at 1.55 gallons and both tied for 45th in the state rankings) while Tennessee and Georgia have the same level of average consumption. Average consumption levels in the neighboring aspirational states (North Carolina, Missouri and Virginia) are markedly higher than average consumption in Tennessee. Average consumption of wine in Missouri is 2.79 gallons (44 percent larger than Tennessee), 3.02 gallons in North Carolina (56 percent larger than for Tennessee), and 3.57 gallons in Virginia (84 percent larger than for Tennessee).

Table 5.1. Estimated Wine Consumption in Tennessee and Other Selected Areas, 2013.

State	Wine consumed per person over 14 years old per year	State Ranking	Compared to Tennessee
Arkansas	1.55	45	-25%
Kentucky	1.55	45	-25%
Georgia	1.94	39	0%
Tennessee	1.94	39	N/A
Missouri	2.79	29	44%
North Carolina	3.02	25	56%
Virginia	3.57	20	84%
South	2.64	N/A	36%
United States	3.26	N/A	68%

Source: National Institute on Alcohol Abuse and Alcoholism, 2015.

The attitudes reflected in wine consumption levels in the state are at least in part responsible for a somewhat restricted legal environment regarding selling wine in the state. The sale of either liquor or wine is prohibited in any county or municipality unless the local government entity in question passes an ordnance explicitly allowing such sales (i.e., Tennessee counties and municipalities are "default dry") (Alcohol Laws of Tennessee, 2015). Among the state's 95 counties, 26 are totally dry (no sales of liquor or wine is allowed), 60 counties are limited sales counties, where certain forms of either liquor or wine can be sold, and nine counties (including the counties with the four largest cities) are wet, meaning sales of wine and liquor are allowed. Besides restricting access to Tennessee wine, these legal restrictions are indicative of the attitude held by many citizens concerning the sale and consumption of wine. Both attitudes and legal restrictions remain a challenge for the industry.

Restrictions on wine sales are expressed in other ways. Although wineries can now sell directly to consumers in off-site satellite locations, the amount of sales allowed is still restricted to 3,000 cases and two satellite locations per winery. Further, while grocery stores in given locations began selling wines starting in the summer of 2016, restrictions still apply in terms of local ordinances and in terms of location relative to liquor stores that currently sell wine. Specifically, a grocery store cannot sell wine until July 2017 if it is within 500 feet of an existing liquor store that sells wine without the written permission of the liquor store. (By the same token, the liquor stores in question will be banned from selling items such as ice until that same date unless an agreement is made with the grocery store in question.) The ability of grocery stores to sell wine is also restricted to voter approval at the municipal level (Could, 2016, Hinds, 2015).

State regulations also affect growth of wineries as producers of cider. Specifically, conflicting regulations between Tennessee and the federal government also create issues with respect to cider production, and other state restrictions also confuse consumers. In terms of federal government regulations, wineries can produce and sell cider with an alcohol content of 8.5 percent; in fact, any such product above 8.5 percent is legally considered wine by federal regulators (Sorini and Hatef, 2014).[14] State of Tennessee regulations, on the other hand, require hard cider to be labeled as wine even if the alcohol content is below 7 percent. State regulators also define alcohol beverages based on alcohol content regardless of the source, and any product below 6 percent in such content is considered beer while any product above 7 percent is considered wine or ultimately distilled spirits (the latter for products with higher alcohol content). Further, Tennessee regulators seek to have Tennessee wine labeled as "cider wine," which is not a legal definition under federal regulations. Such conflicting regulations create confusion in the mind of producers. Worse, it limits the ability of Tennessee wineries to produce and market hard cider to consumers in an easily understood fashion.

The regulatory issues are unfortunate because cider is a rapidly growing portion of the U.S. alcohol products markets. U.S. cider production was 5.2 million gallons in 2012, a 650 percent increase from the 0.8 million gallons produced in 2007 (Alcohol and Tobacco Tax and Trade Bureau, 2013). As of January 2015, almost 500 commercial cider producers (defined as cideries) were operating in 39 states. Most of these operations have existed for less than 6 years (Peck and Miles, 2015). As of early 2016, Virginia had at least seven cideries in operation (Peck and Groover, 2016). Part of the increase is driven by the gluten-free attribute of cider. Many consumers (especially female) also see cider as an easily available and desirable alternative to craft beer as cider is typically sold through the same marketing outlets as beer.

[14] Until December 2015 the federal alcohol content limit for cider was 7 percent. However, under H.R. 2029, this legal limit is apparently being increased to 8.5 percent and other "cider industry friendly" changes are also to be made, such as legally treating peary (the pear-based form of cider) under cider regulations.

Statewide cooperation is needed across all three major areas of the state if certain statewide goals are to be obtained.

REGIONAL RIVALRIES

Regional efforts, such as regional wine trails, can be beneficial to the growth of the Tennessee wine industry. As discussed in Chapter 3, a wine trail is a group of wineries and often other related businesses and assets connected by a roadway or other type of transportation corridor that cooperatively market their products and sites (through assets such as road signage) (Wargenau and Che, 2006). While some have criticized wine trails as not necessarily beneficial (Fraser and Alonso, 2006), it is generally accepted that a well-developed wine trail can lead to strong horizontal linkages between wineries and vertical linkages between wineries and tour operators, providers of lodging, and area restaurants (Wargenau and Che). Such growth-inducing linkages of course means cooperation among the involved parties.

Statewide cooperation is needed across all three major areas of the state if certain statewide goals are to be obtained, such as the creation of a statewide wine trail with associated publicly provided signage and other possible benefits, or improvements in the legal environment at the state level. The author notes some competition between the three major areas of the state; while this competition can be healthy and to an extent competition between regions is to be expected (Turok, 2004), wineries in the three major areas of the state need to realize that cooperation is essential to growing their industry especially with regards to influencing state policy.

NEED FOR A MORE POSITIVE IMAGE

Based on results regarding perceptions about the Tennessee wine industry discussed in the demand analysis sector, the industry is well-regarded by a significant share of survey respondents, but many respondents do not have a strong positive image of the industry. Survey respondents also pointed out issues with quality, or uncertainty regarding quality, although in this regard the image was largely positive. Authors of a recent study of the North Carolina wine industry pointed to inconsistent quality of state wines and tasting room experiences and lack of a strong positive image as core weakness (Canziani and Byrd, 2015). Based on their findings and on our survey results, the lack of a positive brand image, including some concerns about quality, are also challenges for the Tennessee winery industry. As to be discussed later in this chapter, a marketing campaign joined to quality enhancement efforts should be considered as a way to improvement the image of the Tennessee wine industry.

SUPPORT FOR RESEARCH, EXTENSION AND MARKETING

Many states provide support for their wine industry through wine and grape boards (Canziani and Byrd) and through their university system. Tennessee producers can access certain tourism-based funds and the Tennessee Department of Agriculture provides support (as discussed in the opportunities section), but more targeted support could be useful in promoting the industry. Likewise, the University of Tennessee Institute of Agriculture supports the industry through research and Extension activities, but such support could be enhanced as discussed later in this chapter under the heading Moving Forward.

OPPORTUNITIES

We see the opportunities for growth in the Tennessee wine industry to be stronger than the challenges. We also see some areas of change as a potential double-edged sword for the Tennessee wine industry. Accordingly, growth of craft beer and craft spirits industries is discussed as both an opportunity and challenge.

CHANGING LEGAL ENVIRONMENT

Recent improvements in the legal environment regarding wine sales in Tennessee should engender further growth. The 2014 session of the Tennessee Legislature approved a bill (House Bill 2027 and Senate Bill 2415) allowing wineries in the state to "self-distribute" up to 3,000 cases of wine per year. Wineries are also allowed to operate up to two additional satellite tasting locations for selling wine that they produce. This new legislation removes the burden of having to sell through wholesale distributors at off-site locations for small levels of production. According to authors of the Tennessee Viticultural and Oenological Society (TVOS) Newsletter (April 2014), similar legislation in states such as Georgia, North Carolina, Texas and Virginia has led to the dramatic growth in the winery industry in those states.

Allowing the sale of wine as a municipality-based option for Tennessee grocery stores started in July 2016 (Senate Bill 837 passed in 2014 and later amended by Senate Bill 837) should also enhance opportunities for the state industry. Media reports stated that anywhere from 270 to 500 grocery stores in 78 municipalities in the state plan to sell wine (Cloud, 2015; Hind, 2016). Although retail through commercial outlets would be a challenge for most Tennessee wineries, allowing purchases in established retail outlets tends to benefit the industry in general (Rickard et al., 2011) by in part reducing the stigma associated with wine consumption and by increased access. It also provides an opportunity for larger operations with sufficiently low costs per bottle of production, due to economies of size or producers of higher quality, to price wines to compete in the off-site retail market. Economies of size (or higher quality market sales) are necessary because (based on national data) wineries receive around 50 percent of the final prices of wine sold in retail outlets such as grocery stores due to wholesale, retail and transportation markups.

GROWTH OF LOCAL FOODS

As discussed in Chapter 3, support of the local foods movement is a key driver in the willingness of Tennessee residents to purchase Tennessee wine. Although still a small share of the total food dollar in the U.S., the local foods sector continues to experience strong growth (Low et al., 2015). The survey of Tennessee residents also indicated strong support for Tennessee farmers and the state economy as reasons for consuming Tennessee wine. These results are consistent with research regarding why consumers seek out local foods (i.e., in large part the desire to support state farmers) (Carpio and Isengildina-Massa, 2010). Research regarding the wine industry also indicates a preference by wine consumers in restaurants for locally produced wines (Perla, Rickard, and Schmit, 2014). In as much as local foods remains a driving factor behind consumer purchase decisions, Tennessee wines should continue to benefit from the trend, especially in light of increased access due to satellite tasting sites and the opening of the grocery store market.

STRONG REGIONAL EFFORTS

Although the Tennessee wine industry exists in numerous counties, it is concentrated or clustered in certain areas. The economic literature indicates that such clustering can lead to strong growth for an industry under appropriate conditions. Several studies support the existence of beneficial clustering effects in the wine industry and also provide real-world examples regarding the mechanisms through which clustering can provide specific benefits to the industry.

Economic clusters can be defined as "geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions in a particular field that compete but also cooperate in producing similar products" (Porter, 2000 p.15) that serve as a means of engendering growth of a given industry. Porter argues that economic clusters have five drivers in terms of activity. The first driver is a strong and knowledgeable local demand. The second driver is strong linkages between input suppliers and, in our case, wineries (i.e., firms that sale in final markets). The third driver is business access to favorable resources — for example, capital and labor — but in the case of the wine industry a favorable resource is appropriate terrier (that is, land and all of its attributes including climate). The fourth driver is an appropriate competitive environment, where firms compete for customers but at some level are willing to share information and certain resources. In this regard, the transmission of knowledge (often tacit or "understood" knowledge) between firms and between firms and supporting institutions is critical.[15] This element also means that appropriate networking or social capital among firms and between firms and supporting institutions as a means of spreading knowledge is a critical element of success (Hira et al., 2013).[16] The fifth driver is a focus on regional export markets (to other regions or countries). These drivers set up businesses to obtain what economists call agglomeration economies, which is often a key element in local prosperity. Agglomeration economies exist where there is a set of unique factors that improve business productivity (and hence growth) because firms are physically close. Physical closeness, or proximity, can lead to the advantages of sharing a specialized workforce, having ready access to markets, and positive influence on local government policies. Reiterating, sharing of key industry information between businesses is often the most important benefit.

Researchers have analyzed the way clustering applies to the wine industry in several regards and which of those have possible implications for the industry in Tennessee. For example, Hira and Swartz (2014) argue that Napa Valley wineries have a price advantage over other regions due to the close cooperation of major stakeholders in the region. Their analysis attempted to control for factors such as variations in quality and effects of terrier. Likewise, in their spatial analysis of wineries in Washington and California, Yang et al. (2012) indicated that the neighborhood influence of having quality wineries nearby positively influenced the price received by wineries. Hira et al. (2013) argue that cluster-based development in the wine industry has tended to be more incremental than the dynamic change found in information technology based clusters such as Silicon Valley. They also see Etlowitz's (2003) triple helix of partnership between researchers, industry and government as key to successful wine cluster development. In this regard, there are complementary roles for universities (research and extension), "government (support and guiding action toward collective goods) and the private sector (production and efficiency) (p. 20)."

Centonze (2010), in his analysis of the New York wine industry, emphasizes the key role played by public institutions such as Cornell University and a state level nonprofit, the New York Wine and Culinary Center (which has the goal of showcasing state wine and food industries). The New York wine industry has experienced rapid growth but still primarily consists of smaller operations, which tend to be heavily dependent on tourist traffic. Because the industry by and large does not retail through wholesalers and off-site retail outlets, and because it is not a major player in national or international markets, he characterizes the New York wine industry as a developing cluster. We see the Tennessee wine industry as also a developing cluster

[15] An example of tacit knowledge would be best winemaking practices or how to deal with a particular problem in the grape-growing or winemaking process. Such tacit knowledge if often exchanged on an informal basis; for example, New Zealand wine managers talk about attending grape grower seminars that provide little useful information but indicate discussions in the bar with other managers after the formal meeting as providing very useful information (Harfield, 1999).

[16] Bourdieu and Wacquant, 1992, p. 119 define social capital as "the sum of the resources, actual or virtual, that accrue to an individual or group by virtue of possessing a durable network of more or less institutionalized relationships of mutual acquaintance and recognition." Putnam 1995, p. 67 defines social capital as "all features of social life – networks, norms, and trust – that enable participants to act together more effectively to pursue shared objectives."

because of such similar characteristics (i.e., the predominance of smaller operations, the importance of direct sales especially to tourists, and recent rapid growth).

An application of the clustering concept can be found in the American Viticultural Areas (AVA) concept. AVAs are wine grape growing regions recognized by the U.S. Department of the Treasury Alcohol and Tobacco Tax and Trade Bureau. An AVA is "a delimited grape-growing region having distinguishing features, as described in federal regulations with a title and a delineated geographical boundary" (Federal Register, 2014, p. 60594). AVA designation allows "vintners and consumers to attribute a given quality, reputation, or other characteristic of a wine made from grapes grown in an area to the wine's geographic origin. The establishment of AVAs allows vintners to describe more accurately the origin of their wines to consumers and helps consumers to identify wines they may purchase (Federal Register, p. 60954)." As of December 30, 2015, there are 231 AVAs in the U.S., 136 of which are in California. [The Mississippi Delta AVA is a 6,000-acre region mostly in Mississippi covering a very small portion of southeastern Tennessee and a part of Arkansas. The destination of the region has not resulted in any appreciable growth in the local wine industry (Appellation America.com., 2015)].

While economists and others (such as Cross et al., 2011) have disagreed about the advantages for wine industry growth with respect to AVAs, in general the literature indicates that AVAs can facilitate higher returns and industry growth for affected wineries. Gokcekus and Finnegan (2014) emphasize that sub-AVA areas have been important in Oregon, where higher quality producers separate themselves from other wineries within the AVA in question to receive a quality-based price premium for their wines. Hoemmen et al. (2013) in their study of two AVAs in California, also argue that AVA designation provides a price advantage for wineries in the affected areas.

However, Hoemmen et al. contend that the implementation (starting in 1996) of a sustainable winegrowing program, the Sustainable in Practice Certification Standards Program or SIP, has resulted in an even stronger price premium for wines produced in the affected areas. The SIP is based on the goals of attentive and sustainable fruit production and enhanced worker well-being. Conservation of wildlife habitat, use of appropriate pest management techniques, energy efficiency, water conservation, and appropriate worker support and management efforts are important criteria. The program includes a review of the entire farm operation including worker treatment, soil fertility maintenance, use of cover crops, appropriate irrigation technologies, and wildlife and native plant conservation techniques. The program provides a winegrowers workbook, workshops designed to assist farmers in implementing practices covered in the workbook, and demonstration vineyards for evaluating particular practices (Shaw et al., 2011). Starting in 2005, a third-party certification program regarding the implementation of sustainable practices was also added. Shaw et al. also indicate that wineries have started to pay a price premium for grapes grown under the certification program. While this effort emphasizes sustainable production practices, enhancement of the quality of grapes and wine production is a major and important element of the program.

Specifically, in her evaluation of the effect a sustainable wine program in Colorado, Loureiro (2003) found that without being tied to efforts that also enhanced the quality of the wine, sustainable product efforts yielded virtually no price premium benefit for participating wineries. Similarly, in the recently published strategic plan for the North Carolina wine industry, Canziani and Byrd recommend the implementation of a quality control program as a way to increase growth. These findings are also consistent with the demand analysis in Chapter 3, where, in general, survey respondents indicate a desire for both quality wine and the use of sustainable production practices.[17]

[17] The form of marketing sustainable production is also important; specifically, analysis of eco-labeling is not effective unless based on a formal eco-certification program (Delmas and Grant, 2014) such as SIP.

STRONG INDUSTRY ASSOCIATION

In our view, the Tennessee Farm Winegrowers Alliance (TFWA) is a strong advocate for the industry. It maintains a reasonably well-done website (2015) and is an effective voice for the industry with the state legislature and with the Tennessee Department of Agriculture (TDA). The TFWA is an example of a nonprofit, much like the New York Wine and Culinary Center in New York State (Centonze), which is critical to the further growth of any developing economic cluster. The TDA also maintains support of the industry through its website (Pick Tennessee Products program, 2015) by providing a listing of restaurants that serve Tennessee wines and by providing an order form for a Tennessee winery guide. TDA also devotes personnel to assist in marketing and in general supporting the industry. As discussed in Chapter 3, Pick Tennessee Products and Tennessee Farm Fresh programs are also available through the TDA for promotion purposes.

TDA devotes personnel to assist in marketing and in general supporting the industry.

OPPORTUNITY AND CHALLENGE: GROWTH OF CRAFT BEER AND CRAFT SPIRITS INDUSTRIES

Related to the growth in local foods and regional and local wines is the growth of the craft beer and craft spirits industries. The growth in craft beer and craft spirits is both an opportunity and a challenge in our view. On the positive side, according to one industry expert, Christian Miller, (Arthur, 2016) both the increase in craft beer and wine consumption are driven by an interest in artisan-based production in which consumers value variety and quality (drivers of consumption of local foods as well in our view). He argues that such trends hold in particular for millennial age consumers (responsible for 30 percent of U.S. wine consumption). He also contends that wine and craft beer consumption benefit from a new emphasis on diversity and that there is no consistent negative correlation between wine and craft beer consumption. One can also add that growth in the production of craft beer and craft spirits is in the long term a benefit to the Tennessee wine industry by increasing the social acceptability of alcohol consumption.

That being stated, both wine and craft beer are similar forms of alcoholic products and conceivable growth in craft beer consumption could take away from growth in wine consumption. For example, Rickard et al. (2013) indicate that an increase in access to wine through grocery stores can result in a decline in beer consumption. We also examined the relationship between average (by all individuals 14 years of age and older) consumption of beer, wine and spirits at the state level. While a strong positive relationship was found between wine consumption and spirits consumption and between beer consumption and spirits consumption, we were unable to establish any clear relationship between average consumption of wine versus average consumption of beer. Further, since we are discussing craft beer and craft spirits production, which are both specialized segments of their respective markets, any use of these results would be highly speculative for our purposes.

MOVING FORWARD

There are several recommendations that arise as a result of this study. Recommendations include a quality enhancement program, market education and promotional efforts, a statewide wine trail, and the possible development of AVAs at the regional level.

Based on survey results of households that consume Tennessee wine and in our review of the literature regarding similar wine industries in other state, inconsistent quality is an issue. (Although reiterating, the perception held by surveyed Tennessee residents who drink wine concerning the state industry was generally positive.) In this regard, a concerted effort to enhance the quality of wine produced in the state tied to an effort to employ environmentally sustainable production practices especially in growing grapes could yield dramatic benefits. The literature highlights the needs to join such efforts. Survey respondents also indicated that sustainable production practices are important. As highlighted in the analysis of the SIP program, workshops, demonstration vineyards and workbooks could be used as the means of educating grape growing regarding production of high-quality grapes in an environmentally friendly manner. Such an effort would enhance reputation, an important driver of higher selling price and hence higher profitability.

Consumer survey results and the literature together highlight the need for enhanced market access to Tennessee wine. The recent opening of satellite operations (even on a limited sales basis) and the grocery store market in much of the state should help ease the market access issue. However, Tennessee wine drinkers in general are used to purchasing wine at liquor stores and a significant number of survey respondents indicated they were either unaware of Tennessee wines and/or find it difficult to find Tennessee wine. These set of study results point to the need to better market Tennessee wines.

Loureiro (2001), in her study of the Colorado wine industry provides a set of apt recommendations that could be employed in increasing consumer awareness about and access to Tennessee wines. These include making sure that industry-related websites have information regarding wine festivals, tours, tasting events and wineries links (to its credit, the TFWA covers these items). But she also cites the need to promote in-state, high-quality wine at wine tastings. Developing and maintaining strong relationships with food columnists and business journalists would also serve to increase awareness and enhance access to Tennessee wines by consumers. Wineries and wine associations sponsoring appropriate philanthropic events, such as a fundraiser for a regional food bank, could help achieve these goals as well.

Loureiro (2001) also presents a set of recommendations regarding in-store product placement and other store-based promotional efforts. She reports that some stores placed Colorado wines in hard to find or odd (such as with international wines) locations where consumers would not seek them. Although we did not directly evaluate product placement as an issue in our survey, it may be a problem in stores that currently sell Tennessee wines and could be become a problem in the grocery store market starting this summer. In this regard, working with retail industry organizations, such as the Tennessee Grocers and Convenience Store Association, and with independent groceries stores and especially with grocery stores that highlight the promotion of local foods, could help enhance access to and knowledge about Tennessee wines. Further, educational efforts aimed at retail staff in grocery stores and liquor stores could yield benefits. Although staff did not rank highly as a source of information in our survey, Loureiro argues that in particular uninformed consumers rely on retail staff for purchasing advice. Loureiro also advocates providing promotional materials such as wine brochures, maps that highlight wineries and shelf tags that provide information regarding wine attributes and food parings as ways to promote. Finally, she recommends traditional, appealing labeling to promote the concept that the wineries in question are well established.

Another unexploited form of promotion is a statewide wine trail. A wine trail is a group of wineries and usually other hospitality oriented businesses and other assets connected by a roadway or other transportation corridor in a geographically defined area (Wargenau and Che). A trail offers the opportunity to promote Tennessee wine in restaurants and other venues. It can help establish an area as a wine tourism destination by developing linkages between the hospitality industry and the wine industry and by developing linkages between wineries themselves. Official state winery signage on interstates and other major travel arteries are beneficial in bringing tourists and others to winery tasting rooms, especially for smaller wineries and/or new wineries that cannot afford to purchase commercial advertising (White). A statewide effort could also facilitate connections between the three diverse regions of Tennessee.

An additional means of developing the Tennessee wine industry is the possible designation of American Viticultural Areas (AVAs) at the regional level. As discussed earlier in this chapter, AVA designation could facilitate development of regionally based wine clusters in the state by supporting cooperation among wineries and among wineries and other regional promotional entities.

We see the opportunities outweighing the challenges in terms of the ability of the Tennessee wine and grape industry to move forward.

SUMMARY AND CONCLUSION

The Tennessee wine industry faces several challenges and opportunities with respect to boosting future growth. Challenges include attitudes regarding alcohol consumption (including legal barriers), regional rivalries, lack of knowledge regarding the industry by in-state consumers, and support for research and marketing activities. Opportunities or strengths include a changing legal environment, growth of local foods, regional efforts and a strong industry association. The growth of the craft beer and craft spirits industries is an intertwined challenge and opportunity.

In terms of moving forward, specific recommendations are made concerning ways to enhance consumer awareness in general, consumer perceptions regarding quality, and consumer ability to access Tennessee-produced wines. Specific recommendations are also made regarding the development of a statewide wine trail and designation of American Viticultural Areas (AVAs) at the regional level. In summary, we see the opportunities outweighing the challenges in terms of the ability of the Tennessee wine and grape industry to move forward.

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