Domestic and Foreign Sources of U.S. Demand for Fresh Vegetables and Fruits

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Introduction

Fresh vegetable and fruit consumption in the United States (U.S.) has increased significantly in the last two decades (Huang and Huang 2007). The overall increase in fresh fruit consumption is due entirely to sharp increases in the consumption of fresh noncitrus fruits and melons, while the overall gains in fresh vegetable consumption are mainly due to increased consumption of onions, bell peppers, tomatoes, cucumbers, carrots, broccoli and head lettuce (Putnam and Allshouse 1994). Coupled with increasing demand, the import share of many fruits and vegetables has increased (Huang and Huang 2007). For example, the import share of fresh tomatoes in domestic consumption has increased from 20.5% in 1990 to 43.5% in 2009 while the import share of cantaloupes in domestic consumption has increased from 23% in 1990 to 37% in 2009 (Economic Research Service (ERS) 2013f, 2013j, 2013g, 2013h). For some fruits and vegetables, the import shares are quite small. Fresh spinach, onions and oranges have import shares of only 1.6%, 6%, and 11%, respectively, in 2009 (ERS 2013e, 2013d, 2013b).

Although fruits and vegetables are an important and growing part of the U.S. diet, few studies estimate the demand for these products. This is particularly true in terms of the demand for a specific product by place of origin, and most treat domestic products as separable from imported products. As a result, little is known about demand relationships between domestically produced fruits and vegetables and imported products. Yet these relationships are important for the future viability and survival of some of these commodities.

In this paper, we fit a differential demand system to data of three vegetables (i.e., fresh spinach, fresh onions, and fresh tomatoes) and two fruits (i.e., fresh oranges and fresh cantaloupe) that include the expenditure and quantity of domestic and imported products by source of origin. The usual restrictions implied by demand theory are tested with log-likelihood ratio (LR) tests. The question of separability is also addressed empirically, that is, whether or not domestic production is separable from imported product. Expenditure and price elasticities are obtained and particular attention is focused on relationships between domestically produced fresh vegetables and fruits and imported ones.

Literature Review

The number of papers studying the demand for imported fruits and vegetables is not large. All utilize separability assumptions in some manner to estimate a manageable, conditional demand system, and the usual method is multistage budgeting as discussed by Barten (1977). Most maintain separability between domestically produced (home) goods and imported ones allowing for the estimation of import demand without the added complication of including home goods. Those that follow this method and estimate the import demand for a group of specific fruits or vegetables include Lee, Seale, and Jierwiriyapant (1990), Schmitz and Seale (2002), Seale *et al.* (2005), Nazku, Houston, and Fonsah (2010), and Tshikala and Fonsah (2012).

Studies that analyze the demand for imported goods by source of production also apply multistate budgeting to obtain a conditional demand system and maintain that domestic goods are separable from imported ones (Seale, Spark, and Buxton 1992; Sparks 1992; Honma 1993; Andayani and Tilley 1997; Muhammad 2012; Seale, Zhang, and Traboulsi 2013). No studies are found that maintain domestically produced fruits or vegetables are inseparable from imports. This is in spite of Winters (1984) argument that home goods are not separable from imports, and thus import demand models should include home goods and imported goods. In the spirit of Winters (1984), this paper includes home-produced fruits and vegetables along with imports by source of origin in the same manner as Seale, Marchant, and Bosso (2003) who estimate demand for U.S. and imported red wines in the U.S. market.

Methodology

The empirical model in this study is a geographic allocation model, and the function form is that of a conditional Rotterdam import demand model (Seale, Spark, and Buxton 1992). As with all mentioned studies, a multistage budgeting approach is used. Unlike previous import demand studies on fruits or vegetables, we include home goods in our specification. By doing so, we maintain that consumers do not choose between home goods and imported goods until the last step of the allocation problem. The Rotterdam parameterization is attractive because it allows for nested testing of restrictions for homogeneity, symmetry, and strong separability (additive preferences).

Conditional Geographic Import Demand System

Let there be $g = 1, \ldots, n$ groups, each group consisting of one good bought from n_g countries including the home country. The final step in the allocation problem is to allocate total group expenditure among imports and the home good for each n groups. Let E be total expenditure and E_g be expenditure on all n_g supplying countries (including domestic) in group S_g. Thus, E_i is expenditure spent on good g from source i $(= 1, \ldots, n_g)$. The preference structure between groups of goods may be represented by blockwise dependence (Theil, Chung, and Seale 1989, p136-138.). This enables one to estimate the demand for good g from the n_g countries (including domestic) conditional on E_g, the expenditure spend on good g. Estimation of the conditional demand for good g from source i allows one to measure the effects on the conditional trade shares when the total expenditure on good g changes or when the relative prices for good g from different sources change.

Let $q_1,\ldots,q_{n_g}$ and $p_1,\ldots,p_{n_g}$ represent quantities and prices of good g from the n_g source countries (including domestic), $W_g = E_g/E$, and $w_i = E_i/E$ represent the shares of group S_g (i.e., good g) and of good g from source i, respectively. Define θ_{ij} such that $\theta_{ij} = (\mu/\phi E)p_i u^{ij} p_j$, where μ represents the marginal utility of income, u^{ij} is the i, jth element of U^{-1}, the inverse of the Hessian matrix of the utility function, and ϕ is the income flexibility or the reciprocal of the income elasticity of the marginal utility of income $(1/\phi = (d\mu/dE)E/\mu)$ (Theil, Chung and Seale,1989, p.152-153). Additionally, let $\theta_i = (\partial p_i q_i/\partial E)$ represent the marginal share of good g from i, $\Theta_{gh} = \sum_{i\in S_g}\sum_{j\in S_h}\theta_{ij}$, and $\Theta_g = \sum_h \Theta_{gh}(g,h = 1,\ldots,G)$ represent the marginal share of group S_g. From $E_g = \sum_{i\in S_g} E_i$, it follows that $W_g = \sum_{i\in S_g} w_i$. Following Seale, Sparks, and Buxton (1992), it can be shown that the conditional differential import demand for good g from source $i \in S_g$ is

$$w_i^* d\log(q_i) = \theta_i^* d\log(Q_g) + \sum_{j\in S_g}\pi_{ij}^* d\log(p_j), \tag{1}$$

where source i includes domestic and imported products, $\theta_i^* = \theta_i/\Theta_{gg}$ is the conditional marginal share for good $i \in S_g$, and p_i is the price of good g from country i such that, letting x_i represent either p_i or q_i, $d\log(x_i) = dx_i/x_i$. The π_{ij}^*s are conditional Slutsky (compensated) price parameters, $d\log(Q_g) = \sum_{i\in S_g} w_i^* d\log(q_i)$ is the Divisia quantity index for S_g, and

$w_i^* = w_i / W_g$. The adding-up condition requires $\sum_{i \in S_g} \theta_i^* = 1$ while homogeneity and symmetry require that $\sum_{j \in S_g} \pi_{ij}^* = 0$ and $\pi_{ij}^* = \pi_{ji}^*, i, j \in S_g$, respectively. By assuming θ_i^* and π_{ij}^* are constants, we obtain the conditional absolute price version of the Rotterdam model,

$$\overline{w}_{it}^* Dq_{it} = \theta_i^* DQ_{gt} + \sum_{j \in S_g} \pi_{ij}^* Dp_{jt} + \varepsilon_{it} , \tag{2}$$

where $\overline{w}_{it}^* = \left(w_{it}^* + w_{i,t-1}^*\right)/2$ and $Dx_{it} = \log(x_{it}) - \log(x_{i,t-1})$ where x represents q , p , or Q_g . To estimate the system of equations represented by equation (2), omit one equation and estimate the system's remaining $n_g - 1$ equations. Parameter estimates are invariant to the equation omitted (Barten 1969), and the parameters of the omitted equation can be recovered from $\theta_{n_g}^* = 1 - \sum_{i \neq n_g} \theta_i^*$ (the adding-up condition) and from $\pi_{in_g}^* = -\sum_{j \neq n_g} \pi_{ij}^*$ (the homogeneity condition). With symmetry imposed, the $n_g - 1$ equations can be estimated jointly with maximum likelihood using an iterative seemingly unrelated regressions (SUR) technique.

Data

Data are collected from the U.S. Department of Agriculture (USDA). Specifically, data sources of cantaloupes are from National Agricultural Statistics Service (NASS) (2013k) and Economics Research Service (ERS) (2013g, 2013h). The sources of other commodities are all from ERS (i.e., for tomatoes, ERS 2013c, 2013f, 2013j; for fresh onions, ERS 2013d, 2013i; for fresh oranges, ERS 2013a, 2013b; and for spinach, ERS 2013e).

Prices are calculated differently depending upon the availability of data. In terms of the domestically produced commodities, the prices of tomatoes and oranges are measured by retail prices, cantaloupes and spinach are measured by supplier prices, and fresh onions are measured by shipping prices. In terms of imported commodities, the price is defined as the import value/import quantity except in the case of tomatoes where the price is defined as the (import value/import quantity)*(U.S retail price/U.S supplier price). The periods of analyses are 1989-2009 (fresh tomatoes), 1980-2010 (cantaloupes), 1989-2010 (fresh onions), 1993-2011 (fresh oranges), and 1992-2011 (fresh spinach). Quantities and quantity shares of the major exporting countries in 2009 of the five selected commodities are listed in Table 1.

Home produced goods made up the vast majority of consumption of fresh onions, fresh oranges and fresh spinach, while import commodities play a more important role in terms of consumption of fresh tomatoes and cantaloupes. Namely, the consumptions of fresh tomatoes and cantaloupes are 44% and 37 % from imported sources, respectively. Another salient fact concerning imported vegetables and fruits into the U.S. is that the countries that provide these specialty commodities are few in number. For example, Mexico is the primary country to export fresh tomatoes, fresh onions, fresh oranges, and fresh spinach to the U.S., and the consumption of cantaloupes from Honduras and Costa Rica accounts for 17% of the total consumption.

Results

The U.S. domestic and import demands for fresh tomatoes, cantaloupes, fresh onions, fresh oranges, and fresh spinach are estimated based on the conditional Rotterdam import demand system. Conditional expenditure, Cournot-own price, and Cournot cross-price elasticities are calculated on a per capita basis.

Testing Restrictions

Laitinen (1978) and Meisner (1979) argue that asymptotic tests of homogeneity and symmetry of consumer demand systems are biased toward rejection of the null hypothesis. For this paper, the restrictions of homogeneity and symmetry constraints are tested using a LR tests. The log likelihood values are reported in Table 2 for the unrestricted, homogeneity restricted, and homogeneity and symmetry restricted models. The test is -2(Lr-Lu) where Lr is the log-likelihood value of the restricted model and Lu is that of the unrestricted model. The test is approximately χ^2 with degrees of freedom equal to the number of restrictions. Table 2 shows the log-likelihood-ratio values for all the selected commodities.

The results of the LR tests indicate that the null hypothesis of homogeneity is not rejected for any commodity at the .01 significance level, but it is at the .05 significance level for fresh tomatoes. When the symmetry restriction is imposed and tested against homogeneity, symmetry is rejected at .01 significance level for cantaloupe and fresh onions, but not for the other commodities. Symmetry is rejected at the .05 significant level for fresh tomatoes but not at the .01 significance level.

Four-equation-demand systems are estimated for fresh tomatoes (1989-2009), cantaloupes (1989-2010), and fresh onions (1989-2010), a three-equation-demand system is estimated for fresh spinach (1992-2011), and a two-equation-demand system is estimated for fresh oranges (1993-2011). For cantaloupes, fresh onions, fresh spinach, and fresh oranges, the homogeneity and symmetry restricted models are chosen for presentation, For fresh oranges, all imports are aggregated into one category.. In the case of fresh tomatoes, the unrestricted model is chosen for presentation[1]. Conditional expenditure and price parameters are estimated along with asymptotic standard errors and reported in Table 3.

Conditional Expenditure and Price Parameters

The conditional expenditure parameters measure the marginal shares of expenditure conditional on total expenditures for the good from all sources. Marginal shares measure the share of an additional dollar that is spent on each commodity. These values are reported in column (6) of Table 3. For tomatoes, Mexico has the largest marginal share (.45) followed by the U.S. (.37), Canada (.10), and ROW (.08), and all marginal shares are significantly different from zero (α=.05). These results indicate if U.S. total expenditure on fresh tomatoes increases by one U.S. dollar, the expenditure on imports from Mexico increases by 45 cents, U.S. domestic tomatoes by 0.37 cents, from Canada by 10 cents, and from ROW by 0.08 cents. For other commodities, the U.S domestic marginal shares are all greater than one half. The U.S domestic marginal shares are especially dominant in spinach (0.98) and fresh oranges (0.98).

The own-price parameters of the five commodities from all sources are negative and less than one absolutely. The Slutsky (compensated) cross-price parameters indicate whether the same commodity from different source countries are substitute or complements, depending on the sign of the parameters. If negative, commodity pairings are complements; if positive, they are substitutes. For fresh tomato, all country pairings are substitutes except that of U.S.-Canada,

[1] When homogeneity is imposed on the tomato demand system, the price parameter of the rest of world (ROW) turns positive, a result that is implausible.

Mexico-ROW, and Canada-Mexico. For fresh onions, all combinations are substitutes except Chile-ROW. For cantaloupes, fresh onions, and fresh spinach, all combinations are substitutes except for Honduras-Costa Rica (cantaloupes), U.S.-ROW (onions), and Mexico-ROW (spinach). For fresh oranges, the pair U.S.-ROW are substitutes.

Conditional Expenditure Elasticities

The conditional expenditure elasticities of the five commodities are reported in column (2), Table 4. These conditional elasticities estimate the percent change in quantity demanded for commodities when total U.S. expenditures on the selected commodities increase by 1%. If an elasticity is less than one, it is conditionally inelastic and indicates that the budget share of the commodity from a particular source will decrease if total expenditure for the commodity increases. If a conditional expenditure elasticity is higher than 1.0, it is conditionally elastic and indicates that the budget share of the commodity from a particular source will increase as total expenditure on this commodity increases. If the elasticity is unitary, it indicates that the conditional budget share will be unchanged as total expenditure on the commodity increases.

Expenditure elasticities for U.S. home goods are unitary elastic for fresh oranges (1.00), and close to unitary elastic for cantaloupes (1.02), and fresh spinach (1.01). Countries with elastic expenditure elasticities are Canada for fresh tomatoes (1.75) and onions (1.75) and Mexico for fresh tomatoes (1.54) and onions (2.12). These sources have most to gain if the market for the commodity in the U.S. expands.

Conditional Cournot Own-Price Elasticities

The conditional Cournot uncompensated own-price elasticity measures the percent change of quantity demanded from an importing country of a commodity for a 1% increase in own price with nominal expenditure remaining constant. As such it includes both the substitute and income effects of an own-price change. All own-price elasticities are negative for all selected commodities from all sources, and most are significant at the 10% level or smaller. The exceptions are fresh tomatoes and fresh oranges from ROW, and spinach from Mexico. All conditional Cournot own-price elasticities are inelastic (less than one, absolutely) although two are close to unitary absolutely. The larger the absolute value of the own-price elasticity, the more sensitive is demand to an own-price change. U.S produced fresh spinach (-.99) and fresh oranges (-.98) are the most sensitive to an own-price change. For the other commodities, cantaloupes from U.S. (-.82), fresh tomatoes from Canada (-.79), and fresh oranges from ROW (-.93) are the most own-price sensitive. Own price elasticities that are less than one half are cantaloupe (-.29) from Costa Rica, fresh onion (-.44) from ROW, fresh oranges (-.28) from ROW, and spinach (-.023) from Mexico.

Testing Weak Separability

In this section, we test for weak separability between the home good and imports (Moschini, Moro, and Green 1994; Boonsaeng and Wohlgenant 2009). Weak separability is tested by joint Wald tests, that is, for the implied restrictions for the whole system jointly. These tests are

χ^2 with degrees of freedom equal to the number of restrictions. Results from the tests are mixed. At the 1% level, weak separability of home goods and imports is not rejected for fresh tomatoes, cantaloupes, fresh oranges, and fresh spinach. However, it is rejected for fresh onions.

Conclusions

In this paper, we follow Winters (1984) and maintain that domestic and imported goods of the same type are not separable and include U.S domestically produced commodities with imports. Specifically, U.S domestic and import demands for fresh tomatoes, cantaloupes, fresh onions, fresh spinach, and fresh oranges are estimated using the conditional Rotterdam import demand system. There are some key findings from this research.

First, U.S. marginal shares are all greater than one half for all commodities except fresh tomatoes. This result indicates that marginal shares of expenditures on home goods are generally higher than imported ones, although the imported volumes have increased in recent years. Second, import and domestic commodities are substitutes except U.S-Canada pairings for tomatoes, implying competition relationships between domestic and imported goods. Third, imports of fresh tomatoes, fresh onions, and fresh oranges all have conditional expenditure elasticities that are elastic (greater than 1.0). These countries stand to benefit most from increases in demand of these commodities in response to rising U.S consumer income. Finally, in terms of own-price elasticities, those of U.S. fresh oranges and fresh spinach are approximately unitary.

For other suppliers of these commodities, the own-price elasticities are inelastic and thus allow these suppliers to increase their total revenues by increasing the price.

In closing, several comments should be made. Whether one maintains that home goods are separable or inseparable matters. Domestic production, at least for the commodities studies, is so large relative to imports that the domestic data literally swamp the import data. This, combined with such a small number of relatively large exporters to the U.S. for these commodities and the generally lack of data availability on a longer time-series basis, makes it difficult for the models to empirically capture actual effects in a statistically significant manner. However, the effects of imports, at least conceptually, on home goods are more directly addressed when including home goods in a demand system that also includes imports of the goods. Admittedly, one can test for weak separability, but the tests are asymptotic which brings up the question of their power.

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Table 1. U.S. Import Quantity and Quantity Share for Selected Crops by Country of Origin on Per Capita Basis, 2009

Country	Quantity, per Capita (pound)	Quantity Share (percentage)
	Fresh Tomatoes	
United States	11.06	56.5%
Mexico	7.51	38.3%
Canada	0.93	4.8%
Rest of the World	0.09	0.5%
	Cantaloupes	
United States	5.72	62.7%
Honduras	0.96	10.5%
Costa Rica	0.62	6.9%
Rest of the World	1.81	19.9%
	Fresh Onions	
United States	17.30	89.0%
Canada	0.21	1.1%
Mexico	1.34	6.9%
Rest of the World	0.58	3.0%
	Fresh Oranges	
United States	8.92	93.1%
Rest of the World	0.66	6.9%
	Spinach	
United States	2.04	98.4%
Mexico	0.03	1.2%
Rest of the World	0.01	0.4%

Source: Economics Research Service (2013 b, 2013d, 2013e, 2013f, 2013g, 2013h, 2013j)

Table 2. Log Likelihood Values for Different Restrictions in Demand Systems for Five Fruits and Vegetables

Crop, Years	Unrestricted	Homogeneity	Homogeneity and Symmetry
	Log-Likelihood Ratio		
Fresh Tomatoes, 1989-2009	181.70	176.56	172.02
Cantaloupes, 1989-2010	287.99	286.20	279.98
Fresh Onions, 1989-2010	219.46	218.58	211.83
Fresh Oranges 1993-2011	57.06	56.02	56.02
Fresh Spinach , 1992-2011	134.43	133.44	132.60

Table 3.Conditional Parameter Estimates for U.S. Domestic and Import Demands for Selected Crops from Selected Countries on Per Capita Basis

Fresh Tomatoes, 1989-2009
Unrestricted

	Parameters				
	Price (π_{ij}^{*})				
Country	United States	Mexico	Canada	ROW[b]	Marginal Shares (θ_i^{*})
(1)	(2)	(3)	(4)	(5)	(6)
United States	-0.203**	0.041	-0.280***	0.116	0.369**
	(0.110)[a]	(0.031)	(0.089)	(0.075)	(0.179)
Mexico	0.106	-0.040	0.302***	-0.128*	0.452**
	(0.111)	(0.031)	(0.089)	(0.075)	(0.180)
Canada	0.082***	-0.002	-0.040*	0.030	0.103**
	(0.030)	(0.008)	(0.024)	(0.020)	(0.050)
ROW[b]	0.015	0.000	0.018	-0.018	0.076**
	(0.022)	(0.006)	(0.017)	(0.015)	(0.035)

Cantaloupes, 1980-2010,
Homogeneity and Symmetry

	Parameters				
	Price (π_{ij}^{*})				
Country	United States	Honduras	Costa Rica	ROW[b]	Marginal Shares (θ_i^{*})
(1)	(2)	(3)	(4)	(5)	(6)
United States	-0.029	0.003	0.014*	0.012	0.781***
	(0.025)[a]	(0.006)	(0.009)	(0.024)	(0.050)
Honduras		-0.022***	-0.005	0.024***	0.008
		(0.006)	(0.003)	(0.008)	(0.011)
Costa Rica			-0.012**	0.002	0.039*
			(0.006)	(0.010)	(0.020)
ROW[b]				-0.038	0.172***
				(0.029)	(0.050)

Fresh Onions,1989-2010,
Homogeneity and Symmetry

	Parameters				
	Price (π_{ij}^{*})				
Country	United States	Canada	Mexico	ROW[b]	Marginal Shares (θ_i^{*})
(1)	(2)	(3)	(4)	(5)	(6)
United States	-0.006	0.000	0.019	-0.013*	0.543***
	(0.019)[a]	(0.004)	(0.013)	(0.008)	(0.105)
Canada		-0.013**	0.001	0.012***	0.029
		(0.006)	(0.004)	(0.004)	(0.022)
Mexico			-0.032***	0.012*	0.365***
			(0.011)	(0.006)	(0.072)
ROW[b]				-0.011	0.063
				(0.007)	(0.040)

Spinach , 1992-2011,
Homogeneity and Symmetry

	Parameters			
	Price (π_{ij}^*)			
Country	United States	Mexico	ROW[b]	Marginal Shares (θ_i^*)
(1)	(2)	(3)	(4)	(5)
United States	-0.013	0.006	0.008	0.980***
	(0.009)[a]	(0.006)	(0.005)	(0.016)
Mexico		-0.005	-0.000	0.004
		(0.006)	(0.003)	(0.011)
ROW[b]			-0.007**	0.016*
			(0.003)	(0.009)

Fresh Oranges, 1993-2011,
Homogeneity and Symmetry

	Parameters		
	Price (π_{ij}^*)		
Country	United States	ROW[b]	Marginal Shares (θ_i^*)
(1)	(2)	(3)	(4)
United States	-0.007	0.007	0.975***
	(0.010)[a]	(0.010)	(0.012)
ROW[b]		-0.007	0.025**
		(0.010)	(0.012)

[a] Asymptotic standard errors are in parentheses.
[b] ROW = Rest of World.
*** Significance at 0.01; ** significance at 0.05; * significance at 0.10.

Table 4. Conditional Expenditure and Cournot (Uncompensated) Price Elasticities of U.S. Domestic and Import Demand for Fresh Tomatoes, Cantaloupes, Onions, Oranges, and Spinach from Selected Countries

Fresh Tomatoes, 1989-2009

Country	Expenditure elasticities	Own-price elasticities	Cross-price elasticities: United States	Mexico	Canada	ROW[a]
(1)	(2)	(3)	(4)	(5)	(6)	(7)
United States	0.59**	-0.69***	-	-0.11	-0.48***	0.17
Mexico	1.54**	-0.59***	-0.60	-	0.94***	-0.47*
Canada	1.75**	-0.79*	0.30	-0.55**	-	0.48
ROW[a]	3.54**	-0.93	-1.50	-1.02**	0.63	-

Cantaloupes, 1989-2010

Country	Expenditure elasticities	Own-price elasticities	Cross-price elasticities: United States	Honduras	Costa Rica	ROW[a]
(1)	(2)	(3)	(4)	(5)	(6)	(7)
United States	1.02***	-0.82***	-	0.08***	-0.01***	-0.15***
Honduras	0.23	-0.70***	-0.10	-	-0.16	0.69***
Costa Rica	0.83*	-0.29**	-0.33	-0.12***	-	-0.09
ROW[a]	1.10***	-0.41***	-0.76***	-0.43***	-0.14***	-

Fresh Onions, 1989-2010

Country	Expenditure elasticities	Own-price elasticities	Cross-price elasticities: United States	Canada	Mexico	ROW[a]
(1)	(2)	(3)	(4)	(5)	(6)	(7)
United States	0.69***	-0.55***	-	-0.03***	-0.06***	-0.03***
Canada	1.50	-0.70**	-1.17	-	-0.21	0.58***
Mexico	2.12***	-0.55***	-1.55***	-0.15***	-	0.01
ROW[a]	2.35	-0.47***	-2.31**	1.59***	-0.84*	-

Spinach , 1992-2011

Country	Expenditure elasticities	Own-price elasticities	Cross-price elasticities: United States	Mexico	ROW[b]
(1)	(2)	(3)	(4)	(5)	(6)
United States	1.01***	-0.99***	-	-0.01***	-0.00***
Mexico	0.20	-0.25	0.06	-	-0.01
ROW[b]	1.47*	-0.71**	-0.71	-0.05	-

Fresh Orange 1993-2011

Country	Expenditure elasticities	Own-price elasticities	Cross-price elasticities: United States	ROW[a]
(1)	(2)	(3)	(4)	(5)
United States	1.00***	-0.98***	-	-0.02*
ROW[a]	1.01**	-0.28	-0.71	-

[a]ROW=Rest of World
*** Significance at 0.01; ** significance at 0.05; * significance at 0.10