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Feasibility of a Co-operative Winery

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The number of operating wineries in the United States has doubled during the past decade. Most of this growth has been due to a large number of entrepreneurial landowners developing their own small acreage vineyards and trying to branch into winemaking. However, wineries are capital-intensive enterprises which require high initial investment and experience lagged cash flow associated with the time between the purchase of grapes and initial wine sales. Additionally, the availability of local grape production often limits the production capabilities of an entrepreneur's small winery. As a result, some vineyard owners consider establishing co-operative wineries. This paper describes a feasibility assessment tool developed to assist vineyard owners in examining the potential for a co-operative winery and provides an example of how this tool can be used to examine a number of co-operative operating scenarios.

Key Words: co-operative, feasibility template, qualified and nonqualified stock, revolving equity, winery

Background

In the past decade, the number of wineries in America has more than doubled, with in excess of 4,700 now in operation (WineAmerica, 2008). Wineries can be found in all 50 states. The majority are small operations, producing less than 25,000 cases annually. Like many states, Oklahoma at the time of statehood was home to many vineyards and wineries. However, state and federal prohibition laws reduced the commercial wine industry to nonexistence when prohibition, in the form of the 18th Amendment to the Constitution of the United States, was enacted on January 16, 1919, and was in effect until December 5, 1933 [Oklahoma Grape Growers and Wine Makers Assn. (OGGWMA), 2007].

Oklahoma and many other states saw little change or growth in the winemaking industry after prohibition was repealed due to a complex system of state regulations regarding the sale and distribution of wine and spirits which limited winemakers to marketing their products solely to wholesalers and distributors.

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However, the industry began to experience dramatic growth as state legislation was updated to expand the rights of winemakers to include the rights to serve winery samples on-site or at festivals and trade shows and to sell directly to customers, retail outlets, and restaurants. Since 1992, when state legislation began to trend toward promoting winemaking in Oklahoma, the numbers of licensed wineries has grown from three to more than 45 (OGGWMA, 2007).

While recent years have proven to be a period of industry change and growth, there are many challenges facing winery entrepreneurs. The historical lack of commercial winemaking in many states has created a void in technical expertise. Yet, enology is not the only field of education needed to establish and operate a winery. Most small wineries are started by vineyard owners whose love of viticulture and enology outweighs their business savvy (Morton and Podolny, 2002). To prevent a start-up business from turning into an extremely expensive hobby, a number of business planning guides and sample plans have been developed and made publicly available (e.g., Folwell and Castaldi, 1987; Dillon et al., 1992; Illinois Small Business Office, 2007; Ohio Wine Producers Association, 2007; Price et al., 1993; Pisoni and White, 2002).

A winery is a very capital-intensive enterprise in which economies of size can be significant (Folwell and Castaldi, 1987). Due to the high initial investment and the lagged cash flow associated with the time between the purchase of grapes and initial wine sales, most new winery operations are forced to seek debt capital. In nontraditional winemaking areas such as Oklahoma, interested parties may face difficulty in acquiring debt and/or outside equity capital because lenders and investors are unfamiliar with the wine industry. The development of co-operatives as a means of securing the capital and production base to establish a winery may be an option. However, whether pursuing capital through traditional lenders or via co-operative equity drives, a sound feasibility assessment and business plan combined with assessments of risks and returns are often a prerequisite for acquiring capital (Kenkel and Holcomb, 2005).

The objective of this study is to describe the economic feasibility of a co-operative winery and identify the major risk factors that impact feasibility. This study makes use of a spreadsheet-based winery financial template designed to help interested parties more easily assess the viability of establishing their own winery. The template models the financial performance of the winery business and has options for both simple investor-owned and co-operative business models. While the baseline example discussed here was developed using Oklahoma winery information, interested readers can assess the template and apply the concepts and implications of this study to winery projects in other regions of the United States. The findings identify the impacts of equity structure, debt load, and operational parameters on overall winery operations and returns to co-operative members.

Justification for a Co-operative Winery

The co-operative business model has many advantages for a winery operation. The common rationales for forming a co-operative—achieving economies of scale, gaining market access, increasing bargaining power, sharing risks, and purchasing in bulk—are all applicable to a co-operative winery. A group of grape producers can pool their resources and establish a co-operative winery at a lower per unit cost relative to an individual-owned winery. The larger production volume could also allow the co-operative winery to access restaurant or wholesale markets that may not be open to smaller operations. The co-operative model even allows for quality control through the use of uniform marketing agreements, which can contain provisions ensuring minimum quality requirements for every ton of grapes delivered to the winery.

The co-operative business structure does provide for some unique options for the distribution of returns and taxation. Co-operatives have a variety of options for retaining funds and for distributing funds to their member owners. U.S. tax code permits co-operatives to deduct certain types of distributions from their taxable income, allowing the co-operative entity to avoid taxation. Distribution decisions that create tax deductions for the co-operative are generally taxable to the co-operative members. Decisions as to whether the co-operative retains profits to finance business activities or distributes profits to its members, and decisions as to the form in which profits are distributed impact both the cash flow of the co-operative business and the owners' realized return (Cook, Ratchford, and Griffith, 1995).

The simplest method for a co-operative to transfer profits and tax obligations to its members is to distribute profits as cash patronage. Cash patronage distributions are deductible to the co-operative business and taxable income to the member. Issuing a cash patronage distribution reduces the co-operative's cash flow and increases each member's realized return on investment. Co-operatives can also make noncash patronage distributions by retaining funds in the business and issuing the patrons additional equity. These distributions, which are allocated in proportion to business volume, can be "qualified distributions" that are taxable to the member and deductible to the co-operative or "nonqualified distributions" that are not taxable to the member or deductible to the co-operative. In a subsequent year, the co-operative will redeem these equities for cash. The redemption of nonqualified equity creates a tax deduction for the co-operative and taxable income for the member.

Noncash distributions (either qualified equity or nonqualified equity) improve the business's cash flow relative to a cash distribution. Shifting from cash to noncash distribution reduces the members' realized rate of return since each member does not receive cash until the equity is eventually redeemed. Nonqualified distributions are more favorable to the business' cash flow and more detrimental to the member's return relative to nonqualified distributions because the member is immediately assuming the tax payment.

Co-operative businesses can also retain funds in the business before allocating profits to the members. This action builds the "unallocated reserves" category on the balance sheet which is similar to the retained earnings category used by investor-owned firms. Profits held within the co-operative business and not distributed to members are taxed at the co-operative level. Channeling profits to unallocated reserves therefore improves the co-operative's cash flow relative to distributing cash patronage, but is less favorable than issuing qualified stock. Retaining profits as unallocated reserves is the least favorable alternative for the member's realized return since the individual member will never receive the funds until the business liquidates. In addition to preserving cash flow, unallocated reserves serve an important function as a reserve against future losses. In the absence of unallocated reserves, a co-operative that experiences a loss is forced to write down the face value of its members' stock.

The co-operative structure addresses scale economy and market access issues, but the primary economic motivation for the formation of a co-operative winery is similar to the motivation for any new business start-up. The co-operative members must assess the feasibility of the venture and conclude that the projected returns are sufficient to offset the costs and risks (Henehan and Anderson, 2001). Feasibility assessment is a vital step in the establishment of either a co-operative or privately owned winery business.

The Winery Feasibility Template

A feasibility study is generally defined as a preliminary study that determines and documents the viability of a business project (Holz-Clause and Hofstrand, 2006). Feasibility studies can explore multiple elements including market feasibility, technical feasibility, financial feasibility, and organizational and management feasibility. While all of these dimensions are important, the typical agribusiness feasibility study focuses on the analysis of market potential and the financial assessment which projects the financial performance.

The concept of a feasibility template, such as the winery feasibility template used for this study, is to combine the formal feasibility report for a "typical" or base case situation with a user friendly software program that allows the end user to quickly examine the impact of different assumptions. For the purpose of this study, the winery feasibility template was used to examine the impact of different capital structures, raw materials, capacity, equipment, wine selections, product prices, and other factors on the feasibility of a typical winery.

Data and information for the winery feasibility template were obtained from on-site analysis and information provided by five existing winery operations. Information was also obtained from regional suppliers of equipment and inputs. (A complete discussion of the winery feasibility template and the Oklahoma base case scenario is available at http://www.fapc.biz/PAGES/winerytemplate.xls.)

Ingredient Options

Several operational aspects of small vineries are pertinent to the understanding of winery feasibility. As in any business, market demand and marketing strategies are key drivers of a successful winery. Marketing strategies of wineries vary widely and are based on characteristics of the local or target markets. A new small winery may choose to concentrate on the wine tourist market, local restaurant, web-based sales, conventional retail sales, or numerous other niche markets. The target market obviously impacts the types of wines produced as well as the raw materials, labels, closure system, and the investment in the tasting room and/or retail facility.

Winery operators can base products on specific grape varieties, blends of grape varieties, and/or incorporate bulk juices and concentrates. However, regulations on the inclusion of bulk wine or concentrate into a "locally made" wine vary across states. The winery template includes 45 potential grape varieties and eight categories of bulk juice, with the user providing the expected prices per ton for grapes or the price per gallon for bulk juice. Working capital and equipment needs can be adjusted to match the use of grapes, bulk juice, or both, but for this co-operative example it is assumed that the winery only utilizes grapes purchased from members.

Bottle closure options include natural corks, synthetic corks, screw caps, and other non-cork systems. Natural corks are the most expensive closure, while screw caps have the lowest per unit cost but require separate installation equipment. Synthetic corks are significantly cheaper than natural corks and are compatible with standard corkers. Decisions on packaging and presentation have both technical and marketing considerations because consumer expectations vary across market segments.

Tasting Room Costs and Revenues

Most small wineries include a tasting room which may range from a simple area for samples to an elaborate retail/agritourism operation. A survey of Washington state wineries indicated an average tasting room construction cost of $25,000 with an average additional furniture investment of $9,300 (Folwell and Grassel, 1995). In addition to the facility investment, the variable costs and revenues from samples must be considered. A portion of a small winery's production is typically dedicated to tasting room samples which may or may not be a source of revenue. Folwell and Grassel reported tasting room revenues averaging 10% of total sales. A start-up winery would likely expect a lower percentage. The baseline assumptions in this study allocated 7% of production to tasting samples and tasting room revenues, based off fees charged for wine tasting of 2% of product sales.

Production Equipment

A basic complement of winery equipment includes de-stemming, pressing, and filtering equipment, bulk tanks for fermentation and storage, bottling and labeling equipment, tasting room equipment, and office and miscellaneous equipment. To maintain a certain level of quality in the production process and to ensure adherence to food and beverage processing regulations, stainless steel production equipment is commonplace. Presses come in an array of styles, but small wineries typically utilize bladder presses (Dillon et al., 1992). Most small wineries use two presses, allowing the operation of one while emptying and refilling the other. Tanks and containers made of wood, plastic, and glass are all common, but stainless steel is becoming a predominant choice for wine making.

Model Assumptions

The assumptions made for this study revolve around a hypothetical co-operative winery to be located in central Oklahoma. Thus, most expenses and operating assumptions are based upon information obtained from Oklahoma wineries and regional suppliers of equipment and inputs.

Financing and Input Assumptions

The basic financing assumption for the model is a loan for 50% of the total cost of the plant, property, and equipment acquired at an interest rate of 8% for a term of 10 years. Working capital was estimated at 10% of annual sales with a short-term interest rate of 6%. These and other assumptions for basic operations and inputs are provided in table 1. Costs for bottles, labels, corks, capsules, and even state and federal excise taxes per bottle are also given in table 1.

For the sake of this example, the co-operative purchases and processes three varieties of vinifera grapes: merlot and cabernet sauvignon for red wines, and chardonnay for a white wine. These three common grape varieties constitute the bulk of grape production from Oklahoma vineyards. Prices per ton for these grape varieties were taken from annual surveys of prices paid to vineyard owners, as reported by the Oklahoma Grape Growers and Wine Makers Association and Oklahoma State University (OGGWA, 2007). It was also assumed that production capacity was equally divided among the three wines.

Production, Storage, and Bottling Equipment

To maintain a certain level of quality in the production process and to ensure adherence to food and beverage processing regulations, stainless steel products should be used when possible. Unless a vintner is purchasing fruit which has already been crushed and destemmed, equipment associated with these activities will be required. A winery will also need to pump both wine and must, and utilize

Table 1. Financing and Various Input Assumptions

Parameter	Value
Debt load	50% of plant, property, and equipment
Financing for fixed assets	10-year loan at 8% interest
Working capital	10% of annual sales, w/6% short-term interest rate
Property taxes	6% of plant, property, and equipment
Annual maintenance expenses	2% of equipment costs
Insurance expenses	2% of plant, property, and equipment
Co-operative's income tax rate	30%
Expense inflation rate (annual)	1%
Discount rate for NPV calculations	9%
Annual business fees	$1,275
Laboratory supplies (annual)	$1,260
Marketing/promotional materials (annual)	$5,000
Merchandise sales	10% of annual wine sales
Merchandise markup	100%
Bottles (750 ml)	$0.60/bottle
Corks (mid-grade natural)	$0.17/bottle
Labels	$0.10/bottle
Shrink-wrap capsules	$0.04/bottle
Oklahoma excise tax on wine	$0.72/gallon, or $0.1425/bottle
Federal excise tax on wine	$0.107/gallon, or $0.0337/bottle (small producer rate)
Percent member grapes in wine	100%

Table 2. Production Equipment Costs

Equipment	Value
Stainless steel, 3.5 ton/hr. crusher/destemmer	$1,735
85-gallon wooden basket bladder press	$2,695
Various-speed, hydraulic must pump w/2.5″ outlet	$2,625
Various-speed, hydraulic must pump w/1.5″ outlet	$1,725
20 × 20 plate and frame filter	$1,375
Various filter accessories	$200
30 feet of 2.5″ and 1.5″ hose	$625
Total:	$10,980

a filtering system for the wine. Production equipment used in this spreadsheet analysis was derived from an assessment of five operating wineries, suggestions from publications (Dillon et al., 1992), and a commonly used regional supplier. The production equipment and prices used in the baseline assumptions are summarized in table 2.

A 5,000-gallon winery could use an almost innumerable combination of varying styles and sizes of tanks to attain its capacity goal. Stainless steel containers have

Table 3. Storage Equipment

Container	Value of Each	Quantity	Value
530-gallon stainless steel tanks	$4,995.00	10	$49,950.00
3-gallon glass carboy	$15.50	5	$78.00
5-gallon glass carboy	$19.50	10	$195.00
55-gallon stainless steel drums	$55.00	10	$550.00
55-gallon plastic drums	$10.00	15	$150.00
		Total:	$50,923.00

Table 4. Bottling and Packaging Equipment

Equipment		Value
4-spout gravity-fed manual filler		$1,150.00
Manual Portuguese floor corker		$70.00
Bottle washer		$20.00
Bottle tree (3 @ $15)		$45.00
MEP semi-automatic labeler		$3,395.00
Upright heat shrink applicator		$995.00
	Total:	$5,675.00

become a predominant choice for wine making as they are easy to clean and maintain, and do not directly influence the flavor of the wine. Vine, Harkness, and Linton (2002) and Boulton et al. (1996) both discuss the pros and cons of using containers made from alternative materials. Their suggestions and those from operating wineries were utilized in determining the tanks and containers for the baseline winery, which are summarized in table 3.

The bottling process also requires an assortment of equipment for bottle cleaning and drying, filling, corking/capping, and labeling. Sizes of equipment vary, as well as the level of automation. The equipment assortment utilized for this spreadsheet analysis are taken from Vine, Harkness, and Linton (2002) and Price et al. (1993). Bottle washing accessories and drying trees are included in the miscellaneous supplies of the winery. The pieces of equipment utilized for filling, corking, labeling, and shrink-wrapping a plastic sleeve on the bottle necks are listed in table 4.

Tasting Room and Office Equipment

Vine, Harkness, and Linton (2002) recommend that the style and design of the tasting room reflect the image and style of the winery and its owners/operators, which can have a significant impact on start-up costs. For the sake of simplicity, the baseline winery only considers wine-tasting stemware, a table-mounted cork remover, a wine refrigerator, a dishwasher, a computer/cash register, and printer as

Table 5. Tasting Room Equipment and Furnishings

Equipment		Value
3 cases (36 each) glass stemware		$425.00
Bench model cork remover		$60.00
Workstation configured for small business		$1,204.00
All-in-one printer		$256.00
24″ dishwasher		$550.00
48-bottle wine cellar refrigerator		$330.00
Furnishings/decorations		$1,000.00
	Total:	$3,825.00

Table 6. Office Furniture and Equipment

Equipment		Value
Desk		$319.00
2 chairs		$140.00
Computer and software		$1,204.00
File cabinets		$258.00
	Total:	$1,921.00

tasting room necessities (table 5). An additional start-up cost of $1,000 was included for decorations and furnishings, but this may vary with the image to be conveyed by winery owners.

Office equipment was estimated at slightly under $2,000 for chairs, file cabinets, a desk, and a desktop computer (table 6). As with the tasting room equipment, the spreadsheet allows for office furnishing expenses to be modified to fit the desires of the winery operators.

Total Plant, Property, and Equipment

The total equipment cost of the winery and tasting room is $74,023, and this is the figure used for calculating depreciation (table 7). Installation costs can be estimated from a percentage of the equipment cost. In this case, the cost of shipping and installation is assumed to be 100% of the equipment cost, based upon experiences of wineries providing information for the template. The total equipment cost of $148,046 is incorporated into the total cost of plant, property, and equipment (table 8) and is used in calculating capital investment and returns.

It is assumed two acres of land would be adequate for the winery and tasting room facilities and the accompanying parking area. Because land values vary greatly depending on location, a price of $1,000 per acre is assumed. Some private wineries may have substantially more property if they operate their own

Table 7. Total Equipment Cost and Installation

Equipment Description	Cost
Production equipment	$10,980.00
Laboratory equipment	$700.00
Storage equipment	$50,923.00
Packaging/bottling equipment	$5,675.00
Tasting room equipment	$3,825.00
Office furniture and equipment	$1,921.00
Equipment Cost	$74,023.00
Installation	$74,023.00
Total Equipment Cost:	$148,046.00

Table 8. Value of Plant, Property, Equipment, and Land

Description	Value
Plant, property, and equipment	$222,987.00
Land	$2,000.00
Total:	$224,987.00

vineyard, but this model is concerned only with a co-operative winery and does not include vineyard considerations.

The building style used for a winery can vary greatly, from newly constructed facilities to modified existing structures. Old barns, farmhouses, schools, and churches have all been converted into wineries in Oklahoma. The baseline model relies on a previous work for an estimate of the cost of a winery/tasting room facility. Price et al. (1993) estimated the cost of a 5,000-gallon winery structure of 2,400 square feet to be $74,000. Adjusting this price for year and location using indices for commercial construction, the cost of a small winery in Oklahoma is $35.92 per square foot. For the hypothetical winery of 2,000 square feet, the cost of construction would be $71,844.66.

Results

The projected sales, expenses, profitability, and cash flow of the winery operation under the baseline assumptions are reported in table 9. The winery had projected sales of slightly over $317,000, with before-patronage profits of $103,332. The winery cash flow was projected at $35,693. The winery co-operative had a projected internal rate of return of over 46% (table 10). However, the member's realized return under the baseline structure was 16.29%. The member's tax payments and the distribution of profits to unallocated equity and stock patronage accounted for the differences between the firm's and member's rate of return.

Table 9. Summary of Income and Expenses (baseline scenario: average of 10 years)

Description	Amount
Gross sales	$317,206
Variable costs	$150,918
Fixed costs	$54,445
Profit before patronage	$103,332
Cash patronage refund	$25,042
Qualified patronage refund	$35,059
Nonqualified patronage refund	$24,177
Tax	$13,376
After-tax net savings	$31,211
Cash flow from operations	$75,724
Qualified stock redemption	$24,177
Nonqualified stock redemption	$24,177
Net cash flow	$35,693

Table 10. Return on Investment for Co-operative and Member

NPV	IRR (Co-operative)	IRR (Member)	Avg. Cash Flow (Co-operative)
$554,166	46.70%	34.13%	$32,128

Table 11. Impact of Changes in Variable Costs

Variable Cost Excluding Grape Cost	IRR (Co-operative)	IRR (Member)	Average Cash Flow
$1.09	46.70%	34.13%	$32,128
$1.19	45.76%	33.44%	$31,161
$1.30	44.73%	32.68%	$30,098
$1.41	43.65%	31.89%	$28,999
$1.52	42.61%	31.12%	$27,936
$1.63	41.57%	30.34%	$26,873
$2.17	36.39%	26.35%	$21,654

The sensitivity of the winery profits to changes in variable production costs, grape prices, and plant and equipment costs are summarized in tables 11–13. The returns were not particularly sensitive to changes in baseline production costs, with each 10% change in costs impacting the internal rate of return by around 1%. Returns were more sensitive to wine prices, with each 10% change in wine price impacting returns by over 10%. The projected returns were moderately sensitive to plant cost, with each 10% change in plant and equipment costs impacting the internal rate of return by around 3%.

Table 12. Impact of Changes in Wine Price

% of Baseline	Merlot	Cabernet Sauvignon	Chardonnay	IRR (Co-operative)	IRR (Member)
70%	$9.29	$9.93	$8.40	8.79%	0.43%
80%	$10.62	$11.35	$9.60	22.81%	14.65%
90%	$11.95	$12.77	$10.80	35.11%	25.33%
100%	$13.28	$14.19	$12.00	46.70%	34.13%
110%	$14.60	$15.61	$13.20	57.96%	42.05%
120%	$15.93	$17.03	$14.40	69.06%	49.51%
130%	$17.26	$18.44	$15.60	80.08%	56.71%

Table 13. Impact of Increase in Plant Cost

Equipment Cost	IRR (Co-operative)	IRR (Member)	Average Cash Flow
$74,023 (100% baseline)	46.70%	34.13%	$32,128
$81,425 (110% baseline)	43.26%	31.21%	$30,248
$88,828 (120% baseline)	40.16%	28.58%	$28,368
$96,230 (130% baseline)	37.36%	26.18%	$26,488

Table 14. Impact of Increase in Unallocated Reserves

Percentage to Unallocated Reserve	IRR (Co-operative)	IRR (Member)	Average Cash Flow
0.0%	$554,166	34.51%	$31,804
5.0%	$554,166	34.13%	$32,128
10.0%	$554,166	33.74%	$32,453
15.0%	$554,166	33.34%	$32,779
20.0%	$554,166	32.93%	$33,107

Note: Cash patronage held constant at 25%; qualified and nonqualified stock reduced in proportion to increase in unallocated reserves.

The impacts of the various profit allocation and equity structures on the co-operative's and member's returns are summarized in tables 14–16. These impacts do not address the issue of member tax burdens associated with profit allocation. Changes in the portion of income directed to unallocated reserves (table 14) had only moderate impact on the co-operative's cash flow or on the member's return. Increasing the portion to unallocated reserves increased the member's projected internal rate of return. This impact was due to the proportionate decrease in the amount distributed as qualified stock. Because the member pays taxes on the amount of qualified stock in the year of distribution but does not receive cash for the stock until it is revolved, higher proportions of qualified stock tend to decrease the member's realized return.

Table 15. Impact of Increase in Cash Patronage

Percentage to Cash Patronage Refund	IRR (Co-operative)	IRR (Member)	Average Cash Flow
20.0%	46.70%	30.83%	$34,983
25.0%	46.70%	34.13%	$32,128
30.0%	46.70%	37.44%	$29,257
40.0%	46.70%	44.15%	$23,466
50.0%	46.70%	50.93%	$17,608
60.0%	46.70%	57.79%	$11,682
70.0%	46.70%	64.72%	$5,688
80.0%	46.70%	71.72%	($378)

Note: Allocation to qualified and nonqualified stock refund reduced in proportion to increase in cash patronage.

Table 16. Impact of Increase in Nonqualified Stock Refund

Percentage to Nonqualified Stock Patronage Refund	IRR (Co-operative)	IRR (Member)	Average Cash Flow
70.0%	46.70%	34.13%	$24,544
60.0%	46.70%	34.13%	$26,711
50.0%	46.70%	34.13%	$28,878
40.0%	46.70%	34.13%	$31,044
35.0%	46.70%	34.13%	$32,128
30.0%	46.70%	34.13%	$33,211
20.0%	46.70%	34.13%	$35,378
10.0%	46.70%	34.13%	$37,545
0.0%	46.70%	34.13%	$39,711

Note: Cash patronage held constant at 25%; percentage of qualified stock patronage refunded reduced in proportion to increase in nonqualified stock refund.

Increasing the portion of profits distributed as cash patronage had positive impacts on the member's return and negative impacts on the co-operative's cash flow (table 15). Decreasing the time period for revolving stock (redeeming for cash) also increased the member's return at the cost of reducing the co-operative's cash flow (table 16).

Stochastic risk analysis was also examined utilizing Simetar® to account for variations in grape costs and wine sales prices. Using the per ton grape prices paid to vineyard owners for more than a decade and the corresponding wine prices from all Oklahoma wineries, distributions for these values replaced mean values in the spreadsheet and simulations were conducted. Little correlation was apparent in grape and wine price movements, due in part to the small percentage of the bottled wine price that is actually derived from the cost of grapes per bottle. Table 17 provides summary statistics for grape and wine values.

Table 17. Grape and Wine Price Summary Statistics

Grapes / Wine	Mean	Std. Dev.	Minimum	Maximum
Grapes ($/ton):				
Merlot	$1,116.79	$75.46	$1,020.00	$1,231.80
Cabernet Sauvignon	$1,101.11	$45.51	$1,032.40	$1,158.31
Chardonnay	$1,136.18	$43.90	$1,072.88	$1,204.31
Wines ($/750 ml bottle):				
Merlot	$12.99	$2.20	$10.00	$14.95
Cabernet Sauvignon	$14.19	$0.43	$14.00	$14.99
Chardonnay	$12.00	$1.73	$10.00	$13.00

Source: Oklahoma Grape Growers and Wine Makers Assn. (2007).

The results of the stochastic analysis are graphically illustrated by two different means in figures 1 and 2. From a lender's viewpoint, measures of a firm's ability to cover costs and service debt are the desired results of risk analysis. Figure 1 illustrates the probability of the winery experiencing negative cash flow years as a result of equipment cost overruns and with expected variation in Oklahoma grape costs and wine prices. The model winery is not extremely susceptible to equipment cost overruns of even 50%, but the rising price of stainless steel could easily push equipment costs up into a range where the risk of negative cash flows becomes too great for a lender. Figure 2 shows that the winery's projected fixed-cost coverage ratio (FCCR) does not fluctuate greatly over the 10 years at the baseline equipment costs and the forecasted cost/price variation.

It is not uncommon for a fledgling business to experience one or even two years of negative cash flow, but the probability for more than two years of negative cash flow suggests significant risk for both co-operative shareholders and lenders. Similarly, a dip in the FCCR below a generally recognized "safe" level of 2 represents a measure of risk for lending institutions expecting to have the principal portion of the loan paid in a timely manner.

Conclusions

The winery feasibility template provides an excellent planning tool for entrepreneurs who are considering a wine production enterprise. The incorporation of drop-down menus for selections of grapes and wine blends helped to provide a user friendly but robust tool. The feasibility projections indicated the winery to be an attractive business investment. The profitability of the wine co-operative was found to be particularly sensitive to wine prices. This underscores the importance of market research in the business planning effort.

The analysis of the co-operative-related choices provides some interesting insights. The differential between the internal rate of return for the wine co-operative and the realized return for the co-operative member highlights the implications of the traditional co-operative structure which minimizes up-front

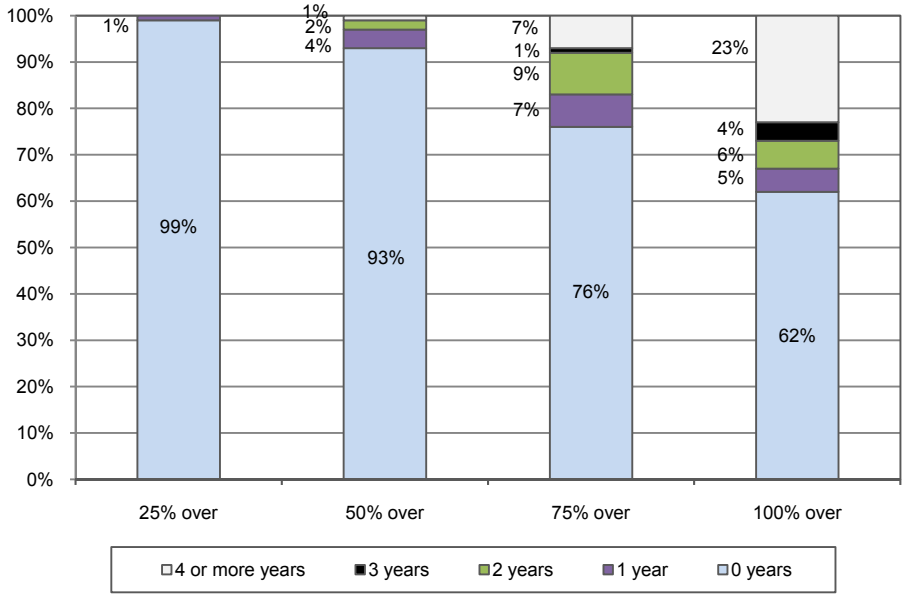

Figure 1. Probabilities of negative cash flow for a co-operative winery resulting from equipment cost overrun (10-year projections)

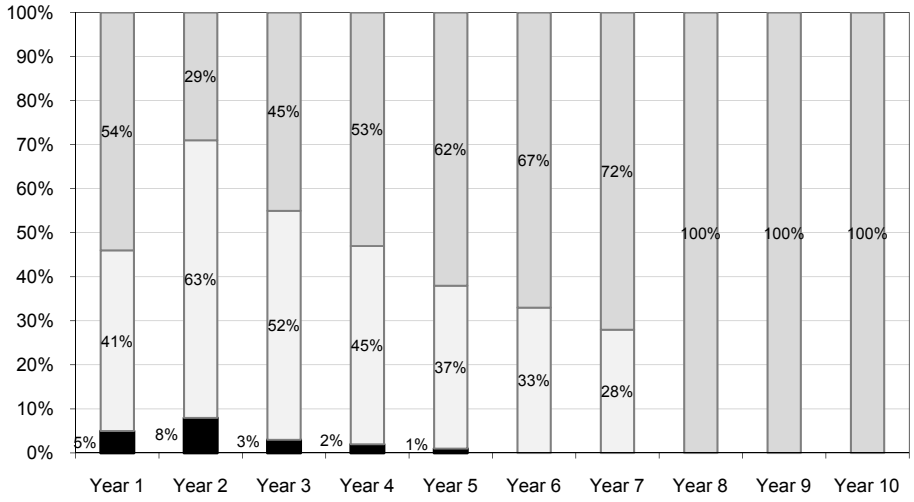

Figure 2. Probability of case co-operative winery generating fixed-cost coverage ratios of < 2 (black) or > 3 (dark gray)

investment at the expense of delayed cash distributions. Co-operative businesses have a wide variety of choices in profit distribution, many of which are linked to equity instruments. The sensitivity analysis illustrated the tradeoff in terms of the member's return and the co-operative's cash flow. The template provides a convenient method for groups contemplating a wine co-operative to understand the interaction between the profit distribution choices and to select the most attractive structure for their situation.

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