The Demand for Meat Products in the United States: An Empirical Analysis*

by

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Abstract

Given the importance of meat consumption, and the proportion of consumers' income spent on meat, this study estimates the demand for eight meat categories using two different functional forms. An inverse almost ideal demand system (IAIDS), and linear double-log price dependent demand models are specified. In most cases, flexibilities obtained from both methods are comparable and show that the demand for meat products is price inflexible. In addition, there are regional as well as seasonal variations in the demand for meat products.

Key Words

Meat consumption, Income, Demand system, Ideal demand system

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Introduction

Despite the recent increase in health awareness among the American public, meat consumption remains a significant part of total food consumption. Annual ground beef consumption in the United States is estimated to be more than 7 billion pounds (Egbert et al.), about 44 percent of total fresh beef consumed. Some reports estimated that the consumers spend about 4 percent of their disposable income on red meat and poultry products, accounting for 30 percent of consumers' food budget (Stillman).

Although there have been numerous debates over the cause and nature of structural shifts in the parameters of demand for beef or poultry, advancements in technology and the introduction of new products, such as lean beef, may intensify the need for further study of the meat industry. There is a general consensus among economists and analysts that the demand for beef is declining while the demand for poultry is increasing. However, there is a difference of opinion as to why this is occurring. Further examination of the demand for meat products including a variety of methods and an explicit comparison of those methods seems to be warranted.

Earlier studies on the structure of the demand for meat have differed in the methodology they employ, the assumptions made and in the type of data used. (See, for example, Houck, Anderson, Huang (1988, 1990), Weymark, Chambers and McConnell, Dahlgran, Eales and Unnevehr, Capps, Peters, Peters and Spreen.) Our method is similar to Peters in that we use similar data sets and a similar functional form. However, we specify a single system of demand equations for the U.S. with the inclusion of regional dummies to capture regional effects. In addition, our method is different from most earlier studies in that we use actual consumption data from consumer expenditure surveys as opposed to using disappearance data which implies or assumes that consumer preferences for meat are separable by species.

We estimate two models of the demand for various meat products in the United States, an inverse almost ideal demand system (IAIDS) and a linear double-log price dependent system. We then compare the results from the two models and find that the results are robust for beef and pork products, but differ for poultry. We also find significant differences in demand among regions of the country and significant seasonal effects on demand. The remainder of the paper contains a section on methodology which describes the two models of demand and the data used, a section describing the empirical results, and a conclusion.

Methodology

As mentioned earlier, our methodology consists of two different approaches. We specify an inverse almost ideal demand system and a linear double-log price dependent model. Each of the functional forms is described below.

An Inverse Almost Ideal Demand System

An inverse almost ideal demand system (IAIDS) has properties similar to the direct almost ideal demand system (AIDS). For convenience, the derivation of the inverse almost ideal demand system is restated as follows:[1]

Let a distance function be represented by equation

$$\ln D(U,q) = a(q) + U * b(q)$$

Where

$$a(q) = a_0 + \sum \alpha_i * \ln q_i + \frac{1}{2}\sum_i \sum_j \gamma_{ij} \ln q_i \ln q_j$$

and

$$b(q) = \beta_0 \Pi q_i^{\beta_i}$$

Given that U and q represents the level of utility and vector of quantities consumed respectively, for the distance function to be homogeneous in q requires that

$$\sum \alpha_i = 1, \quad \sum_i \gamma_{ij} = \sum_j \gamma_{ij} = \sum \beta_i = 0 \quad and \quad \gamma_{ij} = \gamma_{ji}$$

Taking partial derivatives with respect to ln q_i yields a compensated share equations, W_i, the budget share of good i

$$(A) \quad \frac{\partial \ln D(U,q)}{\partial \ln q_i} =$$

$$\alpha_i + \sum_j \gamma_{ij} \ln q_j + U \beta_i \beta_0 \Pi e^{\beta_i \ln q_i}$$

Since equation A is a function of quantity and unobservable utility, a directly estimable expression can be derived by inverting the distance function, and obtaining an expression for utility, and substituting that expression into (A). Assuming utility maximization requires that D(U,q)=1, therefore, we get the uncompensated share equation

$$(B) \quad W_i = \alpha_i + \sum_j \gamma_{ij} \ln q_j - \beta_i \ln(Q)$$

where

$$\ln(Q) = a(q), \ \sum_i \alpha_i = 1, \ \gamma_{ij} = \gamma_{ji} = 0, \ \sum_i \gamma_{ij} = 0, \ \sum_i \beta_i = 0$$

The above expression can be estimated in a linear form by approximating ln(Q) with a quantity index $(\sum_k W_k \ln q_k)$. This expression is analogous to the Stone price index, commonly used in AIDS model. This system of equations forms a seemingly unrelated regressions (SUR) model. We have to drop one equation from the model; we choose to drop the equation for other poultry products.

Linear Double-log Price Dependent Form

The linear double-log model is specified as follows:

$$LP_i = B_0 + B_1 LGBQ + B_2 LRSTQ + B_3 LSTKQ + B_4 LPRICQ + B_5 LOMQ + B_6 LWCKQ + B_7 LCKPQ + B_8 LOPLTQ + B_9 LY + B_{10} R_2 + B_{11} R_3 + B_{12} R_4 + B_{13} R_{22} + B_{14} R_{33} + B_{15} R_{44} + B_{16} S_2 + B_{17} S_3 + B_{18} S_4 + B_{19} T + E$$

Where:

LP_i = deflated prices (1967 = 100) of ground beef, roast, steak, pork, other meats, whole chicken, chicken parts, and other poultry expressed in logarithms, respectively.

LGBQ = monthly quantity of ground beef (lbs) consumed per household expressed in logarithms

LRSTQ = monthly quantity of roast (lbs) consumed per household expressed in logarithms

LSTKQ = monthly quantity of steak (lbs) consumed per household expressed in logarithms

LPRKQ = monthly quantity of pork (lbs) consumed per household expressed in logarithms

LOMQ = monthly quantity of other meat (lbs) consumed per household expressed in logarithms

LWCKQ = monthly quantity of whole chicken (lbs) consumed per household expressed in logarithms

LCKPQ = monthly quantity of chicken parts (lbs) consumed per household expressed in logarithms

LOPLTQ = monthly quantity of other poultry (lbs) consumed per household expressed in logarithms

LY = monthly household disposable income in dollars expressed in logarithms

R_2, R_3, R_4 = regional dummies representing the West, Southeast and Northeast regions, respectively.

R_{22}, R_{33}, R_{44} = interaction dummies between income and West, South, and Northeast regions respectively.

S_2, S_3, S_4 = dummy variables representing second,third, and fourth quarters, respectively

T = a time trend

B_0 = constant terms

$B_1 \ldots B_{19}$ = coefficient estimates

E = error term

The equations are estimated using OLS.

Data

Our system includes demand equations for eight meat products: beef roast, steak and ground beef, pork, chicken parts, whole chickens, other poultry and other meats. Secondary data adapted for meat demand analysis by Peters were used in this study. We use monthly observations from 1982 to 1986. The data on prices and consumption are taken from the Bureau of Labor Statistics Consumer Expenditure Survey and expenditure was generated from price and consumption data. Total meat expenditure is used as a proxy for income; this is calculated by summing the expenditures across all meat categories.

In addition, monthly consumer price indices (1967=100) for meat, poultry and eggs are used to deflate the product prices. The consumer price indices are obtained from CPI detailed report, Bureau of Labor Statistics. Regional dummy variables are generated for four regions of the country: Northeast, South, Midwest and West, using the official U.S. Census definitions for those regions.

Empirical Results

The parameter estimates obtained from the IAIDS models for all eight meat products and for the regional and seasonal dummies are presented in Table 1. (The omitted categories for the dummy variables are the Midwest and the first quarter of the year.) The analogous results from the linear double-log model are presented in Table 2. We corrected the double-log system for autocorrelation. We do not, however, report the Durbin-Watson statistic for either system. According to Peters, little is known about the validity of the Durbin-Watson test when applied to a system of equations; the test may indicate the existence of autocorrelation when it actually does not exist.

In both the IAIDS and linear double-log model, almost all the coefficients are statistically significant. All the own and cross quantity effects are significant, except in the equation for other poultry in the linear double-log model. The regional effects are also significant in general for both models. The IAIDS model shows that ground beef and roasts consumption is higher in the West and South, but ground beef consumption is lower in the Northeast than the Midwest. Both models show that steak consumption is highest in the West and Northeast. If steak is a normal good and if income is higher in the West and Northeast, then these results are sensible. Both models also show the result that pork consumption is highest in the Midwest.

The coefficients on income in the double-log model are all positive and significant, except in the equation for whole chicken, which implies that all meat products except whole chicken are normal goods. The coefficients associated with the interaction dummy variable between income and region in the double-log model are, in general, not significant.

The results of the seasonal dummies in both models are mixed across products , but tend to have the same signs in each model. Consumption of meat products does not vary much across seasons, although consumers seem to reduce their consumption of chicken during the fourth quarter.

It is not generally useful to directly compare the coefficients of the IAIDS model with those of the double-log model. Rather, we can generate flexibilities from both models and compare those for sign and magnitude. The flexibilities for the IAIDS model are obtained by substituting the estimated parameter values along with the budget shares into the equation:

$$\epsilon_{ij} = -\delta_{ij} + \frac{\gamma_{ij}}{W_i} - \beta_i \left\{ \frac{W_j}{W_i} + \frac{1}{W_i} \sum_{W_k} \ln q_k (\epsilon_{kj} + \delta_{kj}) \right\}$$

where

δ_{ij} is the Kronecker delta (δ_{ij} = 1 for i =j, δ_{ij} = 0, otherwise) (Green and Alston, and Peters). The flexibilities calculated from the IAIDS model are reported in Table 3.

Table 1. Results for Meat Demand in United States Obtained from IAIDS Model

		Quantity									Regional Dummy			Seasonal Dummy			
	Constant	Ground Beef	Roasts	Steak	Pork	Other Meat	Chicken Whole	Chicken Parts	Other Poultry	Q Index	R2	R3	R4	S2	S3	S4	R^2
Ground Beef	0.1170	0.1360	-0.0078	-0.0257	-0.0457	-0.0313	-0.0072	-0.0126	-0.0057	0.0140	0.0076	0.0203	-0.0111	-0.0018	-0.0076	-0.0076	0.8967
	0.0061[a]	0.0033	0.0021	0.0021	0.0028	0.0023	0.0014	0.0018	0.0012	0.0045	0.0020	0.0023	0.0024	0.0020	0.0020	0.0021	
	19.177[b]	40.947	-3.6940	-12.057	-16.287	-13.924	-5.1876	-6.9155	-4.9147	3.1173	3.7517	8.8829	-4.7095	-3.7891	-3.7891	-3.6951	
Roasts	0.1420		0.0649	-0.0131	-0.0201	-0.0108	-0.0043	-0.0061	-0.0028	-0.0028	0.0086	0.0106	-0.0020	-0.0018	-0.0049	-0.0038	0.7382
	0.0060		0.0027	0.0019	0.0025	0.0019	0.0012	0.0016	0.0012	0.0045	0.0021	0.0021	0.0022	0.0020	0.0020	0.0021	
	23.490		24.501	-7.0284	-8.0526	-5.6247	-3.5158	-3.7164	-2.4094	-0.6215	4.1927	4.9794	-0.8983	-0.9157	-2.5039	-1.8473	
Steak	0.1988			0.1278	-0.0370	-0.0231	-0.0075	-0.0153	-0.0061	0.0015	0.0165	-0.0126	0.0294	0.0037	-0.0017	-0.0016	0.9196
	0.0055			0.0026	0.0025	0.0020	0.0012	0.0016	0.0011	0.0042	0.0019	0.0020	0.0021	0.0018	0.0018	0.0019	
	35.148			48.836	-14.692	-11.845	-6.0857	-9.2979	-5.6802	0.3509	8.7617	-6.1817	13.851	2.0329	-0.9564	-0.8251	
Pork	0.1584				0.1651	-0.0351	-0.0056	-0.0091	-0.0096	0.0021	-0.0243	-0.0362	-0.0264	-0.0031	0.0037	0.0044	0.8860
	0.0074				0.0045	0.0027	0.0016	0.0021	0.0014	0.0055	0.0025	0.0027	0.0027	0.0024	0.0024	0.0025	
	21.345				36.430	-	-5.2168	-4.3785	-6.7215	0.3810	-9.8117	-13.402	-13.402	-1.2941	1.5158	1.7510	
						13.1870											
Other Meats	0.1591					0.1248	-0.0102	-0.0085	-0.0059	-0.0050	-0.0105	0.0124	0.0103	0.0038	0.0046	0.0007	0.9223
	0.0052					0.0030	0.0013	0.0016	0.0010	0.0038	0.0017	0.0021	0.0020	0.0016	0.017	0.0017	
	30.662					41.818	-7.9103	-5.400	-5.6994	-1.569	-6.0961	6.0300	5.2216	2.3223	2.7006	0.42611	
Chicken. Whole	0.0579						0.0470	-0.0063	-0.0029	-0.0041	0.0023	0.0013	0.0036	0.0012	0.0022	0.0012	0.8997
	0.0036						0.0011	0.0011	0.0007	0.0027	0.0012	0.0013	0.0014	0.0012	0.0012	0.0012	
	0.7162						41.489	-5.9029	-4.1038	-1.51514	1.9021	0.9928	2.6352	1.0630	1.9039	0.9416	
Chicken. Parts	0.1038							0.0599	-0.0096	-0.0096	0.0022	0.0048	0.0024	-0.0016	0.0039	-0.0018	0.8810
	0.0054							0.0020	0.0042	0.0042	0.0019	0.0020	0.0022	0.0018	0.0018	0.0019	
	19.402							30.5180	-2.2863	-2.2863	1.1751	2.4196	1.0528	-0.8753	2.1715	-0.9450	
Other[c] Poultry	0.0630								0.0426								
	-								-								
	-								-								

[a]Standard error
[b]t Statistics
[c]Calculated from the restriction in the model
R2, R3 and R4 are dummy variables representing West, South, and Northeast demand regions respectively
S2, S3, and S4 are dummy variables representing April-June, July-September, and October-December periods, respectively

Table 2. Results for Meat Demand in United States Obtained from the Linear Double-Log Model

	Quantity									Regional Dummy			Regional/Income Interaction Dummy			Seasonal Dummy					
	Ground Beef	Roasts	Steak	Pork	Other Meat	Chicken Whole	Chicken Parts	Other Poultry	Income	R2	R3	R4	R22	R33	R44	S2	S3	S4	Trend	Constant	R^2
Ground Beef	-0.1820	0.0371	-0.1660	-0.1690	-0.1570	-0.0354	-0.0586	-0.0273	0.8527	-0.0002	0.0792	0.1275	-0.0338	-0.0242	0.1593	0.0042	-0.0302	-0.0208	-0.0017	-2.3829	0.451
	0.0522[a]	0.0244	0.0424	0.0598	0.0443	0.0185	0.0216	0.0122	30.2306	0.1265	0.1276	0.12017	0.0934	0.0947	0.0907	0.0158	0.0172	0.0167	-0.0004	0.5362	
	-3.4866[b]	-1.5214	-3.9114	-2.8245	-3.5401	-1.9180	-2.7138	-2.447	3.6975	0.0012	0.6211	1.0610	-0.3623	-0.2551	1.7568	0.2663	-1.7478	-1.2410	-4.1220	-4.4438	
Roasts	-0.3280	-0.2739	-0.2552	-0.3287	-0.2118	-0.0913	-0.0991	-0.0687	1.7137	-0.0683	0.2104	-0.1603	-0.1153	0.0450	-0.0528	0.0018	-0.2950	-0.0040	-0.0010	-0.1686	0.502
	0.0722	0.0336	0.05919	0.0833	0.0617	0.0255	0.0301	0.0168	0.3214	0.1743	0.1768	0.1656	0.1284	0.1309	0.1246	0.0223	0.0247	0.0237	0.0062	0.74811	
	-4.5413	-8.1481	-4.3109	-3.9473	-3.4358	-3.5740	-3.2891	-4.0943	5.315	-0.3917	1.1900	0.9680	-0.8982	0.3432	-0.4240	0.0822	-1.1969	-0.1687	-1.6899	-0.2253	
Steak	-0.0217	-0.0393	-0.0774	-0.0862	-0.0187	-0.0154	-0.0359	-0.0073	0.2657	0.1299	-0.0093	0.2668	0.0178	0.0723	0.0156	0.0295	0.0065	0.0049	-0.0025	-3.2643	0.944
	0.0271	0.0125	0.0227	0.0319	0.0235	0.0096	0.0116	0.0063	0.1231	0.0652	0.0673	0.0623	0.0473	0.0490	0.0460	0.0091	0.0104	0.0097	0.0003	0.2873	
	-0.8013	-3.1426	-3.4091	-2.7041	-0.7944	-1.5993	-3.1064	-1.1676	2.1580	1.9920	-0.1377	4.2865	0.3758	1.4748	0.3386	3.2477	0.6286	0.5100	-7.9883	-11.360	
Pork	-0.1748	-0.0613	-0.1147	-0.2431	-0.1290	-0.0376	-0.0366	-0.0376	0.8975	-0.2193	-0.3431	-0.2116	-0.0858	-0.1244	-0.0951	-0.0131	0.0093	0.0142	0.0008	-2.1037	0.857
	0.0278	0.0128	0.0234	0.0329	0.0242	0.0099	0.0119	0.0065	0.1270	0.0675	0.0702	0.0648	0.0483	0.0502	0.0470	0.0096	0.0111	0.0103	0.0004	0.2967	
	-6.2833	-4.7810	-4.8938	-7.3856	-5.3274	-3.8137	-3.0642	-5.8348	7.0676	-3.2483	-4.8904	-3.2654	-1.7763	-2.4769	-2.0241	-1.3660	0.8357	1.3785	2.2512	-7.0917	
Other Meats	-0.1457	-0.0554	-0.1167	-0.1631	-0.2406	-0.0481	-0.0294	-0.0279	0.7207	0.0655	0.1926	0.1917	0.0948	0.1053	0.0961	0.0186	0.0215	0.0022	-0.0001	-2.4438	0.717
	0.0340	0.0161	0.0270	0.0383	-0.0285	0.0120	0.0137	0.0080	0.1465	0.0835	0.0827	0.0795	0.0618	0.0616	0.0602	0.0097	0.0104	0.0104	0.0002	0.3396	
	-4.2896	-3.4491	-4.330	-4.2624	-8.4486	-4.0078	-2.1365	-3.4686	4.9197	0.7836	2.3297	2.4085	1.5323	1.7076	1.5950	1.9223	2.057	0.2120	-0.5755	-7.1955	
Chicken, Whole	0.0225	-0.0199	-0.0093	-0.0119	-0.0251	-0.0085	-0.0069	0.0010	0.0244	0.1507	0.0196	0.1310	0.0425	0.0199	0.0177	-0.0096	0.0151	-0.0034	0.0011	-5.2643	0.871
	0.0184	0.0085	0.0156	0.2199	0.0161	0.0065	0.0080	0.0043	0.0846	0.1491	0.0539	0.0526	0.0317	0.0333	0.0310	0.0066	0.0078	0.0073	0.0004	0.1991	
	1.2184	-2.3382	-0.5929	-0.5388	-1.5610	-1.3085	-0.8715	0.2363	0.2880	3.0697	0.3639	2.4882	1.3415	0.5972	0.5695	-1.4584	1.9311	-0.4638	2.9919	-26.443	
Chicken, Parts	-0.0136	-0.0274	-0.0446	-0.0467	-0.0606	-0.0213	-0.0567	-0.0148	0.2971	0.0113	-0.1953	-0.1068	-0.0147	-0.1432	-0.0231	-0.0155	-0.0114	-0.0249	0.0020	-4.0581	0.713
	0.0323	0.0149	0.0272	0.0382	0.0281	0.0114	0.0138	0.0075	0.1472	0.1783	0.0813	0.0751	0.0560	0.0582	0.0545	0.0111	0.0129	0.0119	0.0004	0.3439	
	-0.4228	-1.8418	-1.6414	-1.2245	-2.1624	-1.8596	-4.0992	-1.982	2.0182	0.1444	-2.4014	-1.4215	-0.2630	-2.460	-0.4236	-1.3981	-0.8896	-2.0894	4.7583	-11.800	
Other Poultry	0.00003	-0.00002	-0.00005	-0.00005	0.000001	0.00005	0.00009	-0.0002	0.0002	0.00035	0.00003	0.0004	0.0001	0.00008	0.00002	-0.00008	-0.000008	0.00003	0.000004	0.0067	0.796
	0.0001	0.00007	0.00012	0.00017	0.00012	0.00005	0.00006	0.00003	0.0007	0.00038	0.0004	0.00042	0.0002	0.0003	0.00024	0.00005	0.00006	0.00006	0.000003	0.0015	
	-0.1800	-0.29004	-0.3975	-0.02676	0.0117	1.0038	1.4785	-4.5905	0.3654	0.9040	0.0663	0.8708	0.5529	0.3055	0.0752	-1.5072	-0.1250	0.5253	1.5036	4.4108	

[a]Standard error.
[b]t statistic.
R2, R3, and R4 are dummy variable representing the West, the South and the Northeast demand regions.
S2, S3, and S4 are dummy variable representing the April-June, July-September, and October-December periods, respectively.
R22, R33, and R44 are Interaction dummy between Income and the West, the South and the Northeast demand regions, respectively.

Table 3. Flexibilities for Meats in the United States Obtained from the IAIDS Model

	Ground Beef	Roasts	Steak	Pork	Other Meat	Chicken Whole	Chicken Parts	Other Poultry
Ground Beef	-0.2468	-0.0471	-0.1535	-0.2855	-0.1917	-0.0449	-0.0766	-0.0329
Roasts	-0.0794	-0.2782	-0.1424	-0.2125	-0.1141	-0.0465	-0.0653	-0.0306
Steak	-0.1693	-0.0856	-0.1702	-0.2439	-0.1517	-0.0493	-0.1000	-0.0397
Pork	-0.1920	-0.0840	-0.1550	-0.3155	-0.1475	-0.0361	-0.0383	-0.0401
Other Meat	-0.1754	-0.0618	-0.1316	-0.1933	-0.2635	-0.0581	-0.0476	-0.0341
Chicken, Whole	-0.1198	-0.0787	-0.1342	-0.1356	-0.1789	-0.1093	-0.1136	-0.1534
Chicken, Parts	-0.1331	-0.0719	-0.1814	-0.0737	-0.0854	-0.0734	-0.235	-0.0249
Other Poultry	-0.1863	-0.0811	-0.1802	-0.3086	-0.1844	-0.0845	-0.0634	-0.0441

The parameter estimates from the linear double-log model are also the direct price flexibilities (Table 2). The own flexibility ranged from -0.0441 to -0.3155 in the IAIDS model, and -0.0002 to -0.2739 in the double-log model. In both models, all own and cross flexibilities are less than 1 (absolute value). The low own- and cross flexibilities indicate that a minimal reduction in price will result in larger increase in quantity consumed by consumers. While the low flexibilities obtained for these meat products complements studies such as Peters, and Peters and Spreen, other studies such as Dahlgran have reported larger own flexibilities for pork, beef, and poultry. However, the differences may be due to the type of data as well as functional forms used in the respective studies. It is well known that elasticity varies for data representing different lengths of time. Thus, it is reasonable to expect different elasticity (flexibility) estimates using monthly as opposed to yearly data. In addition, the present study does not include a lag structure which would take into account habit formation and inventory effects. Another potential explanation of the difference lies in the level of product aggregation. We analyze the demand for disaggregated products instead of aggregated products (e.g. roast, steak and ground beef instead of beef). Since the disaggregated products can all substitute for each other, we expect that the demand for an individual disaggregated product is more elastic (and hence more price inflexible) than the demand for the aggregated product.

Since all of the flexibilities obtained from the AIDS model (Table 3) are negative, the products are considered substitutes by consumers. Further, the flexibilities obtained from both the IAIDS model and the linear double-log model are comparable in sign and magnitude.

In general, the results provided by both models are similar, and are both representative of the beef industry. However, the IAIDS model satisfies theoretical restrictions such as homogeneity, adding-up, and symmetry. The ability of the IAIDS model to satisfy these condition makes it viable for use in industry analysis such as a price endogenous mathematical programming approach (Peters).

Conclusion

Meat has, and will continue to be a significant part of Americans' diets. There has been a structural change in the demand parameters for beef and poultry, but analysts have yet to form a consensus on the reason for this change. The issue of separability and type of data employed in demand analysis will also continue to plague applied demand researchers.

This study uses actual consumption data (consumer panel data) to estimate the demand for meat via two different functional forms viz: inverse almost ideal demand system and linear double-log price dependent model. In general, the results were comparable, and the sizes of the estimated coefficients were consistent with economic theory, and they were also consistent with earlier works involving similar time and product dimensions. However, future researchers may consider using a dynamic IAIDS model which may be more appropriate especially if monthly data are used.

The results provided by this study should be able to help the food industry, especially the beef industry in analyzing the regional differences in demand for meat products. A knowledge of regional demand and seasonal variations in the demand for meat products may help the beef industry target production activity in order to minimize costs, and hence maximize profit. In addition, a knowledge of respective regional demand will increase understanding of efficient distribution of meat and food products including transportation from surplus regions to deficit regions.

The meat, as well as food, industries can maximize production and profit potentials by targeting their supplies to high consumption regions based on knowledge of the demand. Also, knowledge of the price flexibility or demand elasticity for various products in respective regions would facilitate market planning across meat cuts and market locations so that consumer demand can be accounted for in industry decisions affecting quantities supplied.

Endnotes

[1]See Peters and Peters and Spreen for more on the derivation of the IAIDS and Deaton and Muellbauer or Green and Alston for the derivation of the direct AIDS.

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