

Economic Considerations for Small-Sized to Medium-Sized Wineries

WEbg 1992:6,17,19,21-23

by Carl R. Dillon, Justin R. Morris,
Carter Price, David Ward and
David Metz

Editors' Note: Three of the authors are associated with the Department of Agricultural Economics and Rural Sociology at the University of Arkansas: Carl R. Dillon, Assistant Professor; Carter Price, Professor; and David Ward, Research Assistant. They may be contacted at 221 Agriculture Building Fayetteville, AR 72701; telephone (501) 575-2256. Justin R. Morris is University Professor in the Department of Food Science at the University of Arkansas, 272 Young Ave., Fayetteville, AR 72703; telephone: (501) 575-4679. David Metz is Marketing Director for Prospero Equipment Corporation in Pleasantville, New York, and may be reached at 725 Climer St., Muscatine, IA 52761 or by calling (319) 263-1394.

Why are some wineries economically successful and others aren't? Recent research by the University of Arkansas was undertaken to address this complex question. The study was designed to provide owners and operators of small-sized to medium-sized wineries with practical economic guidelines. One part of this study was the basis for an article, "Packaging Line Considerations for Small Wineries," by David Metz, which appeared in the 1991 edition of the *Wine East Buyers' Guide*.

Discussions with individuals in the industry have pointed to a need for research combining economic and technological considerations. The purpose of this paper is to communicate some of the results of this research as a continuation of the earlier article in the *Wine East Buyers' Guide* and to help in the decision making process and

management of small- to medium-sized wineries.

Research conducted at the University of Arkansas has led to the development of an economic decision-making model for small- to medium-sized wineries. As the name implies, a model simply serves as a starting point for making decisions. The physical and economic circumstances of one winery are different from those of another. Consequently, anyone attempting to apply the data and conclusions of this study needs to consider carefully the differences between their winery and the one modeled here.

When reading this study it is important to remember that all economic considerations provided include actual economic worth of all components with the exception of taxes on income and inventory. Therefore, the economic value of services such as unpaid labor by family members is entered at its normal market value. All facilities are designed to be at the highest professional standard; no used equipment was entered into the model.

Model Description

The economic decision-making model is designed to represent the economic and technological winemaking environment facing the manager and operator of a small winery. Mathematical programming techniques are used in a computer model to allow the effects of management decisions to be estimated, reflecting real circumstances as nearly as possible. This will permit the approximation of maximum returns above costs.

The model contains several critical production and marketing decisions and winemaking activities that represent a winemaking business. For example, such decisions include:

- 1) What types of wine and what varieties should be made and sold? How much of each wine type should be produced?
- 2) Should grapes be purchased or should the winery engage in grape production?
- 3) How large a vineyard will be required?
- 4) What percentage of the wine should be white varieties and what percentage should be red varieties?
- 5) What size of facilities and equipment should be used considering investment levels required?
- 6) How much labor should be hired in terms of year-round employees and seasonal labor?
- 7) How can retail and wholesale markets be used?
- 8) What are the greatest net returns the winery can make?

Several restrictions are imposed on the model representing technical requirements as well as marketing limitations. Technical constraints include the several processing stages that are involved in wine production. The model requires that no wine can be sold until these constraining factors have been satisfied and the wine is properly aged. The model reflects this through the sales schedule by varietal as shown in Table 1. This demonstrates that the model is a long-run equilibrium model that attempts to determine the operating plan the winery will be using after six years. In addressing the economically best long-run plan, the first five years are not considered. However, an adequate cash flow during the establishment phase (which can last many years, often ten or more) is imperative to the financial survival of the business. It is crucial to consider the cash flow of the winery. The model recognizes that:

- 1) Labor, grapes, necessary equipment, and other supplies must be available when the grapes are ready for processing.

- 2) Grape production requires land, labor, and various other inputs.
- 3) Obviously, different facility sizes can produce different amounts of wine.

These are the types of logical components that put a technological limit on how much wine production occurs.

In addition to these and other constraints related to the technology, there are limits to what an individual winery can sell resulting from marketing conditions. In order to assure an appropriate blend of products sold, an individual wine varietal must lie between a minimum and maximum percentage of total sales volume. In most cases, an adequate selection of wine types is needed to attract a sufficient number of customers. The location can also affect the mix of wine types sold. Wineries with high tourist traffic and those located on interstate highways report increased demand for sweeter wines as indicated by conversations with individuals in the wine industry. One Eastern producer of viniferas reported that nearly 30% of sales were in a sweet Niagara. As the winemaker stated, "the Chardonnay makes the prestige, but the Niagara makes the profits." One can conclude that a high-traffic location brings in different categories of retail customers. It is likely that there are higher numbers of "unsophisticated" wine drinkers desiring fruity, sweeter wines of high quality. Since these wines are less expensive to produce, their increased sales boost overall profits of the winery. These constraints also reflect market saturation points giving an upper limit on the sales of any one type of wine. The amount of retail versus wholesale marketing is also dependent upon the size of the winery.

This study examines the specific cases of six sizes of medium to small wineries in annual fermenting capacities of 100,000; 80,000; 40,000; 20,000; 10,000 and 5,000 gallons. Ample storage capacities were assumed as required. The retail and wholesale prices per 750 ml bottle projected for each wine varietal under consideration are presented in Table 2. Note that Vidal and Seyval are presented together

Table 1 Sales Schedule of Wine Production by Wine Varietal and Year Years Where Year 1 is Production

Varietal	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Sales in Percentage (%)						
Chardonnay	0	0	50	25	25	NA*
Vignoles	0	50	25	25	NA*	NA*
Vidal & Seyval	0	50	25	25	NA*	NA*
Riesling	0	50	25	25	NA*	NA*
Niagara	0	50	25	25	NA*	NA*
Cabernet	0	0	0	50	25	25
Cynthiana	0	0	0	50	25	25
Chambourcin	0	0	50	25	25	NA*
Chancellor	0	0	50	25	25	NA*

* NA means not applicable. In this model, wines are sold on either a four, five or six year cycle. For example, Vignoles, Vidal, Seyval, Riesling and Niagara are sold on a four year cycle with 50% sold in year 2, 25% in year 3 and the remaining 25% sold in year 4. Sales begin in either the second, *third or* fourth season after the grapes are produced, harvested, crushed, and the winemaking process is initiated.

Table 2 Retail and Wholesale Wine Prices per 750 ml Bottle by Wine Varietal

Varietal	Retail Price/750 ml	Wholesale/750 ml
Dollars (\$)		
Chardonnay	8.50	5.10
Vignoles	7.00	4.20
Vidal & Seyval	5.00	3.00
Riesling	4.00	2.40
Niagara	4.00	2.40
Average White	5.70	3.42
Cabernet	8.00	4.80
Cynthiana	6.50	3.90
Chambourcin	6.00	3.60
Chancellor	5.00	3.00
Average Red	6.38	3.83
Average Wine	6.00	3.60

Note: Wine prices were determined from a survey of Ozark Region winery

here and throughout the study because data were identical for the two varieties.

The retail prices were discounted by 40% in order to reflect wholesale prices. Since total wine production is not sold in the year in which the wine is made, the prices are further discounted using net present value financial techniques to reflect a gradual sale of wine produced according to variety. Most equipment requirements and labor availabilities are taken from Metz (Wine East Buyers' Guide, 1991 edition). Conversations with individuals within the industry supplemented this data to expand upon capacities and provide further capital requirement and depreciation information. Similarly, data were obtained on:

- 1) Building and non-vineyard land requirements and costs.
- 2) Equipment efficiency and processing rates.
- 3) Winemaking supply costs.
- 4) Labor costs and requirements.
- 5) Grape requirements.
- 6) Wine taxes.
- 7) Marketing percentage limitations.
- 8) Other related factors.

The resulting maximum and minimum sales of wine varieties as a percentage of total sales volume in gallons are given in Table 3. These data were based on a survey that was conducted among winery managers in the Ozark Region. The maximum retail sales are projected by annual capacity as follows:

**Maximum and Minimum Sales of Wine Varietals as a Percentage of
Total Sales Volume in Gallons**

Varietal	Minimum Percentage (°/)	Maximum Percentage (%)
Chardonnay	2.5	10.0
Vignoles	10.0	20.0
Vidal &	7.5	60.0
Seyval	2.5	10.0
Riesling	2.5	10.0
Niagara	2.5	10.0
Cabernet	2.5	10.0
Cynthiana	5.0	20.0
Chambourcin	2.5	10.0

Note: Marketing percentages were determined from a survey of Ozark Region winery managers. Different marketing conditions will prevail dependent on individual circumstances.

100,000 gallon 22%; 80,000 gallon -25%; 40,000 gallon - 40%; 20,000 gallon -65%; 10,000 gallon -100%; 5,000 gallon 100%. Grape production data such as grape prices, grape yields, grape production costs, harvest costs, and similar information are obtained from published estimates (Kirchner, Price, and Morris, Economic Analysis of Wine Grape Production in Arkansas - 1987). Data on general processing plant costs such as repairs and maintenance, insurance, and office expenses percentages were obtained from published sources in related food processing economic analyses (Price et al.). While this provides a general flavor of the data utilized in this model, it is beyond the scope of this paper to discuss in detail the particular aspects used in developing the economic decision making model. Interested individuals should contact the authors.

Findings of the Study

The model's projected capital requirements for the alternative winery sizes are provided in Table 4. The estimated gross revenue, costs, and net returns above costs are displayed in Table 5, while the schedule of fulltime employees is shown in Table 6. As the needed investments increased from \$163,545 for a 5,000 gallon plant to \$2,223,382 for a 100,000 gallon plant, the estimated net returns increased from \$1,048 for the 5,000 gallon to a profit of \$221,614 (Tables 4 and 5). However, the progression in estimated returns was not smooth as winery plant practices expanded from the 5,000

gallon minimum size. Profits for a 10,000 gallon plant were estimated to be \$39,053 annually, but projected operations for a 20,000 gallon plant resulted in slightly lower profits of \$30,836. Based on the prices and other data included in the model, wineries of capacities of 40,000 gallons per year or greater were estimated to be increasingly profitable.

The model projected that expansion from the 5,000 gallon size to the 100,000 gallon winery resulted in steadily increasing net returns with the exception of the slight decrease at the 20,000 gallon level corresponding to the greatest capital requirements per square foot (Table 4 and 5). The additional financial burdens in the model associated with the purchase of automatic bottling equipment coupled with a tripling of receiving and crushing equipment costs and other substantial increases in equipment and labor costs caused the expansion from 10,000 to 20,000 gallons to display a decrease in net returns. Thus, with the exception of the 20,000 gallon capacity winery, net returns were estimated to increase as the size of the winery is expanded from the 5,000 gallon level (Table 5). While net returns for the 5,000 gallon winery show a gain of only \$1,048 per year, this in fact is quite favorable. The reasoning behind this is that almost all conceivable costs are considered (including a value for personal labor and a return on personal capital invested). About the only costs not considered in the model are taxes on income and inventory.

These results indicate a need to consider the potential wine sales market in contemplating expansion. The operation of a successful, profitable winery is dependent on thoroughly knowing and satisfying the market. Even assuming a decreasing retail sales percentage, increasing the size of the winery beyond the 20,000 gallon capacity results in ever increasing net returns up to the last estimated level of 100,000 gallon capacity. It is at this 100,000 gallon winery level where the greatest net returns are obtained at \$221,314 annually. While this represented the greatest net returns, it also represented only the second highest returns to capital above the interest costs. Under these considerations, the 100,000 gallon winery had a 9.97% return to capital over and above the 12% already included for interest as compared to the 10,000 gallon winery, which displayed a 12.39% return on capital over and above interest costs. These results reflect

the importance of retail sales in the operation of the small winery as a business. These findings also indicate the desirable nature of both the 10,000 and the 100,000 gallon winery under different considerations.

Capital requirements for the different sized wineries are broken into various equipment categories in Table 4. In the model estimates, the most dramatic capital requirement increase in receiving and crushing equipment is seen to occur between the 10,000 and 20,000 gallon sizes. Only between these sizes did capital requirements nearly triple for receiving and crushing equipment. The next most sizeable receiving and crushing equipment capital requirement increase is a \$50,000 or approximately 8% increase between the 40,000 and 80,000 gallon level. Substantial increases of 564% in estimated capital outlay are also displayed for the 20,000 gallon plant's bottling equipment where the need for greater technological efficiency and increased capacity becomes necessary due to the expansion from the 10,000 gallon level.

Cellar and fermenting equipment, tanks, and barrels tend to display more even increases relative to the additional capacity achieved (Table 4). However,

**Table 4 Capital and Vineyard Acreage Requirements by Equipment Type and Winery Size
Winery Size (Annual Capacity in Thousand Gallons)**

Item	100	80	40	20	10	5
EQUIPMENT-						
	Dollars (\$)					
Receiving & Crushing	124,335	123,995	73,995	65,990	22,455	14,920
Cellar	116,205	116,205	64,265	36,100	31,510	6,010
Bottling	160,100	160,100	127,070	119,695	18,015	6,715
Tanks	227,670	209,860	118,570	84,500	50,180	37,600
Refrigeration	55,000	55,000	40,000	40,000	20,000	0
Barrels	491,072	392,858	196,429	98,820	48,927	24,300
TOTAL EQUIPMENT	1,174,382	1,058,018	620,329	445,105	191,087	89,545
Buildings & nonvineyard land	1,049,000	784,000	434,000	224,000	124,000	74,000
TOTAL (EQUIPMENT & BUILDINGS)	2,223,382	1,842,018	1,054,329	669,105	315,087	163,545
	Square Feet of Buildings and Sales Area					
Sq Ft	40,000	29,400	15,400	8,400	4,400	2,400
	Dollars (\$)					
Capital per Sq Ft	55.58	62.65	68.46	79.66	71.61	68.14
	Acres					
Acres (total vineyard)	125.00	100.00	50.00	25.00	12.50	6.25

*Equipment capital requirements are taken from David Ward, Planning Guidelines for Small and Medium Sized Wineries/Juice Plants in Arkansas (*Unpublished MS Thesis*).

Table 5 Estimated Annual Revenues, Costs and Net Returns by Winery Size

Item	Winery Size (Annual Capacity in Thousand Gallons)					
	100	80	40	20	10	5
	Dollars (\$)					
Gross Revenue	1,747,408.70	1,422,211.23	772,111.81	436,849.43	253,984.15	126,992.08
Total Costs (Variable & Fixed)	1,526,094.25	1,279,116.14	688,651.53	406,013.87	214,930.83	125,943.68
Net Returns	221,614.45	143,195.09	83,460.28	30,835.65	39,053.32	1,048.40
	Percent (%)					
Returns to Capital over Interest Expense	9.97	7.77	7.92	4.61		

Note: Gross revenue less total costs reflect all costs including a 12% interest rate (or rate of return on personal investment) and a salary for the owner but excluding taxes on income and inventory.

Table 6 Full-Time Employees by Position and Winery Size

Item	Winery Size (Annual Capacity in Thousand Gallons)					
	100	80	40	20	10	5
	Person Years					
Position						
Winemaker	1	1	1	1	1	1
Retailer	2	2	1	1	0	0
Cellar Worker	2	2	1	1	0	0
Marketing & Delivery	1	1	1	0	0	0
Laborer	2	2	2	1	2	1
Total Employee Positions	8	8	6	4	3	2

Note: Labor needs are taken from David Ward, Planning Guidelines for Small and Medium Sized Wineries/Juice Plants in Arkansas. (Unpublished MS Thesis.)

Table 7 Wine Sales Volume in Gallons by Wine Varietal and Winery Size

Varietal	Winery Size (Annual Capacity in Thousand)					
	100	80	40	20	10	5
Chardonnay'	10,000	8,000	4,000	2,000	1,000	500
Vignolesa	20,000	16,000	8,000	4,000	2,000	1,000
Vidal & Seyval	22,500	18,000	9,000	4,500	2,250	1,125
Riesling b	2,500	2,000	1,000	500	250	125
Niagara b	2,500*	2,000*	1,000*	500*	250*	125*
Total White	57,500	46,000	23,000	11,500	5,750	2,875
Cabernets	10,000	8,000	4,000	2,000	1,000	500
Cynthianaa	10,000	8,000	4,000	2,000	1,000	500
Chambourcina	20,000	16,000	8,000	4,000	2,000	1,000
Chancellor b	2,500*	2,000*	1,000*	500*	250	125*
Total Red	42,500	34,000	17,000	8,500	4,250	2,125
Total Wine	100,000	80,000	40,000	20,000	10,000	5,000

Note: Sales represent total volume that occurs annually during and after the sixth year of production allowing for all cycles to be completed as *described in* Table 1 and within the text.

*- Indicates grapes for making this wine type were purchased rather than raised in the winery's own vineyard because it was more economical.

a- Indicates that the wine is sold at the maximum percentage allowed.

b- Indicates that the wine is sold at the minimum percentage allowed.

refrigeration equipment needs did not change for the 20,000 and 40,000 gallon levels nor was there an increase estimated in these costs between the 80,000 and 100,000 gallon capacities.

Capital outlay requirements for all equipment were estimated to range from \$89,545 to \$1,174,382 respectively for the capacities studied (Table 4). When the additional capital requirements for buildings, customer sales areas, and offices are considered, capital requirements range from \$163,545 for the 5,000 gallon winery up to \$2,223,382 for the 100,000 gallon winery. The substantial capital requirements for getting into the wine business are well evidenced by these estimates. Naturally, the amounts could differ. Capital outlay would likely decrease with the purchases of used equipment, for instance.

The problem for many managers of wineries is what wines to produce and in what amount. The question is often answered in one of two ways. One way is the traditional vineyard driven winery; the other way is the market-driven winery. It is the contention of the authors that the path of ruin frequently begins with the idea that the winery will "make what it grows" and sell the resulting wines.

However, the authors believe the more successful concept is to "grow and make what you can sell." This latter situation is one in which wine selection is driven by market conditions rather than by the grapes produced in the vineyard.

Observing and analyzing market conditions will allow the winery manager to establish guidelines of an economically viable mix of wine sales in order to address decisions on what wines to produce and in what amounts. The breakdown of the mix of wine sales for the model winery by variety is presented in Table 7. White wine comprised 57.5% of sales with red wine accounting for the 42.5% difference. The heaviest concentration of wine sales was estimated to be in the Vidal and Seyval varieties. Also, other varieties experienced relatively favorable profit margins as indicated by the fact that they are sold at a maximum percentage allowable within the model. As denoted by the "a" in Table 7, these more profitable varieties are the Chardonnay, Vignoles, Cabernet, Cynthiana, and Chambourcin wines. Not surprisingly, these are the higher-priced wines. This demonstrates a need to closely investigate high-priced wines in the sales mix.

Costs of production and potential marketability need to be carefully considered as well. Thus, a good indicator of the potential profitability of a given variety is the price of the wine relative to the cost and amount of grapes required. Also, with the exception of the Vidal and Seyval varieties, the other wine varieties were sold at the minimum percentage allowable (denoted by "b" in Table 7). While the amount of wine sales naturally will change from one winery size to another, the percentages as related to capacity remained constant.

When setting retail prices, the manager of the winery must also consider the effect that price has on sales. While one should consider the prices that local competitors charge for similar wines, one must keep in mind that while the competition needs to be considered, they may be charging too much or too little relative to marketing conditions. This study can provide a baseline for determining retail prices. From that baseline, the manager of the winery should experiment to find the best price. It is crucial, however, to consider thoroughly the specific marketing environment involved.

While Concord wine was included in the model, none was ever produced or sold by the model winery since it was unprofitable at \$2.50 retail per 750 ml bottle and the model did not require it to be produced. Concord may, of course, be worthwhile, depending on the market, as indicated by the fact that some wineries do produce and sell it. Given that these results are specific to the data used, it would be useful to calculate the break-even wine prices under which the winery operator will just cover variable or total costs. Table 8 presents the breakeven prices for the various varieties under different winery sizes. For the purposes of this table, variable costs are defined to be those costs related to the production of one additional bottle of wine for the various varieties, assuming a winery is already in operation. Therefore, these variable costs include the cost of additional

purchase or production and harvest of grapes, necessary utilities, bottles, yeast, wine taxes, and related supplies. Since all labor hired is for full-time, year-round personnel on salary, additional costs attributable to labor are non-existent. Likewise, interest and insurance as well as depreciation and repairs and maintenance on capital equipment are irrelevant to these variable costs.

As Section I of Table 8 demonstrates, the variable costs attributable to producing an additional bottle of wine range from as low as \$1.07 for Niagara at the 100,000 gallon winery to \$1.97 for producing a bottle of Cabernet at the 5,000 gallon winery. While prices would have to be higher than this by a significant level to make a profit and cover fixed costs and constant labor expenses (salary) as well, it displays the somewhat low prices necessary to justify producing additional wine once the winery is already in operation. These results also indicate the desirability of producing several varieties if a more diverse blend will increase the marketability and desirability of the business in terms of attracting customers. Consequently, the production and sales of some less profitable wines may be justified when considering total operating profits. There is a steady increase in the required break-even price above variable costs as winery size decreases. While the amounts are not substantial, this indicates the increased technological efficiency of larger capacity equipment.

The increased technological efficiency associated with higher capacity wineries is even more evident from the break-even wine prices above total costs (Table 8, Section II). It should be noted for the purposes of interpreting these projected prices that in order to allocate fixed and constant labor costs, all costs not considered as variable (in Table 8, Section I) were added before dividing by the total amount of production for the winery size in question.

While technological efficiency in terms of mechanization is reflected in the tables, the component of labor presents issues not represented within the break-even prices. The

Break-even Wine Price per 750 ml Bottle above Variable and Total Costs by Wine Varietal and Winery Size

Section I. Break-even above Variable Costs

Varietal	Winery Size (Annual Capacity in Thousand Gallons)					
	100	80	40	20	10	5
Chardonnay	1.72	1.72	1.73	1.73	1.76	1.76
Vignoles	1.34	1.34	1.34	1.35	1.37	1.38
Vidal & Seyval	1.26	1.26	1.26	1.26	1.29	1.29
Riesling	1.50	1.50	1.50	1.51	1.53	1.54
Niagara	1.07	1.07	1.07	1.07	1.10	1.10
Cabernet	1.93	1.93	1.93	1.94	1.97	1.97
Cynthiana	.66	1.66	1.67	1.67	1.70	1.71
Chambourcin	1.33	1.33	1.33	1.34	1.36	1.37
Chancellor	1.34	1.34	1.34	1.35	1.37	1.38

Section II. Break-even above Total Costs

Varietal	Winery Size (Annual Capacity in Thousand Gallons)					
	100	80	40	20	10	5
Chardonnay	4.20	4.39	4.71	5.51	5.82	6.78
Vignoles	3.59	3.77	4.05	4.78	5.06	5.93
Vidal & Seyval	3.51	3.68	3.97	4.70	4.98	5.85
Riesling	3.75	3.93	4.22	4.94	5.22	6.09
Niagara	3.32	3.49	3.78	4.51	4.79	5.66
Cabernet	4.66	4.87	5.22	6.09	6.43	7.49
Cynthiana	4.39	4.60	4.95	5.83	6.17	7.22
Chambourcin	3.81	4.00	4.32	5.11	5.42	6.38
Chancellor	3.82	4.01	4.33	5.12	5.43	6.39

Note: For the purpose of this table, variable costs include cost of grapes (the lesser of production costs or purchase price), federal and state wine taxes, glass, labels, corks, yeast and utility expenses.

small winery has only limited expert staff. It is critical that those key people have time available for conducting the actual business operations and management necessary in an economically suitable winery. Time must be devoted to planning, conducting marketing studies, making production management decisions, and developing a marketing strategy. While the physical work involved in making wine is definitely important to the success of the winery business, it is equally vital to devote adequate time for conducting business operations.

In the break-even illustration (Table 8, Section II), the required break-even price more than doubles in comparison to the break-even price above variable costs. This demonstrates the relatively large component of fixed and constant labor costs attributable to a winery and indicates the large portion of costs attributable to capital equipment (depreciation, insurance, interest, repairs, and maintenance) as well as salaried employees.

The group of red wines has an estimated higher than break-even price than do white wines. Red wine, due to the aging process, requires a longer time before it can be sold. Therefore, the net present value techniques that account for the storage costs and foregone interest that could be earned create a need for higher prices for red wines in general. Niagara displays the lowest break-even price above total costs, with Vidal, Seyval, and Vignoles also displaying favorable break-even price levels. Chardonnay possesses the highest break-even price for a white wine because its aging and sales scenario parallels the red wine conditions described. The 100,000 gallon winery possesses extremely favorable total cost break-even price levels at about \$2.50 above the break-even prices for variable costs. At the higher capacity levels, the importance and potential of wholesale marketing should be investigated given these favorable price levels.

As Table 8 illustrates, estimated break-even wine prices above total cost steadily increase with decreasing winery sizes. At the 5,000 gallon winery level, this amounts to approximately five additional dollars per bottle over break-even prices above variable costs for several varietals (Table 8, Section I I). Break-even wine prices range between \$5.66 and \$7.49 for the 5,000 gallon winery and between \$4.79 and \$6.43 for the 10,000 gallon winery. These findings demonstrate the need of very small wineries to emphasize a retail sales program of marketing. While this break-even analysis extends the usefulness of the research conducted, it should be noted that the data used will still differ from the particular circumstances of any specific individual winery. They are meant to be used as guidelines in focusing, planning, and stimulating decision-making processes.

This study does not address the production of fruit and dessert wines. While these wines are often given a negative connotation by modern winemakers, they can still be an important source of profit. A good example is given by some of the authors' observations of Concord which, when produced as a varietal, is sold at a approximately \$2.50 per 750 ml bottle on a retail level. However, it is possible to use Concord as a feed stock to produce a light sherry that can sell from \$5.00 to \$8.00 per 750 ml bottle. While this is only an example, it serves to illustrate the need to be open to alternative products, especially those that may utilize otherwise less than desirable grapes.

Fruit wines can also be a very high profit item. They often appeal to the entry-level wine drinker and often possess a high profit margin. Opportunities exist for converting low-cost, damaged fruit unsuitable for fresh market consumption and creating a desirable, high-quality fruit wine.

Conclusions

The specific findings of this study will not directly apply to any given individual situation. Additional factors and components should be considered as they relate to the individual small winery and the goals of the owner and manager. The results do provide

information, however, that will be of use in the management and operation of a small winery.

Several economic considerations for small wineries can be raised from the study. Winery location is a component vital to a winery's economic success or failure as a direct result of the influence of the area on marketability. Location is tightly bound to a winery's marketing plan and its success. Observations by the authors indicate that this is perhaps the single most critical factor for the winery in the 5,000 to 20,000 gallon size. As this study shows, the bulk of sales should be at retail for the smaller wineries to survive.

Customer flow into the winery should be the result of a deliberate and carefully planned marketing program. Part of the program can be the natural result of consumer traffic being exposed to the winery simply by passing by and being convenient and accessible. Therefore, it is important that a winery be on a relatively major route, not isolated on a side road. There is some evidence that shows that the most successful wineries are those clustered with other wineries. Due to increased tourist traffic, a wine region will support more sales for the individual wineries than the isolated wineries could support for themselves.

Cost of marketing is often directly related to location. Clusters of wineries can benefit from group advertising and promotions. On interstates and main highways, identifying billboards and signs are of vital importance. Also, it must be observed that marketing costs are related to profits. It is the authors' observation that the wineries that are growing are those with the strongest promotion programs, good locations, and good wine quality. Those that are in isolated locations without a good marketing plan are static in growth and in danger of going out of business.

Crucial considerations in the planning process also include the influences of retail and wholesale levels as well as availability of different varietals desired by the customers. Of the six winery sizes analyzed, the 100,000 gallon winery provided the greatest net returns at \$221,314 annually. However, the

10,000 gallon winery provided the greatest net returns per dollar of capital invested at 12.39% above the 12% already included for interest or opportunity cost of capital. The 10,000 gallon winery provided this higher rate of return because it assumed that 100% of sales are at the retail level.

While there is a necessity to evaluate the cost associated with obtaining grapes through purchasing or personal production, the risk associated must also be considered. If the required vineyard acreage is under separate management, the operator of a winery has limited control over the purchase price of grapes. This creates one type of distinct risk. However, engaging in production of grapes in one's own vineyard comes with its own set of risks in production and related factors. Investments in vineyard acreage would be in addition to the substantial outlay of capital required for the investment of even small wineries. The 100,000 gallon winery required both 125 acres and a total capital outlay of \$2,223,382 for buildings, nonvineyard land, and plant equipment while the 5,000 gallon winery needed 6.25 acres and \$163,545 for other capital. Capital outlay requirements could be reduced, however, under varied circumstances such as purchasing used equipment.

Wine production of the model winery tended towards white wine types with 57.5% of the total production. Not surprisingly, the model projected that the higher priced wines were produced at the maximum level allowed. Nonetheless, it is advisable to examine the cost being accrued in the production of all wine varieties and types relative to the price of the wine. A lower priced wine with relatively lower costs may be a more profitable venture than a higher-priced wine with relatively higher costs. Individual circumstances have to prevail in consideration of the value of individual wine varietals.

Break-even analysis allowed estimation of the wine prices required to just cover variable costs and total costs. Break-even analysis indicated the need to investigate the potential of wholesale markets for the higher capacity wineries. In comparing break-even prices above variable costs

to the break-even prices above total costs, there tended to be a \$2.50 to \$5.00 per 750 ml bottle difference for the different winery sizes. These results indicate the fact that if a winery is already in production, a specific wine varietal may be justifiably produced if it is covering the break-even price above variable costs. This allows consideration of increasing product availability in order to attract customers.

The study results indicate that adequate planning and management is a key component to economic success or failure in the winery business. While there are many reasons to enter into the wine business other than making money, there is a distinct need to address the economic aspects of the wine business. Economically unsuccessful wineries are not managed by individuals who plan to fail, but by

managers who often fail to plan. Even if profits are not the primary motivation for owning and operating a winery, they are often pertinent to the cash flow and very survival of the winery. Detailed attention to production of premium grapes and the making of high quality wine at the sacrifice of developing and following adequate business practices can still result in the winery going out of business. It is the contention of the authors that the transition from grape grower to wine marketer can be difficult. The authors believe that the winery owners and operators that make this conceptual transition are the ones that are the most economically successful. Knowing one's market and operating in such a way as to satisfy that market is essential to operating a successful, profitable winery.

Acknowledgments

The authors wish to thank the numerous winemakers who have contributed to this study. Special thanks are due to Andrew Post of Post Winery in Altus, Arkansas, who contributed significantly in establishing processing costs.

References

- Metz, D. "Packaging Line Considerations for Small Wineries." *Wine East Buyers'Guide*, 1991 edition, p. 10-25.
- Kirchner, D. A., C. Price, and J. R. Morris. Economic Analysis of Wine Grape Production in Arkansas -1987. Arkansas Agricultural Experiment Station Special Report 130. March 1988.
- Price, L., et al. Planning Data for Marketing Selected Fruits and Vegetables in the South: Part 1-Canning *Handbook*. Southern Cooperative Series Bulletin 146. June 1968.
- Ward, D. Planning Guidelines for Small and *Medium Sized* Wineries/Juice Plants in Arkansas. Unpublished Masters Thesis. 1991.

