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

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Introduction

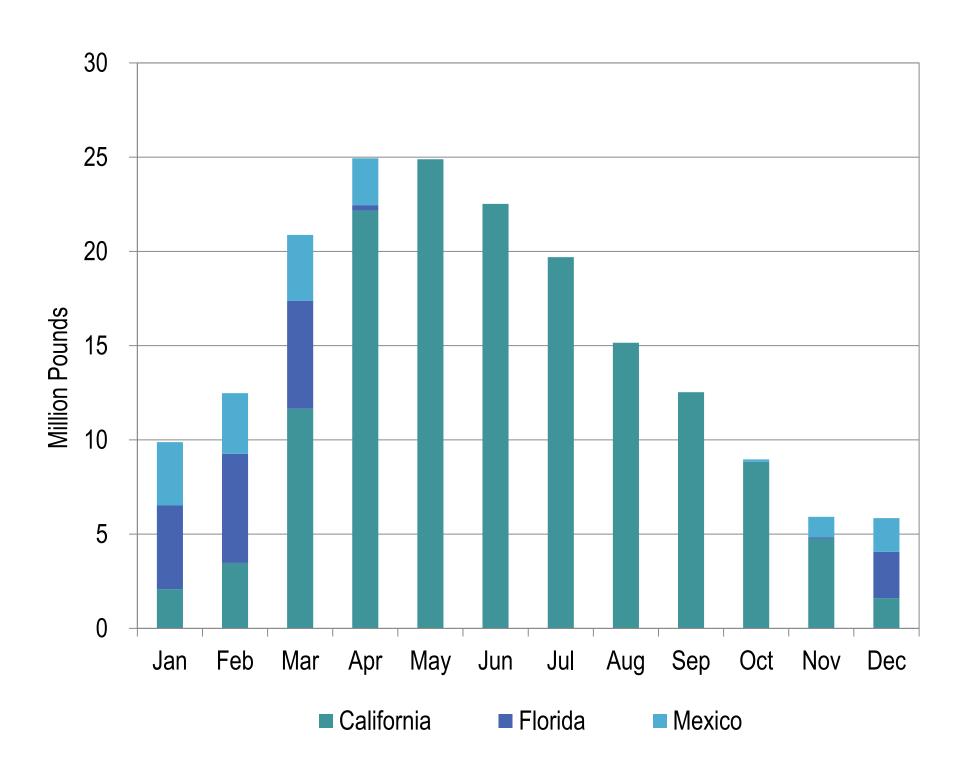
• California and Florida are the leading strawberry producing states. Their production accounts for 98% of U.S. total production.

• 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.

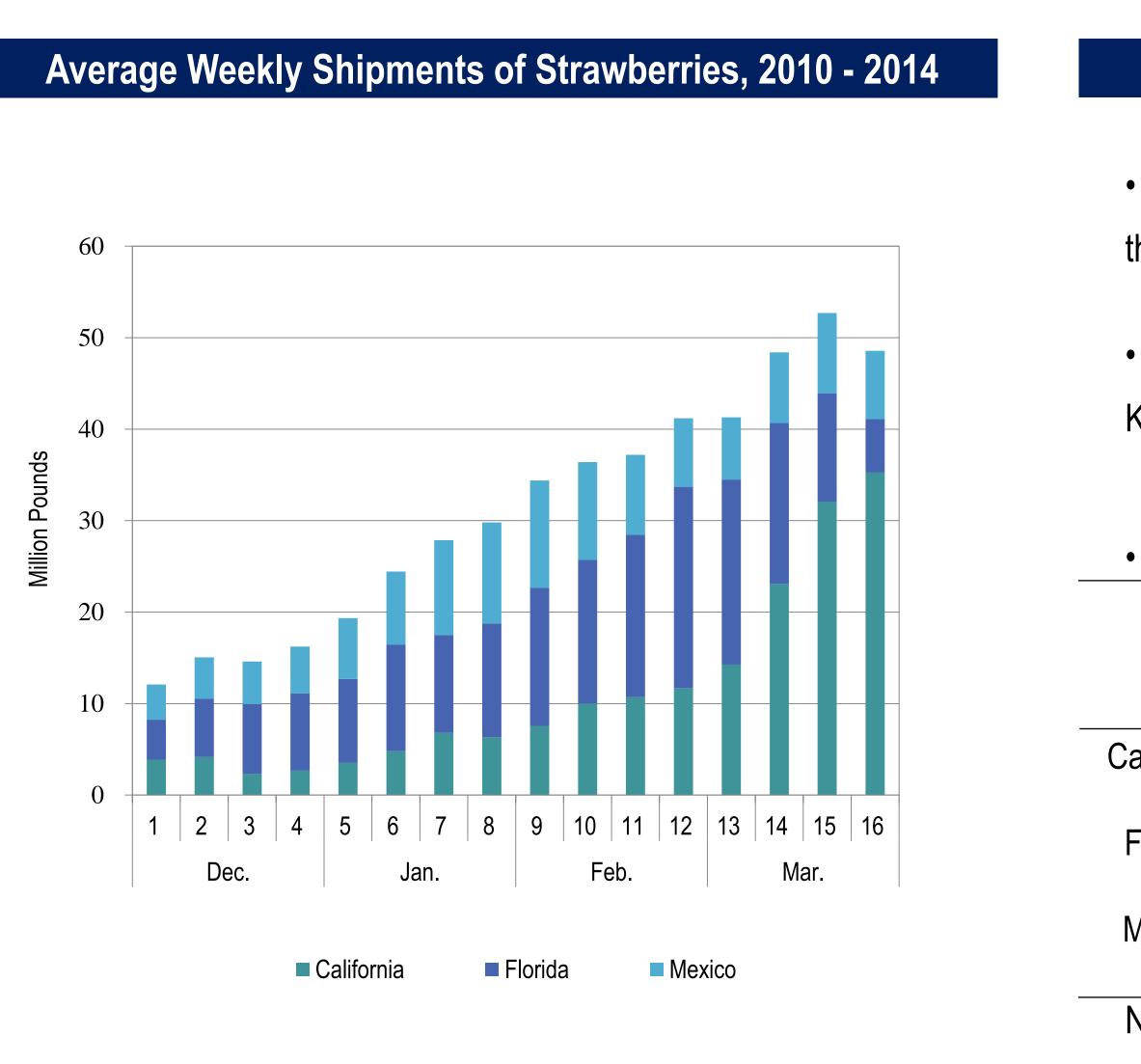
• This study aims to 1) examine the effects of contemporaneous changes in the shipments of California, Florida, and Mexican strawberries on their prices in terms of scale elasticities and price flexibilities, and 2) further identify the pattern of Mexican shipment's impact on the prices and shipment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



Average Monthly Shipments of Strawberries, 2010 - 2014



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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 $(\sum_{i} \gamma_{ii} = 0)$, and symmetry $(\gamma_{ii} = \gamma_{ii})$.

			Lotim	ation Result							d Mexican Sh		
• Scale Elasticity: $\varepsilon_i = -1 + \frac{\beta_i}{\bar{s}_i}$ where \bar{s}_i is the sample mean of							Baseline				Simulated Prices and Shipment Values		
the	sha	are of strav	wberries shi	pped from so	urce <i>i</i> .			-	Quantity (Million lbs.)	Price (\$/lb.)	Value (Million \$)	Price (\$/lb.)	Value (Million \$
• Pri	ice	Flexibility	$f_i = -\delta_{ii}$	$+ \frac{\gamma_{ij} + \beta_i \bar{s}_j}{M}$	where δ_{ij} is th	e	Dec.	1	4.369	2.988	13.053	2.460	10.749
• 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.							2	6.367	3.020	19.228	2.549	16.230	
Kror	nec	cker delta f	that equals of	one if $i = j$ a	nd zero other	wise.		3	7.606	2.238	17.018	1.970	14.984
								4	8.443	2.081	17.572	1.846	15.587
• Es	tim	nation Res	ulte				Jan.	5	9.168	1.909	17.505	1.648	15.105
· L3			ullo					6	11.673	1.863	21.741	1.618	18.887
			Scale	F	Price Flexibilitie	S		7 8	10.696 12.389	1.878 1.613	20.089 19.977	1.588 1.370	16.983 16.971
			Elasticities	California	Florida	Mexico		0	12.309	1.015	19.977	1.570	10.971
				Shipment	Shipment	Shipment	Feb.	9	15.089	1.425	21.501	1.200	18.110
Califo	rnia	a Price	-1.083	-0.601	-0.306	-0.176		10	15.701	1.363	21.393	1.125	17.671
			(0.051)	(0.027)	(0.031)	(0.024)		11	17.754	1.316	23.358	1.106	19.634
Flori	da	Price	-0.869	-0.207	-0.479	-0.183		12	22.009	1.019	22.421	0.846	18.623
			(0.045)	(0.024)	(0.030)	(0.026)	Mor	13	20.235	1.066	21.563	0.863	17.458
Mexi	ico	Price	-1.166	-0.244	-0.355	-0.481	Mar.	13 14	20.235	1.000	18.824	0.803	17.456
1110/(1		1 1100	(0.055)	(0.023)	(0.029)	(0.049)		15	11.854	1.027	12.169	0.733	6.798
Note	א יב ۸	Numbers ir						10	5.856	1.034	6.058	0.175	1.026
	5. IY		i parenules	es are stanua	ra errors.			16	5.050	1.034	0.000	0.175	1.020
	5.1		i parentiles	es are stanua	ra errors.		Sum No				293.468		238.782
			•	Mexican Stanua Value	nipment on (Simulated	California d Prices and ent Values Value	Nc	ote: T	he simulated	d prices ar lexican shi		alues are ca	238.782 Iculated
		y Effect o	of Doubled Baseline Price	Mexican St	nipment on (Simulated Shipme	d Prices and ent Values	Nc	ote: T	he simulated	d prices ar lexican shi	293.468 nd shipment va ipments increa	alues are ca	238.782 Iculated
Wee		y Effect of Contract of Contra	b f Doubled Baseline Price	Mexican St Value	nipment on (Simulated Shipme Price	d Prices and ent Values Value	Nc by	ote: T assi	he simulated uming that M	d prices ar lexican shi Coi	293.468 nd shipment va ipments increa	alues are ca se by 100%	238.782 Iculated
		y Effect of Contract of Contra	of Doubled Baseline Price) (\$/lb.)	Nexican St Value (Million \$)	nipment on (Simulated Shipme Price (\$/lb.)	d Prices and ent Values Value (Million \$)	Nc by • T	te: T assu	he simulated uming that M	d prices ar lexican shi Cor exican ship	293.468 nd shipment va ipments increa nclusions	alues are cal ise by 100%	238.782
Wee		y Effect of Quantity (Million Ibs. 3.868 4.155 2.332	Doubled Baseline) (\$/lb.) 2.936 3.034 2.663	Value (Million \$) 11.357 12.606 6.210	nipment on Simulated Shipme Price (\$/lb.) 2.361 2.370 1.829	d Prices and ent Values Value (Million \$) 9.133 9.847 4.265	Nc by • T pri	te: T assu	The simulated uming that M ncreased Me of California	d prices ar lexican shi Cor exican ship and Florid	293.468 nd shipment va ipments increa nclusions oments result in a strawberries	alues are cal ise by 100% n reductions 5. The simula	238.782 Iculated
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• 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.

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

1.546

1.478

1.434

23.088

32.076

35.259

16

Sum

35.705

47.405

50.548

308.539

1.381

1.346

1.324

31.874

43.175

46.694

260.215

References

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