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Fresh Produce Imports Affect U.S. Consumption and Prices

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The fast growth of fresh produce imports since the mid-1980s has significant implications for both the fresh produce industry as well as consumers in the United States. Because imports increasingly outpace exports in the trade of fresh produce, during the last farm bill debate U.S. produce farmers requested resources to improve access to international markets through programs such as the Market Access Program, the Technical Assistance for Specialty Crops Program, and the Emerging Markets Program. Historically, specialty crops, including produce, received few benefits from Federal farm programs. However, the *Food, Conservation, and Energy Act of 2008* allocated about \$3 billion over 2008-12 to address the various issues facing the specialty crops industry.

In this study, we investigate the role of imports in shaping U.S. fresh produce consumption and prices. We examine the relationships between the monthly fresh produce imports and their corresponding domestic shipments. In addition, we estimate a set of price-dependent demand equations for fresh produce. These demand equations are then used to simulate the effects of price changes in response to various scenarios of change in fresh produce imports.

Methodology

To examine the dynamics of the seasonal nature of fresh fruit and vegetable marketing, we use monthly data from (1) *Fresh Fruit and Vegetable Shipments*, issued by the Agricultural Marketing Service of the U.S. Department of Agriculture and (2) *Consumer Price Indexes* issued by the Bureau of Labor Statistics of the U.S. Department of Labor.

We estimate a set of monthly price-dependent demand equations derived from the Hotelling-Wold identity for fresh fruits and fresh vegetables as

$$\log (p_{it} / m_t) = \sum_j f_{ij} \log (q_{jt}) + \sum_k \alpha_k d_{kt} .$$

Where p_{it} is the retail price for either fruits or vegetables at time t , q_{it} is its quantity of per capita consumption (by excluding exports from total shipments as a proxy), m_t is per capita income, and the parameter f_{ij} is price flexibility. The variable d_{kt} is a monthly dummy variable with its parameter α_k .

These demand equations are used to simulate the effects of price changes in response to various scenarios of changes in fresh produce imports by assuming that domestic production and exports are maintained at actual past levels. We then calculate the coefficient of variation (CV) as an indicator of price variations:

$$CV = [\sum_t (y_t - y^*)^2 / n]^{1/2} / y^* \cdot 100.$$

Where y_t is the simulated price at time t with a total of n observations, and y^* is the average of simulated prices. Higher CV values indicate greater variation in the time series data.

Results

On average 54.3 percent of fresh fruits and 25.2 percent of fresh vegetables in the U.S. produce market came from imports during 1999-2010. The average shares of imports in total shipments peak in winter—at 58.7 percent for fresh fruits and 35.1 percent for fresh vegetables. Because of climate difference, most domestic production is at a low in the winter but peaks in the summer. Thus, the seasonal variations of import shipments are in general counter to that of the domestic shipments. As a result, the large fresh fruit and vegetable imports make it possible to overcome seasonal shortages in U.S. production, and imports have allowed consumers to enjoy year-round access to fresh produce (table 1 and figures 1 and 2).

Most of our estimates in the price equations are statistically significant at the 5-percent level (table 2). The own-price flexibilities of fruits and vegetables are -0.2937 and -0.1264, respectively, meaning that a marginal 1-percent increase in the quantities of fruits and vegetables would cause their prices to reduce by 0.29 and 0.12 percent, respectively. The estimated cross-price flexibility between the price of fruits and the quantity of vegetables is -0.5620 which implies a substitution relationship. A marginal 1-percent increase in the quantity of vegetables is associated with a 0.56 percent decrease in the price of fruits to induce consumers to purchase the same quantity of fruits.

In the price analysis, our results indicate that fresh produce imports, especially fruits, have helped to lower domestic produce price levels and reduced the price variations (table 3 and figures 3 and 4). For example, without fresh fruit imports, the average real retail price indexes would increase from 156 percent to 237 percent and cause volatile price variations with the estimated *CV* increase from 3.4 percent to 12.6 percent. The marketing effects from fresh vegetable imports, however, are much smaller; without fresh vegetable imports, their price indexes would increase from 138 percent to 158 percent, and the estimated *CV* would increase from 5.9 percent to 7.3 percent. The reason of the difference is mainly because of high import share in the domestic marketing for fresh fruits while most fresh vegetables consumed by Americans are still domestically produced.

Conclusion

Large produce imports, especially in the winter, make it possible to meet seasonal shortages in U.S. production and provide year-round supplies for consumers. Increases in produce imports reduce and smooth domestic produce price fluctuations.

Table 1--Monthly shipments of fresh fruits and vegetables, 1999-2010 average

	Fruits			Vegetables		
Month or season	Domestic shipments	Imports	Import share	Domestic shipments	Imports	Import share
	(1)	(2)	(3)=(2)/(1+2)	(1)	(2)	(3)=(2)/(1+2)
	-- million pounds --		Percent	-- million pounds --		Percent
January	1037	1397	57.4	1695	911	35.0
February	963	1403	59.3	1552	872	36.0
March	1121	1632	59.3	1873	976	34.3
April	955	1490	61.0	2008	757	27.4
May	1055	1470	58.2	2407	561	18.9
June	1183	1471	55.4	2049	426	17.2
July	1266	1288	50.4	1688	389	18.7
August	1233	1187	49.0	1671	385	18.7
September	1144	1125	49.6	1546	403	20.7
October	1245	1195	49.0	1735	483	21.8
November	1203	1203	50.0	2008	597	22.9
December	1136	1253	52.4	1961	724	27.0
Total	13540	16114	54.3	22195	7483	25.2
Distribution:		--Percent--	<u>1/</u>		--Percent--	<u>1/</u>
Winter	23.0	27.5	58.7	23.1	36.9	35.1
Spring	23.6	27.5	58.2	29.1	23.3	21.2
Summer	26.9	22.3	49.7	22.1	15.7	19.4
Fall	26.5	22.7	50.5	25.7	24.1	23.9
Total	100	100	54.3	100	100	25.2

Note: Quantities exclude melons, potatoes, and sweet potatoes.

1/ Imports as a percentage of total shipments in the season.

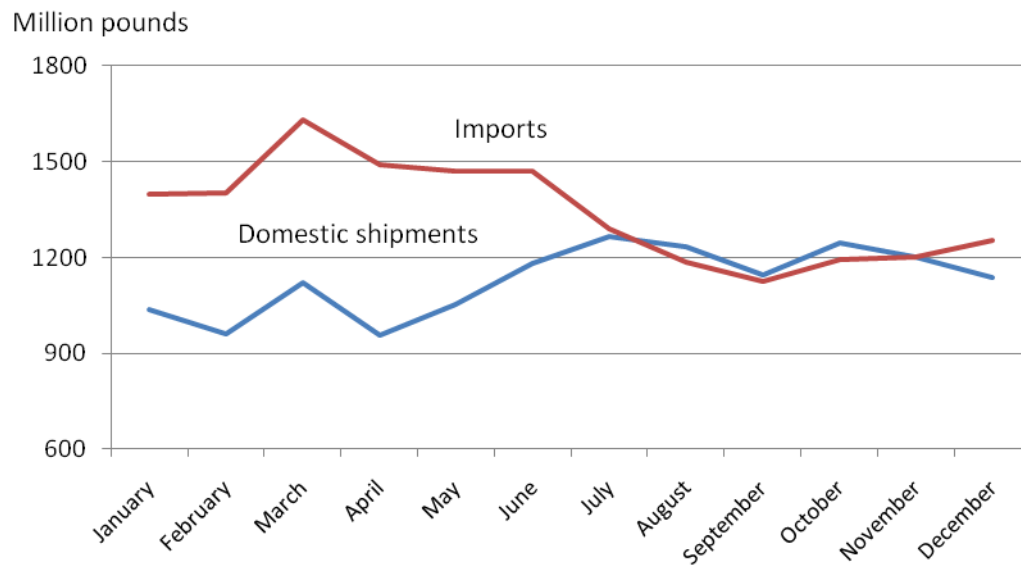
Table 2--Price-dependent demand equations of fresh fruits and vegetables

Regression	Retail prices of			
	Fresh fruits		Fresh vegetables	
	Coefficient	Standard errors	Coefficient	Standard errors
Quantity of				
Fruits	-0.2937	0.0631	-0.1231	0.0417
Vegetables	-0.5620	0.0746	-0.1264	0.0493
Month of				
January	0.0399	0.0189	0.0308	0.0125
February	-0.0534	0.0191	-0.0054	0.0126
March	0.0648	0.0217	0.0261	0.0143
April	0.0379	0.0197	0.0012	0.0130
May	0.0900	0.0212	-0.0054	0.0140
June	-0.0075	0.0215	-0.0305	0.0142
July	-0.1135	0.0250	-0.0569	0.0165
August	-0.1301	0.0242	-0.0716	0.0160
September	-0.1589	0.0261	-0.0755	0.0173
October	-0.0830	0.0215	-0.0427	0.0142
November	-0.0438	0.0191	-0.0263	0.0126
Constant	7.2524	0.2116	5.8646	0.1398
R-square	0.41		0.44	

Table 3--Monthly real retail price variations of fresh fruits and vegetables, 1999-2010

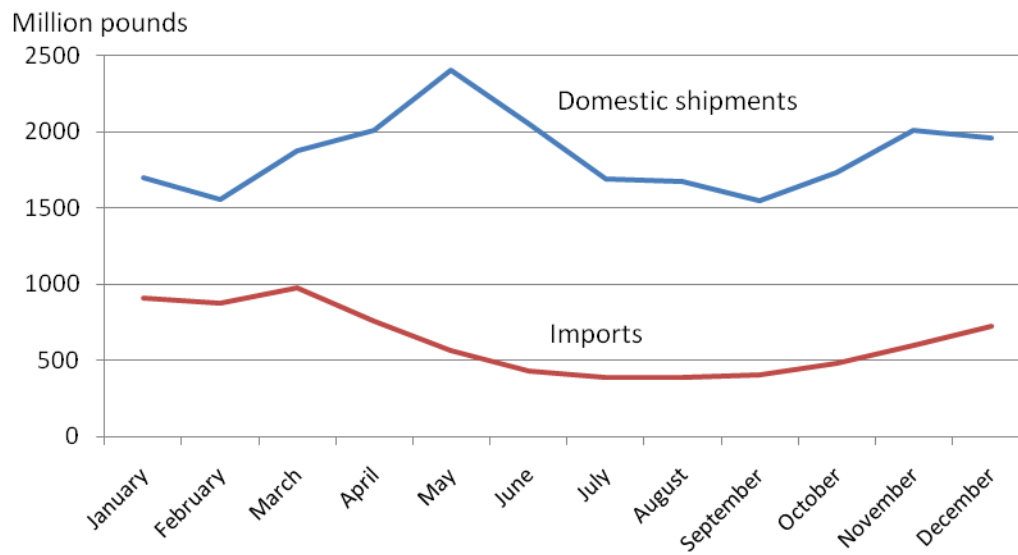
Real retail price variations	Standard	Average	Coefficient of
(Base period: 1982-84=100)	deviation (1)	(2)	variation (1)/(2)
Fresh fruits:		-- Percent --	
Actual price with imports	5.2	154.5	3.4
Simulated price with imports	5.8	153.4	3.8
Simulated price with imports reduced by 50%	11.3	183.4	6.2
Simulated price without imports	29.8	236.6	12.6
Fresh vegetables:		-- Percent --	
Actual price with imports	8.1	137.7	5.9
Simulated price with imports	6.4	136.6	4.7
Simulated price with imports reduced by 50%	8.0	145.1	5.5
Simulated price without imports	11.6	158.4	7.3

Figure 1--Monthly shipments of fresh fruits, 1999-2010 average



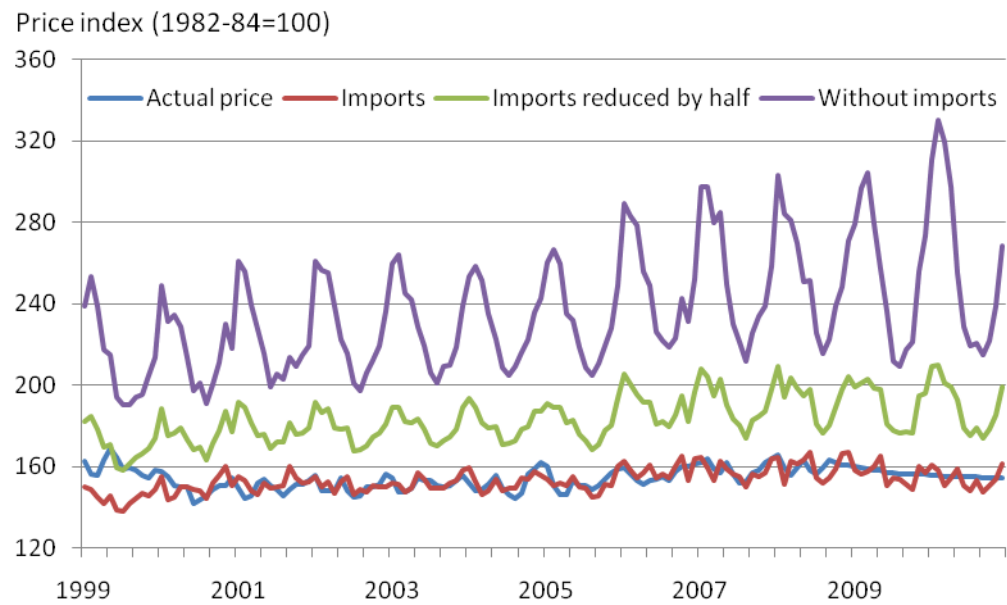
Source: USDA/Economic Research Service estimate using data from USDA/AMS.

Figure 2--Monthly shipments of fresh vegetables, 1999-2010 average



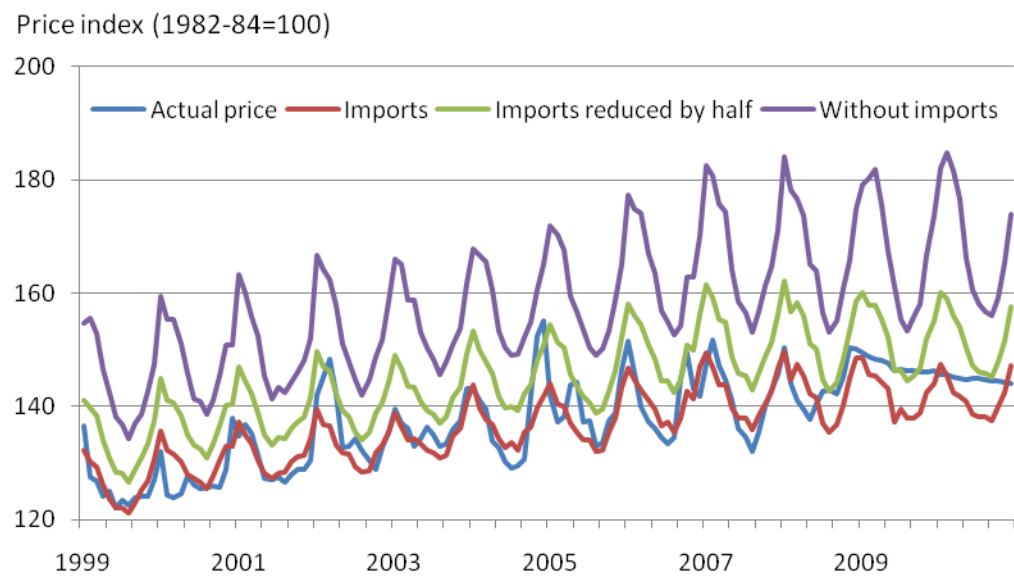
Source: USDA/Economic Research Service estimate using data from USDA/AMS.

Figure 3--Monthly real retail price variations of fresh fruits



Source: USDA/Economic Research Service estimate using data from USDA/AMS.

Figure 4--Monthly real retail price variations of fresh vegetables



Source: USDA/Economic Research Service estimate using data from USDA/AMS.