Assessing the Impact of Competition from Mexico on the U.S. Strawberry Industry

Dong Hee Suh
Food and Resource Economics Department, University of Florida
do1ghsuh@ufl.edu

Zhengfei Guan
Food and Resource Economics Department, University of Florida
guanz@ufl.edu

Hayk Khachatryan
Food and Resource Economics Department, University of Florida
hayk@ufl.edu

Selected Poster prepared for presentation at the 2015 Agricultural & Applied Economics Association and Western Agricultural Economics Association Joint Annual Meeting, San Francisco, CA, July 26-28.

Assessing the Impact of Competition from Mexico on the U.S. Strawberry Industry

Dong Hee Suh, Zhengfei Guan, and Hayk Khachatryan
Food and Resource Economics Department, University of Florida

Introduction

• California and Florida are the leading strawberry producing states. Their production accounts for 98% of U.S. total production.

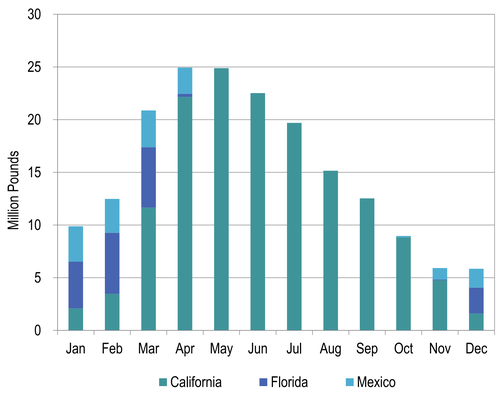
• California produces throughout the year; 80% of which occurs in summer. Florida grows only in winter, with harvest occurring in winter, from November to March.

• During winter season, the United States imports strawberries from Mexico, accounting for about 95% of total import volumes of strawberries. In 2013, about 300 million pounds were imported from Mexico between November and April, which was larger than Florida production and jumped more than twice compared to the 2009 level.

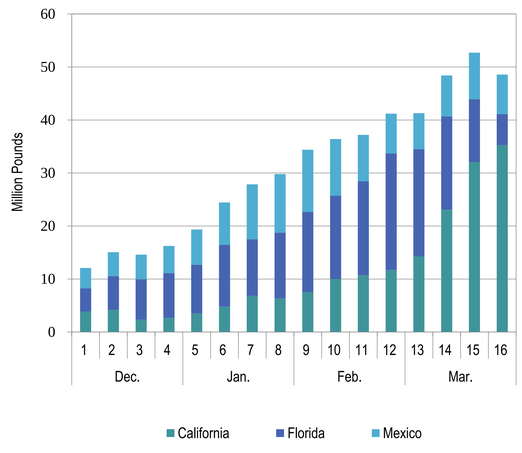
• The import volumes will continue to increase as the Mexican government has proposed to *double* the production capacity of its strawberry industry in the next five years, which is expected to have large impact on the domestic market.

• This study aims to 1) examine the effects of contemporaneous changes in the shipments of California, Florida, and Mexican strawberries on their prices in terms of scale elasticities and price flexibilities, and 2) further identify the pattern of Mexican shipment's impact on the prices and shipment values of domestic strawberries over the season.

Average Monthly Shipments of Strawberries, 2010 - 2014



Average Weekly Shipments of Strawberries, 2010 - 2014



Data and Methodology

• The weekly data are obtained from the Agricultural Marketing Service. Since the competition occurs mainly between December and March, the data cover the second week in December through the fourth week of March over 2010-2014.

• We differentiate winter strawberries shipped from main sources: 1) California, 2) Florida, 3) Mexico. The quantities of strawberries used in this analysis represent shipment volumes measured in million pounds, and the prices indicate shipping-point prices measured in dollars per pound.

• A differential version of the Inverse Almost Ideal Demand System (IAIDS) (Eales and Unnevehr, 1994; Brown et al., 1995)

$$\Delta s_i = \sum_{j=1}^{n} \gamma_{ij}\, \Delta \ln q_j + \beta_i \Delta \ln Q$$

where s_i is the budget share or expenditure share of commodity i, and q_i is the shipment from source i. In addition,$\Delta \ln Q$ is specified as $\sum s_i\, \Delta \ln q_i$ to linearly approximate the differential form of the IAIDS. The economic regularity conditions include adding up ($\sum_i \gamma_{ij} = 0$ and $\sum_i \beta_i = 0$), homogeneity ($\sum_j \gamma_{ij} = 0$), and symmetry (γ_{ij}=γ_{ji}).

Estimation Results

• Scale Elasticity: $\varepsilon_i = -1 + \frac{\beta_i}{\bar{s}_i}$ where $\bar{s}_i$ is the sample mean of the share of strawberries shipped from source i.

• Price Flexibility: $f_i = -\delta_{ij} + \frac{\gamma_{ij} + \beta_i \bar{s}_j}{\bar{s}_i}$ where δ_{ij} is the Kronecker delta that equals one if $i = j$ and zero otherwise.

• Estimation Results

	Scale Elasticities	Price Flexibilities		
		California Shipment	Florida Shipment	Mexico Shipment
California Price	-1.083	-0.601	-0.306	-0.176
	(0.051)	(0.027)	(0.031)	(0.024)
Florida Price	-0.869	-0.207	-0.479	-0.183
	(0.045)	(0.024)	(0.030)	(0.026)
Mexico Price	-1.166	-0.244	-0.355	-0.481
	(0.055)	(0.023)	(0.029)	(0.049)

Note: Numbers in parentheses are standard errors.

Weekly Effect of Doubled Mexican Shipment on California

		Baseline			Simulated Prices and Shipment Values	
		Quantity (Million lbs.)	Price ($/lb.)	Value (Million $)	Price ($/lb.)	Value (Million $)
Dec.	1	3.868	2.936	11.357	2.361	9.133
	2	4.155	3.034	12.606	2.370	9.847
	3	2.332	2.663	6.210	1.829	4.265
	4	2.676	2.235	5.981	1.514	4.052
Jan.	5	3.518	2.388	8.400	1.705	5.996
	6	4.790	2.224	10.652	1.631	7.810
	7	6.807	2.113	14.382	1.642	11.174
	8	6.337	1.938	12.278	1.464	9.280
Feb.	9	7.557	1.828	13.816	1.404	10.610
	10	10.004	1.813	18.141	1.479	14.796
	11	10.694	1.649	17.636	1.352	14.457
	12	11.697	1.662	19.435	1.397	16.341
Mar.	13	14.265	1.682	23.986	1.452	20.711
	14	23.088	1.546	35.705	1.381	31.874
	15	32.076	1.478	47.405	1.346	43.175
	16	35.259	1.434	50.548	1.324	46.694
Sum				308.539		260.215

Note: The simulated prices and shipment values are calculated by assuming that Mexican shipments increase by 100%.

Weekly Effect of Doubled Mexican Shipment on Florida

		Baseline			Simulated Prices and Shipment Values	
		Quantity (Million lbs.)	Price ($/lb.)	Value (Million $)	Price ($/lb.)	Value (Million $)
Dec.	1	4.369	2.988	13.053	2.460	10.749
	2	6.367	3.020	19.228	2.549	16.230
	3	7.606	2.238	17.018	1.970	14.984
	4	8.443	2.081	17.572	1.846	15.587
Jan.	5	9.168	1.909	17.505	1.648	15.105
	6	11.673	1.863	21.741	1.618	18.887
	7	10.696	1.878	20.089	1.588	16.983
	8	12.389	1.613	19.977	1.370	16.971
Feb.	9	15.089	1.425	21.501	1.200	18.110
	10	15.701	1.363	21.393	1.125	17.671
	11	17.754	1.316	23.358	1.106	19.634
	12	22.009	1.019	22.421	0.846	18.623
Mar.	13	20.235	1.066	21.563	0.863	17.458
	14	17.577	1.071	18.824	0.795	13.966
	15	11.854	1.027	12.169	0.573	6.798
	16	5.856	1.034	6.058	0.175	1.026
Sum				293.468		238.782

Note: The simulated prices and shipment values are calculated by assuming that Mexican shipments increase by 100%.

Conclusions

• The increased Mexican shipments result in reductions in the prices of California and Florida strawberries. The simulation results reveal that the effects of Mexican shipments are greater when domestic strawberries are less shipped to the market.

• The results indicate that rising Mexican strawberry production capacity will cause large losses to the domestic strawberry industry, particularly for the Florida industry, posing great challenges. Technology development/adoption and market differentiation are needed to address the challenges..

References

• Brown, M.G., J. Lee. and J.L. Seale. 1995. A Family of Inverse Demand Systems and Choice of Functional Form. *Empirical Economics* 20(3): 519-530.

• Eales, J.S., and L.J. Unnevehr. 1994. The Inverse Almost Ideal Demand System. *European Economic Review* 38(1): 101-115.