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Effects of Meat Imports on the Puerto Rican Livestock-Meat Industry

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Kenneth E. Nelson
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EFFECTS OF MEAT IMPORTS ON THE PUERTO RICAN LIVESTOCK-MEAT INDUSTRY. By Lawrence A. Duewer, Kenneth E. Nelson, and Terry L. Crawford, Commodity Economics Division, Economic Research Service, U.S. Department of Agriculture. Agricultural Economic Report No. 605.

ABSTRACT

Puerto Rico imports more beef, relative to local production and population, than does the U.S. mainland. Imports of foreign beef, especially from Central America, tend to depress Puerto Rican beef prices and, in turn, production. The lean Puerto Rican beef, unlike beef from the States, directly competes with Central American meat. Small-scale production and marketing, high land values from population pressure, and easy access to low-cost Central American meat hurt the Puerto Rican producers' competitive position. Curtailing imports under a simulated model significantly boosts Puerto Rican beef prices, production, and consumption, but such restrictions may violate U.S. trade agreements. This report describes Puerto Rico's beef industry, especially the effects of beef imports on Puerto Rican producers.

KEYWORDS: Puerto Rico, beef imports, beef production, beef marketing, econometric model.

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PREFACE

This analysis was completed under an agreement between the Commonwealth of Puerto Rico Department of Agriculture and the U.S. Department of Agriculture, Economic Research Service (ERS). Authors Duewer and Nelson went to Puerto Rico to become better acquainted with the beef industry and to talk with producers, packers, processors, marketing agents, agricultural economists, animal scientists, and government officials. Luz M. Arroyo de Carrillo of the Puerto Rico Department of Agriculture and Jamie Sorrentini, a cattle producer (with interests in meatpacking) and representative of the Puerto Rico Farm Bureau, graciously assisted and facilitated this visit.

This report does not explain if or how beef imports should be reduced. Although issues and policy alternatives are discussed, this report recommends no policies for Puerto Rico.

Note that use of trade names in this publication provides only examples and does not imply endorsement by the U.S. Department of Agriculture.

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SUMMARY

Puerto Rico imports more beef, relative to local production and population, than does the U.S. mainland. Imports help maintain lower prices for consumers, but at the expense of local producers. Foreign beef imports, especially from Central America, tend to depress prices, and in turn, production. Curtailing imports under a simulated model significantly boosts Puerto Rican beef prices, production, and consumption, but such restrictions may violate U.S. trade agreements.

This report describes Puerto Rico's beef industry, especially the effects of beef imports on Puerto Rican producers.

Local grass-fed beef supplies more than a fourth of the beef consumed in Puerto Rico. The lack of feed grains encourages the production of lean beef, which Puerto Ricans like. Shipments to Puerto Rico of grain-fed beef from the States provide another fourth of the beef consumed. Imports, mainly from Central America, furnish the remaining beef consumed.

The lean Central American beef, unlike beef from the States, directly competes with Puerto Rican meat. Small-scale production and marketing, high land values from population pressure, and easy access to low-cost Central American meat hurt the Puerto Rican producers' competitive position. Curtailing imports under a simulated model significantly boosts Puerto Rican beef prices, production, and consumption. But if trade were actually restricted, local production would not be able to fill the gap, and consumers might shift to substitutes such as poultry. The amount imported might be curtailed directly by law--at the risk of violating U.S. trade agreements--or could be forced by strengthening its own competitive position (by raising local beef production at favorable prices). Subsidies could help producers compete with imports, without affecting retail prices. Subsidies would encourage local production, which should reduce imports without hurting demand for beef.

But increasing beef production may not be a viable alternative for Puerto Rico. Production costs are high for beef producers partially because of high-priced land and labor. Many cattle producers have small, fairly high-cost units. Not much additional land is available for production. The current inventory of 500,000 head use most of the 900,000 cuerdas (1 cuerda = 0.9712 acres) of pasture land. Another 500,000 cuerdas of forest and brush lands, forest reservations, and other lands would support a lower cattle density without considerable capital expenditures, but would allow production to increase less than 40 percent.

Puerto Rico's marketing system is inefficient, with small slaughter plants unable to achieve economies of size. Producers sell most of their beef to small meat markets and grocery stores rather than to the increasingly important supermarkets.

The lack of a grading system for Puerto Rican cattle and beef means that buyers and sellers must evaluate their own beef; no official standards are available. The present arroba pricing system, based on visually estimated weights, could be improved if scales were always used. Nonetheless, the system of livestock price-reporting needs improvement. Cattle and beef prices seem to depend on prices of imported beef and beef from the States.

Local beef prices would increase if the quantity of imported beef decreased. The higher prices would encourage more Puerto Rican beef production (assuming producers would be better off if they could sell more beef at higher prices). Consumers, however, might have to pay higher prices for the same quantity of beef, depending on how imports were decreased.

This report does not explain if or how beef imports should be reduced. Although issues and alternative policies are discussed, this report recommends no policies for Puerto Rico.

Effects of Meat Imports on the Puerto Rican Livestock-Meat Industry

Lawrence A. Duewer

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INTRODUCTION

Imports of beef into Puerto Rico have resulted in low or negative returns to Puerto Rico's beef producers over a number of years. Beef imports from Central American countries directly compete with Puerto Rican beef because of its similarity with the local product. This report, a cooperative project between the U.S. Department of Agriculture's (USDA) Economic Research Service and the Puerto Rico Department of Agriculture, examines the Puerto Rican beef industry and effects of beef imports on the industry.

This report also discusses possible policy alternatives. Some alternatives might violate U.S. international obligations and invite trade-restricting retaliation, not only against Puerto Rico but also against potentially all U.S. agricultural exports.

THE COMMONWEALTH OF PUERTO RICO AND ITS BEEF SECTOR

Puerto Rico is the smallest of the four major West Indies islands known as the Greater Antilles. Puerto Rico is approximately 100 miles long and 35 miles wide, covering 3,435 square miles. With about 3.3 million people, or about 1,000 persons per square mile, Puerto Rico has one of the world's highest population densities (6). 1/

The self-governing Commonwealth of Puerto Rico is a possession of the United States; Puerto Ricans are U.S. citizens. U.S. law applies to Puerto Rico on a case-by-case basis, depending on specific legislation. For the most part, U.S. law applicable to cattle and beef applies in Puerto Rico. The Meat Import Act of 1979 applies as do regulations on Federal inspection of meatpacking and processing plants and restrictions on use of, and residues from, feed additives or implants. Puerto Ricans do not pay U.S. Federal income tax but do pay Commonwealth income tax.

For trade purposes, Puerto Rico is almost always treated as one of the States. It is inside the U.S. Customs areas, so all import duties and quotas apply as they would for foreign imports into Florida, for example. All shipments, including meat, between Puerto Rico and the States are duty- and

1/ Underscored numbers in parentheses refer to literature cited in the References section.

quota-free. Legal exemptions can be made, as was done for coffee, in which Puerto Rico is permitted to impose its own import duty (coffee is the only product exempted; and the likelihood of another product being granted an exemption seems slight). Therefore, meat shipped from the States to Puerto Rico is viewed as inshipments, not as imports.

Gross agricultural income of Puerto Rico for fiscal year (FY: runs from July through June) 1984/85 was \$608.3 million, with farm value of crops totaling \$206.0 million, livestock \$349.9 million, and farm subsidies and incentive payments \$44.1 million.

To understand the current setting of the beef industry in Puerto Rico, we examined its cattle industry, meatpacking operations, assembly and wholesale distribution, retail outlets, and meat consumption and trade.

For the most comprehensive, up-to-date information, we examined Puerto Rico's beef industry through data from many sources. We used the official U.S. data from the U.S. Customs Service, when possible, disaggregated data on various groups of meat from the U.S. Department of Commerce, and local data from the Puerto Rico Government. The data reported here are the latest available at the time the report was written. Data are sometimes valuable to set the general level even though they may be up to 3 years old.

The Cattle Industry

The cattle in Puerto Rico are used to harvest forage and turn it into a fairly high valued product (beef). Most cattle are marketed and slaughtered off of grass at 3 or more years of age and form a valuable source of income to the producer. Herd sizes vary from many very small to a few fairly large beef enterprises.

Small-scale production and marketing, high land values from population pressures, and easy access to low-cost meat imports hurt the Puerto Rican producers' competitive position. But increasing beef production may not be a viable alternative for Puerto Rico's cattle industry. High-priced land and labor prop up production costs, and the local climate and resources hold down productivity. But it is difficult to estimate the extent that these affect production because estimates of local production vary, depending on the source.

The 1982 U.S. Census of Agriculture reports 21,820 farms in Puerto Rico: 10,106 with some cattle and 6,789 with a beef cattle inventory (13). The census reports the Puerto Rican cattle inventory at 335,684 head, considerably fewer than the Puerto Rico Department of Agriculture's estimated 576,312 head in January 1983 (table 1). This discrepancy probably results from differences in the U.S. and Puerto Rican definition of farms and operations. If so, many places with few cattle may not qualify as farms in the census. The census classified the cattle into 170,851 dairy animals (111,778 dairy cows) and 164,833 beef animals (35,501 beef cows). According to Puerto Rico's estimates, carcass weight of beef production in FY 1984/85 was almost 54 million pounds (table 2).

Cattle production and marketing differ appreciably from systems in the States. Puerto Rican slaughter cattle are much older and leaner than the grain-fed steers and heifers in the States. Puerto Rico's beef cattle feed almost exclusively on pastures. Feeding cattle grain would become expensive because more grain would have to be imported. Imported corn is fed mainly to

Table 1--Puerto Rico's cattle inventory, 1951-85

Year <u>1/</u>	All cattle	Cows	Heifers	Bulls and steers		
				Number		
1951	337,068	132,805	68,425	62,901	39,100	33,837
1952	353,379	140,123	70,436	70,064	40,086	32,670
1953	369,257	146,753	72,417	76,428	42,156	31,503
1954	383,762	152,522	74,736	82,253	43,915	30,336
1955	395,875	157,443	76,835	87,081	45,347	29,169
1956	414,866	165,862	79,538	93,058	48,406	28,002
1957	427,324	172,296	81,781	96,488	49,924	26,835
1958	436,591	177,302	84,043	98,208	51,370	25,668
1959	433,080	178,979	83,718	94,950	50,932	24,501
1960	444,186	184,111	87,376	95,938	53,427	23,334
1961	457,512	183,005	91,502	108,888	54,901	19,216
1962	458,000	186,000	92,000	91,800	72,000	16,200
1963	488,000	197,000	98,000	98,600	77,000	17,400
1964	498,000	199,000	99,000	106,250	75,000	18,750
1965	485,000	194,000	97,000	103,697	73,000	17,303
1966	495,000	198,000	99,000	105,411	75,000	17,589
1967	490,000	196,000	98,000	105,600	73,000	17,400
1968	497,000	201,000	98,000	103,000	78,000	17,000
1969	507,000	203,000	101,000	112,000	76,000	15,000
1970	518,000	208,000	102,000	116,000	79,000	13,000
1971	530,000	212,000	104,000	122,000	81,000	11,000
1972	538,000	212,000	104,000	121,000	77,000	10,000
1973	554,000	231,000	115,000	120,000	79,000	9,000
1974	541,000	221,000	113,000	120,000	79,000	8,000
1975	546,000	221,000	112,000	127,000	78,000	8,000
1976	560,648	224,259	112,130	140,162	78,491	5,506
1977	570,871	228,348	114,174	142,718	79,922	5,709
1978	562,171	234,725	114,031	127,977	79,576	5,862
1979	523,933	219,298	106,756	114,904	77,057	5,918
1980	478,989	198,829	98,586	105,917	69,880	5,777
1981	488,600	199,459	104,279	107,475	71,488	5,899
1982	535,840	212,969	114,972	124,218	77,778	5,903
1983	576,312	228,772	123,641	134,675	82,998	6,266
1984	591,972	232,957	124,791	143,395	84,185	6,644
1985	579,810	227,086	120,614	144,028	81,021	7,061

1/ As of January.

Sources: (1 and 2).

Table 2--Beef and veal (fresh or frozen) supply in Puerto Rico during FY 1968/69-84/85: Carcass weight equivalent

Fiscal year	Population	Beef and veal			Available for consumption
		Local production	Imported	Exported	
	<u>Thousand</u>	<u>1,000 pounds</u>			
1968/69	NA	33,903	55,802	4,942	<u>1/</u> 90,763
1969/70	2,707	39,910	63,318	5,660	<u>1/</u> 97,568
1970/71	2,744	44,500	70,811	5,038	110,273
1971/72	2,822	45,800	79,273	4,089	120,985
1972/73	2,869	41,795	79,314	3,905	<u>1/</u> 122,605
1973/74	2,881	49,119	66,306	7,616	107,809
1974/75	2,914	44,207	86,320	12,833	117,694
1975/76	2,979	46,417	104,890	12,783	138,524
1976/77	3,046	46,451	102,322	9,253	139,520
1977/78	3,098	56,059	95,287	7,496	143,850
1978/79	3,141	62,011	1,00928	5,651	157,289
1979/80	3,184	48,676	91,750	3,408	137,018
1980/81	3,227	37,748	95,521	3,702	129,567
1981/82	3,255	37,400	99,685	3,029	134,057
1982/83	3,264	46,737	100,131	3,262	143,606
1983/84	3,268	53,772	97,490	3,678	147,584
1984/85	3,282	53,928	90,656	2,793	141,792

NA = Not available.

1/ Corrected: original source did not total.

Sources: (1 and 2).

dairy cattle, swine, and poultry. Feeding cattle vegetable wastes or other byproducts has been minimal. Male calves are generally left as bulls (not castrated), grazed in groups separate from the cow (female) herd for several years, and marketed near 1,000 pounds. Beef cattle are found on different terrains, varying from flat coastal plains and the common rolling pastures to steep mountainside pastures. Production can be inhibited by wide seasonal variation in rainfall, erosion, heat, and insects (especially ticks). Some land, seemingly grazable, stands idle. Much of this land would require capital outlays for fences and improvements in order for it to become productive pasture.

We could not make an informed judgment about added potential of Puerto Rico's beef production, but we were told that 500,000 additional acres reasonably could be diverted for raising cattle. An assumed carrying rate of 3 acres per animal could increase production 30-40 percent. Thus, local production probably could not increase fast enough to substitute for a large decrease in imports.

Local slaughter varies seasonally because some parts of the island have very distinct wet and dry seasons. Although Puerto Rico is smaller than some counties in the States, the amount, and especially the monthly distribution, of rainfall varies considerably across the island.

Although many cattle exhibit mixed breeding, including Holstein, most Puerto Rican beef cattle are of Brahman breeding background. Brahmans seem well adapted to local climates, forages, and insects. Many dairy calves are slaughtered for veal, but the Puerto Rican Government offers farmers incentive payments of \$60 per animal to raise calves to heavier weights. About 116,000 cattle and 77,000 hogs were slaughtered in Puerto Rican slaughter houses in 1984/85 (table 3).

Meatpacking

Meatpacking plants in Puerto Rico are smaller than most plants in the States and are dispersed throughout the island. USDA's Food Safety and Inspection Service reported 20 plants slaughtering cattle and calves in Puerto Rico during FY 1984/85 (9). Although the largest plants slaughtered many more animals than the smallest, industry concentration does not appear to be an issue. Some plants belong to municipalities, some are privately owned, and at least one is owned by a corporation whose stockholders are cattle producers.

Unlike in the States, beef slaughterers in Puerto Rico traditionally do not purchase or own (take title to) cattle. Rather, they custom slaughter cattle for an intermediary (described below) or a farmer (for about \$12 per animal). The packer typically keeps the hide and organs (except the heart and tongue). Intermediaries often take the carcasses away hot (immediately after slaughter), although cooling facilities are available, and free, at most slaughter plants. Intermediaries are not involved with the producer-owned packing plant.

Only three plants bone and box beef. The availability of boxed beef from Central America and the United States, and the demand for boxed beef from more retail chain stores, pressured these three plants into boxing programs and likely will encourage others to follow.

Assembly and Wholesale Distribution

Intermediaries, who buy cattle to sell meat, perform important functions in assembly and distribution. About 300 intermediaries purchase cattle from producers at the farm or local market, paying cash under the Spanish arroba system of cattle transactions. Cattle are priced per arroba, which are 25-pound units of "clean meat" (carcass weight). Although a scale was readily available at the sale we attended, the buyer and seller visually estimated the arrobas of cattle offered for sale.

The Puerto Rico Department of Agriculture provided the facilities for local markets, where livestock is sold under private treaty between the farmer and intermediaries or other farmers without involvement of auctioneers or commissioned agents. Many intermediaries are also farmers, and they may put purchased animals back to pasture to gain weight before slaughter.

Intermediaries maintain title to cattle through the slaughter process. The dressed (skinned and gutted) carcasses are sold and delivered to retail outlets in plaza meat markets, butcher shops, and small retail grocery stores.

Retail Outlets

Beef is sold at retail in local plazas in small shops, some with minimal refrigeration; alongside shops selling fresh fruit and vegetables; in butcher shops; in small grocery stores; and in large chain stores. The plaza stores

Table 3--Animals slaughtered in Puerto Rican slaughterhouses
during FY 1950/51-84/85

Fiscal year	Cattle		Hogs		Goats	
	Animals	Weight	Animals	Weight	Animals	Weight
	Number	1,000 pounds 1/	Number	1,000 pounds 1/	Number	1,000 pounds 1/
1950/51	80,720	21,068	48,022	4,838	4,280	113
1951/52	86,014	22,510	62,144	6,384	6,360	181
1952/53	69,664	17,495	62,870	6,402	4,947	154
1953/54	70,070	18,200	93,621	9,007	5,431	142
1954/55	82,414	20,820	94,266	9,401	5,274	123
1955/56	97,476	25,430	93,246	9,751	5,707	125
1956/57	107,927	26,554	94,240	9,653	4,839	125
1957/58	120,617	29,415	103,932	10,307	7,375	187
1958/59	123,644	31,178	111,032	11,047	6,085	159
1959/60	106,229	26,091	113,367	11,726	4,618	124
1960/61	102,926	27,154	127,579	13,381	4,929	124
1961/62	104,212	27,694	134,019	14,296	4,809	128
1962/63	112,228	30,912	139,701	15,288	4,675	124
1963/64	117,526	33,303	132,797	15,049	4,558	113
1964/65	135,159	38,350	145,401	16,356	4,636	118
1965/66	143,471	42,341	146,255	16,196	4,473	116
1966/67	139,386	42,532	142,414	15,891	3,999	105
1967/68	130,038	40,129	149,692	16,672	4,094	113
1968/69	118,730	37,728	169,892	19,052	3,795	101
1969/70	109,557	37,516	140,265	16,153	3,397	96
1970/71	119,365	42,091	84,810	10,261	2,665	72
1971/72	79,907	31,843	35,743	4,190	622	17
1972/73	114,627	42,768	58,621	6,743	228	7
1973/74	127,653	45,919	50,214	5,765	264	7
1974/75	95,245	33,047	45,621	5,210	151	4
1975/76	95,952	34,823	58,914	6,569	280	9
1976/77	99,832	36,232	72,265	7,857	297	10
1977/78	126,345	43,726	97,297	10,214	553	14
1978/79	136,516	48,368	88,956	9,222	987	24
1979/80	104,536	37,968	62,964	6,436	1,035	23
1980/81	77,577	29,444	73,518	7,485	762	17
1981/82	75,110	29,947	80,508	8,023	393	8
1982/83	89,800	37,390	75,597	6,573	1,180	28
1983/84	114,298	45,706	68,479	6,120	1,332	33
1984/85	115,730	45,758	77,332	7,085	1,214	29

1/ Carcass weight.

Sources: (1 and 2).

are the traditional retail outlet, but are being replaced by large chain stores similar to those in the States. There are four major chains of foodstores in Puerto Rico, none of which are major U.S. chains. These organizations buy meat at a central office for all their stores. They prefer large-volume deliveries, reliable supplies, and consistent quality. The intermediary wholesale system is not capable of fulfilling the needs of these chains, so they mostly buy and sell beef from the States and Central America.

Many fast food outlets, including McDonald's, Burger King, and Wendy's, are located in Puerto Rico, especially in the cities. Beef used by these restaurants may be local, imported, or inshipped. Other commercial outlets include many types of food service, ranging from expensive formal restaurants to roadside barbecue stands.

Meat Consumption

Although there are many estimates, there is no exact number for the amount of meat consumed in Puerto Rico. Using information provided by the Puerto Rico Department of Agriculture, we calculated that Puerto Ricans consumed 43.2 pounds per capita of beef and veal (carcass weight) in FY 1984/85 (we divided the meat available for consumption from table 2 by the population). One could also estimate 1985 consumption from production, inshipments, and imports:

Puerto Rican production = 53,928,000 pounds

U.S. net inshipments = $37,918,582 \times 1.12 = 42,468,812$

Puerto Rican net imports = $67,517,576$ (excludes sausage) $\times 1.36 = 91,823,903$

Total available for consumption = 188,220,715 pounds

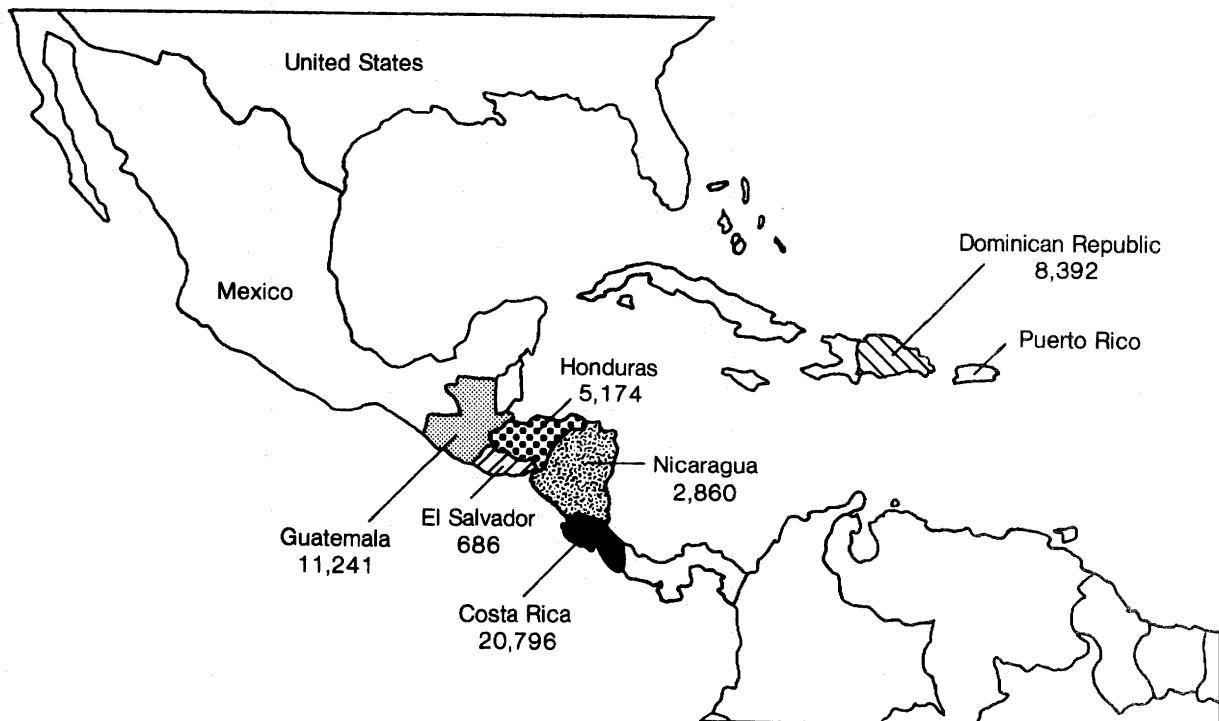
These figures use Puerto Rican production from table 2, inshipments and out-shipments from table 7, and imports from table 6 minus exports from table 8. For this example, the boneless to bone-in conversion factor was 1.36. We assumed that a third of net inshipments was boneless with a conversion factor of 1.36, and that the remaining two-thirds were bone-in with a conversion factor of 1.00. Thus the conversion factor for net inshipments was 1.12: 0.33 (a third of net imports was boneless) times 1.36 (equals 0.45) plus 0.67 (two-thirds of inshipments were bone-in) times 1.00 (equals 0.67). The 1.36 conversion factor was used with net imports because most imported beef was boneless (table 5). In this example, per capita consumption in Puerto Rico becomes 57.3 pounds (carcass weight), compared with about 106.9 pounds in the States in calendar year 1985 (we divided total available for consumption by population).

The above numbers include some processed and other beef with the fresh beef (table 9 shows estimates of per capita consumption of beef, pork, and poultry). Table 10 calculates beef consumption. The 1977/78 Nationwide Food Consumption Survey lists weekly per capita consumption of foods in various areas of the United States (12). Multiplying weekly consumption in Puerto Rico by 52 weeks, we get beef consumption at 61.88 pounds a year; pork, 48.36; lunch meat, 16.12; poultry, 67.08; and fish, 26.00.

These yearly consumptions are consistent for pork and poultry but are greater than either Puerto Rico Department of Agriculture's or our table 9's estimates for beef. Puerto Rico's grass-fed beef is very lean and is typically sold as boneless, sliced muscle. Imported Central American beef is similar to Puerto Rican beef, which is not viewed as a substitute for beef from the States. Many Puerto Rican producers and processors separate Central American from beef from the States because the inshipped U.S. Choice beef has a higher fat content and is more tender.

Figure 1

Meat exported to Puerto Rico in 1985 ¹⁾



¹⁾Quota meat subject to the U.S. Meat Import Act. Export data expressed in 1,000 pounds.

Source: Tabulated from (14).

Meat Imported into Puerto Rico

Costa Rica, the Dominican Republic, Guatemala, Honduras, and Nicaragua supplied almost all (97 percent) of the meat subject to the U.S. Meat Import Act that was imported into Puerto Rico in 1985 (fig. 1).

These five Central American countries accounted for less than 10 percent of all U.S. beef imports. Australia and New Zealand supplied almost 75 percent of U.S. imports, but were of minor importance to Puerto Rico (table 4). Imports to Puerto Rico accounted for 3.8 percent of U.S. meat imports subject to the U.S. Meat Import Act and 3.7 percent of total U.S. meat and poultry imports (tables 5 and 6).

Puerto Ricans bought 309.7 million pounds of meat from the States. Of that, 12 percent was beef, 31 percent was pork, and 57 percent was poultry (table 7).

ESTIMATING HOW IMPORTS AFFECT THE LOCAL INDUSTRY

A 10-equation system of supply and demand helped us assess effects of beef imports on the Puerto Rican meat industry (see box). Four of those equations then simulated prices and consumption. Lack of data limited our model. Table 10 summarizes the data from this section.

Table 4--Countries supplying meat, subject to the U.S. Meat Import Act, to Puerto Rico and the States, 1985

Exporters	Importers			
	Puerto Rico		United States <u>1/</u>	
	<u>1,000</u> <u>pounds</u>	<u>Percent</u>	<u>1,000</u> <u>pounds</u>	<u>Percent</u>
Australia	578	1.2	595,845	45.2
Costa Rica	20,795	41.7	54,660	4.1
Dominican Republic	8,392	16.8	18,860	1.4
El Salvador	686	1.4	1,664	.1
Guatemala	11,241	22.5	28,229	2.1
Honduras	5,174	10.4	15,116	1.1
New Zealand	68	.1	398,036	30.2
Nicaragua	2,860	5.7	3,914	.3
Panama	118	.2	118	0
Other countries	NA	NA	201,771	15.3
Total	49,912	100.0	1,318,213	<u>2/</u> 99.8

NA = Not applicable.

1/ The U.S. figures include data for Puerto Rico (and all U.S. territories).

2/ Does not total 100 because of rounding.

Sources: Puerto Rico figures were tabulated from U.S. Department of Commerce data (14). U.S. figures were tabulated from U.S. Customs Service data (11).

The Model

Our model estimates derived demand for Puerto Rican meat. That is, the demand for Puerto Rican meat is based on the demand for: beef produced in Puerto Rico, beef imported from foreign countries, beef shipped from the States (referred to as "U.S. beef" in the model), all pork products, and all poultry products.

These five demands are specified in price-dependent form; that is, the deflated price (adjusted for inflation) of each product depends on the estimated per capita consumption (carcass weight) of all five meats and on the deflated disposable per capita personal income in Puerto Rico. Supply of each of the meat classes is also specified.

Supply of Local Beef

The quantity of local beef supplied in a given year depends on: Puerto Rican deflated farm prices of beef prevailing in each of the 5 previous years, and the deflated farm price of milk prevailing in the current year and each of the 4 preceding years.

Table 5--Selected meat imports (product weight), subject to the U.S.
Meat Import Act, by country of origin, 1985 1/

Importer and exporter	Beef with bone		Boneless beef	Beef and veal	Beef, special	Other	Sheep,	Goat	Total	Puerto Rico's share of U.S. meat imports
	Fresh (1061020)	Frozen (1061040)	fresh or frozen (1061060)	prepared or preserved (1075500)	cuts (1076100)	Veal (1061080)	beef and veal (1076200)	excluding lambs (1062200)		
<u>U.S. imports from:</u>										
Australia	37	717	580,007	--	--	462	1	2,138	139	587,668 1.0
Costa Rica	76	755	53,220	--	--	41	--	--	--	54,091 38.4
Dominican Republic	130	251	17,900	--	--	--	--	--	--	18,280 45.9
El Salvador	798	--	1,738	--	--	--	--	--	--	2,536 27.0
Guatemala	--	--	29,480	--	--	--	--	--	--	29,480 38.1
Honduras	92	--	14,473	--	--	--	--	--	--	1,565 35.5
New Zealand	104	837	369,796	--	--	11,108	567	51	17	382,480 --
Nicaragua	--	2,096	10,813	--	--	--	--	--	--	12,909 22.2
Panama	--	--	160	--	--	--	--	--	--	160 73.7
All countries <u>1/</u>	70,753	7,627	1,212,498	451	6	19,696	699	2,226	156	1,314,111 3.8
<u>Puerto Rican imports from:</u>										
Australia	--	--	106	--	--	--	--	333	139	578 NA
Costa Rica	--	--	20,796	--	--	--	--	--	--	20,796 NA
Dominican Republic	--	164	8,228	--	--	--	--	--	--	8,392 NA
El Salvador	--	--	686	--	--	--	--	--	--	686 NA
Guatemala	--	--	11,241	--	--	--	--	--	--	11,241 NA
Honduras	--	--	5,174	--	--	--	--	--	--	5,174 NA
New Zealand	--	--	--	--	--	--	--	51	17	68 NA
Nicaragua	--	280	2,580	--	--	--	--	--	--	2,860 NA
Panama	--	--	118	--	--	--	--	--	--	118 NA
All countries <u>1/</u>	--	444	48,928	--	--	--	--	384	156	49,912 NA

-- = Few, negligible, or none.

NA = Not applicable.

1/ Only countries from which Puerto Rico imports are listed (all countries exporting to the United States are combined). The U.S. data include data for Puerto Rico (and all U.S. territories). These data differ slightly from the official data from the U.S. Customs Service because we tabulated imports from U.S. Department of Commerce data (the only data available at the time).

Source: Tabulated from U.S. Department of Commerce data (14).

Table 6--Total U.S. and Puerto Rican meat and poultry imports
(product weight) by country of origin, 1985 1/

Importer and exporter	Beef and veal	Pork	Mutton, goat, and lamb	Poultry	Total imports
<u>1,000 pounds</u>					
U.S. imports from:					
Argentina	95,732	366	--	--	96,099
Australia	585,857	--	8,105	1	66,691
Austria	119	--	--	--	119
Belgium and Luxem- bourg	727	2,425	--	--	3,152
Belize	201	--	--	--	201
Brazil	76,402	37	--	--	76,440
Canada	194,680	418,486	290	1,148	614,604
Costa Rica	54,091	--	--	--	54,091
Denmark	7,459	325,848	--	--	333,307
Dominican Republic	18,280	37	--	--	18,316
El Salvador	2,536	--	--	--	2,536
France	1	282	--	--	283
West Germany	309	5,388	--	--	5,697
Guatemala	29,480	--	--	--	29,480
Haiti	86	--	--	--	86
Honduras	14,565	--	--	--	14,565
Hungary	28	37,994	--	--	38,021
Ireland	4,379	--	--	--	4,379
Italy	359	18	--	--	377
Japan	1	123	--	--	124
Mexico	2,785	--	--	--	2,785
Netherlands	31	21,778	--	--	21,809
New Zealand	382,616	75	26,503	--	409,194
Nicaragua	12,909	--	--	--	12,909
Norway	126	74	--	--	200
Panama	317	58	--	--	375
Sweden	3,933	15,239	8	--	19,180
Switzerland	85	144	--	--	229
Taiwan	185	1,439	--	--	1,624
United Kingdom	731	33	--	--	763
Uruguay	3,617	--	--	--	3,617
Western Samoa	15	--	--	--	15
Yugoslavia	10	20,618	--	--	20,628
Bahrain	70	--	--	--	70
Cook Islands	--	51	--	--	51
Czechoslovakia	--	2,551	--	--	2,551
Falkland Islands	--	76	--	--	76
Finland	--	3,710	--	--	3,710
Grenada	--	40	--	--	40
Hong Kong	--	74	--	--	74
Israel	--	36	--	--	36
Kenya	--	325	--	--	325

See footnotes at end of table.

Continued--

Table 6--Total U.S. and Puerto Rican meat and poultry imports
(product weight) by country of origin, 1985 1--Continued

Importer and exporter	Beef and veal	Pork	Mutton, goat, and lamb	Poultry	Total imports
<u>1,000 pounds</u>					
Mauritius	--	38	--	--	38
Netherlands Antilles	--	108	--	--	108
Niger	--	37	--	--	37
Pakistan	--	34	--	--	34
Philippines	--	174	--	--	174
Poland	--	72,036	--	--	72,036
Portugal	--	76	--	--	76
Romania	--	4,471	--	--	4,471
Soviet Union	--	32	--	--	32
All countries	1,492,654	934,402	34,899	1,155	2,463,110

Puerto Rican imports

from:

Argentina	7,313	--	--	--	7,313
Australia	106	--	472	--	578
Austria	--	--	--	--	--
Belgium and Luxem- bourg	--	43	--	--	43
Belize	--	--	--	--	--
Brazil	11,130	--	--	--	11,130
Canada	--	48	--	--	48
Costa Rica	20,796	--	--	--	20,796
Denmark	36	17,748	--	--	17,785
Dominican Republic	8,392	--	--	--	8,392
El Salvador	686	--	--	--	686
France	--	--	--	--	--
West Germany	--	325	--	--	325
Guatemala	11,241	--	--	--	11,241
Haiti	--	--	--	--	--
Honduras	5,174	--	--	--	5,174
Hungary	--	610	--	--	38,021
Ireland	--	--	--	--	--
Italy	--	--	--	--	--
Japan	--	--	--	--	--
Mexico	--	--	--	--	--
Netherlands	--	1,494	--	--	1,494
New Zealand	--	--	123	--	123
Nicaragua	2,860	--	--	--	2,860
Norway	125	--	--	--	125
Panama	118	--	--	--	118
Sweden	--	--	--	--	--
Switzerland	--	--	--	--	--

See footnotes at end of table.

Continued--

Table 6--Total U.S. and Puerto Rican meat and poultry imports
(product weight) by country of origin, 1985 1/--Continued

Importer and exporter	Beef and veal	Pork	Mutton, goat, and lamb	Poultry	Total imports
<u>1,000 pounds</u>					
Taiwan	--	--	--	--	--
United Kingdom	--	--	--	--	--
Uruguay	92	--	--	--	92
Western Samoa	--	--	--	--	--
Yugoslavia	--	--	--	--	--
Bahrain	--	--	--	--	--
Cook Islands	--	--	--	--	--
Czechoslovakia	--	--	--	--	--
Falkland Islands	--	--	--	--	--
Finland	--	--	--	--	--
Grenada	--	--	--	--	--
Hong Kong	--	--	--	--	--
Israel	--	--	--	--	--
Kenya	--	--	--	--	--
Mauritius	--	--	--	--	--
Netherlands Antilles	--	--	--	--	--
Niger	--	--	--	--	--
Pakistan	--	--	--	--	--
Philippines	--	--	--	--	--
Poland	--	2,816	--	--	2,816
Portugal	--	--	--	--	--
Romania	--	--	--	--	--
Soviet Union	--	--	--	--	--
All countries	68,067	22,552	595	--	91,214

	<u>Percent</u>				
Puerto Rico's share of U.S. imports from:					
Argentina	7.6	--	--	--	7.6
Australia	--	--	5.8	--	.9
Austria	--	--	--	NA	--
Belgium and Luxem- bourg	--	1.8	--	NA	1.4
Belize	--	--	--	NA	--
Brazil	14.6	--	--	NA	14.6
Canada	--	0	--	NA	--
Costa Rica	38.4	--	--	NA	38.4
Denmark	0.5	5.4	--	NA	5.3
Dominican Republic	45.9	--	--	NA	45.8
El Salvador	27.0	--	--	NA	27.0
France	--	--	--	NA	--
West Germany	--	6.0	--	NA	5.7
Guatemala	38.1	--	--	NA	38.1
Haiti	--	--	--	NA	--

See footnotes at end of table.

Continued--

Table 6--Total U.S. and Puerto Rican meat and poultry imports
(product weight) by country of origin, 1985 1/--Continued

Importer and exporter	Beef and veal	Pork	Mutton, goat, and lamb	Poultry	Total imports
<u>Percent</u>					
Honduras	35.5	--	--	NA	35.5
Hungary	--	1.6	--	NA	1.6
Ireland	--	--	--	NA	--
Italy	--	--	--	NA	--
Japan	--	--	--	NA	--
Mexico	--	--	--	NA	--
Netherlands	--	6.9	--	NA	6.9
New Zealand	--	--	.5	NA	--
Nicaragua	22.2	--	--	NA	--
Norway	99.1	--	--	NA	62.5
Panama	37.1	--	--	NA	31.2
Sweden	--	--	--	NA	--
Switzerland	--	--	--	NA	--
Taiwan	--	--	--	NA	--
United Kingdom	--	--	--	NA	--
Uruguay	2.5	--	--	NA	2.5
Western Samoa	--	--	--	NA	--
Yugoslavia	--	--	--	NA	--
Bahrain	--	--	--	NA	--
Cook Islands	--	--	--	NA	--
Czechoslovakia	--	--	--	NA	--
Falkland Islands	--	--	--	NA	--
Finland	--	--	--	NA	--
Grenada	--	--	--	NA	--
Hong Kong	--	--	--	NA	--
Israel	--	--	--	NA	--
Kenya	--	--	--	NA	--
Mauritius	--	--	--	NA	--
Netherlands Antilles	--	--	--	NA	--
Niger	--	--	--	NA	--
Pakistan	--	--	--	NA	--
Philippines	--	--	--	NA	--
Poland	--	3.9	--	NA	3.9
Portugal	--	--	--	NA	--
Romania	--	--	--	NA	--
Soviet Union	--	--	--	NA	--
All countries	4.6	--	1.7	NA	3.7

NA = Not applicable.

-- = Few, negligible, or none.

1/ U.S. data include data for Puerto Rico (and all U.S. territories).

Source: Tabulated from U.S. Department of Commerce data (14). See appendix table 3 for codes included.

Table 7--Meat traded (product weight) between Puerto Rico and the States, 1985

Traders	Essentially import quota meats	Beef and veal	Pork	Lamb, mutton, and goat	Poultry	Total
<u>1,000 pounds</u>						
The States to Puerto Rico	32,831.3	38,641.9	94,912.2	34.9	176,142.1	309,730.9
Puerto Rico to the States	396.1	723.3	39.2	NA	NA	762.5

NA = Not applicable.

Source: Tabulated from U.S. Department of Commerce data (14).

Data Used in the Model

Puerto Rican data are published on a July-to-June fiscal-year basis (1), while U.S. data are normally based on calendar years. We adjusted the U.S. data to a fiscal-year basis with simple 2-year moving averages. The sample period extended from FY 1970/71 to 1984/85. Data for lagged local farm beef and milk prices reach back to FY 1965/66.

Data reflecting the Puerto Rican meat economy are limited and may affect the demand or supply estimates. Sufficient price series are available only at the farm level for beef, pork, and poultry as gross classes (no distinction between cows and young animals, for example). This is also the case for local slaughter. Foreign import quantities and shipments from the States were calculated mainly from special U.S. Department of Commerce data (14). Data relating meat subject to the U.S. Meat Import Act are from the U.S. Customs Service.

Estimation

We estimated the 10 equations using indirect (two-stage) least squares, employing the Cochrane-Orcutt autoregressive least squares procedure (7). This method accounted for the simultaneous nature of the demand equations and all but one of the supply equations. This method also eliminated the influence of autocorrelation in the residuals of the estimated equations. Two-stage means a set of values are estimated and then used to obtain the final estimated values. Autocorrelation means that explanatory variables move together from some force outside the system being studied.

The local beef supply is recursive; that is, it depends only on lagged values of the local farm cattle and milk prices. Local beef supply was estimated using the Almon polynomial lag procedure, which allows flexibility in lagged coefficient weights over the lag period (6). Therefore, one year may influence supply more than would other years. The indirect variables for two-stage least squares are the exogenous variables of the 10 equation system.

Table 8--Meat exported (product weight) from Puerto Rico
and the United States, 1985

Exporter and importer	Beef and veal	Pork	Mutton, goat, and lamb	Poultry	Total imports
<u>1,000 pounds</u>					
U.S. exports to:					
French West Indies	147.3	540.0	--	161.6	848.9
West Germany	385.5	2,861.7	16.6	6,306.9	9,570.6
Haiti	64.0	3,084.3	--	788.7	3,936.9
Japan	184,449.8	20,605.9	58.5	103,731.7	308,845.9
Leeward and Windward Islands	697.3	1,174.3	97.9	27,247.7	29,217.1
Namibia	78.8	94.7	3.8	229.8	407.0
Netherlands Antilles	1,967.0	1,002.9	7.9	11,502.4	14,480.2
Trinidad and Tobago	478.8	439.0	28.0	2,165.9	3,111.8
Netherlands	483.7	1,597.0	3.3	1,339.0	3,423.0
Singapore	1,105.4	486.3	5.7	50,004.4	51,601.9
Barbados	283.4	172.2	57.6	4,802.8	5,316.0
Dominican Republic	18.7	24.8	2.3	201.6	247.3
Hong Kong	1,881.6	1,735.2	19.8	92,555.1	96,191.7
Jamaica	449.5	652.4	12.8	46,144.4	47,258.9
Malaysia	248.1	313	--	3,795.8	4,357.5
Spain	55.0	495.9	4.6	781.0	1,336.6
All countries	241,459.3	89,778.4	1,013.6	495,465.6	827,716.9
Puerto Rican exports to:					
French West Indies	2.8	101.2	--	--	104.1
West Germany	18.1	--	--	--	18.1
Haiti	25.1	2,237.6	--	390.7	2,653.4
Japan	39.8	--	--	--	39.8
Leeward and Windward Islands	51.5	1.2	30.0	5,076.1	5,158.7
Namibia	5.8	71.7	--	58.8	136.3
Netherlands Antilles	145.4	530.1	--	5,240.2	5,915.8
Trinidad and Tobago	261.1	324.0	--	363.5	948.6
Netherlands	--	3.2	--	214.6	217.8
Singapore	--	43.2	--	--	43.2
Barbados	--	--	--	106.4	106.4
Dominican Republic	--	--	--	35.5	35.5
Hong Kong	--	--	--	40.8	40.8
Jamaica	--	--	--	6,333.2	6,333.2
Malaysia	--	--	--	28.5	28.5
Spain	--	--	--	30.1	30.1
All countries	549.7	3,312.4	30.0	17,918.4	21,810.5
<u>Percent</u>					
Puerto Rico's share of U.S. exports to:					
French West Indies	1.9	NA	NA	NA	12.3
West Germany	4.7	NA	NA	NA	.2
Haiti	39.3	NA	NA	NA	67.4
Japan	--	NA	NA	NA	--
Leeward and Windward Islands	7.4	NA	NA	NA	17.7
Namibia	7.4	NA	NA	NA	33.5
Netherlands Antilles	7.4	NA	NA	NA	40.9
Trinidad and Tobago	54.5	NA	NA	NA	30.5
Netherlands	--	NA	NA	NA	6.4
Singapore	--	NA	NA	NA	.1
Barbados	--	NA	NA	NA	2.0
Dominican Republic	--	NA	NA	NA	14.4
Hong Kong	--	NA	NA	NA	--
Jamaica	--	NA	NA	NA	13.4
Malaysia	--	NA	NA	NA	.7
Spain	--	NA	NA	NA	2.3
All countries	0.2	NA	NA	NA	2.6

NA = Not applicable.

-- = Few, negligible, or none.

1/ Only countries to which Puerto Rico exports are listed (all countries receiving U.S. exports are combined). The U.S. data include data for Puerto Rico (and all U.S. territories).

Source: Tabulated from U.S. Department of Commerce data (14).

Table 9--All beef, pork, and poultry (carcass weight) consumed in Puerto Rico, 1970-84 1/

Year	Imported beef <u>2/</u>	Shipments to Puerto Rico from the States	Local beef	Total beef	Pork	Poultry
<u>Pounds per capita</u>						
1970	17.33	20.60	16.44	54.37	46.53	37.35
1971	16.69	19.33	16.69	52.71	48.29	40.65
1972	16.65	17.41	16.72	50.78	45.83	41.75
1973	17.56	18.35	17.12	53.03	41.65	41.18
1974	17.25	18.99	15.34	51.58	42.64	46.39
1975	19.32	21.87	15.93	57.12	46.47	53.57
1976	22.95	23.08	15.59	61.62	47.43	55.27
1977	23.15	21.06	18.40	62.61	53.40	56.96
1978	22.15	18.70	20.02	60.87	56.30	64.15
1979	21.19	17.53	15.50	54.22	54.54	67.57
1980	22.52	16.89	11.86	51.27	53.47	69.26
1981	23.88	17.14	11.59	52.61	50.10	66.16
1982	24.67	15.98	14.36	55.01	47.33	62.79
1983	23.93	14.23	16.47	54.63	48.77	62.33
1984	24.95	15.42	16.50	56.87	50.44	67.50

1/ These are values used in the econometric model.

2/ Beef imported into Puerto Rico minus beef exports from Puerto Rico, minus beef shipments from Puerto Rico to the States.

These lagged (previous) beef price relationships exist because of the time it takes producers to adjust their production to changes in the prices they receive. The milk price is included because a large portion of Puerto Rico's cattle is slaughtered from herds kept primarily for milk production. Decreases in milk prices might increase beef production for a year or two as dairy herds are decreased, but cattle slaughter would decline after the dairy herd had been significantly reduced.

Supply of Imported Beef

The quantity of imported beef is affected by the relative prices of imported and local beef, beef from the States, and the U.S. cattle price index. International shipments are expected to move toward the higher price. For example, with higher prices of Puerto Rican beef, supplies of international beef should increase.

Supply of Beef from the States

The quantity of beef shipped to Puerto Rico from the States depends on the local price of beef, the amount of beef produced (consumed) in the United

Table 10--Puerto Rican beef production, imports, inshipments, and calculated consumption, 1978-84 ^{1/}

Item	Unit	1978	1979	1980	1981	1982	1983	1984
Imported meat from major exporters:								
Costa Rica	1,000 pounds	14,779	10,399	7,851	13,903	13,863	13,931	17,435
Dominican Republic	do.	1,668	3,561	2,129	9,243	9,040	7,408	1,562
El Salvador	do.	155	754	634	83	121	498	405
Guatemala	do.	1,969	5,947	4,333	3,192	1,282	6,604	8,483
Honduras	do.	13,056	12,210	15,496	16,686	13,997	15,772	10,731
Nicaragua	do.	11,801	6,569	6,387	4,078	5,121	3,454	1,649
Total meat imports (a)	do.	52,707	51,466	54,513	58,394	61,094	59,308	61,464
Meat exports (b)	do.	924.0	883.0	675.0	900.0	1,331.5	1,269.5	870.5
Meat outshipments (c)	do.	1,334.5	1,653.5	1,125.0	834.0	729.5	615.0	648.0
Net imports (a-b-c) times 1.36 conversion factor (carcass weight)	do.	68,610.6	66,544.1	71,690.4	77,058.3	80,294.9	78,096.6	81,526.6
Puerto Rico's population	1,000 persons	3,098	3,141	3,184	3,227	3,255	3,264	3,268
Per capita consumption of net imports	Pounds per capita	22.2	21.2	22.5	23.9	24.7	23.9	24.9
Shipments to Puerto Rico from the States times 1.36 conversion factor (carcass weight)	1,000 pounds	57,932.6	55,071.2	53,764.9	55,296.9	52,027.5	46,433.1	50,400.2
Per capita consumption of meat shipped to Puerto Rico from the States ^{2/}	Pounds per capita	18.7	17.5	16.9	17.1	16.0	14.2	15.4
Beef production in Puerto Rico	1,000 pounds	62,011.0	48,676.0	37,748.0	37,400.0	46,737.0	53,772.0	53,928.0
Per capita consumption of Puerto Rican beef ^{3/}	Pounds per capita	20.0	15.5	11.9	11.6	14.4	16.5	16.5
Total beef consumption in Puerto Rico	do.	60.9	54.2	51.3	52.6	55.0	54.6	56.9

^{1/} Except for individual country exports, most data for one year are an average of that year and the next. Consumption estimates are on a carcass weight basis.

^{2/} These data are also "actual" data in figure 3.

^{3/} These data are also "actual" data in figure 2.

States (at least some of the beef shipped to Puerto Rico from the States is for a specialty market), and an index of ocean freight rates.

Supplies of Pork and Poultry

Pork and poultry quantities depend on supplies (consumption) in the States, Puerto Rican prices, and the ocean freight rate index because the States ship Puerto Rico large portions of its pork and poultry supply. Producers in the States consider much of the chicken shipped to Puerto Rico as byproducts because the chicken is Grade C. Grade C chicken is the lowest of three poultry grades (A, B, and C). Grade C may have cuts, tears, or bruises; wings may be removed; and moderate amounts of trimming of the breast and legs are permitted. Most stores in the States sell only Grade A chicken.

Effects on the Price and Quantity of Local Beef

The price of beef will usually decrease as the quantity increases: most (18 out of 25) of the estimated coefficients on quantity are negative, and 14 of 15 of the beef coefficients are negative. Prices will increase as consumer incomes increase: all five income coefficients are positive (table 11).

Many Puerto Ricans with whom we spoke believed that imported Central American lean beef is more competitive with (substitutable for) locally produced beef than is the fatter beef from the States. The coefficient estimates for the demand equation for local beef (table 11) at least partially support that belief. The coefficient on the variable for beef from the States is smaller in absolute size (-0.001) than those for local beef (-0.006) and imported beef (-0.009), indicating that a pound of imported beef could reduce the local price more than would a pound of beef from the States. However, the coefficient (and flexibility) for beef from the States in the imported beef demand equation is similar in absolute magnitude (-0.015) to the local beef coefficient (-0.019), and is slightly larger than the imported beef coefficient (-0.009), indicating that the beef types are actually substitutable.

The computed own flexibilities and cross-flexibilities for all of the estimated beef quantity coefficients are inflexible between 0 and -1. A flexibility of -0.27 (the flexibility of local beef price with respect to local beef quantity) means that a 1-percent increase in the quantity of local beef consumed will decrease the price of local beef by 0.27 percent.

Increasing output can raise the total revenue. Inflexible coefficients imply that the percentage increase in the quantity of the product sold moves more than the percentage decrease in price. Net revenue could also be increased, which raises profits or reduces losses, if the marginal (incremental) cost of the increased production is less than the revenue generated from it.

Simulating Reduced Imports

Many Puerto Rican beef producers felt that competition from imports has hurt their own cattle and beef prices. This econometric analysis of the Puerto Rican meat industry simulates how constraints on imports of foreign beef may affect the price and quantity of local beef. Our simulation examines whether, and how much, a change (from whatever influence) in the quantity of beef imported would affect local beef production, prices, and consumption in Puerto Rico. We first simulated these effects with all 10 equations, but the system

Table 11--Estimated demand equations

Price	Intercept	Quantities consumed per capita of--					Income	Rho	Regression statistics					
		Imported							R ²	R ² on transformed model	Durbin Watson	F		
		Local beef	beef	U.S. beef	Pork	Poultry								
Local beef (t-statistic)	0.130 (1.57)	-0.0059 (-4.36)	-0.0095 (-5.38)	-0.0014 (-1.43)	-0.0022 (-2.12)	-0.0024 (-2.30)	0.0007 (7.39)	-0.45 (-1.84)	0.95	0.97	2.11	41.14		
Flexibility		-.27	-.60	-.07	-.32	-.41	2.30							
Imported beef (t-statistic)	.327 (-1.06)	.019 (-3.72)	.0094 (-1.42)	.015 (-4.22)	.019 (4.93)	.010 (-2.68)	.0010 (2.95)	-.45 (-1.83)	.75	.82	2.78	7.14		
Flexibility		-.73	-.50	-.69	2.34	-.150	2.89							
U.S. beef (t-statistic)	.125 (.50)	.0070 (-1.72)	.0049 (.92)	.0053 (-1.80)	.011 (3.50)	.0110 (-3.52)	.0006 (2.22)	-.83 (-1.35)	.84	.78	2.8	11.45		
Flexibility		-.25	-.24	-.22	1.2	-.143	1.61							
Pork (t-statistic)	.132 (3.05)	.0069 (9.73)	.0151 (-16.24)	.0076 (14.76)	-.0039 (-7.04)	.0013 (2.35)	.0003 (6.99)	-.47 NA	.996	.99	2.8	232.77		
Flexibility		.33	-.99	.42	-.58	.23	1.19							
Poultry (t-statistic)	.042 (.816)	.0008 (.90)	.0084 (-7.32)	.0022 (3.56)	.0008 (-1.25)	.0041 (-5.97)	.0006 (9.40)	-.68 NA	.99	.97	2.4	137.9		
Flexibility		.05	-.67	.15	-.15	-.88	2.35							

NA = Not available.

would not converge to yield positive solutions because of poor pork and chicken estimates.

We used a subset of four equations for simulations over the historical period because our primary interest was with the beef equations. We simulated the local and the beef from the States demand (table 11) and supply (table 12) equations with three sets of imported beef quantity series: historical data, per capita limit on imports, and population share of imports. (The supply and demand equations were also omitted for imported beef because imports were exogeneously set.)

These simulations show that foreign beef imports directly affect Puerto Rican production and prices. Local producers produce less and receive lower prices than they would if less beef were imported. Consumers in Puerto Rico would also pay substantially more for beef if imports were somehow constrained.

These simulations do not reflect any notion of whether imports ought to be constrained; but reflect only estimates of what might occur if imports were constrained. Imports reduce prices for consumers, but at the expense of local producers.

Historical Data

The first simulation tested the hypothetical series against the historical import data. Except for the first 2-3 years, the simulated values of local beef prices, consumption of local beef, and consumption of beef from the States are close to the actual data (figs. 2-4.)

Per Capita Limit of Imports

The second simulation (using computed hypothetical values for the per capita consumption of foreign beef imports) examines if limiting imports to per capita levels raises the production of locally produced beef. We limited imports to equal the approximate average weight of imported beef consumed per person in the States in each of the sample years. This limit reduces consumption of imported beef to 25-50 percent of actual levels.

Limiting imports significantly raises the simulated quantity of production and consumption of local beef and the farm price of beef in Puerto Rico over actual values. On average, local beef production increases 22 percent and local beef prices increase 29 percent. The simulated quantity of beef shipped to Puerto Rico from the States increases only 3.4 percent.

It is important to remember, however, that these simulated values reflect simulated changes only in the quantity of imported beef. These values do not reflect increases in price or production of pork and poultry, which would likely occur and might mitigate effects on local beef prices and quantities.

Population Share of Imports

The third simulation limits quantities of imported beef to the same proportion of Central American beef imports as is the proportion of Puerto Rico population to population in the States. This limit reduces imports to less than 10 percent of actual values (table 13). This scenario results in the largest simulated increase in locally produced beef and in farm prices (figs. 2-4). This simulation also does not account for increased beef imports from countries outside Central America which would likely quickly fill the gap.

Table 12--Estimated supply equations

Item	Coefficient	t-statistic	Regression statistics			
			Rho	R ²	Durbin Watson	F
Local beef:						
Intercept	-7.48	(-1.08)	NA	0.87	2.43	25.40
Farm price--						
(t-1)	-5.59	(-.73)				
(t-2)	12.61	(2.70)				
(t-3)	22.28	(5.93)				
(t-4)	23.39	(6.81)				
(t-5)	15.97	(6.80)				
Milk price--						
(t)	-31.59	(-4.43)				
(t-1)	-5.80	(-4.60)				
(t-2)	10.26	(3.47)				
(t-3)	16.58	(3.84)				
(t-4)	13.16	(3.94)				
Imported beef:						
Intercept	22.6	(2.5)	0.82	.84	2.46	1.8
			(5.16)			
Farm price--						
Ratio of imported beef price to U.S. beef price	10.61	(1.13)				
Puerto Rican farm price	-14.09	(-1.13)				
Index of prices of cattle in the States	-.017	(-1.09)				
U.S. beef inshipped:						
Intercept	-26.73	(-4.8)				
Puerto Rican farm price	6.21	(.82)	-.25	.83	2.05	20.38
			(-.94)			
Beef consumed (per capita) in the States	.49	(7.56)				
Ocean index	1.91	(2.25)				
Pork:						
Intercept	39.39	(2.05)	.80	.55	1.30	5.98
Puerto Rican farm price	6.89	(.18)	(4.8)			
Pork consumed (per capita) in the States	.20	(.93)				
Ocean index	-2.56	(-1.20)				
Poultry:						
Intercept	83.24	(2.47)	.72	.91	1.40	39.46
Puerto Rican farm price	-117.83	(-2.21)	(3.7)			
Chicken consumed (per capita) in the States	.088	(.17)				
Ocean index	3.61	(1.49)				

NA = Not available.

Source: (3).

Table 13--Selected meat imports (product weight) subject to the U.S. Meat Import Act,
estimated as share of population 1/

Year	Imports into Puerto Rico (1)	Imports into United States (2)	Puerto Rico's share of U.S. imports [(1)/(2)] (3)	Percentage of U.S. population in Puerto Rico (4)	Limiting Puerto Rico's share of U.S. imports to the same share of U.S. population in Puerto Rico [(2) x (4)] (5)
<u>1,000 pounds</u>					
1978	43,428	213,688	20.32	1.405	3,002
1979	39,440	255,843	15.42	1.409	3,605
1980	36,830	175,965	20.93	1.411	2,483
1981	47,185	152,361	30.97	1.415	2,156
1982	43,424	138,151	31.43	1.413	1,952
1983	47,667	129,226	36.89	1.403	1,813
1984	40,265	101,098	39.83	1.392	1,407
1985	49,149	131,861	37.27	1.385	1,826

1/ Imports from Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, and Nicaragua.

Figure 2
Per capita consumption of Puerto Rican beef

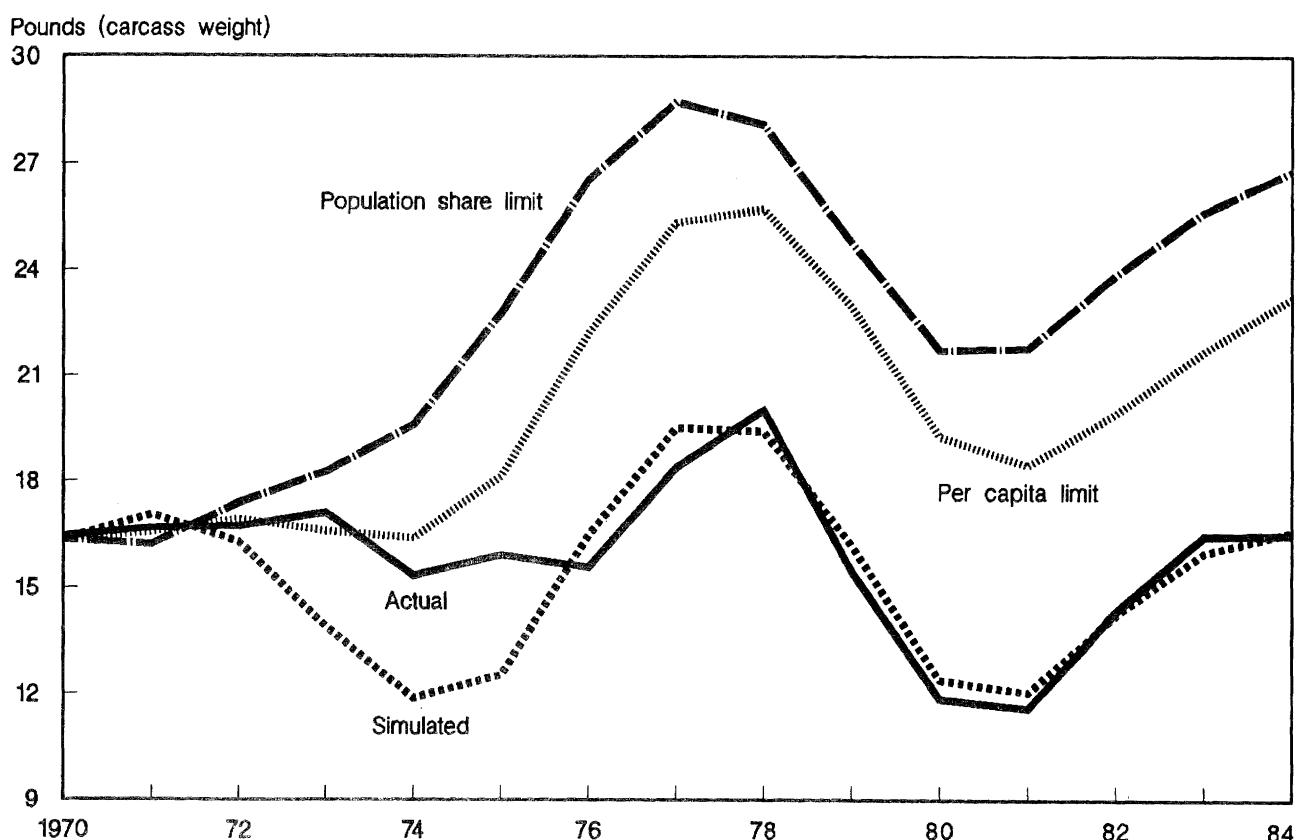


Figure 3
Per capita consumption of beef shipped to Puerto Rico from the States

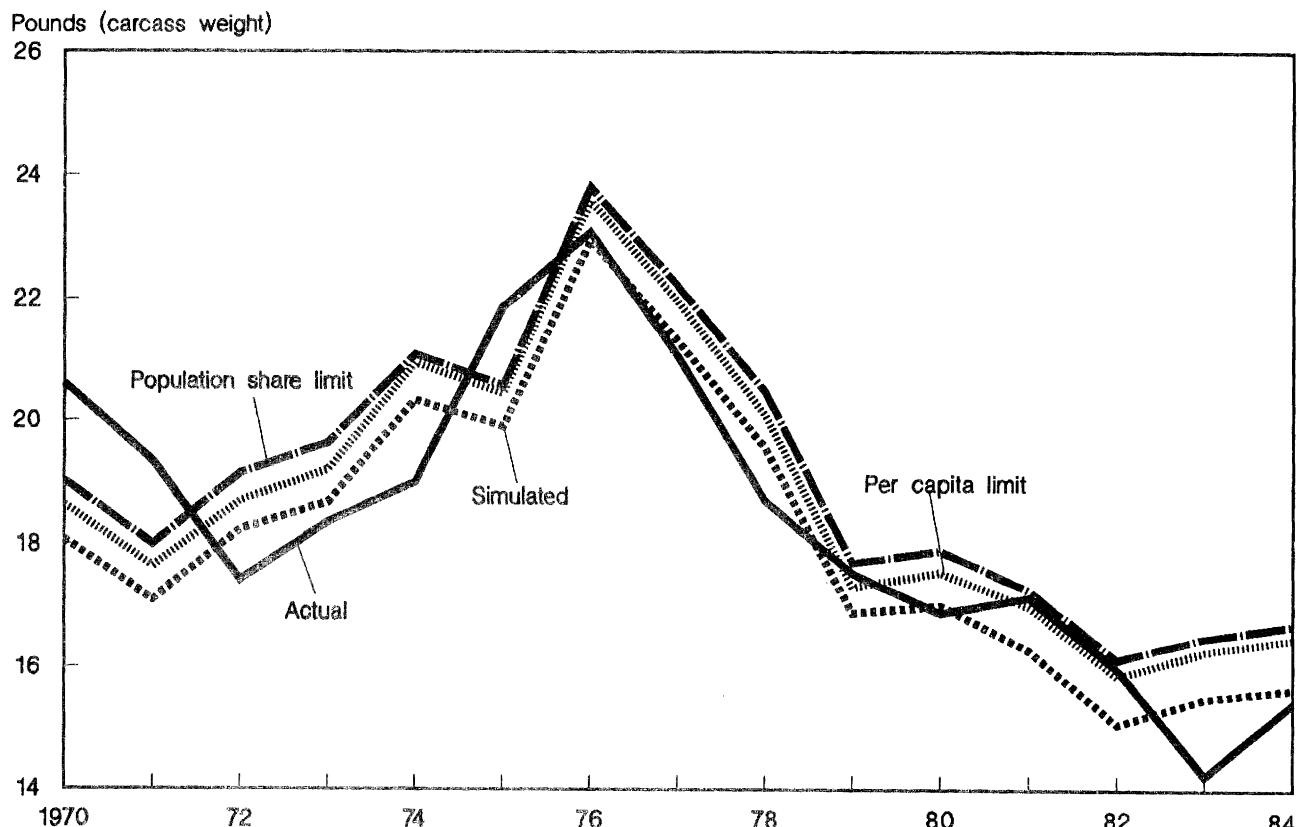
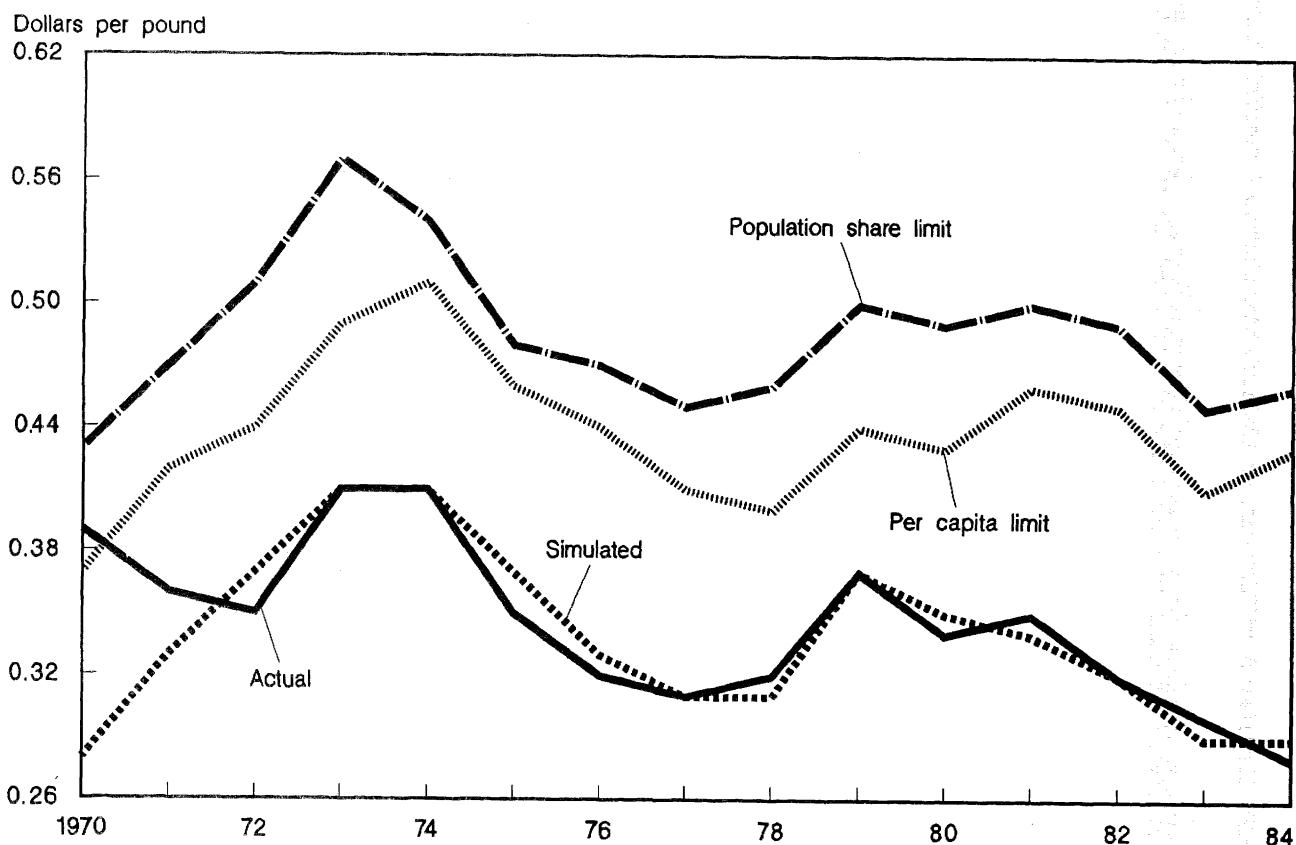


Figure 4

Beef prices (deflated) that Puerto Rican farmers received**DOMESTIC FACTORS SAID TO AFFECT PRODUCTION AND COSTS**

Our simulations show that foreign beef imports depress Puerto Rico's own beef production and prices...but producers in Puerto Rico felt that local resources also limit their competitive position.

Cost of Production

Producers emphasized that production costs are higher in Puerto Rico than in Central America. But the higher costs are difficult to combat because they are due to land and labor costs, lack of feed grain, and beef hormones/additives. Marginal revenue would likely cover marginal costs of small-scale expansion for many producers with under-used grazing capacity. But as in the States, product prices would have to rise significantly to encourage more production. Many production items represent fixed (sunk) costs, including landownership, real estate taxes, and ownership costs of equipment. Marginal production costs may range as low as \$9-\$16 per arroba, or about 50-70 percent of cattle prices (we totaled selected shortrun costs from the unpublished survey in 2).

Land Costs

High population pressures the land for residential and business purposes. Land prices are bid substantially higher for grazing land in Puerto Rico than in Central America: we were quoted values up to \$10,000 per cuerda. Average

values are much lower but are still higher than prices of grazing land in the States and in Central America (2).

Labor Costs

Puerto Rican producers are subject to pay U.S. minimum wages, while Central American producers pay much lower market rates. But Puerto Rico subsidizes some wages, somewhat lessening the effects of labor costs.

Lack of Grain

A lack of locally produced grain makes fed-beef production infeasible. While some grain is imported, returns are higher when it is used as dairy, swine, or poultry feed.

Hormones and Additives

Use of hormones and additives lowers production costs relative to countries that do not use them. Puerto Rican producers must follow U.S. rules regulating the use of hormones and additives. Imported meat must meet residue requirements, but the exporting countries control the actual production practices.

Marketing Functions

Many inefficiencies, including intermediaries, small plants, and the lack of price data and grade standards, exist in Puerto Rico's meat assembly and distribution activities.

Assembly

The intermediary method of assembly and distribution is costly. We were told that an intermediary can earn a reasonable income by handling 10 head of cattle per week. Costs for similar marketing functions are much lower in the States.

Meatpacking

It is difficult for small packing plants to achieve economies of size. Small packing plants also lose significant value from their lack of (onsite or offsite) facilities to process byproducts.

Lack of Market News and Grade Standards

We could not identify a formal system of livestock-price reporting in Puerto Rico: informal radio reports and news from other buyers and sellers seemed to be the producers' source of price information. The absence of systematic livestock or meat grades and standards further compounds pricing problems. The arroba price system, based on visually estimated live and/or dressed weights, precludes precise price and quantity data. It is, therefore, difficult to interpret any price information.

Level of Imports

Puerto Rico imports more beef, relative to local production or population, than do the States. Many producers want imports curtailed to strengthen their

own competitive position. However, recall that U.S. trade laws and restrictions apply to the Commonwealth of Puerto Rico. Restricting the amount of imports would violate U.S. international obligations under the General Agreement on Tariffs and Trade (GATT). The GATT prohibits quantitative restrictions except under certain circumstances, usually relating to domestic restriction of production and marketing. The United States is also presently engaged in multilateral trade negotiations, one objective of which is to increase U.S. exports by liberalizing world agricultural trade, including trade in beef. Imposing U.S. trade restrictions would undermine the accomplishment of this objective and could lead to foreign trade retaliation that could restrict all U.S. beef exports.

In theory, imports can be reduced with a ban on trade or with special quotas and tariffs. However, implementing this proposition is probably illegal.

Import Ban

Puerto Rican production initially, and probably even in the long term, could not fill the shortfall in beef supplies resulting from a total ban on imports. Ensuing price increases would probably be excessive. Demand for local beef may permanently decrease from a shift to pork or poultry.

Special Quotas or Tariffs

Although some States have sought special import regulations on the grounds that they were disproportionately affected by meat imports, none were approved. Congress granted Puerto Rico a special tariff on coffee in the 1930's, probably because coffee was not grown in any State. (A quota limits the quantity, a tariff taxes the price, of goods.)

The U.S. Meat Import Act of 1979 has operated with few restrictions. Voluntary restraint agreements (VRA's) with the larger trading countries have been used to control import quantities (table 14). Many Puerto Ricans remember when individual country quotas were used (it appears the last country quotas were developed in 1976, table 14) and would like quotas placed on the Central American countries that export mainly to Puerto Rico. The amount of beef coming from Central America as a percentage of U.S. quota meat imports is small, but the amount going to Puerto Rico is a large share of U.S. total beef imports from Central America. As a result, Puerto Rican producers reportedly would favor a limit on the maximum percentage that any country could send to Puerto Rico of the total U.S. imports from that country. Producers would also favor a quota on the Central American countries, so that less total meat (much of it sent to Puerto Rico) came from these countries.

Subsidies

A wide variety of support programs can strengthen production without restricting trade. Puerto Rican producers already enjoy a range of government assistance.

Tick Control Program

This helps defray costs of preventing tick infestations. We were told this program cost \$8.5 million, about \$15 per head of cattle per year.

Table 14--U.S. imports under U.S. meat import laws, 1965-87 1/

Year	Imports			Program
	Adjusted base quantity	Trigger level 2/	Actual	
<u>Million pounds 3/</u>				
1965	848.7	933.6	613.9	No restrictions.
1966	890.1	979.1	823.4	No restrictions.
1967	904.6	995.1	894.9	No restrictions.
1968	950.3	1,045.3	1,001.0	Formal VRA's with Australia and New Zealand negotiated in August. Other exporters asked not to exceed scheduled shipments.
1969	988.0	1,086.8	1,084.1	VRA's negotiated with all suppliers except Canada and the United Kingdom.
1970	998.8	1,098.7	1,170.6	VRA negotiated below trigger level. Quota imposed then suspended at midyear; new restraint levels established for participating countries. Section 204 used to control transshipments through Canada.
1971	1,025.0	1,127.5	1,132.6	Quotas imposed and suspended; VRA program negotiated at revised 1970 level.
1972	1,042.4	1,146.6	1,355.5	VRA negotiated but suspended at midyear.
1973	1,046.8	1,151.5	1,355.6	Quotas imposed then suspended; no restrictions.
1974	1,027.9	1,130.7	1,079.1	Quotas imposed then suspended; no restrictions.
1975	1,074.3	1,181.7	1,208.9	VRA negotiated with most supplying countries.
1976	1,120.9	1,233.0	1,231.7	VRA negotiated, but quotas imposed in last quarter.
1977	1,165.4	1,281.9	1,250.2	VRA negotiated, supported by letter of understanding with Canada.
1978	1,183.9	1,302.3	1,485.5	VRA negotiated at beginning of year. Quotas imposed and suspended to allow a 200-million pound increase in June.
1979	1,131.6	1,244.8	1,533.7	Quotas imposed and suspended, VRA negotiated above trigger level.
1980	1,516.0	1,667.6	1,431.2	No restrictions.
1981	1,316.0	1,447.0	1,235.7	No restrictions.
1982	1,181.8	1,300.0	1,319.6	VRA's negotiated with Australia and New Zealand, supported by letter of understanding with Canada for fourth quarter.
1983	1,119.0	1,231.0	1,240.1	VRA's negotiated with Australia and New Zealand, supported by letter of understanding with Canada for fourth quarter.
1984	1,117.0	1,228.7	1,148.7	No restrictions.
1985	1,199.0	1,319.0	1,318.6	No restrictions.
1986	1,309.0	1,440.0	4/1,339.3	No restrictions.
1987	1,309.0	1,440.0	NA	NA

VRA = Voluntary restraint agreement. NA = Not available.

1/ P.L. 88-842 from 1965 amended by P.L. 96-177, effective 1980.

2/ Shipments at or above these levels would trigger imposition restrictions.

3/ Product weight.

4/ Preliminary.

Sources: (10 and 11).

Machinery Rental

Puerto Rico rents crawler tractors and other equipment to farmers at an attractive rate. These machines can clear, prepare, and seed land for improved pastures. However, the high demand for machinery rental produces long waiting lists.

Government Incentives

The Puerto Rican Government provides producers with incentive payments to expand cow herds; raise dairy calves for slaughter; build facilities; and help pay wages and fertilizer costs. Puerto Rico spends about \$3 million a year on incentive payments, about \$6 per head of inventory or \$25 per head slaughtered. These payments averaged about \$750 per farm (2).

Government Stores

Farmers can purchase agricultural supplies at reduced prices in 18 government stores (although several producers questioned the degree of price advantage in these stores).

Livestock Markets

Government facilities for livestock sales are also available. Although we do not know how many facilities exist, they appear to be locations merely for purchases and sales.

Tax Breaks

Farm income is 90-percent exempt from Puerto Rico's income taxes if agriculture provides at least half of the farmer's total income.

Government Services

Puerto Rico's Government provides services similar to services to producers in the States, including meat inspection, agricultural research, and extension services. Rentals of government-owned grazing land to cattle producers are offered below market rates. (A study of government lands is currently underway in Puerto Rico.)

Research

Puerto Rico also supports research on developing its tropical resources to produce more animal feed on an economically competitive basis.

ALTERNATIVE POLICIES

Imports and domestic factors constrain Puerto Rico's beef production, sales, and prices. Policymakers and industry participants, therefore, face several critical issues in assessing Puerto Rico's beef sector. This section presents information only on which to base decisions. The alternative policies listed below are merely possibilities, not recommendations.

Leaving current policies unchanged could hurt the Puerto Rican beef industry if producer costs remain at their not-so-competitive levels. Current policies

would also likely result in consumers paying the lowest price (or cost) for beef, thus buying more imported beef instead of local meat.

Petitioning Congress to allow a special tariff on beef imports to Puerto Rico, if successful, would be similar to the coffee tariff. But the tariff on beef imports would:

- o Violate U.S. international obligations and invite trade-restricting retaliation by trading partners against U.S. agricultural exports.
- o Likely increase prices of local lean beef, by nearly the tariff level, for Puerto Rican farmers and consumers.
- o Likely increase sales of local and imported poultry and pork. Consumers would shift consumption toward the less expensive substitutes.
- o Likely increase beef shipments to Puerto Rico from the States, as beef from the States would not be charged a tariff.
- o Complicate U.S. Customs procedures to assure that beef is not transshipped through the States to Puerto Rico to avoid the new tariffs.

Petitioning Congress to limit imports to Puerto Rico to a percentage of all U.S. quota beef imported from specific Central American countries, if successful, would decrease beef imports from those countries. But these limits would:

- o Violate U.S. international obligations and invite trade-restricting retaliation by trading partners against U.S. agricultural exports.
- o Likely cause some States to seek similar protection.
- o Depending on how the limits are enforced, be ineffective if imposition requires that imports first be near trigger levels before the limits are imposed. Imports effectively could be reduced if the limits are automatically in effect for specified countries, regardless of total import levels.
- o Complicate U.S. Customs procedures to assure that beef is not transshipped through the States or other countries to avoid the new quotas.
- o Increase beef imports from other countries and/or beef shipped from the States.
- o Likely increase transportation costs on imports from some countries, as distribution patterns may change.
- o Stress Puerto Rican importers because they operate (are vertically integrated into) beef production and packing operations in Central America.

Petitioning Congress for a specific quota on beef imported to Puerto Rico, if successful, would:

- o Violate U.S. international obligations and invite trade-restricting retaliation by trading partners against U.S. agricultural exports.

- o Likely increase prices of lean beef for producers and consumers.
- o Likely increase inshipments of beef from the States.
- o Likely increase sales of poultry and pork.

Raising direct subsidies for beef cattle production in Puerto Rico would increase government expenditures, be difficult to apply equitably to all types and sizes of producers, and likely precipitate objections or similar requests from other producer groups.

Raising indirect subsidies for cattle production by improving marketing services to reduce marketing costs can be achieved in many ways. For example, encouraging price-reporting and grade-standards services would increase government costs; likely help transactions between packers, wholesalers, retail food services, and retail chain stores; and might help producers obtain the real worth of their animals. Encouraging more efficient marketing could:

- o Reduce employment of intermediaries.
- o Require farmers, or preferably packers, to take title to cattle in the slaughterhouse.
- o Increase the amount of cutting packers do and could also begin a trend of boxing meat. Packers would hire buyers (of live cattle) and salespeople (of meat). Packers would also take on a greater distribution role to control quantity and quality to meet retailer needs.
- o Increase returns to livestock producers and/or lower prices to consumers.

POSSIBILITIES

The following possibilities toward improving the Puerto Rican beef sector are presented only for discussion purposes. Descriptions of how these possibilities could be implemented are beyond the scope of this report.

Improve Marketing and Distributing Beef from the Farm to the Consumer

Working toward fewer, but larger and more efficient, packing plants can market and distribute more and cheaper beef if the plants: buy the cattle they slaughter, purchase on a live- or carcass-weight basis using scales to weigh, and fabricate beef as well as slaughter cattle.

Intermediaries will be forced out of business if fewer, but larger, plants purchase cattle to slaughter; but the packing plant could hire some as cattle buyers or as beef salespeople.

An improved marketing and distributing system would make local beef more desirable and would support two types of live animal markets: direct purchases at the packing plants where producers could call competing plants for price quotes, and open livestock markets, selling mainly nonslaughter animals, although slaughter animals could also be sold to packers. These markets could be auctions or private treaties, but scales would be required. An improved system also requires some grading or differentiation system for market animals.

Provide Help and Subsidies for Local Producers

Provide a subsidy for each male slaughter animal over 900 pounds, but less than 4 years old; for each female slaughter animal over 850 pounds and less than 3 years old; and for any other beef animal over 800 pounds sold for slaughter. The subsidy would decrease for the lighter weights.

These subsidies would help producers compete with imports without directly affecting retail prices. Subsidies could increase or decrease over time to encourage or discourage production. The subsidies would encourage local production to grow. Prices for local beef should then drop below imported beef prices, thereby reducing beef imports.

Other government programs now in effect can continue along with the subsidy program.

Allow Free Entry of Imported Beef and Beef Shipments from the States with the Subsidy Program

Supply and demand forces can work naturally under a free-entry system. The increased local production (encouraged by the subsidies) should reduce imports and inshipments without hurting demand. (If imports and inshipments were forced down abruptly by law, local production would not be able to fill the gap and consumers might shift to substitutes.)

REFERENCES

- (1) Puerto Rico Department of Agriculture, Office of Agricultural Statistics. Facts and Figures on Puerto Rico's Agriculture 1981/82-1982/83. Santurce, PR. 1985.
- (2) _____, Office of Economic Studies. Unpublished working data. Santurce, PR. 1986.
- (3) Puerto Rico Department of Labor, Commonwealth of Puerto Rico. Unpublished working data. Santurce, PR. 1986.
- (4) Puerto Rico Federal Affairs Administration. Puerto Rico, U.S.A., 3rd ed. Washington, DC.
- (5) Puerto Rico Planning Board, Bureau of Economic Analysis. 1983 External Trade Statistics: Puerto Rico. Santurce, PR. May 1985.
- (6) Puerto Rico Tourism Company, Bureau of Economic Analysis. Que' Pasa: Official Visitors Guide to Puerto Rico. Santurce, PR. May 1986.
- (7) The Sorities Group, Incorporated. Soritec Reference Manual Economic Analysis Package Version 1.05. Springfield, VA. 1982.
- (8) U.S. Department of Agriculture, Agricultural Marketing Service. "Let the Grade be your Guide in Buying Food," 1982 Yearbook of Agriculture.
- (9) _____, Food Safety and Inspection Service. Unpublished meat plant inspection data, 1986.

(10) , Foreign Agricultural Service. Foreign Agriculture Circular, Dairy, Livestock and Poultry U.S. Meat Import Law, Supplement 5-85. July 1985.

(11) , Foreign Agricultural Service. Unpublished working data, 1986.

(12) , Human Nutrition Information Service, Food Consumption and Dietary Levels of Households in Puerto Rico, Summer and Fall 1977, 1977/78 Nationwide Food Consumption Survey, Preliminary Report No. 9 (table 6). Hyattsville, MD. June 1982.

(13) U.S. Department of Commerce, Bureau of the Census. 1982 Census of Agriculture, Vol.1 Geographic Area Series, Part 52 Puerto Rico, ACR-A-52. July 1984.

(14) U.S. Department of Commerce, Customs Service. Unpublished working data, 1986.

(15) U.S. International Trade Commission, Annual Report on the Impact of the Caribbean Basin Economic Recovery Act on U.S. Industries and Consumers, USITC Pub. No. 1897. Sept. 1986, pp. 3-4.

Appendix table 1--Quantity and value of selected U.S. and Puerto Rican meats imports (product weight), 1978-85 1/

Meat imported from	Units	1978	1979	1980	1981	1982	1983	1984	1985
Costa Rica to:									
Quantity--									
Puerto Rico	1,000 pounds	14,779	10,399	7,851	13,903	13,863	13,931	17,435	20,796
United States	do.	62,704	71,060	46,013	62,403	52,392	35,025	43,431	54,091
Puerto Rico's share	Percent	23.6	14.6	17.1	22.3	26.5	39.8	40.1	38.4
Total value--									
Puerto Rico	1,000 dollars	12,881	13,138	11,654	19,376	17,109	16,382	20,349	22,327
United States	do.	52,926	85,868	59,893	70,375	53,378	36,928	44,765	51,059
Value per unit--									
Puerto Rico	Dollars per pound	.8716	1.2634	1.4844	1.3937	1.2342	1.1759	1.1671	1.0736
United States	do.	.8441	1.2084	1.3017	1.1278	1.0188	1.0543	1.0307	.9439
Dominican Republic to:									
Quantity--									
Puerto Rico	1,000 pounds	1,668	3,561	2,129	9,243	9,040	7,408	1,562	8,392
United States	do.	1,791	3,784	2,129	10,746	10,992	7,800	1,804	18,280
Puerto Rico's share	Percent	93.1	94.1	100.0	86.0	82.2	95.0	86.6	45.9
Total value--									
Puerto Rico	1,000 dollars	1,634	3,994	2,672	11,689	11,112	8,969	1,892	8,750
United States	do.	1,789	4,268	2,672	13,314	13,175	9,400	2,206	17,469
Value per unit--									
Puerto Rico	Dollars per pound	.9797	1.1215	1.2554	1.2646	1.2292	1.2107	1.2114	1.0427
United States	do.	.9988	1.1278	1.2554	1.2391	1.1986	1.2051	1.2226	.9556
El Salvador to:									
Quantity--									
Puerto Rico	1,000 pounds	155	754	634	83	121	498	405	686
United States	do.	8,450	10,775	4,499	328	2,607	3,604	3,479	2,536
Puerto Rico's share	Percent	1.8	7.0	14.1	25.3	4.6	13.8	11.6	27.1
Total value--									
Puerto Rico	1,000 dollars	163	924	915	93	150	588	493	754
United States	do.	7,958	12,879	5,496	339	2,579	3,603	3,503	2,794
Value per unit--									
Puerto Rico	Dollars per pound	1.0485	1.2256	1.4438	1.1306	1.2398	1.1803	1.2185	1.0996
United States	do.	.9418	1.1952	1.2214	1.0326	.9891	.9996	1.0069	1.1015
Guatemala to:									
Quantity--									
Puerto Rico	1,000 pounds	1,969	5,947	4,333	3,192	1,282	6,604	8,483	11,241
United States	do.	29,626	34,266	19,250	11,550	6,399	19,483	19,477	29,480
Puerto Rico's share	Percent	6.6	17.4	22.5	27.6	20.0	33.9	43.6	38.1
Total value--									
Puerto Rico	1,000 dollars	2,004	7,344	5,570	3,994	1,604	6,126	6,892	8,262
United States	do.	27,136	40,780	23,739	12,898	6,931	17,056	16,411	22,367
Value per unit--									
Puerto Rico	Dollars per pound	1.0177	1.2349	1.2855	1.2510	1.2514	.9277	.8124	.7350
United States	do.	.9160	1.1901	1.2332	1.1167	1.0831	.8754	.8426	.7587
Honduras to:									
Quantity--									
Puerto Rico	1,000 pounds	13,056	12,210	15,496	16,686	13,997	15,772	10,731	5,174
United States	do.	42,956	61,542	58,043	48,265	35,398	36,341	22,394	14,565
Puerto Rico's share	Percent	30.4	19.8	26.7	34.6	39.5	43.4	47.9	35.5
Total value--									
Puerto Rico	1,000 dollars	10,733	12,149	16,219	17,237	15,338	16,503	11,731	4,952
United States	do.	36,742	62,617	63,542	49,549	35,496	35,594	21,930	11,818
Value per unit--									
Puerto Rico	Dollars per pound	.8220	.9950	1.0466	1.0330	1.0958	1.0464	1.0931	.9570
United States	do.	.8553	1.0175	1.0947	1.0266	1.0028	.9794	.9793	.8114
Nicaragua to:									
Quantity--									
Puerto Rico	1,000 pounds	11,801	6,569	6,387	4,078	5,121	3,454	1,649	2,860
United States	do.	68,161	74,416	46,031	19,069	30,363	26,973	10,513	12,909
Puerto Rico's share	Percent	17.3	8.8	13.9	21.4	16.9	12.8	15.7	22.2
Total value--									
Puerto Rico	1,000 dollars	12,828	8,915	10,118	5,543	6,405	3,986	1,768	2,915
United States	do.	63,937	92,024	62,517	22,238	32,159	27,080	9,770	11,881
Value per unit--									
Puerto Rico	Dollars per pound	1.0870	1.3571	1.5841	1.3592	1.2508	1.1541	1.0722	1.0194
United States	do.	.9380	1.2366	1.3581	1.1662	1.0591	1.0040	.9293	.9204

1/ The U.S. data include data for Puerto Rico (and all U.S. territories).
Source: Tabulated from U.S. Department of Commerce data (14).

Appendix table 2--Tariffs for meats subject to import controls
under U.S. Meat Import Act (P.L. 96-177)

Schedule 1. Animal and vegetable products: Part 2, Meats

TSUSA
number

Most
favored
nation (MFN)
duty

Subpart B. - Meats other than bird meat

Subpart B headnote:

1. For the purposes of this subpart--

(a) The term "fresh, chilled, or frozen" covers meats even though completely detendonized and deboned, but does not cover meats which have been prepared or preserved; and
(b) The term "prepared or preserved" covers meats even if in a fresh, chilled, or frozen state if such meats have been ground or comminuted, diced or cut into sizes for stew meat or similar uses, rolled and skewered, or specially processed into fancy cuts, special shapes, or otherwise made ready for particular uses by the retail consumer; and also covers meats which have been subjected to processes such as drying, curing, smoking, cooking, seasoning, flavoring, or to any combination of such processes.

Meat (except meat offals), fresh, chilled, or frozen, of all animals (except birds):

106.10	Cattle.....	2¢ per lb.
	Beef, with bone:	
106.1020	Fresh or chilled.....	
106.1040	Frozen.....	
106.1060	Beef, without bone.....	
106.1080	Other (veal).....	
106.22	Sheep (except lambs).....	
106.25	Goats.....	1.7¢ per lb. 0.6¢ per lb.
	Beef and veal, prepared or preserved (except sausages):	
	Valued not over 30 cents per pound.....	
	Valued over 30 cents per pound.....	
	Beef in airtight containers:	
	Corned beef.....	
	In containers holding not more than 2 pounds.....	
	In containers holding more than 2 pounds.....	
	Others.....	
	In containers holding not more than 2 pounds.....	
	In containers holding more than 2 pounds.....	
	Others:	
107.55	Valued not over 30 cents per pound.....	2¢ per lb.
	Valued over 30 cents per pound:	
	Prepared, whether fresh, chilled, or frozen, but not otherwise preserved:	
107.61	Beef specially processed into fancy cuts, special shapes, or otherwise made ready for particular uses by the retail consumer (but not ground or comminuted, diced or cut into sizes for stew meat or similar uses, or rolled or skewered) which meets the specifications in regulations issued by the U.S. Department of Agriculture for Prime or Choice beef, and which has been so certified prior to exportation by an official of the government of the exporting country, in accordance with regulations issued by the Secretary of the Treasury after consultation with the Secretary of Agriculture.....	4% ad val.
107.62	Other.....	10% ad val.

Note: Only those items whose tariff numbers appear in the left column are subject to import controls under the U.S. Meat Import Act. Of those items, imports from those countries eligible under the Caribbean Basin Economic Recovery Act enter with zero duty.

Source: Copied from (10).

Appendix table 3--Import and export codes used for meats

Meats	-----Imports <u>1/</u> -----	-----Exports <u>2/</u> -----
Quota meats	1061020 1075500 1061040 1076100 1061060 1076200	1061080 1062200 1062500 1061080 1076200 1061025 1061060 1061080 1076200 0111010 0111020 1073820 1073840
Beef and veal	1061020 1061040 1061060 1061080 1075500 1076020 1072000 1072520 1074000 1074500 1074820 1074840	1075000 1075020 1075040 1075060 1075080 1075220 1075240 1076040 1076100 1076200 1076300 1075000 1075020 1075040 1075060 1075080 1075220 1075240 1076040 1076100 1076200 1076300 0111010 0111020 1061025 1061060 1061080 1073820 1073840
Pork	1064020 1064040 1071000 1071500 1073020 1073040	1073060 1073515 1073520 1073525 1073540 1073560 1073060 1073515 1073520 1073525 1073540 1073560 1064020 1064040 1071000 1071500 1073020 1073040 1064060 1073715 0113010 0113020 0113030 1064020 1064040 1073725 1073740 1073750 1073770 0121020 0121030 0121040 1073725 1073740 1073750 1073770 0121010
Mutton, goat, and lamb	1062020 1062040 1062200 1062500	1063000 1077520 1077600 1062000 1062500
Poultry	1051000 1052000 1053000 1054000 1055000	0114005 0114010 0114015 0114020 0114025 1054120 1054140 1054160 0114030 0114033 0114038 1055120 1055140 0114040 1056100 0129015 0138010 0138040 1058100 1058300

1/ Import codes are seven-digit Tariff Schedules of the United States Annotated (TSUSA) commodity codes.

2/ Export codes are seven-digit Schedule B commodity codes.

Appendix table 4--Selected U.S. and Puerto Rican meat exports (product weight), 1985 1/

Exporter and importer	Beef with bone fresh or frozen (1061025)	Boneless beef fresh or frozen (1061060)	Prepared beef (1073820)	Meat and offals (1076200)	Veal fresh or frozen (1061080)	Prepared veal (1073840)	Total	Puerto Rico's share of U.S. exports
<u>1,000 pounds</u>								
<u>Percent</u>								
U.S. exports to:								
West Germany	95	156	114	--	--	--	365	5.0
Haiti	24	4	23	9	1	--	61	41.3
Netherlands Antilles	32	391	1,046	79	17	8	1,573	1.9
Trinidad and Tobago	81	28	329	24	3	--	465	51.9
Japan	5,721	173,021	2,834	65	447	27	182,116	--
Leeward and Windward Islands	147	245	175	389	2	4	963	27.6
All countries	20,588	196,393	12,628	5,958	3,304	307	239,179	.3
Puerto Rican exports to:								
West Germany	18	--	--	--	--	--	18	NA
Haiti	24	--	1	--	--	--	25	NA
Netherlands Antilles	1	--	--	29	--	--	30	NA
Trinidad and Tobago	64	--	177	--	--	--	241	NA
Japan	--	40	--	--	--	--	40	NA
Leeward and Windward Islands	46	5	1	214	--	--	266	NA
All countries	153	45	179	243	--	--	620	NA

-- = Few, negligible, or none.

NA = Not applicable.

1/ Only countries to which Puerto Rico exports are listed (all countries receiving U.S. exports are combined). The U.S. data include data for Puerto Rico (and all U.S. territories).

Source: Tabulated from U.S. Department of Commerce data (14).

Appendix table 5--Price, quantity, and value of U.S. and Puerto Rican meat exports (product weight) subject to the U.S. Meat Import Act, 1978-85 1/

Year	Unit price		Quantity		Value	
	Puerto Rico	United States	Puerto Rico	United States	Puerto Rico	United States
	<u>--Dollars per pound--</u>				<u>---1,000 pounds--</u>	
1978	1.358	1.589	711	122,202	965	194,148
1979	1.656	1.890	740	122,761	1,226	233,068
1980	1.563	1.828	907	131,494	1,417	240,345
1981	1.423	1.775	507	160,352	721	284,621
1982	1.498	1.996	1,272	178,503	1,904	356,239
1983	1.963	1.924	717	194,239	1,407	373,691
1984	1.504	1.916	841	237,393	1,264	454,728
1985	1.169	1.923	620	239,179	725	459,814

1/ U.S. data include data for Puerto Rico (and all U.S. territories).

Source: Tabulated from U.S. Department of Commerce data (14).

Appendix table 6--Price, quantity, and value of selected U.S. and Puerto Rican meat exports (product weight), 1978-85 1/

Year	Beef and veal						Pork					
	Unit price		Quantity		Value		Unit price		Quantity		Value	
	Puerto Rico	United States	Puerto Rico	United States	Puerto Rico	United States	Puerto Rico	United States	Puerto Rico	United States	Puerto Rico	United States
	<u>Dollars per pound</u>		<u>---1,000 pounds---</u>		<u>---1,000 dollars---</u>		<u>Dollars per pound</u>		<u>---1,000 pounds---</u>		<u>---1,000 dollars---</u>	
1978	1.243	1.598	947	121,296	1,177	193,801	0.519	1.029	1,429	220,825	741	227,148
1979	1.601	1.910	901	126,550	1,442	241,699	.700	1.060	2,498	214,692	1,750	227,521
1980	1.745	1.900	865	131,179	1,510	249,346	.702	1.020	9,109	185,665	6,395	189,340
1981	1.624	1.822	485	164,612	787	299,995	.655	1.137	15,675	222,413	10,268	252,964
1982	1.425	1.976	1,315	188,860	1,874	373,190	.698	1.230	9,902	153,165	6,914	188,486
1983	1.516	1.910	1,348	205,126	2,043	391,821	.489	1.175	4,369	156,110	2,136	183,486
1984	1.505	1.910	1,191	245,875	1,793	469,593	.529	.978	1,877	115,835	993	113,288
1985	1.327	1.935	550	241,459	730	467,179	.425	.846	3,312	89,778	1,407	75,983
39												
	Mutton, lamb, and goat						Poultry					
Year	Unit price		Quantity		Value		Unit price		Quantity		Value	
	Puerto Rico	United States	Puerto Rico	United States	Puerto Rico	United States	Puerto Rico	United States	Puerto Rico	United States	Puerto Rico	United States
	<u>Dollars per pound</u>		<u>---1,000 pounds---</u>		<u>--1,000 dollars--</u>		<u>Dollars per pound</u>		<u>---1,000 pounds---</u>		<u>---1,000 dollars---</u>	
1978	0.785	1.343	21	3,032	17	4,073	0.346	0.496	17,671	428,515	6,116	212,641
1979	2.139	1.650	7	1,238	16	2,043	.428	.527	23,715	516,997	10,139	272,572
1980	4.159	1.736	2	1,311	10	2,276	.475	.538	16,432	748,001	7,808	402,338
1981	.684	1.296	12	2,142	8	2,775	.514	.561	15,796	862,847	8,120	483,679
1982	.546	1.563	80	1,490	44	2,329	.457	.503	13,250	610,788	6,049	306,958
1983	2.470	1.678	8	1,392	20	2,336	.399	.524	11,629	524,131	4,636	274,691
1984	2.000	1.705	7	1,935	14	3,300	.355	.560	19,044	495,461	6,763	277,345
1985	.833	2.117	30	1,014	25	2,146	.402	.489	17,918	495,466	7,199	242,019

1/ U.S. data include data for Puerto Rico (and all U.S. territories).

Source: Tabulated from U.S. Department of Commerce data (14).

Appendix table 7—Price, quantity, and value of U.S. and Puerto Rican meat imports (product weight), 1978-85 1/

Year	Beef and veal						Pork					
	Unit price		Quantity		Value		Unit price		Quantity		Value	
	Puerto Rico	United States	Puerto Rico	United States	Puerto Rico	United States	Puerto Rico	United States	Puerto Rico	United States	Puerto Rico	United States
	<u>Dollars per pound</u>		<u>----1,000 pounds----</u>		<u>----1,000 dollars----</u>		<u>Dollars per pound</u>		<u>---1,000 pounds---</u>		<u>---1,000 dollars---</u>	
1978	0.906	0.778	53,154	1,655,385	48,172	1,287,368	1.404	1.437	9,064	346,788	12,724	498,327
1979	1.153	1.132	52,261	1,737,136	60,228	1,966,903	1.263	1.319	10,345	361,100	13,065	476,169
1980	1.332	1.149	50,671	1,549,374	67,496	1,780,234	1.263	1.122	11,648	433,403	14,710	486,172
1981	1.259	1.059	58,356	1,329,025	73,481	1,407,622	1.309	1.144	8,950	431,568	11,713	493,892
1982	1.173	.934	58,433	1,460,169	68,549	1,363,773	1.370	1.209	11,293	498,306	15,476	602,205
1983	1.080	.963	63,755	1,414,978	68,862	1,362,913	1.181	1.100	15,485	555,062	18,284	610,646
1984	1.047	.937	54,862	1,311,035	57,450	1,228,394	.995	.963	20,293	784,257	20,190	754,917
1985	.950	.855	68,067	1,492,654	64,649	1,276,457	.956	.922	22,552	934,402	21,558	861,237
+												
	Mutton, lamb, and goat						Poultry					
Unit price	Quantity		Value		Unit price	Quantity		Value		Unit price	Value	
	Puerto Rico	United States	Puerto Rico	United States		Puerto Rico	United States	Puerto Rico	United States		Puerto Rico	United States
	<u>Dollars per pound</u>		<u>--1,000 pounds--</u>		<u>--1,000 dollars--</u>		<u>Dollars per pound</u>		<u>--1,000 pounds--</u>		<u>---1,000 dollars---</u>	
1978	0.908	0.790	377	38,848	342	30,697	NA	0.601	NA	14	NA	9
1979	1.195	.936	245	43,760	292	40,972	NA	1.075	NA	109	NA	117
1980	1.239	1.077	220	34,131	273	36,755	NA	.347	NA	735	NA	255
1981	1.471	1.203	202	31,711	296	38,133	NA	.741	NA	55	NA	40
1982	1.421	1.357	88	19,281	125	26,170	NA	.641	NA	202	NA	129
1983	1.122	1.228	378	19,514	424	23,970	NA	.471	NA	695	NA	328
1984	.815	.750	32	19,443	26	14,577	NA	1.331	NA	147	NA	196
1985	.584	.962	595	34,899	348	33,583	NA	.410	NA	1,156	NA	474

NA = Not applicable.

1/ The U.S. data include data for Puerto Rico (and all U.S. territories).

Source: Tabulated from U.S. Department of Commerce data (14).

Appendix table 8—Price, quantity, and value of meat shipments (product weight) from the States to Puerto Rico,
1970-85

Year 1/	Beef and veal			Pork			Lamb			Poultry (including turkey)		
	Unit price	Quantity	Value	Unit price	Quantity	Value	Unit price	Quantity	Value	Unit price	Quantity	Value
	Dollars per pound	1,000 pounds	1,000 dollars	Dollars per pound	1,000 pounds	1,000 dollars	Dollars per pound	1,000 pounds	1,000 dollars	Dollars per pound	1,000 pounds	1,000 dollars
1970	0.714	38,010	27,135	0.402	82,059	33,012	0.502	2,997	1,504	0.330	85,056	28,056
1971	.710	43,985	31,242	.373	89,137	33,247	.480	3,142	1,507	.335	93,141	31,167
1972	.779	34,003	26,489	.474	91,605	43,414	.599	1,564	937	.342	104,138	35,655
1973	.974	38,265	37,272	.590	80,786	47,624	.800	924	739	.456	100,608	45,911
1974	.907	39,161	35,521	.620	75,706	46,910	.607	1,235	750	.484	107,093	51,827
1975	.829	41,280	36,445	.733	84,033	61,552	.557	2,059	1,147	.532	125,066	66,562
1976	.975	52,429	51,117	.708	86,221	61,079	.620	1,661	1,030	.503	144,388	72,559
1977	.990	48,676	48,181	.660	88,665	58,535	.580	902	523	.479	137,057	65,666
1978	.990	45,658	45,183	.773	98,517	76,109	.960	405	387	.516	159,885	82,469
1979	1.197	39,537	47,307	.797	118,407	94,419	1.007	408	411	.542	168,392	91,177
1980	1.222	41,450	50,637	.838	127,061	106,418	.982	828	813	.563	173,291	97,543
1981	1.242	37,616	46,708	.873	120,003	104,769	1.218	243	296	.574	169,720	97,441
1982	1.244	43,703	54,369	.965	106,248	102,539	.975	436	425	.526	161,599	85,040
1983	1.211	32,808	39,713	.887	103,045	91,431	1.278	273	349	.532	155,074	82,461
1984	1.311	35,476	46,495	.956	103,703	99,139	1.172	296	347	.562	166,498	93,575
1985	1.118	38,642	43,206	.923	94,912	87,602	1.486	35	52	.564	176,142	99,419

1/ Pre- and post-1978 data are not comparable. For example, lamb data included numbers for goats before 1978.

Source: Tabulated from U.S. Department of Commerce data (14).

Appendix table 9--Prices of Costa Rican beef exports (as the beef leaves Costa Rica) to Puerto Rico and the United States, quarterly 1978-85 1/

Importer and year	Quarter				Yearly average	
	1	2	3	4		
<u>Dollars per pound 2/</u>						
Puerto Rico:						
1978	0.822	0.832	0.920	0.925	0.872	
1979	1.079	1.293	1.413	1.420	1.263	
1980	1.510	1.414	1.399	1.526	1.484	
1981	1.432	1.385	1.405	1.336	1.393	
1982	1.141	1.417	1.380	1.279	1.236	
1983	1.195	1.243	1.230	1.106	1.176	
1984	1.213	1.181	1.046	1.136	1.167	
1985	1.130	.997	1.116	1.048	1.074	
The United States:						
1978	.709	.836	.854	.936	.843	
1979	1.081	1.336	1.222	1.278	1.208	
1980	1.339	1.255	1.302	1.259	1.295	
1981	1.175	1.106	1.160	1.056	1.127	
1982	.985	1.054	1.189	1.038	1.019	
1983	1.060	1.100	1.121	1.012	1.054	
1984	1.047	1.080	1.020	.981	1.031	
1985	1.035	.938	.926	.907	.951	

1/ Data are for import item 1061060, boneless beef (fresh and chilled).

2/ Product weight.

Source: Tabulated from U.S. Department of Commerce data (14).

Appendix table 10--Value of animals and animal products (product weight) moved in and out of Puerto Rico, FY 1984/85

Products	Products from--			Products to--		
	The States	Foreign countries	Total	The States	Foreign countries	Total
<u>1,000 dollars</u>						
Live animals	4,685	10	4,695	2,360	113	2,473
Meat and meat products	301,475	87,380	388,855	7,659	12,403	20,062
Dairy products and eggs	182,396	6,999	189,395	7,445	17,984	25,429
Fish and shellfish	41,935	232,737	274,672	556,105	2,787	558,892
Animal feed	30,328	14,703	45,031	39,665	5,943	45,608
Total	560,819	341,829	902,648	613,234	39,230	652,464

Source: (2).

Appendix table 11--Land use in Puerto Rico, FY 1983/84-84/85

Land use	Area	
	FY 1983/84	FY 1984/85 1/
<u>Cuerdas 2/</u>		
Total agricultural land	1,771,706	1,763,413
Cropland	333,365	325,896
Sugar cane	60,318	60,583
Coffee	115,000	115,000
Tobacco	670	477
Pineapples	4,191	4,271
Pigeon peas	11,500	11,000
Rice	4,287	4,616
Other crops	<u>3/</u> 137,399	<u>3/</u> 129,949
Pasture land	847,179	846,091
Improved pasture	303,877	295,434
Natural clean	202,574	204,009
Unimproved pasture	<u>4/</u> 340,728	<u>4/</u> 346,648
Forest and brush	363,696	365,919
Forest reservation	90,000	90,000
Other land	137,466	135,507

1/ Preliminary. 2/ One cuerda equals 0.9712 acres. 3/ Includes acreage in starchy leafy vegetables and fruit. 4/ Includes fallow land and abandoned farms.

Source: (2).

Appendix table 12--Size distribution of commercial beef herds in Puerto Rico

Farm beef cattle inventory	Farms	Average inventory per farm	Total inventory
		<u>Number</u>	
30-99	420	56	23,410
100-199	145	137	19,801
200-399	80	274	21,935
400 or more	36	921	33,149
Total	681	144	98,295

Source: (2).

Appendix table 13--Average prices of local beef in Puerto Rico's seven main markets (live carcass weight), FY 1977/78-84/85 1/

Year	Cows, bulls, oxen	Heifers	Veal	Weighted average price
<u>Dollars per hundredweight</u>				
1977/78	71.00	89.00	95.00	84.09
1978/79	77.00	95.00	101.00	90.82
1979/80	109.00	126.00	129.00	121.20
1980/81	123.60	139.61	142.72	135.66
1981/82	122.64	140.57	146.75	135.93
1982/83	119.64	138.38	149.29	134.48
1983/84	117.01	136.89	149.77	132.02
1984/85	111.00	131.00	146.00	126.88

1/ Prices are those received by intermediaries at Ponce, Caguas, Santurce, Bayamon, Mayaguez, Arecibo, and Rio Piedras collected by market observers.
 Source: Tabulated from U.S. Department of Commerce data (14).

Appendix table 14--Production, farm price, and value of Puerto Rican beef, pork, and other meats
(carcass weight), FY 1957/58-84/85

Year	Beef			Pork			Other meats 1/		
	Weight	Price	Value	Weight	Price	Value	Weight	Price	Value
	1,000 pounds	Dollars per pound	\$1,000	1,000 pounds	Dollars per pound	\$1,000	1,000 pounds	Dollars per pound	\$1,000
1957/58	31,591	0.359	11,338	20,405	0.324	6,615	1,122	0.567	637
1958/59	33,354	.369	12,291	21,075	.318	6,695	1,085	.577	625
1959/60	28,268	.417	11,793	21,617	.348	7,512	1,041	.570	593
1960/61	29,331	.425	12,460	23,276	.324	7,546	1,037	.584	606
1961/62	29,869	.410	12,258	24,024	.340	8,168	1,039	.558	580
1962/63	33,087	.422	13,976	25,302	.343	8,683	1,028	.558	573
1963/64	35,478	.412	14,606	25,060	.349	8,733	843	.623	525
1964/65	40,524	.412	16,712	26,790	.349	9,339	826	.680	562
1965/66	44,516	.424	18,857	26,954	.352	9,490	831	.684	568
1966/67	44,707	.433	19,367	26,973	.361	9,745	822	.728	598
1967/68	42,304	.441	18,639	28,070	.371	10,403	841	.726	611
1968/69	39,903	.478	19,062	30,754	.390	11,997	826	.757	625
1969/70	39,910	.521	20,781	28,971	.427	12,356	836	.812	678
1970/71	44,500	.549	24,439	29,500	.554	16,328	800	.843	674
1971/72	45,800	.531	24,329	31,300	.542	16,952	870	.863	751
1972/73	47,195	.535	25,268	33,137	.526	17,427	885	.889	787
1973/74	49,119	.660	32,399	32,165	.642	20,637	895	.959	859
1974/75	44,207	.726	32,076	34,105	.699	23,850	990	.968	958
1975/76	46,417	.718	33,341	40,927	.769	31,481	1,059	1.001	1,061
1976/77	46,451	.697	32,367	43,649	.751	32,759	1,110	1.011	1,122
1977/78	56,059	.687	38,507	56,747	.728	41,312	1,286	1.011	1,300
1978/79	62,011	.738	45,783	51,232	.806	41,308	1,312	1.137	1,491
1979/80	48,676	.911	44,344	35,753	.856	30,611	1,277	1.140	1,455
1980/81	37,748	.930	35,098	41,581	.792	32,920	1,219	1.140	1,415
1981/82	37,400	1.066	39,853	44,600	.817	36,447	970	1.410	1,370
1982/83	46,737	1.044	48,793	36,518	.864	31,559	994	1.530	1,528
1983/84	53,772	.979	52,627	33,999	.893	30,368	952	1.565	1,490
1984/85*	53,928	.934	50,390	39,661	.890	35,314	935	1.583	1,481

* = Preliminary.

1/ Includes goats, rabbits, and fowls (except broilers).

Sources: (1 and 2).

Appendix table 15--Hog inventory by type of farm in
Puerto Rico, 1951-83

Year 1/	All farms	Commercial farms 2/	Other farms
<u>Number of animals</u>			
1951	118,491	2,773	115,718
1952	133,976	6,216	127,760
1953	135,525	6,163	129,362
1954	145,903	6,688	139,215
1955	143,596	9,958	133,638
1956	139,470	9,621	129,849
1957	141,890	9,789	132,101
1958	150,768	15,665	135,103
1959	155,155	16,273	138,882
1960	152,861	16,109	136,752
1961	163,411	22,970	140,441
1962	164,330	17,825	146,505
1963	163,376	15,019	148,357
1964	154,057	15,080	138,977
1965	161,743	14,877	146,866
1966	176,482	14,780	161,702
1967	180,170	15,842	164,328
1968	183,502	18,138	165,364
1969	193,842	19,951	173,891
1970	191,031	13,518	177,513
1971	198,070	16,058	182,012
1972	210,401	24,908	185,493
1973	223,695	32,307	191,388
1974	223,327	32,627	190,700
1975	243,902	33,900	210,002
1976	269,304	40,531	228,773
1977	332,241	84,209	248,032
1978	279,371	93,254	186,117
1979	232,030	59,368	172,662
1980	212,151	53,549	158,602
1981	230,311	65,935	164,376
1982	215,964	57,098	158,866
1983*	205,597	49,221	156,376

* = Preliminary.

1/ January survey.

2/ Farms farrowing 10 or more sows or having 15 or more pigs over 6 months old.

Source: (1).

Appendix table 16--Puerto Rico's expenditures for incentives to
beef cattle enterprises, FY 1983/84 and 1984/85 1/

Incentives	1983/84	1984/85
<u>Dollars</u>		
Breeding calves (raise the dairy calf for beef)	281,610	300,000
Replacement breeding cows	585,260	200,000
Structures (including fences)	58,834	75,000
Salary incentives	2,559,902	2,185,680
Fertilizers	137,781	142,000
Total	3,623,387	2,902,680

1/ Preliminary data.

Source: (2).

Appendix table 17--Cattle inventory and beef and veal production in selected Caribbean Basin countries 1/

Country	Cattle inventory	Beef and veal production
	<u>1,000 head</u>	<u>Million pounds</u>
Honduras	2,824	84
Guatemala	2,587	126
Costa Rica	2,553	139
Dominican Republic	1,922	121
Panama	1,423	117
El Salvador	929	49

1/ The cattle inventory is as of January 1, 1986. Beef and veal production is for 1985.

Source: (15).

Appendix table 18--Average retail prices for meat (retail weight) in Puerto Rico, FY 1980/81-84/85

Beef	1980/81	1981/82	1982/83	1983/84	1984/85
<u>Dollars per pound</u>					
Puerto Rican beef:					
Sirloin steak, sliced	3.23	3.26	3.26	3.20	3.13
Round steak, sliced	2.77	2.81	2.73	2.68	2.65
Boneless meat stew	2.25	2.29	2.24	2.17	2.12
Average	2.75	2.79	2.74	2.68	2.63
Imported beef:					
Sirloin steak, sliced	2.98	2.79	2.85	2.75	2.85
Round steak, sliced	2.57	2.61	2.58	2.54	2.58
Boneless meat stew	2.24	2.16	2.39	2.23	2.27
Average	2.60	2.52	2.61	2.51	2.57

Source: (3).

Appendix table 19--U.S. Customs Service accounts of meat
subject to the U.S. Meat Import Act 1/

Exporters	Cumulative approximate quantities	
	1985	1986 (preliminary)
<u>1,000 pounds</u>		
Australia	595,845	668,294
Belize	263	189
Canada	187,762	169,947
Costa Rica	54,660	68,965
Dominican Republic	18,860	25,106
El Salvador	1,664	649
Guatemala	28,229	7,731
Haiti	46	--
Honduras	15,116	20,824
Mexico	--	--
New Zealand	398,036	364,016
Nicaragua	3,914	--
Panama	118	90
Sweden	3,444	7,008
European Community	9,725	6,172
Guam	531	343
Total	1,318,213	1,339,334

-- = Few, or negligible, or none.

1/ The U.S. Meat Import Act (P.L. 96-177) covers fresh (chilled or frozen) beef, veal, mutton, and goat meat, and certain prepared items. It excludes canned meat and certain other prepared or preserved meat products.

Source: (11).