RESEARCH OPPORTUNITIES IN BEEF EXPORT MARKETS: UNITED STATES AND PACIFIC RIM COUNTRIES

Proceedings of An

International Symposium

Sponsored by

W-177 Western Regional Beef Research Project

and Farm Foundation, Chicago, Illinois

Hosted by

University of Arizona

Tucson, Arizona

November 19 and 20, 1986

Published June 1987

Report Number 621

THE BEEF INDUSTRIES OF SOUTH KOREA AND TAIWAN AND OPPORTUNITIES FOR BEEF EXPORT RESEARCH*

Gary W. Williams**

Abstract

Rapid economic growth has led to a rapid increase in beef consumption in both Taiwan and South Korea. Although increasing, beef production has lagged behind consumption providing an incentive to import. A number of barriers, however, currently limit U.S. access to those markets. The research required to reduce or eliminate each barrier is discussed.

---

*Invited Paper, International Symposium of Research Opportunities in Beef Export Markets: United States and Pacific Rim Countries, Tucson, Arizona, November 19-20, 1986.

**Associate Professor of Economics and Assistant Coordinator of the Meat Export Research Center, Iowa State University, Ames, Iowa.

THE BEEF INDUSTRIES OF SOUTH KOREA AND TAIWAN AND OPPORTUNITIES FOR BEEF EXPORT RESEARCH*

Gary W. Williams**

Both researchers and policymakers in the United States have focused largely on the potential of Japan as the major foreign market for U.S. beef and beef products. Meanwhile, however, economic growth in several middle income countries has induced a significant shift in their food consumption patterns away from traditional, low-value products like rice toward higher quality, value-added products like beef. In the Pacific Rim area, Taiwan and South Korea have recently emerged as newly industrialized countries with rapidly growing livestock and meat markets. Nevertheless, little is known in this country about the behavior of meat producers, processors, distributors, or consumers in either Taiwan or South Korea, government policies that affect the growth and structure of their markets, or other aspects of their potential as markets for U.S.-produced beef.

This paper focuses on the cattle and beef industries in both Taiwan and South Korea with two major objectives: 1) to identify the major economic and noneconomic forces that shape behavior in those markets, and 2) to define the research agenda related to U.S. exports of beef to both markets. Consequently, following a discussion of the economic structure and policy environment of the cattle and beef markets in Taiwan and South Korea, the paper identifies the major barriers facing U.S. beef exports to those markets and the related research issues. The paper concludes with some summary comments.

Cattle and Beef Industry of Taiwan[1]

There are three different breeds of cattle in Taiwan: (1) yellow and hybrid cattle, (2) dairy cattle, and (3) buffalo cattle. Until 1970, most cattle were used largely as draft animals. With increasing

---

*Invited paper, International Symposium on Research Opportunities in Beef Export Markets: United States and Pacific Rim Countries, Tucson, Arizona, November 19-20, 1986.

**Associate Professor of Economics and Assistant Coordinator of the Meat Export Research Center, Iowa State University, Ames, Iowa.

industrialization and farm mechanization in Taiwan over the last two decades, however, cattle inventories began to decline rapidly. In 1960, the number of buffalo cattle was about 325,000 head, accounting for nearly 80% of total cattle numbers. By 1982, however, buffalo cattle numbers dropped to about 47,000 head, accounting for only 36% of the total. Similarly, the number of yellow and hybrid cattle dropped from 93,033 head (22%) in 1960 to 49,555 head (38%) in 1982. Nevertheless, the use of yellow and hybrid cattle for beef rather than draft purposes has increased over time. In 1961, the number of beef cattle was only 144 head, accounting for less than 0.04% of total cattle numbers. By 1977, beef cattle numbers had jumped to 61,539 head, accounting for more than 22% of total numbers. Increasing demand for beef in Taiwan has brought increasing imports of cheap beef from Australia, however, and a sharp reduction in beef cattle numbers since 1977 to about 20,000 head in 1985.

In contrast, dairy cattle numbers have grown steadily over the past two decades, except for a small decline in 1978 and 1979 as a result of the Australian beef imports. The number of dairy cattle jumped from 3,024 head (0.7% of total cattle numbers) in 1960 to 51,990 head (36.3% of total cattle numbers) in 1985.

Beef Cattle Supply

The remarkably rapid growth of the beef cattle industry in Taiwan over the last decade can be attributed to a number of factors (Whan). First, with rapid economic development and industrialization in Taiwan, there developed an acute shortage of farm labor as workers migrated to urban areas to find employment in factories. The result has been an increasing incentive to mechanize farm operations as a labor-saving technique. In the process, the supply of beef increased as the number of cattle required for draft purposes dropped precipitously.

Second, the sustained increases in per capita income achieved during the process of economic development prompted an up-grading of Taiwanese diets. The increasing supply of beef from draft cattle allowed a significant increase in the proportion of animal protein consumed. Third, farm mechanization also released the feed for draft cattle for consumption by beef cattle. Finally, a number of government programs fostered growth of the beef cattle industry, including the sloping land development program,

the dual purpose for beef and draft cattle program, and the specialized beef and dairy villages program (see Gong and Williams for more detail). Under pressure from Australian beef, the Taiwanese industry has contracted significantly in recent years despite continuing government efforts to foster growth.

Dairy Cattle Supply

In the early 1960's, the Taiwanese government promoted a system of small dairy farms by offering government-subsidized loans to farmers to purchase one dairy cow to start business. Also, superior Holstein bulls were introduced from the United States to cross with native cows in order to upgrade milk quality. Dairy cow numbers increased slowly, however, because the program provided an incentive for farmers to cull low-producing cows.

In 1961, the Joint Commission on Rural Reconstruction (JCRR) assisted the Provincial Farmers' Association (PFA) to establish a fluid milk plant and launched a program to promote fresh milk consumption by school children. In 1965, the JCRR initiated a program to promote dairy farming on sloping land in Miaoli. With JCRR technical and financial assistance, milk production increased along with a significant reduction in the cost of production.

In the late 1960's, small farms accounted for only about 1,000 head of milking cows, with a total daily production of 13 metric tons (mt) of milk, all of which went to only one milk plant. Financial and marketing problems have forced the plant to discontinue collecting milk from some areas so the Animal Industry Division of JCRR financed the establishment of a pilot sterilized fluid milk plant in Caughua county. During the early 1970's, following the establishment of the milk plant, the price of raw milk stabilized at a relatively high level, encouraging dairy farmers to improve their management techniques, milk quality, and cattle breeding.

Since the mid-1970's, the consumption of fresh milk and the size of the national dairy herd have been growing steadily. However, the supply of milk has been growing more rapidly than consumption leading to a large surplus. As a remedy, the government has prohibited dairy cattle imports and temporarily dropped the dairy farm program. In addition, about 5,000

mt of surplus milk has been supplied to school children. As an additional measure to remedy the surplus milk situation, the government provided NT $10 million to subsidize milk processing plants for making sweetened condensed milk and powdered milk and to pay interest on bank loans used for purchasing raw milk from the farmers.

Beef Cattle Marketing and Slaughter

In contrast to hogs, the beef marketing system in Taiwan is quite simple. Most cattle dealers are small-scale retailers and butchers who usually purchase one or two head directly from nearby cattle farms, slaughter them, and then sell the beef at retail. Imported beef is sold directly by trade companies to retailers (Liu).

Prior to the influx of Australian beef in the early 1970's, domestic cattle slaughter and beef output were growing steadily (figure 1). The subsequent drop in domestic beef output prompted the government to provide a subsidy to cattle slaughterers beginning in 1975. The strategy was successful in boosting domestic slaughter and beef output until 1977 when increasing pressure from imports forced a cut-back in output from a peak of 16,000 tons in 1977 to 4,000 tons in 1985. Nevertheless, total beef supply increased to a record 32,000 tons in 1985 from only 5,000 tons in the early 1970's.

Beef Imports

Until the early 1970's, almost all beef consumption in Taiwan was supplied from domestic production. However, the government lifted strict import restrictions in 1972 and beef imports began to increase (figure 1). Average imports of beef between 1972 and 1974 were about 1,200 mt, accounting for about 20% of domestic beef consumption. By 1985, imports increased to over 27,000 mt, about 86% of total consumption.

Australia, New Zealand, and the United States are the primary import suppliers of beef to Taiwan (figure 2). Australia currently accounts for about 79% of the total. The U.S. share of Taiwanese imports has been highly unstable, ranging from 18% in 1979 to 3% in 1981. Australia entered the Taiwanese market following a severe drought in Australia that led to a large increase in the number of cattle slaughtered. Some of the surplus Australian beef was shipped to Taiwan leading to a sharp decline in the

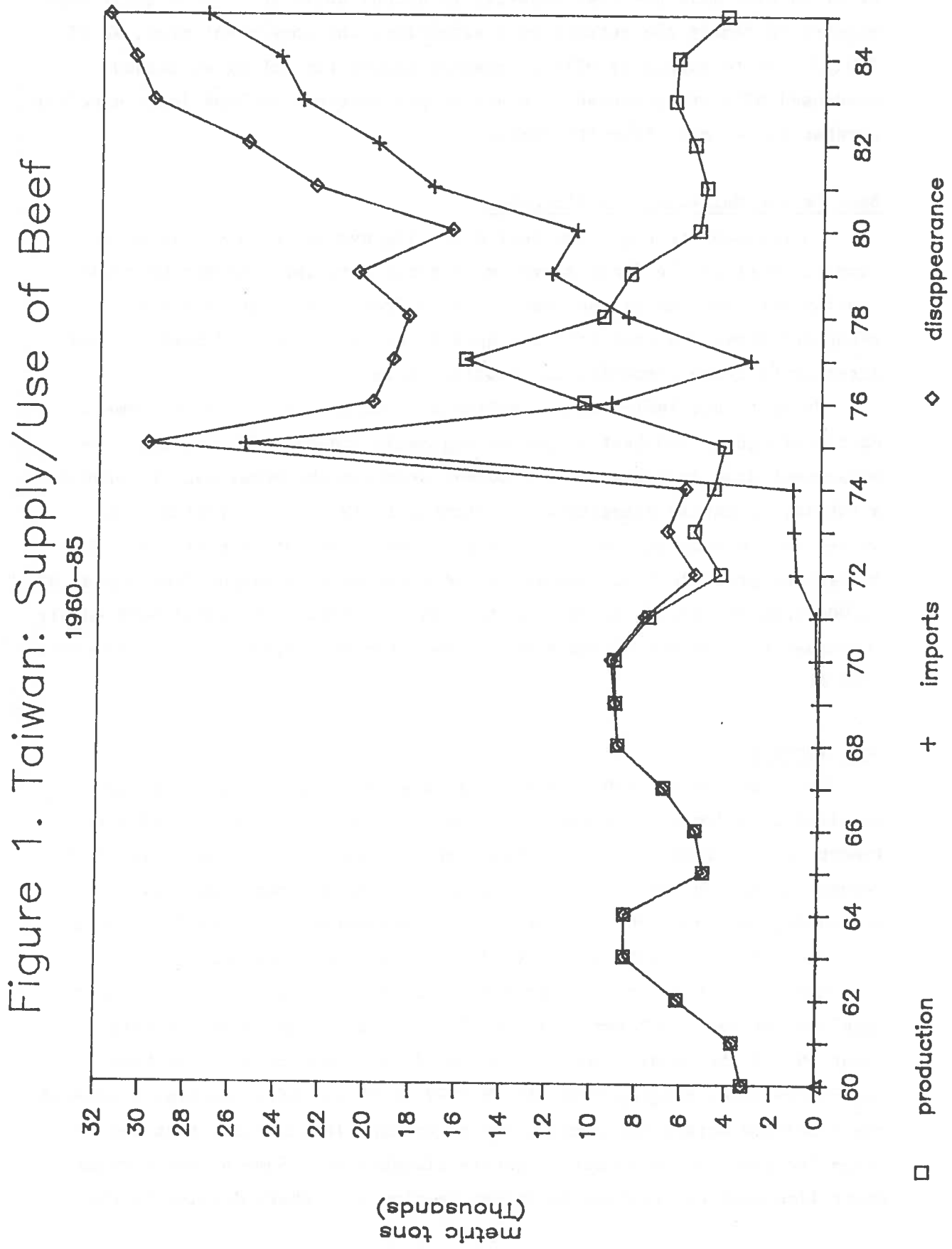


Figure 1. Taiwan: Supply/Use of Beef
1960–85
metric tons
(Thousands)
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
60
62
64
66
68
70
72
74
76
78
80
82
84
production
imports
disappearance

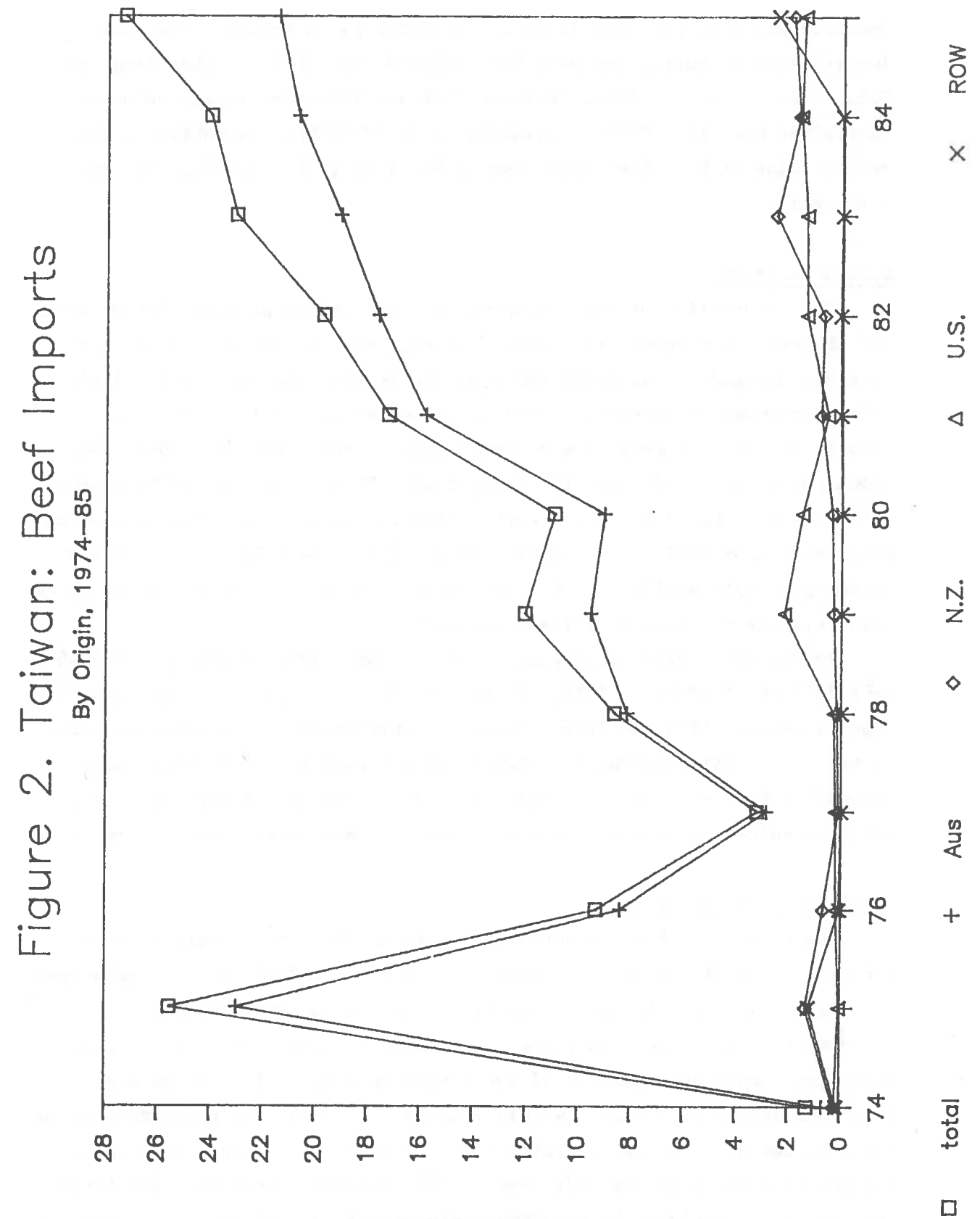


Figure 2. Taiwan: Beef Imports
By Origin, 1974–85
metric tons
(Thousands)
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
74
76
78
80
82
84
□ total
+ Aus
◇ N.Z.
△ U.S.
× ROW

domestic price of beef and in cattle inventories in Taiwan. The unit import value of Australian beef has remained about half of that from the U.S. since the early 1970s. Between 1974 and 1985, the import value of Australian beef rose from US $1.57/kg to US $2.37/kg. In contrast, the import value of U.S. beef rose from US $3.71/kg to US $5.44/kg over the same period.

Demand for Beef

The consumption of beef in Taiwan is less important than that of pork and chicken for a number of reasons. First, meat-eating in general has been discouraged by religious beliefs. Currently, however, such beliefs affect consumption patterns of mainly the older generation. Second, because most cattle were used as draft animals until the mid-1960s, the Taiwanese were unaccustomed to eating beef. Third, the limited land area in Taiwan has restricted the growth of the cattle industy. Finally, with restrictions on beef imports until the mid-1970s, beef has only recently become generally available. As one consequence, the price of beef is quite high relative to those of chicken and pork.

Annual per capita consumption of beef jumped from an average of 0.45 kg in 1970 to 1.62 kg in 1984. A drop in the retail price of beef due to imports between 1975 and 1976 (figure 3) contributed to a tremendous surge in beef consumption during that period (see figure 1). Following some rebound in beef price and a slight drop in consumption, the price of beef has been quite stable since 1981 allowing consumption to continue rising.

Cattle and Beef Policies

The cattle and beef industry in Taiwan has been relatively free of direct government controls in comparison to those industries in neighboring countries like South Korea and Japan. There are currently no direct government controls such as price stabilization schemes or direct producer subsidies. When huge imports of cheap beef from Australia threatened to drive domestic beef prices down significantly in 1975, the government opted for a series of producer subsidies rather than direct import controls as was the case in Japan and South Korea. The subsidies have now been largely eliminated and replaced by programs designed and carried out by the PFAs to foster development of the cattle industry. These include the sloping land

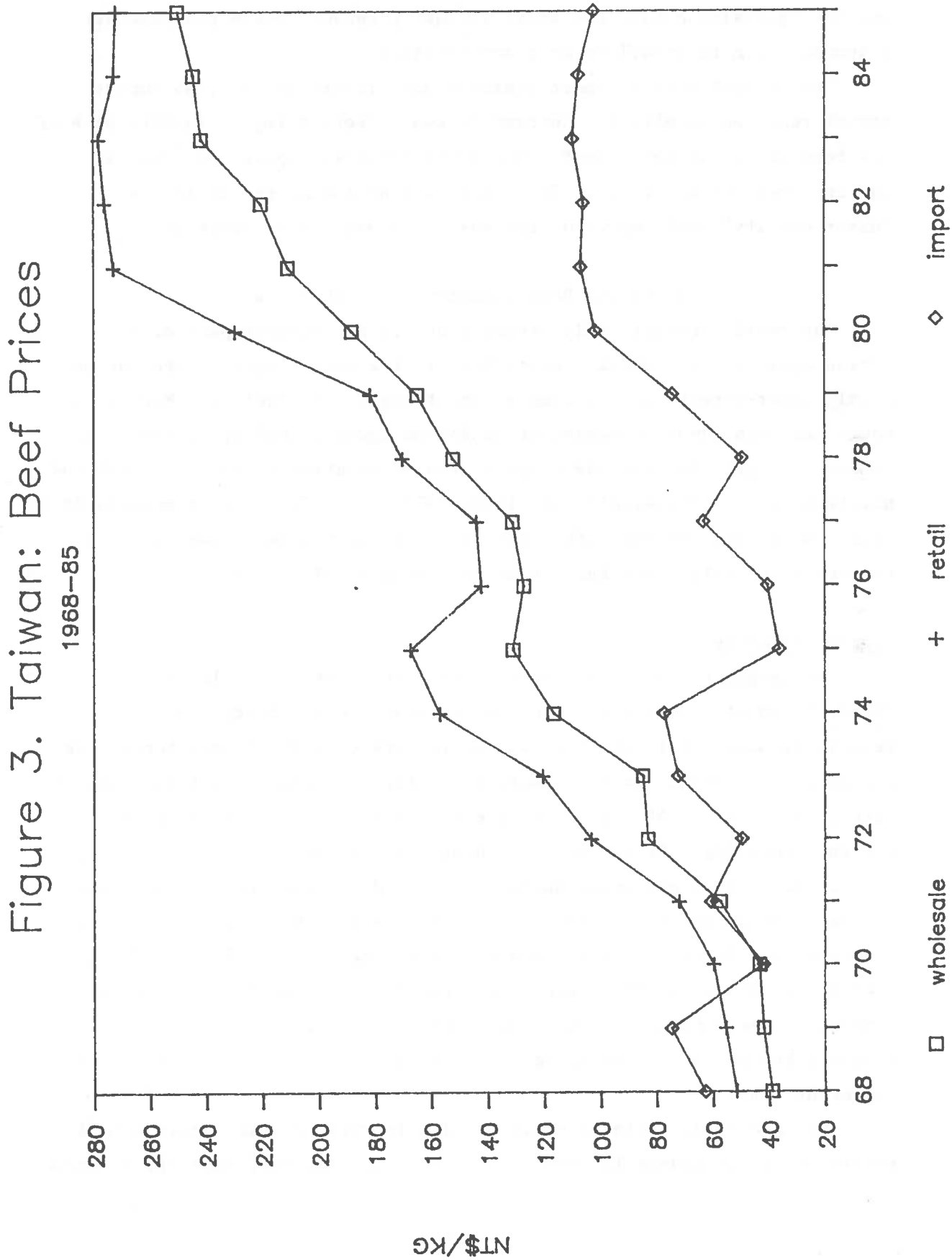


Figure 3. Taiwan: Beef Prices
1968-85
NT$/KG
280
260
240
220
200
180
160
140
120
100
80
60
40
20
68
70
72
74
76
78
80
82
84
wholesale
retail
import

development program, the dual purpose for beef and draft cattle program, and the specialized beef and dairy village program. These programs are discussed in more detail by Gong and Williams.

Even though direct import controls were lifted in 1972, an import tariff remained in effect. Currently, two different import tariffs on beef are imposed by the government. One is NT $23.8/kg imposed on "special quality" beef from the U.S. The other is a NT $30/kg tariff imposed on "other quality" beef imported from Australia and other countries.

Cattle and Beef Industry of South Korea[2]

The cattle industry only recently became an integral part of the Korean agricultural system. Historically, the Korean agricultural sector, highly labor-intensive, revolved around foodgrain production. Mechanical power has been almost nonexistent in Korean agricultural production until recently largely because the cropped area is relatively small in total and per farm unit. Economically and technically, therefore, draft animals like cattle have been the most efficient source of farm power. Consequently, the number of cattle per farm in Korea averages only 1.5 head.

Supply of Cattle

The geographic distribution of cattle in Korea is similar to the distribution of arable land. In some mountainous districts, however, relatively more cattle are raised. Cattle are classified into three broad categories in Korea: native, beef, and dairy. On the 1.5 million head of cattle in Korea in 1981, 85.2% were classified as native, 12.9% as dairy, and the remaining 1.9% as beef. Although the native herd increased at a rate of about 0.2% per annum during 1965-81, dairy and beef cattle numbers increased at an average annual rate of 24.1% and 28.6%, respectively. As a consequence, the native cattle share of the total dropped from 99.7% in 1965 to the 85.2% in 1981. Behind the rapid rise in beef and dairy cattle numbers has been the rapid increase in the demand for beef and dairy products brought on by the rapidly increasing level of per capita incomes in recent years.

The Korean cattle industry is based primarily on small-scale animal raising which is generally carried out as a supplementary activity to grain

production. This reflects both the use of cattle as draft animals on grain farms and the sideline nature of beef production in Korea. Large-scale cattle feeding operations have increased gradually, but steadily, over the past several years. Medium and large-scale cattle feeding operations (10 head or more) accounted for only 3% of the total cattle numbers in 1978 but over 9% in 1984. The number of large-scale cattle feeding operations (over 20 head) increased only slightly from 0.2% of the total cattle raising farms in 1978 to 0.9% in 1984.

Dairy cattle have become progressively more important in overall beef production in Korea since 1960. The number of dairy cattle per farm has also increased from 3-4 head in the early 1960s to 9-10 head in the 1980s. Because dairy products are consumed mostly in urban areas, dairy farming exhibits a distinctly urban distribution.

Imports of Live Cattle

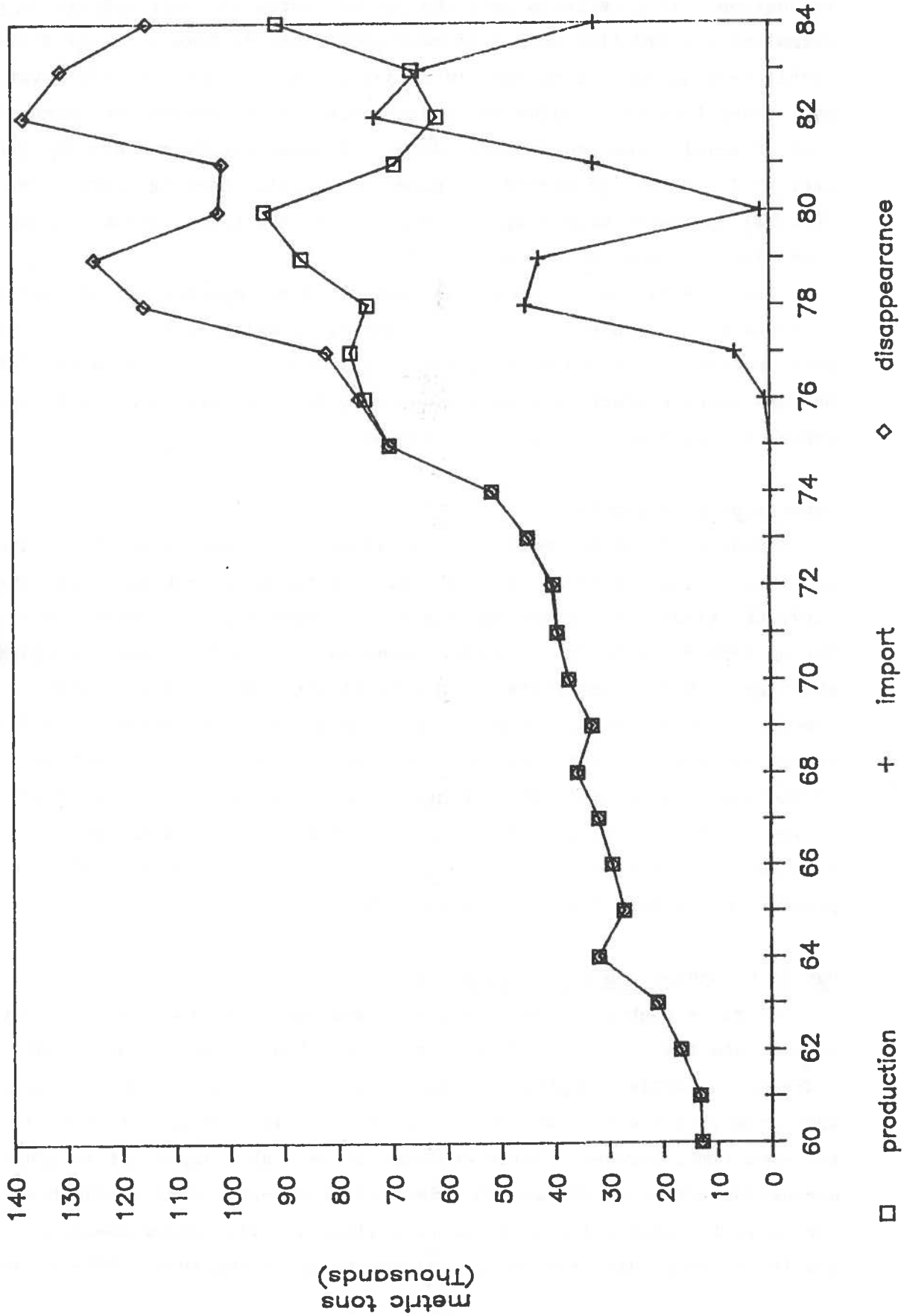
Imports of cattle, mainly for breeding rather than slaughter, have increased significantly. Although dairy cattle have been imported since 1962, the first significant imports of live beef cattle occurred in 1977. During 1980-81, a decrease in the demand for milk and a foreign exchange shortage in Korea contributed to a significant drop in dairy cattle imports. Nevertheless, a significant proportion of the increase in dairy cattle numbers in Korea over time has come from imports. In contrast, most of the increase in beef cattle numbers has resulted from the retention of calves. A recent decline in the domestic price of cattle led to the suspension of beef cattle imports in 1985. Imports of beef cattle for genetic improvement have been allowed, however.

Cattle Slaughter and Beef Production

Cattle slaughter in Korea has increased markedly in recent years to accommodate the increasing demand for beef. Nevertheless, the annual increase in cattle slaughter and beef output has been slow and unstable, particularly since 1976 when beef imports were liberalized (figure 4). At the same time, however, cattle continue to be highly important in grain production, reducing the growth potential of domestic cattle slaughter. Surges in the demand for beef led to a significantly larger number of female cattle slaughtered in several years, including 1970, 1974-76, and

Figure 4. Korea: Supply/Use of Beef

1960–84



1979-81. This has contributed to a significantly slower growth rate in cattle numbers in the late 1970s and early 1980s.

Imports of Beef

Imports of beef into Korea for general consumption were prohibited before 1976. However, because of a rapid increase in consumer demand for beef, rapidly escalating beef prices, and an improvement in the balance of payments, beef was removed from the list of prohibited imports in 1976. Beef imports rose rapidly from 700 mt in 1976 to 6,366 mt in 1977, and then exploded to approximately 47,852 mt in 1978 (figure 4). Imports continued through most of 1979 but were suspended again by the government in 1980 because of a decrease in the demand for beef and a sharp deterioration in the balance of payments, both associated with a recession in the overall Korean economy. Along with economic recovery in 1981, beef imports were once again allowed by the government.

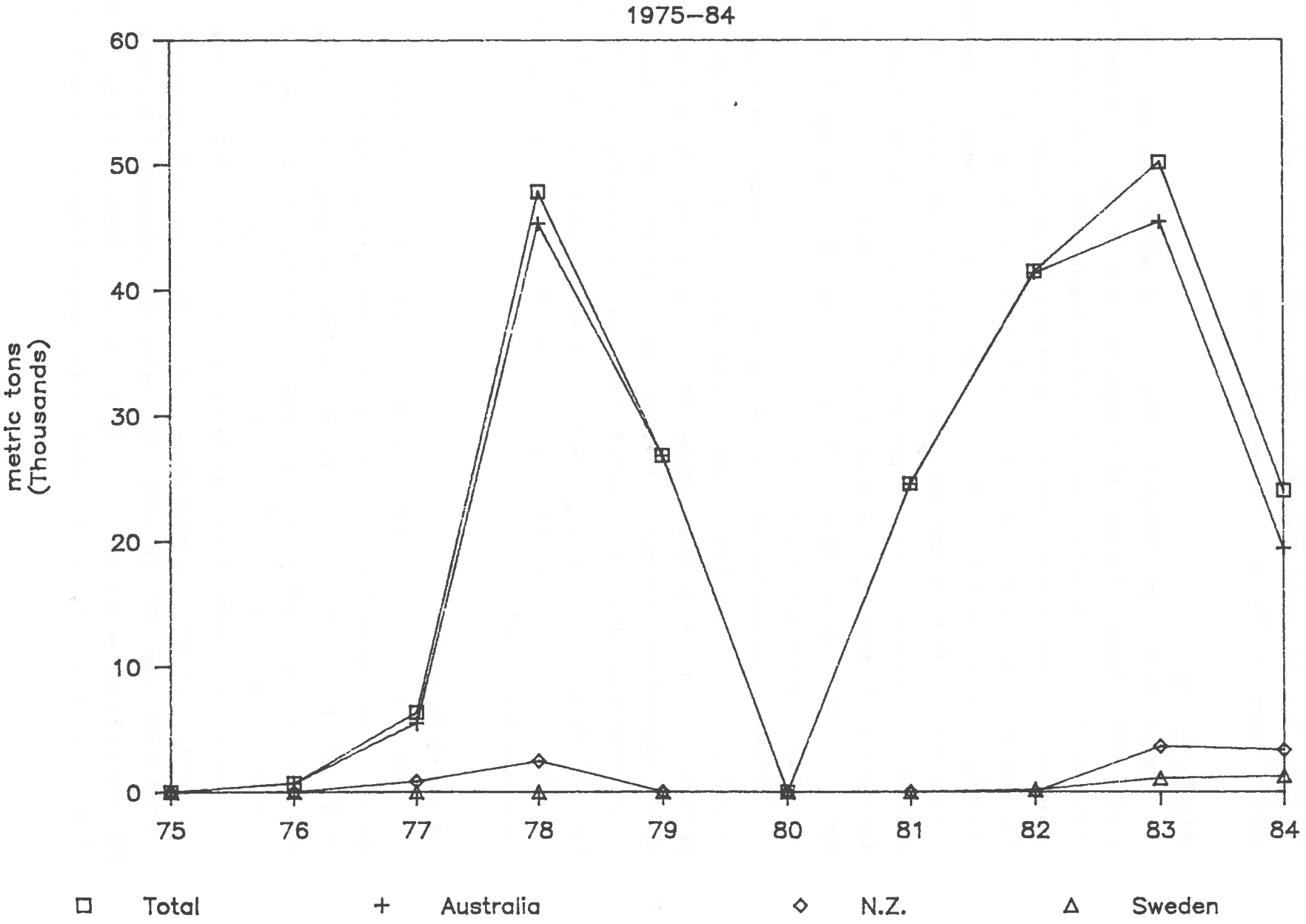
A weakened demand for beef in 1984 and a boom in cattle ownership induced by increasing cattle prices in past years has led to a steady decline in the price of cattle since 1984. Consequently, the government again suspended beef imports in 1985 in order to prevent further declines in cattle prices. Beef was imported almost entirely from Australia during the 1970s (figure 5). Imports from New Zealand and Sweden increased significantly in 1983 and 1984. The U.S., however, has yet to break into the Korean beef market.

Demand for Beef

Despite government efforts to promote domestic beef production, the share of beef consumption from domestic production dropped rapidly from nearly 100% in 1980 to about 57% in 1983 as imports began to rise (figure 4). With the imposition of stricter import controls, however, the domestic share of beef consumption rebounded to about 82% in 1984.

Annual consumption of beef in Korea jumped by nearly 800% over the last twenty years at an average annual rate of over 11% to an estimated 114,944 metric tons (MT) in 1984. Per capita beef consumption has more than tripled from an average of 0.7 kg in the early 1960s to 3.0 kg in the 1980s. Beef is usually cut into small slices and grilled or boiled for a

Figure 5. Korea: Beef Imports by Origin



long time and added to soups in Korean cooking. For such cooking, native beef is reportedly preferred to imported beef.

Four major factors have contributed to the rapid expansion in beef consumption in Korea. First, real per capita income in Korea increased at an annual rate of almost 17% between 1965 and 1984. During the mid-1970s, the rate of increase averaged slightly over 28% a year. Second, the income elasticity of beef demand in Korea is reportedly very high at about 1.38 according to one study (Choi). Third, a relatively high rate of population growth and migration of labor from rural to urban areas has stimulated a demand for meat protein in Korean diets. Although the population growth rate has declined to about 1.5% from nearly 2.6% in the mid-1960s, the average annual population increase is relatively high compared to most industrialized nations. Finally, rapid industrialization has encouraged migration of rural labor to urban areas where consumption of beef is higher because of higher income levels. Also, rapid urbanization and industrialization have forced substantial shifts in urban food consumption patterns toward higher-quality foods like beef.

One consequence of the expansion of beef demand has been a seven-fold increase in the real retail price of beef over the last 10 years. Korean beef consumption exhibits a seasonal pattern. Consumption is relatively low during the summer months but rises during the winter. The annual consumption pattern is characterized by two separate peaks - a harvest festival in September/October and the Christmas festival in December. While livestock products have become more important in the average Korean diet, other commodities, such as the various cereal grains and potatoes, have tended to decrease in relative importance (Huh). Projections by the Korean Rural Economics Institute suggest that these trends will continue during the 1980s. Per capita beef consumption is projected to increase nearly 60% between 1981 and 1991, from 2.8 kg to 4.4 kg.

Cattle and Beef Policies

Government intervention in the Korean cattle and beef sector include three types of policies: (1) production incentives, (2) import controls, and (3) price stabilization.

Production Policies

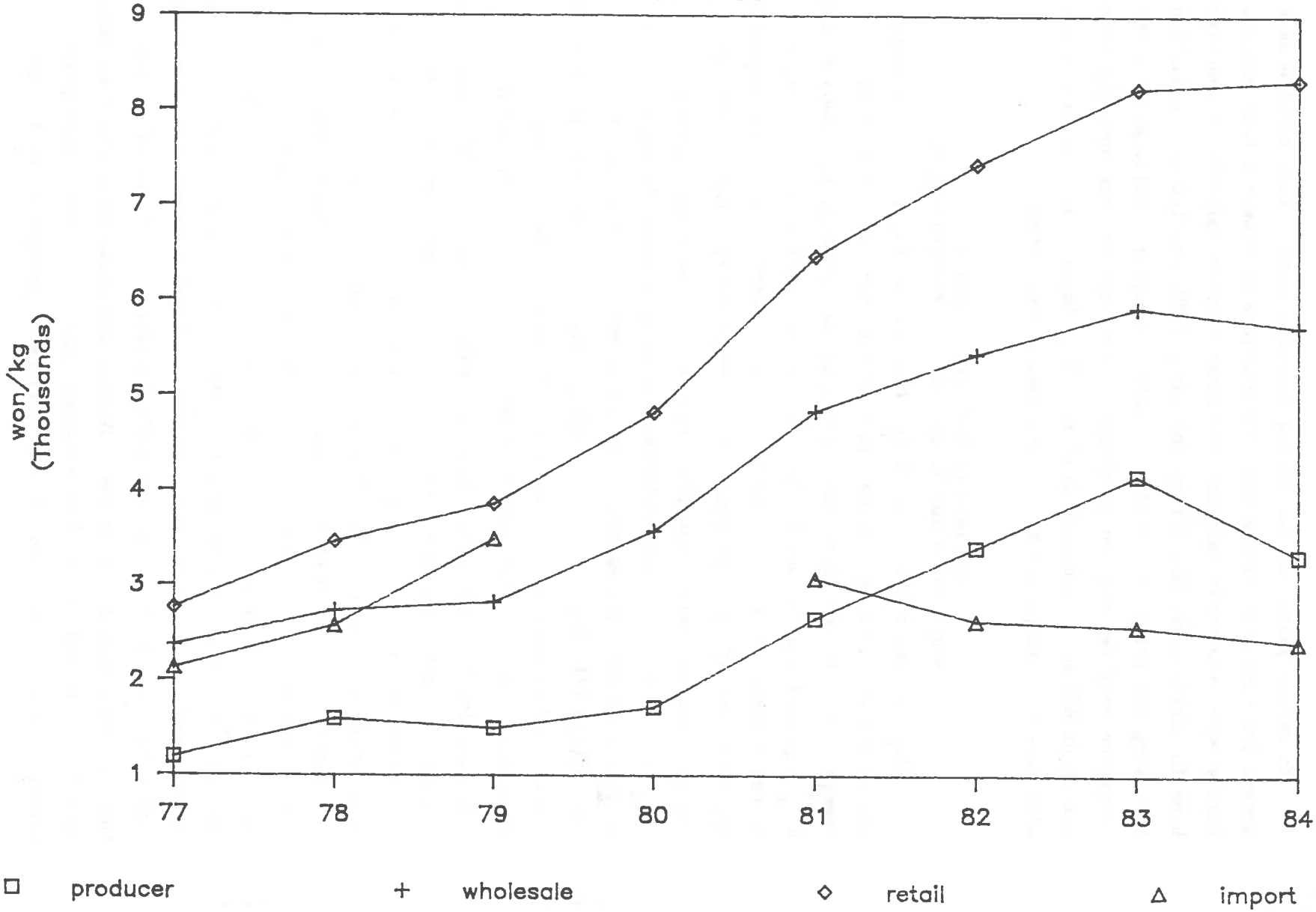
The government has given high priority to the development of the Korean livestock industry to alleviate the growing gap between domestic beef consumption and production. Consequently, the government promotes beef production in four major ways: (1) encouraging large-scale beef cattle breeding projects and the import of beef and dairy cattle for breeding to enlarge the basis for beef production, (2) providing cattle purchase loans at low rates of interest, (3) disseminating hybrid beef cattle for breeding, and (4) providing low cost loans to improve slaughter technology in order to increase slaughter weights. Other policies indirectly benefit beef producers and lead to increased domestic production of beef. In particular, the government encourages the production of feedstuffs through long-term loans to reclaim marginal land for forage and feed crop production. The government also provides technical assistance for efficient use of rice-straw as roughage and for planting forage crops in paddy fields as a second crop after the fall rice harvest.

Import and Price Stabilization Policies

Beef imports are currently subject to an import quota which is determined by estimating the difference between anticipated consumption and production during a given period. The National Livestock Cooperatives Federation (NLCF), a quasi-governmental body, has sole control over purchasing and distributing beef imports in Korea. The NLCF is also empowered to buy, sell, and stockpile beef to maintain retail prices within a predetermined stabilization band. Through the import quota system, NLCF attempts to raise beef prices to a predetermined level. Then through the fine-tuning mechanism of buying and selling beef, the NLCF stabilizes the domestic price of beef within the politically and socially acceptable stabilization band. As a consequence, the wholesale, carcass price of Korean beef has increased rapidly from approximately the world (landed) price level in 1978 to about 2.4 times that level in 1984 (figure 6). Returns to NLCF are derived from purchasing beef on the world market at world prices and selling the beef in the domestic market at a wholesale price set by NLCF. The profits are used to provide financial and technical support to livestock producers.

Figure 6. Korea: Cattle and Beef Prices

1977–1984



In recent years, an increasing domestic supply, coupled with weak demand for beef, has placed downward pressure on domestic beef prices. Furthermore, the rapid increase in cattle numbers following a speculative boom in cattle ownership during the early 1980s has led to a reduction in the slaughter price of cattle. In order to support cattle prices, the NLCF suspended beef imports and purchased 12,200 head of live domestic cattle and about 600 mt of domestic beef in 1985. Imports of live cattle and beef also have been suspended by the government since 1985.

Barriers to U.S. Beef Exports to South Korea and Taiwan and the Research Agenda

Since at least the early 1970s, the United States has been quite successful at building international markets for raw agricultural commodities. In the first three years of this decade, for example, the U.S. exported nearly two-thirds of the wheat, half of the cotton, a third of the tobacco, nearly a third of the corn, nearly half of the soybeans, and over half of the rice produced in this country. During the same period, however, only about 1% of the beef produced was exported.

Why has the U.S. been relatively more successful in exporting raw agricultural commodities like corn and soybeans than value-added commodities like beef? Some economists have suggested that it is a simple question of economics; that is, the U.S. does not have a comparative advantage in beef. That answer, however, is quite unsatisfactory. If the same question had been posed about soybeans during the 1950s, those same economists might well have given the same answer and concluded that conducting research on the international market potential of soybeans would be an inefficient allocation of scarce research resources.

Exports of U.S. beef to Taiwan and South Korea face a number of complicated and significant barriers. The seven most significant barriers (in no particular order) include: 1) protectionistic policies by both countries and other export suppliers that either restrict total imports or reduce the U.S. share of total imports, 2) legal barriers like health and sanitation laws that act as nontariff barriers, 3) the relative distance of the U.S. beef industry from the Taiwanese and South Korean beef markets, 4) social factors and cultural differences that affect meat consumption patterns in both countries, 5) the paucity of processing skills and

technology in this country required to structure meat products with the physical characteristics most desired by Taiwanese and South Korean consumers that also conform to traditional food preparation and consumption practices, 6) an export marketing I.Q. deficiency in this country, 7) and the usual concerns about comparative advantage, i.e., relative costs of production, as well as other economic forces that might impede beef imports. The U.S. faces similar barriers to beef exports to other current and potential foreign markets.

If U.S. beef exports to Taiwan, South Korea, or other such markets, are to achieve any significant increase over the next decade or so, research resources will have to be directed at analyzing the nature and extent of each barrier in each potential market and generating the information, technology, institutions, educational programs, and policy recommendations required to lift the barriers that exist. The following provides some indication of the research issues related to each barrier to increased U.S. beef exports to Taiwan and South Korea.

The Policy Barriers

The Taiwanese livestock industry and beef imports are relatively free of controls. In fact, the beef import tariffs imposed by Taiwan actually provide an implicit subsidy to import U.S. rather than Australian beef because of the lower rate charged on U.S. beef. South Korea is another story, however. The South Korean beef import quota and price stabilization scheme are highly reminiscent of Japanese beef policies (Williams). In addition, direct and indirect subsidies to South Korean beef producers stimulate beef output.

To what extent have South Korean policies reduced imports of beef and affected the U.S. share of the market? Are there alternative policies that could protect domestic producers while allowing increased consumption and imports of beef? What are the social costs involved in restricting imports and subsidizing production? To what extent are the political forces in South Korea tied to the fortunes of the livestock industry? In Taiwan, if the beef market is relatively unprotected, why has the wholesale price of beef increased from about the price of imported beef before 1972 to about 2.5 times the price of imports in 1985?

To what extent do policies affecting feed grain imports in both countries reduce their imports of beef? What is the direction and magnitude of the impact of the policies of either country that promote the expansion of the hog or chicken industries of beef production and imports? What are the beef policies of U.S. beef export competitors? How do those policies affect world prices and the U.S. share of Taiwanese and South Korean beef imports? To what extent does U.S. feed grain policy discourage exports of beef to either country? What is the return to current U.S. beef export market development efforts in these markets? What is the optimal level of market development expenditures in these markets? The answers to these and other questions could provide U.S. policymakers with necessary information to successfully negotiate changes in policies that restrict opportunities for U.S. beef exports in both Taiwan and South Korea.

The Legal Barriers

Although volumes have been written about the health and sanitation, quarantine, technical standards, and administrative regulations that affect the flow of beef into Japan, relatively less is known about such legal, nontariff barriers to beef exports to either Taiwan or South Korea. To the extent that such regulations effectively impede beef imports by either country, efforts to reduce all other barriers will be relatively unsuccessful in generating exports. Research to provide information on the nature and effect of such barriers would provide information necessary to suggest alternative export marketing and negotiating strategies.

The Distance Barrier

The relatively greater distance of th U.S. than either Australia or New Zealand from Pacific Rim markets presents at least two problems for U.S. beef exports to that area. First, the greater distance of the U.S. to the Pacific Rim suggests a greater transportation cost, and, therefore, relatively lower prices to U.S. beef exporters compared to those in Australia. What is the impact of current and alternative transportation rates, contacts, sizes of shipments, and transport services on U.S. exports of beef? What are the least-cost transportation arrangements for beef exports to Taiwan and South Korea?

Second, U.S. exports of fresh, chilled beef to the Pacific Rim are not economically feasible because of a significant potential deterioration in the quality of the meat that occurs in transit. As a consequence, almost all U.S. beef is exported as frozen carcasses in competition with fresh, chilled beef from Australia. What can be done to extend the shelf-life of U.S. beef so that quality deterioration is less of a problem? Can improved handling and packaging techniques extend shelf-life? What are the other factors that potentially affect the shelf-life of beef and how can they be modified to improve the storability of U.S. beef? Are there any differences in the shelf-life of U.S. beef compared to beef from our export competitors? Does irradiation hold any promise to extending shelf-life and reducing the cost of transportation? Answers to these questions could effectively draw the U.S. closer to the beef markets in both Korea and Taiwan.

The Social and Cultural Barriers

Besides prices and per capita income levels, a number of social and cultural factors affect beef consumption and imports in Taiwan and South Korea. Social factors include the demographic structure over time, occupational, educational, and labor force participation patterns of contemporary Taiwan and South Korea, and the age-sex-size composition of households in both countries. Cultural factors include regional, ethic, or religious beliefs and practices that affect attitudes toward beef consumption in each country. Other cultural factors include patterns of food planning, purchasing, and preparation in Taiwanese and Korean households and attitudes regarding U.S. beef relative to Australian and domestically-produced beef.

To what extent do these factors affect current beef consumption levels in each country? How would economic projections of the future growth in beef consumption and imports by these two countries need to be modified to account for the influence of the relevant social and cultural factors? What are the key social and cultural factors affecting the beef markets in each country and their implications for U.S. exports of beef? What changes in the physical characteristics of U.S. beef would be required to respond to these factors and thereby compete more successfully with domestically-produced beef? Research on these social and cultural issues must precede

successful U.S. efforts to break into the beef markets of Taiwan and South Korea.

The Technology Barriers

In Taiwan and South Korea, as in Japan, beef is consumed in different forms than in this country. While roasts and steaks are common in the United States, oriental housewives rarely have ovens and are unaccustomed to roasting, broiling, or barbecuing. Beef is usually sliced thin and used in traditional dishes. What new technologies in both cattle breeding and meat processing may be required in this country to produce and structure beef and beef products that conform to the traditional Taiwanese and South Korean lifestyles? Given the significant cultural, social, and economic factors that affect beef consumption in both countries, what new beef products and related processing techniques might be developed to create growth markets for U.S. beef in the Pacific Rim? What characteristics of U.S. beef might need to be modified and what technologies or processes would need to be developed to make the quality, appearance, color, texture, flavor, etc., modifications in U.S. beef so that it can compete more favorably with domestically produced beef? Unfortunately, relatively little research is being done in these areas.

The Export Marketing I.Q. Barrier

Many beef processors have not adequately explored the export potential of their products or are simply not familiar with the required export procedures. This is particularly the case for small and medium-sized processors that may not have the resources or experience to invest in exporting or to research alternative export marketing strategies. At the same time, most U.S. agricultural producers have been content to simply produce and devote few resources to marketing. During periods of growing demand, such a strategy may be acceptable. During periods of declining demand, either at home or abroad, however, significant resources must be devoted to marketing in order to protect both market share and earnings.

In this connection, what are the mechanics of marketing beef internationally? What specific forms, regulations, and procedures are unique to the Taiwan and South Korean markets? What are possible alternative strategies for marketing different types of beef products in

the Taiwanese and South Korean markets? What is the appropriate decision-making framework within which a beef processor can determine its optimal involvement in the beef export process? What resources are available to assist potential exporters to break into the Taiwanese and South Korean markets?

The Economic Barriers

If no other barriers existed, the U.S. might still not be able to export beef to South Korea and Taiwan or other foreign markets if it is a relatively high cost producer of beef. Determining the U.S. comparative advantage in beef, however, is difficult since the beef trade barriers that exist distort prices and make international comparisons of cost of production fairly meaningless. The relevant question to ask is: "What would be the pattern of trade in the international beef market in the absence of government policies and other barriers that distort market signals?" The answer to such a question would require a large model of the world beef market that also addresses concerns about distortions in exchange rates, feedgrain prices, and other such variables exogenous to international beef markets.

Another way of approaching the comparative advantage question is to ask whether there is a greater return to U.S. agriculture from producing and exporting feedgrains or producing feedgrains, feeding them to cattle and then exporting the beef. Comparing the answer to that question given current market conditions and under a free trade scenario would provide some indication of the U.S. comparative advantage in beef and suggest appropriate directions for policy and investments in U.S. agriculture.

It is important to note that the elasticities of substitution between U.S. grain-fed beef and Australian grass-fed beef or beef produced in Taiwan and South Korea are likely less than unity. While the U.S. may not have a comparative advantage in grass-fed beef, as U.S. beef imports from Australia might suggest, the U.S. may have a comparative advantage in grain-fed beef, as growing U.S. beef exports to the Pacific Rim might suggest. To the extent that Taiwanese and South Korean consumers prefer grain-fed to grass-fed beef, as is reportedly the case in Japan, the more likely are U.S. exports of beef to grow in line with general economic development in those countries. Thus, it is important to determine the

degree of substitutability between U.S. beef and beef produced in Taiwan, South Korea, and in export competing countries like Australia.

Finally, to improve the efficiency of decision-making in this country, intensive research is required to identify and measure the key parameters affecting behavior at all levels in the beef markets of both countries. Among other things, this research must focus on 1) measuring the direct- and cross-price and income elasticities of meat demand in both countries, 2) determining livestock producer response to economic forces in the short and long run, 3) quantifying beef policy response in each country to changes in market and general economic conditions, and 4) measuring the efficiency of their feed and livestock marketing and distribution systems.

Concluding Comments

The Taiwanese and South Korean beef markets are small but growing rapidly. Growth of U.S. beef exports to those markets, however, face a number of barriers, only some of which are faced by U.S. beef export competitors. It would be a serious mistake, however, to conclude that those barriers will effectively preclude the U.S. from gaining a growing and significant share of those markets. The barriers can be significantly reduced or at least skirted to some extent to allow greater access of U.S. beef into both the Taiwanese and South Korean markets. That will not happen, however, until the full extent and nature of the barriers are understood and the research is conducted to discover the means by which the barriers can be circumvented and dismantled. Failure to commit adequate funds to do the necessary research would be an implicit decision to allow Australia, New Zealand, and other beef exporters to capture the value-added in exporting to those markets.

Footnotes

[1]This section is a brief summary of one part of a study by Gong and Williams. The more detailed report also provides extensive data on the hog, cattle, and poultry sectors of the Taiwanese livestock industry.

[2]This section is a brief summary of one part of a study by Shin and Williams. The more detailed report also provides extensive data on the hog, cattle, and poultry sectors of the South Korean livestock industry.

References

Choi, S. J. "Changing Consumption Patterns for Livestock Products: Korea and Japan," Livestock in Asia: Issues and Policies, J. C. Fine and R. G. Lattimore, (eds.), International Development Research Centre, Ottawa, Canada, 1982.

Gong, S. C. and G. W. Williams. "The Taiwanese Livestock Industry: Economic Structure and Policy Interventions," MERC Working Paper No. WP3-86, Meat Export Research Center, Iowa State University, November 1986.

Huh, S. H. Economic Analysis of the Korean Livestock Industry (in Korean), Korea Rural Economics Institute, Korea, 1980.

Korea Rural Economics Institute. A Long-Run Analysis of the Supply and Demand of Food (in Korean). Seoul, Korea, 1982.

Liu, F. R. "The Analysis of Marketing Costs and Efficiency of Taiwan Beef Imports" (in Chinese), The Journal of Agricultural Finance, 6:243-267, July 1981.

Liu, C. C. "The Stabilization Strategy of Taiwan Hog Production and Price" (in Chinese), The Journal of Agricultural Finance, 3:153-156, March 1980.

Shin, Y. D. and G. W. Williams. "The South Korean Livestock Industry: Economic Structure and Policy Interventions," MERC Working Paper No. WPI-86, Meat Export Research Center, Iowa State University, June 1986.

Whan, C. "The Prospects for Taiwan Beef Cattle Industry" (in Chinese), Free China Industry, 54(4):2-10, October 1980.

Williams, G. W. "Japanese Livestock Markets and Policy: Implications for U.S. Beef Exports," MERC Staff Report No. 7-85, Meat Export Research Center, Iowa State University, Ames, Iowa, December 1985.