# An evaluation of terminal value calculations and their impact to the internal rate of return of a Sacramento Valley almond investment

by

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**ABSTRACT**

Agricultural investments are becoming a more desirable investment as a means of diversification among investors and their respective clients. Agriculture offers diversification and security, as the underlying asset, the land, continues to appreciate, while potentially growing a profitable crop. California, Florida, Georgia, Arizona, Washington and Oregon are experiencing growing interest in farmland investments from pension funds and other money to diversify their current investment portfolios and capitalize on potential profits found in permanent crop farming.

This thesis evaluates a 2021 acquisition of a large almond ranch located in the Sacramento Valley and considers various methods of terminal value calculation to determine if the method used is acceptable and if any one method is superior to the other. The methods being evaluated are:

1. Modified Liquidation Valuation
2. Capitalization Rate
3. Multiplier Approach

These methods rely on future projections of net operating income. When comparing these methodologies to the base evaluation, it was determined that the base model is potentially overly conservative and could mislead investors to not invest in an otherwise reasonable opportunity.

Of the methodologies evaluated, the modified liquidation valuation and capitalization rate evaluation are supported by historic data and provide terminal values, resulting in an internal rate of return above 9%. The multiplier approach is the more

simplistic of the methods, is reliant upon the performance of other similar business within the same sector, and generates an internal rate of return of above 8%. Many investors would consider this to be an acceptable return to their portfolios, however, on the lower end of acceptability.

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# CHAPTER I: INTRODUCTION

Large and small companies are diversifying their portfolios to include both permanent and row crop ground. California, Florida, Georgia, Arizona, Washington and Oregon are experiencing growing interest in farmland investments from pension funds and other investment sources to capitalize on potential profits found in permanent crop farming. There is a widely held belief, among investors, that permanent plantings can provide above average risk-adjusted returns to their stakeholders while diversifying their current portfolio.

The long economic life of permanent crops can provide an attractive long-term return profile with significant near-term income potential. In addition, permanent crops are well positioned to take advantage of the following macroeconomic trends:

- Global population growth and the associated increase in food consumption;
- Rising income in emerging markets and changing consumption patterns; and,
- Limited growth in arable land coupled with greater water scarcity.

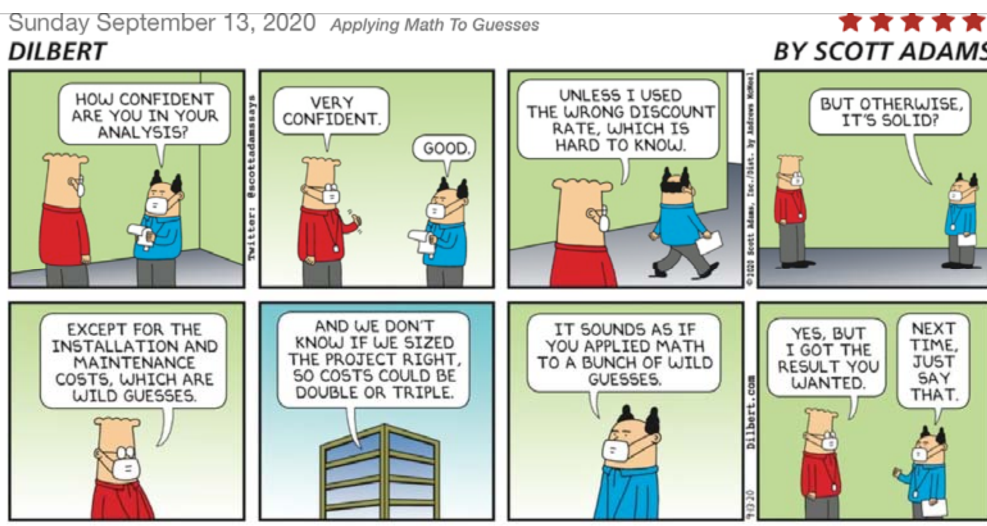
Underscoring investment decisions, financial analyses are completed estimating future price, production, and expenses on perspective properties. Each model is assumed to be held for a given period of time, before it is projected to be sold, at which point a terminal value is calculated estimating the future value of the investment asset.

The ensuing financial analysis evaluates an actual 20-year almond investment, purchased in January of 2021 and is modeled to be sold in 2030. The base model used for a potential acquisition for an investment fund, the subject property had modeled internal rate of return at 7.6% before asset management fees were considered. The modeled return was considered low, however acceptable as a means of adding additional diversification to the portfolio that was to absorb the property. This document evaluates ceteris paribus, terminal value calculations and analyze their impact on the estimated financial return.

### 1.1 Opportunity for Improved Analysis

To determine the feasibility of an investment, firms are required to make a series of assumptions that include: the value of the underlying ground—as it varies region to region, estimated future revenue streams, farming costs, including if necessary, management fees, potential operational capital expenditures required to improve or maintain the growing conditions on the farm, and lastly, an appropriate terminal value to be used at the modeled sale of the investment.

The investment modeled used in this analysis takes into account the aforementioned data points; however, some of them are more malleable than others. For example, discount rates can be adjusted to improve the return, much like the Dilbert below.



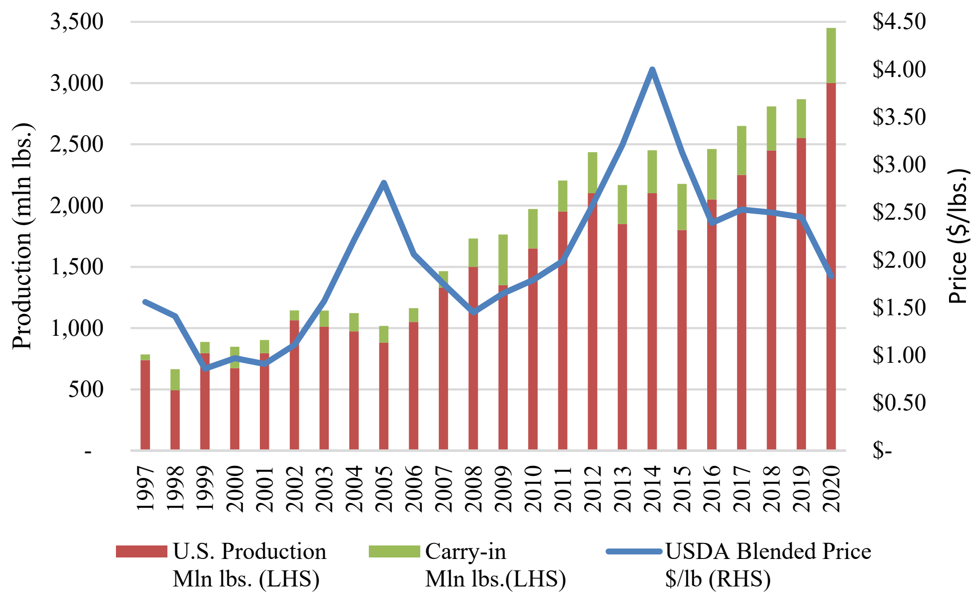

The prices are based on 10-year historic averages and inflation at a 2% annual rate thereafter, for the life of the model. Expenses are based on the firm's actual experiences in the region and similarly inflation adjusted.

This thesis does not evaluate the underlying assumptions used in the model, such as price, expenses, historic inflation, etc., rather it considers different terminal valuation methodologies and their impact to the modeled rate of return.

## CHAPTER II: GLOBAL ALMOND SUPPLY AND DEMAND TRENDS

Almonds have been around, like most agricultural commodities, for centuries. However, unlike most commodities, almonds have been commercially grown for less than a century. Almond plantings in California began expanding in the mid-1900s. In the 1990s and early 2000s, mechanization took hold, and economies of scale began taking place. Reduced labor costs from mechanization coupled with increasing global demand has allowed almonds to become the second most valuable crop produced in the state, valued at $5.62 billion in 2020 (California Department of Food and Agriculture n.d.).

**Figure 2.1: California Almond Production and USDA Blended Price 1997 - 2020**




Source: Almond Board of California, USDA, 2022

Beginning 2000, the Almond Board of California began strategic marketing efforts, designed to increase global consumption, as production increased. Between 1990 and 2020, almond acres in the state have tripled and yields have increased over 50% due to better farm management and mechanization. In 2000, domestic consumption was 292 million pounds and export shipments were 503 million pounds. At the end of the 2019/20 crop year (ended August 31, 2020) domestic shipments were 741 million pounds and exports were just shy of 1.6 billion pounds (Almond Board of California 2020).

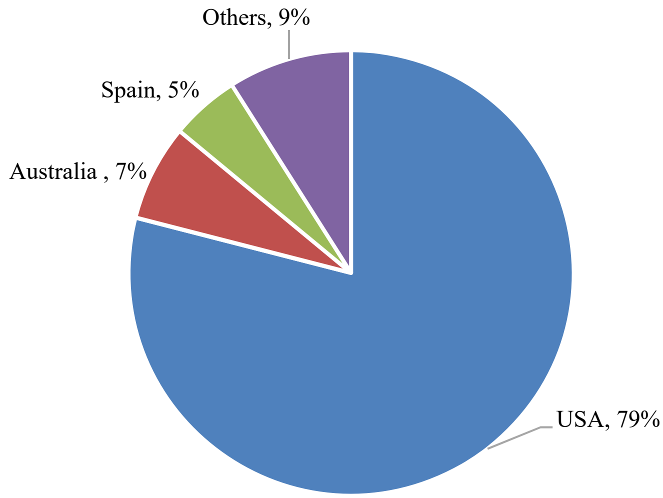
California almond growers are in a unique position as they have quickly dominated the world market and are responsible for between 75% and 85% of total global production, effectively monopolizing the market (International Nut and Dried Fruit Council Foundation (INC) 2019) .

**2.1 California Producer Have a Competitive Advantage**

The warm summers and cool winters in the Central Valley of California provide ideal growing conditions for almonds. Most production is concentrated in California's Central and Southern San Joaquin Valley. However, in the last decade, improved rootstocks and growing practices have led to increased production in Northern California, increasing the area which almonds can be grown.

According to the International Nut and Dried Fruit organization, California is the largest producer of almonds at 79% of world production in 2019. The other major producers are: Australia 7% and Spain 7%, with the remaining 9% being grown in various countries in the Middle East and European Union. While some of these regions have an appropriate climate for growing almonds, land and water are constrained resources, limiting almond growth potential (International Nut and Dried Fruit Council Foundation (INC) 2019).

**Figure 2.2: 5-Year Average Global Almond Production 2016 - 2020**

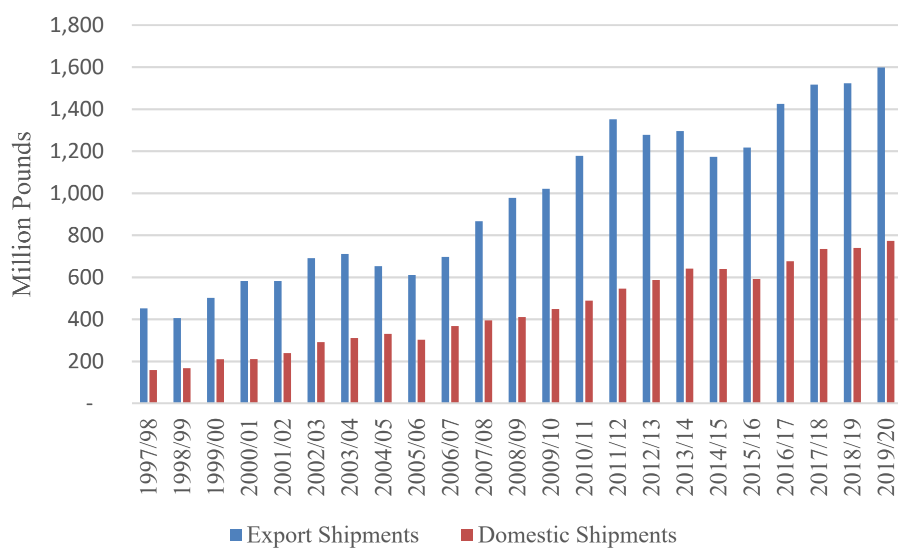



Source: International Nut and Dried Fruit Council, 2021

## 2.2 Demand Growth

During the past two decades, production has increased substantially. Export shipments have tripled, while domestic shipments have nearly quintupled, indicating sustainable demand (Almond Board of California 2020) .

**Figure 2.3: California Actual Domestic and Export Shipments 1997 – 2020**




Source: Almond Board of California, 2022

In addition to taste and convenience, health trends in the U.S. and globally have been an important tool used by marketers to entice consumers to eat more tree nuts not only as a snack but in other forms as well. Large food manufacturers, including General Mills, Nestle, Kraft, and Kellogg's, continue to develop a wide variety of almond snacks. ABC estimates that over 50% of all California almonds go into manufactured food products including confectionaries, breakfast cereals, frozen products, salads, and desserts among others.

i. Domestic Demand: The USDA's Economic Research Service (ERS) estimates that per capita consumption for tree nuts has grown at an annual rate of 2.2% between 1970 and 2016. Almonds have been the primary driver of growth in the nut category, growing at 4.1% per annum and accounting for 43% of total per-capita nut consumption (Economic Research Services U.S. Department of Agriculture 2019).

**Table 2.1: U.S. Per Capita Consumptions of Tree Nuts (pounds), 1970 and 2016**

| Unit Pounds | 1970 | 2016 | CAGR |
|---|---|---|---|
| **Almonds** | 0.25 | 1.6 | 4.1% |
| **Hazelnuts** | 0.04 | 0.04 | 0.0% |
| **Pecans** | 0.33 | 0.34 | 0.1% |
| **Walnuts** | 0.27 | 0.43 | 1.0% |
| **Macadamias** | 0.03 | 0.06 | 1.5% |
| **Pistachios** | 0.03 | 0.33 | 5.4% |
| **Other** | 0.43 | 0.88 | 1.6% |
| **Tree Nuts** | 1.38 | 3.69 | 2.2% |

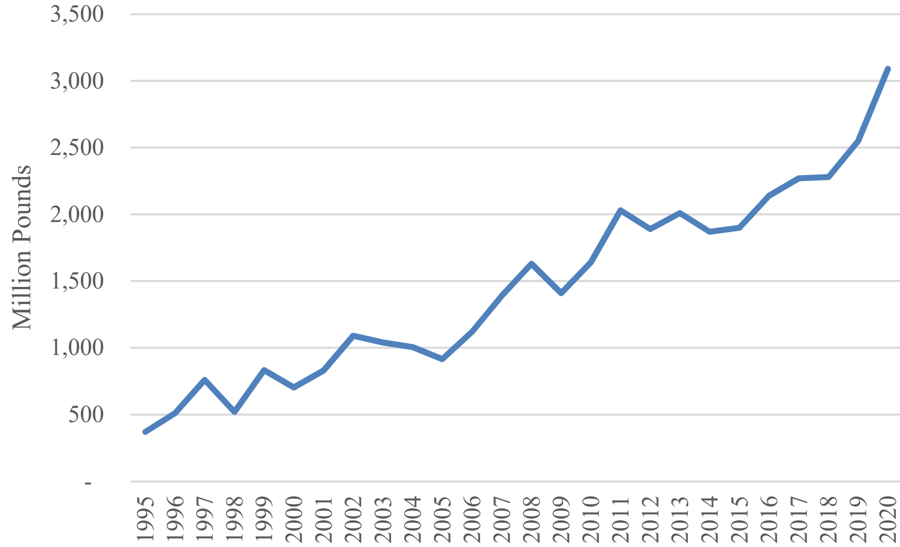
Source: USDA, 2022

ii. International Demand: Over the past decade (2010 - 2019), approximately 65% of production has been exported. Demand for almonds in international markets has been strong, especially in the Asia Pacific and Middle East Regions where almond imports have grown at double digit rates (Almond Board of California 2020).

**2.3 Supply Growth**

Over the past 15 years, U.S. almond production has nearly tripled from slightly more than 1.0 billion pounds in 2006 to over 3.0 billion pounds in 2020 (Almond Board of California 2020). Despite the rapid increase in supply, prices have remained strong, and consumption has maintained pace with production (United States Department of Agriculture National Agricultureal Statistics Service 2021).

**Figure 2.4: California Almond Production 1995 - 2020**

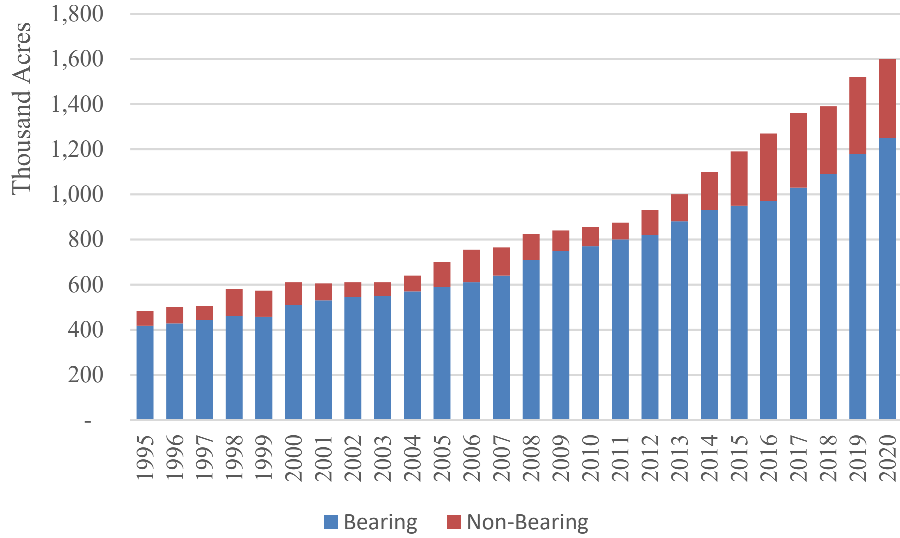



Source: Almond Board of California, 2022

Blended average prices during the last two decades have been above $2.00 per pound, spurring rapid growth in the industry. Almond acreage has more than doubled in the past 15 years. During the same time period the cost of land has tripled limiting the production of less profitable crops and encouraging growers to plant the highest valued commodity utilizing the land's potential for maximum profits (United States Department of Agriculture National Agricultureal Statistics Service 2021).

The Sustainable groundwater management act, passed in 2018 and to be implemented no later than 2040. Will reduce almond supply and will likely have a material impact on prices.

**Figure 2.5 California Bearing and Nonbearing Almond Acreage 1995 - 2020**




Source: Almond Board of California, 2022

The Sustainable Groundwater Management Act (SGMA), passed in 2018 and to be implemented no later than 2040. Will reduce almond supply and will likely have a material impact on prices. Based on a Land IQ survey of almond acreage in the San Joaquin Valley, almonds are responsible for approximately 20% of total crop land in California's Central Valley and as such will be significantly impacted as the law is fully implemented in 2040. A detailed analysis of where and when land will be fallowed is outside the scope of this analysis, however, the model does provide estimates as to the impact of SGMA on productive almond ground (Land IQ 2020).

### 2.4 SGMA and Supply

While SGMA is out of the scope of this paper, it is important to note that production in the coming decades will likely be stifled as SGMA[1] takes effect reducing the

[1] "SGMA requires governments and water agencies of high and medium priority basins to halt overdraft and bring groundwater basins into balanced levels of pumping and recharge. Under SGMA, these basins should reach sustainability within 20 years of implementing their sustainability plans. For critically over-drafted basins, that will be 2040. For the remaining high and medium priority basins, 2042 is the deadline." (California Department of Water Resources 2022)

available water to grow crops in California. A significant amount of less desirable land will be removed entirely from production, while other areas will require fallowing portions of productive land to provide adequate water for the remaining planted ground. The implementation of the Sustainable Groundwater Management Act is anticipated by the Public Policy Institute of California to transition an estimated 800,000 to 1,000,000 acres away from agricultural production in the San Joaquin Valley over the next two decades. (Serrato 2019)

Current prices and the anticipation and implementation of SGMA, will cause a significant number of older less profitable orchards to be removed from production. The USDA estimates that there are approximately 250,000 acres of trees planted that are greater than 20 years old. These producers are likely struggling to cover their input costs, given the lower production. Additionally, it is anticipated that with the implementation of SGMA an additional, upwards of 125,000 acres will need to be removed from production to satisfy groundwater pumping curtailments. This results in an estimated sustainable yield between 2.0 and 2.2 billion pounds.

# CHAPTER III: DATA ANALYSIS AND METHODS

The base data is an investment analysis of a 567-acre almond orchard located in California's Sacramento Valley. The financial forecasts revenues and expenses and the terminal value of the investment. These values are based on general assumptions of future production, price, and general farming costs. It ultimately generates an estimated internal rate of return, which, along with the timing of cashflows, is used to determine the viability of the investment.

This analysis evaluates the underlying assumptions of the investment analysis, considers how the terminal value is calculated and whether or not there is merit in using one methodology over another. The three terminal value calculations used are:

1. Modified expected liquidation value
2. Capitalization rates
3. Exit Multipliers

## 3.1 Financial Assumptions

The base data originated from an internal model built to determine the estimated internal rate of return of a 567-acre almond orchard investment in the Sacramento Valley. Almond prices are based on actual historic average prices of comparable ranches in similar geographic locations, discounted for current market circumstances and incrementally increased over 4-years to the 10-year historic average in 2024, then 2% inflation adjusted thereafter. Expenses are based on actual farming costs, the farm management arm of the investment firm[2], used to farm other comparable properties in the region. Given the young

[2] The investment firm is the organization that is responsible for purchasing and managing farmland investments for selected clients, including high net worth individuals, insurance agencies, and general pension funds.

age of the trees, yields were determined based on regional historic average performance, and adjusted based on rootstocks and tree density.

All assumptions were measured against the University of California Davis 2019 Almond Cost Study designed to provide sample costs to establish an orchard and produce almonds. (Buchner, et al. 2019)

The financial model assumes an economic life of 25-years for almond trees in the Sacramento Valley, before redevelopment occurs. This orchard is modeled over a 20-year period. It assumes a ten-year holding period, at which point, the asset is assumed to be sold. Traditionally, the terminal value calculation has been taking the net present value of the latter 10 years net operating income, discounted at a flexible CAPM rate, then adding it back to the bareland value, appreciated at 4% per annum to determine a final selling price.

**Table 3.1: Terminal Value Assumptions**

| **Unit $/acre** | | | |
|---|---|---|---|
| **Discount Rate** | 12.0% | | |
| **Bareland Growth Rate** | 4.0% | | |
| **Bareland Value 2021** | $18,000 | | |
| | | **Per Acre** | **Total** |
| **Bareland Value 2030** | | $25,620 | $14,530,000 |
| **NPV (2031 – 2040)** | | $12,469 | $7,070,000 |
| Total | | $38,095 | $21,600,000 |
| **CAGR** | | 1.5% | |

The internal rate of return is then calculated by taking the net income of the holding period, including the initial purchase price and final sale price.

*3.1.1 Revenues*

Revenue is modeled based on historic average pricing and estimated yields. The predominate almond variety grown is a Nonpareil, which is also the industry standard for pricing. All other varieties are considered pollinators and are discounted based on the Nonpareil price. Table 3.1 below shows the 10-year average Nonpareil price, in compared with the USDA's blended almond price, reported annually.

**Table 3.2: Historic Almond Pricing, 6-year and 10-year Average (Dollar/Pound)**

| | 6-Year Average | 10-Year Average |
|---|---|---|
| **Nonpareil** | $ 2.99 | $ 2.82 |
| **USDA Blended** | $ 2.28 | $ 2.66 |

Source: USDA, Internal Data, 2022

Market conditions at the time of modeling were taken into consideration and the starting Nonpareil price was discounted to reflect the state of the industry. Prices were then increased $0.30 per year through 2024, when the 10-year average is met, then inflation adjusted 2% per annum for the economic life of the orchard.

Then blended average age of this orchard is 5 years old. The average projected gross revenues for the first ten years of ownership is $3.7 million or $6,525 per planted acre with an average yield of 2,450 pounds per acre.

*3.1.2 Expenses*

The model identifies expenses in the form of farming costs that include fertilizer, pesticide, fungicide applications, as well as, all other cultural cost associated with farming almonds. Additional costs modeled include, current water costs on a per acre basis, assumed increased water costs in 2026 as California's Sustainable Groundwater Management Act continues to materialize, harvest and hauling costs, along with hulling costs. An onsite farm management fee is also assumed as the organization hires out 3rd parties to manage the day-to-day operations.

Expenses are broken down into immature and mature expenses. Immature expense are expenses that occur prior to 4th year of production or assumed to be once estimated revenues exceed expenses.

**Table 3.2: Mature and Immature Almond Expenses**

| Unit $/acre | Mature Farming Costs | Development Year | Immature Farming Costs |
|---|---|---|---|
| **Farming** | $2,300 | Year 0 | $5,500 |
| **Water** | $500 | Year 1 | $4,000 |
| **Addt'l Water 2026** | $200 | Year 2 | $2,050 |
| **Hulling** | $0.07/lb. | Year 3 | $3,000 |
| **Harvest & Hauling** | $400 | Year 4 | $3,400 |
| **On-Site Mgmt Fee** | $168 | | |
| **Totals** | $3,568 | | $17,950 |

Additional expenses include, general and administrative costs, property taxes, multi-peril crop insurance, and the organizations farm management fees. Total mature expenses over the ten-year holding period average 2.38 million dollars per year, or $4,194 per planted acre.

Immature expenses that are capitalized during the holding period are those expense associated with the development of immature trees into mature productive trees. During the holding period, average gross development costs are 1.72 million dollars for the acres in development. This costs, net of projected revenue offset is $954,000 or an average of $2,430 per acre in development.

*3.1.3 Internal Rate of Return*

The financial model is evaluated over a 20-year period, the client is assumed to retain the investment asset for the first 10-years, then an assumed sale occurs at the end of year 10, capitalizing on the assumed inflation of bareland, along with the remaining 10 years of economic life of the almond trees. The financial model takes the net present value of the estimated remaining crop value in years 11- 20 and then add it back to the inflation adjusted bareland to determine the terminal value.

**Table 3.3: Terminal Value Assumptions**

| **Unit $/acre** | | | |
|---|---|---|---|
| **Discount Rate** | 12.0% | | |
| **Bareland Growth Rate** | 4.0% | | |
| **Bareland Value 2021** | $18,000 | | |
| | | **Per Acre** | **Total** |
| **Bareland Value 2030** | | $25,620 | $14,530,000 |
| **NPV (2031 – 2040)** | | $12,469 | $7,070,000 |
| Total | | $38,095 | $21,600,000 |
| **CAGR** | | 1.5% | |

Finally, the internal rate of return is calculated based on the initial investment and net revenues through the time of sale. Given these assumptions, and the assumed terminal value calculation noted above, the projected internal rate of return of the base data is 7.6%.

### 3.2 Terminal Value Calculations

The purpose of this analysis is not to evaluate the underlying assumptions that were used to create this aforementioned model, rather to consider different options for evaluating how the terminal value is calculated, as this value determines the assets internal rate of return.

Each of the methodologies are contingent upon the accuracy of future projections of an asset's performance, i.e. accurately estimating future cash flows. The three terminal value calculations to be modeled and their respective formulas are defined below.

The abbreviations in the formulas below are noted as:

- *NPV* – Net Present Value
- *Dr* – Discount Rate
- *NOI* – Net Operating Income
- *P* – Period of Ownership
- *BV* – Bareland value or the value of the soil without any improvements
- *r* – inflation rate

The three methods evaluated are:

1. Modified expected liquidation value, as was used in the base model, however this analysis reviews actual land value inflation and determines an appropriate discount rate based on current market conditions;

$$Terminal\ Value = NPV\big((Dr), NOI_{P11-P20}\big) + \left(BV * (1+r)^{(P10-P1)}\right)$$

2. Using a capitalization rate, as an appropriate measure of the properties' terminal value;

$$Terminal\ Value = \left( \frac{NOI_{P10}}{\left( \frac{NOI_{P1}}{Purchase\ Price} \right)} \right)$$

3. Or using an acceptable industry wide multiplier, as is often used in the non-agriculture related business sector for acquisitions.

$$Terminal\ Value\ = NOI_{P10} * Exit\ Multiplier$$

The following sections evaluate these different scenarios and their impact to the base model presented above.

*3.2.1 Liquidation Value /CAPM & Bareland Appreciation Terminal Value Calculations*

The base model assumes a modified liquidation value, calculating the book value of the asset, inflation adjusted bareland, adding the potential earning power of the asset to the inflation adjusted bareland calculation. CAPM is the calculated discount rate applied to the net present value of future cash flows. In the model being analyzed, this is the final ten years of net operating income, discounted to a future current value, then added back to the appreciated bareland value.

$$Terminal\ Value = NPV((Dr), NOI_{P11-P20}) + (BV * (1 + r)^{(P10-P1)}$$

The CAPM assumption is used to determine an appropriate discount rate used to evaluate the net present value of future projected cash flows. Much like the Dilbert comic in the introduction, there is significant debate as to what an appropriate discount rate is for various commodity types. As a part of this analysis, a comparison of various commodities relative to different alternative investments was calculated to determine the discount rate to be used. Additionally, the firm has historically used a bareland growth rate of 4%, without consideration as to the geographic location, water security, or actual historic growth rates as further discussed below.

*3.2.2 CAPM Assumptions*

To determine the appropriate discount rate, three separate data sets were used were selected: the firms historic annual permanent crop returns from 2001 – 2020, the NCRIEF annual permanent crop, row crop and total farm land returns from 2001 – 2020, and a specific clients actual annual return for various crops by commodity type from 2011 – 2020. The returns were compared directly to the S&P 500, Wilshire 5000, and Barclays Aggregate Bond, that were predetermined as reasonable alternatives for client's capital. The tables below summarize the findings.

**Table 3.4: Correlation of Farmland Returns Relative to Alternative Investments**

| | NCREIF Farmland | NCREIF Timberland | NCREIF Property | Company Portfolios | Wilshire 5000 | S&P 500 | Barclays Aggregate Bond |
|---|---|---|---|---|---|---|---|
| Mean | 12.3% | 5.9% | 8.3% | 15.5% | 9.6% | 9.1% | 4.9% |
| STD | 7.7% | 6.6% | 8.4% | 12.4% | 17.6% | 17.3% | 3.1% |
| Beta | 0.002 | 0.005 | 0.07 | -0.04 | 1.01 | 1.0 | -0.04 |
| Correlation NCREIF Farmland | 100.00% | 82.96% | 55.63% | 84.27% | -0.89% | -0.51% | -38.64% |
| Correlation Wilshire 5000 | -0.89% | -2.06% | 12.53% | -7.51% | | 99.77% | -21.71% |
| Correlation S&P 500 | -0.51% | -1.21% | 13.97% | -5.35% | | | -23.02% |
| Correlation Barclays Aggregate Bond | -38.64% | -33.76% | -22.89% | -27.77% | | | |

The beta was calculated to determine the relative risk in relation to the S&P 500. A beta of 1 would indicate that the investment opportunity has a risk level that is no different to the S&P 500. Each of the agricultural investments have beta's at or near zero, indicating relatively little risk in comparison to the stock market. A beta of zero aligns closest with what an expected U.S. treasury bill might yield, and investors could thus assume a similar discount rate. During the past 10 years the historic treasury bill has had a 2% inflation rate and over the last 30-yers has averaged approximately 4%. Therefore, a low, to mid-single digit discount rate could be considered acceptable when calculating the net present value of future investment cashflows.

One of the investment firm's clients[3], to be noted as "Client X's" to protect the proprietary nature of the portfolios and investor, returns were broken down by the predominate commodity investments within the portfolio. These investments include tree nuts, fresh citrus, and leased row crop ground. The returns for five tree nut properties, three citrus properties, and two row crop properties were averaged to determine commodity specific returns relative to the S&P 500. The average annual returns for the years 2011 through 2020 were compared to the S&P 500.

The aggregate tree nuts and citrus properties indicated a lower historical return relative to the S&P 500, however, the measured volatility was half of what an investor might expect if their capital was placed in a more traditional investment.

[3] The investment firm has 5 clients and manages more than 50,000 acres of productive farmland in North America for them. The Client X, as a diversified portfolio of 10 properties, including tree nuts, fresh citrus, and row crops.

**Table 3. 5 Correlation of Annual Income Returns Relative to Alternative Investments**

| | Avg. Annual Income Return Tree Nuts | Avg. Annual Income Return Citrus - Fresh | Avg. Annual Income Return Row Crop | S&P 500 | NCREIF Farmland | Company Portfolio |
|---|---|---|---|---|---|---|
| 2011 | 6.92% | 10.02% | 3.64% | 2.11% | 15.16% | 30.40% |
| 2012 | 4.65% | 14.29% | 3.72% | 16.00% | 18.58% | 17.02% |
| 2013 | 18.12% | 19.46% | 3.75% | 32.39% | 20.91% | 26.13% |
| 2014 | 15.29% | 13.63% | 3.08% | 13.69% | 12.63% | 27.41% |
| 2015 | 16.38% | 13.42% | 2.79% | 1.38% | 10.35% | 23.76% |
| 2016 | 6.41% | 12.68% | 2.74% | 11.96% | 7.09% | 5.34% |
| 2017 | 1.95% | 12.05% | 2.68% | 21.83% | 6.19% | 4.48% |
| 2018 | 7.02% | 12.24% | 2.63% | -4.38% | 6.74% | 5.34% |
| 2019 | 2.78% | 4.24% | 2.52% | 31.49% | 4.81% | 4.81% |
| 2020 | 4.30% | 4.58% | 2.60% | 18.40% | 3.08% | -1.70% |
| Mean | 8.38% | 11.66% | 3.01% | 14.49% | 10.55% | 14.30% |
| Standard Dev. | 5.64% | 4.29% | 0.47% | 11.70% | 5.76% | 11.27% |
| Correlation S & P 500 | -7.77% | -5.03% | 8.90% | | 9.42% | -16.84% |
| Correlation NCREIF Farmland | 55.35% | 75.31% | 96.06% | | | 81.01% |
| Correlation Comp. Portfolio | 72.26% | 58.05% | 74.78% | | | |
| Beta | -0.037 | -0.019 | 0.004 | | | -0.038 |

*3.2.3 Land Appreciation*

Evaluating the value of the underlying asset, in this case bareland, is an essential part in determining the assets potential value at the time of a future sale. This analysis evaluated historic land trends as reported by the California Chapter of the American Society of Farm Managers and Rural Appraisers (ASFMRA).

The amount of tillable farmland is decreasing. Additionally, in California, water adds further constraints as it is a limiting factor in the amount of land that can be put into production agriculture. With the impending implementation of the Sustainable Ground

Water Management Act, it is estimated that between 800,000 acres and 1,000,000 acres of farmland that is currently being utilized, will be fallowed. The assumed inflation rates do not take into account the potential fallowing farmland in the state, though it would likely compound the calculated inflation rates below.

In the financial analysis, land appreciation accounts for 67% of the estimated terminal value, therefore, analyzing and understanding actual land appreciation rates is fundamental to this model. An evaluation of permeant crop land appreciation across several regions in California's Central Valley was considered to understand how agriculture land has appreciated across the state and to determine whether land appreciation in the Sacramento Valley was an anomaly relative to other areas. The average appreciation rate as reported from 1995 – 2020 by the California Chapter of the ASFMRA is 6.4%, slightly higher than the 6.3% appreciation reported during the same period in the Sacramento Valley. This is finding is supported by the USDA, as it also indicates that general farmland appreciation, in California, has appreciated approximately 6.4% per annum between 1970 and 2017 (Service 2022).

Compound annual growth rates were taken in 5-year increments from 1995 through 2020 based aggregate data compiled by the California Chapter of ASFMRA. The analysis was looked at in 5-year increments to consider potential trends (California Chapter ASFMRA n.d.). When considering period over period appreciation rates, land value experienced the greatest appreciation between 2010 and 2020. In is during these periods that SGMA laws were being passed and permanent crop commodity prices were at record levels.

**Table 3.6: CAGR of Sacramento Valley Tree Nut Land Sales 1995 – 2020**

| Average Per Acre Price | | $5,875 | $5,700 | $9,000 | $10,875 | $25,500 | $26,750 |
|---|---|---|---|---|---|---|---|
| $5,875 | | 1995 | 2000 | 2005 | 2010 | 2015 | 2020 |
| $5,700 | 1995 | | -0.6% | 4.4% | 4.2% | 7.6% | 6.3% |
| $9,000 | 2000 | | | 9.6% | 6.7% | 10.5% | 8.0% |
| $10,875 | 2005 | | | | 3.9% | 11.0% | 7.5% |
| $25,500 | 2010 | | | | | 18.6% | 9.4% |
| $26,750 | 2015 | | | | | | 1.0% |

**Table 3.7: CAGR of North San Joaquin Valley Tree Nut Land Sales 1995 – 2020**

| Average Per Acre Price | | $7,750 | $9,500 | $14,750 | $18,625 | $32,250 | $31,375 |
|---|---|---|---|---|---|---|---|
| $7,750 | | 1995 | 2000 | 2005 | 2010 | 2015 | 2020 |
| $9,500 | 1995 | | 4.2% | 6.6% | 6.0% | 7.4% | 5.8% |
| $14,750 | 2000 | | | 9.2% | 7.0% | 8.5% | 6.2% |
| $18,625 | 2005 | | | | 4.8% | 8.1% | 5.2% |
| $32,250 | 2010 | | | | | 11.6% | 5.4% |
| $31,375 | 2015 | | | | | | -0.5% |

**Table 3.8: CAGR of Central Joaquin Valley Tree Nut Land Sales 1995 – 2020**

| Average Per Acre Price | | $6,000 | $6,750 | $10,500 | $13,250 | $28,375 | $28,750 |
|---|---|---|---|---|---|---|---|
| $6,000 | | 1995 | 2000 | 2005 | 2010 | 2015 | 2020 |
| $6,750 | 1995 | | 2.4% | 5.8% | 5.4% | 8.1% | 6.5% |
| $10,500 | 2000 | | | 9.2% | 7.0% | 10.0% | 7.5% |
| $13,250 | 2005 | | | | 4.8% | 10.5% | 6.9% |
| $28,375 | 2010 | | | | | 16.5% | 8.1% |
| $28,750 | 2015 | | | | | | 0.3% |

**Table 3.9: CAGR of South San Joaquin Valley Almond Land Sales 1995 – 2020**

| Average Per Acre Price | | $5,500 | $6,500 | $12,500 | $15,250 | $34,500 | $27,000 |
|---|---|---|---|---|---|---|---|
| $5,500 | | 1995 | 2000 | 2005 | 2010 | 2015 | 2020 |
| $6,500 | 1995 | | 3.4% | 8.6% | 7.0% | 9.6% | 6.6% |
| $12,500 | 2000 | | | 14.0% | 8.9% | 11.8% | 7.4% |
| $15,250 | 2005 | | | | 4.1% | 10.7% | 5.3% |
| $34,500 | 2010 | | | | | 17.7% | 5.9% |
| $27,000 | 2015 | | | | | | -4.8% |

ASFMRA reports both low and high values of actual farmland transacted in the respective region for the specific commodity. For the purpose of this analysis, the simple average of the two values was taken, and a compound annual growth rate was calculated in 5 year increments. This resulted in the estimated land appreciation rate for specific regions in California's Central Valley.

Based on the ASFMRA data, an appropriate bareland appreciation value for the Sacramento Valley is approximately 6.3%. Going forward, this appreciation value could be arguably higher, given the increased water security in Northern California relative to similar ground in Central and Southern California.

*3.2.4 Liquidation Valuation*

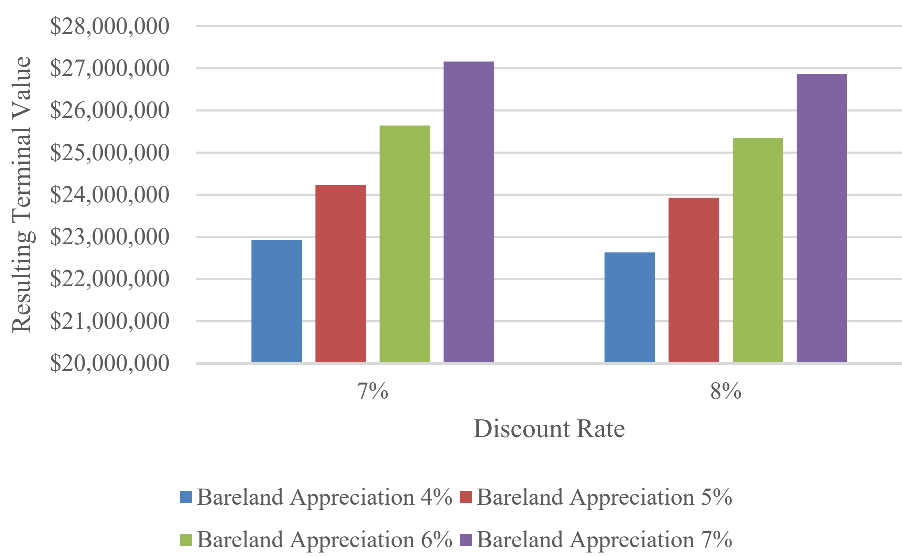
The base model used a 12% discount rate and a 4% inflation rate, resulting in a terminal value of $21,600,000. The data evaluated supports a lower discount rate and a higher bareland inflation rate. Using the revised inflation rate, along with the 8% discount rate, ceteris paribus, the expected return increases to 9.0%.

**Table 3.10: Revised Terminal Value Assumptions Using Adjusted Discount Rates and ASFMRA Data**

| **Unit $/acre** | | | |
|---|---|---|---|
| **Discount Rate** | 8.0% | | |
| **Bareland Growth Rate** | 6.3% | | |
| **Bareland Value 2021** | $18,000 | | |
| | | **Per Acre** | **Total** |
| **Bareland Value 2030** | | $31,194 | $17,690,000 |
| **NPV (2031 – 2040)** | | $14,287 | $8,101,000 |
| Total | | $45,485 | $25,790,000 |
| **CAGR** | | 2.7% | |

When evaluating the various scenarios, using bareland appreciation rates between 4% and 7%, incrementally increasing in 1% intervals and discount rates of 7% or 8%. The resulting terminal value ranges from $25.3 million to $27.2 million with respective IRRs of 8.9% to 9.4%.

**Figure 3.1 Terminal Value Calculation After Applying Historic Land Inflation Rates and Market Discount Rates**




### 3.3 Capitalization Rates

Capitalization rates are traditionally used in commercial real estate and refers to the expected return, based on the net operating income that the property generates. This formula allows for a direct comparison across multiple investments regardless of the asset class.

Capitalization rate are traditionally used when discussing returns to a client based on current market values, as shown in the formula below, however, if a capitalization rate is assumed, the model can estimate a potential terminal value based on the projected net operating income of a property.

$$Capitalization\ Rate = \frac{NOI_{P1}}{\text{Purchase } Price}$$

At the time of modeling, the orchard being acquired was considered to be immature and had revenues had not yet stabilized. However, once revenues stabilized, in approximately year 4 of ownership, the underwritten capitalization rate equates to 7.1%. When determining a terminal value, the capitalization rate calculated at inception can be applied to the future projected cashflows, to generate a terminal value. The formula below indicates how this can be done.

$$Terminal\ Value = \left( \frac{NOI_{P10}}{\left( \frac{NOI_{P1}}{Purchase\ Price} \right)} \right)$$

Based on actual appraisals, completed by several reputable appraisers, of tree nut properties located across the San Joaquin Valley and Sacramento Valley, acceptable capitalization rates for young mature almond orchards ranges between 5% and 12%.
At the time of projected sale, the estimated net operating income, in the model is $1,821,000 and using the aforementioned rates, the estimated terminal value of the property could be between $15,200,000 and $36,400,000.

Further narrowing the capitalization rate range, the most recent appraisal completed by Colliers International Valuation and Advisory Services, identified a capitalization rate range of 7.0% to 9.25% depending on the age of the specific orchard being evaluated.

The capitalization rate that this property was underwritten at was approximately 7%. Using this same rate at the time of projected sale would result in a terminal value of approximately $26,000,000, with an internal rate of return of 9.1%.

The table below highlights the impact to the estimated internal rate of return based on a range of appropriate capitalization rates.

**Table 3.11: Property Terminal Value Using the Capitalization Model**

| Final Year NOI | Capitalization Rate | Estimated Terminal Value | Estimated IRR Return |
|---|---|---|---|
| **$1,821,000** | 5% | $36,420,000 | 11.9% |
| | 6% | $30,350,000 | 10.3% |
| | 7% | $26,014,286 | 9.1% |
| | 8% | $22,762,500 | 8.0% |
| | 9% | $20,233,333 | 7.1% |
| | 10% | $18,210,000 | 6.4% |
| | 11% | $16,554,545 | 5.7% |
| | 12% | $15,175,000 | 5.1% |

### 3.4 Multiplier Approach

The final approach to be evaluated is less conventional in the investment agriculture sector, however, has merit as a potential method of determining the terminal value. The multiplier approach, sometimes referred to as the valuation approach, is a comparable analysis method that values similar companies or in this case industries using the same financial measurements. When several firms are within the same industry, this approach can assist in determining the value of firm 'A' based on the value or multiplier of another similar firm.

$$Terminal\ Value\ = NOI_{P10} * Exit\ Multiplier$$

In the Farming/Agriculture sector, the appropriate multiplier is estimated to be between 11.49x to 20.93x for all firms (Damodaran 2022).

As a modified approach, the average projected EBITDA over the 10-year holding period is estimated to be $1,373,000. With an expected purchase price of $17,500,000, the multiplier would be 12.75.

Using the 12.75 multiplier, in conjunction with the NOI of final year of the projected holding period, the estimated terminal value would be $23,210,000, resulting in an expected return of 8.2%. The table below highlights the potential terminal values based on the range of multipliers identified. The suggested terminal value would range between $19,356,800 and $34,505,600. The multiplier methodology is not believed to be traditionally accepted amongst investment groups for farmland acquisitions, as most investment institutions utilize public data such as quarterly or annual reports to determine what an industry standard multiple should be. There are few public firms that are solely in the agriculture space and have detailed financials which could be use to generate an industry standard multiplier.

The resulting terminal value, using the multiplier approach is slightly more conservative than the other methods evaluated, as detailed in table 3.12.

**Table 3.12: Property Terminal Value Based on Industry Standard Exit Multiplier**

| Average Projected Returns 2025 - 2030 | Multiplier | Estimated Terminal Value | Estimated IRR Return |
|---|---|---|---|
| **$1,683,200** | 20.5 | $37,330,500 | 12.1% |
| | 19.5 | $35,509,500 | 11.70% |
| | 18.5 | $33,688,500 | 11.20% |
| | 17.5 | $31,867,500 | 10.80% |
| | 16.5 | $30,046,500 | 10.30% |
| | 15.5 | $28,225,500 | 9.70% |
| | 14.5 | $26,404,500 | 9.20% |
| | 13.5 | $24,583,500 | 8.60% |
| | 12.5 | $22,762,500 | 8.00% |
| | 11.5 | $20,941,500 | 7.40% |

# CHAPTER IV: RESULTS

Based on the analyses above, and comparing three different methodologies for calculating terminal value, there is evidence that the actual return should be 0.6 to 1.60 percentage points greater than what was used. The methodology of 'guess and check' as historically used within the investment firm can result in an artificially low or high estimated rates of return and is not fundamentally supported by actual data.

When considering the implications of the methodologies attempted above, it is clear that the that terminal value calculated using the multiplier methodology, may be underestimating the terminal value. However, this may be a limitation of the formula given that it is evaluating and comparing the industry EBITDA with the respective purchase price or asset value at a specific point in time. This formula may result in higher terminal values in times of economic growth within the sector.

Both the liquidation and the capitalization methodologies are supportable by historic data and have merit for future use in identifying an appropriate terminal value range. These formulas are limited given their reliance on projected the ability to accurately predict future prices and expenses.

The liquidation valuation method has merit as the most accurate measurement as it relies heavily on actual historic data, such as bareland inflation rates and historic performance relative to the potential opportunity costs of the capital being placed.

Using this methodology, bareland appreciation rates ranging between 5.8% and 7% are supportable by historical actuals, based on properties sold in various regions in the state. Additionally, the CAPM model supports a 5% to 8% discount rate, establishing an estimated return between 8.9% and 9.4%. When using the 8% capitalization rate, and the historic bareland inflation rate, the resulting terminal value is $25,790,000, resulting in a projected return of 9.0%

The capitalization model suggests a terminal value of $26,017,000, this is the highest calculated terminal value of the modeled methodologies and indicates a projected internal rate of return of 9.1%.

A potential drawback to the use of a capitalization rate is the inability of the calculation to fully account for the value of the assets. In this example, there is significant development and carrying costs associated with the planting and establishing of almond trees. The initial calculation of the capitalization rate, during the first couple years of ownership, does not account for that and artificially deflates the potential value of the property, therefore the capitalization rate being used, is only as accurate as the underlying data supporting the future projections of the asset.

The simplicity of the multiplier approach makes it an attractive methodology for evaluating a firm's terminal value. However, given that a true multiplier is based on how similar firms in the sector are valued in the market, this can be viewed as a relative value and does not take into consideration future discounted cashflows.  The multiplier calculated, does fall within the range of acceptability, however, it does error on the side of conservatism, which could be reflective of the potential conservatism built into projected revenues and expenses.

**Table 4.1: Terminal Value Direct Comparisons**

| | Estimated Terminal Value | Estimated IRR Return |
|---|---|---|
| **Base Model** | $21,600,000 | 7.6% |
| **Liquidation Model** | $25,790,000 | 9.0% |
| **Capitalization rate** | $26,015,000 | 9.1% |
| **Multiplier Approach** | $23,210,000 | 8.2% |
| **Average** | $25,005,000 | 8.8% |

The base model originally used under values the asset and underestimates the projected return, relative to other commonly used methodologies. Within the investment firm, historical data is often viewed as too aggressive, however, it is supported based on the similar results found using the capitalization rates. The average terminal value calculation of the three methodologies was $25,005,000, resulting in a projected return of 8.8% or 1.20% higher than the base model.

# CHAPTER V: CONCLUSION

The evaluation of terminal value calculations in relation to a 2021 acquisition of a 567-acre almond ranch located in the Sacramento Valley indicates that original terminal value calculation that assumes a bareland appreciation of 4% and a discount rate of 12% resulting, errors on the side of conservatism relative to the models evaluated, and could potentially dissuade an investor or fund from pursuing the potential acquisition.

When modifying the liquidation valuation to use historical data, the estimated potential return could be as much as 1.40 percentage points higher than what was originally modeled. Similarly, given the minimal risk associated with farmland investments, relative to the S&P 500, it was determined that the base model under estimated the potential long-term valuation by 1.50 percentage points. The multiplier valuation method can also be viewed as relatively conservative in relation to the two aforementioned methodologies, however, it also yielded a return that was 0.60 percentage points higher than the base model.

While many of the Funds managed by the investment firm have indicated return thresholds they would like to meet. Funds that have more aggressive return thresholds, may be more suited to using the liquidation or capitalization rate models, while firms that are looking for more consistency within their portfolio may be inclined to use the more conservative methodology to determine investments opportunities within their risk appetite. This analysis is for the specific property in the Sacramento Valley. Each acquisition has other differing variables that are considered during the investment analysis which would impact the calculated terminal value.

Future projects could include an evaluation of actual costs increases over time, or a more in-depth price analysis to sure up those assumptions.

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