California Farmland Valuation: A Hedonic Approach

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Introduction

- The average farmland prices in the U.S. have been rising in the last 20 years. Being the provider of agricultural products and rural residence, farmlands have been increasingly demanded as a capital investment tool since they have higher returns than the S&P 500.
- The majority of the U.S. specialty crops such as fruits, melons, and tree nuts are produced in California. The revenues received by these crops, particularly the tree nuts have grown by over 30% in recent year. As a result, there has been a significant increase in farmland prices in California. However, the farmland values vary significantly in the state across various crops.
- The determinants of county farmland values are evolving over time and the farmland value growth varies by regions. There is a need to be dynamically update the farmland valuation models with the changes in the input and output markets, and in the regional economic environment.
- This study used a Hedonic pricing model to examine the key factors that influence the farmland values in 26 counties of California across the seven regions based on different crop varieties, and county-level economic and demographic characteristics.

Data and Method

- There are seven regions in California. In our dataset, twenty-six counties across all seven regions were studied.
- The agricultural land values by nineteen different crop varieties between 1999 and 2011 are collected. The varieties include rice, almonds, walnuts, pistachios, prunes, olives, pears, wine grapes, citrus, avocados, cherries, strawberries, peaches, pears, and etc.
- Three groups of county-level data are utilized: agricultural production and productivity, urban influence and development, and regional economic characteristics. The agricultural production and productivity group includes crop yield, revenue per acre, and acreage bearing. The urban influence category consists of land conversion rate and real estate earnings per capita. The regional economic and demographic characteristics category contains population growth, population density, GDP per capita, farm earnings per capita and total farmland area.
- A Hedonic pricing model is used to analyze the relationship between variables that are deemed to influence demand, supply and the agricultural land values.
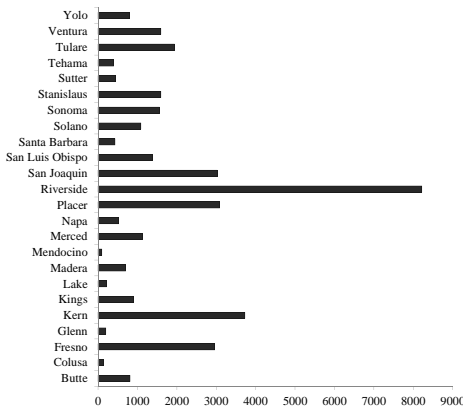
Results

Table 1. California Farmland Value per Acre Range for Various Crops, 1999-2011

Crop	Farmland Value
Almonds	$7,029.17~$12,875.00
Avocados	$22,700.00~$45,000.00
Cherries	$13,727.27~$19,090.91
Citrus: Tangelos	$9,333.33~$38,750.00
Cling Peaches	$9,500.00~$16,375.00
Lemons	$23,600.00~$48,900.00
Olives	$3,975.00~$7,210.42
Open land for pears	$7,033.33~$15,866.67
Peaches	$6,416.67~$12,583.33
Pears	$5,672.73~$8,336.36
Pistachios	$9,269.23~$15,384.62
Prunes	$4,396.55~$8,043.10
Rice	$3,127.27~$4,975.76
Strawberries	$29,705.88~$51,088.24
Vineyards	$9,716.00~$19,100.00
Vineyards: AXR	$24,269.23~$36,307.69
Vineyards: Resistant Root Stock	$55,916.67~$223,333.33
Walnuts	$7,152.17~$13,552.90
Wine Grapes	$19,385.19~$35,291.11

Figure 1. Bi-Annual Acreage of Agricultural Land Converted to Unban Uses in Selected California Counties

Results

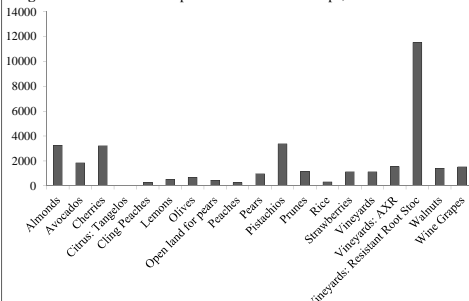**Figure 2.** Annual Revenue per Acre for Various Crops, 1999-2011

Table 2. Annual GDP, Farm Earnings, and Real Estate Earning per Capita Values in Selected California Counties

County	GDP/Capita (in thousands)	Farm Earnings/Capita	Real Estate Earnings/Capita
Butte	$27,606.75	$489.23	$99,228.57
Colusa	$32,118.50	$8,009.72	$21,895.80
Fresno	$27,277.38	$1,218.27	$79,171.58
Glenn	$25,551.00	$3,776.47	$8,662.90
Kern	$26,342.70	$1,247.91	$38,908.62
Kings	$22,395.75	$1,965.91	$14,970.79
Lake	$29,839.53	$12.75	$62,570.78
Madera	$23,152.08	$1,757.79	$27,534.59
Mendocino	$33,569.33	$124.59	$488,790.48
Merced	$25,421.88	$2,440.56	$62,172.24
Napa	$44,114.83	$873.80	$167,060.46
Placer	$43,646.60	$37.43	$89,920.57
Riverside	$27,943.93	$191.12	$84,832.42
San Joaquin	$28,325.14	$811.93	$71,379.83
San Luis Obispo	$31,069.57	$499.71	$154,638.36
Santa Barbara	$38,947.25	$944.74	$1,394,045.40
Solano	$34,823.14	$201.48	$136,854.50
Sonoma	$41,067.80	$297.16	$358,689.71
Stanislaus	$27,697.25	$972.69	$145,656.64
Sutter	$29,343.17	$1,622.85	$86,834.68
Tehama	$23,042.67	$580.07	$20,341.80
Tulare	$30,186.92	$1,960.41	$28,885.13
Ventura	$41,373.50	$735.91	$297,630.51
Yolo	$31,731.25	$941.06	$84,619.76

Table 3. Model Estimation Results

Variables	Coefficients	Std. Err.
Agricultural Productivity		
Acreage bearing	0.010*	0.006
Average yield per acre	8.693**	4.359
Dollar revenue per acre	2.529***	0.390
Urban Influence		
Land conversion to urban	0.860***	0.224
Real estate earning per capita	0.006***	0.002
Economic Characteristics		
Population growth (%)	-1737.092***	314.588
Population density	4185.838***	1426.093
GDP per capita	0.424***	0.110
Farm earning per capita	-0.767***	0.102
Total farmland area	-0.002***	0.0007

***$p<0.01$, **$p<0.05$, *$p<0.10$

Conclusions

- Farmland value in California is mostly determined by the production, productivities and dollar returns to the tree nuts, citrus and wine grapes. Higher productivity and net returns contribute to the increase in the farmland values.
- Urban influence factors have been playing a critical role in affecting the overall farmland value. Each additional acre of land converted to urban use raises the farmland value by $0.89 per acre. In addition, high real estate earnings might lead to rising farmland values;
- Positive population growth decreases farmland values since farmland as a fixed asset lumpy asset syndrome which indicates the farms are operating with excess capacity.
- High farm earnings per capita could lower the farmland value, which suggests a tendency of switching from pursuing economies of scale to producing high value-added crops that might need less farmland.
- High per-capita GDP and high population density might increase the farmland values.

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