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Farmland Values in California: Pre- and Post-COVID-19 Perspectives



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Abstract

The specialty crop industry in California is still adapting to the ever-changing circumstances in the aftermath of the COVID-19 outbreak, including labor shortage and market disruptions. This article utilizes secondary data to shed light on the most recent trends in farmland values for specific fruits and tree nuts in the state, as well as the various factors that may impact farmland values. These factors encompass crop yield, production levels, and a range of macroeconomic indicators. Subsequently, we employ correlation analyses to furnish

evidence indicating that the degree of association between farmland values in California and these factors differs depending on the type of commodity.

INTRODUCTION

Similar to other major fruit and vegetable areas of the world, California's specialty crop growers faced unprecedented shocks to the supply chain due to the COVID-19 outbreak. This resulted in shifts in food prices (Yu et al., 2020; Bairagi, Mishra, and Mottaleb, 2022) and labor shortages (Beatty, Martin, and Rutledge, 2020; Charlton and Castillo, 2020). The global food supply experienced disruptions to varying degrees—for example, the fresh produce supply chain remained robust in Canada during the pandemic (Richards and Richard, 2020; Chenarides, Richards, and Richard, 2021), and vegetable supply chains demonstrated resilience in Ethiopia (Hirvonen et al., 2021), but produce supply chains were severely disrupted in Senegal (Fabry et al., 2022). The economic impacts of COVID-19 on different specialty crops in the U.S. varied, such as increased production expenses and supply chain disruptions (Ridley and Devadoss, 2020; Goodrich, Kiesel and Bruno, 2021).

Understanding the trends of farmland prices is crucial for growers, as land serves as both an essential input and asset. Due to the economic shutdown during the COVID-19 pandemic, agricultural producers expect to face reduced crop returns, which is putting downward pressure on farmland values (Lawley, 2020). However, numerous prior studies exploring the impact of COVID-19 on farmland values have revealed either positive or no discernible effect in various geographic areas. For instance, Deaton (2021) conducted a survey on farmland values in Ontario and reported that nearly 60% of respondents indicated no effect of COVID-19 on the land values, with more than 80% of respondents expected farmland values in the area to remain stable or increase after 2020. Oppendahl (2021) found an average annual increase of 6% in agricultural land values in five Midwest states from 2020 to 2021. Similarly, Zhang (2020) and Zhang and

Duffy (2020) conducted a survey in Iowa and indicated that respondents anticipated stable or rising land values in the year following 2020. Additionally, Zhang and Basha (2022) used secondary data to demonstrate that the average farmland values in the state of Iowa rose by 30% in 2021. However, there is a scarcity of research regarding farmland values in California. In this research, our primary focus is on California, given its unique role in nurturing the growth of a diverse range of specialty crops. We choose to study the years 2018 to 2020, encompassing pre-pandemic (2018-2019), pandemic (2020), and post-pandemic years (2021-2022).

There are some general trends of farmland values in California compared to the U.S. between 2018 and 2020 based on the data from the USDA National Agricultural Statistics Service (USDA NASS, 2023). As shown in Table 1, farmland values in California are three times higher than the national average in the U.S. Prior to the COVID-19 outbreak, the values of both cropland and farmland including buildings were increasing in both the U.S. and California. However, as seen in Table 1, the rate of increase was significantly higher in California. In 2020, the value of California's cropland experienced a slight increase of 0.5%, despite disruptions in the specialty crop industry. Meanwhile, cropland value in the U.S. remained unchanged from the previous year. Following 2020, both cropland values and values of farmland with buildings experienced rapid growth, both in the state and nationally, with the country seeing a slightly higher growth rate. It appears that the onset of COVID-19 initially slowed down the growth of farmland values, but the increase rebounded swiftly thereafter.

Another trend of economic interest is the rent paid for farmland, which represents the net return on the agricultural land. When adjusting for inflation, we examined the real cropland price-to-rent ratios over the past five years, mirroring the findings of Zulauf, et al. (2022), which revealed a consistent upward trend in the U.S. However, as shown in Figure 1, in California, these ratios trended down between 2018 and 2020. From 2021 onward, there was a rapid and substantial increase, surpassing the national trend. This divergence can be attributed to pre-pandemic conditions, when cash rents for cropland in California experienced a notably faster growth compared to the appreciation of farmland values. In 2021, when cash rents decreased, farmland value in the state continued to rise.

To further understand the trends and elements that influence the farmland values in California, in the rest of the paper, we will analyze secondary data from

2018-2022 to track recent trends in farmland values for three tree nuts (walnuts, almonds, pistachios) and a group of fruits (wine, raisin, and table grapes, peaches, cherries, citrus, avocados, strawberries, and dates) in California. Given the prevalence of specialty crops in the state, we consider a diverse group of factors that might influence farmland values in California. Additionally, we use correlation analysis to discern associations between farmland values and these factors, depending on the specific type of commodity. Our study aims to shed light on the varied trends in California's farmland values and their connections to commodity and farmland market conditions, as well as the broader macroeconomic environment.

CALIFORNIA FARMLAND VALUES IN RECENT YEARS

Tree nuts—walnuts, almonds, pistachios—collectively contribute 6% to California's farm value (CDFA 2023). As displayed in Table 2, from 2018 to 2022, average per-acre values for pistachio land were highest at \$46,100, followed by almonds at \$38,142, and walnuts at \$32,680. In 2020, values for all three increased, with pistachios leading at 14.29%. Post-2020, almonds and pistachios continued rapid growth, while walnut values slightly dropped in 2021 but rebounded in 2022. Over five years, almond values increased 25%, pistachios rose 55%, and walnuts remained stable.

For grapes, significant increases occurred in wine grape farmland values (28% from 2018 to 2022), raisin grapes (26%), and moderate changes in table grapes. In 2020, grape values remained stable, except for table grapes, which surged by 28.16%. Post-pandemic, wine and raisin grapes resumed upward trends, while table grape values dropped in 2022.

Farmland values for various fruits showed diverse trends. Avocado and date values surged over 20%, citrus and strawberries rose around 16%, and peaches and cherries increased slightly over 10%. In 2020, values remained stable or slightly increased, with significant variations post-2020.

Factors that Influence Farmland Values

Agricultural Returns to Farmland

California contributes 73% of total farm cash receipts for key commodities in the U.S. (Skorbiansky et al., 2022). Figure 2 illustrates nominal cash receipts for fruits and nuts, revealing a 4.5% drop in 2020 due to COVID-19 challenges (Johnson, 2020). However, 2021

and 2022 saw a rebound, reaching \$30.84 million, driven by increased consumer demand and adaptive food supply chains.

Commodity Prices

Approximately 75% of U.S. fruits and nuts are from California, contributing 44% to total farm sales (Goodhue, Martin, and Simon, 2021). Table 3 indicates significant price fluctuations for walnuts, pistachios, almonds, and grapes. Notably, walnut prices rose by 20.83%, but in 2022, walnut growers faced a 56.55% decrease. Grapes are an important specialty crop cultivated in California, contributing a total of \$5.23 billion in 2022 (CDFA, 2023). Grape growers also witnessed notable fluctuations, with table grapes leading to a 19.13% price increase in 2022.

In the post-2020 years, most commodities saw rapid price increases such as peaches, cherries, and avocados. Avocado prices, in particular, surged at a remarkable rate partially due to the growing global demand for this commodity (Huang, Blare, and Hammami, 2023).

Commodity Production

Table 4 depicts fluctuations in tree nut and grape production. Noteworthy is the 2020 surge in tree nut production and a subsequent decline in almond and pistachio production in 2022. Grape production showed declines, and as of 2022, production levels for several commodities remained below pre-pandemic levels.

Macroeconomic Environment

Numerous macroeconomic variables can influence farmland values, such as interest rates, inflation rates, housing prices, and prevailing trends in the stock market (Lawley, 2020; Schnitkey, 2016). Table 5 highlights the 58.41% drop in the 10-year treasury bond interest rate in 2020. Although lower interest costs might cause additional investments with lower capital costs, Cheng, Wessel, and Younger (2020) found that the drastic decline triggered investment uncertainty, resulting in altered investment strategies. By 2022, the interest rate had rebounded to its 2018 level, which marked a possible sign in the economic recovery.

Regarding inflation, we examine the Consumer Price Index (CPI) and Producer Price Index (PPI) for fruits and vegetables, key indicators of price trends in these essential specialty crop commodities (BLS, 2023a; BLS, 2023b). Inflation, measured by CPI and PPI for fruits

and vegetables, surged in 2022, with CPI rising by 8.53% and PPI by 14.78%.

We also consider housing prices, which have been shown to be associated with farmland values, depending on proximity (Huang, et al., 2006). Over the course of the last five years, the most striking development occurred in 2022, when the median prices of single-family homes in California surged by 44% when compared to the baseline year of 2018.

Before the pandemic, the stock market was thriving. However, when COVID-19 struck, and many businesses across various industries were forced to close, the growth rate of the Dow Jones Index plummeted significantly. The pattern of the S&P 500 Index over the last five years closely mirrors that of the Dow Jones Index, which underscores the synchronized movement of these two influential market indicators. However, the growth rate of the S&P 500 Index did not plummet as steeply as that of the Dow Jones Index. This could be attributed to the broader diversity of companies represented in the S&P 500 Index, which includes a wider range of industries.

RESULTS FROM CORRELATION ANALYSIS

In examining the factors influencing fluctuations in farmland values across various commodities in California, three distinct groups of factors were analyzed. The first group focused on commodity-specific factors, including cultivated acres, crop yield, total production, and grower prices. The second group extended the analysis to macroeconomic indicators such as CPI, PPI, Dow Jones Index, 10-year treasury bond interest rates, and housing prices. The third group explored factors linked to agricultural land and farm returns, including cash rent for irrigated crop land, assessed value of irrigated crop land, and cash receipts for fruit and tree nut farmers.

Tree Nuts

Figure 3 illustrates correlations between farmland values of different tree nuts and the three groups of factors. Notably, associations vary among almonds, pistachios, and walnuts. Almond and pistachio farmland values show a positive correlation with acres but a negative correlation with yield, while walnut values exhibit different patterns. Macro-economic factors show interesting relationships, with pistachios and almonds aligning closely with CPI, PPI, Dow Jones Index, and housing prices, while walnuts display distinct correlations. Agricultural land and farm returns

indicate shared patterns for almonds and pistachios, with a potential tradeoff between crop land rental costs and land values.

Grapes

Figure 4 reveals consistent correlations for farmland values of wine, raisin, and table grapes. Negative correlations exist with factors like acres, yield, and total production, while positive associations are observed with grower prices. Macro-economic factors exhibit shared patterns, with all grape varieties showing a negative correlation with 10-year treasury bond interest rates. Wine and raisin grapes display positive relationships with the value of irrigated cropland and cash receipts, while table grapes show a negative association.

Other Fruits

In Figure 5, farmland values for different fruits demonstrate positive correlations with various indicators and negative correlations with cash rent for irrigated cropland. Varied relationships exist with factors like acres, yield, total production, grower prices, and interest rates.

Except for peach land, farmland values of all commodities demonstrate a positive relationship with acres bearing. Similarly, these values show a negative relationship with yield except for dates land. Furthermore, farmland values of peaches, cherries, citrus, and avocados are negatively correlated with total production, while the land values for strawberries and dates display a strong positive relationship with total output. Moreover, farmland values of peaches, cherries, avocados, and strawberries exhibit a robust positive correlation with grower prices, whereas the land values for citrus and dates show a negative relationship with prices.

Based on the correlation coefficients, we present a list of commodities with significant associations with variables in the three groups. Table 6 shows that farmland values for pistachios, almonds, cherries, citrus, strawberries, and dates display robust positive correlation with acres bearing. Meanwhile, land values for strawberries and dates also display strong positive correlations with total production. Conversely, farmland values of three types of grapes and peaches show significant negative correlations with yield and total production. The land values of peaches, cherries, avocados, and strawberries trend in line with grower prices, while those of the three tree nuts and citrus move inversely to prices.

In addition, farmland values for pistachios, almonds, wine grapes, raisin grapes, peaches, cherries, citrus, avocados, strawberries, and dates share a significantly positive relationship with CPI, PPI, Dow Jones Index, and housing prices. They also demonstrate strong positive correlations with values of irrigated cropland and cash receipts but a marked negative relationship with cash rents for irrigated cropland. Furthermore, farmland values for walnuts, peaches, and cherries show a strong positive relationship with 10-year treasury bond interest rates, whereas those of table grapes and dates exhibit a strong negative association with the same variable.

CONCLUSIONS

Farmland values in California experienced varying degrees of fluctuations between 2018 and 2022. Among the 12 tree nuts and fruits assessed, all showed stability or increases in land value in 2020 compared to 2019. The majority of these commodities continued an upward trajectory in farmland value in the post-pandemic years.

Additionally, we examined the changes in three groups of factors that might influence farmland values and their correlations with land value changes. Farmland values of 10 selected commodities exhibited a strong positive correlation with CPI, PPI, and housing prices. Stock market conditions showed a positive relationship with land values for pistachio, almond, wine grape, raisin grape, citrus, strawberry, and dates. Moreover, walnut, peach, and cherry land values were positively related to 10-year treasury bond interest rates. However, higher land values for table grapes and dates were associated with lower interest rates.

We find that farmland values for all selected commodities have a significant positive association with cash receipts, except for walnut, table grape, and dates. Land values for pistachio, almond, wine grape, raisin grape, cherry, citrus, avocado, strawberry, and dates share a significant negative association with cash rent paid for irrigated cropland. Furthermore, the land values of tree nuts are positively associated with either acres bearing or yield. Strawberry land values are positively related to acres bearing, total production, and grower prices. Interestingly, farmland values for all three grape varieties are negatively correlated with acres bearing, yield, and total production, while those for tree nuts and citrus are negatively correlated with grower prices.

Our study is exploratory, and our findings do not establish direct causal relationships between farmland

values in California and variables in the three groups covering commodity and land markets, as well as the macroeconomic environment. Nevertheless, they offer valuable insights into the intricate dynamics of the agricultural land market. Our findings also suggest several avenues for future research, all of which have the potential to yield insights for industrial and policymaking audiences. By shedding light on the significant relationships and identifying potential influential factors, our study contributes to a deeper understanding of the various factors in shaping farmland values for specialty crops in the state.

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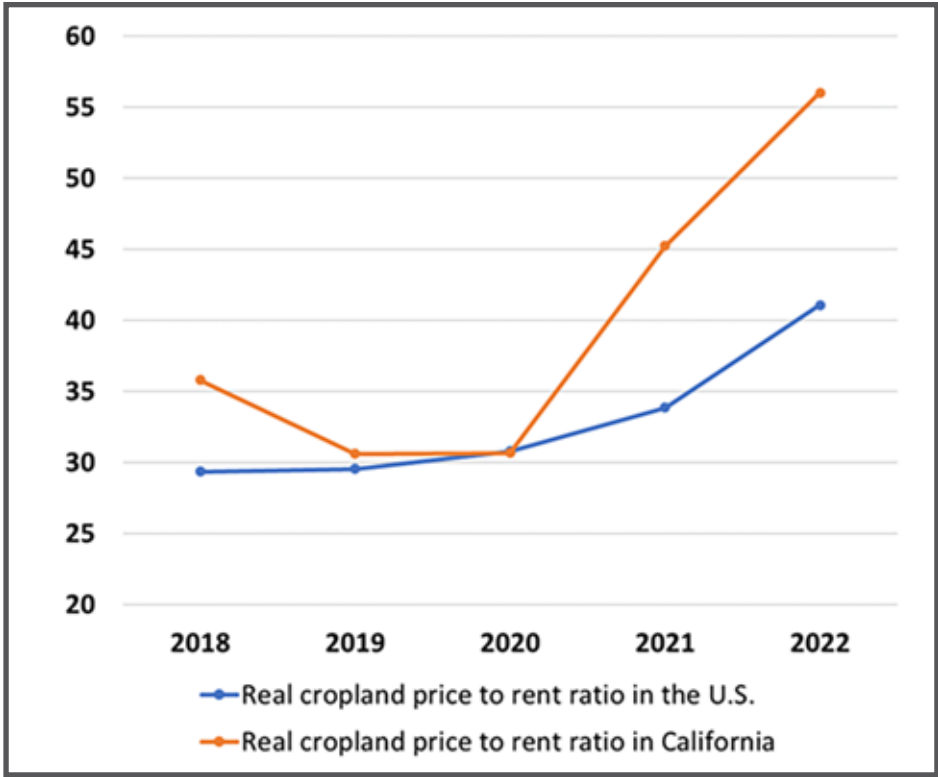


Figure 1. Real cropland price to cash rent ratios in California and in the United States during 2018–2022 (Source: Ratios calculated based on the data from USDA NASS and BLS)

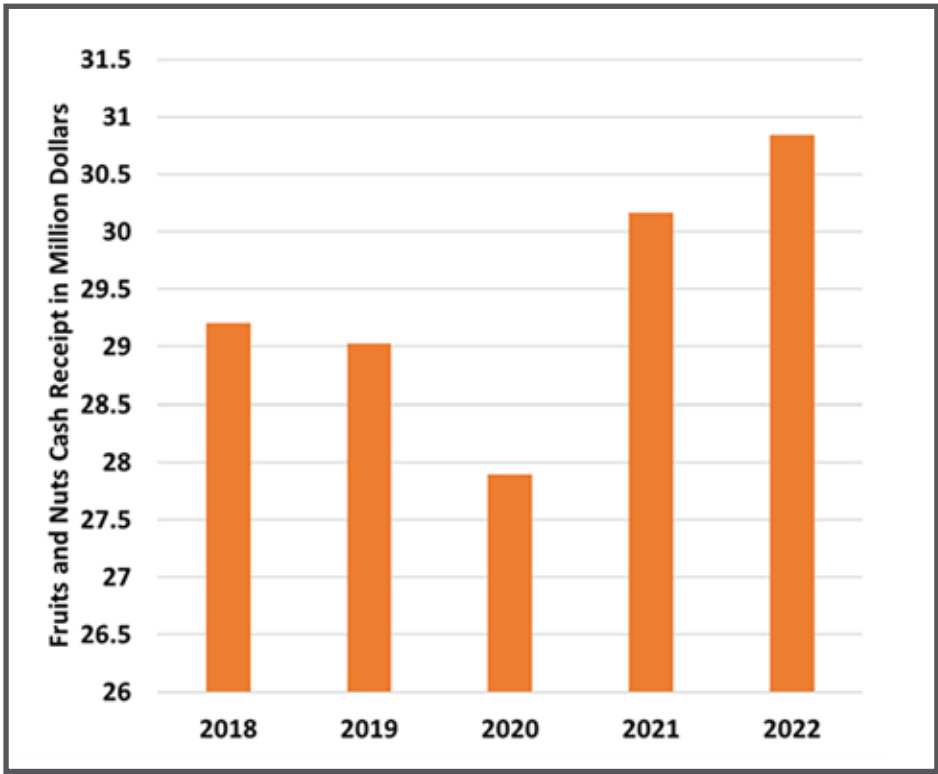


Figure 2. Nominal cash receipts for fruits and nuts in the United States during 2018–2022 (Source: USDA ERS 2022)

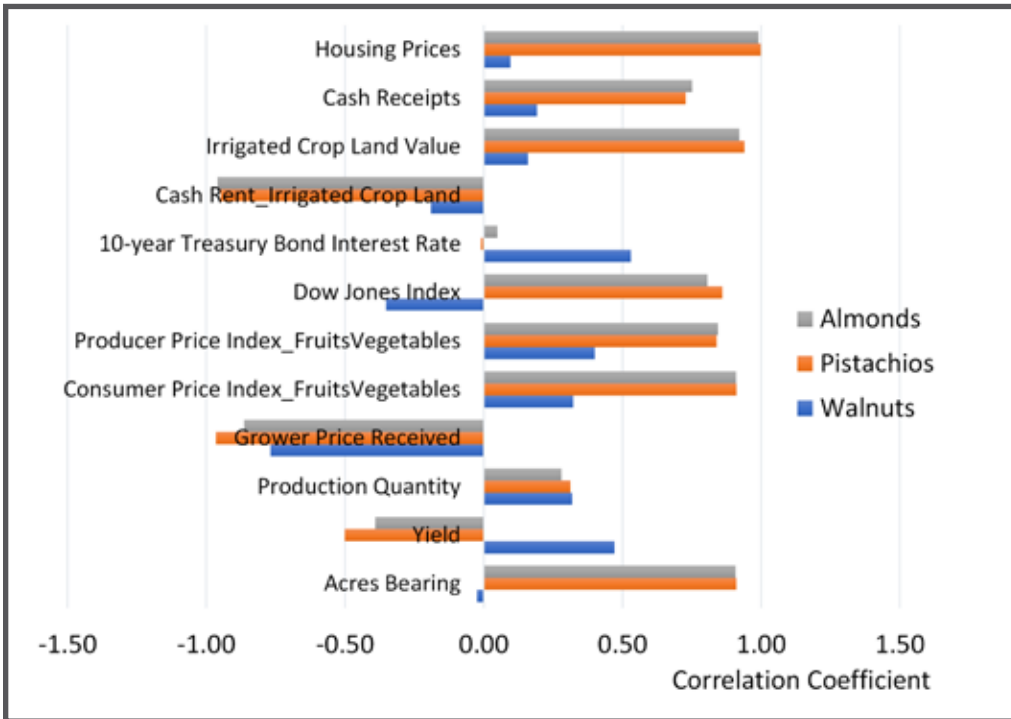


Figure 3. Correlations between California tree nut farmland values and selected factors

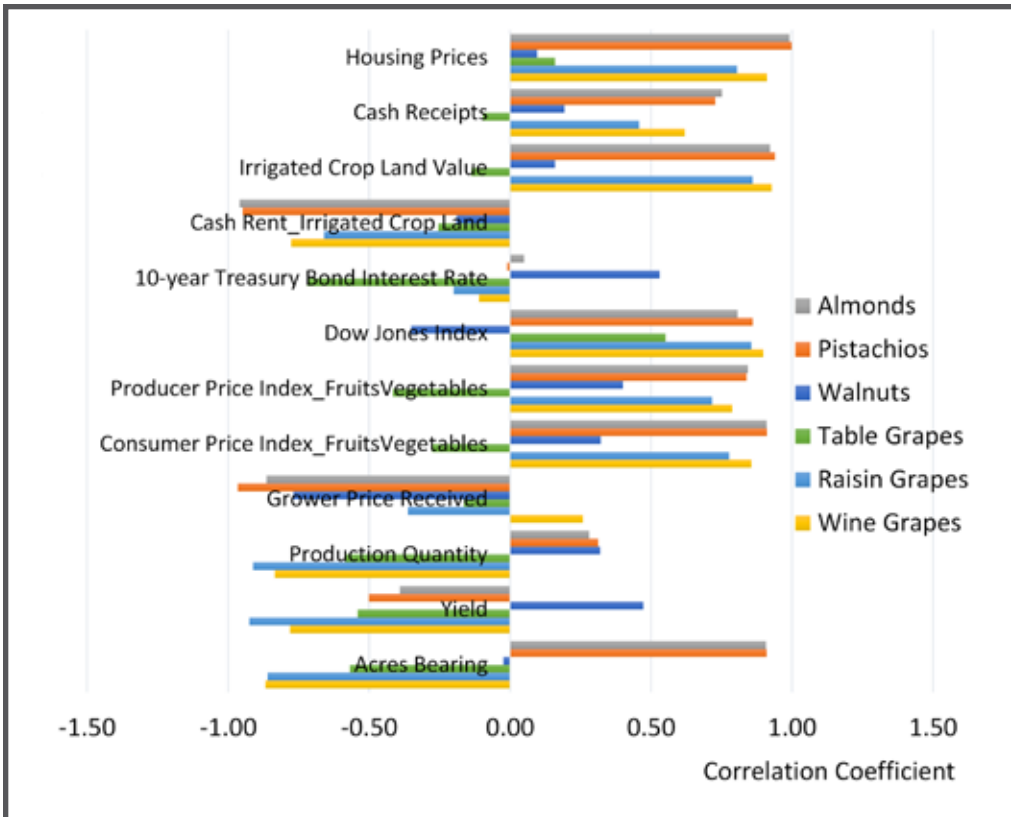


Figure 4. Correlations between California grape farmland values and selected factors

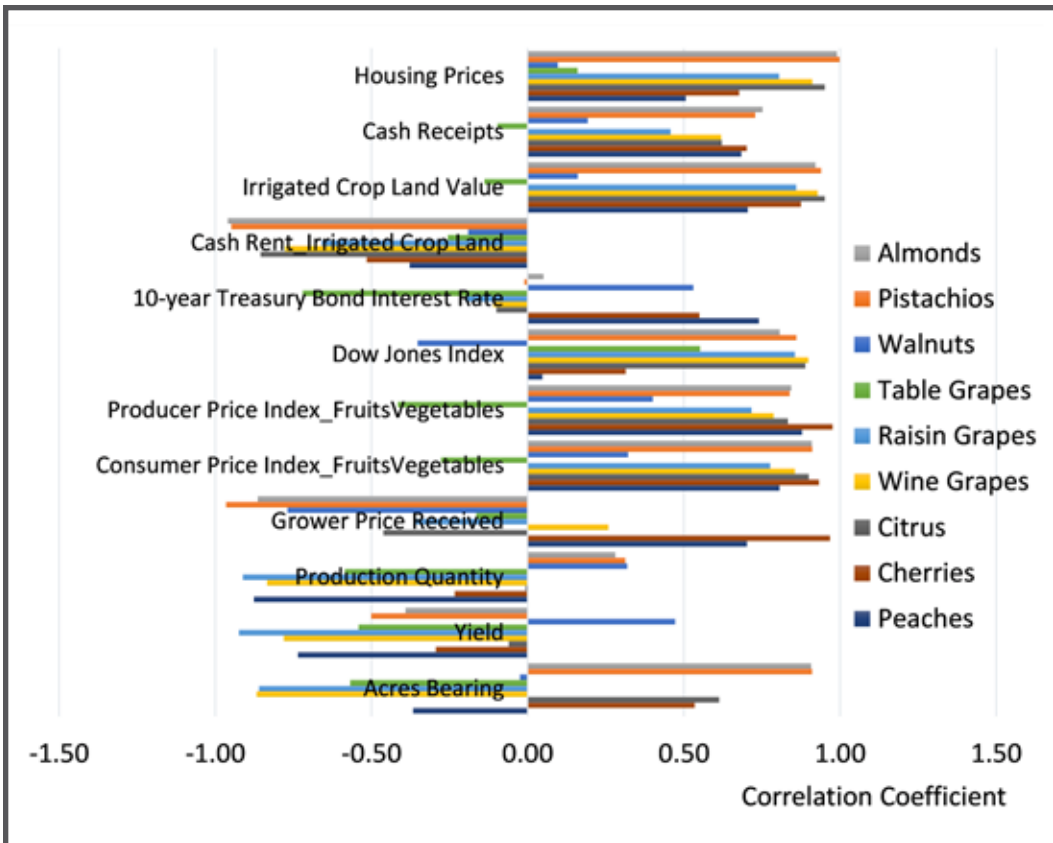


Figure 5. Correlations between California fruit farmland values and selected factors

| Table 1. Nominal Agricultural Land Values in California and in the United States, 2018–2022, \$/Acre | | | | | | | | |
|--|------------|-----------------|-----------------------------|-----------------|---------------|-----------------|-----------------------------|-----------------|
| Year | California | | | | United States | | | |
| | Cropland | Annual % change | Ag Land including buildings | Annual % change | Cropland | Annual % change | Ag Land including buildings | Annual % change |
| 2018 | \$12,170 | | \$9,350 | | \$ 4,050 | | \$3,100 | |
| 2019 | \$12,830 | 5.4% | \$10,000 | 7.0% | \$ 4,100 | 1.2% | \$3,160 | 1.9% |
| 2020 | \$12,900 | 0.5% | \$10,000 | 0.0% | \$ 4,100 | 0.0% | \$3,160 | 0.0% |
| 2021 | \$13,860 | 7.4% | \$10,900 | 9.0% | \$ 4,420 | 7.8% | \$3,380 | 7.0% |
| 2022 | \$15,410 | 11.2% | \$12,000 | 10.1% | \$ 5,050 | 14.3% | \$3,800 | 12.4% |

Source: USDA NASS Quick Stats 2023.

Table 2. Nominal Agricultural Land Values and Annual Returns for Selected Specialty Crops in California

| Tree Nuts Year | Walnuts | | Almonds | | Pistachios | |
|----------------------|-------------|----------|---------------|----------|--------------|----------|
| | \$/Acre | % change | \$/Acre | % change | \$/Acre | % change |
| 2018 | \$33,650 | \$34,750 | | \$37,000 | | |
| 2019 | \$31,500 | -6.39% | \$34,000 | -2.16% | \$38,500 | 4.05% |
| 2020 | \$32,750 | 3.97% | \$37,000 | 8.82% | \$44,000 | 14.29% |
| 2021 | \$32,000 | -2.29% | \$41,500 | 12.16% | \$53,500 | 21.59% |
| 2022 | \$33,500 | 4.69% | \$43,458 | 4.72% | \$57,500 | 7.48% |
| Grapes Year | Wine Grapes | | Raisin Grapes | | Table Grapes | |
| | \$/Acre | % change | \$/Acre | % change | \$/Acre | % change |
| 2018 | \$127,700 | \$30,000 | \$37,667 | | | |
| 2019 | \$145,400 | 13.86% | \$35,000 | 16.67% | \$38,667 | 2.65% |
| 2020 | \$145,400 | 0.00% | \$35,000 | 0.00% | \$38,667 | 0.00% |
| 2021 | \$156,400 | 7.57% | \$36,000 | 2.86% | \$40,500 | 4.74% |
| 2022 | \$164,000 | 4.86% | \$38,000 | 5.56% | \$37,167 | -8.23% |
| Other Fruits Year | Peaches | | Cherries | | Citrus | |
| | \$/Acre | % change | \$/Acre | % change | \$/Acre | % change |
| 2018 | \$30,000 | \$36,000 | \$42,667 | | | |
| 2019 | \$28,000 | -6.67% | \$36,000 | 0.00% | \$45,000 | 5.47% |
| 2020 | \$28,000 | 0.00% | \$36,000 | 0.00% | \$46,083 | 2.41% |
| 2021 | \$28,000 | 0.00% | \$36,000 | 0.00% | \$47,833 | 3.80% |
| 2022 | \$34,000 | 21.43% | \$40,000 | 11.11% | \$49,583 | 3.66% |
| Year | Avocados | | Strawberries | | Dates | |
| | \$/Acre | % change | \$/Acre | % change | \$/Acre | % change |
| 2018 | \$44,000 | \$60,167 | \$50,000 | | | |
| 2019 | \$45,000 | 2.27% | \$64,333 | 6.93% | \$57,000 | 14.00% |
| 2020 | \$45,000 | 0.00% | \$66,167 | 2.85% | \$60,000 | 5.26% |
| 2021 | \$45,000 | 0.00% | \$68,917 | 4.16% | \$60,000 | 0.00% |
| 2022 | \$54,000 | 20.00% | \$70,250 | 1.93% | \$60,000 | 0.00% |

Source: Trends 2023.

Table 3. Prices Received by Growers in California for Selected Specialty Crops

| Tree Nuts Year | Walnuts | | Almonds | | Pistachios | |
|----------------------|-------------|----------|---------------|----------|--------------|----------|
| | \$/lb | % change | \$/lb | % change | \$/lb | % change |
| 2018 | \$0.68 | | \$2.50 | | \$2.65 | |
| 2019 | \$0.95 | 40.00% | \$2.45 | -2.00% | \$2.81 | 6.04% |
| 2020 | \$0.60 | -36.51% | \$1.71 | -30.20% | \$2.51 | -10.68% |
| 2021 | \$0.73 | 20.83% | \$1.86 | 8.77% | \$2.16 | -13.94% |
| 2022 | \$0.32 | -56.55% | \$1.40 | -24.73% | \$2.11 | -2.31% |
| Grapes Year | Wine Grapes | | Raisin Grapes | | Table Grapes | |
| | \$/lb | % change | \$/lb | % change | \$/lb | % change |
| 2018 | \$0.51 | | \$0.21 | | \$0.49 | |
| 2019 | \$0.49 | -3.76% | \$0.13 | -37.85% | \$0.52 | 5.32% |
| 2020 | \$0.40 | -18.11% | \$0.13 | -3.76% | \$0.66 | 28.16% |
| 2021 | \$0.50 | 25.25% | \$0.18 | 38.28% | \$0.58 | -12.88% |
| 2022 | \$0.54 | 7.32% | \$0.19 | 6.78% | \$0.69 | 19.13% |
| Other Fruits Year | Peaches | | Cherries | | Citrus | |
| | \$/lb | % change | \$/lb | % change | \$/lb | % change |
| 2018 | \$0.32 | | \$1.59 | | \$23.94 | |
| 2019 | \$0.30 | -6.42% | \$1.76 | 10.69% | \$16.64 | -30.51% |
| 2020 | \$0.37 | 22.24% | \$1.66 | -5.97% | \$15.45 | -7.15% |
| 2021 | \$0.38 | 2.87% | \$1.72 | 3.93% | \$19.15 | 23.99% |
| 2022 | \$0.44 | 17.42% | \$2.24 | 29.94% | \$18.40 | -3.94% |
| Year | Avocados | | Strawberries | | Dates | |
| | \$/lb | % change | \$/lb | % change | \$/lb | % change |
| 2018 | \$1.14 | | \$0.90 | | \$1.48 | |
| 2019 | \$1.72 | 51.54% | \$1.10 | 22.91% | \$1.43 | -3.38% |
| 2020 | \$1.10 | -36.34% | \$0.93 | -15.36% | \$1.16 | -18.88% |
| 2021 | \$1.22 | 10.96% | \$1.25 | 34.26% | \$1.54 | 32.33% |
| 2022 | \$1.77 | 45.27% | \$1.08 | -13.60% | \$1.42 | -7.49% |

Source: USDA NASS Quick Stats 2023.

Table 4. Total Production Quantity in California for Selected Specialty Crops

| Tree Nuts Year | Walnuts | | Almonds | | Pistachios | |
|----------------------|-------------|----------|---------------|----------|--------------|----------|
| | 1,000 tons | % change | 1,000 tons | % change | 1,000 tons | % change |
| 2018 | 679 | | 1,140 | | 494 | |
| 2019 | 655 | -3.53% | 1,280 | 12.28% | 371 | -24.92% |
| 2020 | 790 | 20.61% | 1,558 | 21.68% | 523 | 41.03% |
| 2021 | 725 | -8.23% | 1,458 | -6.42% | 578 | 10.53% |
| 2022 | 752 | 3.72% | 1,283 | -12.01% | 441 | -23.64% |
| Grapes Year | Wine Grapes | | Raisin Grapes | | Table Grapes | |
| | 1,000 tons | % change | 1,000 tons | % change | 1,000 tons | % change |
| 2018 | 4,285 | | 1,545 | | 1,300 | |
| 2019 | 3,920 | -8.52% | 1,380 | -10.68% | 1,190 | -8.46% |
| 2020 | 3,415 | -12.88% | 1,190 | -13.77% | 1,110 | -6.72% |
| 2021 | 3,635 | 6.44% | 1,070 | -10.08% | 1,050 | -5.41% |
| 2022 | 3,380 | -7.02% | 1,010 | -5.61% | 1,120 | 6.67% |
| Other Fruits Year | Peaches | | Cherries | | Citrus | |
| | 1,000 tons | % change | 1,000 tons | % change | 1,000 tons | % change |
| 2018 | 479 | | 44 | | 3,536 | |
| 2019 | 498 | 3.97% | 53 | 19.38% | 4,072 | 15.16% |
| 2020 | 503 | 1.00% | 64 | 20.54% | 4,260 | 4.62% |
| 2021 | 505 | 0.40% | 99 | 55.79% | 4,136 | -2.91% |
| 2022 | 475 | -5.94% | 54 | -45.80% | 3,472 | -16.05% |
| Year | Avocados | | Strawberries | | Dates | |
| | 1,000 tons | % change | 1,000 tons | % change | 1,000 tons | % change |
| 2018 | 169 | | 1,165 | | 29 | |
| 2019 | 108 | -35.88% | 1,039 | -10.85% | 48 | 65.50% |
| 2020 | 188 | 73.33% | 1,188 | 14.35% | 49 | 1.74% |
| 2021 | 135 | -28.25% | 1,208 | 1.68% | 53 | 7.16% |
| 2022 | 138 | 2.52% | 1,239 | 2.61% | 49 | -6.57% |

Source: USDA NASS Quick Stats 2023.

Table 5. Macroeconomic Indicators and Annual Changes During 2018–2022

| Year | 10-Year Treasury Bond Interest Rate | | Consumer Price Index | | Producer Price Index | |
|-------------|-------------------------------------|----------|----------------------|----------|-----------------------|----------|
| | Average Yield | % change | F&V | % change | F&V | % change |
| 2018 | 2.91% | | 297.79 | | 186.83 | |
| 2019 | 2.14% | -26.46% | 300.85 | 1.03% | 188.30 | 0.79% |
| 2020 | 0.89% | -58.41% | 304.93 | 1.35% | 190.46 | 1.15% |
| 2021 | 1.45% | 62.92% | 314.81 | 3.24% | 195.83 | 2.82% |
| 2022 | 2.95% | 103.45% | 341.67 | 8.53% | 224.78 | 14.78% |
| Year | Prices of Single-Family Home | | Dow Jones Index | | S&P 500 Index | |
| | Median price in CA | % change | Year Close Price | % change | Average Closing Price | % change |
| 2018 | \$571,058 | | \$23,327 | | \$2,507 | |
| 2019 | \$591,866 | 3.64% | \$28,538 | 22.34% | \$3,231 | 28.88% |
| 2020 | \$650,157 | 9.85% | \$30,606 | 7.25% | \$3,756 | 16.26% |
| 2021 | \$786,275 | 20.94% | \$36,338 | 18.73% | \$4,766 | 26.89% |
| 2022 | \$822,527 | 4.61% | \$33,147 | -8.78% | \$3,840 | -19.44% |

Sources: Consumer Price Index and Producer Price Index data are collected from BLS 2023a and BLS 2023b. Housing Prices are collected from <https://www.car.org/marketdata/data/housingdata>. Data of the Dow Jones Index, S&P 500 Index, and 10-year treasury bond interest rates are collected from <https://www.macrotrends.net/>.

Table 6. Relationship Between California Farmland Values and Selected Factors

| | Variables | Highly Positive Correlations | Highly Negative Correlations |
|---|--|--|--|
| Commodity Specific Factors | Acres Bearing | Pistachio, Almond, Cherry Citrus, Strawberry, Dates | Wine Grape, Raisin Grape, Table Grape |
| | Yield | Walnut, Dates | Pistachio, Wine Grape, Raisin Grape, Table Grape, Peach, Strawberry |
| | Production Quantity | Strawberry, Dates | Wine Grape, Raisin Grape, Table Grape, Peach |
| | Grower Price Received | Peach, Cherry, Avocado, Strawberry | Walnut, Pistachio, Almond, Citrus |
| | Consumer Price Index_ Fruits&Vegetables | Pistachio, Almond, Wine Grape, Raisin Grape, Peach, Cherry, Citrus, Avocado, Strawberry, Dates | |
| Macroeconomic Factors | Producer Price Index_ Fruits&Vegetables | Pistachio, Almond, Wine Grape, Raisin Grape, Peach, Cherry, Citrus, Avocado, Strawberry, Dates | |
| | Dow Jones Index | Pistachio, Almond, Wine Grape, Raisin Grape, Citrus, Strawberry, Dates | |
| | 10-year Treasury Bond Interest Rate | Walnut, Peach, Cherry | Table Grape, Dates |
| | Housing Prices | Pistachio, Almond, Wine Grape, Raisin Grape, Peach, Cherry, Citrus, Avocado, Strawberry, Dates | |
| Agricultural Land and Return Factors | Cash Rent for Irrigated Crop Land | | Pistachio, Almond, Wine Grape, Raisin Grape, Chery, Citrus, Avocado, Strawberry, Dates |
| | Irrigated Crop Land Value | Pistachio, Almond, Wine Grape, Raisin Grape, Peach, Cherry, Citrus, Avocado, Strawberry, Dates | |
| | Cash Receipts | Pistachio, Almond, Wine Grape, Raisin Grape, Peach, Cherry, Citrus, Avocado, Strawberry | |

Note: Highly positive correlation when the correlation coefficient $\rho > 0.5$; highly negative correlation when $\rho < -0.5$.