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Seasonal Farm Price Patterns in Selected U.S. Fresh Fruit Markets

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Introduction

The U.S. fruit and tree nut industries are an integral part of the U.S. agricultural sector:

- Production occurs on less than 2 percent of U.S. harvested cropland but generates nearly \$20 billion in annual farm cash receipts.
- International sales average over \$8 billion per year, 7 percent of total U.S. agricultural exports.
- Per capita consumption is the third-largest among major food groups, after dairy products and vegetables.

The fruit and tree nut sector is comprised of a complex and diverse array of independent markets facing different supply conditions, marketing needs, and demand trends.

Why Investigate Seasonality?

Rationale: Understanding farm price seasonality and the economic factors behind it aid the study of supply and demand relationships within the fruit and tree nut industry as a whole, directly benefiting farm producers and consumers. Produce prices tend to be more volatile than those for staple commodities even as the emphasis on fresh fruit and vegetable contributions to healthy diets has increased.

Definition: Seasonal price fluctuations (SPF) are regular patterns of price change occurring within a year, the result of uneven demand, production, or marketing.

Economic factors identified:

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- Technology (climate-controlled storage, transportation)
- Plant Varietals and Changes in Production Practices (extended growing and harvest seasons)
- Trade (contra-seasonal availability)

Data and Methods

Commodity selection is based on value of U.S. fresh production and availability of monthly data. Nominal monthly grower price data reported by NASS from 1979 to 2010 were collected for five fresh fruits: strawberries², apples, oranges, peaches, and grapes.³The prices were used to address two fundamental questions:

- Is there evidence of seasonal patterns in the grower prices?
- If so, are there shifts in the seasonal patterns over time?

Seasonal price fluctuations were estimated over 3 decades from 1980-2010.

For each commodity, a monthly price index was constructed adopting a methodology used by Houck and Buxton (1974; 1988). Monthly nominal grower prices are divided by a corresponding centered moving average commodity price to create a monthly price index value for each period expressed as:

$$\text{Centered Moving Average} = \left(\frac{\text{12 month grower price sum}}{\text{number of observations within 12 month sum}} \right)$$

This method eliminates trend, cyclical, and random component of price fluctuation in the series (Buxton and Houck; Tomek and Robinson).

Standard deviations and coefficient of variations are calculated from the monthly price index series to aid comparison across time and between commodities.

Results and Conclusions

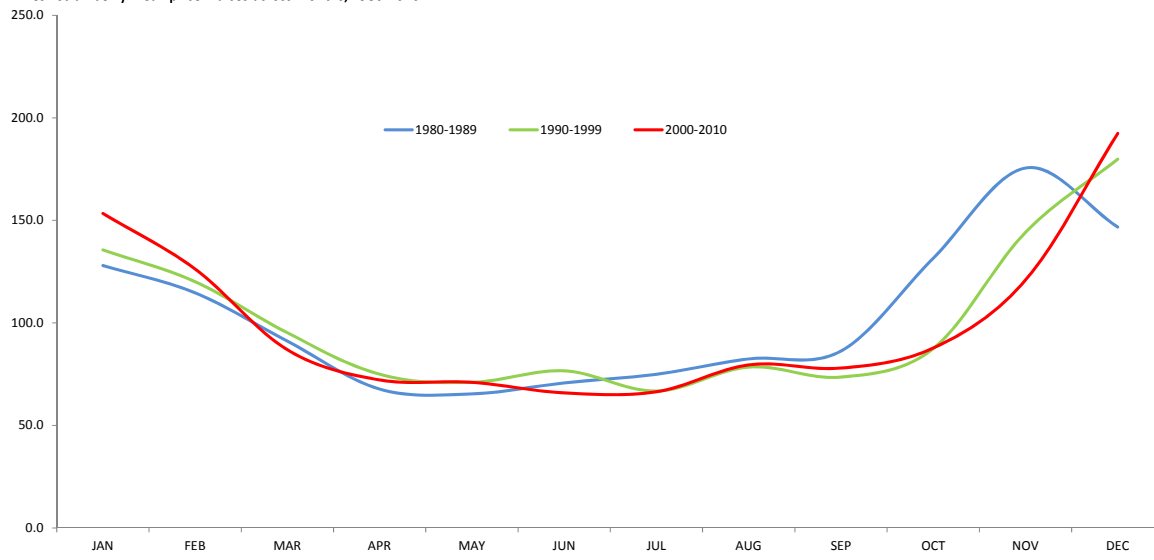
Evidence of seasonality?

Fresh strawberry, peach, and grape grower prices exhibited seasonal patterns consistent with markets for perishable commodities—there are distinct seasonal high and low prices. However, the fresh apple and orange grower price patterns revealed by the analysis exhibit only weak seasonal high and low prices, patterns typically expected for a storable commodity.

² Marketing seasons as follow: strawberries (January-December), apples (August-July), oranges (November-October), peaches (January-December), and grapes (May-April).

³Fresh-market grapes include mostly table grapes but also wine and raisin grapes sold for fresh use. Prices for grapes are only available from 1995 to 2010.

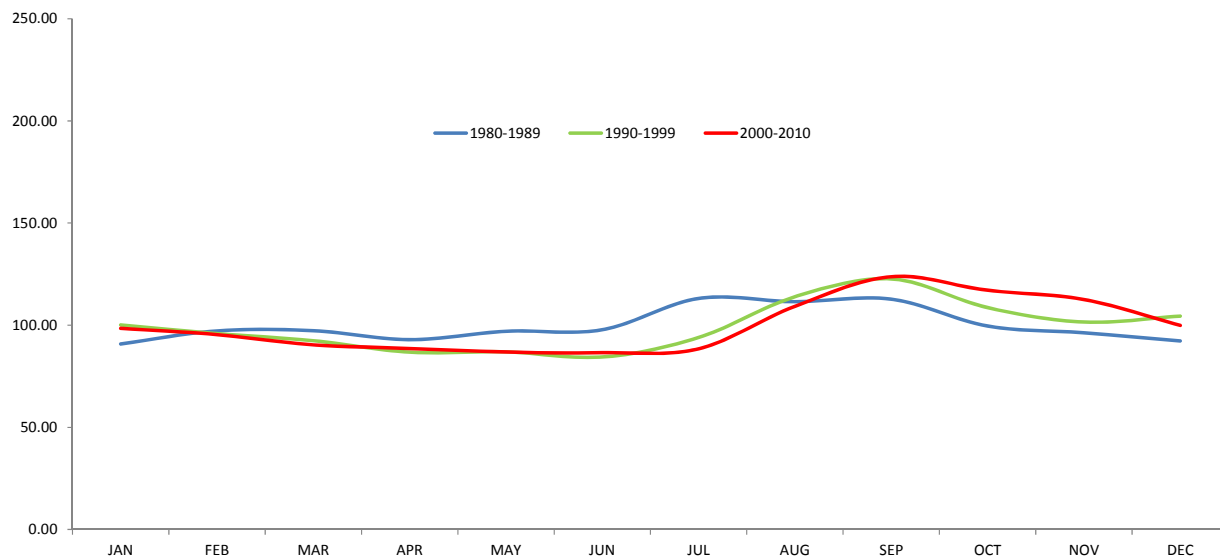
Figure 3
Fresh strawberry mean price indices across months, 1980-2010



Source: National Agricultural Statistics Service, *Agricultural Prices*, various issues.

- Fresh strawberry prices are closely linked to production cycles and availability.
 - Low prices occur during the late spring and summer when California production is high and additional U.S. production areas are harvesting.
 - Price variability is greatest in fall and winter months (November, December, and January) when harvested volumes in California are relatively low and supplies in Florida and Mexico are most susceptible to cold-weather impacts.

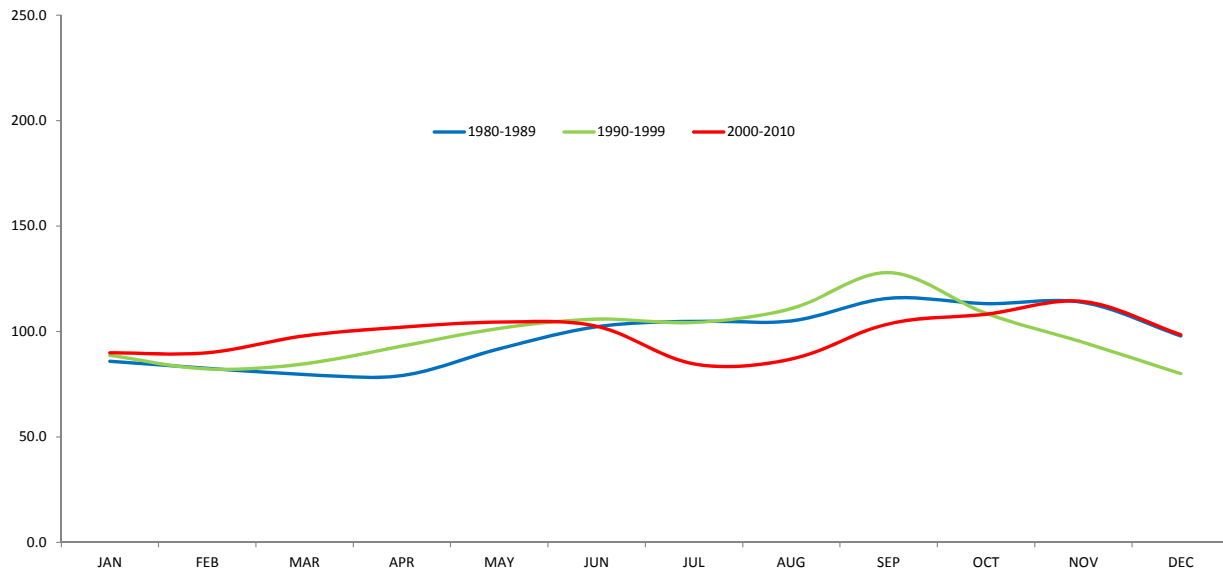
Figure 9
Fresh apple mean price indices across months, 1980-2010



Source: USDA, National Agricultural Statistics Service, *Agricultural Prices*, various issues.

- Though apple harvest occurs largely in the fall, storability of the fruit permits more even releases of supplies throughout the year, smoothing seasonal variability
 - o Little difference in mean prices throughout the year.
 - o Prices fluctuate more in the months prior to harvest, influenced by import supplies, inventory levels, and uncertainty over the upcoming harvest.

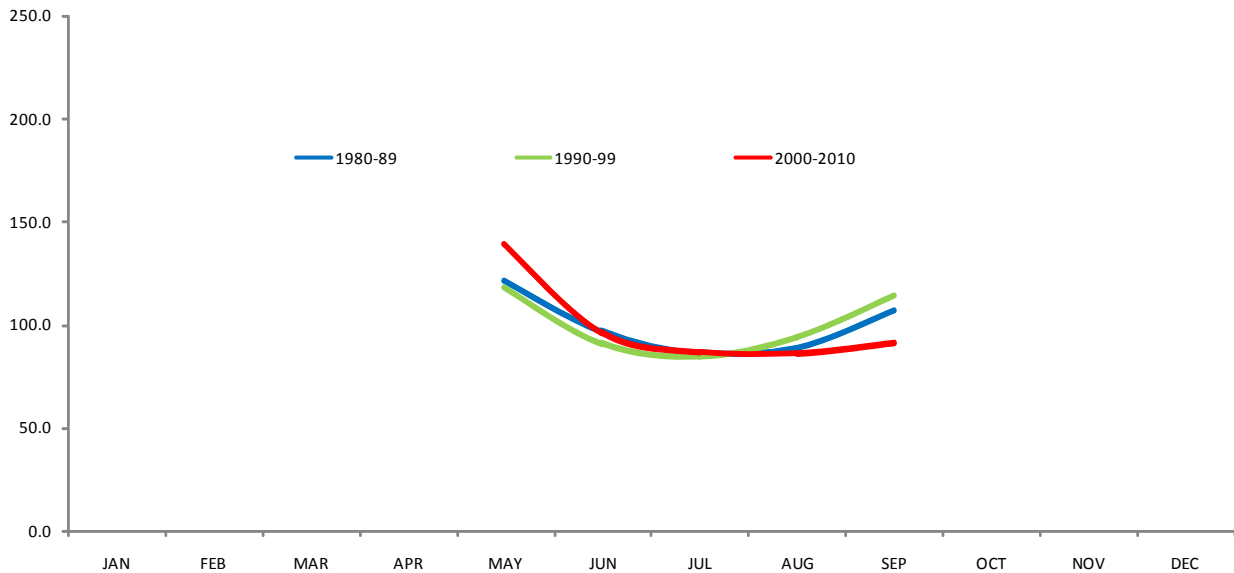
Figure 15
Fresh orange mean price indices across months, 1980-2010



Source: USDA, National Agricultural Statistics Service, *Agricultural Prices*, various issues.

- Grower prices closely linked with production cycles and import volumes.
 - o Prices show strong reaction to weather-related events; November-April prices have the largest variability in response to production risk
 - o Imports have shifted from winter (Dec-Mar) in the 1980s to late summer and fall (Jul-Oct) since 2000.
 - o Prices in the 1990s declined significantly at the end of the year due to high domestic supplies from overplanting in the late 1980s and early 1990s; since then acreage has declined.
 - o Monthly price variations are greatest during the lightest months of domestic navel production, just prior to harvest.

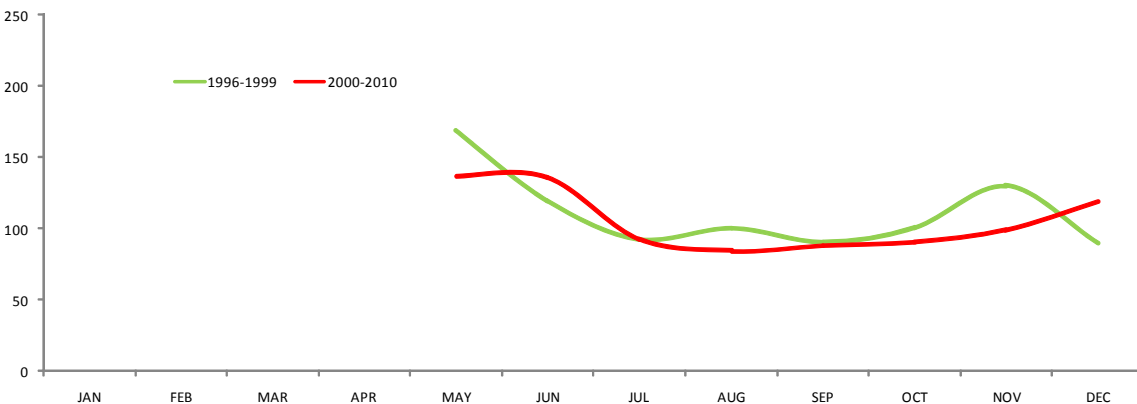
Fresh peach mean price indices across months, 1980-2010



Source: USDA, National Agricultural Statistics Service, *Agricultural Prices*, various issues..

- While evident, seasonal highs and lows are not as pronounced in peaches as strawberry prices.
 - o Highest prices early in the season when supplies are tight, decline through the peak production months of June and July, and increase again towards the end of the season.
 - o Prices are generally most variable in May, due to weather-induced production risks.
 - o Some evidence of increased seasonal patterns since 2000.

Fresh grape mean price indices across months, 1996-2010



Source: National Agricultural Statistics Service, *Agricultural Prices*, various issues.

- Grape prices generally decline from highs early in the season when supplies are limited, bottom out when domestic production is heaviest, then increase again as harvest slows.

- Limited domestic shipments beyond the harvest season.
- Prices at the beginning and end of the harvest season are more variable as supply volumes are more limited and become most vulnerable to import competition.

Have seasonal price pattern shifted between decades?

Results indicate little change for fresh strawberries and apples between the 1990s and 2000s but some notable changes for fresh oranges, peaches, and grapes. Changes in prices patterns for strawberries and apples occurred between the 1980s and 1990s. The following factors likely contributed to these pattern shifts:

1) Technology Advancement

- a. Strawberries – improved storage technology
- b. Apples- storage technology improved and capacity increased- elevates prices during harvest
- c. Oranges- changes in post-harvest storage technology and on-tree storage knowledge

2) Production and Varietal Advancements

- a. Strawberries- new varieties extended production seasons to capture winter pricing opportunities
- b. Apples- diversified varietal profile and adoption of intensive production systems increased production and facilitated storage
- c. Peaches- increased late-season varieties extended the season and late-season volume
- d. Grapes- increased late-season production

3) Trade

- a. Apples- increased exports due to new varieties targeted towards international markets; increased imports towards end-of-season domestic production.
- b. Oranges- increased imports in late summer and fall, increased early spring exports
- c. Grapes- increased within-season import competition