Measuring International Competitiveness in the Beef Sector

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ABSTRACT

Beef is a heterogeneous commodity, which makes it difficult to compare beef prices on an international level. This paper evaluates several methods of comparing beef prices to be used in measuring both comparative advantage and rate of protection. The most suitable method is one that compares the prices of wholesale cuts, adjusted for transportation costs.

MEASURING INTERNATIONAL COMPETITIVENESS IN THE BEEF SECTOR

The specific characteristics of meat greatly affect its price. Qualities such as the age and condition of the animal and the part of the animal from which a particular cut is taken greatly influence prices paid. These quality differences make international comparisons of meat products and prices more complex than those for standardized agricultural commodities such as grains. And differences in the measurement of meat prices can lead to different conclusions about the degree of competitiveness within a country or competitive advantage among countries.

Some of the confusion over the appropriate measure of comparison arises because processing of most meats represents a relatively smaller share of the retail price than that for many other final products. Wheat becomes flour, for example, which in turn becomes bread. It would be unusual to use bread prices as the retail price of wheat, yet farm-gate, wholesale, and retail beef prices are commonly compared.

Several alternative methods exist for comparing beef prices across countries. These methods include average live-animal prices, standardized live-animal prices, average unit values for traded beef (i.e., exported), and retail and wholesale cut prices. The choice is further complicated by the need to adjust for the feed used, the meat's physical condition and temperature, and the presence or absence of contagious diseases in the country of origin. The best measure depends heavily on the purpose for which the comparison is made. Retail beef prices will be of interest to those considering consumer welfare, whereas farm-gate prices will be of interest when producer welfare is the issue. Hahn et al. (1990) provide a good overview of issues related to beef trade and multilateral trade reform.

To date, it has been difficult to gather information on international meat prices; consequently, analysts have tended to use whatever measure was best supported by the available data. The measure

most often used has been the average price received by producers (see, for example, GATT 1989).
This producer price measure has several significant disadvantages when the measure is to be used by
those evaluating international meat products trade.

This paper compares each of several meat price measures, both in terms of data availability and
implications of the measure itself for evaluating international meat products trade. The focus is to
find the most suitable measure for determining a country's ability to compete in international markets.
This measure is of interest because technological innovations in the meat transportation industry have
led to increases in international meat sales and because the success of any multilateral liberalization of
meat markets will depend on accurately measuring the degree to which current policies restrict trade
(Elton et al. 1990). One very intuitive way to determine how much protection producers receive and
thereby indirectly measure the competitiveness of the industry is to measure the price wedge between
world and domestic prices. This price wedge measure is very sensitive to these factors.
Consequently, this paper focuses on measures that can accurately estimate this price wedge.

The first section compares beef prices at the farm gate for selected countries. Subsequent
sections compare prices by using unit import/export ratios, wholesale boxed-beef prices, and retail
prices. The comparison based on wholesale chilled boxed beef is new and is the major focus of this
paper.

Measuring Farm-Gate Beef Prices

Comparing steer and heifer prices received by producers across countries is difficult because
producers customize their feeding and breeding practices to suit the demands of a particular
marketplace. In the United States, for example, young animals are fed intensively on a corn-based
diet and are slaughtered before their 18th month. In Australia and most of South America, animals
are grass-fattened and are usually more than two years old when slaughtered (Simpson and Farris
1982). These different production practices result in different products.

One possible solution to minimize the effects of these differences is to find beef products for which differences in production practices are less important. Meat from cows or mature bulls, for example, is usually used for manufacturing purposes and sold as ground or processed beef. American consumers do not differentiate between Australian grass-fed cow beef and U.S. grass-fed (or grain-fed) cow or bull beef. Thus, prices for these products are less likely to reflect underlying quality differences.

Table 1 shows contemporaneous cow prices for the principal market-oriented beef-producing countries of the world. The middle column presents the farm-gate price of manufacturing beef in selected countries in U.S. dollars/100 kg, and the right column compares these prices with the U.S. farm-gate price for 1986. The base year of 1986 was chosen because 1986 prices are most likely to be used in any current trade agreements and because these prices were readily available. As shown in Table 1, South American producers seem to have a significant price advantage over all other producers; their nearest competitors are Australia and New Zealand. European beef prices are higher than U.S. beef prices, whereas Japanese beef producers are highly protected.

One problem with this farm-gate measure is that it is useless for predicting trade patterns under liberalization because countries that are free of the virus causing foot-and-mouth disease cannot import from countries where the virus exists. Countries free of the virus include the United States, Canada, Australia, New Zealand, Japan, South Korea, the Scandinavian countries, the United Kingdom, and Ireland. These countries essentially form a closed trading bloc, excluding all but canned meat imports from the rest of the world. Of these countries, only Australia and New Zealand have a comparative advantage with the United States in farm-level cow production.

A second problem with using cow prices is that this measure tends to overprice U.S. beef. Americans consume relatively more manufacturing beef than do consumers in the rest of the world, in large part because of the reliance on hamburger in U.S. diets. Cow meat is used for hamburgers in

Table 1. Comparison of farm-gate prices for cows for selected countries, 1986

Country	U.S. $/100 kg	Ratio
Argentina	57.05	30.12
Australia	123.16	65.02
Canada	216.55	114.32
Colombia	93.42	49.32
European Community	289.41	152.79
Finland	495.27	261.47
Hungary	99.71	52.64
Japan	923.74	487.67
New Zealand	79.22	41.82
Norway	453.33	239.33
Sweden	288.19	152.14
Switzerland	302.58	159.74
Tunisia	308.56	162.90
United States	189.42	100.00
Uruguay	88.11	46.52
Yugoslavia	186.17	98.28

SOURCE: GATT 1989.

Note: The U.S. ratio equals 100.00; the ratios for the other countries are relative to that of the United States.

the United States. This reliance tends to increase the price of cow meat in the United States relative to that of other types of beef.

A third problem with this approach is that prices reflect only the raw material price for meat exporters. Live animals are seldom sold to satisfy a demand for meat because the animals lose weight when transported and require expensive maintenance and specially constructed transportation mechanisms. In general, before meat is exported, animals must be transported to a slaughterhouse and processed into boxed or carcass beef. Then the meat must be shipped to its ultimate destination. There is every reason to believe that differences in efficiency exist among the transportation and meat-processing industries in countries free of the foot-and-mouth disease virus.

These three problems limit the appropriateness of using cow prices as a general measure of competition in international markets.

Measuring Unit Import/Export Ratios

For many agricultural commodities such as wheat or sugar, the average import price is commonly used to represent the traded price of a particular commodity. These averages are often quoted as freight and shipping prices and are used extensively by economists.

Table 2 presents the unit import and unit export ratios of the principal countries free of the foot-and-mouth disease virus. These price ratios are expressed in proportion to those for the United States. The United Kingdom is representative of the European countries free of the virus. Here, the reliance of U.S. beef importers on manufacturing beef is clear; U.S. unit import values are lower than those for any other country. Conversely, the unit import value for Japan is very high. These unit import ratios simply reflect the prices received by the exporter and shipper and do not reflect Japan's quota rents. Some Japanese importers are licensed to import a certain quantity of beef for which the specifications are determined by the importer. To maximize their quota rents, importers tend to import only the more expensive "middle cuts" (i.e., steaks and fillets).

Table 2. Comparison of unit import and unit export values for beef for principal countries free of the foot-and-mouth disease virus, 1986

Country	Export Ratio[a]	Import Ratio[b]
Australia	106.59	152.43
Canada	95.54	157.71
Japan	1,241.57	170.60
New Zealand	165.47	119.31
United Kingdom	142.77	120.95
United States	100.00	100.00

SOURCE: GATT 1989.

[a]The export ratio is calculated as the country's FOB export unit price relative to the U.S. FOB export unit price.
[b]The import ratio is calculated as the country's cost, insurance, and freight (CIF) import unit price relative to the U.S. CIF import unit price.

The heterogeneity of "beef" makes this unit import/export measure useless. When Japan lifted its beef quota in April 1991, the relative price of imported boxed carcasses fell and importing full sets or entire boxed carcasses became more economical, resulting in a reduction in Japan's unit import value and in the unit export values of suppliers. In particular, Japan has not limited the quantity of imported diaphragm beef. This beef is inexpensive relative to middle cuts and tends to reduce the U.S. and Australian unit export values and Japan's unit import value, thereby partly offsetting the bias toward middle cuts discussed earlier. Any shift in Japanese preference between U.S. and Australian diaphragm beef would change the unit export values of these countries but would in no way reflect any change in competitiveness between the United States and Australia.

Measuring Wholesale Price Cuts by Comparing Wholesale Boxed-Beef Prices

Much of the world's beef is traded as primal or subprimal cuts, packaged in boxes that may contain several identical cuts or several cuts from the same carcass. It is not uncommon for a country or region to simultaneously import certain cuts and export others. The increased reliance on individual meat cuts rather than on entire carcasses enables meat traders to satisfy local market conditions by purchasing only cuts that are in demand.

Because trade occurs between wholesale markets in different countries and because much of this trade is in boxed beef, wholesale prices of beef cuts are an obvious choice to compare protection levels and comparative advantage. Price comparisons based on wholesale cuts reflect some of the heterogeneity of beef products and are based on the product actually traded. The obvious disadvantage of this approach is the comparability of the data. Each country has different cutting practices, and even where cutting practices are similar, different terms are used to describe the same cuts.

This wholesale-cuts price comparison is most useful for measuring the protection level afforded to different beef industries. Consider the following simplified example. Consumers in country A prefer the cheaper forequarter beef cuts; consumers in country B are similar in every respect except that they prefer hindquarter cuts. Suppose that each country imposes a prohibitive tariff. This tariff may well be invisible when average prices or live-animal prices are used. However, if tariffs were measured based on the traded cuts, large protection levels could be measured. With the removal of these tariffs, beef forequarters would move from country A to country B and hindquarters would move in the opposite direction, yet average beef prices would be similar in both countries. The government in either country could construct a situation in which average tariff levels were lower than the true measure. For example, country A could impose a high tariff on beef forequarters and a low tariff on hindquarters and argue that the average tariff was low.

This example is extreme, but it portrays some real issues in international meat trade. For example, the United States simultaneously imports large quantities of low-quality beef and exports beef offal and high-quality cuts. Also, U.S. demand for different beef cuts is seasonal; cheaper cuts are in high demand in the spring, and more expensive cuts are demanded during the summer months.

Choice of Cuts for International Comparison

To compare wholesale cuts, specific cuts from each country must be selected. Several considerations are important. Comparing cuts among countries will be most straightforward for cuts consisting of an individual muscle separated at the bone. Other factors important in determining appropriate cuts for comparison are market popularity, the percentage of the primal that the subprimal cut represents, and some representation of the whole carcass. These criteria were used to identify a set of specific cuts for comparison as shown in Table 3.

Figure 1 shows the different names and locations of selected cuts in each of the countries free of the foot-and-mouth disease virus. In the beef forequarter, subprimals of the chuck and brisket were chosen. The beef chuck/shoulder clod consists of three muscles removed at the seams. This cut is found in the cutting guides of Australia, New Zealand, the United Kingdom, and Japan. Also, the beef chuck/chuck tender is used because it includes only the supraspinatus muscle and is easy to identify in other markets.

The brisket also consists of a single, long muscle. This factor is important because, although the brisket is a popular cut internationally, it is usually cut into two parts that are not the same in every market. Because the muscle is relatively lean, a weight measure would allow accurate price comparisons. Therefore, even where the brisket is halved, the cutting method would not hinder comparison.

Ribs were not included in the comparison. Although ribs are frequently traded and are popular in some countries, difficulties exist in comparing rib cuts because of the many variations in the way

Table 3. Subprimal beef cuts useful for international comparisons

United States	United Kingdom	Australia	Japan	Canada
Square-cut Chuck	Chuck	Chuck	Square-cut Chuck	Chuck
Brisket	Brisket	Brisket	Brisket	Brisket
Top Sirloin	Rump	Rump	Sirloin	Sirloin
Ribeye Roll (lip on)	Cube Roll	Rib Roast	Ribeye Roll (lip on)	Rib
Striploin	Striploin	Sirloin Roast	Striploin	Short Loin
Tenderloin	Fillet	Fillet	Tenderloin	Fillet
Top Inside Round	Inside Round	Top Side	Top Round	Top Inside Round

SOURCES: United States: American Meat Institute 1988.
United Kingdom: Irish Fresh Meat Exporters Society, Ltd. 1980.
Australia: Australian Meat and Live-Stock Corporation 1988.
Japan: U.S. definition cuts commonly traded in Japanese wholesale markets.
Canada: Agriculture Canada 1986-89.

Australia

Great Britain

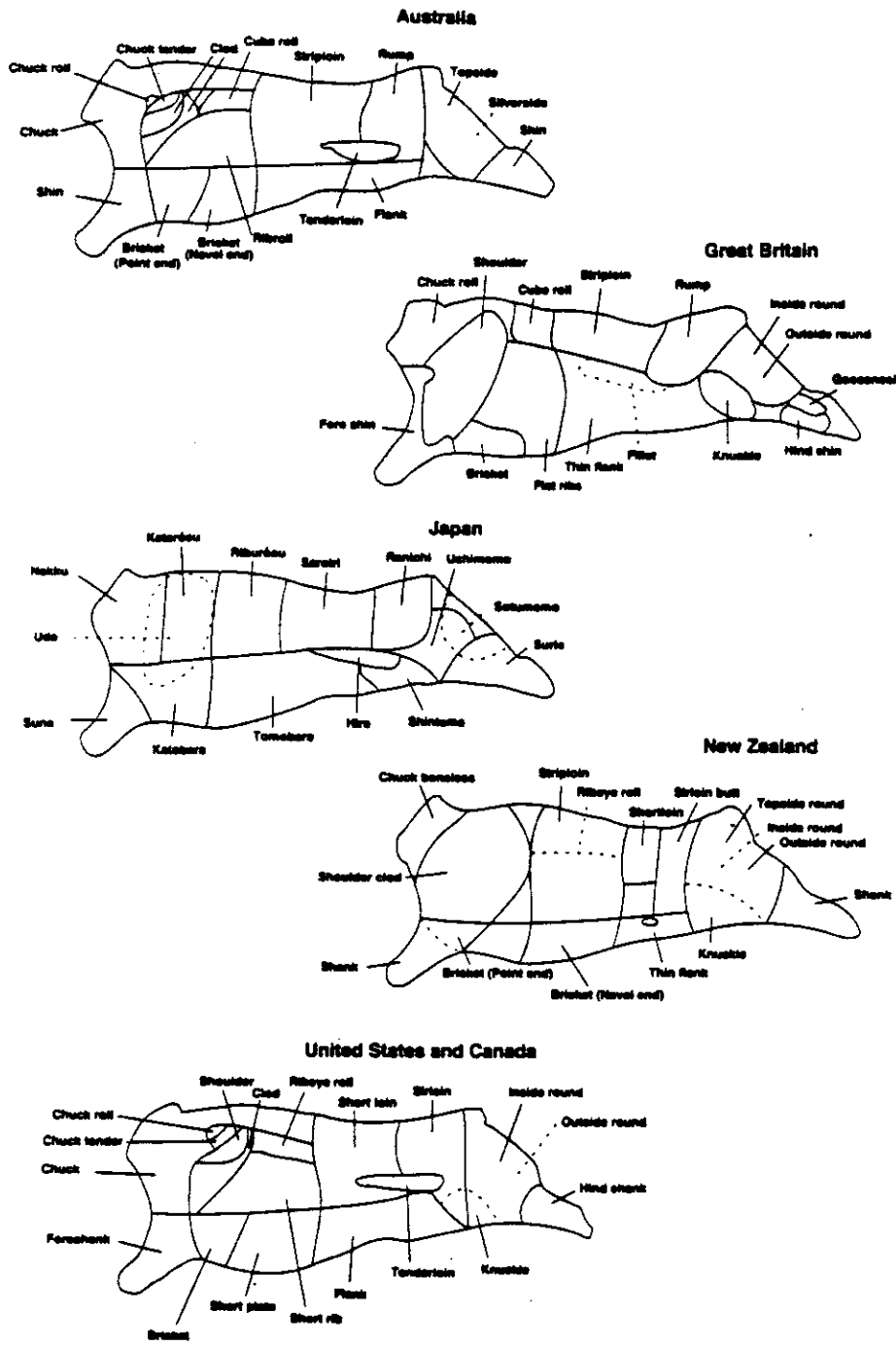**Japan**

New Zealand

United States and Canada

Figure 1. Names and locations of selected cuts in countries free of the foot-and-mouth disease virus

the rib is broken down into subprimal cuts. The muscle sizes vary greatly between the chuck and loin ends. Also, the amount of bone removed would be difficult to determine.

Some representative hindquarter cuts include those from the top inside round, flank, and tenderloin. From the round area, the top inside round, trimmed (or untrimmed), was chosen. The top inside round is traded internationally and represents a large percentage of the round. The tenderloin is an acceptable cut because it is an internationally traded cut and consists of a single muscle. The flank could also be used, even though it is not popular in the marketplace. This cut has little fat and bone and is similar in most countries, so a good price comparison would be possible. The knuckle might also be chosen to represent the poorer quality cuts from the round area.

Table 4 compares the prices of selected cuts in April 1987 and January 1989. (This information was not available for all the countries before April 1987.) The most surprising aspect of these numbers is the relative cost of beef cuts in the United States and Australia. As shown, Australia's comparative advantage in farm-gate cow prices is greatly reduced when wholesale-cut prices are used, particularly for the 1989 numbers. Also, note the competitiveness of U.K. beef producers for certain cuts. Both the Australian and U.K. prices are for grass-fed beef, whereas the U.S., Japanese, and Canadian prices are for corn-fed beef.

The prices in Table 4 come close to satisfying the requirements for measuring international competitiveness. However, adjustments for relevant transportation costs must be made before these prices can be used. To include this adjustment, we have calculated the bilateral tariff equivalents for all the cuts and time periods by combining the price in country A with the transportation costs from country A to country B and comparing these costs with the wholesale prices in country B. The difference between the price of meat cuts in country B and the price of comparable meat cuts from country A being sold in country B (adjusted for transportation costs) is expressed as a percentage of the delivered price. This "tariff equivalent" is therefore the ad valorem rate that would maintain

Table 4. Wholesale chilled beef prices by cut

	Australia	Canada	Japan (Imported)	United Kingdom	United States
	U.S. Dollars per Pound				
April 1987					
Top Sirloin	1.38	1.70	4.23	1.88	1.50
Top Round	1.14	1.43	3.67	1.20	1.87
Square-cut Chuck	0.81	0.98	2.86	0.82	1.26
Brisket	0.80	0.70	2.37	0.86	0.94
Ribeye	1.55	2.89	7.86	2.47	3.08
January 1989					
Top Sirloin	2.19	1.80	4.12	2.02	1.80
Top Round	1.58	1.64	4.17	1.30	1.58
Square-cut Chuck	1.17	1.13	3.64	0.91	1.45
Brisket	1.04	0.67	2.93	0.93	1.08
Ribeye	2.94	3.53	8.19	2.83	3.76

SOURCES: Australia: Australian Meat and Live-Stock Corporation 1990.
Canada: Agriculture Canada 1986-89.
Japan: *Shokuniku Kai* 1988 and 1990.
United Kingdom: Australian Meat and Live-Stock Corporation 1989.
United States: USDA 1987-89.
Exchange rates: Based on information from *International Financial Statistics*.

current trade flows. If this number is negative, country A would need a subsidy to maintain current

trading levels. The numbers are presented in Tables 5 through 9. Table 5 shows that Australia

would need to subsidize beef imports to attract meat from abroad that is free of the foot-and-mouth

disease virus.

The implication of Tables 5 through 9 is that Australia is not going to become a major export

market in the near future because almost all of the tariff equivalents are negative. However, Japan is

currently a profitable export market for all cuts and countries represented. The numbers for the

United Kingdom, Canada, and the United States demonstrate one of the principal strengths of this

measure; namely, that certain cuts could successfully be interchanged between countries. For

Table 5. Australian tariff equivalents

	Australia	Canada	Japan	United Kingdom	United States
April 1987					
Top Sirloin	-	-32.02	-68.85	-36.70	-24.59
Top Round	-	-35.23	-70.54	-24.00	-48.18
Square-cut Chuck	-	-38.17	-73.53	-27.68	-49.06
Brisket	-	-22.33	-68.87	-31.03	-37.01
Ribeye	-	-51.86	-80.77	-44.04	-54.55
January 1989					
Top Sirloin	-	2.82	-49.31	-5.60	2.82
Top Round	-	-19.80	-63.84	-1.25	-17.28
Square-cut Chuck	-	-19.86	-69.53	-3.31	-34.27
Brisket	-	4.00	-66.77	-15.45	-26.24
Ribeye	-	-23.83	-64.96	-6.07	-28.12

Table 6. Canadian tariff equivalents

	Australia	Canada	Japan	United Kingdom	United States
April 1987					
Top Sirloin	7.59	-	-62.05	-16.26	6.25
Top Round	6.72	-	-63.52	5.93	-27.41
Square-cut Chuck	-2.97	-	-68.49	1.03	-27.94
Brisket	-30.00	-	-73.28	-30.69	-32.69
Ribeye	65.14	-	-64.36	10.31	-9.12
January 1989					
Top Sirloin	-24.69	-	-58.81	-17.05	-5.26
Top Round	-7.87	-	-62.90	13.10	-2.38
Square-cut Chuck	-17.52	-	-70.95	6.60	-27.10
Brisket	-45.97	-	-78.93	-37.96	-43.22
Ribeye	12.42	-	-58.18	18.46	-8.55

Table 7. Japanese tariff equivalents

	Australia	Canada	Japan	United States	United Kingdom
April 1987					
Top Sirloin	167.72	116.92	-	81.55	141.71
Top Round	173.88	118.45	-	122.42	73.11
Square-cut Chuck	183.17	132.52	-	125.20	89.40
Brisket	137.00	149.47	-	80.92	99.16
Ribeye	349.14	150.32	-	169.18	136.04
January 1989					
Top Sirloin	72.38	100.98	-	66.80	100.98
Top Round	134.27	120.63	-	138.29	127.87
Square-cut Chuck	165.69	163.77	-	167.65	114.12
Brisket	136.29	218.48	-	112.32	120.30
Ribeye	160.83	116.67	-	149.70	104.24

Table 8. U.K. tariff equivalents

	Australia	Canada	Japan	United Kingdom	United States
April 1987					
Top Sirloin	11.90	1.62	-59.83	-	13.94
Top Round	-16.67	-24.05	-70.87	-	-40.59
Square-cut Chuck	-26.13	-27.43	-75.23	-	-41.84
Brisket	-21.82	1.18	-69.50	-	-21.10
Ribeye	33.51	-18.75	-70.28	-	-23.53
January 1989					
Top Sirloin	-18.88	3.59	-55.80	-	3.59
Top Round	-30.85	-27.37	-71.86	-	-24.86
Square-cut Chuck	-38.10	-28.91	-77.75	-	-43.12
Brisket	-30.60	13.41	-72.49	-	-24.39
Ribeye	-12.65	-23.10	-67.25	-	-27.62

Table 9. U.S. tariff equivalents

	Australia	Canada	Japan	United Kingdom	United States
April 1987					
Top Sirloin	-12.28	-16.67	-66.52	-26.11	-
Top Round	27.21	22.22	-52.30	38.52	-
Square-cut Chuck	10.53	16.67	-59.49	29.90	-
Brisket	-16.81	17.50	-64.12	-6.93	-
Ribeye	63.83	3.01	-62.02	17.56	-
January 1989					
Top Sirloin	-28.57	-5.26	-58.81	-17.05	-
Top Round	-17.28	-9.20	-64.25	8.97	-
Square-cut Chuck	-3.33	17.89	-62.72	36.79	-
Brisket	-21.17	40.26	-66.04	0	-
Ribeye	14.98	3.58	-55.45	26.17	-

example, the United Kingdom could export ribeye to Canada (Table 6) and profitably import brisket (Table 8). The magnitude of the numbers between the United States and Canada are of interest, given that beef products move relatively freely between the two countries and at relatively low cost. There does not seem to be a lot of export potential for U.S. boxed beef in Canada (Table 6), and only brisket and square-cut chuck would provide a reasonable rate of return in the opposite direction in 1989 (Table 9).

The numbers presented here demonstrate apparent seasonality. Figures 2 through 10 show some selected comparisons between prices in two countries throughout the year. Figures 2 through 5 show how the United States and Australia compare. Although obvious in hindsight, it is surprising to note how the seasonality in Australia is so different from that in the United States. The obvious reason is that the seasons are reversed in the Southern Hemisphere.
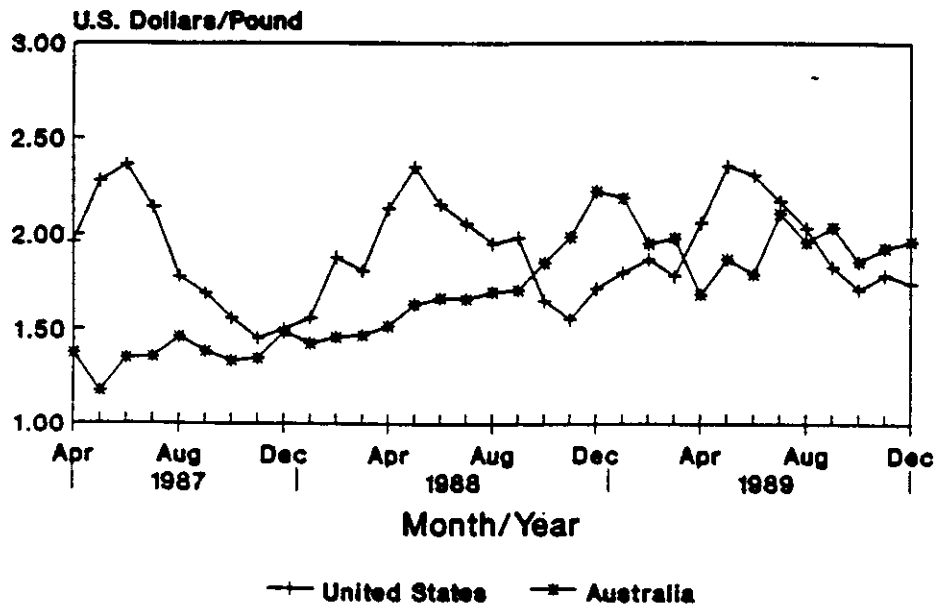
U.S. Dollars/Pound

Figure 2. Wholesale prices of U.S. and Australian top sirloin
SOURCES: Australian Meat and Live-Stock Corporation 1990; USDA 1987-89.
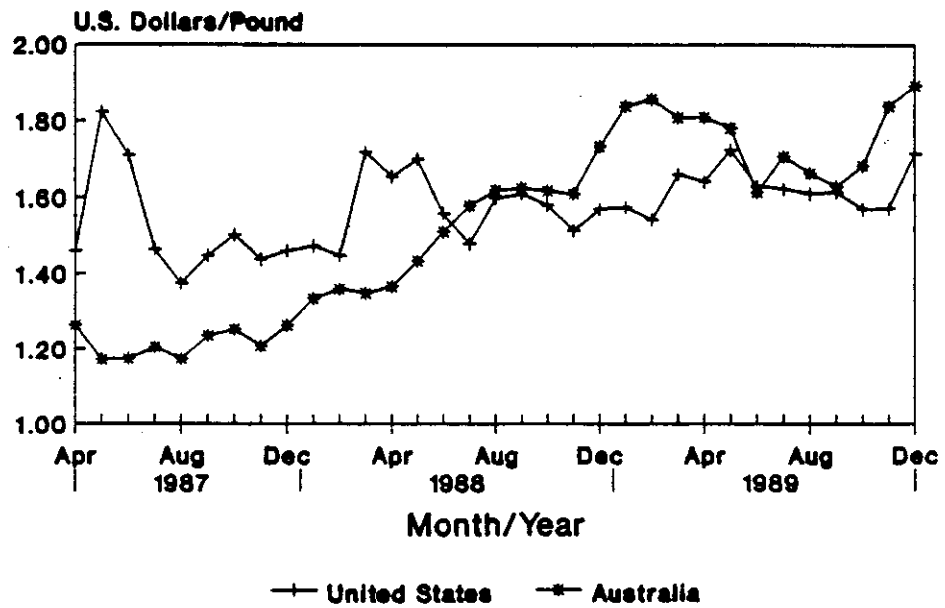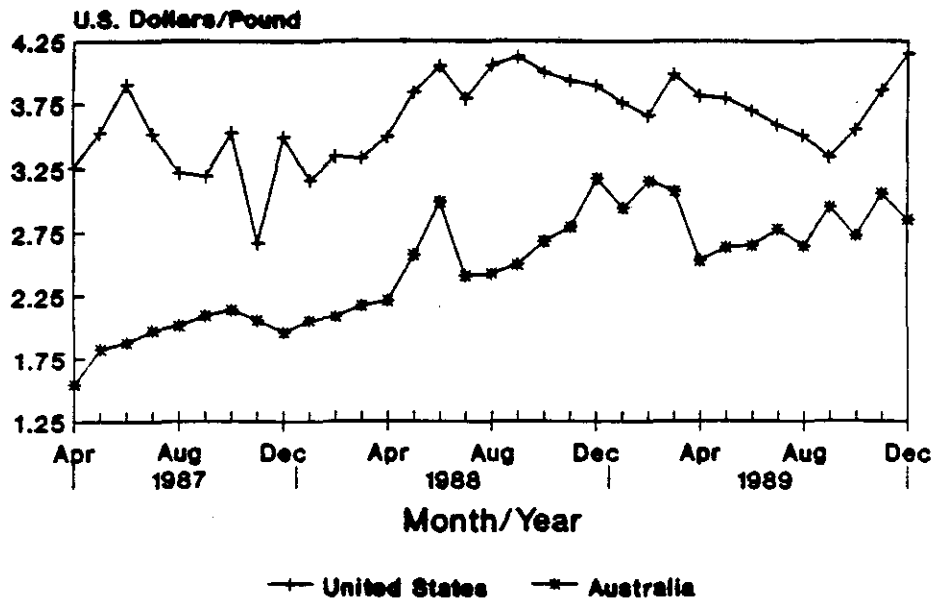
U.S. Dollars/Pound

Figure 3. Wholesale prices of U.S. and Australian top round
SOURCES: Australian Meat and Live-Stock Corporation 1990; USDA 1987-89.

Figure 4. Wholesale prices of U.S. and Australian ribeye roll
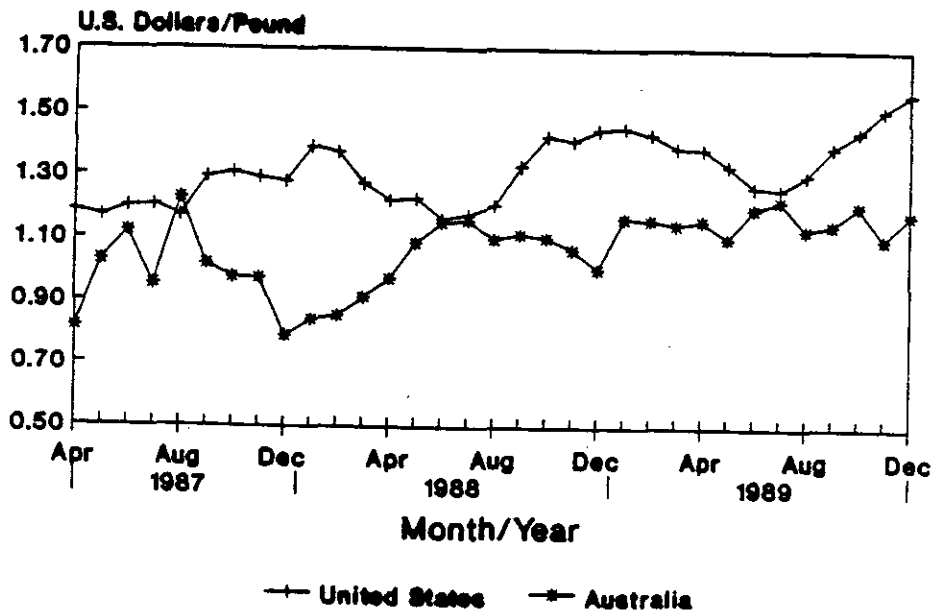SOURCES: Australian Meat and Live-Stock Corporation 1990; USDA 1987-89.

Figure 5. Wholesale prices of U.S. and Australian chuck roll
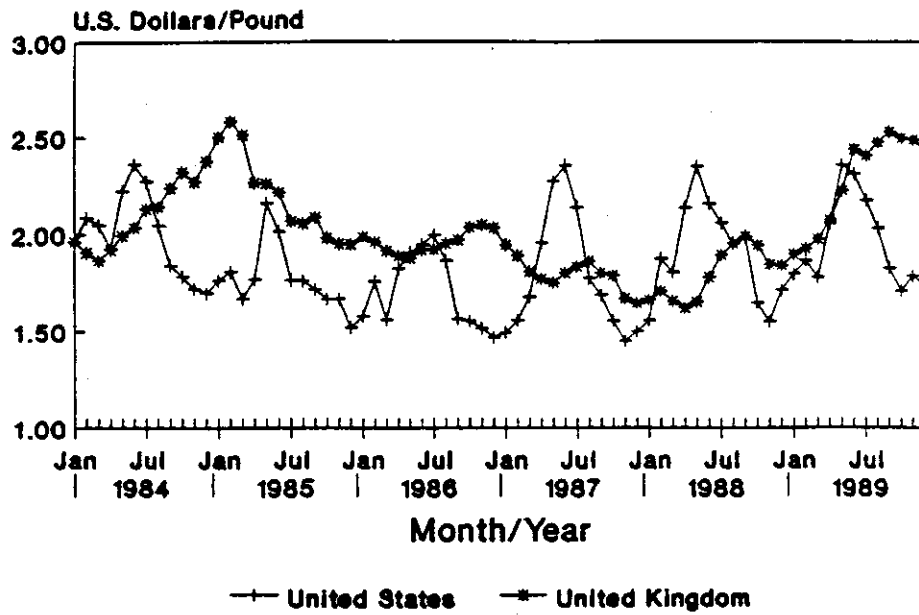SOURCES: Australian Meat and Live-Stock Corporation 1990; USDA 1987-89.

Figure 6. Wholesale prices of U.S. and U.K. top sirloin
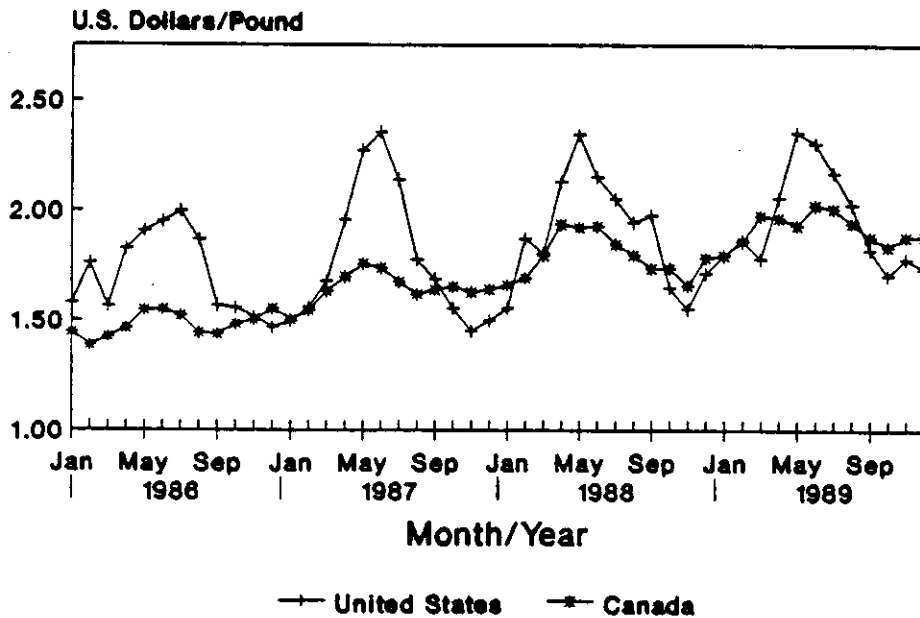SOURCES: USDA 1987-89; Meat and Livestock Commission 1990.

Figure 7. Wholesale prices of U.S. and Canadian top sirloin
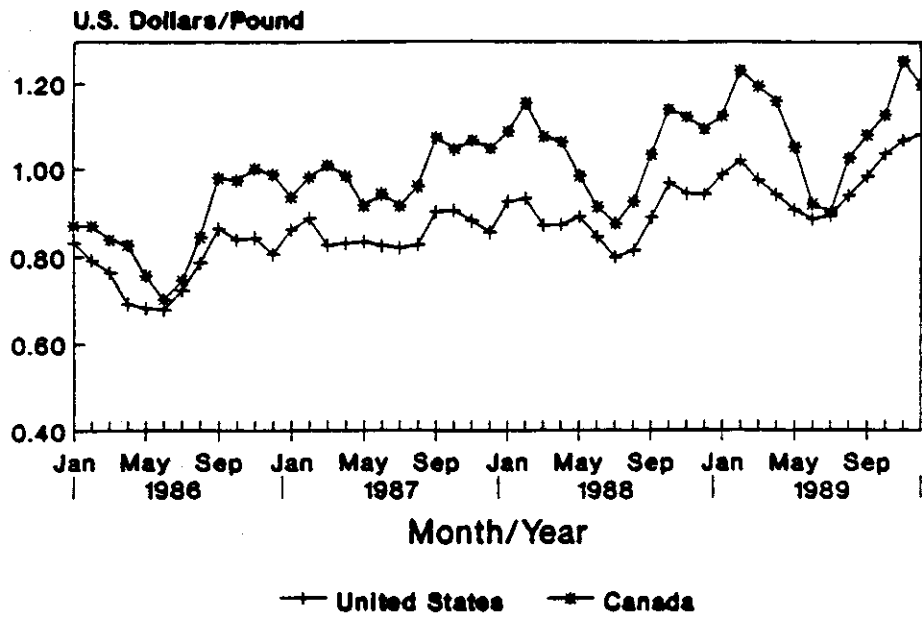SOURCES: Agriculture Canada 1986-89; USDA 1987-89.

U.S. Dollars/Pound

Figure 8. Wholesale prices of U.S. and Canadian chuck roll
SOURCES: Agriculture Canada 1986-89; USDA 1987-89.
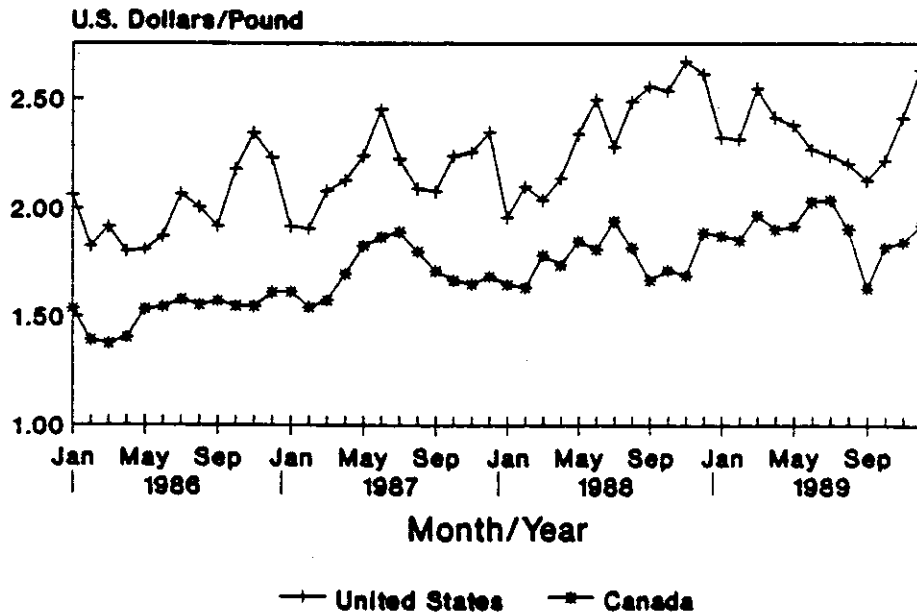
U.S. Dollars/Pound

Figure 9. Wholesale prices of U.S. and Canadian ribeye roll
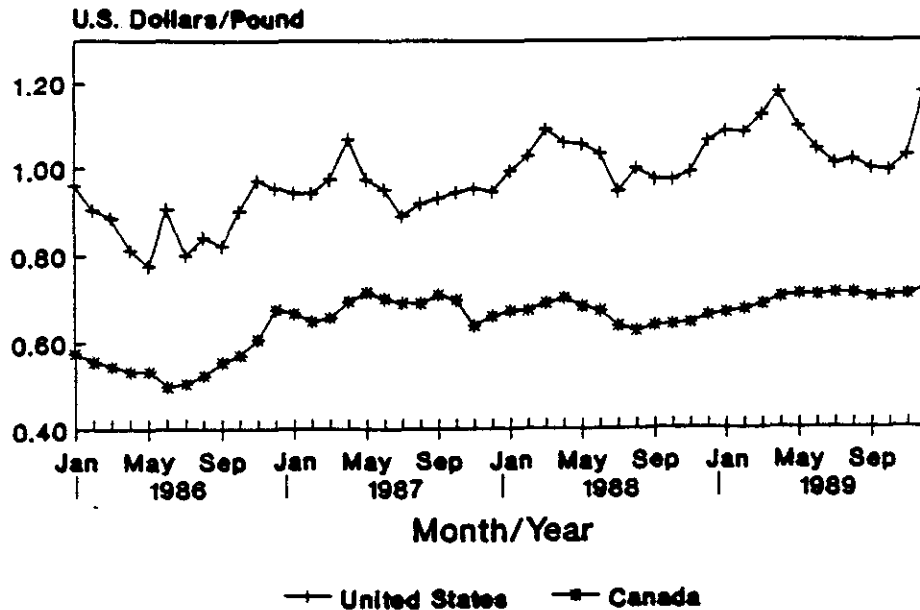SOURCES: Agriculture Canada 1986-89; USDA 1987-89.

Figure 10. Wholesale prices of U.S. and Canadian brisket
SOURCES: Agriculture Canada 1986-89; USDA 1987-89.

Figure 6 compares the prices of top sirloin in the United Kingdom and the United States.
Again, the seasonal variations are of greatest interest. Even though in the same hemisphere,
consumer preferences and, perhaps, differences in production methods seem to dictate the differences,
giving the United States export opportunities in winter and the United Kingdom export opportunities
(to the United States) in summer.

Other factors, of course, also affect relative price movements. For example, Australian prices
have risen at a faster rate than have U.S. prices. One explanation for this trend might be the
enormous increase in Australian beef exports to Japan and South Korea, which have been far greater
as a proportion of domestic production than have U.S. exports to Japan. Also, the large run-up in
U.K. prices that began in January 1989 may be attributable in part to the EC hormone ban, which
became effective on that date.

Figures 7 through 10 compare U.S. and Canadian prices. In these figures, the seasonal patterns are similar. Chuck roll prices in the United States are lower than those in Canada, whereas the prices of ribeyes and briskets are lower in Canada. The reason for the Canadian competitive position in ribeyes may be attributable to the Canadian preference for leaner (and therefore cheaper) steaks.

Measures Using Retail Cut Prices

Comparable retail beef price measures for meat products are difficult to find. For example, the United States calculates a weighted average price for beef, whereas Australia quotes a representative cut (sirloin). Table 10 shows how retail prices compare across countries. Again, the surprising feature is the high cost of the Australian product. Although not shown here, Australian consumers pay more for grass-fed rump steak than U.S. consumers pay for corn-fed rump steak.

Table 10. Retail sirloin prices, 1987

Country	Cut	Price (U.S. $/lb.)
Australia	Sirloin/rump	2.78
Canada	Sirloin	3.79
Japan	Sirloin	12.55
New Zealand	Sirloin	1.56
United Kingdom	Sirloin	6.47
United States	Sirloin	2.98

SOURCES: Australia, Canada, Japan, and New Zealand: GATT 1989.
United Kingdom: Meat and Livestock Commission 1990.
United States: Data collected from grocery store.

Note: Exchange rates = Australian $1.4067/U.S. $1.
British £ 0.547/U.S. $1.
Canadian $1.3074/U.S. $1.
Japanese ¥ 128.59/U.S. $1.
New Zealand $1.6886/U.S. $1.

It is interesting to speculate why Australia loses its competitive advantage when price comparisons are made further up the processing chain. One possibility is that beef costs significantly more to transport, slaughter, and process in Australia than it does in the United States. This factor may be attributable to longer hauling distances, smaller packing plants, and a more highly unionized work force. If this is so, then for purposes of international comparison, Australia's advantage in live-animal production and its disadvantage in all other aspects of the process should be considered together when comparing each country's ability to produce the product that is actually traded on world markets.

Conclusions

Beef is a heterogeneous commodity, and much useful information is lost if we use "beef" prices in international comparisons rather than using the prices of the goods actually traded (i.e., boxed beef cuts). In this paper, we have examined several methods for comparing prices. These methods produced surprisingly different results. By using farm-gate prices, the results show that South American, Australian, and New Zealand producers seem to have a significant price advantage over European, U.S., and Japanese beef producers. For comparisons at the wholesale-cuts level for foot-and-mouth disease-free countries, however, Australia's competitive advantage is greatly reduced. At this level, European (U.K.) and U.S. industries are competitive in the world market for certain cuts at certain times. These results indicate that the U.S. comparative advantage among countries free of foot-and-mouth disease is much better than one would believe by comparing manufacturing beef prices.

The feasibility of evaluating competitiveness by using these alternative measures, of course, is dependent on the availability of data. We have shown that, by following consistent criteria for selecting cuts, it is possible to identify comparable cuts and find prices for comparison. With an

increasing share of international beef trade being conducted as boxed beef, measures of competitiveness that reflect the true nature of the traded product are superior.

REFERENCES

Agriculture Canada. January 1986-December 1989. *Canada Livestock and Meat Trade Report.* Market Information Service, Agriculture Development Branch.

American Meat Institute. 1988. *Meat Facts.* Washington, DC: American Meat Institute.

Australian Meat and Live-Stock Corporation. 1988. *A Vital Industry: Meat and Livestock in Australia.* Sydney: Australian Meat and Live-Stock Corporation.

_____. 1989. *The Meat Producer and Exporter* 43 1(January).

_____. 1990. Communication received by the Meat Export Research Center, Iowa State University, Ames. February.

Elton, D.K., W.A. Kerr, K.K. Klein, and E.T. Penner, eds. 1990. *Selling Beef to Japan . . . A Resource Guide for Exporters.* Calgary: Canada West Foundation.

General Agreement on Tariffs and Trade (GATT). 1989. *The International Market for Meat, 1988/89.* Arrangement Regarding Bovine Meat, Ninth Annual Report. Geneva: General Agreement on Tariffs and Trade.

Hahn, W.F., T.L. Crawford, L. Bailey, and S. Shagam. 1990. *The World Beef Market--Government Intervention and Multilateral Policy Reform.* Washington, DC: U.S. Department of Agriculture.

International Financial Statistics. Washington, DC: International Monetary Fund, various issues.

Irish Fresh Meat Exporters Society, Ltd. 1980. *BBC Beef Cuts Code.* 2nd Edition. Dublin: An Foras Taluntais.

Meat and Livestock Commission. 1990. Communication received from the United Kingdom by the Meat Export Research Center, Iowa State University, Ames. February 7.

Shokuniku Kai. 1988. Special Edition. Shokuniku Tsushin-Sah, Osaka, Japan. 25 13(November).

_____. 1990. Special Edition. Shokuniku Tsushin-Sah, Osaka, Japan. 27 2(February).

Simpson, James R., and Donald E. Farris. 1982. *The World's Beef Business.* Ames: Iowa State University Press, 1982.

U.S. Department of Agriculture (USDA). 1987-89. "Fabricated Boxed Beef Cuts." In *Market News: Weekly Summary and Statistics.* Washington, DC: U.S. Department of Agriculture, Agricultural Marketing Service, various issues.