Labor Market Integration in California Agriculture: Do the Data Support Industry Reports of Shortages?

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INTRODUCTION

The purpose of this analysis is to test labor market integration in California agriculture to verify the existence of reported labor shortages , given that shortages should never occur in efficient, integrated markets

- Wage cointegration is one basic method of observing market integration
  - Wages in isolated areas are more affected by local market conditions
  - There shouldn't be any potential for arbitrage in integrated markets
- Employment can be used to test market integration as well
  - Observe increased employment in response to high wages and decreased employment in response to lower than market wages
  - If wages between regions differ then arbitrage should be observed to correct the imbalance
- The berry labor market relies heavily on unskilled, seasonal labor

BACKGROUND

- California agriculture is highly dependent on seasonal labor.
- Changing economic conditions in Mexico have reduced the supply of migrant farm labor over time
- Since 2012, growers in several regions of California have expressed concerns over labor shortages when hiring additional labor to harvest their crops.
- According to a survey the California Farm Bureau performed in 2012 regarding labor availability, 61% of respondents reported worker shortages.
  - Agricultural producers requiring a great deal of seasonal, unskilled labor state are reported to be the most significantly affected by labor shortages.
  - Crops that employed large quantities of seasonal harvesting labor include tree fruits, vegetables, table grapes, raisins, and berries
  - Smaller producers employing fewer workers overall are reported to experience worse labor shortages
  - Respondents reported shortages adjusted by offering higher wages, mechanizing, delaying pruning and harvesting, and simply not harvesting

HYPOTHESES

- Labor is not fluid across regions and/or agricultural industries, meaning the reported labor shortages are likely isolated growers that cannot attract new workers with higher wages
- Growth in buyer demand for certain crops has shifted out their derived demands for labor and raised wages to prohibitive levels for other crops harvested at similar times
- Seasonal laborers choose positions based on potential weekly wages rather than the piece rate they receive

METHODOLOGY

Test for basic market integration by determining whether different relevant wage series are cointegrated. The following 3 steps are repeated when comparing the labor markets for different agricultural industries different levels of aggregation.

Step 1: Convert nominal wages to real wages using CPI (1982-84 dollars).

Step 2: Test for unit roots (non-stationarity) in each wage series using the Augmented Dickey-Fuller test.

Step 3: Test for cointegration between different wage series using the Engle-Granger test. If a wage series is found to possess a unit root according to the Dickey-Fuller test, then it is first-differenced in the Engle-Granger test.

Focus analysis on the seasonal labor market for picking berries. Strawberries represent most of the California berry industry and are heavily reliant on seasonal labor due to their harvest being entirely hand-picked. Examining this labor market provides insights on the availability of undocumented labor.

RESULTS

Figure 1: Average Wages Across Primary Agricultural Employment Groups

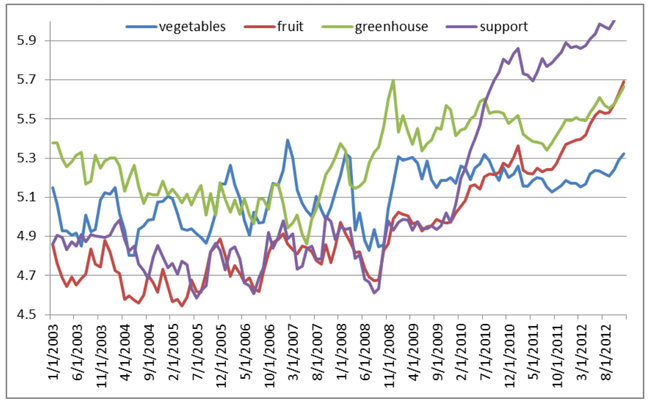


Figure 2: Unit Roots in Primary Wage Series

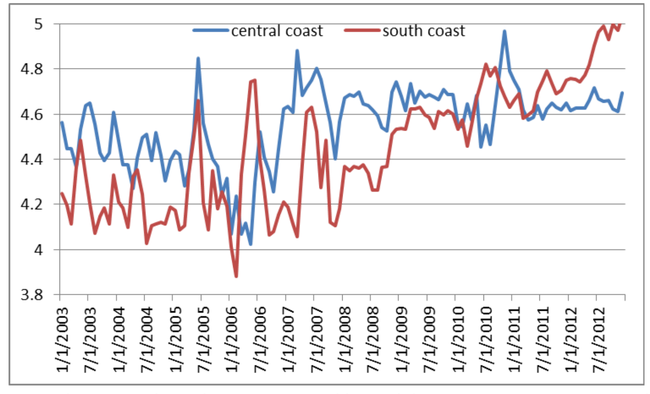
Employment Category	Unit Root
Vegetable and Melon Farming	No
Fruits and Tree Nuts	Yes
Greenhouse, Nursery, and Floriculture Production	Yes
Support Activities for Crop and Animal Production	Yes

Figure 3: Cointegration Between Primary Employment Groups

Employment Category	Cointegrated			
	(V)	(F)	(G)	(S)
Vegetable and Melon Farming		Yes	Yes	Yes
Fruits and Tree Nuts			Yes	Yes
Greenhouse, Nursery, and Floriculture Production				Yes
Support Activities for Crop and Animal Production				

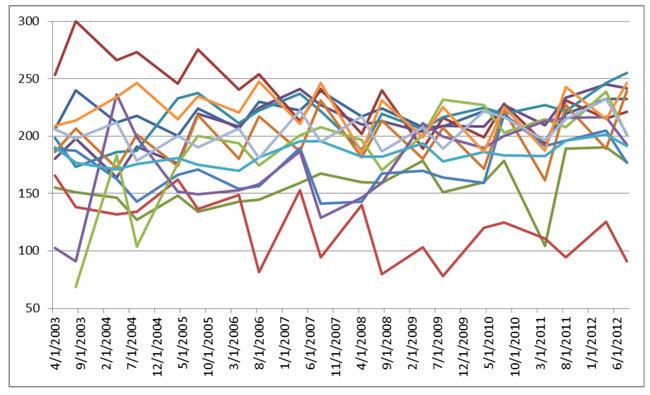
RESULTS

Figure 4: Average Wages in the Berry Labor Market by Region



The central coast and south coast regional berry labor wages are cointegrated according to the Engle-Granger test. Thus there is a basic level of regional berry labor market integration.

Figure 5: Average Weekly 2nd and 3rd Quarter Wages by County



CONCLUSIONS

California's major agricultural labor markets appear to be integrated. Regional berry labor markets appear integrated as well, implying that seasonal labor adjusts to demand along the coast. However, total weekly wages for berry labor are not cointegrated across all California counties.

It may be the case that unskilled, seasonal laborers seek jobs with higher weekly earnings, regardless of hours worked and the piece rate. If so, it appears there are some berry-producing counties whose labor markets are not fully integrated. Typically these are fringe producers and smaller operations.