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AN INVESTMENT ANALYSIS OF NEW YORK SMALL PREMIUM WINERIES

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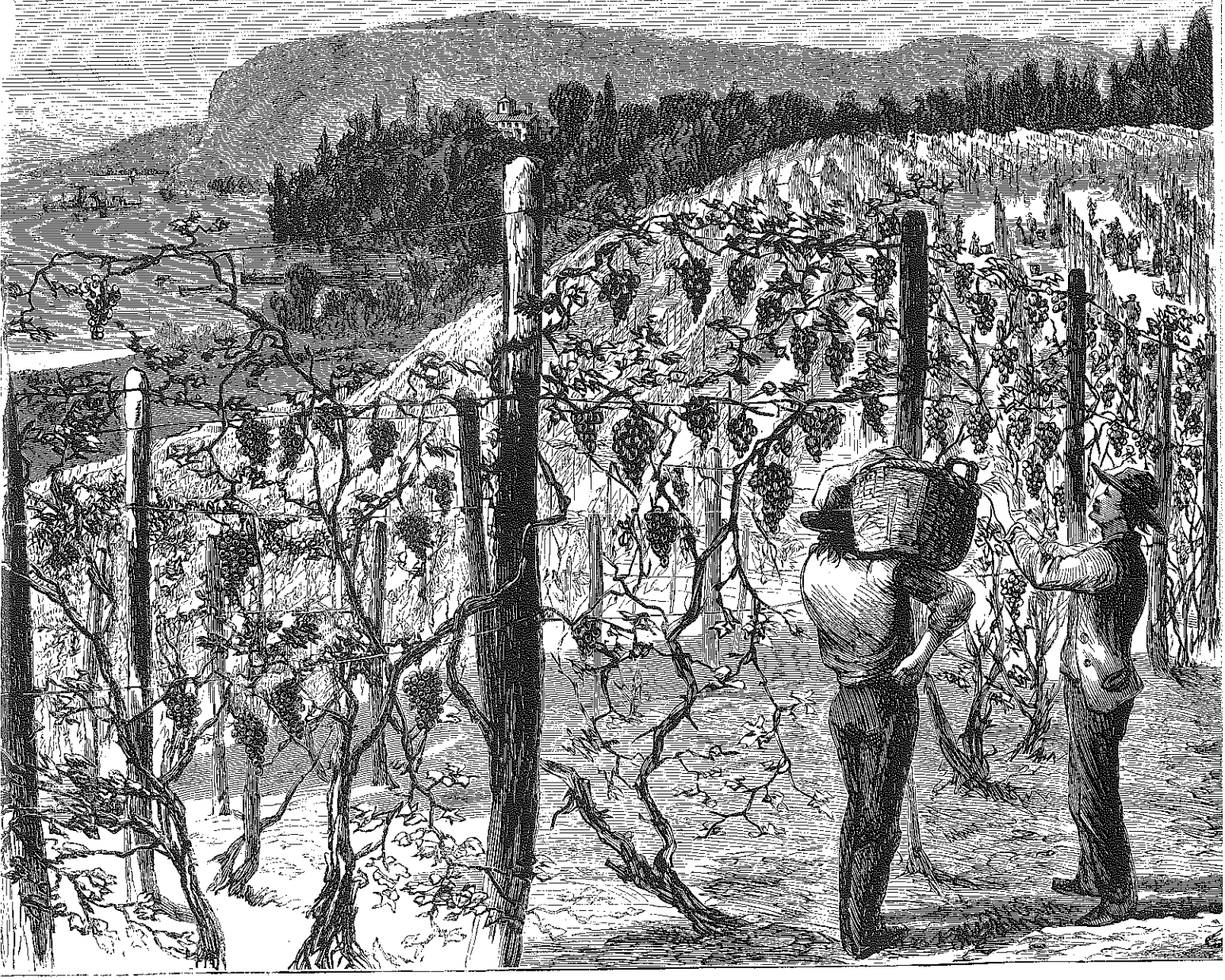

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COVER: The grape harvest at Mr. Underhill's vineyards, Croton-on-Hudson, New York. Illustration from Harper's Weekly, October 26, 1867. With French Hugenots settling and planting vines there in the 17th century, the Hudson River Valley is one of the oldest wine districts in America.

ABSTRACT

This study presents a matrix of probable risk and return outcomes --- given various assumptions about grape and bottle prices, inflation, growth strategy, and debt --- to quantify the profitability and financial feasibility of small premium wineries in New York State.

Capital asset costs to build and equip a winery ranged from $164,000 (or $27.31 per gallon) to $1.566 million (or $15.66 per gallon) for the 6,000 and 100,000 gallon wineries, respectively. Average total cost per bottle (750 ml) decreased from a high of $3.68 at 6,000 gallons to $2.99 at 100,000 gallons, assuming a grape cost of $600 per ton.

While capital asset costs per gallon and average total cost per bottle declined with winery size, market channel discounts overwhelm these economies of size. The internal rates of return decrease with capacity because, as winery capacity expands, proportionately larger market channel discounts are required to move the product and these erode the net FOB per bottle return to the winery.

Despite these discounts, wine-making can offer significant profits, with the returns to capital above 15 percent at all winery sizes if grape costs are less than $600 per ton and the wine is sold for at least $5.00 per bottle. However, judgement of this benchmark return must also include consideration of investment risk, substantial with wine-making, and liquidity.

Of the winery sizes examined, the 50,000 gallon winery produced the largest net present value. Winery profitability is somewhat sensitive to assumed asset appreciation. Also, the analysis showed that wineries can be a profitable venture for the outside investor.

For each winery size, maximum secured debt carrying capacity was examined as well as sources and terms of financing. Based upon the assumptions of this study, the major constraint to expanded winery financing is the availability of adequate security, rather than low repayment capacity. Other constraints are the limited number of potential lenders, lack of lender experience vis-à-vis winery financing, long cash payback lags, inadequate capitalization, and a weak resale market for bulk and bottled wine.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

AN INVESTMENT ANALYSIS OF NEW YORK SMALL PREMIUM WINERIES

by

C.C. Vreeland, J.R. Brake, and G.B. White[1]

INTRODUCTION

1.1 JUSTIFICATION

The small premium sector of the New York wine industry is emerging from infancy. With confidence abounding and the technique of producing excellent wines largely known, capital and marketing expertise are still viewed as limiting factors (Mitchell:1981:28).

While vintners have not completely mastered the art of marketing their wines, a growing body of literature is available to assist them with evaluating marketing alternatives (Wagner:1977; Sands:1979; Cadoux:1979; and Cooper:1981). Winery capital investment analyses, in contrast, are rare. In fact, no thorough study of the economic and financial requirements for an expanded small premium wine industry is available[2].

Small wineries are often characterised as 'capital starved' by industry watchers (Miller:1982:32) without reference to the underlying causes. It is not known, on the one hand, whether financial flows into the sector have been held at a trickle because prospective investors have not been made aware of the potential opportunities in winery investment; thus, this sector remains 'undiscovered' by big captial. Or, on the other hand, whether significant price and non-price constraints exist which discourage the flow of funds and ration credit into this sector.

Examples of possible price constraints are low return on investment and insufficient or slow repayment capacity. Non-price constraints may include restrictive collateral requirements or down-payment obligations.

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[2] A few short economic studies of wineries have been published. See Chapter Two for citations.

The potential for developing this sector rests upon answering these basic questions. At present local bankers and investors, lacking previous experience with winery financing and unable to draw upon published business ratings applicable to the local industry, approach winery proposals with conservatism. Consequently, the vintners are deprived of their potential backers' support for expansion and innovation.

Eastern vintner Eric Miller contrasted the financial situation of west versus east coast wineries in a recent article. He noted that "in the past decade and a half, millions of dollars of fresh capital have been pumped into [the] California [wine industry]," particularly by large corporations (e.g., Beatrice Foods, Pillsbury, Standard Brands, Santori, Coke, and Moet-Hennessy) as well as by institutional lenders (banks and insurance companies).

These sources, Miller argues, have provided a climate of confidence that has instilled smaller private investors to sink their own funds into small wineries, unlike in the east, where both sources of capital have yet to enter the market. He concluded:

> Some of the most brilliant financial people in the world today have used their talents to the benefit of the California wine industry. The fact is that the East has not yet received this kind of attention. And we need it (1982:32).

This study addresses the problem of the lack of economic and financial data required by potential investors and lenders to evaluate proposed and existing wineries. The results should be of interest to several groups:

1. New Entrants such as grape growers desiring to evaluate adjustment alternatives offered by expansion into wine making and de novo entrepreneurs who must compare returns on wine-making with other investment opportunities.

2. Present vintners who are anticipating expansion need to know the risk/return trade-offs involved.

3. Potential capital suppliers of venture and debt capital, requiring rates of return and cash flow estimates to calculate debt repayment capacity or investment payback.

1.2 OBJECTIVES

This study presents a matrix of probable risk and return outcomes --- given various assumptions about grape costs, inflation, growth strategies, and net bottle prices --- to quantify the investment opportunities for small premium wineries in New York.

Specific objectives are:

1. Determining the capital asset requirements for constructing and maintaining a winery over a ten year production horizon.

2. Estimating the respective annual cash flows and average costs per bottle.

3. Calculating the return on investment for the wineries.

4. Determining maximum secured debt carrying capacities and minimum equity requirements.

5. Evaluating potential sources of capital for winery financing.

6. Identifying major financial constraints to expanded investment in wineries.

1.3 PROCEDURE

The economic analysis utilized a synthetic engineering approach to construct five wineries of varying capacities: six, twelve, twenty-five, fifty, and one hundred thousand gallons per year. A synthetic engineering approach was selected because an analysis based completely upon empirical findings would not have been meaningful owing to the enormous variety of winery buildings and equipment found across the State. Furthermore, selecting only the most common equipment for the equipment complements would not have insured that all the components, when installed, would have produced a working production line.

The study's equipment complements were selected with the assistance of two of the region's leading manufacturer representatives[3]. The complements included economically priced equipment able to produce premium wine. Costs were obtained from current price lists. Estimates of some of the variable

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[3] They were Jeff Heacock, Scott Laboratories, Inc., and Jurgen Koch, SWK Machines.

and fixed costs, including marketing, were developed from an informal survey of a dozen New York wineries.

The return on investment computations incorporated the time value of money and were generated using an internal rate of return (IRR) approach.

In Chapter Three, the financial analysis, the debt carrying capacities were calculated by adjusting after-tax cash flows to generate cash available for debt service. Within each investment scenario, the winery borrows the maximum amount of money within the security guidelines that could be paid back with debt service cash within nine years. Maximum amount is defined as the amount needed by the winery for capital asset purchases and operating expenses. The winery does not borrow more than these requirements. A sensitivity analysis varying the loan security guidelines and interest rates was conducted to observe the effect upon loan repayment.

The discussion of current lending practices was compiled from telephone surveys of the managers of major lending institutions in New York and California that have a history of servicing the winery industry.

Chapter II

LITERATURE REVIEW

2.1 ECONOMIC ANALYSIS

A considerable body of literature has been published on the economics of small wineries. Most of these studies present estimates of costs and profitability for wineries of specific capacities. Table 1 contains a comprehensive list of these cost studies, representing estimates of wineries from New York, Washington, California, Illinois, North Carolina, Pennsylvania, and Ohio.

Among the literature on the economics of small wineries, only three studies incorporated the time value of money method, an important tool in modern financial analyses, into the calculation of winery profitability. These studies were authored by Mathia, et al (1977), Boulton (1981), and Key (1982). Each study is described briefly below.

In Economic Opportunities for Profitable Winery Operations in North Carolina, Mathia, et al used an economic engineering model to determine the financial feasibility of establishing a winery utilizing the State's increasing production of muscadine grapes (a native American grape variety). Annual budgets were estimated for several bottle prices and were used to generate the winery investment's internal rate of return (IRR) for winery sizes 20,000 to 500,000 gallons capacity per year.

The results indicated that the 100,000 gallon winery was the most profitable, attaining maximum after-tax returns of 11 and 13 percent IRR's at $1.10 and $1.15 per 750ml bottle[4] before decreasing due to extra excise taxes. Their analyses also included an estimation of average cost per bottle. These average costs decreased from $0.97 per bottle at the 20,000 gallon capacity to $0.82 per bottle at 500,000 gallons.

Roger Boulton, at the Department of Viticulture and Enology, University of California, Davis, developed a computer program to evaluate winery IRR's. Variables handled include: construction cost, grape price, net bottle price, expected inflation, production and sales growth pattern, and lending

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[4] These are 1977 prices.

TABLE 1

Bibliography of Winery Cost Studies

Size	Study
3,000	Sattui (1981); Wykoff (1979)
10,000	Debevc (1978)
12,000	Ellsworth (1977); Ledgerwood (1981); Key (1982); Boulton (1981); Robbins (1981)
16,000	Wills (n.d.)
20,000	Debevc (1978); Howard & Folwell (1974); Mathis et al (1977); Schuchter (1978)
24,000	Cook et al (1977);
25,000	Robbins (1981); EASTERN GRAPE GROWER & WINERY NEWS (1981); Zabadal (1981); GOOD FRUIT GROWER (1981a)
32,000	Wills (n.d.)
36,000	Robbins (1981)
50,000	Sceiford (1970); Easley (1977); Robbins (1981)
60,000	Robbins (1981); Keehn (1981)
100,000	Mathia et al (1977)
120,000	Schaefer (1977)
144,000	Callaway (1979)
240,000	Cook et al (1977)
300,000	Howard & Folwell (1974); Schaefer (1977)
420,000	Cook et al (1977)
500,000	Mathia et al (1977); GOOD FRUIT GROWER (1982b)
720,000	Schaefer (1977)
1,000,000	Howard & Folwell (1974)

NOTE: With some studies a conversion factor of 1 case = 2.4 gallons was used.

guidelines.

Unfortunately, certain simplicities in the program's assumptions make it of limited use. Tax considerations, such as net operating losses, which can be quite considerable in the early years of the investment, and investment credits are not carried forward; no flexibility exists for selection of depreciation schedules; and no mechanism is included for integrating positive terminal values and capital gains (and minimum tax effects) in the year of disposition. Because these disadvantages were considered significant, the program was not used for this study.

Key analyzed a 50 acre vineyard producing sufficient grapes to supply a 12,000 gallon winery. He concluded that the vineyard/winery enterprise was profitable (had a positive net present value). The annual equivalent cash flow, after taxes, was $9,805 for the vineyard and $21,792 for the winery. A sensitivity analysis on grape or bottle prices was not done.

Tower (1975; 1979) constructed a linear programming model designed to calculate the profit maximizing combination of quantity and variety of wine to produce. Price Waterhouse, San Francisco, uses a program to generate cost relationships. It is not available for outside use.

Cooper (1981) described the previously neglected small winery sector by interviewing most of the then existing 35 small farm wineries. His objective was to identify these wineries' marketing strategies, legal status, and near term growth forecasts. Cooper's survey, however, did not encompass any financial data.

2.2 FINANCIAL ANALYSIS

Unlike the literature in winery cost studies, published articles on winery financing are scarce. Three articles were included in Moulton's seminar proceedings (1981). These were Greg Bissonette (of Chateau Chevalier Winery), Winery Financing and Other Matters; Roger Barr (Bank of America), Financing Winery Operations; and Mike Fitch (Wells Fargo), A Banker's View of Financing. All three evaluated potential sources of equity and debt. Terms and guidelines were compared and some discussion of security valuation and preferred documentation were provided.

Other sources include Wykoff, Financing the New Winery (1979), and Financing a Farm Winery; Farm Winery Workshop (1979). In the latter publication representatives from three funding sources --- Lusk (Farmers Home Administration), Hockin (Small Business Bureau), and Ledgerwood (Farm Credit Administration) --- discussed the lending philosophies and experiences of their respective firms. Ledgerwood's article is of particular interest because he projected cash flows and repayment capacity for a hypothetical vineyard/winery operation.

Chapter III

ECONOMIC ANALYSIS

This chapter opens with a description of the major assumptions used to construct the economic analysis. Next, the results of the analysis of capital asset costs, average costs, and return on capital are described in separate sections. The chapter concludes with a discussion of the sensitivity analysis of several key assumptions in order to quantify the risk and return trade-offs inherent with winery investments.

3.1 MAJOR ASSUMPTIONS OF THE WINERY MODEL

Buildings

Winery buildings in New York State form no discrete pattern. They run the gamut from recycled chateaux, to modernistic octagons, to born-again barns. Because of this great architectural diversity, a proxy for winery building cost was chosen to provide a baseline against which other cost estimates could be chosen.

Using the American Appraisal Association's cost estimates for a two-storied bottling plant as the most similar proxy and allowing for an additional $6.00 per square foot for embellishments, winery building costs were estimated at $41 per square foot. Warehouse costs, based upon the Association's estimates for a one-storied, pre-engineered warehouse, cost about $20 per square foot. Dimensions were calculated from an informal winery survey[5].

Equipment

In synthetically constructing the equipment complement, emphasis was given to selecting a balance between the currently popular and the more innovative, state-of-the-art equipment. All equipment was purchased new and costs were gathered from manufacturer price lists. While many wineries will buy some of their equipment second hand, this assumption was included to produce a conservative return on investment.

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[5] See Appendix A for the capital asset requirements of the respective wineries.

Cooperage

A wine line of 75 percent white and 25 percent red was assumed. The tanks were stainless steel and 75 percent of them were refrigerated. Twenty-five percent of all wines had some oak aging. A ratio of 165 gallons of wine per ton of grapes was used to calculate cooperage capacity.

Size & Growth Strategy

Five winery sizes were chosen: 6,000; 12,000; 25,000; 50,000; and 100,000 gallons. It was assumed that both production and sales for each size of winery increased by a quarter of total capacity per year; that is, the wineries were operating at full production by year four. This strategy was considered prudent and typical for many of the State's wineries and it avoided, or at least minimized, the problem of cash flow constraints which predictably arose if a winery tooled up production too quickly and without the support of a coordinated marketing policy.

Source & Cost of Capital

The wineries were assumed to be financed with equity capital in order to determine base investment requirements uninfluenced by leverage.

Inflation

Assumed rate of inflation was 8 percent for all costs and revenues. None-the-less, historically wine and grape prices have not kept up with general inflation, as measured by the Consumer Price Index for all items. Table 2 presents data on the average annual lag or difference between inflation and grape and wine price increases.
For example, general inflation exceeded average annual table wine price increases by 1.5 percentage points per year, French Hybrid grape prices by 3.1 percent, and Concord grape prices by 5.6 percent. The CPI for table wine outsprinted French Hybrid and Concord grapes by 1.6 and 4.1 percent, respectively.

Despite this evidence, the decision to utilize identical rates of inflation for revenues and expenses in this study was based upon, one, uncertainty that future changes will mirror past trends and, two, computational ease.

Wine Marketing Channels

Small wineries essentially utilize three marketing channels: direct to the consumer, sale to a retail liquor store or restaurant, and sale to a wholesaler/distributor. The per-

TABLE 2

Grape & Wine Price Trend Lags Compared with Inflation (1970-80)

Consumer Price Indices	Average Annual Lag (Percentage Point)		
	Table Wine	French Hybrid Grapes	Concord Grapes
All Items	1.5	3.1	5.6
Alcoholic Beverages	2.0	3.6	6.1
Table Wine	-	1.6	4.1

SOURCES: Wines and Vines, Statistical Issue (1982) and Putnam (1982).

cent utilization of these wine marketing channels[6] by winery size are displayed in Table 3.
Admittedly, while sales at some wineries do not fit these assumed wine marketing channels, the assumptions do represent average conditions. Market channel discounts to sales middlemen represent significant cuts in the net returns to the winery. Discounts to wholesalers are generally 50 percent and to retailers about one-third of the retail (consumer paid) bottle price.

Revenue

Bottle prices ranged in value from $3.00 to $9.00 at $2.00 increments. These prices represented FOB winery or retail prices. Actual revenue calculations were net of market channel discounts and inflation.

Grape Source & Price

All grapes were assumed purchased, that is, the winery had no attached vineyards. To capture a full range of grape costs, the following prices were chosen: $200, $400, $600,

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[6] These proportions were derived from Cooper's survey data (1981) and were modified at the upper capacity range to correct perceived statistical bias caused by Cooper's small sample size at this range.

TABLE 3

Wine Marketing Channels

Size	Market Channel		
	Direct	Retail	Wholesale
		-- % of Total --	
6,000	80	20	-
12,000	65	35	-
25,000	30	70	-
50,000	20	50	30
100,000	15	25	60

SOURCE: Adopted from Cooper (1981).

$800, and $1000 per ton.

Variable & Fixed Costs

Variable and fixed costs were derived from a winery survey and from other studies. Marketing costs for advertising, promotion, and tastings were assumed $1.25 per gallon through year four and $1.00 per gallon thereafter (exclusive of sales personnel salaries).

Taxation

All tax assumptions and calculations conformed with the Economic Recovery Tax Act of 1981. Year one of the investment horizon corresponds to tax year 1983. The winery enterprise was a sole proprietorship, with the principal filing a joint return, had four exemptions, and took the standard deduction.

Terminal Values

Terminal values were based upon percentage increases over the capital assets' original basis. The following percentages were used: 0.50, 1.00, and 2.00 (nominal).

3.2 CAPITAL ASSET COSTS

Capital asset costs[7] represent a major cash outflow during the first year of the investment. In keeping with the assumptions outlined above, during the first year land was purchased, buildings were constructed, all equipment was installed, and a quarter of the cooperage was set in place. By the year's end, the winery was deemed ready to receive the first crush and proceed with fermentation.

For each of the next consecutive three years tanks and oak casks were added to increase production by one-quarter per year. A summary of the total capital asset costs for the five winery sizes is displayed in Table 4. Capital Requirements ranged from about $164,000 to build and equip a 6,000 gallon winery to $1.6 million for a 100,000 gallon winery. On a dollar per gallon basis, these costs represented a high of $27.30 per gallon at 6,000 gallons capacity and dropped down to $15.66 per gallon at 100,000 gallon capacity.

Analyzing the capital asset costs on a percentage basis, building costs generally decreased and equipment and cooperage costs increased with winery size. While the proportion of investment in cooperage was highest at the 6,000 gallon capacity, this was an exception due to the necessity of purchasing numerous smaller and more expensive tanks.

Building costs, accounting for nearly 50 percent of total capital asset costs, are the real wild card in winery construction. Wide variability in architectural designs, degree of embellishment, and construction costs can make or break a new winery enterprise. In short, the results indicate that great care should be taken by the vintner to estimate as accurately as possible all construction costs.

3.3 ANNUAL BUDGETS

Annual cash budgets provided the financial "fodder" to generate the winery's return to capital. These budgets were estimated in the same manner by which accountants compute after-tax net income on an income statement, with an additional adjustment required to convert net income to cash flow.

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[7] Capital asset costs are defined here as similar to the accounting entry "operational assets": property, plant, and equipment. See Appendix A for a detailed list of the wineries' capital asset accounts.

TABLE 4

Capital Asset Cost Summary by Winery Size

Item	Winery Size (gal.)				
	6,000	12,000	25,000	50,000	100,000
Equipment					
Receiving	5,560	20,750	30,950	43,550	72,800
Cellar	8,063	16,001	18,488	40,209	48,076
Refrigeration	2,220	2,220	16,397	27,369	37,279
Bottling	1,235	1,450	11,275	39,000	127,500
Furnishing	2,000	4,000	6,000	10,000	20,000
Mat. Hdlg.	600	1,800	7,600	14,800	15,300
Laboratory	2,000	2,000	2,500	3,000	4,000
Motor Vehicles	7,000	14,000	20,000	20,000	27,000
Misc. Supplies	1,000	2,000	5,000	10,000	20,000
Total	29,678	64,221	118,210	207,928	371,955
Cooperage					
S.S. tanks	32,359	44,118	84,194	147,903	266,538
Oak casks	18,471	31,712	68,654	136,083	272,166
Total	50,830	75,830	152,848	283,986	538,704
Building					
Winery	81,800	163,000	244,100	324,800	607,300
Warehouse	0	0	10,200	20,300	40,600
Total	81,800	163,000	254,300	345,100	647,900
Land	1,500	3,000	3,000	4,500	7,500
TOTAL	163,808	306,051	528,358	841,514	1,566,059
$/G	27.30	25.50	21.13	16.83	15.88

Net income was calculated as follows. Annual revenue from wine sales, less annual expenses (including depreciation), equals gross income. Gross income was adjusted by personal exemptions and standard deductions to compute taxable income. Taxable income, less taxes (net of tax credits and operating loss carry forwards), equals net income.

To convert net income to cash flow, depreciation (a non-cash expense) was added back to net income, while capital asset purchases and an opportunity cost for managerial labor were netted out. The result was an after-tax return to capital cash flow (hereafter called cash flow). Because the manager was considered the sole proprietor of the winery, his salary[8] could not be expensed for tax purposes. Hence, his salary (representing a cash return to owner/operator) was subtracted from (after-tax) net income.

Table 5 provides an example of the cash flow calculations in nominal dollars over the ten year investment horizon for a 50,000 gallon winery buying grapes at $600 per ton and selling the wine at $5.00 per bottle. Revenue sources were wine sales and sales of assets in the year of disposition. Expenses were divided into variable and fixed costs. Notice that the winery, due to the carryforward of net operating losses, did not pay any taxes until year five. These accumulated net operating losses were exhausted by year five, leaving future incomes to bear full tax liabilities. In year six, for example, federal and state taxes amounted to over a quarter of a million dollars. Lastly, cash flows turned positive in year four.

In general, a small winery can expect to attain a net positive cash flow within 5, 4-3, 3-2, or 2 years at $3.00, $5.00, $7.00, and $9.00 per bottle prices, respectively, given grape costs of $600 per ton. Cumulative cash flows by winery size are displayed in Figure 1.

Of particular interest to both the potential vintners and lenders is the length of time required to recover the original investment. A superior method, the discounted payback analysis, computes the time period when cumulative present values breakeven (Bierman & Smidt:1980). Discounting these cash flows at a fifteen percent cost of capital[9], reveals a discounted payback period of 7 to 8 years for the 6,000 and 12,000 gallon wineries, 9 years for the 25,000 gallon winery, and 10 years for the 50,000 gallon winery. The 100,000 gallon winery did not attain a positive net present value at this cost of capital. More will be said about the wineries' present values in Section 3.5 and in Table 7.

The time horizon before investment breakeven for the winery investment can be even longer. Purchasing more expensive equipment or decreasing the proportion of direct sales beyond the assumptions of this study would add several more years to

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[8] Managerial salaries were: $10,000; $15,000; $20,000; $25,000; and $30,000 for the respective wineries.

[9] A 15 percent cost of capital translates to a 6 percent real return, given the assumptions of this study.

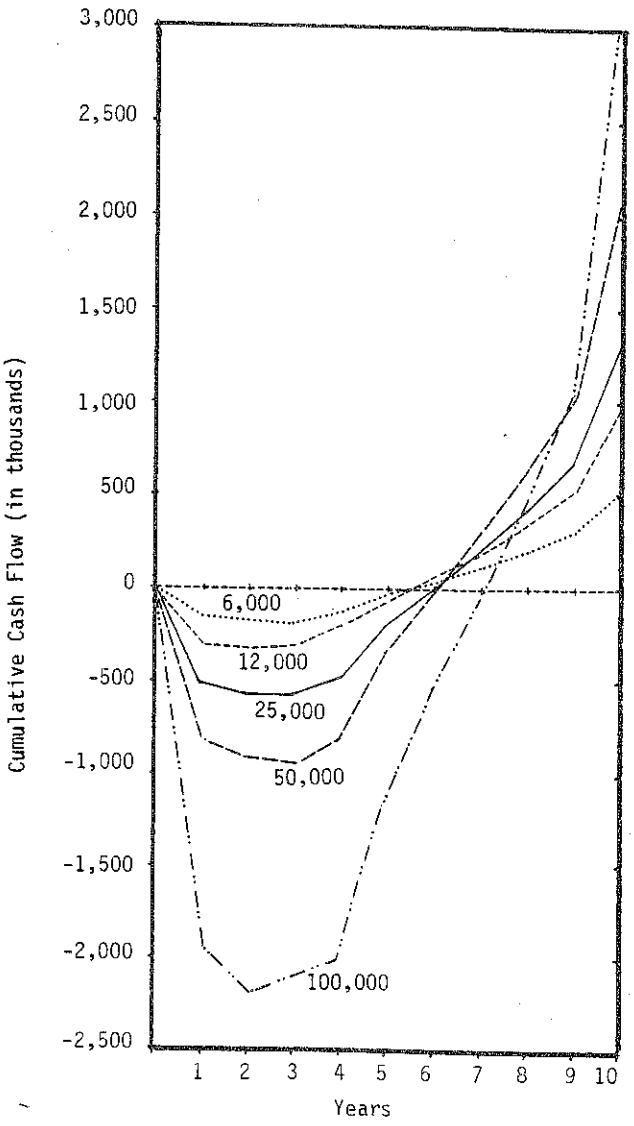
TABLE 5

Net Income & Cash Flows: 50,000 Gallon Winery

Item	Year 1	2	3	4	5	6	7	8	9	10
Revenue										
Wine, total	0	230,875	498,750	807,750	1,163,000	1,256,500	1,357,000	1,465,500	1,582,500	1,846,500
Sale of Assets	0	0	0	0	0	0	0	0	0	841,514
Subtotal	0	230,875	498,750	807,750	1,163,000	1,256,500	1,357,000	1,465,000	1,582,000	2,688,014
Expenses										
Variable Costs										
Grapes	45,456	98,185	159,089	229,091	247,272	267,272	288,485	311,515	336,666	363,333
Mfg supplies	2,250	4,860	7,873	11,337	12,245	13,224	14,282	15,424	16,658	17,991
Packaging	26,250	33,750	91,854	132,269	142,853	154,277	166,625	179,949	194,345	209,895
Excise Taxes	0	3,645	7,873	12,754	18,367	19,836	21,423	23,136	24,987	26,987
Labor	77,160	83,333	89,999	97,198	104,976	113,371	122,445	132,237	142,815	154,243
Marketing	15,625	33,750	54,675	78,731	68,025	73,465	79,345	85,690	92,545	99,950
Utilities	2,750	5,940	9,623	13,857	14,966	16,162	17,456	18,852	20,360	21,989
Office Supplies	700	1,512	2,449	3,527	3,809	4,114	4,443	4,799	5,183	5,597
Subtotal	166,191	260,655	418,770	573,726	607,070	655,854	708,153	764,757	826,167	891,994
Fixed Costs										
Insurance	3,487	3,734	3,978	4,221	4,221	4,317	4,414	4,519	4,640	4,640
Depreciation	82,617	102,616	107,317	106,681	106,148	54,405	48,296	42,373	37,061	17,255
Property Tax	4,370	4,807	5,244	5,681	6,118	6,555	6,992	7,429	7,866	8,303
Bonding & License	8,656	156	156	156	156	156	156	156	156	156
Repairs & Maintenance	13,949	14,937	15,911	16,884	16,884	17,269	17,657	18,076	18,560	18,560
Subtotal	113,079	126,250	132,606	133,623	133,527	82,702	77,515	72,553	68,283	48,914
Total Expenses	279,270	386,905	551,376	707,349	740,597	738,556	785,668	837,310	894,450	940,908
Gross Income	(279,270)	(156,030)	(52,626)	100,401	422,403	517,944	571,332	628,190	688,050	1,747,106
Taxes, total	0	0	0	0	(4,159)	(233,964)	(252,455)	(271,969)	(292,163)	(548,606)
Investment Credits	0	35,188	2,962	2,924	5,231	40,775	3,105	3,354	3,874	(6,032)
Net Income	(279,270)	(120,842)	(49,664)	103,325	423,475	324,755	321,982	359,575	399,761	1,192,468
Capital Purchases	(610,969)	(49,367)	(48,732)	(48,650)	0	(19,218)	(19,408)	(20,960)	(24,210)	0
Depreciation	82,617	102,616	107,317	106,681	106,148	54,405	48,296	42,373	37,061	17,255
Manager's Salary	(25,000)	(27,000)	(29,160)	(31,493)	(34,012)	(36,733)	(39,672)	(42,846)	(46,273)	(49,975)
Cash Flow	(832,622)	(94,593)	(20,239)	129,863	495,611	323,209	311,198	338,142	366,339	1,125,238
Grape Purchases (tons)	75.76	151.52	227.27	303.03	303.03	303.03	303.03	303.03	303.03	303.03
Wine Sales (gallons)	0	12,500	25,000	37,500	50,000	50,000	50,000	50,000	50,000	100,000

ASSUMPTIONS: Grape price $600 per ton; bottle price $5.00;

Figure 1: Cumulative Annual Cash Flows by Winery Size



ASSUMPTION: Grape price $600 per ton; bottle price $5.00;

the discounted payback.

3.4 AVERAGE COSTS

Average bottle costs were estimated using the present value annual equivalent cost method. A fourteen percent cost of capital (or a 6 percent real return to capital, assuming an 8 percent inflation rate) was used to take the present value of each variable and fixed cost over the ten year investment horizon. These present values were divided by an appropriate annuity factor to produce annual equivalent costs which, in turn, were divided by the average wine production in bottles. Thus the average bottle costs reflected both operating and capital costs. The results of this analysis by winery size are presented in condensed form in Table 6, assuming grape costs of $600 per ton[10].

By assumption, average variable costs except for labor were not affected by winery size and, hence, were the same amounts throughout. Average labor costs generally declined with size, although the inclusion of a full-time sales person and cellar worker at the 25,000 gallon capacity tended to increase average labor costs. These higher labor costs produced the only exception to an otherwise decreasing average variable cost schedule. Average variable cost generated from $2.42 to $2.67 of the costs of a bottle of wine.

Average fixed cost declined with size. The only anomaly was bonding and license which increased at 100,000 gallons because of higher licensing fees. The average fixed cost added $0.57 to $1.01 per bottle of wine.

Average total cost was a high of $3.68 at the 6,000 gallon capacity and dropped to $2.99 at the 100,000 gallon capacity.

Grape costs (at $600 per ton) accounted for about 32 percent of the average total cost of a bottle of wine, followed by capital outlays and packaging (bottles, corks, labels, and foils) both with 18 percent. Increasing grape costs to $1,000 per ton expanded to about 45 percent the percentage grape costs comprise of average total costs per bottle. Average total cost is pushed to a range of $3.70 to $4.39 per bottle.

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[10] Appendix B contains a detailed description of the average resource requirements and prices for the respective wineries.

TABLE 6

Average Costs per Bottle (contant dollars)

Item	Winery Size				
	6,000	12,000	25,000	50,000	100,000
	---Average cost per bottle---				
Variable Costs					
Grapes ($600/ton)	1.058	1.058	1.058	1.058	1.058
Mfg supplies	0.051	0.051	0.051	0.051	0.051
Packaging	0.599	0.599	0.599	0.599	0.599
Excise taxes	0.066	0.066	0.066	0.066	0.066
Manager/operator	0.327	0.245	0.157	0.098	0.059
Labor	0.177	0.141	0.293	0.304	0.199
Marketing	0.310	0.310	0.310	0.310	0.310
Utilities	0.063	0.063	0.063	0.063	0.063
Office supplies	0.016	0.016	0.016	0.016	0.016
AVERAGE VARIABLE COSTS	2.667	2.549	2.613	2.565	2.421
Fixed Costs					
Insurance	0.036	0.035	0.028	0.022	0.020
Capital outlays	0.758	0.725	0.594	0.466	0.432
Property taxes	0.062	0.062	0.046	0.031	0.029
Bonding & license	0.014	0.011	0.009	0.008	0.010
Repairs & maintenance	0.143	0.138	0.112	0.087	0.081
AVERAGE FIXED COSTS	1.013	0.971	0.789	0.614	0.572
AVERAGE TOTAL COSTS	3.680	3.520	3.402	3.179	2.993

ASSUMPTIONS: Grape price $600 per ton; and cost of capital 14% (nominal).

3.5 RETURNS TO CAPITAL

The cash flows were used to generate the wineries' return on investment using an internal rate of return procedure. The returns to capital at various grape and bottle prices for the five winery sizes are displayed in Figures 2 to 6.

The returns to capital at all winery sizes show a linear relationship. Looking at the 50,000 gallon winery (Figure 5), grape price per ton is denoted on the horizontal axis and return to capital, percent per annum (% pa) on the vertical axis. Each line represents an iso-revenue line, one for each bottle price[11]. If a vintner paid $600 per ton for grapes

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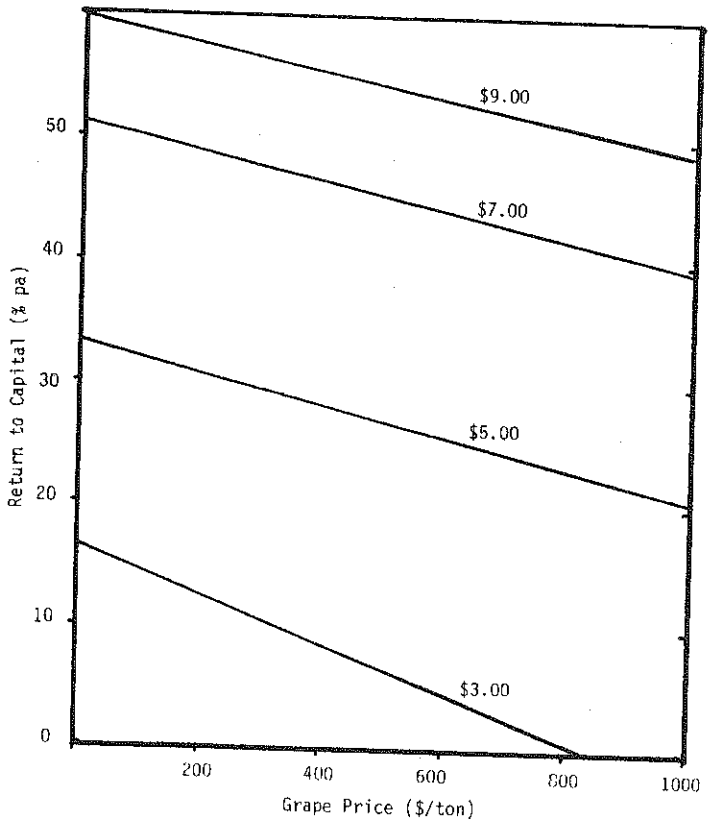
[11] Bottle prices are listed for clarity in the figures at their retail value (consumer paid) in constant dollars. The actual computations used FOB winery (retail) prices in

Figure 2: Return to Capital: 6,000 Gallon Winery



ASSUMPTION: Each line represents a different bottle price in constant dollars.

(the average 1983 price for Seyval Blanc assuming the average 1981 price and indexed at 8% inflation) and sold the wine for $5.00 per bottle (the upper end of the hybrid prices from Table 9 below), he could have expected an annualized rate of return, after taxes, of 20 percent. If the price for a ton of grapes increased to $800 and the market for Seyval Blanc stayed at $5.00 per bottle, then the return on capital is depressed to about 17 percent.

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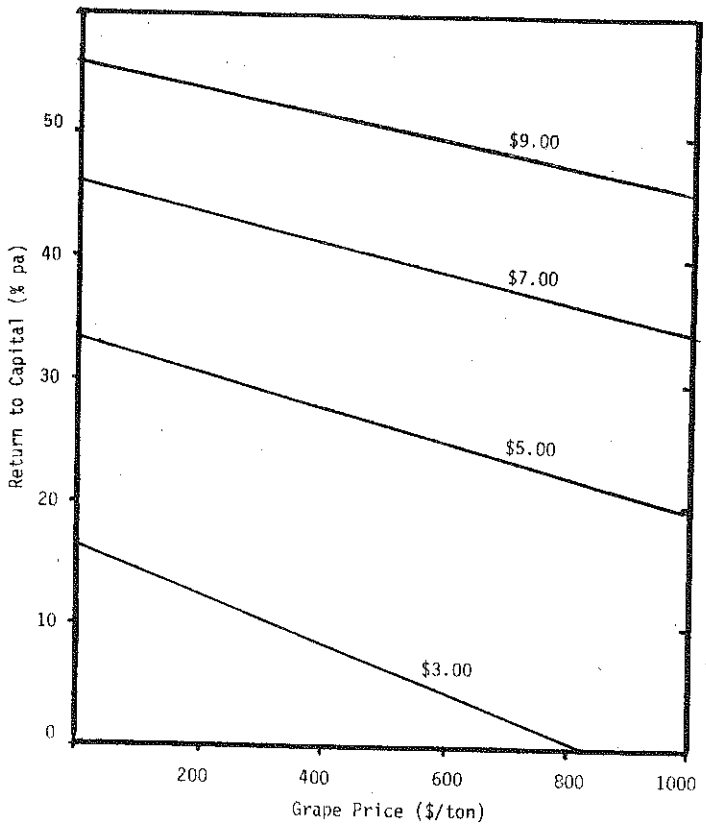
nominal dollars and were adjusted by marketing margins.

Figure 3: Return to Capital: 12,000 Gallon Winery



ASSUMPTION: Each line represents a different bottle price in constant dollars.

If, however, the winery could create a larger demand for its label of Seyval Blanc over other labels and could raise the price to, say, $7.00 per bottle, then the return on capital is increased to 36 percent, up from 20 percent[12].

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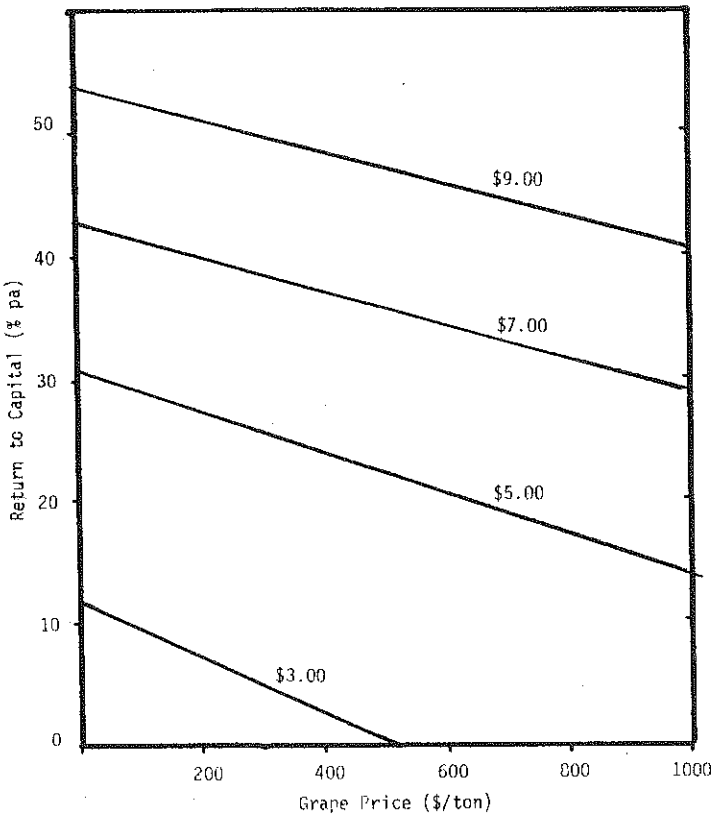
[12] Since the IRR calculations assumed fixed costs and prices (albeit inflated), a change in grape or bottle price would affect the winery's IRR by an amount lying somewhere between the iso-revenue line representing the returns with the original assumption and the line with the new price/

Figure 4: Return to Capital: 25,000 Gallon Winery



ASSUMPTION: Each line represents a different bottle price in constant dollars.

The reader is cautioned against mis-using the iso-revenue lines. These prices are set in the market and are "taken" by the individual vintners. Surely if one utilizes $200 per ton grapes and can sell a bottle of the wine for $9.00, he will achieve a 54 percent return; yet who is going to buy Concord grape wine (about $200 per ton) at Chardonnay prices?

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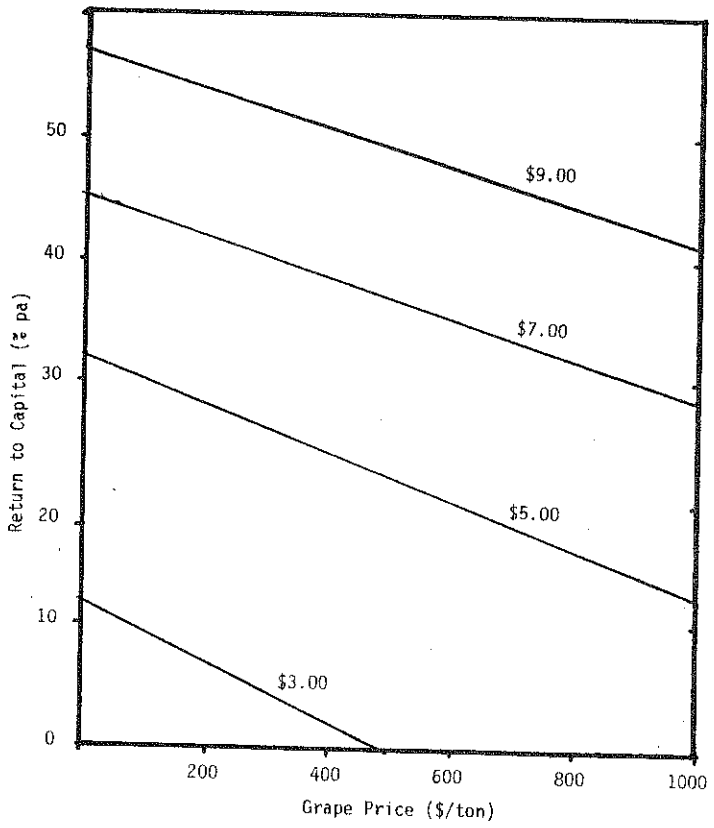
cost assumption. The magnitude of this change depends upon how soon in the investment horizon this change took place.

Figure 5: Return to Capital: 50,000 Gallon Winery



ASSUMPTION: Each line represents a different bottle price in constant dollars.

At all combinations of grape and bottle prices, the returns to capital are monotonically decreasing. Grapes, accounting for 32 percent of the average total cost (from Table 6), represent the major cost component in the production of wine. Hence, the higher the costs of purchasing the grapes, the lower the rate of return. Using linear regression, an increase of $100 per ton of grapes results in a 1.47 percentage point per annum decline in return to capital[13].

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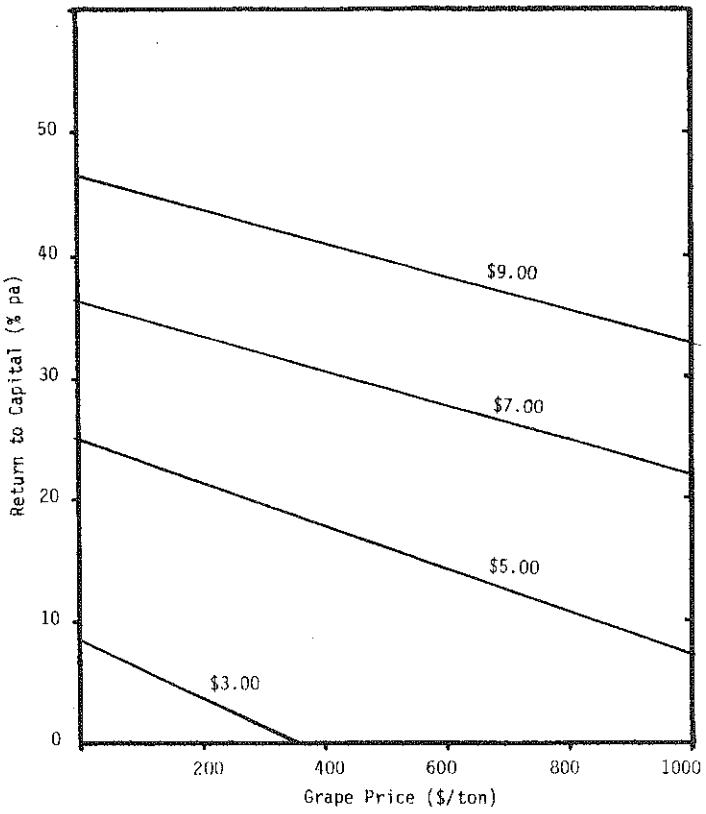
[13] The coefficient of determination was 99 percent.

Figure 6: Return to Capital: 100,000 Gallon Winery



ASSUMPTION: Each line represents a different bottle price in constant dollars.

Regraphing these rates of return against winery size reveals a crucial relationship between investment profitability and winery capacity. As can be seen in Figure 7, there is a general decline in profitability as the winery increases in size. Linear regression quantified this decline as a drop of 0.14 percentage points per annum for each 1,000 gallon expansion in capacity[14].

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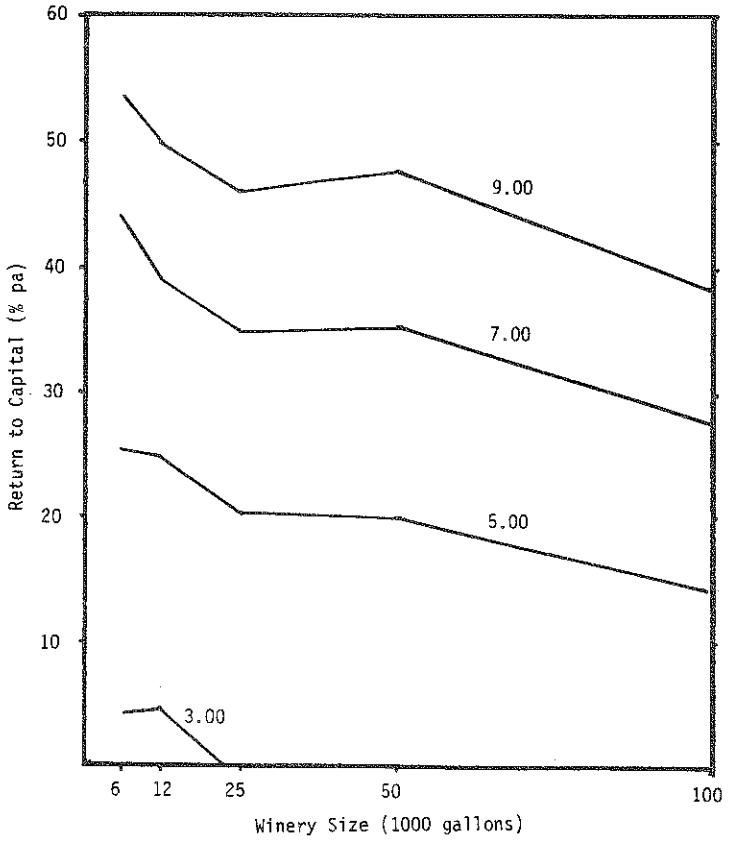
[14] This calculation was based upon a sample size including the $5.00 through $9.00 per bottle for all winery capacities

Figure 7: Effect of Winery Size on Return to Capital



ASSUMPTIONS: Grape price $600 per ton; each line represents a different bottle price in constant dollars.

This conclusion might appear paradoxical at first because it was noted above that both capital asset costs (Table 4) and average total costs (Table 6) decreased with winery size. The factor offsetting declining costs per gallon/bottle was the assumed pattern of net bottle prices. As wineries increased in size, proportionately more of their product has to be marketed at discounted prices through wholesalers and retailers.

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except the 25,000 gallon. The coefficient of determination was 96%.

Instead of expanded production leading to greater overall profitability, marketing constraints tend to cork further revenue expansion.

For example, the net FOB return to the winery for a $5.00 bottle of wine is reduced to $4.67 at the 6,000 gallon and to $3.08 at the 100,000 gallon winery (in constant dollars), a 34 percent drain in net revenue.

Figure 7 illustrates another return-winery size relationship. The iso-revenue lines at all four bottle prices slump at the 25,000 gallon capacity. As explained in the previous section on average costing, this lowered profitability was due to added labor costs (sales person and cellar worker) which could not be spread over significantly expanded production. This slump was only one or two percentage points in magnitude, however.

The decline in rate of return with winery size should not be taken as evidence that the most profitable wineries are the smallest wineries. While relative returns may drop with capacity expansion, absolute profits increase with winery size up to a point. The source of this potential confusion is the computation of the IRR method which, because it reflects average capital costs, eliminates consideration of investment size or scale.

Another method of measuring investment worth not susceptible to this size problem is the present value approach. A 15 percent and 10 percent cost of capital, representing 6 and 2 percent real rates of return, respectively, were selected and used to discount the cash flows back to year one of the investment horizon. The investment with the highest net present value (NPV) could be considered the economically superior investment. The results are displayed in Table 7.

Of the winery sizes studied, the analysis showed that the most profitable size was in the interval between 50,000 and 100,000 gallons at both the 15 and 10 percent cost of capital. (The profitability of the 100,000 gallon was constrained by the marketing channel assumptions.) Also listed are years to investment breakeven. Such long lags in payback add greatly to the risk of the investment.

3.6 RISK AND RETURN: SENSITIVITY ANALYSIS

Wine making, as with any business, has its share of risks. Mistakes and inaccurate cost projections can easily sour the expected profit outlook and transform an otherwise healthy investment into a very expensive hobby.

TABLE 7

Winery Net Present Value by Winery Size

Size	15% Cost of Capital		10% Cost of Capital	
	NPV ($)	Breakeven Year	NPV ($)	Breakeven Year
6,000	119,473	7-8	213,362	6-7
12,000	199,010	7-8	362,592	6-7
25,000	196,290	8-9	446,239	7-8
50,000	300,545	9-10	698,716	7-8
100,000	(62,525)	-	616,320	-

ASSUMPTIONS: Grape price $600 per ton; and bottle price $5.00.

In addition to grape cost and wine fluctuations, the most important economic risks and potential sources of returns the winery owner faces are capital investment cost, asset depreciation or appreciation, technological expertise, and marketing. A brief discussion of each of these elements is presented below.

3.6.1 Capital Investment Cost

A manufacturer who represents the "cadillac" of the winery equipment cost spectrum confided that his estimates for equipping a premium winery could run 60 percent higher than estimates used in this study. If this more expensive equipment complement was purchased, total capital asset costs would increase to $181,615 (or $30.27 per gallon) for the 6,000 gallon and to $1.789 million (or $17.89 per gallon) for the 100,000 gallon winery. This represents an 11 to 14 percent increase in total capital asset cost.

Most winery engineers and consultants recommend an inclusion of a 15 percent contingency reserve above total capital cost estimates as a guard against unforeseen construction overruns, equipment cost inflation, and unanticipated equipment modifications and additions. For example, while digging

the winery foundation, striking solid granite would add dollars to the cost of excavating each cubic foot of ground. If the vintner orders equipment which must be manufactured and shipped from abroad, delays and inflation could run up the equipment's final, landed price. Finally, vintners, especially inexperienced vintners, might not have budgeted all the connecting pieces of equipment needed to get the production line in operation. Or they might decide after installation to invest further in options and accessories.

While contingency costs may be a necessary element in the engineer's calculation of total investment costs, they are not appropriate in an economist's cost projections. The reason for this is basic. If one can expect cost overruns, then the original price of the asset should be adjusted accordingly and the adjusted cost becomes eligible for depreciation. In this study it was assumed that the calculations and proxies used to determine total capital asset cost were as accurate as possible. The equipment selection has been checked for its completeness and a small contingency entry, called miscelleneous supplies, was included as a catch-all item and was depreciated.

As for discrepancies between listed and landed prices of foreign manufactured equipment, this risk can be eliminated or at least minimized by demanding cost estimates in that country's currency to avoid foreign exchange fluctuations. In any event, these fluctuations can move in either direction, favoring or hurting the prospective buyer.

3.6.2 Capital Gains

With annual operating cash flows not exhibiting remarkable profitability, it was hypothesized that the profit "kicker" was in anticipated capital asset appreciation and/or goodwill with favorable capital gains treatment in the year of disposition.

A simulation was calculated to quantify the influence of appreciated value upon the investment's rate of return. The three values in nominal terms were 0.5, 1.0, and 2.0 times original asset basis, or 0.25, 0.50, and 1.00 in constant terms.

The results of the calculations showed that return to capital was sensitive to assumed appreciated values. Changing the assumptions from 0.5 to 1.0 times original basis caused the investment's rate of return to increase about 2.5 percentage points; and from 1.0 to 2.0 times original basis, the rate of return was increased 4 percentage points. However, there is simply not enough data available on winery sales prices to

substantiate claims of significant asset appreciation and capital gains providing a pot of investment gold at the end of a long period of net operating losses.

At least 17 New York wineries have closed during the past ten years. Discussions with knowledgeable people in the industry suggest that many of them failed because of poor or inadequate marketing or because they were under-capitalized and not as a result of wanting to "cash in" on the accumulated goodwill of their label. Thus, one is left with the distinct impression, as aptly phrased by Jurgen Koch, President of SWK Machines, that "...the winery only changes hands when it cannot make it"[15].

3.6.3 Comparative Profitability of Wine Types

Table 8 illustrates the maximum grape costs at differing bottle prices a winery could afford to purchase and still maintain an adequate rate of return (here assumed 15 percent).

TABLE 8

Maximum Affordable Grape Price for a 15% IRR

	Winery Size				
Bottle Price	6,000	12,000	25,000	50,000	100,000
	---Dollars per ton---				
3.00	100	80	0	0	0
5.00	1,400	1,360	960	880	560
7.00	> 2,000	> 2,000	> 2,000	1,860	1,500
9.00	> 2,000	> 2,000	> 2,000	> 2,000	> 2,000

ASSUMPTION: Maximum grape & bottle prices in year one (1983) dollars.

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[15] Private communication.

The grape and bottle[16] prices in Table 8 are listed in constant dollars. At $9.00 per bottle, wineries at any size could purchase grapes at $2,000 per ton or more, while earning at least a 15 percent rate of return. At $5.00 per bottle, the 6,000 gallon winery could buy grapes up to $1,400 per ton, but the 100,000 gallon winery could afford only $560 per ton. A winery selling its wine at $3.00 per bottle could barely afford to buy any grapes.

Comparing these grape costs with 1983 inflated grape prices reveals the range of affordable grape varieties. If historical price trends continue, then in 1983 (or year one of the investment horizon), grape prices will average $331 per ton for Labrusca, $435 for French-American hybrids, and $1,566 for Vinifera[17].

Accordingly, wineries selling their wines at $3.00 per bottle could not afford to buy any grapes; at $5.00 per bottle, the wineries could afford Labrusca and French-American hybrids; at $7.00 per bottle, the wineries (except perhaps the 100,000 gallon winery) could afford Vinifera grapes as well.

Now let us turn the discussion to wine pricing. Estimated 1983 wine prices are presented graphically in Table 9. Labrusca wine ranged in price from $2.50 to $5.00 per bottle, with a mean price of $3.75. With the market for Labrusca wines remaining at such low prices and yet hardly able to afford any grapes at this bottle price, small wineries specializing in Labrusca are in a marginally profitable business.

Putnam (1982) estimated that 79 percent of all grapes crushed for wine in New York State are Labrusca[18], a percentage that has not changed over the last ten years. On the wine pricing side, Cooper (1981) found that 60 percent of his surveyed wineries priced their wine in the $3.00 to $5.00 per bottle range ($3.36 to $5.60 per bottle in 1983 prices). If the above analysis is correct, these small wineries should face considerable financial difficulties.

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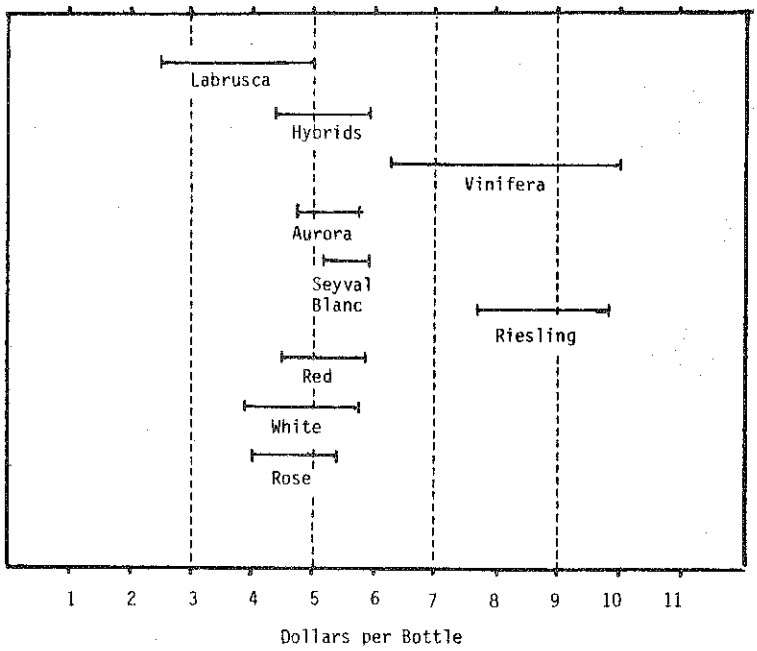
[16] Bottle prices are listed in the table at their retail value. The effect of market channel discounts upon return to vintner were included in the actual calculations of maximum affordable grape prices.

[17] As a vinifera price series was not available, this price was indexed at the same rate as for French-American hybrids. This indexing may have understated future Vinifera prices, however.

[18] Forty-five percent of these Labrusca grapes are Concords.

TABLE 9

Selected Retail Wine Price Ranges (1983 dollars)



SOURCE: Cooper (1981)

NOTE: The bottle prices used Cooper's 1981 prices and were indexed by a factor of $(5.80)^2$, the CPI index for table wine. The price range bars are two standard deviations in width. The vertical dashed lines mark bottle prices used in this study. The bottle prices are in year one (1983) dollars.

French-American grape wines have a mean price of $5.15 per bottle and a range of $4.43 to $5.87. Small wineries could afford to buy these grapes, sell it at the market rate, and expect to earn at least a 15 percent return to capital. Eighteen percent of all grapes crushed for wine in New York are these hybrids.

Vinifera grape wine prices have a mean of $8.79 per bottle and range from $7.75 to $9.83. Small wineries would be able to purchase Vinifera grapes and still achieve the 15 percent rate of return requirement. Vinifera grapes account for 3 percent of the grapes crushed for wine.

The above discussion has implicitly assumed that the supply and demand situations for wine and grapes will not change significantly to affect prices. The strength of this assumption is open to debate. As Putnam (1982:32) has aptly remarked, "The grapes used by New York's small winery sector are generally the ones that are already in short supply." Whether the collective demand of these small wineries for French-American hybrids and Vinifera grapes can bid up their prices, at least in the short-term, needs to be explored in further research.

3.6.4 Technological Risks

Wine quality can deteriorate due to errors, spillage, and climatic factors. It can also be deemed unacceptable if it is released before being aged properly. In fact, Finger Lakes wine consultant Beth Schwartz cautioned that losses of five to ten percent could be expected during the first few years of production[19]. Even after the winery has become established and its winemakers have gained considerable technical expertise, whole vats of wine or bottled wine could degenerate to the point where it must be dumped or recalled.

The economic cost of recalling a wine from the retailers' shelves could be less damaging than the action's psychological impact upon the wine makers. Vintners are loathe to publicize their mistakes and, consequently, run the risk of downgrading their reputation by leaving the damaged or immature wine on the shelves. "The green wine will come back to haunt you for the rest of your career," admonished winery owner Thomas Wykoff at a recent Eastern wine conference (1979:43).

3.6.5 Marketing Risks

It is commonly acknowledged that marketing, after production, remains the biggest risk a winery owner faces. Before the first bottle of wine is sold (in year two of the investment), approximately 80 percent of the capital assets have to be purchased and installed. Yet it takes the winery several more years of grape crushes and wine releases before it can develop a solid market for its products.

Sales downturns can be caused by several factors.

Direct Sales

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[19] Private communication.

Cooper noted that the type of tourist customer "may not be compatible with the quality of wine produced." A winery concentrating "... on small quantities of a limited range of varietal wines" selling at high prices may not attract or want to attract the typical bus load of tourists (Cooper:1981:16).

Retail Sales

Retail sales to liquor stores are constrained by the amount of available shelf space. This sets all the wineries competing against one another for this limited space. And even when a store agrees to carry a winery's label, the bottles may not be displayed in the most visible location (at eye level near prominent displays).

The competition for shelf space is even more ferocious in California, according to George Vare, wine industry investment and marketing consultant. He said in a recent newspaper interview that about a decade ago, when the selection of premium Napa Valley chardonnays numbered only about 15, retailers snapped up every small winery's label released. Today, that selection has expanded to about 60 premium chardonnays and Vare reports that these retailers cannot afford to carry all of them. They might decide to restrict their stock to 25 (Vare:1982).

The buying policy of retail stores in some areas can exhibit strong loyalty for wines produced locally over wines produced in other regions of the state. Chautauqua-based vintners have complained that store owners in Syracuse and Rochester, strongly aligned toward the Finger Lakes area, have been unreceptive toward their wines.

Wholesalers & Distributors

Sales to wholesalers and distributors turn increasingly difficult as certain grape types (like the French-American hybrids), not well known to the wine drinking public, become over-represented and saturate that segment of the wine market. "How many types of Cayuga White need I stock?" queried one New England-based distributor.

Vintner Eric Miller contrasted this marketing situation with that in California:

> One of the keys to the success of California wines has been their uniform high quality and consistency....In the East we have yet to standardize our major varietals. A selection of Seyval Blancs, for instance, might range from 0 to 3 percent residual sugar and each be termed "dry"....Such inconsistencies can be confusing. There are literally hundreds of eastern wine types on the market today, and the

> easier we make it for the consumer to know exactly what he is getting, the better our ultimate acceptance will be (1981:33).

Quantifying the risks inherent with marketing can follow a line of analysis similar to the discussion above on the effect of wine and grape price changes upon return on investment. Under a marketing risk scenerio, assume that because a label isn't moving off the retailers' shelves, the owners are forced to lower its price. Again using the 50,000 gallon winery and $600 per ton grapes as an example (Figure 5), a $7.00 bottle of wine reduced to $5.00 will cut the return to capital by 16 percent, to 20 percent from 36 percent.

3.6.6 Investor Risk & Return

Because wineries are very capital intensive and require substantial working capital up-front to help finance their development, acquiring sufficient equity capital can be as challenging and essential as producing a good, marketable product. If the winery principals are financially well endowed, capital requirements can be easily met, but commonly, outside sources are necessary. Just how profitable an investment in a winery is for an outside investor is the subject of the following analysis.

Most of the winery production scenarios described in this study generate substantial net operating losses, investment credits, and depreciation expense. An investor with relatively large sources of taxable income could become a limited partner and use these losses and credits to "write-off" or offset this taxable personal income.

In the following analysis, the investor was assumed to have $75,000 of annual income, after exemptions and deductions[20]. Also the winery manager's salary, before considered an after-tax opportunity cost, was now expensed for income and tax purposes.

The results indicated that, with the injection of outside capital and change in tax rates, the rate of return on the winery investment was increased by one to two percent per annum. This increment was almost constant across all winery sizes, as can be seen in Figure 8.

Apparently, the relatively large tax shield during the first few years of the investment, which has a high present value, offsets the disadvantage of increased tax liabilities

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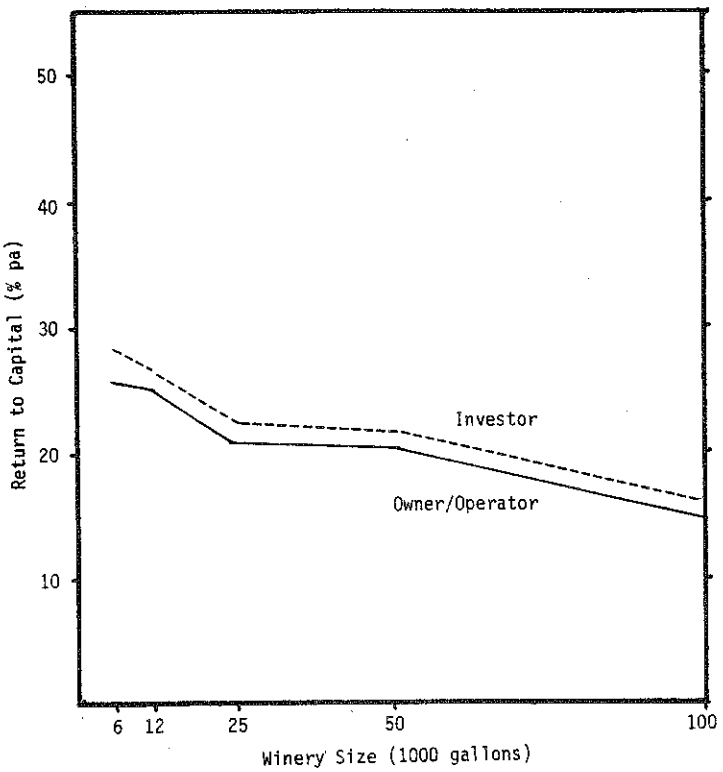
[20] The investor's income stream was inflated each year.

Figure 8: Effect of Winery Size on Return to Investor



ASSUMPTIONS: Grape price $600 per ton; bottle price $5.00;

in later years, which have lower present values. The magnitude of this increment reflects the net addition to the wineries' returns of the investor's income stream, less the increased expense for the manager's salary. Considering that the return to the investor remains above 20 percent per annum from the 6,000 through the 50,000 gallon capacity wineries, an investment in a smaller winery is relatively competitive with returns from a money market fund, albeit with different risk and liquidity characteristics.

Chapter IV

FINANCIAL ANALYSIS

4.1 DESCRIPTION OF PROCEDURES & ASSUMPTIONS

4.1.1 Background

The business of wine making is financially hazardous because extremely large net cash outflows are incurred to meet capital and operating expenditures during the first few years of operation while net cash inflows are not generated until several years later. The results of this study showed that net positive cash flows did not occur until year 3 to 5, depending upon grape and bottle prices, and that several additional years passed before these net positive cash flows attained significant magnitude to provide debt repayment ability (Section 3.3).

As noted in the introduction, an analysis was needed to identify the sources of constraints to expanded capital flows into small winery investments. Accordingly, one of the study's objectives was to present data on the ability of these small wineries to absorb and repay debt capital.

This chapter opens with a description of the financial procedures and assumptions needed to calculate the small wineries' maximum secured borrowing capacities. Next, these capacities --- given arrays of different bottle and grape prices, interest rates, and security guidelines --- are generated. This is followed by a discussion of current bank lending practices and concludes with a synopsis of the common constraints to expanded capital injections.

4.1.2 Procedures

Traditional methods to calculate debt carrying capacities based upon typical or average cash flows are not applicable to winery investment analysis because they fail to take into consideration the string of net operating losses incurred during the early years of the investment.

A more appropriate analysis was utilized which sought to answer the question: given, one, the cash flow pattern of rel-

atively heavy net outflows in the beginning years and heavy net inflows in later years and, two, security availability, how much debt could be carried which, on the one hand, could satisfy capital and operating needs and which, on the other hand, could be totally repaid within nine years? This nine year period of analysis ignored year ten and the revenue generated from winery disposition in year ten. Debt needs are defined as meeting, but not exceeding, capital asset purchases and operating expense requirements, including interest payments, and are constrained by available security. The inclusion of the security constraint was based upon meeting institutional lenders' typical security guidelines.

In this analysis, cash available for debt servicing was identical to after-tax cash flows because imputed costs for family living expenses were already subtracted from after-tax net income in the form of a manager/operator opportunity cost (Footnote 8). There were no existing interest or machinery replacement expenses. The tax deductibility of interest expense was ignored in these calculations because the existence of large net operating losses generally offset potential tax liabilities until late in the investment horizon and repayment period.

4.1.3 Assumptions

Major assumptions for the financial analysis were as follows:

1. The winery borrows the maximum amount of money available for, but not exceeding, capital asset and working capital requirements and debt repayment.

2. The lender would lend up to 75 percent of security value (appraised at original cost).

3. The lender extends the loan in multiples of thousands and the principal is repaid in thousands plus interest due.

4. The interest rate is 14 percent.

5. The loan is repaid with annual payments and at least interest payments must be met.

6. For contingencies, a cash balance of five percent of that year's cash expenses, including family living and taxes, is provided.

4.2 MAXIMUM SECURED BORROWING CAPACITY

The results of the wineries' secured borrowing capacities are presented below. Total investment capital requirements are defined as the nine year summation of equity and debt requirements to meet capital asset purchases and operating expenses.

4.2.1 Results

Table 10 is provided to illustrate the secured debt carrying computations. The example chosen represents the now familiar 50,000 gallon winery. This funds flow statement is divided into sources and uses of funds. Sources of funds are: cash from operations and available for debt service; cash from equity, providing the shortfall between cash from operations and maximum secured debt borrowing; and new debt. Funds are used to pay down debt and to retain a five percent cash contingency balance. Excess cash represents cash in excess of debt payments and contingency uses. The magnitude of this excess cash balance can indicate whether repayment capacity or security is limiting further financing.

In year three, for example, the winery had an annual cash deficit from operations of $20,239 and interest payments of $69,300. To meet this deficit, the winery was able to borrow a maximum of $37,000 of new debt made available by security on that year's new cooperage purchases. The cash short-fall had to be plugged by $58,539 of equity. These transactions left an annual net cash balances of $6,000 which, when added to year two's balance of $20,000, provided the 5 percent cash contingency balance required by this example's assumptions. There was no excess cash in year three.

The flow of debt service cash from winery operations was sufficient by year four to enable the winery to start paying down the accumulated principal on the loan. The debt was paid off by year six, well within the nine year repayment requirement. In total, about $575,000 of equity and $532,000 of debt were required to cover operating expenses and capital asset purchases. Accumulated excess cash balances were $2,938,146, an amount nearly three times the sum of equity and debt required to supplement cash from operations. With this winery scenario, the availability of adequate security, rather than repayment capacity, constrained further borrowing.

Total capital requirements were $203,000; $353,000; $686,000; $1.107 million; and $2.471 million for the respec-

TABLE 10

Maximum Secured Debt Borrowing: 50,000 Gallons

Year	Sources of Funds			Uses of Funds		
	Cash From Operations	Cash From Equity	New Debt	Debt Pmt	Contingency Cash Balance	Excess Cash
1	(832,622)	416,622	458,000	0	42,000	-
2	(94,593)	99,713	37,000	64,120	20,000	-
3	(20,239)	58,539	37,000	69,300	26,000	-
4	129,863	-	-	123,480	32,000	383
5	495,611	-	-	489,620	38,000	374
6	323,209	-	-	69,540	42,000	250,043
7	311,198	-	-	-	48,000	555,241
8	338,142	-	-	-	54,000	887,383
9	366,339	-	-	-	63,000	1,244,722
TOTAL		574,874	532,000			2,938,146

ASSUMPTIONS: Interest rate on borrowing 14%; grape price $600 per ton; and bottle price $5.00.

tive wineries[21].

Not surprisingly, the wineries with the largest total capital requirements were those selling their products at $3.00 per bottle. The larger net operating losses and interest payments required approximately 60 percent more investment capital to produce and sell wine at $3.00 as compared with $9.00 per bottle wine. Yet these wineries could not justify borrowing as much money as others selling at higher prices since low repayment capacity and lack of adequate security constrained additional borrowing. The largest secured debt carrying capacity was incurred by the wineries selling their wine at $5.00 per bottle because the need for debt capital, the availability of security, and sufficient repayment capacity were met[22]. The secured debt carrying capacities for these

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[21] This assumes $600 per ton grapes and $5.00 per bottle wine.

[22] Of course, if it were assumed that the wineries could bor-

wineries were $109,000; $200,000; $345,000; $532,000; and $978,000, respectively.

Figure 9 illustrates minimum percent equity. Minimum percent equity represents the capital shortfall for a winery investment after maximum feasible secured debt has been incurred. By definition, the greater the winery's ability to borrow funds (within the limits of the assumptions), the less the amount of owner's equity is required. Notice that minimum percent equity declines from the 6,000 gallon capacity winery, reaching the lowest minimum equity requirement of 43 percent at the 12,000 gallon winery. Thereafter, minimum percent equity increases and hits 50 percent at 25,000 gallons and 60 percent at 100,000 gallons.

In dollar amounts, equity requirements were $94,000; $153,000; $341,000; $575,000; and $1.493 million for the respective wineries. For every 1,000 gallon expansion in winery capacity, minimum equity requirements are increased 0.14 percentage points[23]. The probable causes for decreased minimum equity at the 12,000 gallon winery size are, one, paydown of principal is possible by year three and, two, comparatively small cash contingency balances were required.

In Figure 10, equity and debt per gallon of production are plotted. The dip in equity per gallon at the 12,000 gallon capacity is very noticeable. The lowest equity per gallon was attained at the 50,000 gallon winery size. Debt per gallon decreased throughout.

Years to loan payback did not vary significantly among winery sizes. In general, it required nine, six, five, and four years to repay maximum secured loans at $3.00, $5.00, $7.00, and $9.00 per bottle, respectively.

An analysis of the 50,000 gallon winery size was conducted to compare the effects of varying grape and bottle prices upon secured debt borrowing. Figure 11 presents minimum percent equity and Figure 12 displays equity and debt per gallon using grapes purchased at $600 per ton. While no debt repayment was possible at $3.00 per bottle, minimum equity and equity and debt per gallon remained somewhat static from $5.00 to $9.00 per bottle.

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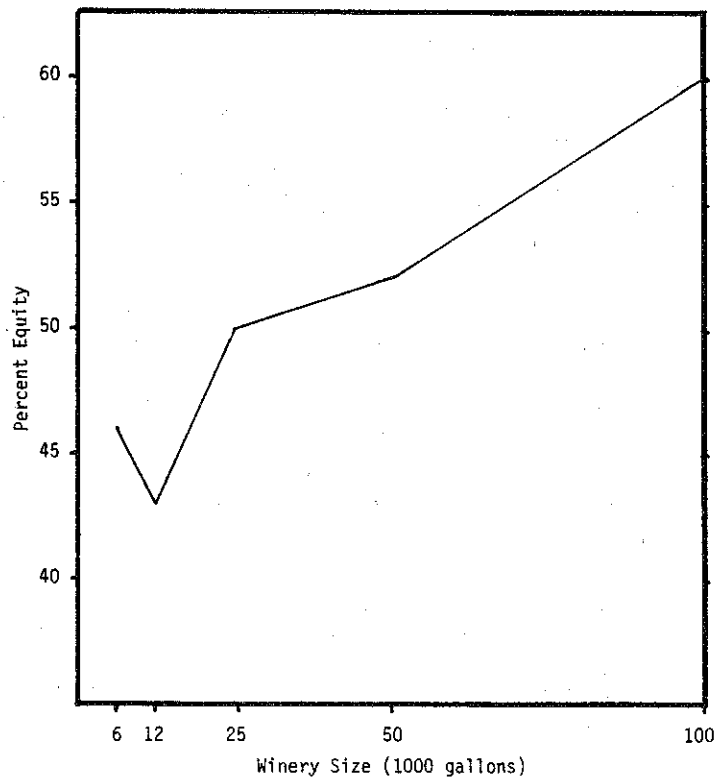
row beyond their actual cash needs, those wineries selling their wine at $9.00 per bottle would have attained the largest maximum debt carrying capacity because they are comparatively more profitable enterprises.

[23] This calculation excluded the data from the 12,000 gallon winery. The coefficient of determination was 99 percent.

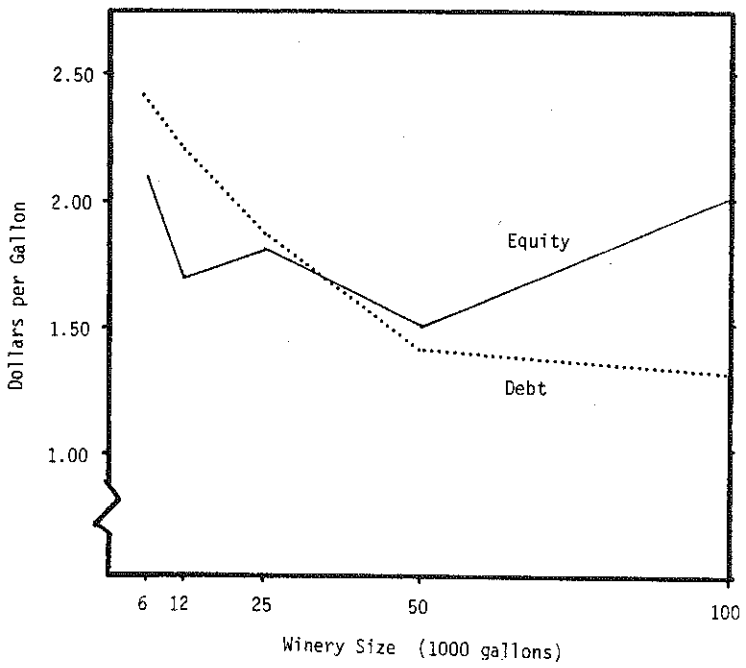
Figure 9: Minimum Percent Equity by Winery Size



ASSUMPTIONS: Grape price $600 per ton; bottle price $5.00.

The largest secured debt borrowing capacity was attained at $7.00 per bottle. At $9.00 per bottle, cash generated by the winery supported many capital purchases and working capital requirements and, hence, less debt was needed. Years to loan payback were nine years at $3.00, six at $5.00, five at $7.00, and four years at $9.00 per bottle.

Figure 10: Equity & Debt per Gallon by Winery Size



ASSUMPTION: Grape price $600 per ton; and bottle price $5.00.

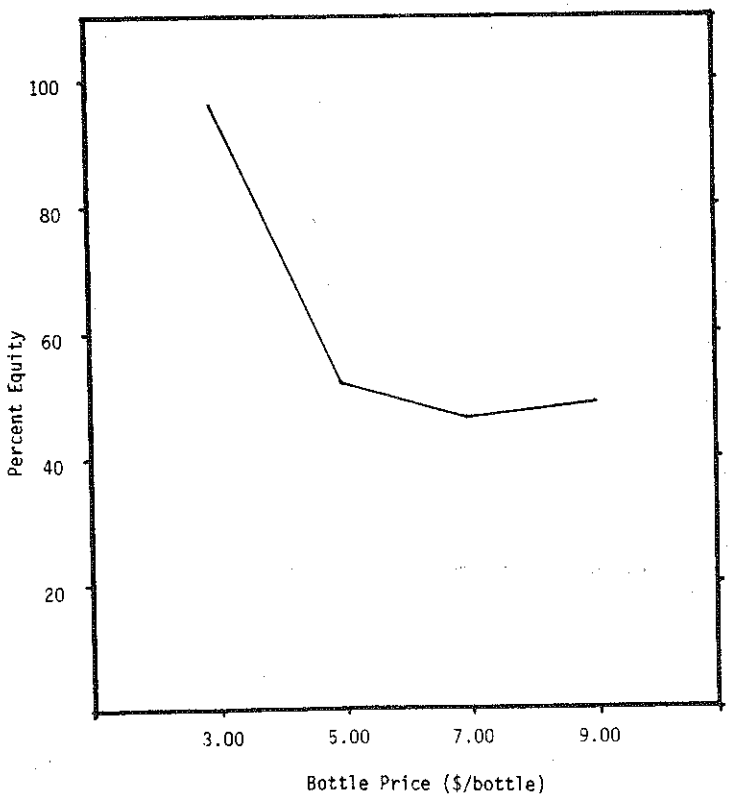
4.2.2 Sensitivity Analysis

Two analyses were conducted to observe the sensitivity of secured borrowing to changes in interest rates and security guidelines, keeping winery capacity, bottle price, and grape cost constant. Both analyses used the 50,000 gallon winery, $600 per ton for grapes, and $5.00 per bottle assumptions.

In the first analysis, the interest rate charged for loans was increased from 14 percent, the original assumption, to 16 and 18 percent. With each two percentage point change in the interest rate, total investment capital requirements were increased a negligible 2 percent, with this increment supported entirely by increased minimum equity. Debt requirements were not affected. Years to loan payback continued to be six years.

In the second analysis, security guidelines were varied from a conservative 50 percent to a liberal 100 percent of se-

Figure 11: Minimum Percent Equity: 50,000 Gallons

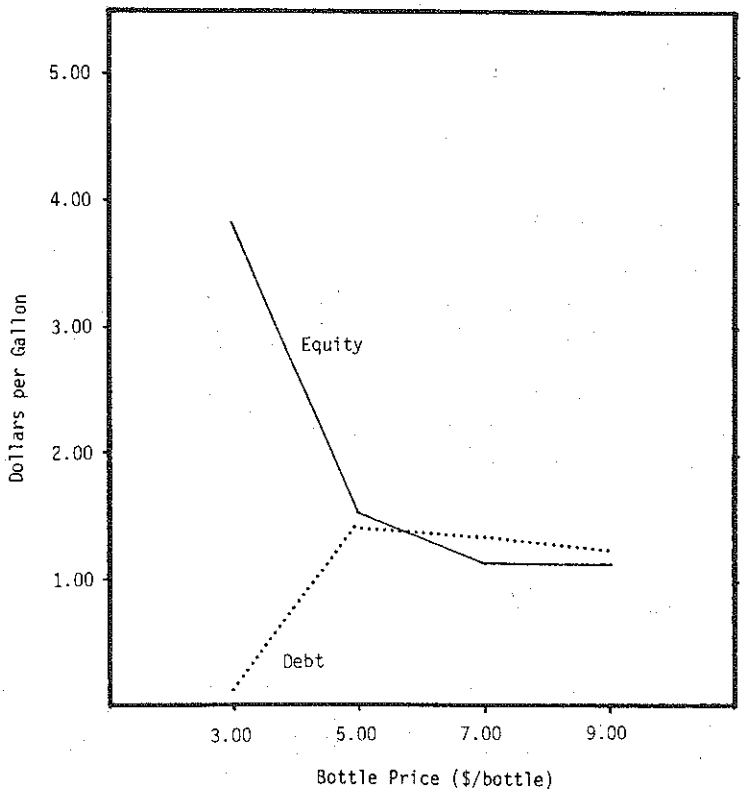


ASSUMPTION: Grape price $600 per ton.

curity value. Decreasing the guideline to 50 percent from 75 percent, the original assumption, cut the secured debt borrowing capacity by 33 percent, to $354,000 from $532,000, and increased minimum equity requirements to 67 percent from 52 percent. Years to loan payback were shortened by one year, to 5 from 6 years.

Increasing the guideline to 100 percent of security value had the exact opposite effect: maximum secured debt borrowing capacity increased 33 percent, to $709,000, and minimum percent equity dropped to 38 percent. Years to loan payback increased one year to seven years. Based upon these results, the availability of security, rather than repayment capacity, is a major factor in winery debt management.

Figure 12: Equity & Debt per Gallon: 50,000 Gallons



ASSUMPTION: Grape price $600 per ton.

4.3 SOURCES OF CAPITAL

In this section, sources of capital for winery financing are described and evaluated. Capital sources include: owner's equity, commercial banks, Farm Credit Banks, Farmers Home Administration, investment bankers and venture capitalists, foreign investors, corporations, insurance companies, and the Small Business Administration.

4.3.1 Owner's Equity

If available in sufficient and timely amounts, the best source of equity is that provided by the vintner/owner himself, because it grants the vintner maximum control over the business, requires no interest payment, and provides a margin of error in that credit can be obtained in short order. The next best source is a partner/acquaintance who shares the vintner's sense of commitment.

4.3.2 Commercial Banks

Commercial banks are important sources of capital for wineries. They can offer short, intermediate, and long term financing at both variable and fixed rates. Loans can be secured by real estate, equipment, and, in some cases, by wine inventory (bulk and bottled) and accounts receivables. A discussion of bank financing policy vis à vis winery development is presented in Section 4.4.

4.3.3 Farm Credit Banks

Major lenders to agriculture, the banks of the Farm Credit System can supply short and intermediate term credit through the Production Credit Associations (PCA) and long term credit through the Federal Land Banks (FLB). To be eligible for Farm Credit loans, the vintner must control at least 50 percent of his grape supply. Thus, wineries without attached vineyards are not eligible.

Farm Credit financing has three significant advantages. One, the banks are firmly committed to lending to agricultural enterprises. Two, because the banks' interest rates are based upon the average cost of their funds, in periods of rising interest rates, the interest charged on their loans can be lower than rates charged by other lending institutions. Three, the PCAs in California have considerable experience with handling loans for winery development[24]. More will be said about this in Section 4.4.

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[24] This fact is not much help to New York vintners as that State's PCAs have comparatively less experience with winery financing.

4.3.4 Farmers Home Administration

To be eligible for loans from the Farmers Home Administration, the enterprise must generate at least half of its gross income from agricultural production and have been denied credit from commercial sources. Being classified as food processors rather than as agricultural producers, wineries must apply for non-farm enterprise loans. These loans, and other Farmers Home insured loans, are available up to $200,000 for real estate and $100,000 for short and intermediate term financing.

To date in New York, about a half dozen insured loans have been granted to vineyard/winery enterprises, according to Farm Program Chief, Paul Dendis[25]. Dendis' counterpart in California, Barrel Zerger, reported that Farmers Home is currently financing about one percent of the wine grape acreage and about 2 to 3 percent of the State's farmers (out of a total of 4,000 to 5,000 farmers). About 50 of their loans are to wine grape growers and Zerger estimates that, of these growers, only "a few" have attached winery operations. The bottom line is that the Farmers Home Administration has very limited experience with loans to wineries.

4.3.5 Investment Bankers & Venture Capitalists

Barr (1981) and Wykoff (1979) advise against relying upon financing from investment bankers and venture capitalists because both groups seek high rates of return on their investments and often lack commitment. Further, investment bankers and venture capitalists tend to be impatient and, after putting their money in up-front, "... want to see the kicker in four or five years" (Barr:1981:164).

4.3.6 Foreign Investors

Hugh Smith, a wine consultant from a California-based firm with the same name, considers foreign investors and major domestic corporations as the two largest forces on the winery investment horizon today[26]. Foreign investors are attracted

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[25] Private Communication.

[26] The size of foreign investment in California wineries is almost staggering. Within the past several years, they have invested about $125 million, according to Business Week (1980:48), in these wineries. Investors include such reputable firms as Piper Heidsieck, Baron Philippe de Roth-

to invest in wineries attached to substantial vineyards, explained Smith, because these investments enable them to control large amounts of assets, particularly land. "Europeans consider the United States as the last stronghold of private ownership" where the value of wealth is well protected and fear of expropriation (or nationalisation) of their holdings is remote[27]. An article in Business Week offers another explanation:

> French vintners, beset by chronic shortages, of top-quality grapes and stiff price competition in the U.S. from Italian imports, are also seeking access to California grapes (1980:48).

Barr does not consider foreign investors as a good source of capital for most small wineries because, one, they prefer to deal with large investments financially beyond the scope of the typical small winery and, two, it may take a long time to consumate any deal (1981:164).

4.3.7 Corporations

According to Smith, the corporations investing in wineries are very large food products corporations desiring to add a wine line. Barr rates the motives and degree of commitment of these corporations toward winery investment as ill-matched because corporations generally seek steady streams of earnings which, at winery start-up, are not there. Further, they want to control the venture and typically are interested only in large-sized investments (Barr:1981:165).

4.3.8 Insurance Companies

Insurance companies are a viable source of capital, but tend to be primarily interested in loan amounts of a million dollars or more (Fitch:1981:171-172).

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eschild, Moet Hennessey, Suntory Distillers of Japan, as well as German and Thai concerns (Newsweek: 1980:59).

[27] Private communication.

4.3.9 Guarantees

While not a source of funds per se, various guarantee arrangements can facilitate the extension of credit by providing an equity-type substitute. Acceptable guarantees by the winery owner or partner/acquaintance are stocks or other assets with a high degree of liquidity. For the devlopment of a winery unattached to a vineyard or to an established farm enterprise, guarantees are almost essential.

The Small Business Administration can guarantee as much as 98 percent of a loan up to $500,000. To date, the New York Small Business Administration has had no experience with guaranteeing loans for wineries and has participated in only one vineyard loan. The Farmers Home Administration can guarantee between 80 and 90 percent of a loan up to $300,000 for real estate and $200,000 for personal property. It has not extended any guaranteed loans to winery/vineyards in either New York or California.

4.4 CURRENT LENDING PRACTICES

This discussion is based upon telephone surveys conducted with managers of leading financial institutions currently lending to the small winery sector[28]. Numbering about a half dozen lending institutions in total (4 in California and 2 in New York), the survey includes the majority of the institutions involved with lending and is indicative of the fact that lending to this sector is relatively concentrated.

The discussion draws heavily upon the policies and practices of the surveyed Californian banks as the New York banks generally lack sufficent lending experiences with winery lending. At the time of the survey, one of the two New York-based banks had only three winery loans outstanding, with the oldest about six years old. The other bank was negotiating its first winery loan.

A description of lending guidelines, terms, and eligible security is provided for each of three categories of lending: operating, intermediate, and long term[29]. This is followed by

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[28] The managers were: Andrew Johnson, Bank of America (St. Helena); John Rerecich, PCA (North Bay); Jeff Kanter, PCA (St. Helena); Perry Tef, Wells Fargo (San Francisco); Larry Ledgerwood, PCA & FLB (Waterloo, NY); and Fred Lewis, First National Bank of Ovid (Ovid, NY). Their time and consideration were greatly appreciated.

[29] Leasing is outside the scope of this study and readers in-

a brief analysis of common lending scenerios and of foreclosure trends.

4.4.1 Operating Credit

Operating or seasonal lines of credit are extended to support expenses incurred at grape crush (particularly grape purchases), bottling, inventory accumulation, and accounts receivable. Unlike "typical" business inventories which turn-over on an annual basis, wine aging can extend the inventory turn-over cycle to two or three years or more. Nonetheless, it is still financed with an annual line of credit.

Advance ratios with winery inventory as collateral range to a maximum of 50 to 60 percent of inventory value, generally appraised at the lower of cost or market. Not only do these guidelines fluctuate among lending institutions, but they also fluctuate due to the reputation or financial strength of the winery, with the more conservative valuations applied against wineries lacking established marketing records or sustained profitability. Hence, wine inventory as collateral is not a likely option for the developing winery.

While inventory valuation based upon cost is easily obtainable from winery records, estimation of market values can vary considerably. Current appraised bulk wine values, as determined by the lender survey, ranged from $1.00 to $6.00 per gallon, or $0.50 to $3.60 maximum loan per gallon. These prices will probably increase with the 1982 crushing season. Citing the lack of an established bulk market or system of brokers, the New York-based banks valued bulk inventory at $1.00 per gallon, definitely at distressed sale prices.

Market value appraisals for bottled inventory ranged from $1.00 to $10.00 per gallon ($0.50 to $6.00 loanable value). In California current bottled wine prices are $1.00 to $2.00 per gallon for generics and $5.00 to $10.00 per gallon for varietals. One bank uses a composite price based upon net average case return to the winery.

In New York the bottled inventory is appraised at cost. For bottled inventory to be acceptable as security, it must be produced by a well established and not the developing winery. Added consideration is given to variety, size of inventory, and winery reputation.

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terested in a good discussion of lease-versus-buy decisions should consult Barr (1981).

To illustrate how conservatively valued these appraisals are, a comparison with current retail prices is in order. The typical bottle of California premium cabernet sauvignon retails for $10.00 to $15.00 or $50.00 to $75.00 per gallon. Thus security appraisals are only 10 to 13 percent of the wine's retail value.

Several banks in California accepted accounts receivable as collateral. These loans are limited to a maximum of 65 to 80 percent of value. Acceptable accounts are defined as those for wine already accepted by the buyer.

4.4.2 Intermediate Credit

For intermediate credit, maximum lending guidelines are from 50 to 70 percent of the value of the collateral, which is usually equipment. The terms are from 3 to 7 years to repay with longer terms available for the purchase of heavier equipment, like bottling lines and tanks. Interest rates can be fixed or variable.

4.4.3 Long Term Credit

Long term credit is limited to a maximum of 55 to 80 percent of the value of the buildings and real estate. One lender preferred to tie up all the equipment and tanks with the winery building in order to have a security interest over the whole productive unit rather than over just the "shell" of the building. The loan terms ranged from 15 to 25 years, sometimes coupled with call provisions, at fixed or variable rates.

4.4.4 Common Lending Scenerios

Andrew Johnson, manager of the St. Helena office of Bank of America, noted four prerequisites for a successful lending situation: a good winemaker, a reliable manager, experienced winery owners, and extra sources of equity capital for contingencies. He stressed the importance of thoroughly probing the financial status of the potential winery borrower because "... once you get started with one, you're married to it"[30].

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[30] Private communication.

Lending to develop a winery attached to a producing vineyard controlled by the winery principals is the least risky scenerio because excess grape sales generate income for debt servicing and the established vineyard provides security. If the vineyard is in good shape and the borrower has sufficient equity, then loan repayment is only at risk between the time when the vineyard loses revenue by re-routing grapes to the winery and when wine sales generate income. This break in cash flow can last from one to several years.

A common lending practice, given good equity and a productive vineyard, is to cover the winery development with intermediate term financing from the PCA[31]. This can be coupled with an interest only provision in the early years when cash flows are negative or insufficient.

If the winery continues to develop successfully, the FLB or an insurance company can "take-out" or refinance the PCA debt, usually with a balloon payment. The resulting mortgage is amortized over twenty to twenty-five years. The vintner gains by the longer terms and generally lower interest rates on real estate loans. Mike Fitch, an officer with Wells Fargo, reported that a commitment for the take-out loan can be made at the outset before the development of the vineyard/winery (1981:172).

The FLB does not normally make development loans because, as Jeff Kanter (manager of the St. Helena office of the PCA) explained, "The FLB likes to look at history, not at projections"[32]. The role of the PCA is to help get the business established.

Besides the take-out loan, a vineyard/winery can be financed with a "swing" loan, another Californian bank parlance. This loan is appropriate in situations in which the borrower is interested in acquiring a vineyard (or additional acreage for expansion) but does not have enough cash to meet the down payment. The PCA would provide one hundred percent financing with the understanding that later, the borrower will sell existing property or has a note coming due that can be used to pay down the loan, possibly with a balloon payment. In a sense, it is a form of temporary financing which then "swings" over to equity. Kanter reports that swing loans were popular for vineyard purchases, rarely for winery financing, when the real estate market was strong. Now property sales seldom "cash-out", with the original lender getting paper instead of cash.

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[31] It is less likely that commercial banks could finance a winery development.

[32] Private communication.

Lending for the development of both the winery and vineyard is very risky and not very common because, one, capital requirements are doubled and, two, the time lag between planting and wine sales is significantly increased. Lenders would require substantial outside guarantees.

If capital is limited, then Robert Trinchero of Sutter Home Winery in California advises to start with the winery and buy all the grapes.

> I have seen too many people start with a vineyard and run out of money before they were ready to sell the wine (1981:142).

One reason why people would run out of money before the winery was ready to produce wine is because, at current wine-grape supply and demand conditions, it is cheaper to buy many varieties of grapes than it is to grow them[33]. Another reason is the long time lag of between four and a half to seven years from planting to wine sales.

Financing the start-up of a winery without vineyards is potentially constrained for several reasons. One, without equity provided by the vineyards, bankers would require considerable outside guarantees. Two, repayment capacity is jeopardized or limited because there are no sales of excess grapes providing cash. Three, the number of potential lenders is limited. Wineries and winery/vineyard enterprises that produce less than 50 percent of their grapes used for wine making are ineligible for Farm Credit financing. With adequate up-front equity and with demonstratable progress, debt capital could become an option later in the investment horizon, but not for winery start-up.

4.4.5 Defaults & Foreclosures

None of the bank officers interviewed reported (or admitted) any winery account defaults or foreclosures. The absence of actual defaults does not mean that there are no problem loans, only that neither bankers nor vintner borrowers like to publicize their difficulties. "People would rather commit suicide than admit business failure," said Brian Pendleton, owner of a financially troubled winery in San Jose. "People are smiling right up until they go bankrupt" (1982:D3). In light of today's gloomy economic situation, pessimistic outlooks characterize many other industries as well. Dun and

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[33] Gerald White, Department of Agricultural Economics, Cornell University (private communication) and New York State Wine Grape Growers, Inc. (1982).

Bradstreet reported, for example, that the rate of business failures, already running 43 percent ahead of the previous year, hit a 50 year high during the last week of October, 1982 (Dun & Bradstreet:1982).

Several articles proclaiming the arrival of sour times for Californian small premium wineries have begun to appear in the press. Nonetheless, the extent of this current financial instability amongst Californian premium wineries is difficult to measure owing to wide-ranging and often conflicting estimates.

Andrew Johnson refutes rumors of spreading gloom amongst the State's vintners[34]. Jack Daniels, consultant with the marketing concern Wilson Daniels of St. Helena, estimated that at least 20 wineries are currently for sale as a result of economic and financial difficulties (1982:C1). George Vare is more pessimistic. He counted a dozen wineries in "critical shape", with about 40 more seeking out "financial assistance, in one form or another" (1982:D3).

New York bankers and small premium winery watchers report an approaching shake out of a few wineries, but no ominous trends.

The bottom line is that, while hard times may lie ahead for some wineries, the majority of these cases are reorganizations and changes of ownership rather than foreclosures and permanent closings. As a result, no solid data on loan defaults are available.

4.5 CONSTRAINTS

4.5.1 Financial Risk

Wine making is a financially hazardous business because comparatively large net cash outflows to meet capital and operating expenditures are incurred during the first few years, while net cash inflows are not achieved until several years later. Trying to accomodate with debt this long cash payback lag, adds greatly to the financial risk and complexity of winery management.

Because of these risks, bankers are hesitant to lend to a developing winery, unless substantial guarantees are offered. Even with a large injection of debt capital, substantial equity is still needed up-front to cover capital costs and repayment obligations.

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[34] Private communication.

4.5.2 Inadequate Capitalization

The diseconomies of size in winery investment results in double jeopardy for winery owners. The larger the size of the winery, the greater the capital needs, but also the smaller the debt carrying capacity as a percentage of total capital (equity and debt). A 50,000 or 100,000 gallon winery may require 0.8 to 1.6 million dollars in total capital outlays, and yet be eligible to borrow up to only 40 or 50 percent of that outlay versus 50 to 60 percent at smaller capacities.

4.5.3 Supply of Outside Capital

The field of potential capital suppliers to the small winery industry is limited to a half dozen lenders. This number is reduced further for vintners who, operating without attached vineyards, are ineligible for Farm Credit and Farmers Home Administration loans. Further, knowledgeable wine industry persons do not recommend arranging financial agreements with investment bankers, venture capitalists, or foreign investors.

The Farm Credit banks, especially the PCA, have been instrumental in extending short and intermediate term financing to developing vineyard/wineries. If the venture is successful, these loans later can be refinanced with FLB long term debt, to the advantage of the vintner who gains from the lower interest rates and longer maturities. Without the PCA to act as a financial catalyst at winery start-up, securing debt capital at the front end is doubtful. The Small Business Administration and Farmers Home Administration, both sources for loan guarantees, have little to no experience with winery lending.

4.5.4 Lender Inexperience

The degree of previous experience and knowledge of the winery industry is an important determinant to the flow of debt capital to the industry. Most New York lenders lack experience in lending to wineries and thus approach loan requests with conservatism.

4.5.5 The Resale Market

The East Coast lacks an established and dependable resale market or system of brokers to handle bulk and bottled wine. This situation has contributed toward the use of comparatively conservative appraisal values on security currently used by area bankers.

Chapter V

CONCLUSIONS

5.1 CONCLUSIONS

Based upon the results of this study, the following conclusions are presented.

5.1.1 Winery Investment Outlook

Given the above assumptions, an investment in a small premium winery can yield a respectible rate of return. That is, provided the vintner can sell his wine for more than $5.00 per bottle, he can expect at least a 15 percent return on investment over a reasonable range of grape prices and winery sizes. However, consideration of liquidity and risk, both major factors in winery financing, should be included in the selection of adequate investment rate of return benchmarks.

The small winery investment can be equally attractive for the outside investor. Assuming that this investor (an owner but not an operator) has an income of $75,000 or more, after deductions, the change in tax rates and net operating loss carry forwards produced by the winery, can boost the investment's IRR by two percentage points.

5.1.2 Decreasing Returns to Size

Winery IRR's are very sensitive to market channel distributions. Given the assumptions of this study, the larger the size of the winery, the lower its IRR due to depressed marketing margins eroding the return to capital. For the typical New York State small premium winery, crucial top dollar sales become progressively diluted as proportionately less wine gets marketed direct or to retailers. The "lost margin" factor overwhelms consideration of the economic benefits of expanded capacity, namely, economies of size (declining capital asset cost per gallon and decreased average cost per bottle). Studies which fail to incorporate the effect of capacity and the mix of marketing channels upon winery rate of return lead to inaccurate predictions of size and profitability.

This conclusion does not deny the possibility of increased profitability at larger sizes. Increasing the proportion of direct sales as a percentage of total sales or the length of the investment horizon can reverse the diseconomies of scale.

5.1.3 Risk

Concommitant with increased absolute returns at larger winery sizes is expanded investment risk. The major risks associated with the winery investment are, one, comparatively large cash expenses up front and, two, long payback lags (on a discounted basis) of at least seven years. This lag can stretch even longer given technical or marketing problems or purchase of more expensive equipment.

5.1.4 Capital Gains

Using proxies to gloss over the lack of any winery market value trends, the results indicated that if the vintner can tough-out long years of net operating losses, capital asset appreciation and/or goodwill can provide a substantial pot of gold at the end of the investment horizon, ceteris paribus. The problem is, the possibility of living poor and dying rich may provide enough of a financial raison d'etre for the romantic, but rarely for the pragmatist.

The winery investment's IRR can be enriched by as much as four percentage points per annum if the investor can expect with certainty to double his money at winery disposition. However, the present wave of winery failures may transform this distant equity kicker into a mere mirage.

5.1.5 Comparative Profitability of Wine Types

The decline in relative profitability with winery capacity influences the selection of wine types. If historical trends continue in grape and wine price increases, the smaller-sized wineries are able to produce and sell at lower cost the more expensive Vinifera grape wines. No winery could afford to purchase any type of quality grapes when selling the wine at $3.00 per bottle. Since Labrusca-grape wines sell around this price, their production is marginally profitable.

5.1.6 Maximum Secured Loanable Amount

Financing winery development by institutional lenders is generally constrained by the amount of collateral available and the security guidelines, rather than by low repayment capacity. This holds true at all but the lowest bottle prices. A 25 percent expansion in the security guidelines increases by 33 percent maximum loanable amount.

Other constraints to expanded capital flows into the small winery sector are, one, the limited number of potential lenders permitted to fund winery enterprises without attached vineyards; two, lack of lender experience with winery loans; three, cash payback lag; four, inadequate capitalization; and five, a weak resale market for bulk and bottled wine.

Wineries in the 6,000 to 25,000 gallon capacity levels can borrow and repay up to 50 percent of total capital and operating needs, given a 75 percent security guideline and interest only provisions at the start-up. Larger wineries can handle up to 40 percent debt. Thus, the larger the winery, the greater the capital needs but the less, as a percentage of debt/capital requirements, the ability to borrow.

Appendix A

CAPITAL ASSET ACCOUNTS

A.1 6,000 GALLON WINERY

1. EQUIPMENT COMPLEMENT

Name	Capacity and Description	Amount
1.1 Receiving Equipment		
Receiving Hopper	not needed for hand picked grapes	-
Crusher Stemmer	1.6 T/hr. Bosello Mini Mecv;SCOTT	1,560
Holding Tank	not critical at this stage	-
Press	mobil hydraulic basket press; 184 G capacity; WINE AND THE PEOPLE	3,000
Must Pump	not needed at this stage	-
Must Lines	not needed at this stage	-
Scales		1,000
		$5,560
1.2 Cellar Equipment		
Filter	years 1-3 commercial filter;PIWC	300
	year 3 plate and frame, Schenk Capitan filter; 16"x16", 10 pads; SCOTT	4,000
Centrifugal Pump	used stainless steel dairy supply, 20 psi	1,000
Transfer Lines	clear food grade plastic 1 1/2" @ $2/ft., 100' (replace every 3 years)	200
Fittings	miscellaneous	500
Open Fermentation Vat	used 250 G @ $2/G	500
		$6,500

ABBREVIATIONS: T=tons and G=gallons.

Name	Capacity and Description	Amount
1.3 Refrigeration		
Tank	used dairy tank 300 G, 3 horse-power condensor plus installation	1,500
Glycol	food grade @ $5.13/G, 50 G	257
Hose	PVC 1 1/2" @ 0.2119/ft., 75' PVC 2" @ 0.2919/ft., 75'	16 22
Pump	1 horsepower	200
Fittings	miscellaneous PVC	25
Controls	controls plus installation	200
		$2,220
1.4 Bottling (assumes manual system 150 cases/day capacity)		
Filler	4 spout siphon; FLOWER CITY	210
Corker	manual; PIWC	75
Bottle Rinser	uses existing sink and steam source	150
Labeler	manual	200
Foil Spinner	manual	600
		$1,235
1.5 Office Equipment and Sales Room Furnishing		
Equipment	miscellaneous	$2,000
1.6 Materials Handling		
Hand Pallet Truck		500
Hand Cart		600
		$1,100
1.7 Laboratory		
Equipment	miscellaneous	$2,000
1.8 Motor Vehicles		
Truck		$7,000
1.9 Miscellaneous Supplies		$1,000

2. COOPERAGE

Year	Quantity	Size (G)	Cost ($/G)	Total $
2.1 Stainless Steel Tanks				
1	3 refrigerated	500	4.72	7,080
	1 holding tank	500	4.35	2,175
	transportation	-	-	350
				$9,605
2	1 refrigerated	1,000	3.63	3,630
	1 holding tank	1,000	3.25	3,250
	transportation	-	-	350
				$7,230
3	1 refrigerated	500	4.72	2,360
	1 refrigerated	1,000	3.63	3,630
	1 holding tank	500	4.35	2,175
	transportation	-	-	350
				$8,515
4	1 refrigerated	1,000	3.63	3,630
	transportation	-	-	350
				$3,980

Year	G/year	Barrels	G	$/Barrel	Total $
2.2 Oak Casks (estimates from OAK BARREL WINECRAFT)					
1-9 American	281	6	50	180	1,080
1-9 European (except year 5)	94	2	60	290	580
					$1,660/yr

3. BUILDINGS

Square Feet	$/ft^2	Total Cost
3.1 Winery		
2,000	40.75	$81,800

4. LAND

Acres	$/Acre	Total Cost
1	1,500	$1,500

A.2 12,000 GALLON WINERY

1. EQUIPMENT COMPLEMENT

Name	Capacity and Description	Amount
1.1 Receiving Equipment		
Receiving Hopper	not needed for hand picked grapes	-
Crusher Stemmer	4-5 T/hr.; stainless steel	4,300
Holding Tank	used; conical bottom tank ($500) and installation ($250)	750
Press	horizontal 500 liter; ZAMBELLI	8,000
Must Pump	piston, 3" bore, 6,000 T/hr.	5,000
Must Lines	3" reinforced food grade plastic @ $4/ft., 50'	200
Scales		2,500
		$20,750
1.2 Cellar Equipment		
Agitator	Guth with stainless steel "T" fitting; SCOTT	1,200
Fittings	Miscellaneous	1,000
Filter	Velo Model 2; SCOTT	5,000
Filter	plated frame Schenk capitan 16"x16" 20 pads; SCOTT	4,500
2 Centrifugal Pumps	used stainless steel dairy supply, 20 psi	2,000
Transfer Lines	clear food grade plastic 1 1/2" @ $2/ft., 160', (replace every 3 years)	320
Barrel Rinser	Gasquet Simplex model; SCOTT	545
		$14,565

ABBREVIATIONS: T=tons and G=gallons.

Name	Capacity and Description	Amount
1.3 Refrigeration		
Tank	used dairy tank 300 G, 3 horse-power condensor plus installation	1,500
Glycol	food grade @ $5.13/G, 50 G	257
Hose	PVC 1 1/2" @ 0.2119/ft., 75' PVC 2" @ 0.2919/ft., 75'	16 22
Pump	1 horsepower	200
Fittings	miscellaneous PVC	25
Controls	controls plus installation	200
		$2,220
1.4 Bottling (assumes manual system 200 cases/day capacity)		
Filler	siphon 8 spout	425
Corker	manual; PIWC	75
Bottle Rinser	uses existing sink and steam source	150
Labeler	manual	200
Foil Spinner		600
		$1,450
1.5 Office Equipment and Sales Room Furnishing		
Equipment	miscellaneous	$4,000
1.6 Materials Handling		
Hand Pallet Truck		500
Fork Lift	rental 3 months @ $400/month	1,200
Hand Cart		100
		$1,800
1.7 Laboratory		
Equipment	miscellaneous	$2,000
1.8 Motor Vehicles		
Truck		7,000
Car		7,000
		$14,000
1.9 Miscellaneous Supplies		$2,000

2. COOPERAGE

Year	Quantity	Size (G)	Cost ($/G)	Total $
2.1 Stainless Steel Tanks				
1	3 refrigerated	500	4.72	7,080
	1 refrigerated	1,000	3.63	3,630
	1 holding tank	500	4.35	2,175
	1 holding tank	1,000	3.25	3,250
	transportation	-	-	350
				$16,485
2	1 refrigerated	2,000	2.67	5,340
	1 holding tank	2,000	2.15	4,300
	transportation	-	-	350
				$4,650
3	1 refrigerated	1,000	3.63	3,630
	1 holding tank	2,000	2.67	5,340
	transportation	-	-	350
				$9,320
4	1 refrigerated	1,000	3.63	3,630
	1 refrigerated	2,000	2.67	5,340
	transportation	-	-	350
				$9,320

2.2 Oak Casks (estimates from OAK BARREL WINECRAFT)

Year	G/year	Barrels	G	$/Barrel	Total $
1-9 American	563	11	50	180	1,980
1-9 European (except year 5)	187	3	60	290	870
					$2,850/yr.

3. BUILDINGS

Square Feet	$/ft^2	Total Cost
3.1 Winery		
4,000	40.75	$163,000

4. LAND

Acres	$/Acre	Total Cost
2	1,500	$3,000

A.3 25,000 GALLON WINERY

1. EQUIPMENT COMPLEMENT

Name	Capacity and Description	Amount
1.1 Receiving Equipment		
Receiving Hopper	1 T capacity, 6T/hr.	1,200
Crusher Stemmer	4-5 T/hr. stainless steel	4,300
Holding Tank	used conical bottom tank ($500) plus installation ($250)	750
Press	2200 liter, Vasline press; BUDDE & WESTERMANN	17,000
Must Pump	piston 3" bore, 6,000 T/hr.	5,000
Must Lines	3" reinforced food grade plastic @ $4/ft., 50'	200
Scales		2,500
		$30,950
1.2 Cellar Equipment		
Agitator	Guth with stainless steel "T" fitting; SCOTT	1,200
Fittings	miscellaneous	2,500
Transfer Lines	clear food grade plastic 1 1/2" @ $2/ft., 250', (replace every 3 years)	500
Barrel Rinser	Gasquet Simplex model; SCOTT	545
Filter	plate & frame; Schenk Capitan 16" x 16", 20 pads; SCOTT	4,500
Filter	Velo Model 2; SCOTT	5,000
2 Centrifugal Pumps	used stainless steel, dairy supply 20 psi	2,000
		$16,245

ABBREVIATIONS: T=tons and G=gallons.

Name	Capacity and Description	Amount
1.3 Refrigeration		
Tank	used dairy tank 300 G	300
Controls	controls plus installation	200
Chiller	Chiller ($6000) plus installation ($1500)	7,500
Pump	1 horsepower	200
2 Condensing Units	each 5 horsepower, Coplematic units ($6000), plus installation ($1500)	7,500
Hose	PVC 2" @ 0.2919, 150' PVC 3" @ 0.6006, 150'	44 90
Fittings	miscellaneous PVC	50
Glycol	food grade @ $5.13/G, 100 G	513
		$16,397
1.4 Bottling (assumes mixed system 600 cases/day capacity)		
Filler	FJORD	1,000
Corker	automatic	5,000
Bottle Rinser	COMPLETE WINEMAKER	675
2 Labelers	manual	400
2 Foil Spinners		1,200
Conveyor	used	1,000
Membrane Filter	used, Millipore or Satorius	2,000
		$11,275

Name	Capacity and Description	Amount
1.5 Office Equipment and Sales Room Furnishing		
Equipment	miscellaneous	$6,000
1.6 Materials Handling		
Hand Pallet Truck		500
Fork Lift	farm tractor, 35 horsepower with rotating head, used	7,000
Hand Cart		100
		$7,600
1.7 Laboratory		
Equipment	miscellaneous	2,500
1.8 Motor Vehicles		
Truck		7,000
Car		7,000
Van		6,000
		$20,000
1.9 Miscellaneous Supplies		$5,000

2. COOPERAGE

Year	Quantity	Size (G)	Cost ($/G)	Total $
2.1 Stainless Steel Tanks				
1	2 refrigerated	500	4.72	4,720
	2 refrigerated	1,000	3.63	7,260
	1 refrigerated	2,000	2.67	5,340
	1 holding tank	500	4.35	2,175
	1 holding tank	2,000	2.15	4,300
	transportation	-	-	350
				$24,145
2	1 refrigerated	1,000	3.63	3,630
	2 refrigerated	2,000	2.67	10,680
	1 holding tank	2,000	2.15	4,300
	transportation	-	-	350
				$18,960
3	1 refrigerated	2,000	2.67	5,340
	1 refrigerated	3,000	2.26	6,780
	1 holding tank	3,000	1.88	5,640
	transportation	-	-	350
				$18,110
4	1 refrigerated	2,000	2.67	5,340
	1 refrigerated	3,000	2.26	6,780
	1 holding tank	500	4.35	2,175
	transportation	-	-	350
				$14,645

2.2 Oak Casks (estimates from OAK BARREL WINECRAFT)

Year	G/year	Barrels	G	$/Barrel	Total $
1-9 American	1172	23	50	180	4,140
1-9 European (except year 5)	391	7	60	290	2,030
					$6,170/yr.

3. BUILDINGS

Square Feet	$/ft^2	Total Cost
3.1 Winery		
6,000	40.68	$244,100
3.2 Warehouse		
500	20.40	$10,200

4. LAND

Acres	$/Acre	Total Cost
2	1,500	$3,000

A.4 50,000 GALLON WINERY

1. EQUIPMENT COMPLEMENT

Name	Capacity and Description	Amount
1.1 Receiving Equipment		
Receiving Hopper	1 T capacity, 6 T/hr.	1,200
Crusher Stemmer	4-5 T/hr. stainless steel	4,300
Holding Tank	used conical bottom tank ($500) plus installation ($250)	750
Press	3500 liters, Vaslin press; BUDDE & WESTERMANN	22,000
Must Pump	piston 3" bore, 6,000 T/hr.	5,000
Pumace Pump	Menestrina M60 19 T/hr.; SCOTT	7,000
Must Lines	3" reinforced food grade plastic @ $4/ft., 50'	200
Pressure Hose	5" reinforced plastic $12/ft, 50'	600
Scales		2,500
		$43,550
1.2 Cellar Equipment		
Agitator	Guth with stainless steel "T" fitting; SCOTT	1,200
Fittings	miscellaneous	4,000
Transfer Lines	clear food grade plastic 1 1/2" @ $2/ft., 425', (replace every 3 years)	850
Barrel Rinser	Gasquet Simplex model; SCOTT	545
Filter	D.E. Velo Model 4; SCOTT	10,000
Filter	plate & frame, Schenk Capitan 16"x16", 20 pads, SCOTT	4,500
Centrifugal Pump	50 psi	3,000
Centrifugal Pump	30 psi	2,500
Lees Press	Schenk Model 470/20, 10 frames; SCOTT	9,800
		$36,395

ABBREVIATIONS: T=tons and G=gallons.

Name	Capacity and Description	Amount
1.3 Refrigeration		
Tank	used dairy tank 300 G	300
Controls	controls plus installation	200
Chiller	Chiller ($10,000) plus installation ($1500)	11,500
Pump	2 horsepower	500
2 Condensing Units	each 10 horsepower, Coplematic units ($12,000) plus installation ($1500)	13,500
Hose	PVC 2" @ 0.2919, 300' PVC 3" @ 0.6006, 300'	88 180
Fittings	miscellaneous PVC	75
Glycol	food grade @ $5.13/G, 200 G	1,026
		$27,369
1.4 Bottling (assumes automatic system 600 cases/day capacity)		
Filler, Corker Spinner	Velo one block unit	17,000
Bottle Rinser	Uni-twist Model 515	11,000
Labeler	Roll-Thru	8,000
Conveyor	used	1,000
Membrane Filter	used, Millipore or Satorius	2,000
		$39,000

Name	Capacity and Description	Amount
1.5 Office Equipment and Sales Room Furnishing		
Equipment	miscellaneous	$10,000
1.6 Materials Handling		
Hand Pallet Truck		500
Fork Lift	industrial type with rotating head, used	14,000
Assorted hand carts		300
		$14,800
1.7 Laboratory		
Equipment	miscellaneous	$3,000
1.8 Motor Vehicles		
Truck		7,000
Car		7,000
Van		6,000
		$20,000
1.9 Miscellaneous Supplies		$10,000

2. COOPERAGE

Year	Quantity	Size (G)	Cost ($/G)	Total $
2.1 Stainless Steel Tanks				
1	2 refrigerated	500	4.72	4,720
	5 refrigerated	1,000	3.63	18,150
	2 refrigerated	2,000	2.67	10,680
	1 holding tank	500	4.35	2,175
	2 holding tank	2,000	2.15	8,600
	transportation	-	-	700
				$45,025
2	2 refrigerated	2,000	2.67	10,680
	2 refrigerated	3,000	2.26	13,560
	1 holding tank	1,000	3.25	3,250
	1 holding tank	3,000	1.88	5,640
	transportation	-	-	350
				$33,480
3	2 refrigerated	5,000	2.07	20,700
	1 refrigerated	5,000	1.53	7,650
	transportation	-	-	350
				$28,700
4	1 refrigerated	2,000	2.67	5,340
	2 refrigerated	5,000	2.07	20,700
	transportation	-	-	350
				$26,390

2.2 Oak Casks (estimates from OAK BARREL WINECRAFT)

Year	G/year	Barrels	G	$/Barrel	Total $
1-9 American	2344	47	50	180	8,460
1-9 European (except year 5)	781	13	60	290	3,770
					$12,230/yr.

3. BUILDINGS

Square Feet	$/ft2	Total Cost
3.1 Winery		
8,000	40.60	$324,800
3.2 Warehouse		
1,000	20.30	$20,300

4. LAND

Acres	$/Acre	Total Cost
3	1,500	$4,500

A.5 100,000 GALLON WINERY

1. EQUIPMENT COMPLEMENT

Name	Capacity and Description	Amount
1.1 Receiving Equipment		
2 Receiving Hoppers	1 T capacity, 6 T/hr.	2,400
2 Crusher Stemmers	4-5 T/hr. stainless steel	8,600
2 Holding Tanks	used conical bottom tank ($500) plus installation ($250)	1,500
2 Presses	3500 liters, Vaslin press; BUDDE & WESTERMANN	44,000
Must Pump	piston 3" bore, 6,000 T/hr. SM/320 Manzini; SCOTT	6,000
Pumace Pump	Menestrina M60, 19 T/hr.; SCOTT	7,000
Must Lines	3" reinforced food grade plastic @ $4/ft., 50'	200
Pressure Hose	5" reinforced plastic $12/ft, 50'	600
Scales		2,500
		$72,800
1.2 Cellar Equipment		
Agitator	Guth with stainless steel "T" fitting; SCOTT	1,200
Fittings	miscellaneous	6,400
Transfer Lines	clear food grade plastic 1 1/2" @ $2/ft., 700', (replace every 3 years)	1,400
Barrel Rinser	Gasquet Simplex model; SCOTT	545
Filter	Schenk Capitan model 460, 16"x16" 36 pads, with hydraulic closing devise; SCOTT	7,000
Filter	Velo Model 4; SCOTT	10,000
Lees Press	Schenk Model 470/30, 20 frames; SCOTT	12,250
Centrifugal Pump	50 psi	3,000
		$41,795

ABBREVIATIONS: T=tons and G=gallons.

Name	Capacity and Description	Amount
1.3 Refrigeration		
Tank	used dairy tank 500 G	750
Controls	controls plus installation	200
Chiller	Chiller ($15,000) plus installation ($1500)	16,500
Pump	2 horsepower	500
2 Condensing Units	each 15 horsepower, Coplematic units ($16,000) plus installation ($1500)	17,500
Hose	PVC 2" @ 0.2919, 500' PVC 3" @ 0.6006, 500'	146 300
Fittings	miscellaneous PVC	100
Glycol	food grade @ $5.13/G, 250 G	1,283
		$37,279
1.4 Bottling (assumes automatic system 1,600 cases/day capacity)		
Bottling Line	complete unit	125,000
Centrifugal Pump	30 psi	2,500
		$127,500

Name	Capacity and Description	Amount
1.5 Office Equipment and Sales Room Furnishing		
Equipment	miscellaneous	$20,000
1.6 Materials Handling		
2 Hand Pallet Trucks		1,000
Fork Lift	industrial type with rotating head, used	14,000
Assorted Hand Carts		300
		$15,300
1.7 Laboratory		
Equipment	miscellaneous	$4,000
1.8 Motor Vehicles		
2 Trucks		14,000
Car		7,000
Van		6,000
		$27,000
1.9 Miscellaneous Supplies		$20,000

2. COOPERAGE

Year	Quantity	Size (G)	Cost ($/G)	Total $
2.1 Stainless Steel Tanks				
1	4 refrigerated	500	4.72	9,440
	5 refrigerated	1,000	3.63	18,150
	5 refrigerated	2,000	2.67	26,700
	1 refrigerated	3,000	2.26	6,780
	1 holding tank	1,000	3.25	3,250
	2 holding tanks	2,000	2.15	8,600
	1 holding tank	3,000	1.88	5,640
	transportation	-	-	1,000
				$79,560
2	1 refrigerated	500	4.72	2,360
	1 refrigerated	2,000	2.67	5,340
	1 refrigerated	3,000	2.26	6,780
	3 refrigerated	5,000	2.07	31,050
	1 holding tank	2,000	2.15	4,300
	1 holding tank	5,000	1.53	7,650
	transportation	-	-	700
				$58,180
3	1 refrigerated	2,000	2.67	5,340
	1 refrigerated	3,000	2.26	6,780
	3 refrigerated	5,000	2.07	31,050
	1 holding tank	5,000	1.53	7,650
	transportation	-	-	350
				$51,170
4	1 refrigerated	2,000	2.67	5,340
	1 refrigerated	3,000	2.26	6,780
	3 refrigerated	5,000	2.07	31,050
	1 holding tank	5,000	1.53	7,650
	transportation	-	-	350
				$51,170

2.2 Oak Casks (estimates from OAK BARREL WINECRAFT)

Year	G/year	Barrels	G	$/Barrel	Total $
1-9 American	4,688	94	50	180	16,920
1-9 European (except year 5)	1,563	26	60	290	740
					$24,460/yr.

3. BUILDINGS

Square Feet	$/ft^2	Total Cost
3.1 Winery		
15,000	40.49	$607,300
3.2 Warehouse		
2,000	20.30	$40,600

4. LAND

Acres	$/Acre	Total Cost
5	1,500	$7,500

Appendix D

AVERAGE RESOURCE REQUIREMENTS & COSTS PER BOTTLE

D.1 6,000 GALLON WINERY

Item	Description	$/Unit	Annual Equivalent Cost	Average Cost/ Bottle
Variable Costs				
Grapes	36.36 T/yr	600/T	23,800	1.058
Mfg supplies	22,500 B/yr	0.036/B	1,154	0.051
Packaging	22,500 B/yr	0.420/B	13,471	0.599
Excise taxes	22,500 B/yr	0.054/B	1,481	0.066
Mgr/operator		10,000/yr	7,360	0.327
Labor				
Consultant	3 yr contract	2,200/yr	623	0.028
2 workers, crush	6 wks/yr	4.00/hr	1,413	0.063
2 workers, bott.	2 wks/yr	4.00/hr	741	0.021
Accountant	part-time	2,000/yr	1,472	0.065
Subtotal			3,979	0.177
Marketing	22,500 B/yr	0.25-0.20B	6,977	0.310
Utilities	22,500 B/yr	0.044/B	1,411	0.063
Office supplies	22,500 B/yr	0.011/B	359	0.016
AVERAGE VARIABLE COSTS			59,992	2.667
Fixed Costs				
Insurance	0.5% of bldg & equip	-	803	0.036
Capital outlays	-	-	17,055	0.758
Property tax	2.5% of land & bldg	-	1,401	0.062
Banking & license	-	-	319	0.014
Repairs & maint.	2.0% of bldg & equip	-	3,212	0.143
AVERAGE FIXED COSTS			22,790	1.013
AVERAGE TOTAL COSTS			82,782	3.680

ASSUMPTIONS: Grape price $600 per ton; cost of capital 14% (nominal); and a 40 hour week for part-time workers.

ABBREVIATIONS: B = bottle (750 ml) and T = ton.

D.2 12,000 GALLON WINERY

Item	Description	$/Unit	Annual Equivalent Cost	Average Cost/ Bottle
Variable Costs				
Grapes	72.73 T/yr	600/T	47,607	1.058
Mfg supplies	45,000 B/yr	0.036/B	2,309	0.051
Packaging	45,000 B/yr	0.420/B	26,942	0.599
Excise taxes	45,000 B/yr	0.054/B	2,964	0.066
Mgr/operator		15,000/yr	11,040	0.245
Labor				
Consultant	3 yr contract	2,200/yr	623	0.014
Books/Sales/Cellar	part-time	4,000/yr	2,944	0.065
2 workers, crush	6 wks/yr	4.00/hr	1,413	0.031
3 workers, bott.	4 wks/yr	4.00/hr	1,413	0.031
Subtotal			6,393	0.141
Marketing	45,000 B/yr	0.25-0.20/B	13,954	0.310
Utilities	45,000 B/yr	0.044/B	2,823	0.063
Office supplies	45,000 B/yr	0.011/B	718	0.016
AVERAGE VARIABLE COSTS			114,750	2.549
Fixed Costs				
Insurance	0.5% of bldg & equip	-	1,556	0.035
Capital outlays	-	-	32,625	0.725
Property tax	2.5% of land & bldg	-	2,791	0.062
Bonding & license	-	-	499	0.011
Repairs & maint.	2.0% of bldg & equip	-	6,227	0.138
AVERAGE FIXED COSTS			43,698	0.971
AVERAGE TOTAL COSTS			158,448	3.520

ASSUMPTIONS: Grape price $600 per ton; cost of capital 14% (nominal); and a 40 hour week for part-time workers.

ABBREVIATIONS: B = bottle (750 ml) and T = ton.

D.3 25,000 GALLON WINERY

Item	Description	$/Unit	Annual Equivalent Cost	Average Cost/ Bottle
Variable Costs				
Grapes	151.52T	600/T	99,188	1.058
Mfg supplies	93,750 B/yr	0.036/B	4,781	0.051
Packaging	93,750 B/yr	0.420/B	56,156	0.599
Excise taxes	93,750 B/yr	0.054/B	6,188	0.066
Mgr/operator	-	20,000/yr	14,720	0.157
Labor				
Sales	full-time	15,000/yr	11,040	0.118
Cellar worker	part-time	12,000/yr	8,832	0.094
Bookkeeper/sales	part-time	4,000/yr	2,944	0.031
1 sales & tours	18 wks/yr	3.50/hr	1,855	0.020
2 workers, crush	6 wks/yr	4.00/hr	1,413	0.015
2 workers, bott.	5 wks/yr	4.00/hr	1,413	0.015
Subtotal			27,497	0.293
Marketing	93,750 B/yr	0.25-0.20/B	29,063	0.310
Utilities	93,750 B/yr	0.044/B	5,906	0.063
Office supplies	93,750 B/yr	0.011/B	1,500	0.016
AVERAGE VARIABLE COSTS			244,999	2.613
Fixed Costs				
Insurance	0.5% of bldg & equip	-	2,633	0.028
Capital outlays	-	-	55,688	0.594
Property tax	2.5% of land & bldg	-	4,326	0.046
Bonding & license	-	-	870	0.009
Repairs & maint.	2.0% of bldg & equip	-	10,533	0.112
AVERAGE FIXED COSTS			74,050	0.789
AVERAGE TOTAL COSTS			319,049	3.402

ASSUMPTIONS: Grape price $600 per ton; cost of capital 14% (nominal); and a 40 hour week for part-time workers.

ABBREVIATIONS: B = bottle (750 ml) and T = ton.

D.4 50,000 GALLON WINERY

Item	Description	$/Unit	Annual Equivalent Cost	Average Cost/ Bottle
Variable Costs				
Grapes	303.03 T/yr	600/T	198,375	1.058
Mfg supplies	187,500 B/yr	0.036/B	9,563	0.051
Packaging	187,500 B/yr	0.420/B	112,313	0.599
Excise taxes	187,500 B/yr	0.054/B	12,375	0.066
Mgr/operator	-	25,000/yr	18,400	0.098
Labor				
Winemaker	full-time	20,000/yr	14,720	0.079
Sales	full-time	15,000/yr	11,040	0.059
2 cellar workers	full-time	24,000/yr	17,664	0.094
Bookkeeper	part-time	8,000/yr	5,888	0.031
2 sales & tours	18 wks/yr	3.50/hr	3,709	0.020
2 workers, crush	6 wks/yr	4.00/hr	1,413	0.008
2 workers, bott.	10 wks/yr	4.00/hr	2,355	0.013
Subtotal			56,789	0.304
Marketing	187,500 B/yr	0.25-0.20/B	58,125	0.310
Utilities	187,500 B/yr	0.044/B	11,813	0.063
Office supplies	187,500 B/yr	0.011/B	3,000	0.016
AVERAGE VARIABLE COSTS			480,753	2.565
Fixed Costs				
Insurance	0.5% of bldg & equip	-	4,084	0.022
Capital outlays	-	-	87,375	0.466
Property tax	2.5% of land & bldg	-	5,877	0.031
Bonding & license	-	-	1,586	0.008
Repairs & maint.	2.0% of bldg & equip	-	16,336	0.087
AVERAGE FIXED COSTS			115,258	0.614
AVERAGE TOTAL COSTS			596,011	3.179

ASSUMPTIONS: Grape price $600 per ton; cost of capital 14% (nominal); and a 40 hour week for part-time workers.

ABBREVIATIONS: B = bottle (750 ml) and T = ton.

D.5 100,000 GALLON WINERY

Item	Description	$/Unit	Annual Equivalent Cost	Average Cost/ Bottle
Variable Costs				
Grapes	606.06T	600/T	396,750	1.058
Mfg supplies	375,000 B/yr	0.036/B	19,125	0.051
Packaging	375,000 B/yr	0.420/B	224,625	0.599
Excise taxes	375,000 B/yr	0.054/B	24,750	0.066
Mgr/operator	-	30,000/yr	22,080	0.059
Labor				
Winemaker	full-time	20,000/yr	14,720	0.039
2 sales	full-time	30,000/yr	22,080	0.059
2 cellar workers	full-time	24,000/yr	17,664	0.047
Bookkeeper	full-time	12,000/yr	8,832	0.024
4 sales & tours	18 wks/yr	3.50/hr	7,419	0.020
2 workers, crush	6 wks/yr	4.00/hr	1,413	0.004
2 workers, bott.	10 wks/yr	4.00/hr	2,355	0.006
Subtotal			74,483	0.199
Marketing	375,000 B/yr	0.25-0.20/B	116,250	0.310
Utilities	375,000 B/yr	0.044/B	23,625	0.063
Office supplies	375,000 B/yr	0.011/B	6,000	0.016
AVERAGE VARIABLE COSTS			907,688	2.421
Fixed Costs				
Insurance	0.5% of bldg & equip	-	7,547	0.020
Capital outlays	-	-	162,000	0.432
Property tax	2.5% of land & bldg	-	11,018	0.029
Bonding & license	-		3,757	0.010
Repairs & maint.	2.0% of bldg & equip	-	30,189	0.081
AVERAGE FIXED COSTS			214,511	0.572
AVERAGE TOTAL COSTS			1,122,199	2.993

ASSUMPTIONS: Grape price $600 per ton: cost of capital 14% (nominal): and a 40 hour week for part-time workers.

ABBREVIATIONS: B = bottle (750 ml) and T = ton.

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