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Developing carcass beef for the Japanese premium market: A Montana enterprise

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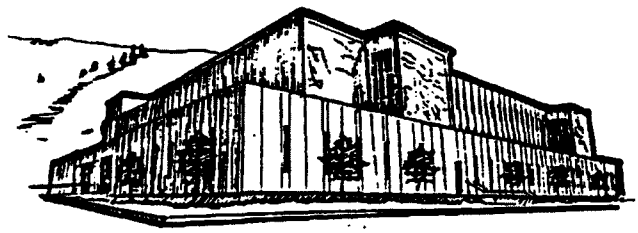

DEVELOPING CARCASS BEEF FOR THE JAPANESE PREMIUM MARKET

A Montana Enterprise

by

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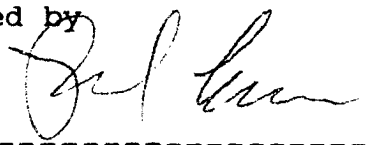

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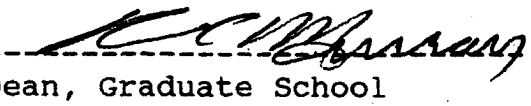

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To my family, Gretchen, Tyrrell and Cooper, this paper is humbly dedicated.

LIST OF TABLES

LIST OF ABBREVIATIONS

BMAA	Beef Market Access Agreement
CPI	Consumer Price Index
GATT	General Agreement on Tariffs and Trade
GNP	Gross Domestic Product
HQ	High Quality
LDP	Liberal Democratic Party
LIPC	Livestock Industry Promotion Corporation
MAFF	Ministry of Agriculture, Forestry and Fisheries
MTN	Multilateral Trade Negotiations
ROA	Return on Assets
ROI	Return on Investment
WSU	Washington State University

INTRODUCTION

With the liberalization of the Japanese beef market in April of 1991, the opportunities for expansion of beef exports to Japan from the United States improved dramatically. This paper will examine the potential for economic gain in the Japanese beef market and the ability of a Montana beef enterprise to participate in that burgeoning market. The productive capacity of Japan itself, the competitive position of other beef-exporting countries and domestic U.S. companies, and the demands of the Japanese consumer will be addressed in an effort to assess the comparative advantage of the Montana enterprise in question. With the Japanese market framed as such, specific steps which the Montana producer may take in order to augment its competitive position will be recommended.

PART I

BEEF CONSUMPTION IN JAPAN -- A FRAMEWORK

CHAPTER 1

A BRIEF HISTORY OF CATTLE IN JAPAN

> The Japanese derive the name of their country from a Chinese phrase meaning "the source of the sun,"...[which] describes the country's geographical position east of China. The word "Japan" came from Marco Polo's attempt to render the Chinese pronunciation of the phrase in Italian after his return from China in the 13th Century. The Japanese themselves, however, usually give the characters a sound that is rendered in English as "Nihon."
>
> Reported in "Farmline" (Farmline 1990, 12).

Buddhism and Shintoism, the primary religious practices in Japan for centuries, shaped much of the social fabric of Japanese society. One of the tenets of this fabric was a prohibition against the consumption of beef. As a result, very little beef was consumed in Japan for 1,200 years. Soldiers, however, were considered a special class, and as such were not subject to the restrictions of the general populace. Japanese military leaders believed that beef gave their soldiers strength and would feed beef to their troops in preparation for battle. Many soldiers consequently developed a taste for beef, which returned with them to civilian life. Because the civilian population still considered the cooking and eating of beef to be sacrilegious and a desecration of the house, these "discharges" would

heat plowshares over hot coals and cook beef outside. Hence, "sukiyaki," which literally means "plow cooking," was born (Lunt 1991, 2b).

Sourced from the Asian mainland via the Korean peninsula, cattle were introduced to Japan as draft animals for the cultivation of rice sometime around the second century. Because of the rugged terrain of the Skikoku region, movement of cattle from this import area was restricted. As a result, cattle were found in small, isolated areas with essentially closed populations (Lunt 1991, 3b).

In 1635 imports of additional cattle were prohibited by mandate of a shogun. Some 200 years later (1854) the prohibition was lifted, and with the Meiji Restoration in 1868 not only was the importation of cattle encouraged, the ban against eating beef was removed. A number of breeds, including Brown Swiss, Shorthorn, Simmental, Holstein and Angus were then introduced for the purpose of crossbreeding. Different regions preferred different breeds, which, when combined with different crossbreeding practices in the different regions, augmented regional differences in types of cattle. These regional differences were reinforced in 1910 when Japan again closed its cow herd to crossbreeding. A number of distinct breeds are therefore contained within the Japanese "Wagyu," which is commonly understood to be the Japanese breed of beef cattle ("Wa" means Japanese or

Japanese-style and "gyu" means cattle) (Lunt 1991, 3b). This would not be unlike Black Angus cattle in the U.S., where many Angus breeders maintain that there is more variation within the Angus breed than there is between some breeds.

As a practical matter, the Japanese Wagyu is separated into two breeds, Black Waygu and Red Waygu. The red in the Red Wagyu reflects either Simmental or Korean influence, depending on the region which is home to the Red Wagyu in question. These cattle are generally "beefier" and more heavily muscled than the Black Wagyu and are more similar to American beef cattle than are the Black Wagyu. The Black Wagyu, likely descended from Brown Swiss, Simmental, Ayrshire, and possibly shorthorn (interview with Dr. Jerry Reeves, animal scientist at Washington State University, June 18, 1992) and which comprise about 90 percent of all Wagyu (Johnson and Fisher 1988, 13), were used primarily for draft purposes, for plowing or pulling carts, or as pack animals. The draft Wagyu show heavier front quarters than do the pack Wagyu, which were selected for overall size and back strength. As with the Red Wagyu, these differences are delineated by region and are apparent today.

The livestock industry in Japan was basically nonexistent prior to the 1950s since cattle were not raised primarily for consumption. In fact, most Waygu were fattened and slaughtered only after serving a productive

life as a draft animal, hence the mature age of many Waygu cattle which came to market. Though initial efforts at expanding livestock production centered on pork and poultry, by 1961 government focus shifted to the cattle industry. Import quotas, price stabilization schemes, and calf production subsidies were implemented (Khan et al. 1990, 10). As a result, the number of beef cattle increased from nearly 1.9 million head to almost 2.7 million head in the period of 1965 to 1988 (Johnson and Fisher 1988, 14).

This does not include dairy cattle (1.3 million to 2.0 million for the same period). At most, Japan's cattle numbers would approach 5 million head at present. This compares to roughly 100 million head in the U.S. and 25 million head in Australia. The dairy industry did not become significant in Japan until after World War II when Holsteins were imported in significant numbers. Though raised mainly for milk, a major market has been established for dairy beef in Japan.

CHAPTER 2

THE DEVELOPMENT OF MODERN JAPANESE AGRICULTURE

Though the total area of Japan is not as large as Montana, four large islands and numerous smaller islands extend in an arc roughly 1,300 miles long, or essentially the distance from Maine to Florida. Because 85 percent of the land mass is mountainous or hilly, leaving 15 percent (or less) which is tillable, the majority of Japan's 124 million people live in coastal areas (Seim 1990, 123).

Historically, protection of domestic agriculture by the Japanese government had a major influence on the development of agriculture in Japan. As manufacturing developed in Japan, labor productivity in agriculture fell. Per-capita farm income was about 80 percent of non-farm income prior to 1900, but this figure dropped by half -- to less than 40 percent -- in the 1930s. Thus, to prevent rural poverty from fomenting social upheaval during the interwar period, the government instituted policies to relieve rural poverty. A prominent feature of Japanese agriculture thus became social policies constructed for the relief of rural poverty (Hayami 1988, 24).

Government intervention for the support of agriculture,

however, was nothing new to Japanese society. As Japan's industrial strength grew during the later 1800s, in part based on Japan's successful agricultural development, comparative advantage shifted to manufacturing. The landlord class then became more concerned about protection for agriculture than about increasing agricultural production (Hayami 1988, 34). Consequently, political lobbying for protective measures became a primary interest of the landlord class. Also, as Japan's industrial capacity developed during the interwar period, rural subsidies were seen as necessary to maintain cheap food for cheap labor. Like the landlords, industrialists recognized the need for agricultural subsidies to prevent peasants from joining the growing labor movement and the socialist ranks (Hayami 1988, 39).

From 1880 to 1920, through the export of silk and other commodities, Japanese agriculture served as a major earner of foreign exchange. This was consistent with real growth in agricultural productivity for the thirty-five year period preceding World War I (Hayami 1988, 29). However, during the 1930s the ratio of subsidy to income in agriculture surpassed that of the non-agricultural sector (Hayami 1988, 39). A cheap food policy, for the purpose of cheap industrial labor, was at the root of this inversion.

A major overhaul of the Japanese agricultural economy occurred after the Second World War with the American

occupation of Japan. Wolf Ladejinsky and Robert Fearey, the principal architects of the occupation's land reform, shared a belief in Jeffersonian agrarianism with General MacArthur. Fundamental to Jeffersonian agrarianism was the belief that private property was a natural right, and that land ownership, independence, liberty, and citizenship were connected. General Headquarters therefore undertook land reform in an effort to make agrarian communities democratic. Free elections were enacted to allow rural representation in the Diet, farmer's cooperatives were organized to add to their representative power, and absentee landlordism was virtually abolished, allowing tenant farmers to become fee-holders of the land they farmed (Johnson and Fisher 1988, 70). This was done in part to prevent agrarian unrest, which might well destabilize Japan's newly established democracy. As a result, rural conservatism took root with small-scale, Jeffersonian owner-operators voicing strong support for democratic principles and the conservative party (Moore 1990, 88).

Paramount to agricultural reform was an urgent need to increase agricultural production, which was done by increasing incentives to those cultivating the land rather than increasing the economic stature of landlords. From 1947 to 1950, 1.7 million hectares (4.2 million acres @ 2.47 acres per hectare) of farmland were purchased by the government from landlords and transferred to tenant farmers.

Farmland under tenancy therefore declined from 45 percent in 1945 to 9 percent in 1955. Not only were the rights of tenants on that land which remained under tenancy strengthened, but tenant rental rates were reduced, both of which further eroded the power of landlords. Land holding was also limited to three hectares in order to prevent a resurgence of landlordism (Hayami 1988, 45).

The net result was a redistribution of land to a much broader class of worker-owners. However, the basic size of farm units remained relatively stable at approximately one hectare. As a result, the small-scale farming enterprises which typify Japanese agriculture, in spite of the successes of land reform invoked by the occupation, left Japan at a distinct competitive disadvantage in terms of producing agricultural products for the international market place.

During the postwar period, though agricultural productivity grew quickly relative to that of other countries, it did not keep pace with growth in Japan's industrial sector. Consequently, in spite of the government's interwar efforts to relieve rural poverty, income growth in the rural sector failed to match that of the industrial, urban sector. Government policy, though having concentrated on improving agricultural productivity in the postwar rebuilding period, now shifted to closing the income gap between farm and urban households. In spite of policy directives this gap progressively widened,

accelerating the migration of farm labor to industrial centers. To stem this course, and to strengthen agriculture relative to the urban sector, the Agricultural Basic Law was enacted as a national charter for agriculture in 1961.

A fundamental tenet of the Agricultural Basic Law was to equalize the income potential and standard of living between farm and non-farm households. To achieve income parity, structural adjustments in agriculture were deemed necessary. These included expansion of farm size to take advantage of mechanization and economies of scale, a shift in production to those commodities which were in greater demand (e.g., decreasing consumption of rice and increasing consumption of beef), and improvements to farm infrastructure and technology (Hayami 1988, 77). Though the law ultimately failed to achieve its primary goals, it did play a significant role in developing the livestock industry in Japan (Johnson and Fisher 1988, 71).

Also important to note is that the emphasis on larger-scale farming operations took precedence over concern about ownership issues, essentially defining a course for agricultural policy which differed from the concerns of the postwar reform movement. To help attain a larger-scale agriculture, the three hectare upper limit on farm size was eliminated in 1970 (Moore 1990, 190). In spite of this, Japanese agriculture remains one of the smallest-scale agricultural industries in the world (average farm size has

remained relatively constant at 1.15 hectares -- about 2.84 acres -- throughout the twentieth century). Comparatively speaking, the average European farm is 15.3 hectares, and the average American farm, 175 hectares (Moore 1990, 200). Though the size of the Japanese farm has remained basically constant throughout the twentieth century, the size of the average American farm has nearly tripled since 1960 (Moore 1990, 205).

Another important government policy was that of food self-sufficiency. Although Japan is one of the richest countries in the world on a per-capita basis, it is capable of producing only 48 percent of its food (Wanatabe 1991, D1). The government has consequently instituted measures to spur domestic production of food stuffs, and as a corollary, has resisted opening its market to food imports in an attempt to promote domestic production.

Since the enactment of the Basic Law in 1961, agricultural assistance has moved away from price support mechanisms because of the financial strain it imposed on the national budget and because it encouraged overproduction of some commodities.

In Japan land is usually inherited intact, with some modification in recent history, by one heir. Though family members are seen as transitory, land is recognized as permanent property of the household. For centuries land was to be preserved by the people for the emperor. Ultimately

this gave way to ownership of land by landlords, and, as described above, this then evolved into ownership by the farmers themselves. Largely the result of the postwar occupation, the practice of dividing land among multiple heirs became acceptable, which has led to fragmented land ownership (Moore 1990, 66). Throughout, land has traditionally held a key position in the structure of the household.

In many rural areas, and often in response to industrial development, land prices have risen in real terms, making agricultural land an attractive investment and encouraging families who own land to retain its ownership. This has become increasingly important with the aging of the Japanese population, and the return of older couples to the farmstead.

Since the early Meiji period, with the rise of manufacturing Japanese farmers have looked to off-farm employment to augment farm income. From 1884 to 1939, about 30 percent of all farms were operated by part-time farmers (Moore 1990, 97), known in Japan as "weekend farmers." Postwar land reform temporarily reduced this percentage, but with the manufacturing opportunities generated by supplying the U.S. military during the Korean War the trend toward off-farm employment accelerated.

This trend has continued to present-day, and in large measure Japan's stellar industrial growth was made possible

by the availability of stable rural labor. With increased mechanization, not only did farmers find themselves less dependent upon hired labor, but they were also able to pursue off-farm wage labor themselves. Much of Japanese manufacturing is based on subcontracting to decentralized plants, many of which are located in rural areas because of the quality of labor found there. This has resulted in an increasing proportion of part-time farms and non-farm income for the farm household.

Two problems have surfaced in recent years regarding succession of the typical Japanese farm. One is the "heir problem." The other is the "bride problem." Finding heirs to carry on farm operations, and the duties of the household line commensurate with that position, is becoming increasingly difficult due to out-migration from farm areas by young farmers. In addition, the greatest problem in 1987 was finding wives for male heirs. Some rural communities resorted to recruiting brides from the Philippines and other countries to fill this vacuum (Moore 1990, 193).

The net effect is the aging of the rural sector. Inheritance and household succession are likely the main problems facing rural Japan in the 1990s (Moore 1990, 272).

CHAPTER 3

RURAL POLITICAL STRENGTH IN JAPAN

NOKYO is the common term for the association of Japanese agricultural cooperatives. Cooperatives were first formed in Japan in 1899 in response to the declining economic stature of agriculture vis-a-vis the growing Japanese industrial sector. In the 1890s, farm income accounted for nearly one-third of the national income. After World War I, with the formation of a national marketing system the number of farm-related cooperatives doubled (Moore 1990, 138). Then, after World War II, the occupation forces abolished the old cooperative system and formed voluntary, democratic cooperatives free of landlord control. NOKYO was also given the right to perform banking activities, and with the Agricultural Cooperative Union Law of 1947, NOKYO was granted quasi-governmental status and the formal right to represent farmers in negotiations with the government. Because of this, NOKYO is considered to be one of the most powerful interest groups in Japan.

Within NOKYO there are a number of different cooperatives engaged in different activities, including marketing of various farm products, selling numerous

supplies to co-op members, credit and insurance businesses, political lobbying, and banking. The Agricultural Central Bank of Japan, the quasi-governmental financial arm of NOKYO, was ranked sixth in the world in deposits in 1988 (Moore 1990, 137).

> Norinchukin, the co-op's principal bank, has assets of $260 billion, more than Citicorp, and is the largest supplier of funds to Japan's short-term money markets. Yet another Nokyo arm is a huge Japanese insurer, with $2.2 trillion of coverage in force -- double that of Metropolitan Life (Eisenstodt 1991, 84).

In 1988, NOKYO cooperatives received $5.6 million in government subsidies (Economist 1988a). In 1991, NOKYO had assets of $447 billion (Eisenstodt 1991, 84). Much of NOKYO's financial strength derives from its control of 95 percent of Japan's rice crop (Moore 1990, 154).

Within NOKYO there are more than 4,300 general cooperatives representing 380,000 employees, 5.5 million members, and 2.5 million non-farm associate members (Hayami 1988, 46; Moore 1990, 142; Kihl and Jacobsen 1990, 101). In 1991 NOKYO had one employee for every three "real" farms, compared to one employee for every six farms in 1975 (Eisenstodt 1991, 84). In addition to the general cooperatives there are some 4,700 specialized cooperatives representing specific interests, such as dairy cooperatives and citrus cooperatives. Semi-government functions, such as channeling low-interest loans, have also been assigned to certain cooperatives (Hayami 1988, 46). About 70 percent of all agricultural loans either originate from or are

administered through NOKYO (Moore 1990, 154). The NOKYO structure is similar to Japanese industrial groups, known as "keiretsu," where the various cooperatives are linked through a central bank.

NOKYO has been successful in securing substantial agricultural price supports through its political influence. Rural Japan has a disproportionate amount of political power. While the farm population decreased during Japan's industrial growth, commensurate adjustments in rural electoral districts were not made. This has essentially given a disproportionate political weight to rural areas in the number of rural representatives in the National Diet. In some instances, the disparity has been as high as one to three -- that is, one rural vote carries a weight equivalent to three urban votes. In the 1986 election, more than twice as many votes were needed to elect a representative to the House of Councillors[1] from a non-farm district as it did from an agricultural region (Johnson and Fisher 1988, 66). The spread of part-time farming, and the return of retirees to the family farm, has contributed to this pattern by

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[1]The Diet, Japan's parliament, is comprised of the House of Representatives (the Lower House), and the House of Councillors (the Upper House). The Japanese constitution provides for an executive branch (the Cabinet, consisting of a Prime Minister and about 20 other Ministers of State who are appointed by the Prime Minister), a legislative branch (the National Diet), and a judicial branch (the court system). Agriculture is represented in the Cabinet by the Ministry of Agriculture, Forestry, and Fisheries (Johnson and Fisher 1988, 63-64).

slowing the decline in rural population.

The increase in the number of part-time farmers has been especially significant. Because of the demands on their time from off-farm employment, and the fact that they are small-scale producers, part-time farmers are more dependent upon the convenience of marketing through and buying from agricultural cooperatives than are full-time farmers. By-and-large they are high-cost producers and loyal, quiet followers of NOKYO. As such, part-time farmers have become NOKYO's economic and political power base (Hayami 1988, 91).

As political spokesman for rural Japan, NOKYO has political power that reaches far beyond its membership numbers. With their conservative roots the rural districts vote as a conservative block, which has provided a political foundation for the ruling Liberal Democratic Party (LDP). In order to retain that support, the LDP has been receptive to NOKYO's demands for protective measures. The ideologically conservative LDP has held a majority in the House of Representatives since 1955 largely because of its rural power base and alliance with NOKYO.

The "World Food Crisis" of 1973-5, which led to sharp increases in world food prices, and, in 1973, the U.S. soybean embargo and the "oil shock," all reinforced the call by NOKYO for greater agricultural protectionism. Japan's national security, it was argued, depended upon its ability

to be self-sufficient in food production, and to be self-sufficient domestic production had to be protected from foreign competition (Johnson and Fisher 1988, 132). Food security through food self-sufficiency became the rallying cry.

NOKYO has proven to be an indispensable vote-getter for the LDP as well as a source of lucrative employment for retired bureaucrats. Because of this, NOKYO; the Ministry of Agriculture, Forestry and Fisheries (MAFF); and the ruling LDP became known as the "iron triangle." This triumvirate has been known to block any attempts to reduce agricultural protection and government subsidy, even when proposed reforms stood to benefit the farmers themselves, because of the potential for reduction in the economic and political power of the "iron triangle."

Aside from its political power, on an operations level some would argue that the cooperatives have been instrumental in modernizing the beef industry in Japan. Because cooperatives provide much of the feed concentrates used in cattle raising, and because they provide credit, veterinary care, and marketing services, it is questionable if the beef industry in Japan would have developed to the extent that it has without NOKYO's services. This is augmented by the fact that cooperatives operate an increasing proportion of slaughter plants and have significant involvement in the preparation and distribution

of beef cuts.

The Waning of Rural Power in Japan

> Because it was once so, we Japanese believe that rice is the lifeline of Japan. But we do not have to grow rice here. Like the Iacoccas of the U.S., Japan's rice farmers influence politics, distorting the economy and crimping the quality of life in our country.
> Kenichi Ohmae, McKinsey & Co's managing partner in Japan (Ohmae 1992, A10).

To support its bureaucracy, NOKYO must charge high prices for its commodities -- prices which are as much as 30 percent higher than prices charged by private Japanese companies, which in turn are higher than prices charged by U.S. companies (Eisenstodt 1991, 84). As a result, Japanese farmers pay some of the world's highest prices for an assortment of agricultural inputs. Because of NOKYO's ubiquitous presence in rural Japan, and its integral part in Japan's rural social fabric, most farmers find it less appealing to shop elsewhere than to bear the higher prices of NOKYO's products. However, a concern is mounting in rural Japan that NOKYO is out for itself first and for the farmer second.

In addition, the LDP is becoming less dependent on the rural farm vote as it gains support in urban areas. It also recognizes the necessity of shifting its political power base to urban areas consistent with changes in demographics and voting district reform. In fact,

...with as many as three out of five LDP members being

> elected by voters who are litereally dying out, party officials know it cannot be much longer before they will have to dump the farmers in favour of the wage-earning city dwellers (Economist 1991, 32).

The government, and by inference the ruling party, is also finding it increasingly difficult to fully support NOKYO and its demands for market protection and subsidies because of budget constraints and a rising consumer voice for cheaper food stuffs. As of 1991, 30 percent of a Japanese family's disposable income was spent on food, nearly double that of the U.S. (17 percent for the U.S., 20% for Europe) (Economist 1991, 32). The Japanese consumer is increasingly aware that the cost of its restrictive trade policies is borne by them. Prices for many consumer goods have not reflected the 40 to 50 percent appreciation of the yen, and the commensurate increase in Japanese purchasing power, since 1985 (Meltzer 1990, D8). As a result, the standard of living of the average Japanese family has not kept pace with Japan's rise in economic power. In 1989, Japan's Economic Planning Agency reported that

> ...typical consumer goods were an average of 40 percent higher in Tokyo than in New York. The items that were far more expensive in Japan were all subject to government regulation (Ishihara 1991, 98).

For instance, surcharges on some cuts of imported beef were as high as 90 to 100 percent (Eaheart 1991, 14).

Haruo Maekawa, a former governor of the Bank of Japan, made the following observation in 1988:

> The main objective of all [government] ministries used to be to foster or protect the producer. That is why

> our economic structure became export oriented. It was not to improve the quality of the life of the people.... The government is now focusing on the quality of life. That's why the whole structure of the economy is changing (Jameson and Redburn 1988, 17).

Consistent with the waning power of NOKYO is this process of change to a more consumer-sensitive economy. The attitude that the consumer need not suffer so that producers may prosper seems to be increasingly prevalent in modern-day Japan.

As a result of changes in Japan's political power structure, the "iron triangle" is being redefined as well. Still composed of three institutions (bureaucracy, the ruling party, and special interest groups), the representation of those special interest groups and the bureaucracy has changed. MAFF is no longer included as a component of the "iron triangle's" bureaucracy[2], and special interest groups have expanded to give more representation to economic organizations which are independent of rural constituencies (Kihl et al. 1990, 100).

NOKYO has also faced mounting criticism from the Japanese business community for obstructing agricultural reform, and for impeding Japan's endeavors to reposition itself in the global economy consistent with its economic stature. Big business has also called for liberalization of

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[2]The bureaucracy of the new "iron triangle" consists of the Ministry of Finance, the Ministry of International Trade and Industry (MITI), and the Economic Planning Agency (Kihl et al. 1990, 100).

food imports in order to contain cost-of-living expenses for their urban employees (Johnson and Fisher 1988, 87).

Internal pressures to relieve the political and economic expense of agricultural protection are augmented by external pressures from food-exporting countries, most notably the United States. Known as "gaiatsu," or foreign pressure, Japanese politicians often use pressure from foreign governments to institute change which they recognize as necessary yet politically unpopular. In this way special interests are overridden, the national interest is served, and Japan's leadership escapes blame.

CHAPTER 4

PROTECTION OF THE JAPANESE MARKET

> The Japanese government has authorized 3,600 shops to sell imported beef, but many receive so little of it that they limit sales to three hours a day. Some offer only 33 pounds a day.
>
> Phil Seng, President and CEO of the U.S. Meat Export Federation (Jameson 1988, 18).

The nominal rates of agricultural protection, defined by the percentage by which domestic (Japanese) producer prices exceed the border price (the price at which exporting countries can place their products at the border of the importing country), are compared as follows for 12 commodities, including beef:

Table 1
Nominal Rates of Agricultural Protection (Percent)

	1955	1960	1965	1970	1975	1980	1984	1986
JPN	18	41	69	74	76	85	102	210
US	2	1	9	11	4	0	6	6

Source: Hayami 1988, 6-7.

As demonstrated by these figures, the Japanese farmer

enjoys a substantially greater degree of market protection than does his American counterpart. Resistance to high food prices softened as industry became more capital-intensive and information-dependent and less reliant upon cheap labor during Japan's postwar "economic miracle" (Hayami 1988, 15). The agricultural lobby was therefore able to provide its markets with a degree of protection among the highest in the world. Furthermore, though protection for manufacturing declined as this sector left the "infant-industry" stage, protection for agriculture was increased in order to arrest its economic decline (Hayami 1988, 23).

Commensurate with Japan's industrial growth was a rise in affluence among Japan's urban population. The share of food as a percentage of the consumer's budget declined from 60 percent in the early Meiji period to about 30 percent in 1988 (Hayami 1988, 19), which lowered the resistance of the consumer to high food prices. Strong protests by consumers to increasing levels of agricultural protection were therefore seldom made, let alone orchestrated. Protective measures were not without their impact, however. In 1988 market protection forced the Japanese to pay from three to six times the world price for beef, wheat and rice. It was estimated that protection added as much as $61 billion, or 4 percent of personal consumption, to food purchases (Economist 1988c, 31).

Protective measures took three forms: (1) border

protection, i.e., import quotas (quantitative restrictions), tariffs, and levies; (2) price supports, which establish floor and ceiling prices, usually set higher than market, and controlled by the release of food stocks from storage by the Livestock Industry Promotion Corporation (LIPC), a government agency; and (3) subsidies, or direct payments from the government to agricultural producers.

Through the price stabilization program, LIPC, which also administers import quotas for beef, has been able to maintain wholesale prices for domestic beef at levels two to four times that of the equivalent import price (Johnson and Fisher 1988, 35). In order to reduce input costs to beef producers, among a host of government-sponsored activities has been the establishment of a feed-price stabilization fund, low-interest loans for capital expenditures including the purchase of livestock, the development of public lands for livestock grazing, and a rice diversion program to shift productive land from rice crops to feed crops which essentially provides cheaper feed to cattle producers (Johnson and Fisher 1988, 40-41).

As a percentage of the agricultural budget, subsidies command the largest share, rising from 49 percent in 1960 to 62 percent in 1984 (Hayami 1988, 57). Subsidies to agriculture in Japan have risen relative to agricultural subsidies in other industrialized countries. The tax-burden imposed on farmers in Japan also appears to be considerably

less than that of Japan's non-farm population. Within farm households, in 1983 on-farm income was taxed at half the rate of off-farm income (Hayami 1988, 61).

Market protection in Japan has afforded the producer a degree of subsidy which is among the highest in the world, and in so doing has sheltered much of Japanese agriculture from international competition. Coupled with tight beef supplies and a continued appreciation in the yen, beef prices in Japan have been kept substantially above world parity.

CHAPTER 5

LIBERALIZATION OF THE JAPANESE BEEF MARKET

> ...when asked about cheaper beef coming into his market...one of the Japanese hosts [replied]..."What would happen in Scotts Bluff, Nebraska, if the Australians came in and started selling beef for 30 cents a pound. Would they get out alive?"
>
> Laura Sands, reporting for Beef Today (Sands 1988, 17).

As Japan developed its modern industrial economy in the 1950s and fueled its economic growth largely through exports, its domestic markets were not opened to foreign products in like amounts. Substantial trade imbalances with many of its trading partners developed as a result. This situation was seen as increasingly inappropriate with Japan's relatively new status as a global economic power. It was also increasingly expensive for the government to continue subsidizing a relatively inefficient agricultural economy.

The Nakasone government sponsored the Maekawa Commission Report, published in 1986, to recommend policy directives which the government could undertake to rectify this situation. The report acknowledged that Japan's economy was structured around exports and that there was an

> ...urgent need for Japan to implement drastic policies of structural adjustment and to seek to transform the

> Japanese economic structure into one oriented to international coordination (Kihl and Jacobsen 1990, 96).

The report specifically called for structural changes in Japanese agriculture, emphasizing that

> ...efforts should be made toward a steady increase in imports of products (with the sole notable exception of rice) whose domestic prices and the international market price differ markedly (Kihl and Jacobsen 1988, 96).

A second Maekawa Commission Report was published one year later (1987) which recommended, among other items promoting agricultural reform, the following:

1. Promoting agricultural policy that gives full consideration not only to producers but also to consumers and the food industry.

2. Reducing the differential between Japanese and overseas prices and achieving stable foodstuff supplies at popularly acceptable prices by improving productivity and promoting imports as appropriate.

3. Making Japanese production more rational and more efficient and holding border adjustment measures to a minimum for nonrice products (Kihl and Jacobsen 1988, 97).

During this period the Japanese government was pressured by the Reagan administration to relax its beef import quotas. Frustrated by the lack of progress, in 1986 the U.S. requested that the General Agreement on Tariffs and Trade (GATT) rule on a number of Japan's restrictive measures, including the legality of its import quota for beef. In 1987 the GATT ruled in favor of the U.S. in ten of twelve agricultural commodities, with beef as one of the ten. Subsequently, agreement with the Japanese government

concerning liberalizing its agricultural imports was reached in 1988 with the Beef Market Access Agreement (BMAA). The BMAA called for a gradual increase in Japan's import quota over a three-year period, after which import quotas would be replaced by an ad valorem tax, which would decrease over a three-year period.

Specifically, imports would increase by 60,000 metric tons in each of 1988, 1989, and 1990. On April 1, 1991, the quota would be replaced by a 70 percent ad valorem tax, which would fall to 60 percent as of April 1, 1992 and 50 percent on April 1, 1993. Subsequent reductions in the ad valorem tax will be subject to negotiation in the Uruguay Round of Multilateral Trade Negotiations (MTN). Should beef imports exceed 120 percent of the previous year's imports, an additional 25 percent tariff would be charged. After April 1, 1994, safeguard measures will be determined by the GATT. The agreement also called for the Livestock Industry Promotion Corporation (LIPC) to cease its involvement in Japan's international beef trade effective April 1, 1991 (Kihl and Jacobsen 1988, 108-109).

Under the quota system, imported beef was subject to a 25 percent tariff, but when combined with additional surcharges a total charge of 75 to 100 percent was common by the time the product reached the market place (Cullison 1991, 3A). As a result of lower prices and greater availability, in the initial months of market liberalization

sales of chilled U.S. beef (volume) nearly doubled. At the beginning of liberalization, only 15 percent of U.S. beef sales in Japan were of chilled beef. Within the first three months that percentage had reached 29 percent, with the expectation that 50 percent of U.S. beef sales in Japan would be of chilled beef within one year (Pendley 1991, 1A).

In total, within the first month of liberalization U.S. beef exports to Japan rose 13.7 percent, most of which was chilled beef (Davies 1991, 7A). By August of 1991 (the first year of liberalization), though exports of chilled U.S. beef continued to exceed those of previous years, total imports of U.S. beef declined by 27 percent in July and August over the same two-month period of 1990. This was due to a reduction in exports of frozen beef, attributable to surplus frozen beef stocks in Japan (Cattle Fax 1991).

The beef import quota had been the primary means by which beef prices were maintained within their designated stabilization bands (defined by floor and ceiling prices, set by LIPC). Since the beef industry has been less developed than the poultry or pork industries in Japan, it has been given the highest degree of protection through a system of quotas, tariffs and levies since 1964. Import quotas were set by MAFF biannually, and were divided between a general quota and special quotas, with each containing further subdivisions. Nearly 90 percent of the general quota was administered by LIPC, with the remaining 10

percent administered by private entities, primarily traders and beef-processors. Special quotas were implemented to satisfy some special interests, namely the hotel quota, the school lunch quota, the Okinawa quota, and the boiled beef quota.

Beef import quotas in metric tons for selected years were:

Table 2
Import Quotas (Metric Tons)

Japan Fiscal Year	General Quota	Special Quota	Total
1975	75,000	10,000	85,000
1980	119,000	15,800	134,800
1985	141,400	17,600	159,000
1988	253,600	20,400	274,000
1989 est.	309,250	24,750	334,000
1990 est.	364,250	29,750	394,000

Source: Johnson and Fisher 1988, 98.

The removal of the quota and the cessation of LIPC's involvement, which will add flexibility to importing and distributing beef in Japan, signaled a major step by the Japanese government toward opening its domestic beef market to foreign competition. The LDP leadership has recognized the inconsistency of promoting liberalization of foreign

markets for manufactured goods while maintaining a highly protected domestic market for agricultural commodities. To develop a consistent trade policy, and to demonstrate its ability to cooperate as a major world economic power, the government agreed to open its agricultural markets. The government has also acknowledged that its goal of food self-sufficiency, given its limited resources, limited factors of production, and limited economies-of-scale, is not practical (Kihl and Jacobsen 1990, 110). Also, "the rapidly increasing demand for beef in Japan has forced the government to allow imports to increase over time to keep prices from increasing significantly above the established stabilization range" (Wahl et al. 1991, 119).

However, in spite of a downward trend in wholesale prices of meats purchased prior to liberalization and held in cold storage in anticipation of higher prices, initially retail prices either remained unchanged or increased. Citing increased labor and rent expense, prior to liberalization retailers were reported to be "gouging the consumer by increasing profit margins to as much as 40-50% from the traditional 30-35%" (Parker and Scandurra 1991).

CHAPTER 6

JAPAN'S AGRICULTURAL ECONOMY

> Nowhere...is the greying of Japan happening faster than down on the farm. In 1960 half of Japan's farming population were still under 42 years old. By 1990 the median had soared to 60 -- retirement age for the rest of Japan. Demographers reckon that, by 2000, as much as a third of Japan's farming population will have died of old age.
>
> Reported in "The Economist" (Economist 1991, 32).

> It appears that, among the seventeen industrial economies, Japan is the only country which has a growth rate of labor productivity smaller for agriculture than for industry.
>
> Cornelius van der Meer and Saburo Yamada, Japanese Agriculture, A Comparative Economic Analysis (Hsiao 1991, 976).

Nearly 250,000 farmers are involved in the beef business in Japan (about 0.2 percent of Japan's population; about 2 percent of all farm workers; and about 2.7 percent of all full-time farmers), most of whom raise Wagyu cattle. Seventy percent of Japan's beef production, however, is in the dairy industry, which raises and fattens Holstein steers and sells cull cows for beef consumption as secondary activities to milk production. Beef production is generally a sideline to milk production, with most producers owning about ten head. Nearly 66 percent of all producers (Wagyu

and dairy) have less than five head. All told, less than 4 percent of aggregate gross agricultural production in Japan is provided by beef cattle (Kihl and Jacobsen 1990, 108).

Consistent with Japan's rise to industrial prominence in the postwar period, 15 percent of Japan's Gross National Product (GNP) was produced by agriculture, which employed 25 percent of the population shortly after World War II. Both figures dropped considerably by 1985, with less than 5 percent of the population employed by agriculture (and less than 1 percent of Japan's population employed on the farm -- including less-than-half-time and more-than-half-time workers) producing 4 percent of Japan's GNP (Hayes et al. 1990, 208). According to Richard Moore, however, 16 percent of Japan's total population was involved in farming in 1985, down from 45 percent in 1950 (Moore 1990, 11).

In either case, the trend is noticeably downward in terms of population involved in agriculture and contribution to Japan's GNP. As previously described, increased farm mechanization, coupled with higher-wage opportunities in manufacturing, led to an out-migration of labor from the farm sector to the industrial sector (Hayes et al. 1990, 208).

Though agriculture's productivity continued to decline relative to that of manufacturing in the postwar period, per-capita farm income increased faster than non-farm income. In 1930, the typical Japanese farm household earned

32 percent of the non-farm household. By 1980, the figure had risen to 115 percent, attributable to agricultural subsidies and market protection and to an increase in off-farm income in farm households (Hayami 1988, 22). Off-farm employment has therefore accomplished a primary objective of the Agricultural Basic Law of 1961, that is, income parity between farm and non-farm households.

In 1950 there was an unusually large number of farms in Japan because of an influx to the farming community from urban areas and from overseas territories shortly after World War II. However, as employment opportunities grew in off-farm occupations, the farm household replacement ratio (inheriting males/farm households) fell from 85 percent in 1950 to 2 percent in 1985 (Hayami 1988, 78-79). The implication of this is that the number of farms in Japan will fall from 4.3 million in 1985 to roughly 80,000 within one generation, barring a return to farming by male core workers who are presently leaving for off-farm employment (Hayami 1988, 106). Whether this means that smaller farms will get larger (through land purchase or lease), and hence more "viable," or be sold into non-agricultural uses is problematic at this point.

However, though many members of farm households found more lucrative employment off the farm, due to the decentralized structure of Japanese industry many of these workers did not have to leave the farm to secure that

employment. Rather, they remained on the farm in a part-time capacity. Nonetheless, the net effect has been a reduction in the number of farms, the number of viable (i.e., full-time and self-sustaining) farms, and the number of farmers, as shown below. Part-time I refers to those farms with farm income larger than off-farm income. Part-time II refers to farms with farm income smaller than off-farm income.

Table 3
Numbers of Japanese Farms and Farm Workers

(10,000s)	1960	1970	1980	1985	1985/1960
Farms (#)					
Total	6057	5342	4661	4376	.72
Viable	521	353	242	232	.45
Workers (#)					
> 1/2 time	1454	1025	697	636	.44
< 1/2 time	312	522	557	527	1.69
Total	1766	1547	1254	1163	.66
Farms (#)					
Full-time	208	83	62	63	.30
Part-time I	204	180	100	78	.38
Part-time II	194	271	304	297	1.53
Total	606	534	466	438	.72

Source: Hayami 1988, 81-82.

As the above information indicates, though the number of workers whose primary vocation was farming decreased by more than half from 1960 to 1985, the number of workers partially involved in farming increased by over 50 percent in the same time period. There has, however, been a net

decrease in the number of farms and the number of farmers of roughly one-third, and part-time farms have replaced viable farms as the dominant force in rural Japan. By 1991, the number of full-time farmers for whom agriculture is their sole source of income was reported as being no higher than 470,000, or less than half-of-one-percent of Japan's population (Economist 1991, 31). Farmers who are classified as full-time comprise about 5 percent of all Japanese farmers (Reid 1990, H4). From 1975 to 1990, the number of households for whom farming is their major source of income declined by 40 percent to about one million. "Full-time farming families earn $24,000 a year from agriculture; adjusting for inflation, that's less than what they earned ten years ago" (Eisenstodt 1991, 84).

The allure of off-farm income is evident in the following figures:

Table 4
Japanese Farm Income

Year	On-Farm Income (A)	Total Income (B)	A/B (%)
1960	$980	$1,950	50.2%
1970	$2,210	$6,920	31.8%
1980	$4,140	$24,320	17.0%
1985	$4,635	$30,065	15.4%

Source: Moore 1990, 15.
Note: Average pre-1986 exchange rate (1978-1985) of 230 yen per dollar was used.

The salient point is that, by 1985, only 15 percent of

a farm household's income came from farming. Off-farm income has become an increasingly dominant factor in the Japanese family's ability to retain and work its farm.

The typical Japanese farm family of the 1990s consists of a head-of-household who commutes to an off-farm job and who farms only on weekends, and a wife and old parents who farm full-time. The introduction of small, ten-or-less horsepower "hand tractors" has allowed women and the elderly to perform many farm functions without the help of able-bodied men. Demographically the age structure in Japan is rising, most noticeably in life expectancy. In the 1930s the average life expectancy of the Japanese was about 50 years. In 1985 this increased to 75 years for men and 80 years for women. With this labor source available for farming, and the off-farm employment opportunities available for heads-of-household, many farm families have been able to retain ownership of their farms. This has, however, had the unintended effect of impeding growth in the viable-farm sector of the farm economy.

Additional motive for retaining farm ownership has been the security inherent in owning land as well as the investment value of the property itself. The value of tillable farm land has increased dramatically in recent years for several reasons. One is Japan's relatively high population density and mountainous terrain, which limit the supply of raw farm land. Another is the tendency to keep

the ownership of farm land in the family, which limits the amount of farm land available for sale. Yet another involves agricultural subsidies, which tend to be capitalized into the value of farm land. The high cost of farm land has contributed to the lack of expansion, via land purchase, in the number of viable farms.

The farm expansion that has occurred has done so primarily through land leasing rather than land purchase. Economy-of-scale has been an objective of Japanese agricultural policy since the Basic Law and has become increasingly important as wage rates have escalated. Basically, where leasing does occur, large farms have become larger and small farms smaller as small farmers lease land to large farmers. Even so, most landownership patterns are sporadic. That is, even at their relatively small size, most Japanese farms are comprised of non-contiguous parcels. Therefore, as larger farms expand through lease arrangements, those leased parcels are often isolated tracts. The scattered ownership of larger farms effectively limits any economy-of-scale through the use of large machinery.

With an elderly labor force entrenched on family farms, expansion of viable farming units by younger, entrepreneurial farmers is greatly restricted. Therefore, the ability of agriculture to attract, retain and reward some of Japan's more promising managerial talent is

unlikely. Unless the comparative advantage of full-time farmers is increased relative to that of part-time farmers, the ability of Japanese agriculture to be internationally competitive is doubtful (Hayami 1988, 110).

CHAPTER 7

BEEF PRODUCTION IN JAPAN

> Japanese Wagyu beef production is as much an art form as it is agriculture.
>
> Toshikazu Tanaka, marketing director for the U.S. Meat Export Federation in Tokyo (Yates 1989).

If surplus rice paddies were converted to feed-crops or to beef-cattle forage, it is estimated that domestic beef production in Japan could double by the year 2025 (Khan et al. 1990, 14). Even if it did, domestic production would not accommodate anticipated demand. Because of Japan's low self-sufficiency in beef production, imports are a necessary variable in the equation of consumer demand and beef supply. Japan expanded its imports after 1954, beginning with frozen grass-fed beef brisket from Australia and New Zealand. In 1986, the first shipment of chilled grain-fed beef (eighty-eight carcasses) was imported by Japan (Johnson and Fisher 1988, 37). By 1987 beef imports had expanded to nearly 50,000 tons valued at about $900 million, which made Japan one of the world's five largest importers of beef (Khan et al. 1990, 14). Commensurate with the development of beef imports was the expansion of Japan's domestic production

capabilities.

As mentioned previously, Waygu and dairy cattle are the two primary sources of domestic beef production in Japan. Known for its ability to produce high-quality beef (simplistically, the greater the marbling the higher the quality since flavor is largely derived from marbling), Wagyu is raised under very careful, deliberate methods in order for the carcass to marble to its full potential. The typical Japanese producer, who is raising Wagyu for Japan's premium market would follow the following procedures: restricted movement, either confined to small pens or tethered in barns; long feeding periods at slow rates of gain (relative to U.S. standards), often feeding the animals for 18 to 20 months (as opposed to 5 months in the U.S. commercial feedlot industry) with slaughter at 27 to 29 months of age (as opposed to a 17- to 19-month average in the U.S.); feeding hand-mixed, carefully measured feeds to each animal twice daily to ensure complete consumption; massaging and grooming; and, in some instances, feeding the animals beer as an appetite enhancer. As a result, beef with twice as much marbling as steaks grading U.S. Prime is brought to market. Marbling is caused primarily by four factors: genetics (Wagyu is best), length of feeding period (longer is better), maturity (older is better), and sex (female is better) (Reeves et al. 1991, 10b).

Wagyu calves are often fed concentrated rations as a

supplement to milk beginning at two to three months of age. They are weaned at eight to ten months and sold as feeder calves (if not retained to be fed by the breeder) or as replacements to other breeders. The majority of the calves are marketed individually at special calf auctions which occur every couple of months and last from two to three weeks.

The more intensive feeding period for Wagyu calves begins at ten to fifteen months of age. In the early 1960s the calves were fed for about twelve months. In the 1980s, this period was more than doubled in an attempt by producers to increase the degree of marbling. The motive was to push their cattle to qualify for the highest meat grades, which sell at substantial premiums. This length of feeding period is expected to continue but is not expected to increase due to the biological limits of Wagyu, which, given current technology, appear to have been met (Wahl 1989, 9).

The "ideal" feeding method involved feeding Wagyu heifers till almost thirty-six months of age. These cattle, representing less than 5 percent of all Wagyu, are fed by growers who specialize in producing top-grade Wagyu beef. Each grower usually fattens one or two head at a time, preferring heifers to steers (but not restricting the operation to heifers only). Special rations, involving a gradual increase in the energy level of the feed during the feeding period, is fed until the animal is finished (Johnson

and Fisher 1988, 22). In extreme cases, the animal is fed for up to six years (Hayes 1990, 5).

Because of the difference in age and length of feeding period from the typical U.S. feeder, the live weight of Wagyu at slaughter will average about 1400 pounds compared to 1050 pounds for the U.S. feeder. This translates to about an 800 pound Wagyu carcass, up from a carcass weight of about 460 pounds in 1960. When compared to U.S. production costs, Japanese Wagyu is two to 2.8 times more expensive to raise (Khan et al. 1990, 18). Wagyu carcass weights have dropped slightly since 1981 as a result of government efforts to decrease production costs (Wahl 1989, 11).

Despite the financial reward for raising this type of beef and the effort expended, very few carcasses reach the top Japanese beef grades. From 1980 to 1990, only 5 to 7 percent of all Wagyu steers graded in the two top categories (Supreme and Superior) (Khan et al. 1990, 18). Only 1 to 2 percent graded in the top category (Wahl 1989, 11).

The second sector of Japan's beef industry is less radically different from the U.S. beef industry. Dairy cattle are fed for 12 to 13 months (still more than double the U.S. feeding period) and are slaughtered from about 1450 to 1475 pounds. After being fed to feeder-calf weights on farms which specialize in raising calves, the calves are sold to feedlots where they are finished (i.e., fed high-

concentrate rations for up to 13 months), at which time their carcasses are similar to U.S. Choice. Though dairy cattle are slaughtered at heavier weights than Wagyu they do not grade as well. Under the old Japanese beef grading system, only one-half-of-one percent to 1 percent of dairy carcasses reached the Excellent grade (the number three grade, with Superior number two and Supreme number one) (Khan et al. 1990, 18; Wahl 1989, 12).

Though dairy beef is not as profitable per unit as Wagyu, it is cheaper to raise and is better suited to economies-of-scale. As Japan's beef market has diversified, dairy beef caters to an increasing market for less exclusive and less expensive cuts. As a result, at least until recently there has been a general downward trend in the production of Wagyu in Japan. Wagyu accounted for 60 percent of total domestic beef production in 1965. By 1987 Wagyu's share of domestic production had slipped by half, to under 32 percent (approximately 177,000 tons). Conversely, dairy beef increased from 900 tons in 1965 to about 375,000 tons in 1987 (Khan et al. 1990, 18-19).

Despite efforts by the Japanese government to encourage beef production, the Wagyu herd decreased from 2.3 million head in 1962 to a low of less than 1.4 million head in 1972. By 1986, the Wagyu herd had recovered to over 1.6 million head, well below its 1962 level. Much of the reason for the decline in herd numbers was attributable to high feed costs,

which led to a sharp drop in the profitability of raising Wagyu (Wahl 1989, 9).

Whereas the Wagyu herd has decreased, the dairy herd has increased -- from less than 1 million head in 1962 to about 3 million head in 1986. The dairy industry has also cut unit costs of production -- something which the Wagyu sector has not been able to accomplish (Johnson and Fisher 1988, 36). Because milk production is profitable, calves are considered a byproduct and contribute less than 10 percent to dairy revenue.

Table 5
Wagyu and Dairy Cattle Numbers in Japan

	Wagyu (1,000s)			Dairy (1,000s)			
Year	Total	Cow Herd	Feeder Cattle	Total	Cow Herd	Feeder Cattle	TOTAL
1962	2337	1309	1027	1145	729	416	3482
1965	1568	733	835	1318	885	434	2886
1970	1573	714	859	2042	1245	797	3615
1975	1427	645	782	2296	1275	1021	3723
1980	1478	633	845	2907	1457	1450	4385
1985	1662	632	1030	3080	1460	1620	4742
1986	1657	618	1009	3068	1418	1650	4725

Source: Wahl 1989, 12, 14, 16.

Of particular importance is the reduction in the breeding base of the Wagyu herd, those cattle which produce premium beef in Japan, by more than half, and a corresponding increase, by a factor of two, in the breeding base of the dairy herd.

While the number of beef cattle (a combination of Wagyu and dairy cattle) has increased from about 1.9 million head in 1965 to over 2.6 million head in 1988, the number of farms which raise beef cattle has decreased from 1.4 million to about 260,000 in the same time period (Johnson and Fisher 1988, 14). This has meant that the number of cattle per farm has increased by a factor of ten, from less than two head per farm to over ten head per farm (Johnson and Fisher 1988, 14). About 85 percent of Japan's beef herd is on farms of less than ten head (Johnson and Fisher 1988, 15).

While the number of dairy cattle has increased from about 1.3 million head in 1965 to over 2 million by 1988, the corresponding number of dairy farms has decreased from 381,600 to about 71,000. Likewise, the number of dairy cattle per farm has increased from just over 3 head in 1965 to nearly 29 head by 1988. Approximately 58 percent of dairy farms have between 10 and 50 head (Johnson and Fisher 1988, 16).

Some researchers consider Japanese dairy beef to be similar to imported beef. Others insist that they are markedly different, and that Wagyu is distinctly different from either. Under this perception beef is not a commodity in Japan. Each beef product has its own characteristics and its own market, and is priced accordingly. As reported below, the farm price for cattle has shown a steady increase for the survey period. Wholesale price of Wagyu is about

twice that of dairy beef, and at the retail level Wagyu has commanded about a 70 percent premium since 1980. The relative prices (in yen per kilogram) appear as follows:

Table 6
Wholesale and Retail Beef Prices in Japan

	Wholesale		Retail	
Year	Wagyu	Dairy	Wagyu	Dairy
1965	510	410	1079	867
1970	843	589	1783	1246
1975	1640	1166	3470	2467
1980	2161	1272	4572	2691
1985	2158	1249	4565	2642
1986	2180	1292	4612	2733

Source: Wahl 1989, 15.

As a point of reference, the retail prices convert to the following dollars per pound:

Year	Wagyu Retail	Dairy Retail
1970	$2.25	$1.57
1980	$9.13	$5.38
1985	$8.66	$5.01
1986	$9.47	$7.33

Source: Calculated from preceding table using average per-year exchange rates.

The average farm size in Japan has basically remained constant since 1908, ranging between 1.0 and 1.2 hectares (about 2.5 to 3 acres). Within this average, as a

percentage of total (i.e., the number of farms less than one-half hectare, the number of farms from one to two hectares, the number of farms larger than five hectares, etc.) the number of farms within different size classes has not changed appreciably within the same time period. The largest category has been farms less than half a hectare (with few exceptions, consistently near 40 percent of all farms have been smaller than half a hectare), and the smallest category has been farms greater than five hectares (with few exceptions, consistently between 1 and 2 percent) (Hayami 1988, 27). Essentially, then,

> ...a large number of inefficient mini-sized farms incompatible with the introduction of modern labor-saving technologies has been preserved, especially in the rice and beef sectors to which the strongest protection has been given (Hayami 1988, 73).

This becomes apparent when compared to the output per farm worker in the U.S., where economies-of-scale are pervasive. Though the output per farm worker in Japan is about one-tenth that of the U.S., conversely, output per unit of land in the U.S. is about one-tenth that of Japan, reflecting a Japanese agriculture which is more intensive than that of the U.S.:

Table 7
Farm Output, U.S. and Japan

	Output per Male Worker[3]	Output per Hectare
U.S.	285	1.2
Japan	28	12.2

Source: Hayami 1988, 75.

If the government's sheltering of agriculture is to be removed, then for the full-time farmer to generate an on-farm income equivalent to that of off-farm workers, labor-saving technology must be implemented. The problem for Japanese agriculture then becomes the structural impediments to increasing scale economies. Given the lack of progress in this regard throughout this century in spite of government policies designed to remove those impediments, it appears as though little progress in real terms in agricultural production in Japan is imminent.

The implications of this for the beef industry in Japan are poignant. Part-time and elderly workers, which make up the bulk of Japan's agricultural labor force, usually focus on rice farming "because it is a very stable crop offering a high return on only intermittent labor without much managerial effort" (Hayami 1988, 90). It would not be unreasonable to conclude that, in terms of units produced,

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[3]Output is in terms of wheat units, equivalent to one ton of wheat into which other agricultural products are converted according to the ratios of their prices relative to the price of wheat (Hayami 1988, 75).

the Japanese beef industry may support only moderate growth in the foreseeable future. In terms of profit, however, in light of a growing demand for beef the industry itself may benefit even as imports command an increasing share of the market.

Although the production of beef in Japan has shown a steady increase, from 2.9 million head and 142,000 carcass tons in 1965 to 4.7 million head and 559,000 carcass tons in 1986, Japan's domestic beef industry remains a relatively insignificant component of Japan's economy (Johnson and Fisher 1988, 9). In 1986, "the value of beef production accounted for only about 4 percent of the gross value of agricultural output" in Japan (Johnson and Fisher 1988, 10). In other words, beef production accounted for about one-tenth of 1 percent of Japan's GNP in 1986.

By 1987, domestic beef production accounted for less than 70 percent of beef supplies, down from 96 percent in 1960 (Johnson and Fisher 1988, 11, 17). The following table compares domestic production with import volume:

Table 8
Volume of Japanese Beef Production and Beef Imports

(1000s tons)	1985	1986	1987	1988	1989
Japan Production	555.3	558.6	564.9	569.8	547.8
Import Volume	220.4	262.0	319.0	379.7	495.9
Total Supply	775.6	820.6	883.8	949.5	1043.6
Import/Total (%)	28.4	31.9	36.1	39.9	47.5
Percent Change	n/a	+5.8	+7.7	+7.4	+9.9

Source: AGSMS 1991, 3.

Though modest increases in domestic production were seen in 1986 through 1988, it is significant that domestic production registered a decrease in 1989 from 1988 in spite of a nearly 10 percent increase in total beef supply. This is illustrative of the growing role which beef imports play in total beef supply. Specifically, domestic production declined about 1.3 percent from 1985 to 1989, while beef imports increased 125 percent and total supply increased about 35 percent -- all of which occurred while Japan's population increased about 1.8 percent (from 121.049 million in 1985 to 123.255 million in 1989) (Statistical Handbook 1991, 15). Beef imports, then, are commanding an increasing share of an increasing market in relative as well as absolute terms. That is, not only are there more people, but more of those people are eating beef (or, those people who are eating beef are eating more of it) and more of the beef being eaten is imported.

The relative decline of the traditional Japanese beef

breed and the emergence of dairy-steer-fattening as a growing element of beef production is likely the most significant development in the Japanese beef industry in recent years (Johnson and Fisher 1988, 17). As of 1987, dairy beef accounted for roughly 70 percent of Japan's total domestic beef and veal production. In the 1960s, slaughter of Wagyu and dairy beef were about equal in terms of numbers of cattle. Twenty years later, about twice as many dairy as Wagyu cattle were raised for slaughter (Johnson and Fisher 1988, 17).

CHAPTER 8

DISTRIBUTION OF BEEF IN JAPAN

> It is true that even Agatha Christie's Hercule Poirot would be baffled by how goods in Japan get from the factory or farm to the consumer.
>
> Shintaro Ishihara, The Japan That Can Say NO (Ishihara 1991, 97).

> Price increases that result when Jeep Cherokees are shipped across the Pacific are an even bigger mystery than the Bermuda Triangle.
>
> Lee Iacocca (paraphrased), The Wall Street Journal (Chandler 1992).

> Today, there's a labor shortage in Japan, yet at least 300,000 people working in the distribution system are said to be completely redundant.
>
> Matasaburo Kazeno, Journal of Commerce and Commercial (Kazeno 1990).

For the domestic beef producer in Japan, there were generally three distribution channels available. These channels were: (1) the traditional channel, controlled largely by the "butcher's guild," which distributed about 10 percent of domestic supply; (2) auction or central markets, which slaughter and auction carcasses, and which provide producers direct access to wholesale markets, distributed 25 to 30 percent of the beef supply; and (3) meat processors, which slaughter, cut, and package beef, and which allowed producers to bypass wholesale markets, distributed 60 to 65

percent of supply (Hayes 1990, 231).

Imported beef was distributed according to the quota system, and was further complicated by specific procedures pertaining to its purchase and sale. The quota system not only made the importing of beef to Japan quite complicated for exporters, it was also cumbersome for user-groups in Japan who were often required to source their beef from different quota allocations. Under the quota system only thirty-six trading companies and twenty-nine user associations were allowed direct participation in the import market, which essentially allowed that market to be monopolized (Khan et al. 1990, 60). With the dissolution of the quota structure and the disengagement of LIPC, this monopoly will disintegrate, and over time, imported beef will become more available to a broader range of wholesalers and retailers at more reasonable prices.

Retailers of foodstuffs and drinks account for over 40 percent of all retailers in Japan, by far the largest category of retail store (JETRO 1990, 70). Though purchases of beef by a retail outlet directly from the foreign supplier is now possible, the use of wholesalers is expected to continue because of their attendant services, such as custom cuts and frequent delivery. Wholesalers may also offer the retailer a significant degree of comfort with their control over quality of product. This may be especially true for the restaurant market.

Meat processors in Japan have a wide distribution system, which may position them to become a major force in the distribution of chilled beef. Increased sales are expected to follow increased distribution since one reason Japanese consumers do not buy beef is simply its lack of availability, especially in smaller meat shops. Since 76 percent of meat shop supplies are provided by cooperative associations, it may be advisable for exporters to work through these cooperatives in order to penetrate this market.

However, for larger retail outlets like hotels, restaurants and supermarkets, direct sales bypass markups imposed by a myriad of middlemen within the Japanese distribution system. With fewer markups, retail prices should decline, and with a price-quantity elasticity greater than one, the amount of beef imported should increase (i.e., as price declines, quantity purchased should increase by a greater amount). With the quota and tariff restrictions of the pre-April 1, 1991 Japanese beef market, prices of imported beef in Japan were almost four times U.S. export costs by the time the beef was purchased by the consumer (Khan et al. 1990, 67).

Top-grade domestic beef sold for as much as (the equivalent of) $54 per pound in Japan in 1988. At its cheapest, popular beef (for which most imported beef would qualify) could be found for $9 per pound (Khan et al. 1990,

67). By inference, the cost to the importer of that same product (popular beef) would be about $2.25 per pound. Historically the Japanese government had maintained that without high prices the domestic beef producer would fall victim to foreign competitors, and Japan's food security would suffer as a result. In terms of direct monetary gain, however, the primary beneficiaries of Japanese pricing schematics were wholesalers and retailers within the Japanese distribution system (Khan et al. 1990, 67). With price being an important consideration in the market for table beef (i.e., home consumption), to the extent that the gap between import cost and retail price can be narrowed by the gradual removal of protective measures and a less cumbersome distribution system, product demand should increase.

Historically, trading companies have played an integral role in the development of Japan's import and export markets. Japan emerged from a two-hundred-year-period of global isolation during the Meiji era. In the 1870s Japan's business community agreed to concentrate trade functions within a relatively small group of specialized companies. This was felt to be necessary in order to overcome language barriers and to work through Japan's unfamiliarity with international trade practices (JETRO 1990, 93). Given Japan's reputation as being a nation of shrewd traders, speculation would allow that this was a wise step.

The trading companies were able to tap into and maintain international trading networks which identified export opportunities for Japanese manufacturers and allowed those businesses to purchase raw materials at favorable rates. Since then trading companies have, in the view of the Japanese, promoted the smooth flow of trade. The benefit that trading companies have is partially found in their volumes of trade, which lead to lower unit costs and more efficiency in product distribution than would otherwise be the case (JETRO 1990, 93).

There are approximately 8,500 classified trading companies in Japan (JETRO 1990, 93). Though the size of these companies varies dramatically, smaller, specialized trading companies handle smaller volume products (like premium beef) which may require sophisticated marketing. By-and-large, in addition to developing trade flows, which is vital since trade is their source of revenue, trading companies act as intermediaries between exporters and importers. Among other activities, trading companies handle much of the necessary paperwork, obtain favorable trade financing, supervise transportation, arrange insurance and storage, and provide useful information (JETRO 1990, 94).

With market liberalization and the end of the quota system, beef exporters were given the opportunity to trade directly with retailers. However, bypassing intermediaries in the distribution system has not proved easy to beef

exporters. Unless the exporter can form its own outlets in Japan, the traditional structure might well prove to be the best avenue for product distribution. High labor and land costs, a shortage of truck drivers and other workers integral to product distribution, and entrenched, traditional distribution channels, all form barriers to new outlets. As a result, established trading companies may well remain a critical link in the distribution of imported goods in Japan (Cody 1991b, 1A).

A critical factor in the distribution of goods in Japan is that of personal relationships. These often take years to develop, and until they are entry to the Japanese market may well be blocked. Establishing trust, and a commitment to the long term, are essential for an exporter to gain access to the Japanese distribution system, which is imperative if one is to gain access to the Japanese market.

CHAPTER 9

ECONOMIC OPPORTUNITY IN THE JAPANESE MARKET

> [Feeding for the Japanese market is] a much greater expense, 20 percent to 25 percent higher, but our restaurant-grade beef will bring $45 to $65 a pound in Japan. Here, it's probably $9.
>
> Donald Butler, President of Shasta Foods International, operator of Monterey County Cattle Feeders Inc. (La Granga 1990).

> At current levels, Japan is importing from all sources the equivalent in beef of all the feeder cattle in Iowa, about 1 million to 1.3 million head. If predictions come true, within 10 years, they will be taking the equivalent of all the meat cattle...[that] Nebraska and Iowa could supply.
>
> Marcia Krings, reporting for Agri-News (Krings 1991).

Japan is one of the richest countries in the world. Per capita GNP in Japan in 1988 was $23,365, second only to Switzerland and Iceland (JETRO 1990, 15). Personal income has grown with GNP, resulting in an increase in personal income in real terms which has fueled an increase in personal consumption. The value of Japanese assets have increased since 1982, which has also encouraged increasing amounts of personal consumption (JETRO 1990, 15).

The upswing of the personal consumption curve is also attributable to the increasing numbers of women entering the

work force. From 1975 to 1988, the number of female employees increased 43 percent to 16.6 million workers, or 37 percent of the total work force. This has led to an increase in the number of double-income households, which means that wives, who control most personal expenditures in Japan, have more money to spend than they've had in recent history. This trend is expected to continue because of the tight supply of labor in Japan (JETRO 1990, 16).

In spite of Japan's efforts toward self-sufficiency in agriculture, Japan is the largest net buyer of farm commodities in the world. It is also the largest market for exports of U.S. agricultural products, accounting for almost 20 percent of total sales of U.S. exports in the past few years. Thirty-four percent of Japanese farm imports were sourced from the U.S. in 1987, and 75 percent of all U.S. beef exports are imported by Japan. Second to Canada, Japan is the largest trade partner with the United States (Kihl and Jacobsen 1990, 107).

Also of significance is the Plaza Accord of 1985, whereby the G-7 finance ministers realigned the value of the yen and the U.S. dollar by allowing the yen a significant increase in value vis-a-vis the dollar. Within three years the value of the dollar was reduced by half with respect to the yen. The effect of the Accord on exchange rates can be seen in the following chart:

Table 9
Exchange Rates

Year	Yen per U.S. Dollar	
	Average	End-of-Year
1978	210.44	194.60
1979	219.14	239.70
1980	226.74	203.00
1981	220.54	219.90
1982	249.08	235.00
1983	237.51	232.20
1984	237.52	251.10
1985	238.54	200.50
1986	168.52	159.10
1987	144.64	123.50
1988	128.15	125.85
1989	137.96	143.45
1990	144.79	134.40
1991	n/a	124.85

Source: Statistical Handbook 1991, 158.

The intention of this agreement was to lower the costs of imports to Japan and raise its costs of exports, primarily with the United States, in order to correct the trade imbalance of those two countries. The appreciation of the yen has been a major factor in increasing Japan's imports, and it has increased the purchasing power of the Japanese consumer. Because prices of imported goods declined, more money was available for the consumer to buy more of everything, not just imports. Domestic spending has consequently become the driving force behind growth in the Japanese economy (Kihl and Jacobsen 1990, 94).

The appreciation of the yen has also made it more difficult for Japanese producers to cut production costs

relative to other countries (JETRO 1990, 9). Coupled with a tight labor market concomitant with the aging of Japan's population, segments of Japan's market are likely to become vulnerable to production in those countries where labor and input costs are relatively cheaper. For this to achieve any significant dimension, however, Japan must allow its international competitors to enter its market place in a more liberalized manner. As Japan's trade imbalance with the United States has persisted in spite of the yen's appreciation, steps toward liberalizing the Japanese market have been taken (see Chapter 5). The rise in the value of the yen, combined with an over-supply of global food supplies, has widened the disparity between Japanese and international food prices, which has led to rising demands from consumers for liberalized food imports.

The removal of beef import quotas effective April 1, 1991, was expected to release a pent-up demand for beef by an affluent market which is half the size of that in the United States. With 124 million people, in terms of total domestic consumption the Japanese market is the second largest in the world. Japan is also one of the two largest net food importers in the world (the former Soviet Union has been the other). Even preceding market liberalization, from 1960 to 1985 the real value of Japan's food imports increased at an average rate of 13 percent per year, which is more than three times that of the world total (Hayami

1988, 2). Consistent with this is Japan's self-sufficiency in beef production, which declined from 96 percent in 1960 to 69 percent in 1986 (Johnson and Fisher 1988, 11).

Monthly disposable income per household in Japan has increased from 344,000 yen (about $1,450) per month in 1983 to 406,000 yen (about $3,170) per month in 1988 while food purchases, though still the largest single budget expenditure, declined from 21 percent of household disposable income to 18.4 percent for the same period (JETRO 1990, 34-35). Similarly, expenditures by Japanese consumers for eating and drinking in 1988 was 157 billion yen (about $1.23 billion). At 27 percent of all expenditures in leisure-related markets, this was the highest single category in terms of disposable income spent of any leisure market (JETRO 1990, 54).

In spite of rising beef prices, beef consumption in Japan has shown a per-capita increase to roughly 10 pounds in 1986 (compared to nearly 70 pounds per-capita consumption in the U.S.) from just under 2.5 pounds in 1960. This level is expected to increase to 15 pounds per capita by 1995 (Johnson and Fisher 1988, 45), or to as much as one-half of the per-capita U.S. consumption (interview with Hiroshi Aoyama, General Manager, Meat Products Department, Nichiro Corporation, June 17, 1992). This would eventually place per-capita Japanese beef consumption at 30 to 35 pounds.

Given the high price elasticity of beef in Japan, if

prices decline as expected with market liberalization, an increase in consumption should outpace increases in price. Beef consumption in Japan has increased with the increase in disposable income. When quantity consumed is charted against disposable income, however, elasticity is estimated to be 1.5, so that with an increase of one unit of disposable income, consumption will increase by 1.5 units. Beef consumption, then, is expected to increase at a faster rate than the increase in disposable income (Khan et al. 1990, 13).

Econometric studies conducted by Thomas Wahl, Dermot Hayes, and Gary Williams suggest as much:

> The estimated expenditure elasticities indicate that both Wagyu and import-quality beef are luxury goods in Japan. The expenditure elasticity of demand for import-quality beef is also greater than is that for Wagyu beef. This result is somewhat surprising because Wagyu beef is more expensive in Japan than is import-quality beef (Wahl et al. 1991, 122-123).

Wahl et al go on to report that, under the Beef Market Access Agreement (BMAA), beef imports are projected to reach 1.2 million metric tons by 1997, up from an anticipated 394,000 metric tons for 1990. In view of this, Wahl et al see an opportunity for U.S. and other beef exporters "to significantly increase exports to Japan" (Wahl et al. 1991, 125). While the authors expect the "disappearance" of Wagyu to change little, they also expect per-capita "disappearance" of import-quality beef to more than double by 1997. Likewise, consistent with the increasing market

for beef imports in Japan, U.S. producers expect their exports to more than double by the year 2000 (Parker and Scandurra 1991). Dermot Hayes expects the value of U.S. exports to Japan to also double, but he expects it to do so by 1993. With U.S. beef exports valued at $1.1 billion in 1989, anticipated sales should therefore exceed $2.2 billion in real terms by 2000.

While climbing from 278,000 tons in 1970 to 565,282 tons in 1987, domestic beef production has not kept pace with consumer demand. Even with the increase in consumer demand, meat consumption in Japan lags that of other countries of similar economic stature. Though pork is the meat most often purchased by the Japanese consumer, beef is nonetheless most frequently named as the meat of choice among most age groups. Increases in purchases of U.S. beef are expected to range from 20 percent to 100 percent depending upon the cut (Khan et al. 1991, 60). When and how much largely depends upon a drop in prices, which is expected to occur as the ad valorem tax declines.

With the projected increase in Japan's population, the limited productive capability of Japan's domestic beef industry, and increasing consumer demand, much of the growing market for beef in Japan will be satisfied by imports. As such, if exports of U.S. beef to Japan double from $1 billion to $2 billion by 1993 as Dr. Hayes expects, this market would be equivalent to 10 percent of the U.S.

beef industry at present value ($20 billion) (Hayes 1990, 6), or an increase of 12 million people in the U.S. population (Hayes et al. 1990, 161). In fact, beef imports are expected to capture an increasing share of an increasing market as the affects of market liberalization take hold.

As of 1991, 70 percent of U.S. beef exports, valued at $1 billion, were shipped to Japan. In 1989, the U.S. shipped 850 million pounds of beef and veal to Japan. This is equivalent to 1.6 million cattle, or 30,000 head per week, which is about 4 percent of U.S. production. As reported by the U.S. Meat Export Federation, these exports increased the value of an average U.S. steer by $79 in 1989 (Dorgan 1990, 1A) as a factor of increased demand.

Compared to imported U.S. beef, domestic Japanese beef was roughly three times as expensive in 1990. Tokyo meat specialists expect that gap to close, however, as U.S. suppliers develop their product to meet the requirements of the Japanese consumer. As a luxury good, top-quality beef often escapes the typical consumer search for bargains (Cullison 1991, 10A).

As reported by the U.S. Meat Export Federation, Japanese consumption of beef is expected to double or triple by 2000. John Harris, a major west-coast beef processor and exporter of beef to Japan, "sees a fivefold increase in U.S. beef sales to Japan if the U.S. cattle industry can capture just half the expansion in purchases by Japanese consumers"

(Dorgan 1990, 1A). While imported beef accounts for about 40 percent of Japan's annual beef consumption at present, by the turn of the century that share is expected to fill more than half of total Japanese demand. As of 1991, U.S. imports accounted for about 43 percent of that 40 percent (Cullison 1991, 10A).

> In the Tokyo Wholesale Market on February 1, 1990, prices of air-freighted chilled carcasses from longer-fed US cattle graded B3 varied between 1,200 yen and 1,400 yen per kilogram (Lin and Mori 1991, 104).

With the exchange rate at 144.93 yen-per-dollar on February 1, 1990, this converts to a range of $3.76 to $4.38 per pound. In comparison, prices for U.S. prime carcasses in the U.S. wholesale market for that same date were approximately $1.20 to $1.25 on a per pound basis[4] (telephone interview with Cattle Fax 1992). This differential suggests a profit margin in the range of $2.50 to $3.10 per pound in the Japanese market over the U.S. market. At the top end of the scale, in the same year Kobe beef, or Wagyu raised in the Kobe region of Japan and known for its superior marbling even by Wagyu standards, sold for as much as $180 per pound in Japan. To the extent that carcass quality can be improved, the upside in terms of

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[4]This price range is based on adding from $5.00 to $6.00 per hundred-weight to the wholesale carcass price of "Choice cut-out value," which is a "rule-of-thumb" for determining the price range of Prime carcasses. The Choice cut-out value on February 1, 1990 was $117.53 per hundred-weight for carcasses weighing 550 to 700 pounds (telephone interview with Cattle Fax, June 3, 1992).

price-per-pound is substantial.

Restaurants offer significant potential as markets for U.S. chilled beef. Thirty-four percent of Japanese beef consumption occurs in restaurants (Eaheart 1991, 15). There is an estimated one restaurant for every 125 people in Japan, as opposed to one for every 400 people in the U.S. (Martin 1991, 158). More than 41 percent of all sales in all retail franchise chains occurs in foodservice franchise outlets (Martin 1991, 158). Home consumption, however, remains the largest sector for beef disappearance at 51 percent, yet, at 25 percent, is also the smallest sector for consumption of beef imports (Eaheart 1991, 15).

CHAPTER 10

DEFINITION OF PRODUCT

> Generally, Japanese consumers claim to judge beef quality by marbling and tenderness. However, according to retailer [sic], price seems to be the most important factor in judging quality.
>
> A Washington State University Team that visited Japan in 1989, reported in BEEF (Vansickle 1991a, 39).

Traditional Japanese dishes require very tender beef. Tenderness and flavor is largely a function of marbling -- the more intramuscular fat there is (marbling) the more tender and flavorful the meat. The Japanese style of premium beef production, i.e., extended feeding periods for Wagyu cattle, evolved from this product requirement. For instance, sukiyaki is made with paper-thin slices of beef, cooked in a skillet with vegetables and a special soy sauce. Shabu-shabu also requires paper-thin slices of beef, which are dipped into boiling water with seasoned ingredients. Without a very high degree of marbling, beef cooked in this manner may produce an offensive odor (especially true with grass-fed beef) and often becomes tough when boiled or cooked in high moisture. The advantage of highly-marbled beef is with its fat, which tends to seal the natural juices

and promote tenderness by melting around the meat. The preference for highly-marbled beef may also be a factor of conditioning in that Japanese consumers are raised to believe that the best tasting beef is that of the heavily-marbled Wagyu (Hayes et al. 1990, 169).

In addition to marbling, other important, defining characteristics of meat quality include freshness (chilled being much preferred to frozen), color and texture of the meat, fat color, moisture content ("absence of drip"), and ultimately, what beef-type the meat is (i.e., Japanese Wagyu vs. domestic dairy vs. imported). The degree to which the product is organic, in the sense of being raised free of pesticides, additives, and chemical treatment (growth implants or vaccinations), and processed without the use of preservatives, are also important considerations for the Japanese consumer.

Separate from the beef itself, but nonetheless an important characteristic of the product, is packaging. Labeling of package ingredients is important in order to identify (or the lack thereof) any inorganic inputs. Also, the size, appearance, and quality of package defines which type of beef it is. Small packages are the norm, reflecting not only the smaller servings which are typical of the Japanese market but also the relative lack of storage space (most meat is consumed on the day of purchase because of limited refrigeration space in the typical Japanese home).

Nearly half of all meat purchases are between one-half and one pound, and beef is purchased on an average of once or twice per week. Several layers of wrapping, higher quality materials, and attractive, eye-catching packages are important to the Japanese consumer. In fact, it is not uncommon for the cost of packaging to exceed the cost of contents in Japan (Khan et al. 1990, 49-50), as it often does in the United States.

CHAPTER 11

BEEF GRADING IN JAPAN

> Because the quality grade is determined by the lowest score of the four quality characteristics, carcasses of the same quality grade often display dissimilar quality characteristics....Because buyers may place different values on different yield and quality characteristics, it is not surprising to see that carcasses of the same yield and quality grades are priced over a wide range. Biing-Hwan Lin and Hiroshi Mori (Lin and Mori 1991, 104).

In April of 1988 Japan changed its beef grading system in an attempt to place less emphasis on marbling in order to reduce production costs. As a result, more emphasis has been given to carcass yield, but as a practical matter marbling has remained a primary consideration in judging the quality of a particular carcass. The old system consisted of six categories. In descending order these were: Supreme, Superior, Excellent, Medium, Common, and Utility. Marbling scores, ranging from a low of 0 to a high of 5, were also used to refine each grade. Japanese graders considered U.S. Prime to be equivalent to Japan's Excellent grade, U.S. medium and high Choice were rated equivalent to Japan's Medium, and U.S. low Choice and high Good were considered equivalent to Japanese Common (Khan et al. 1990,

17).

At the time of the above comparison, the U.S. meat grades were, in descending order of quality: Prime, Choice, Good, Standard, Cutter, and Canner. Prime, Choice, Good, and Standard were further delineated as high (+), medium (absence of + of -), or low (-). Subsequently, "Good" was renamed "Select."

Comparison of U.S. grades with Japanese grades would then appear as follows:

Table 10
Former Japanese Beef Grades and U.S. Equivalents

Japanese Grade	U.S. Equivalent
Supreme	none
Superior	none
Excellent	Prime
Medium	High or Medium Choice
Common	Low Choice or High Good
Utility	(no poor beef exported)

Source: Khan et al. 1990, 17.

An important difference between the Japanese system and the U.S. system is the carcass used to determine grade. While these Japanese grades were determined by cutting the carcass between the 5th and 6th rib, in the U.S. the standard has been to cut between the 12th and 13th rib. The significance of this is that the meat is generally more highly marbled at the former cut (5th and 6th ribs), which has caused U.S. beef to be downgraded in the Japanese market

(Hayes 1990, 2).

The new Japanese grading system involves three yield grades, A, B and C, which use a regression equation to classify yield percentages. According to Mr. Aoyama (General Manager, Meat Products Department, Nichiro Corporation), yield grade refers to the amount of meat retrieved from a carcass, with 70 percent yield qualifying as A, 60 percent yield as B, and less than 60 percent as C (interview with Hiroshi Aoyama, 1992). Yield is determined so that the normal distribution is around the B grade.

Four other classifications, consisting of: (1) beef marbling; (2) meat color and brightness; (3) meat firmness and texture; and (4) color, luster, and quality of fat; are each important measures of quality and are each rated on a scale of 1 to 5 with 5 being high. Carcasses in Japan are now cut between the sixth and seventh rib for the purposes of grading throughout Japan.

A multiple regression equation, which includes four carcass measurements, estimates the cutability percentage of the carcass and assigns a yield score. Most measurements are taken between the sixth and seventh rib. For Wagyu carcasses, a factor of 2 percent is added to the base numerical score in the equation, giving Wagyu a slight but automatic advantage (interview with Dr. Jerry Reeves, June 18, 1992).

There are 12 classifications for marbling (1 is low, 12

is high), with 1 having no intramuscular fat (similar to wild meat), and 12 appearing to be peppered with fat, all intramuscular, comprising as much as 80 percent of the cut. There are seven colors of meat, ranging from a bright pink (best) to a deep, ruddy red (worst). There are also seven colors of fat, ranging from a bright, pure white (best) to a yellowish white (worst). Color assessment for both meat and fat is by visual appraisal, as are firmness and texture.

Once each of the four classifications are assigned a number (from one to five), the lowest of those four numbers is placed with the yield score. The result is a grade ranging from C1 (lowest) to A5 (highest). Out of a possible fifteen scores, the final meat quality score is the minimum score which that carcass can be assigned.

When the new grading system was implemented (1988), quantity of steer carcasses grading in each category in Japan appeared as follows:

Table 11
Carcass Grades of Beef Steers in Japan (1988)

Yield Quality	Meat Quality				
	1	2	3	4	5
A	A1	A2	A3	A4	A5
	0%	3%	8%	11%	6%
B	B1	B2	B3	B4	B5
	1%	23%	22%	4%	1%
C	C1	C2	C3	C4	C5
	2%	12%	8%	0%	0%

Source: Johnson and Fisher, 1988,30.

It is notable that only 33 percent of all domestic steer carcasses graded in Japan in 1988 were in the B4 to A5 range, which is loosely defined as being of premium restaurant quality.

CHAPTER 12

THE JAPANESE BEEF MARKET

> Japan is not one general market. There are many different segments.
> Philip M. Seng, President and CEO, U.S. Meat Export Federation (Cullison 1991, 10A).

Top quality beef is considered a luxury in Japan and is generally reserved for special occasions. This niche represents about 6 percent of the Japanese beef market, and is by-and-large unaffected by rising and falling incomes. Primary users of this type of beef are luxury hotels and exclusive restaurants, and to some extent, supermarkets (Khan et al. 1990, 19).

A much larger segment of the market, in the range of 65 to 70 percent, is made up of end-users of popular beef and can be split into two subgroups: high quality (HQ) beef and popular beef. HQ beef is made up of Wagyu which did not make the top grades and dairy beef which grades as high as the lesser quality Wagyu. U.S. grain-fed Prime beef is generally within this market. Imported beef (primarily from the U.S. and Australia) accounts for about 40 to 50 percent of this market (Khan et al. 1990, 19).

The second subgroup, "popular beef," is made up of the less-desirable cuts of HQ beef, imported grass-fed beef (Australia), imported U.S. Choice beef, and the lesser grades of domestic dairy beef.

The remaining 30 percent of the beef market goes to beef used in processing, such as beef for sausage and meatloaf. Lower beef grades and the less desirable cuts from higher grades fill this demand (Khan et al. 1990, 20).

It is important to note that the large middle market has been growing much faster than either the top or bottom segments in recent years. An end-user who is cost conscious and concerned about quality typifies this market segment. From 1985 to 1989, the cumulative growth in this market was 10 percent (Winkler 1991, 21b).

The Japanese are very cosmopolitan and enjoy a relatively high percentage of overseas travel, due largely to the appreciation of the yen and the relative wealth of the Japanese economy, and a high per-capita savings rate. As a result, and with the pervasive western influence on Japanese culture, dietary habits in Japan are changing. For instance, as a percent of diet, fat has increased from 8.8 percent in 1955 to 27.4 percent in 1985 (compared to 45 percent fat in the average American diet in 1982). Likewise, while protein consumption has remained relatively constant (11.3 percent in 1955 to 13 percent in 1985), carbohydrates have declined from nearly 80 percent to under

60 percent by 1985 (Moore 1990, 3).

Another reflection of dietary change is witnessed by a broadening of cooking styles, including barbecuing or grilling, stews and curries. As a result, the need for highly-marbled beef from the standpoint of odor and flavor retention is becoming less predominant.

"The total Japanese meat market of 4.7 million tons is composed of three major submarkets: beef (19 percent), pork (42 percent), and chicken (35 percent)" (Khan et al. 1990, 63). Imports account for 37 percent of the beef market, 20 percent of the pork market, and 12.5 percent of the chicken market (Khan et al. 1990, 63).

Despite its lesser stature in terms of volume, the meat of choice for out-of-home consumption by the Japanese consumer is beef (Khan et al. 1990, 39, 41). Beef is perceived by the Japanese consumer to be healthy and flavorful. It is also perceived as a food of choice among "smart" people (interview with Hidetaka Iwasaki, President, Nichiro Pacific, Ltd., June 17, 1992). However, a relative unfamiliarity with methods of preparation and a relatively high price hamper more frequent consumer purchases of beef. When beef is purchased, domestic Wagyu and dairy tend to be purchased most frequently, followed by imported chilled beef. Imported frozen beef occupies the bottom slot.

Price awareness appears to be based on two concerns. One is that beef is relatively expensive, and given its

elasticity of demand, when price drops quantity expands. Another is anchored in Japanese shopping habits. The typical Japanese housewife shops frequently, often daily, and is therefore immediately aware of any price movement. The reason most often given for purchase of meat imports is its low price.

Although beef has been expensive in Japan, as the price of fish increases due to declining supplies, beef is becoming more price competitive. According to Mr. Iwasaki, not only can the Japanese housewife get more variety with beef than she can with fish for the same price, but she can also make the table more attractive with beef at a lower cost (interview with Hidetaka Iwasaki, 1992).

CHAPTER 13

THE JAPANESE CONSUMER

> Therefore, in 10 to 20 years, I believe, the gastronomic culture of Japan will be exactly the same as in the United States.
>
> Hiroshi Tanaka, President of Kyotaru Co., which operates more than 600 restaurants in Japan (Nation's Restaurant News 1988).

> Still, total rice consumption has been dropping steadily for decades as the Japanese diet grows more Western. In the past 30 years, rice consumption has gone from 253 pounds per capita to 156 pounds. Since 1987, in a historic turnabout, meat and dairy consumption has exceeded rice.
>
> Reported in "The Washington Post" (Reid 1990, H4).

> Japanese beef consumption has grown nearly 50 percent in the past decade, about half of which has been fueled by imports.
>
> USDA's Economic Research Service, reported in BEEF (Vansickle 1991a, 37).

In addition to being one of the wealthiest countries in the world, with a 1990 population of nearly 124 million Japan is also one of the most populous (seventh in the world). Its population is expected to increase moderately to a peak of about 136 million in 2013, and the percentage of people over age 65 is expected to increase from about 10 percent in 1985 to over 22 percent by 2015 (Statistical Handbook 1991, 15). Elderly people tend to eat less food in general and less fat specifically. They do, however, prefer

high quality protein foods (JETRO 1990, 17), but all-in-all will probably consume less beef than younger people.

About 43 percent of the population lives within a fifty-kilometer radius of three metropolitan areas: Tokyo, Osaka, and Nagoya. The average size of the Japanese household decreased from around five (1920 to 1955) to 3.1 in 1989 (Statistical Handbook 1991, 22).

Due largely to the appreciation of the yen and falling oil prices, domestic prices in Japan have maintained a stable trend in recent years. With 1985 as the base year (100), by 1990 the Consumer Price Index in Japan was 108.9, compared to 124.3 for the United States (Statistical Handbook 1991, 150). At the retail level, the CPI for food in Japan increased at a somewhat slower rate, to 102.2 in 1989 and 106.9 in 1990. The relatively sharp rise in food prices between 1989 and 1990 was attributed to poor weather conditions for the pertinent growing season (Statistical Handbook 1991, 117-118).

From 1975 to 1989, as a percentage of consumption expenditures food decreased from 30 percent to 24.3 percent. Consumption expenditure rose 0.5 percent in real terms (i.e., after adjustment for the rise in CPI) from 1988 to 1989. Since 1978, with the exception of 1980 and 1981, family income has increased in real terms each year, although to varying degrees (from a low of 0.7 percent in 1989 to high of about 4.2 percent in 1982) (Statistical

Handbook 1991, 112).

Selective consumption in Japan has increased steadily since 1982 whereas household purchases of basic necessities have remained relatively flat. A trend towards purchases of goods and services which are different from the norm also appears to be well established. Part of this discriminating market has targeted goods which imply high-status, such as expensive restaurants and high-quality goods. This is reflected in a willingness by the Japanese consumer to pay high prices for quality food products, such as $35 per pound for domestic Wagyu beef (JETRO 1990, 20).

Relative to the 1950s, the Japanese are eating less rice and more meat. More frequent dining-out has become common as has increased frequency of purchase of favorite foods (JETRO 1990, 21). In 1988, sales in specialized restaurants were about 16.5 trillion yen (about $128 billion) (JETRO 1990, 22). The number of restaurants in Japan is expected to increase, and with it the demand for high-quality, international cuisine (JETRO 1990, 23), derived in part from an increase in foreign travel among the Japanese. Relative to total food expenditure, expenses for dining out rose to 14.5 percent in 1989 from 9.1 percent in 1975 (Statistical Handbook 1991, 114).

With their high standard of living, a relatively large percentage of Japanese consumers can afford to be discriminating buyers, and therefore tend to choose high-

quality, brand-name products. In spite of their apparent homogeneity, the Japanese consumer often selects products for purchase for the individuality which it may express. Variety becomes important in these purchase decisions (JETRO 1990, 29), but the product's cost must still be judged to be reasonable. As growth in disposable income has slowed in Japan in recent years, though the middle market has softened, high-priced high-quality goods as well as cheaper goods continue to attract consumers. In fact, the middle market is losing market share to high-quality products. Sales of high-quality imported and domestic foods has been consistent with this trend (JETRO 1990, 36, 38).

Average monthly disposable income for worker households in Japan was 215,500 yen (about $940) in 1975, of which food expenditures accounted for 49,800 yen (about $220), or 23 percent. In 1989 these figures changed to 421,400 yen (about $3,055) monthly disposable income, of which 76,800 yen (about $557) went to the purchase of food, or 18.2 percent (Statistical Handbook 1991, 117). In spite of what appear to be more discriminating, and therefore more expensive, tastes in food, as a percentage of disposable income and as a percentage of expenditures, food costs have declined. This would indicate latitude in the average Japanese household budget for the capacity to increase its purchases of beef once the decision is made to do so.

About half of Japanese women fifteen years old and

older are employed (Statistical Handbook 1991, 103). Families with working women tend to save and consume more because of higher household income, and their families tend to eat out more frequently. Housewives control 80 percent of the income in Japan and give their husbands allowances which they often spend on business entertainment, which frequently includes dining out (JETRO 1990, 52).

The abrupt rise in wages of industrial workers, doubling from 1955 to 1970, and doubling again from 1970 to 1985 (deflated by the CPI) translated into a change in dietary habits. Per-capita annual consumption of rice declined from a peak of 118 kilograms (260 pounds) in 1962 to 80 kilograms (176 pounds) in 1980. As a percentage of consumption expenditure in urban, worker households, rice declined from 10 percent in 1960 to 2 percent in 1980, reflecting its status as an inferior good consistent with increases in per-capita income (Hayami 1988, 50, 69).

Changes in food consumption in Japan are indicated in the following chart:

Table 12
Changes in Food Consumption in Japan

	Quantity Consumed						Percent Change
	1960	1965	1970	1975	1980	1985	1985/1960
Consumption (per capita per day)							
Calorie	2290	2459	2529	2516	2554	2581	13
Protein (g)	70	75	78	80	83	84	20
Animal protein (g)	21	26	31	35	39	41	95
Consumption (per capita kg/year)							
Grains	150	145	128	122	113	109	-27
Rice	115	112	95	88	79	75	-35
Vegetables	100	108	114	110	110	108	8
Fruits	22	29	38	43	39	37	68
Meat	5	9	13	18	23	25	400
Beef	1.1	1.5	2.1	2.5	3.5	4.4	300
Egg	6	11	15	14	14	15	150
Dairy prod.	22	38	50	53	62	67	205
Fresh milk	13	20	26	29	34	35	169

Source: Hayami 1988, 117.

Most notable is the increase in meat consumption by a factor of five in a twenty-five-year-period, and an increase in beef in the same time frame by a factor of four. These were the largest items of increase in per-capita consumption of all items surveyed by a substantial margin.

In spite of a relatively flat growth rate in total

caloric intake and a slowing in Japan's population growth, no significant growth in aggregate demand for food in terms of calories has occurred. However, due to rising affluence in Japan, changes within that overall demand have been substantial, as reflected by an increase in consumption of meat and a decrease in the consumption of rice. Increasingly, Japanese diets are changing to reflect the influence of western styles and habits, one effect of which has been a decrease in the use of traditional seasonings. A growing share of imported foods within that demand structure has been significant (Johnson and Fisher 1988, 42).

It is generally accepted that high prices have limited the consumption of livestock products. Though real prices for some livestock products have fallen, real prices for beef and fish have risen. Consequently, pork, chicken, and some dairy products have experienced faster growth rates in consumption than have beef and fish. Much of this is attributable to protectionist policies which have artificially inflated beef prices. Retail prices for beef and pork were roughly equal in 1960. During the 1980s, however, beef prices exceeded pork prices by about three times. Protectionist trade policies have been responsible for this misalignment (Johnson and Fisher 1988, 43).

While beef consumption grew from 1.1 kilograms per person per year (2.4 pounds) in 1960 to 4.6 kilograms (10.1 pounds) in 1986, pork consumption grew from 1.1 kilograms

(2.4 pounds) to 10.7 (23.6 pounds), and chicken from 0.8 (1.8 pounds) to 9.8 (21.6) in the same time period (Johnson and Fisher 1988, 45). The lower rate of increase in beef consumption is blamed on restrictions on its availability, and consequently its high price relative to other meats.

> Furthermore, in spite of the apparent increase in per person beef consumption, Japan's current level remains less than half that of most industrialized countries and only about a tenth the quantity consumed in Australia and the United States (Johnson and Fisher 1988, 44).

As judged by international standards of the optimal diet in terms of protein, fat, and carbohydrates consumed, the Japanese diet has essentially achieved the optimum. Changes in dietary habits will therefore occur in response to changes in taste, cooking practices, and food preference rather than as an attempt to improve the diet as a whole (Johnson and Fisher 1988, 44).

A seasonal pattern in the type of beef consumed is evident. Premium grade Wagyu, purchased in paper-thin slices, is most popular in mid-winter and in April and May, when sukiyaki and shabu-shabu are cooked for festive occasions. In the summer, when barbecuing and grilling are popular, lower grade domestic beef and the bulk of imported beef are purchased (Johnson and Fisher 1988, 45). With a broadening in cooking practices these distinctions may blur, however. For example, cooking steaks at home that are as well prepared as those in restaurants appeals to Japanese housewives. To do so, those housewives have indicated that

they would like to learn new cooking methods ((Khan et al. 1990, 39).

To the Japanese consumer, domestic beef and imported beef are two separate commodities, as different as, say, pork and lamb (Johnson and Fisher 1988, 46). The beef market in Japan is highly segmented, with each segment displaying different price and income elasticities. Imported beef is often further segmented according to source. Imported beef may therefore not serve as a close substitute for domestic beef (Johnson and Fisher 1988, 46). However, this assessment did not take into account chilled, grain-fed beef imported from the U.S. To the Japanese consumer, freshness is tantamount to quality. In addition, even when it was imported as frozen, U.S. grain-fed beef qualified for the top end of the middle market, otherwise defined as "high quality beef," a market which was judged to be relatively insensitive to price because of the lack of substitutes (Johnson and Fisher 1988, 47).

In 1987 the Australian Meat and Live-Stock Corporation identified five market segments: "(1) high-class hotels and restaurants, and retail and supermarket outlets; (2) middle- class hotels and restaurants, and retail and supermarket outlets; (3) lower-class restaurants and fast food outlets; and (4) manufacturing, ham and sausage small good industries" (Johnson and Fisher 1988, 48).

Some up-scale western markets were included in the

"high class" category, in spite of the fact that domestic Wagyu was this segment's primary meat source. Western-style restaurants also made up part of the "middle class" market, serviced in part by imported grain-fed and chilled beef.

It is assumed that demand for imported beef will increase as prices fall. Greater availability of beef should also lead to its greater utilization outside the home. Finally, consumption of beef is expected to increase at a faster rate than that of pork and chicken, and should eventually exceed pork and chicken in total consumption (Johnson and Fisher 1988, 138).

Specifically, total consumption of beef in Japan is estimated by the Australian Meat and Live-Stock Corporation to increase by 8 percent per year from 1990 to 1994, and imported beef consumption is expected to increase 10 percent per year in the same period (Winkler 1991, 25b). By another estimate, consumption is expected to reach 1.675 million metric tons by Japanese fiscal year 1995 (April 1995 through March 1996), of which 1.115 million metric tons, or 67 percent, will be imported (Platt and Youmans 1991, 44b). This would be an increase of 25 percent over estimated JY1991 levels.

> What type of beef will supply this demand? It will be perceived by the Japanese consumer as a fresh, high quality product that is attractively packaged, healthful, and free of residues. It will display well in the show case. It will be convenient to prepare (perhaps microwave ready) and will appeal to a growing number of affluent, sophisticated, working women. Processed meats, gift items, and ethnic and gourmet

> items also have opportunity. Most importantly, beef that tantalizes the Japanese consumer will have the culinary attributes that appeal to the Japanese palate (Platt and Youmans 1991, 44b).

From 1962 to 1986 the Japanese consumer has enjoyed real growth -- at an annual rate of 3.5 percent per year -- in per-capita expenditure for beef. For the same period, annual real growth of 3.1 percent in monthly per-capita income and 3.3 percent growth in fish expenditures were recorded (Hayes et al. 1990, 206). In real terms, then, the growth in meat expenditures exceeded growth in income. Not only did the per-capita amount of beef consumed increase, but it did so even as it became more expensive relative to fish. One might conclude that a pent-up demand for beef therefore exists, and with the drop in prices expected from a liberalized Japanese market, significant increases in per-capita consumption will occur.

CHAPTER 14

PRODUCT DEVELOPMENT

> Although the Japanese prefer the flavor of U.S. corn-fed beef to the grass-fed beef of Australia, the latter is perceived to be of higher quality because its shelf life of more than 60 days is double that of most U.S. beef.
>
> Patrick E. Brecht, American President Lines Ltd., director of special commodities technical services (Dunlap 1991, 1B).

> ...in the U.S. you can ship things by the half a pound. Here you get gram sales, individually sliced beef for shabu-shabu. This all adds onto the cost in a way foreign trade houses aren't used to dealing with.
>
> A general manager for one of Japan's largest packers, reported in the "Journal of Commerce" (Cody 1991, 2A).

Perhaps more important than any other consideration to the Japanese consumer is that of quality. To develop beef with the quality that is demanded by the Japanese consumer is likely the largest challenge faced by a foreign producer. Not only is imported beef generally perceived as lesser in quality than domestic beef, but the Japanese consumer is often not aware of the inherent differences between grass-fed and grain-fed imported beef.

Further delineation can be made in defining the scale of production in marketing the product. Generally speaking,

the Japanese prefer family-scale businesses that are small enough to be flexible yet large enough to deliver adequate quantities of a consistent, high-quality product. Flexibility may vary from changing cutting practices and packaging methods to accommodate the needs of the end-user to supplying the quantity needed when it's needed.

Long-term relationships are extremely important to the Japanese, and must therefore be equally important to the supplier of the Japanese market. Critical to a long-term relationship is a supplier's commitment to not sell his product to a buyer's direct competitor. The supplier must also be committed to meeting the buyer's delivery schedules and special needs, including the development of a differentiated product (Hayes et al. 1990, 171), if a long-term relationship is to flourish. By all means, confrontation must be avoided. Trust is essential. If the supplier is willing to commit himself to this type of business relationship, then long-term profits can be expected and the supplier will find his interests protected in the Japanese market (Khan et al. 1990, 75).

Developing a brand name and a product guarantee of safety, taste and freshness may be central to successful promotion of one's product in Japan (Khan et al. 1990, 68-69). Attributes of brand-name products which appeal to the Japanese consumer include quality, fashion, status, and "delicate deviation," i.e., "the expression of a modicum of

individuality within a framework of overall conformity" (JETRO 1990, 39, 46). It is important for the exporter to cater to psychological as well as material needs in promoting his product (JETRO 1990, 69).

Once the product is developed, in order to maintain quality, care must be taken during transportation. For instance, a container of chilled beef must not be allowed to sit in the sun while waiting to be loaded, nor should it be stored on the port-side of a ship's cargo bin in summer where it can also be heated by the sun (interview with John Morse, President of Zenchiku Land and Livestock Co., February 21, 1992). A consistent temperature of 30 degrees fahrenheit must be maintained throughout the product's transport if good condition at arrival is to be assured. Temperature monitors may be used throughout the process to determine this. Special packaging may also be required to seal in moisture and to protect the product from bruising from handling or vessel movement (Seim 1990, 124-125).

Packaging at the processing plant should consider the demands of the end-user so that repackaging for the retail outlet is not needed. Likewise, the exterior packaging should be marked in Japanese to save remarking when it reaches Japan.

These steps, and a myriad of others like them, are required if the supplier is to assure delivery of a quality product. It is this type of effort which is vital to

establishing and maintaining a long-term relationship with a Japanese buyer.

A critical step in product development, and one which is imperative to assure product quality during transportation, is shelf life. Shelf life refers to the limited life of chilled beef due to the presence of bacteria and natural decomposition. A minimum shelf life of 60 days is necessary if the product is to remain fresh from slaughter to port-of-departure to port-of-entry to retail meat case and the consumer's table, or to restaurant refrigerator and the customer's plate. Twenty-seven to 28 days are generally required from the time the carcass is chilled till the beef reaches the retail outlet. With a 60-day product life, 32 to 33 days remain for the retailer to sell the product (Seim 1990, 129). This is important to the Japanese retailer because it allows them the flexibility to withhold beef from the market if they expect a favorable price movement (Platt and Youmans 1991, 43b).

A shelf life of 45 days has been adequate for beef produced in the U.S. and sold domestically because of the relative proximity of slaughter plant to supermarket. To achieve an extended shelf life, modifications to meat processing methods and packaging are required. Sanitation at slaughter and during processing, temperature control, handling and transportation all affect shelf life. Not all slaughter plants will be willing to make these adjustments.

The producer who is interested in exporting chilled beef to Japan, however, will need to find a packing plant which will accommodate itself to its customer's specifications. This might include doing all final cuts at the supplier's packing plant to avoid butchering in Japan. As labor becomes more scarce in Japan, this may become an important consideration.

The need for extended shelf-life can be cut considerably if air transport is used. The problem, however, is that air transportation costs about four times as much as ocean freight. If the volume shipped by a given exporter is significant, air freight becomes prohibitive. Temperature control and handling requirements are also more difficult with air freight (Dunlap 1991, 8B).

In addition to improving shelf life, marbling must also be improved. To produce the highly-marbled beef required by the premium Japanese market, at a minimum longer feeding periods by U.S. feeders will be required.

> Because marbling is the deposition of excess energy consumed by the animal, a longer period of consumption by the beef animal of excess energy is required to get increased marbling. However, marbling is not the only site where fat is deposited. Excess energy (in the form of fat) is also deposited as seam fat between muscles (intermuscular fat) and external fat under the hide (subcutaneous fat). Both seam fat and external fat are generally not consumed and are removed or trimmed during cutting, which lowers the saleable yield of the carcass and reduces profits. Ideally for the Japanese market, longer feeding times would increase marbling with no increase in seam or external fat (Knipe et al. 1990, 154).

The trick is to do just that. Selection of cattle which have a genetic predisposition to marbling, and the use

of ultrasonics to determine how well a given animal is marbling while on feed, may be two of many tools which will need to be explored by the U.S. producer in an attempt to develop beef for this particular market.

Promotion may be viewed as an essential element of product development. The U.S. Meat Export Federation allocated $12 million to promote U.S. beef in Japan in 1991. Supermarkets in Japan were also beginning to place imported beef in the center of display cases rather than at the sides, which had a positive affect on sales (Pendley 1991, 10A).

CHAPTER 15

COMPETITION AND COMPETITIVE ADVANTAGE

There are primarily three competitors for the Japanese beef market: domestic producers within Japan, Australian cattle raisers and feedlot operators, and beef producers within the United States. Argentina and Brazil, though major exporters of beef, are focused primarily on European markets. Though the Canadian beef industry is as efficient as the U.S. and Australia, Canadian meat packaging and transportation is not as well developed for export as are those facilities in the U.S. New Zealand does export beef to Southeast Asia but does not have the volume of the U.S. or Australia.[5]

As of 1987, the U.S. had the largest share of the imported beef market, in terms of tonnage and value, if beef offal is included with chilled and frozen beef. Combined beef imports inside and outside of the stipulated quotas were as follows:

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[5]In 1989 there were 7.8 million cattle in New Zealand, 12.2 million in Canada, 22.4 million in Australia, 50.8 million in Argentina, 99.2 million in the United States, and 136.8 million in Brazil (Japan Statistical Yearbook 1991, 768).

Table 13
Australian and U.S. Share of Total Japanese Beef Market

		AUSTRALIA		UNITED STATES		
Year	Total Tons	Tons	% Share	Tons	Share	% of Import Market
1976	119,510	88,421	74.0	20,544	17.2	91.2
1978	157,072	94,451	60.1	46,432	29.6	89.7
1980	177,609	106,271	59.8	59,173	33.3	93.1
1982	182,838	96,953	53.0	75,746	41.4	94.4
1984	214,991	101,340	47.1	96,780	45.0	92.1
1986	273,231	117,033	42.8	137,774	50.4	93.2
1987	317,935	134,757	42.4	162,997	51.3	93.7

Source: Johnson and Fisher 1988, 149.

From 1976 to 1987, beef imported from Australia and the United States grew by 166 percent. Within that market, in terms of tonnage shipped, Australia's market grew by 52 percent while that for the U.S. grew by 693 percent. Coincident with this, Australia's market share slipped from 74 percent to just over 42 percent, due to the erosion of its market by competitors from the United States, whose market share grew from just over 17 percent to more than half.

This can be attributed to two things above others. One is political pressure from the U.S. for Japan to open its beef market to U.S. exports. The other is grain-fed beef which the U.S. has historically produced, and which is more suitable to the Japanese palate than is grass-fed beef which

has been Australia's mainstay.

However, if frozen and chilled beef only are taken into account, the U.S. share of the market takes a noticeable drop:

Table 14
Australian and U.S. Share of Japanese Beef Market:
Frozen and Chilled Beef

($1,000,000)	Volume (tons)			Value		
	1987	1988	1988	1987	1988	1989
Total Beef	220.0	263.5	348.7	799.8	1190.4	1645.2
Chilled	59.8	78.8	118.4	221.8	351.0	591.1
Australia	52.3	64.0	93.7	185.9	263.9	428.7
U.S.A.	6.5	13.4	22.8	31.9	79.9	151.2
Others	1.0	1.5	1.9	4.0	7.2	10.6
Frozen	160.3	184.7	230.3	578.0	839.3	1054.1
U.S.A.	78.8	96.5	126.7	349.0	557.3	727.0
Australia	68.9	72.3	82.9	178.4	207.8	239.3
Others	12.6	15.9	20.7	50.6	74.2	87.8

Source: AGSMS 1991, 2.

The U.S. share of the chilled beef imports in 1989 was 19 percent in terms of volume and 26 percent in terms of value. If chilled and frozen beef imports are combined, the U.S. share becomes 43 percent in terms of volume and 53 percent in terms of value for 1989. In either case, the growth of U.S. beef imports to Japan has exceeded the growth of Australian imports. Incidental to the Japanese market is

"In fiscal 1991, the U.S. imported $1.23 billion in Australian ag products, against exports of only $236 million" (Doane's 1992b). In any event, the total market is expected to increase which should increase sales in terms of volume and value for all beef exporters to Japan.

Australia

> Australia has smart, export-oriented beef producers who will fight tooth-and-nail for the Southeast Asian market -- which, after all, is on the Aussies' front lawn.
>
> Jonathan Knutson, "Agweek Magazine" (Knutson 1990, F2).

Australia's largest export market for beef is the United States, which imported 365,000 tons of Australian beef in 1990, followed by Japan, which imported 200,000 tons (Winkler 1991, 21b). Japan began to import substantial tonnages of beef around 1955, the bulk of which was sourced from Australia as frozen, grass-fed beef. The primary use for this meat was for institutions and meat processors. As a result, Australia's beef became known as a low-quality product.

Thinking that chilled beef would be better than frozen, Japan opened its market to imports of chilled beef from Australia in the 1970s. Even when imported chilled, by Japanese standards Australian beef was cheap, particularly when compared to U.S. grain-fed beef. In addition, because

it was relatively cheap, Australian beef gave importers greater opportunity for price markup, and hence a wider profit margin, than U.S. beef. Importers therefore promoted Australian beef more than U.S. grain-fed beef, giving it wider consumer exposure and higher volume sales. U.S. imports were then directed to specialty markets within the table meat trade. This remained the case until 1978, when Japan made quantitative and qualitative adjustments to its quota system in favor of the U.S. product in response to political pressure from the United States. When combined with a growing preference by the Japanese consumer for grain-fed beef, which more closely resembles Japanese domestic beef, Australia has lost market share to the U.S. (Johnson and Fisher 1988, 89-91).

In 1972 and 1973, demand for beef increased in Japan at a time when domestic production leveled-off. As a result, prices for Australian beef soared and the export market to Japan appeared to take-off. To capitalize on this emerging market, Australian producers began to develop a feedlot industry, often in partnership with Japanese investors, tailored to supplying the Japanese beef market. Due to a combination of factors, including the oil crisis of 1973, accelerating inflation and rising feed costs in Japan (which led to herd liquidations), beef prices in Japan fell dramatically. To protect its domestic industry, the Japanese government first curtailed imports in 1973 and then

closed its market to imports in 1974 for one year.

The budding feedlot industry in Australia was caught at a vulnerable moment. A domestic market within Australia had not been developed for grain-fed beef, and other export markets were not readily available. When the Japanese market was curtailed, and then was closed, many backers of the Australian feedlot industry lost a lot of money. Because of this, once the Japanese market reopened Australian producers resisted reinvesting in the feedlot industry. As a result, Australia's history is one of efficient production of grass-fat beef rather than as a supplier of grain-fed beef. Consequently, Australian beef does not command the price of U.S. grain-fed beef in the Japanese market (Johnson and Fisher 1988, 143; Winkler 1991, 26b).

Unlike the U.S. market, a strong domestic market within Australia for grain-fed beef has not yet developed. This remains a detriment to Australia's grain-fed, export beef industry since the opportunities to sell product which does not qualify for export are limited. The risk, therefore, is higher than it is for the U.S. producer.

Nonetheless, Japanese investment has flowed to Australia in order to develop a supply for the Japanese market. Japanese capital has been crucial in upgrading and expanding slaughter facilities and in establishing feedlots. With Japanese investment has come direct access to Japan's

distribution system. Foreign investment in Australia's beef and meat processing industries, the bulk of which is Japanese, has been extensive. In fact, 33 percent of total Australian slaughter is through packing plants with some foreign ownership. Among others, Marubeni, Mitsubishi, and Nippon Ham have purchased feedlots in Australia to grow beef to the specifications of their customers (Wanatabe 1991, D2). As of 1989, Japanese investment in Australian beef operations reached $132 million, more than twice their investment in the U.S. (Time 1989). With Japanese investment, Australian feedlot capacity, estimated to be 600,000 head in 1991, is expected to double by 1992 (Vansickle 1991, 19). Because of the extent of foreign ownership, some alarm has sounded within Australia concerning the loss of Australian control over its own beef industry (Winkler 1991, 23b).

Australia recently introduced a new grading system which very closely matches the Japanese system. Called the Chiller Assessment Scheme, the grading standard was instituted to allow buyers, and specifically Japanese buyers, to specify the product they want. Like the Japanese system, scores are assigned for marbling, meat color, fat color, and yield. The marbling score is identical to that of the Japanese system, which allows Japanese buyers and Australian suppliers to use the same criteria when defining the product (Winkler 1991, 24b).

Australia is currently orienting its beef trade with Japan toward increasing its profit margins within its existing market share of Japan's middle market, and specifically, the home and institutional segments of that market. This would require raising prices of Australian beef to price levels of U.S. imports and domestic dairy beef.

With the financial backing of Japanese corporations, extensive new growth in Australia's feedlot industry is planned. An expanded use of genetics, including the use of Wagyu semen, is also being pursued in order to add quality to Australia's cattle.

All of this is being done to compete for market share at a higher market price in the Japanese market. The advantage that Australia has in doing so lies largely in the evolution of Australian beef production as an export industry. Established primarily to service markets within the United Kingdom, secondarily (in the 1950s) the U.S. market, and eventually the Japanese market, Australia developed a shelf life of 60 to 90 days for its export beef (as opposed to 40 to 45 days for U.S. beef) as a matter of market orientation. Australia has had to develop a longer shelf life to service its markets while the U.S. has not (Hayes et al. 1990, 168).

Not only does Australia have a great deal of experience in servicing export markets, it has a national focus to do

so. For example, Australia has developed the world's first electronic health certificate (Pierce 1991, 75). It has also established the Australian Meat and Livestock Research and Development Corporation, a quasi-government agency, to conduct export research for the Australian meat industry. This agency recently published a strategy which outlines specific steps, including upgrading quality and price, which Australia can take to directly compete with the U.S. for the high-quality, grain-fed segment of the Japanese "middle market." This market is targeted because it represents two-thirds of total domestic demand and offers the best potential for continued growth (Platt and Youmans 1991, 43b).

With processing facilities located in nothern port cities, Australian meat exporters have direct acess to ocean transportation. Shipping time between Melbourne and Japanese ports has been cut to 12 or 13 days, from as long as 27 days, due to the development of a faster shipping link. Average transport time from Australian ports is said to be from 15 to 17 days (Pierce 1991, 75).

Australia currently dominates chilled beef sales to Japan with sales of 8,000 to 12,000 tons per month compared to chilled beef sales of 2,000 to 4,000 tons per month by the U.S. (1991 figures) (Cody 1991). Half of Australian beef shipped to Japan is chilled, and 91 percent of chilled beef exported by Australia is shipped to Japan. As of 1991,

Australia had captured about 80 percent of chilled beef sales in Japan. Consistent with consumer demand, however, Australia's market share is expected to yield to higher-quality, grain-fed beef sourced from the U.S. (Pendley 1991, 6A).

Japan

> I started this farm twenty-five years ago with one cow and one-and-a-half acres of land....Over the years, I've built up my business until today I have fifty-five head of cattle.
>
> Tsutomu Sameshima, a farmer near Sueyoshi, Japan (Oka 1988b).

> But as you might expect, Japanese beef is best for Japanese.
>
> Yaeko Shishikura, a homemaker in Chiba, Japan (Wanatabe 1991, D2).

Though masked by its relatively high degree of protection, Japanese agriculture has experienced a sharp decline in comparative advantage in the postwar period (Hayami 1988, 11). In spite of this, and in spite of the inherent limitations to an expanded beef industry in Japan (farm size, cost of production, lack of feed grains and pasture, etc.), the outlook for beef production in Japan is not entirely bleak. According to Hayami, beef production is expected to become a major industry in Japanese agriculture, especially in rougher, more remote terrain. Beef production in Japan for a commercial meat market is a relatively new industry. With an elastic demand, as prices respond to

market liberalization, demand will rise for more product. This should benefit the domestic producer as well as foreign exporters. When combined with deficiency payments, international cooperation will be achieved and a domestic industry will grow (Hayami 1988, 119).

Japan has also maintained steady investment in its agricultural infrastructure, such as land improvements, upgrading of irrigation and drainage facilities, and construction of rural roads (Moore 1990, 9).

Perhaps the strongest advantages the Japanese producer has are twofold: (1) it is a domestic industry, and as such enjoys all the attendant benefits including governmental and popular support, direct ties to Japan's complex and difficult distribution system, a complete lack of obstacles inherent in the import-export trade (language, transportation, cultural differences, etc.), and a close geographical link to the consumer; and (2), access to a full array of Wagyu genetics.

Because of this last point alone, the domestic Japanese producer has a virtual lock on the very top-end of the Japanese beef market. Only four Wagyu bulls have been exported from Japan, so all genetics in foreign countries descended from those four bulls. It is also commonly assumed that those bulls were far from the best that Japan had to offer. Therefore, in terms of genetics for marbling, Japan has no peer.

The majority of Japan's cattle production is done by older, semi-retired family members on farms of less than ten head. As previously discussed, this poses problems for the entry of entrepreneurial talent in Japan's beef industry. As a result, innovative practices on a significant scale in the near future are unlikely.

Some rationalization is occurring in Japan's dairy sector, with some benefits being realized from economies-of-scale and lower costs of production (Johnson and Fisher 1988, 136). In the Wagyu sector, however, with market liberalization there are fewer incentives for increased Wagyu production due to the high costs of doing so. That is, as imports become cheaper, Wagyu beef will become relatively more expensive. It is expected that in the longer run the Wagyu share of the Japanese beef market will decrease from its current level of about 20 percent (Johnson and Fisher 1988, 137).

The consensus within the Japanese beef industry is that, at the conclusion of the three-year liberalization phase, a deficiency payments scheme will be implemented to replace the protection that had been granted by quotas and price stabilization, to be administered by a restructured Livestock Industry Promotion Corporation (LIPC) (Johnson and Fisher 1988, 137). Should this be the case, the volume of imports would be somewhat hampered since, in essence, a certain amount of market share would be "set aside" for

domestic producers. However, even if this is the case, "it is inconceivable that the government will succeed in supporting previous levels of self-sufficiency" (Johnson and Fisher 1988, 138).

To overcome the limitations of its domestic production capacity, Japanese beef importers are looking to vertically integrate by purchasing production capacity in foreign countries. In Australia the Japanese have purchased ownership positions in feedlots and meat processing facilities. In the Pacific and Intermountain West, the Japanese purchased Washington Beef Company, a meat processing plant in Yakima, Washington, in 1988. Also in 1988 the Zenchiku Corporation purchased the Selkirk Ranch near Dillon, Montana. Other examples in other parts of the U.S. are readily found, such as the purchase of shares in Iowa Beef Processors Inc. (IBP), a major U.S. meat packer in Nebraska, and the purchase by Japanese investors of Monterey County Cattle Feeders Inc., which feeds an estimated 20,000 cattle for shipment to Japan, and which plans to increase that capacity to 50,000 head (La Ganga 1990,).

Even with its increasing presence, however, according to the U.S. Department of Agriculture, as of 1990 Japanese ownership comprised "less than 1 percent of total investment in U.S. farmland and agribusiness" (Farmline 1990, 10). This percentage would be substantially higher, however, if only cattle operations which focused on exporting carcass

beef to Japan were considered. For instance, 15 to 20 percent of U.S. beef exports to Japan are sourced from Japanese-owned and Japanese-U.S. joint venture companies (Farmline 1990, 12).

In this way the Japanese retain ownership, or at least a significant portion of ownership, of the product from production source to the Japanese distribution system. It can also

> ...raise, process, and package beef to the specifications of the Japanese market in the amount needed and distribute the beef through existing ties in the distribution system (Khan et al. 1990, 57).

By so doing the Japanese essentially become exporters as well as importers, and are positioned to take advantage of the liberalized conditions of the Japanese beef market. Japanese firms which are involved in this process, often through joint ventures with "source" companies in foreign countries, are also competing for import market share. Because of their ties to the distribution system in Japan, and the advantages they enjoy by selling in their own country, they should prove to be formidable competitors (Khan et al. 1990, 57).

The United States

> Even with tariffs at 70 percent...US beef, when freed of import restrictions in three years time, will cost about 25 percent less than Japanese beef....
> Reported in "The Christian Science Monitor" (Oka 1988a).

> At first glance, what the Japanese call a "formed steak" looks delicious....The Japanese create this so-called steak from bits of offal -- what Americans politely call "variety meats." For effect, a touch of fat is added at the edge....This artistry makes it possible for the United States to sell about 60,000 tons of offal to Japan every year, but...it has given American beef a bad name here.
> Reported in the "Los Angeles Times" (Jameson 1988a, 1).

The United States has a proven track record for being a very large, efficient producer of grain-fattened beef. Its beef industry is roughly four times the size of Australia's (roughly 100 million head in the U.S. versus 25 million head in Australia). It has a tremendous capacity to produce feed grains, as well as the ability to convert those feed grains into efficient gain ratios on very large numbers of cattle. Though not competitive with full-blood Wagyu in terms of flavor, the quality of these cattle is very good. In terms of production capability to service the Japanese market, the U.S. is very well positioned.

The genetic quality of U.S. cattle, with the exception of the narrow base of available Wagyu genetics (faced by all countries other than Japan), is significantly ahead of Australia's cow herd. A note of caution must be sounded here, however. Australia's cattle herd was started in large

measure by a type of Indian water buffalo, which is not known for the marbling of its meat (interview with Dr. Thomas Wahl, agricultural economist at Washington State University, February 7, 1992). The Australians have, however, been taking advantage of the superior genetic's offered in the U.S. by purchasing semen for artificial insemination. It is expected that the "genetic deficit" (relative to U.S. cattle) currently present in Australia's cow herd will narrow as Australia pursues a genetic improvement program.

Nonetheless, the U.S. is still ahead of Australia in terms of decades-old genetic development of succulent, grain-fed cattle. Some would also argue that the sheer size of the U.S. feeding and packing industry may also lend itself to supplying custom cuts to fill Japanese orders. Other advantages which the U.S. enjoys include its colder climate (at least in northern-tier states), which the Japanese believe causes better marbling, as well as "the Japanese perception that U.S. processing facilities are very clean and modern and that U.S. inspection systems are the best in the world" (Michaelsen 1990, 22f). Also, consistently, U.S. beef is high-quality and (at least as of 1991) has name recognition.

To service the chilled-beef market in Japan, U.S. exporters must develop an extended shelf-life in order to avoid the high cost of air freight. In 1990 air freight to

Japan from the U.S. ranged from 70 cents to 90 cents per pound. Ocean freight ranged from 17 to 20 cents per pound (Kendall 1990). When weights are measured by the ton, costs savings in transportation can be substantial if not the largest single area of cost discrepancy.

Transport time for ocean freight from Seattle to Tokyo is reputed to range from 7 to 10 days (compared to 12 to 17 days from Australia) (interview with Hidetaka Iwasaki, 1992). Transport time from California ports is close to 15 days (interview with Mr. John Morse, 1992). In this regard then, the U.S. appears to have an advantage over Australia.

Though the U.S. cannot compete with Australia on price, Australia cannot compete with the U.S. on quality. In both categories, however, as mentioned previously Australia expects its product to become more like the U.S. product. While Australia has geared its market toward exports, the U.S. market has been geared toward domestic sales. As a result, the U.S. has not developed the capacity to ship chilled beef to the extent that Australia has. A revamping of export facilities and practices is necessary if the U.S. is to remain competitive with Australia.

In spite of this, though Australia surpasses the U.S. in terms of tonnage of chilled beef exported to Japan, the rate of growth of U.S. exports of chilled beef is much higher than Australia's. From 1987 to 1988, Australian shipments of chilled beef to Japan increased by 22 percent,

followed by a 46 percent increase in 1989. The corresponding numbers for the United States are 106 percent and 71 percent. By 1991, U.S. beef occupied 75 to 85 percent of beef counterspace in Japan (Morgan 1991).

Part of the competitive advantage enjoyed by the United States comes from its stature as the dominant political power in the post-war period. Japan liberalized its beef market largely in response to political pressure from the United States. It is questionable if any other country could have done the same. Because of the persistent trade surplus which Japan has with the United States, it is likely that the Japanese government will insure that a substantial percentage of its beef market will be serviced by U.S. beef.

Peter Drucker essentially likens the U.S.-Japan trade relationship to the adage: if one's debt is small, one is owned by the bank. But if one's debt is very high, one owns the bank:

> We are so hypnotized by the trade surplus that we do not understand how dependent upon the United States Japan has become. In economic history, the point at which a nation's dependence on one market becomes economically and politically dangerous is somewhere around 25 percent. Japan has surpassed that point with the United States, which buys more than 40 percent of Japanese exports (Drucker 1990).

In addition to improving product shelf-life, export facilities and transportation, other areas for attention include changing the fat deposition character of U.S. cattle (increase marbling and decrease the amount of exterior fat which must be trimmed), and reducing package size and

increasing package durability (Khan et al. 1990, 20). Also, according to a 1988 survey, the Japanese consumer often confuses U.S. beef with Australian beef. That is, "the Japanese consumer's image of American beef is mostly formed from taste experiences with Australian beef" (Khan et al. 1990, 50).

Promotional activity in Japan by U.S. beef interests should overcome this misperception, and that promotion is occurring. In 1991, the U.S. Meat Export Federation planned to sponsor five-thousand events to promote U.S. beef in Japan through 1992. Promotional activities would include U.S. beef cook-offs, recipe books and cooking schools. Also planned was a "hookup with Matsushita Electric Industrial Co. to promote Japanese microwave ovens and American beef dishes" (Wanatabe 1991, D2). Apparently some positive results occurred. According to the U.S. Meat Federation, in 1991 U.S. beef did have name recognition (Vansickle 1991b, 19).

One of the most significant advantages U.S. producers have over their counterparts in Japan has to do with costs of production. Though the following figures were published in 1988, the relative difference is likely quite similar:

Table 15
Cost of Finishing Cattle in Japan and the U.S.

	Cost of Finishing	
Expenses	United States	Japan
Feeder Steer	$348.65 (600 lbs)	$1,428.91 (585 lbs)
Feed Costs	$148.57 (to gain 450 lbs, $.33/lb of gain)	$1,537.43 (to gain 855 lbs, $1.80/lb of gain)
Labor	$23.58 (5 hours/head, $4.72/hr/hd)	$268.53 (32 hours/head, $6.24/hr/hd)
Other Costs	$77.17	$278.18
TOTAL COSTS	$633.99 (1,050-lb steer, $60.38/cwt)	$3,513.02 (1,440-lb steer, $243.96/cwt)
SELLING PRICE	$630.63 ($60.06/cwt, Choice str Omaha)	$3,908.88 ($271.45/cwt, Japanese nat'l avg on 1,440-lb dairy steer)
NET GAIN (LOSS)	($3.36)	$395.86

Source: Sands 1988, 17.
Note: Exchange rate @ 125 yen/$1.
Note: Feeding period for a U.S. steer is about 5 months. Feeding period for a Japanese dairy steer is about 16 months.

As U.S. cattle are fed to Japanese standards the costs of production will increase, but will still fall far short of the costs of production within Japan. Selling price will also increase, but is expected to increase relatively more, by a significant margin, than the costs of production.

CHAPTER 16

MARKET RISK

> What all must do, however, is adapt products and marketing to Japanese tastes in what is a faddish, fast-changing market.
>
> As reported in "The Economist" (Economist 1988b, 19).

> I don't know where the other $2,100 went but somebody got it and it wasn't me. Similarly, neither should you assume that the $6 difference between sirloin you deliver for $4 per pound and the $10 per pound retail price is your profit.
>
> Steve Browning, Montana Livestock Exporters, on shipping 1,450-pound live steers to Japan @ $1,875, which sold in Japan for $4,000 (Fitzgerald 1988).

> The Japanese history of beef is so marginal. What they've had is Kobe, which is extremely fat. I think our industry will make a mistake if we feel that's where the taste is going to be.
>
> Billy Powell, Executive Vice President of the Alabama Cattlemen's Association (Johnson 1989, 36).

Whereas the export market will in all probability remain Australia's primary focus in product development, the U.S. is more likely to view the Japanese market as a specialty market. The primary reasons for this have to do with the size of the U.S. domestic market and the cattle feeding and processing industries which have evolved around that market. The trend in U.S. beef production has been

toward leaner, less marbled carcasses. Genetic selection and feeding programs have changed accordingly (Knipe et al. 1990, 154). In a sense, then, beef production in the U.S. has headed away from the type of beef demanded by the high quality beef in Japan. Given the changes necessary to cater to the Japanese market, including different genetic selection, feeding programs, processing, packaging and transportation practices, it is unlikely that a major movement in the U.S. to service this market will emerge. It is equally likely that those who are flexible enough to do so will find it difficult to develop U.S. beef to consistently grade well enough to qualify as premium beef in Japan (B3 or better).

It is not unlikely that the demand for well-marbled beef in Japan will in fact shrink. As the Japanese consume more beef, their concern about consumption of saturated fats may override those factors which motivate the consumer (taste, status, tradition, etc.) to purchase highly-marbled beef. This may then become a declining market in absolute as well as relative terms. The risk in this is that by the time the U.S. producer develops the genetic tools and feed programs to service the premium market, that market may be well on its way down. The practices which the exporter would develop in doing so, however, would in all likelihood carry over into producing beef more appropriate to the changing tastes of the Japanese consumer. Of significant

importance would be the contacts developed within the Japanese distribution system.

> Factors that may retard the current growth in consumption of beef by the Japanese consumer include declining economic growth, declining population growth, slowing changes in dietary habits, and growing consumer health consciousness. Recent trends show both population and economic growth rates to be slowing though continuing to grow. Little increase in demand is expected to occur from dietary changes because influencing factors such as urbanization have essentially made their contribution. The optimal diet in terms of protein, fat, carbohydrate, and caloric consumption has also been reached, having a potential moderating effect on increasing demand for beef. In addition, increasing health awareness may retard the growth rate of per capita beef consumption, especially of beef that is highly marbled with fat (Khan et al. 1990, 13).

Be this as it may. At present, the Japanese are demanding highly-marbled beef, it has been a traditional part of their diet for a long time, and opportunity exists to service that market.

The financial risk involved in developing a product which will qualify for the Japanese premium market is considerable. The cattle are older when they go on feed and are fed for much longer periods, which translates into a longer period of financial commitment than is customary in the U.S. cattle business. That is, the dollars spent to develop and finish the product are much higher than customary, and the time those dollars are invested in developing and finishing the product is much longer than customary. As a result, the finished product represents a substantial commitment of time and financial resources

before any return is realized.

Should that finished product not be acceptable for the targeted export market, and as a result need to be sold domestically, if marketed through traditional channels the animal would be discounted by the U.S. market because that type of beef does not fit consumer preference. Substantial monetary losses would then be incurred. This market position may be avoided if specialty markets within the U.S. can be developed. Should this not be feasible, contracting between all the involved parties may be necessary to distribute the potential for loss fairly. More importantly would be the development of ultrasonics to determine a carcass's condition of marbling at selected points in time to coincide with different marketing alternatives.

All other considerations aside, shortages of refrigerated warehouse space, and inadequate dock and airport freight-staging areas, may constrain any rapid increase in imports of chilled product, at least initially. High land costs to expand these facilities may prove prohibitive. To what extent the Japanese palate will change to accommodate more consumption of beef, and particularly U.S. chilled beef, is open to debate. In a study conducted by a Washington State University sociologist, Japanese-Americans who had lived in Hawaii for three generations only consumed eighteen pounds of beef per capita, as opposed to about seventy pounds for most Americans (interview with Dr.

Jerry Reeves, February 6, 1992). Though this is nearly twice the consumption by the average Japanese today, it falls short of what some U.S. beef exporters may hope for and expect.

Japanese consumers by-and-large favor Japanese beef. Just how much the lower price of imported chilled beef will affect this predilection has yet to be fully determined. In 1991, however, Japan imported 147,116 metric tons of U.S. beef for the first ten months of the year, down from 163,958 metric tons for the same period in 1990, for a decline of over 10 percent. The corresponding value of these exports was about $800 million in 1990 and $745 million in 1991 (about a 7 percent drop) (Cattle Fax 1992). Even though a decline was expected due to the stockpiling of imported beef prior to the lifting of import quotas on April 1, 1991, the negative movement in export volume should not be ignored.

The call for self-sufficiency in food production also lingers (45 percent self-sufficient in beef production in 1988 vs. 90 percent in the 1960s) (Wahl et al. 1991, 119), which may hamper consumer enthusiasm for foreign products despite its lower cost and favorable taste comparison.

Matthew Cohn, Pacific Rim Trade Officer for the Department of Commerce, State of Montana, offered the following observations (interview, July 1, 1992):

> A major problem is the distribution system within Japan. The real profits will be made in Japan as the product works its way through the distribution system, with numerous markups imposed as the product winds its

way toward the consumer.

The Japanese tend to squeeze their suppliers to the "half-penny" in attempting to secure the lowest possible prices. If the Japanese are to pay a premium price in the U.S., they must sell the product for a premium in Japan. For the producer to receive a premium, then, the producer's carcasses must grade better than B3.

The producer will not be able to exert any degree of control over the product once it reaches Japan. For instance, imported U.S. beef, should it grade well, may be sold as domestic Wagyu rather than as U.S. beef. Also, beef that is sold under trademark does not insure that producers of that beef have the trademark's exclusive use. For example, beef sold as "Nebraska" beef in Japan may not be Nebraska beef at all. It could be anything that might pass for "Nebraska" beef. In fact, a Japanese meat marketer may sell domestic Japanese beef as imported beef if he thinks it may sell better if labeled as such.

The Japanese are notorious for "changing the rules in the middle of the game." Not that such a practice is inherently wrong, but it is something to which most U.S. businesses are unaccustomed. In essence, the Japanese operate under a different set of business ethics than do American businesses.

Although a Japanese client may say it wants one-hundred carcasses per month, there is no guarantee that it will take that many, and it is highly unlikely that a U.S. supplier will be able to secure guarantees to that effect.

Other customers should be pursued. Hong Kong, Taiwan, Singapore, Guam and Hawaii are all are big markets for Japanese tourists. Another customer in Japan might be beneficial, but in all likelihood Nichiro would resist such a move. Typically, Japanese customers want "an exclusive" when dealing with suppliers. Japanese restaurants within the U.S. would also be a logical market.

The Japanese have been known to reject a whole container of chilled carcasses because one bit of mold was found on one carcass. Also, a container may spoil because someone forgot to plug it in while it sits on the dock.

U.S. companies which have been successful in Japan have

> done two things. One is to team-up with a Japanese partner. The other is to form their own distribution system. Once Mr. Marchi "figures out" the product and the attendant services (processing, transportation, shelf life, etc.) he should do well, but the investment to learn is significant.

Mr. Aoyama reported that, since liberalization, Japanese dairy farmers have found it increasingly difficult to compete with imports for the "intermediate" beef market. Many dairy farmers are consequently transplanting Wagyu embryos into their dairy cows in order to raise beef for the premium market while continuing commercial milk production. While this may bode well for most imports, it provides additional competition for Nichiro's targeted market.

Mr. Marchi is dealing with an uncertain demand. Mr. Aoyama said that initially Nichiro will want fifty carcasses per month once a grade of B3 is consistently attained, and eventually it will want one-hundred carcasses per month. Mr. Yamamura placed Nichiro's demand at three-hundred per month. Mr. Aoyama acknowledged that demand was uncertain since Nichiro was dealing with an uncertain market. That is, Nichiro has not had the product so they do not know what the demand will be (interview with Hiroshi Aoyama, 1992).

PART II

THE MARCHI PROJECT

CHAPTER 17

MARKET ENTRY

> In terms of carcass quality as seen by the Japanese, on a scale of 1 to 10 we have gone from -1 to 1, and the Japanese want us at 5.
>
> Jon Marchi, a rancher in Polson, Montana, who custom feeds cattle for Nichiro Corporation, Tokyo (interview, January 8, 1992).

> When dealing with the Japanese, one personal visit to Japan is worth one-thousand phone calls and ten-thousand letters.
>
> Y. Yamamura, President and CEO of Arrowhead, Inc., a Tokyo trading house (Marchi interview, 1992).

From September 1987 through January 1988, Jon Marchi, owner of Marchi Angus Ranches of Polson, Montana, purchased, processed and quarantined 742 live steer calves for shipment to Japan. Mr. Marchi had contracted with Montana Livestock Exporters, Inc., to provide those cattle and associated services. The cattle were quarantined in feedlots owned by Marchi Angus Ranches and were shipped to Japan air freight from Seattle in three separate shipments. The first shipment was consigned to Naigai/Mitsui, a 50- percent owner of Montana Livestock Exporters, Inc. The next two shipments were consigned to UNI-COOP.

In June of 1988, Mr. Marchi travelled to Japan to inspect those cattle, then on feed in a Japanese feedlot.

Mr. Y. Yamamura, then a Senior Managing Director of Naigai Foods Co., Ltd., in Tokyo, assisted in making the necessary arrangements for Mr. Marchi. While in Tokyo Mr. Marchi met with Mr. Yamamura, among others, to discuss the potential for additional shipments of Montana cattle to Japan.

While in Tokyo, Mr. Marchi noted that Wagyu beef was selling in the display case for upwards of $70 per pound, while U.S. Choice sold for about $24 per pound. Similarly, Wagyu hamburger sold for $12.50 per pound compared to $8.90 per pound for U.S. hamburger. In his conversations with Mr. Yamamura, Mr. Marchi was told that the typical Japanese ate high-quality beef once per month, but ate less expensive beef once per week or even once per day. He was also told that the younger generation was increasingly fond of beef and that good potential existed for beef imports that catered to Japanese taste.

In these discussions, the expansion of the Marchi feedlot to accommodate and feed more cattle for export to Japan, and the acquisition of or joint venture with a Montana packing plant to process those cattle for export to Japan as chilled carcass beef, was also discussed.

By the end of 1988, shipping live cattle to Japan was dropped in favor of carcass beef. By shipping carcass beef, excessive freight costs could be avoided. Locating and securing a consistent supply of quality cattle could also be avoided. Health problems -- which commonly occur when

calves, usually at various stages of weaning and from a number of different ranches, are put together at about the same time -- would be circumvented. Carcass beef dodged the problem of securing quarantine space in Japan, which was extremely limited (and as such served as a non-tariff barrier) and which often had to be reserved years in advance. The end of the quota system was anticipated, and those companies which were importing carcass beef would be well positioned to capitalize on the new market conditions.

In December of 1988, Mr. Yamamura informed Mr. Marchi that he had resigned from Naigai Foods and had formed a trading company, Arrowhead Inc., in Tokyo. Mr. Yamamura had encouraged Naigai Foods to develop a specialty meat in the United States in order to position itself for the liberalization of the Japanese beef market. Naigai was more interested in cheaper Australian beef, and the possibility of importing beef from Mexico, than it was in high-quality, specialty beef. Mr. Yamamura left Naigai Foods in September of 1988, and subsequently presented the idea to Nichiro Fishery Co., Ltd.

CHAPTER 18

NICHIRO CORPORATION

Nichiro Corporation, known as Nichiro Gyogyo Kaisha Ltd. until 1990, was established in 1914 for the purpose of salmon fishing in northern waters. The company lost virtually all of its assets in World War II, after which it began a long process of rebuilding. In 1962 a joint venture was formed with H.J. Heinz Co., known as Nichiro Heinz, Ltd., which developed fishing grounds off the Sahara coast of Africa. In 1979 Nichiro purchased Peter Pan Seafoods, Inc., a U.S. fish processor. In 1985, Nichiro established SeaBlends Food Company in Seattle, whose charge was to produce specialty seafoods for the U.S. and foreign markets.

By 1987 Nichiro's capital had risen to 8.2 billion yen (about $56.9 million), employed about 2,000 people, and had consolidated annual sales of over $1.8 billion. Of those sales, roughly $380 million, or 21 percent, were in frozen and chilled foods (not including fish, which accounted for 46 percent of sales). Nichiro was one of thirty-six companies designated by LIPC to import beef into Japan under the quota system.

Nichiro's principal activities were: salmon and crab fishing; fish farming; trawl fishing; food processing; feed

manufacturing; foreign trade in fish and other products, and the distribution of those products; cold storage; and shipping. In 1987, Nichiro had 27 subsidiaries and 26 affiliates (Nichiro 1987; Japanese Companies 1987, 15).

According to Nichiro's 1987 annual report, it is a "globally oriented food company...[which] seeks to contribute to society through the supply of high-quality food products ...." Nichiro, according to Mr. Iwasaki, is the third largest fishing company in Japan and is a "mid-level" beef company. It's 1991 gross sales were roughly $2 billion, about half of which were fish. Beef sales were about $180 million, almost all of which were sales of domestic (Japanese) beef.

Nichiro operates a 2,000 head feedlot through its affiliate, Shinmei Chikusan, in Okydo, Japan. It feeds Holstein steers which it buys from Japanese dairy farmers, but wants to introduce Wagyu to its feedlot operation via embryo transplant. It slaughters one-hundred head per month for the Japanese meat market. According to Mr. Iwasaki, Nichiro also imports sixty ton of processed meat (hamburger, which is 50 percent pork) per year from Australia, which it buys through a Japanese trading house.

Nichiro built a new fish processing plant in Seattle in 1990, operated by its subsidiary, Nichiro Pacific, Ltd. When it did so it overbuilt, so that it now has unused capacity, including refrigeration space, cyrovac equipment,

and a labor force. It also has ships available for ocean transport. With its refrigeration space, Nichiro sees the opportunity to provide U.S. beef steak, via air freight, to Tokyo restaurants which operate under just-in-time inventory.

CHAPTER 19

THE MARCHI-NICHIRO FEED TRIALS

> If Jon Marchi can export carcasses that will grade A3 and A4, I will be president of the company!
> Hiroshi Aoyama, General Manager, Meat Products Department, Nichiro Corporation, Tokyo (interview June 17, 1992).

With its extensive distribution network for chilled foods, Nichiro recognized the potential for capitalizing on an emerging (from the standpoints of market liberalization as well as increasing consumer demand) market in Japan, provided the right product could be developed. To position itself in that emerging market, speed was of the essence. Other Japanese companies were doing the same. For instance, Mr. Yamamura reported that Meiji Milk Co. was attempting to develop premium Japanese-quality beef in Australia and Oklahoma in order to supply the same market Nichiro had targeted.

In addition to Nichiro's current distribution chain, two other markets showed promise. One was Japanese restaurants in the United States. The other was a restaurant chain in Japan, to be called Steake Restaurant, which Mr. Yamamura hoped to develop in conjunction with Nichiro and Imperial Hotel. Its purpose would be to sell

Marchi Beef throughout Japan. Before either could be pursued, however, an acceptable product had to be developed.

To develop the product two things were required. First, feed trials were necessary to determine the required feed rations, gain ratios, feeding periods and carcass weights. Secondly, crucial to the process was a U.S. producer who: (1) had access to high-quality Black Angus cattle, (2) had the capability to conduct the feed trials, (3) could arrange for slaughter according to Japanese specifications, and (4) most importantly, was eager to cooperate with Nichiro in developing the product according to Nichiro's standards. Mr. Marchi, presented through Mr. Yamamura and Arrowhead, Inc., offered this opportunity.

Mr. Hiroshi Aoyama, a representative of Nichiro Corporation, visited Mr. Marchi in Polson in May of 1989 (followed by Mr. Yamamura in July). On May 26, Nichiro bought fifty yearling steers from Marchi Angus Ranches at an average live weight of 929 pounds. Selected by Mr. Aoyama and Mr. Marchi as the best of two-hundred Black Angus which Mr. Marchi had in his feedlot in Polson, these cattle were then custom fed by Mr. Marchi for 193 days, till early December, when they were slaughtered at White's Wholesale Meats in Ronan, Montana, at an average live weight of 1298 pounds. Average daily gain (ADG) for the 193-day feeding period was less than 2 pounds. The target had been 2.2 to 2.6 pounds per day.

Compared to U.S. industry standards, slaughter weight was high (most fat cattle in the U.S. are slaughtered at 1050 to 1100 pounds), the feeding period was longer (150 days is the norm in U.S. feedlots), and the ADGs were lower (three to four pounds per day is average in a typical U.S. feedlot). By feeding the Nichiro cattle for longer periods of time at slower rates of gain and to heavier weights, the hope was to develop highly marbled beef which would grade B3 or better, and, in Mr. Yamamura's opinion, to ultimately produce beef which would rival or at least compete with Japan's Kobe beef (premium Wagyu, grown in the Kobe region of Japan) or Matsuzaka beef (Wagyu raised in the Matsuzaka region, generally of somehwat higher quality than Kobe beef). The hope was to have the product developed by the time import quotas were removed (April 1, 1991), at which time Nichiro would import one-hundred carcasses per month, or 530 tons per year (carcass weight of 880 pounds). Under its LIPC quota, as one of the thirty-six Japanese firms allowed to import beef, Nichiro's chilled, grain-fed beef imports were limited to twenty tons per year.

In order to fill its twenty-ton quota for 1989, Nichiro purchased an additional 6.5 carcasses from Mr. Marchi. The carcasses (56.5, for a total carcass weight of 21.3 tons) were quartered, cooled and wrapped to Nichiro's specifications. They were then trucked to Seattle and shipped to Tokyo via air freight as chilled carcass beef.

The arrangements were made by Nichiro Pacific, Ltd. (NPL), a U.S. subsidiary of Nichiro Corporation based in Seattle.

Typical problems which surfaced in chilling and packing carcass beef in the U.S. for shipment to Japan included improper refrigeration and inadequate wrapping materials. Some carcass damage often incurred as a result. Modifications to the packing process at White's, per detailed instructions sent by Nichiro, avoided these problems. Mr. Yamamura had emphasized the necessity of full cooperation from White's so that the integrity of the product not be compromised.

Mr. Genjiro Honda, a Nichiro meat specialist, was present when the cattle were slaughtered at White's. In addition to instructing his American counterparts in the Japanese style of carcass preparation, Mr. Honda graded the carcasses. The results were disappointing.

Of thirty-three carcasses graded on December 4, 1989, none reached B3.[6] One graded B1 (lower than B2). All the others graded B2 (lower than B3). Carcass quality was essentially that of Japanese Holstein and Australian beef. The goal of matching Wagyu, let alone Kobe beef, seemed out-of-reach. Mr. Marchi reported that:

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[6]Of a multitude of criteria involved in the Japanese beef grading system, three are of primary importance: color of the fat (stark white is best, yellow is worst), color of the meat (bright pink is best, dark red is worst), and amount of marbling (the more the better -- from 50 percent to 80 percent).

> The first carcasses were low-Choice to mid-Prime. Bob [Bob White, owner-operator of White's Wholesale Meats], Doug [Dr. Douglas Gray, a meat scientist at Montana State University], and I all thought they were great. Bob said some were the best he'd ever seen. But they weren't what the Japanese wanted.
>
> Both sides were naive. We thought it would work. We all did. The Japanese thought the Americans could do it easily and we did too. But we couldn't, and the Japanese didn't give up.

All in all, the fat color of the carcasses had been quite good, as was the color of meat. The Japanese grader was very pleased with both. Marbling, however, was mediocre. Of the twelve grades of marbling, these carcasses were consistently in the middle. The feeling was that carcasses which would grade B3 or better (i.e., B3, B4, B5, A1, A2, A3, A4, A5) could be produced. The challenge was but to do so consistently, economically, and with most, if not all, of the steers selected for a given feed trial. These conditions had to be satisfied before Nichiro would commit itself to importing one-hundred carcasses per month from Marchi Angus Ranches, which it had hoped to do beginning in April of 1991.

In the feed trial of 1988, Dr. Gray outlined some of the difficulty of product development, and recommended measures that should be attempted. Problems, or complications, which Dr. Gray mentioned include the following:

(1) maintaining gains would get increasingly difficult as the cattle matured;

(2) though barley was the recommended feed, the

potential for bloat, inconsistent feed consumption, and acidosis were considerable;

(3) though corn was a safer feed, it tended to produce fat which was soft and tinged with yellow;

(4) though age worked for producing better marbling (since marbling is the last fat deposited, the animal must have reached structural and muscular maturity before depositing intramuscular fat), it worked against meat color (the older the animal, the darker the meat) and tenderness (the older the animal, the less tender the meat);

(5) meat color was adversely affected by stress -- stress which could be induced simply by trucking the cattle from the feedlot to the slaughter plant;

(6) some cattle will deposit yellow fat regardless of what they are fed because their genetic make-up does not allow them to process carotene well;

(7) maturity is generally reached at about 19 months of age, and marbling occurs between 13 and 36 months, and 30 months was probably getting too old;

(8) marbling is the biggest contributor to flavor yet the most difficult to achieve -- not only is it the last of the four fats to be deposited (external, or back-fat; internal, or body-cavity fat; intermuscular, or seam fat; and marbling, or intramuscular fat), it is also the first to be lost under any sort of stress;

(9) if the carcass was trimmed too much, it would lose 2 percent of its weight through moisture evaporation while in refrigeration; and

(10) no standard efficiency factor's existed for what Mr. Marchi was attempting to do since, to Dr. Gray's knowledge, this had not been attempted before.

Steps which Dr. Gray recommended for the initial feeding trial, in an attempt to avoid some of these potential problems, included the following:

(1) to achieve a carcass weight of 880 pounds, which Nichiro wanted, the cattle should be fed to a live weight of 1430 pounds, requiring 2.6 to 2.7 pounds-per-day gain given the time allowed; as a target, feed cattle to a live weight of 1400 to 1650 pounds;

(2) the cattle should be fed twice daily to maximize consumption;

(3) the ration should eventually become 80 percent barley in order to increase the rate of gain, increase marbling, and to produce fat which is firm and very white;

(4) once slaughtered, electrical stimulation of the carcass might improve meat color, and it would force the marbling to set-up better, which could improve marbling up to 10 percent;

(5) slaughter the cattle as soon as possible after transporting from the feedlot;

(6) barley and wheat are equally good in terms of producing white fat, but barley is better for making more fat;

(7) feed the cattle as much as they will eat, and keep an 80:20 ratio of grain to roughage; at a minimum, 10 percent of the feed ration should be alfalfa hay;

(8) feed uniform sets of cattle, and push them to get maximum feed consumption.

Though many of these recommendations were followed, the cattle weights at slaughter, carcass weights, gains per day, and marbling were not satisfactory in terms of specialty beef for Japan. Because the meat did not fit Nichiro's targeted market, Nichiro sold the carcasses at about 900 yen per kilogram (approximately $2.84 per pound, using the 1990 average exchange rate). Nichiro's cost was about 1,250 yen per kilogram ($3.95 per pound), for a loss of roughly $1.11 per pound. Nichiro's total loss was about $47,000.

Nichiro Corporation thought the weight gains, and the carcass yield (58 percent actual, 61 to 63 percent expected), should have been better. Actual average carcass weight was 755 pounds. Expected carcass weight was 880

pounds. Likewise, whereas the expected ADG was 2.2 to 2.6 pounds per day, actual was 1.97. The Japanese were disappointed, even discouraged. The trust which Mr. Marchi had established with Arrowhead and Nichiro Corporation seemed to be in jeopardy. In their view, the cattle did not perform as expected. For the project to continue, these issues had to be resolved immediately. Trust had to be reaffirmed. It was January of 1990.

Within ten days of receiving Mr. Yamamura's letter outlining the above concerns, Mr. Marchi responded in detail. Among other items addressed, Mr. Marchi explained that the Japanese frame of reference was the Wagyu, which was not fed for marbling until it was structurally mature. The Nichiro cattle in the Marchi feedlot, however, were being fed for structural growth as well as meat development. A lower grain-to-hay ratio had been used in order to foster structural growth, deemed essential in order to achieve marbling. A grain-to-hay ratio of 80:20 would have been more efficient in terms of weight gain, but it would not have been the desired weight type (i.e., backfat and seam fat instead of marbling). A feed ratio of 48:52 grain-to-hay was therefore used. Though hay is the most expensive and least efficient means of feeding cattle in terms of weight gain, it was seen as necessary given the goals of the feed trial.

To rectify this situation in the interest of developing

a product the Japanese wanted at a cost which they felt reasonable, and in a spirit of cooperation and shared risk, Mr. Marchi proposed a cap on cost-of-gain. The 1989 cattle had a cost-of-gain of $1.04 per pound. Mr. Marchi proposed limiting the cost-of-gain on the next feed trial to $.83 per pound.[7] Should cost-of-gain exceed $.83, he would pay the difference up to a live weight of 1500 pounds, with the following conditions: Black-white-face steers would be fed with Black Angus, and the feeding period would be two to three months longer (from 193 days in the 1989 trial to as much as 250 days in 1990).

This was a significant risk for Mr. Marchi since he did not know what the price of feed would be in 1990, although he did expect to feed more grain than hay (thereby lowering the cost-of-gain). Mr. Marchi had already guaranteed death loss not to exceed 2 percent. Plus, in anticipation of providing one-hundred carcasses per month beginning in April of 1991, Mr. Marchi had done the following: purchased an additional hay and grain ranch and contracted to buy yet another; constructed one mile of new road; drilled a four-hundred foot well in order to supply high-quality water to the feedlot; commenced construction of another feedlot; contracted to buy an additional 110 Black Angus steer calves

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[7]Based on its experience of feeding cattle in Japan, Nichiro expected the Marchi steers to perform about 20 percent better than they did. Mr. Marchi proposed a cap of $.83 per pound to reflect a 20 percent reduction in the actual cost-of-gain.

on October 15, 1990; added an additional ranch employee; and contracted with Dr. Gray for advice concerning cattle nutrition.

Mr. Marchi reiterated that 1989 was a trial from which they learned much, that feeding cattle to these weights was virtually unheard of in the U.S., and that a grain ration which excluded corn and relied strictly on barley and wheat was largely untested. He stressed that he had made a substantial investment in this project in terms of time and capital and that he was committed to a long-term relationship with Nichiro in order to develop the product Nichiro wanted.

Nichiro accepted Mr. Marchi's explanation and proposal, and began to deal with Mr. Marchi directly through Mr. Yamamura of Arrowhead, Inc. (the Tokyo trading company), bypassing Nichiro Pacific, Ltd. After a number of different scenarios were discussed, a second feed trial involving five head began July 10, 1990. Some notable differences characterized this trial: only five head were involved; Nichiro would accept only those carcasses which graded a minimum of B3; a feeding program would be provided by Nichiro; the feeding period would be for nine months; and the goal of the trial was to achieve a grade of B4. From Nichiro's perspective, the price differential between B3 and

B4[8] was large enough to absorb some adverse movement in the exchange rate as well as import duty costs and still remain profitable. To effectively compete as a specialty meat, though B3 was acceptable, B4 was desired.

In addition to the cost-of-gain cap, Mr. Marchi stood the risk of not having the carcasses grade B3. Should this be the case, in all probability the carcasses would be heavily discounted in the U.S. market due to their excessive fat (by U.S. standards). The incentive for Mr. Marchi to do so was the prospect of a one-hundred-per-month carcass business. In terms of assumption of risk, it seemed as though he were being asked to go a good deal more than half way. In the interests of developing trust, and in carrying the project forward, he accepted the challenge.

The five steers were slaughtered at White's Wholesale Meats on April 4, 1991. Since a representative of Nichiro was unable to attend, and since the carcasses could therefore not be graded until they were received in Japan, Nichiro accepted all carcasses regardless of their grade. Live weight at slaughter was 1550 pounds and carcass weight averaged 876 pounds, weights which essentially met the Japanese criteria. Average daily gain for the 266-day feeding period (July 10, 1990 through April 3, 1991) was 2.0

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[8]Wholesale prices in Tokyo in June, 1992, on a per-pound basis were: B2 @ $2.50; B3 @ $3.15; A3 @ $5.60; A4 @ $7; A5 @ $9. Price quotes for B4, B5, A1, and A2 were not available (interview with Hiroshi Aoyama, June 17, 1992).

pounds, somewhat less than the target of 2.2 to 2.6 pounds per day. Cost-of-gain was about $.97 per pound up to 1500 pounds, which exceeded the ceiling price of $.83 by $.14 per pound. Consequently, Mr. Marchi credited Nichiro for the difference per their agreement.[9]

The carcasses were evaluated and graded in Japan on April 11, 1991. Of the five carcasses, three graded B2 and two graded A2. The carcasses were clean and in good condition, and the color of the meat and fat were judged to be very good. Marbling, however, was still somewhat disappointing, and a moisture problem, defined as "watery" or "drip," was detected.

Carcass sales price was about 9 percent (on average) less than the expected sales price. Because they could not be sold as B3 (equivalent to Wagyu half-blood cross or Japanese Holstein steer), they had to be sold as "regular imported meat," such as that from Australia.

Other than the increase in carcass weight, attributable to the extended feeding period and upward adjustment in the grain-to-hay ratio (to 75:25 from 48:52), there was slight difference from the first trial in terms of meat improvement. Nichiro recommended increasing the amount of carbohydrates in the feed ration, increasing the quantity of

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[9]$.9659 - $.83 = $.1359 per pound credit; 1500 pounds - 1018.4 pounds = 481.6 pounds of gain per head applicable for feed credit; 481.6 pounds x $.1359 per pound x 5 head = $327.25 total credit.

feed, and extending the feeding period.

All in all, however, Mr. Marchi was informed that future carcasses would be accepted as B3 provided the moisture problem could be solved. The solution could be as simple as withholding feed and water from the cattle for twenty-four to forty-eight hours prior to slaughter, as was customary in Japan.

A third feed trial began on October 1, 1991, with ten Black Angus steers. At an average age of about eighteen months, and an average weight of 1123 pounds, these steers began the feed trial (they had been on summer pasture through September) at approximately the same weight and age of most fat cattle at the time of slaughter in the U.S. The ten were selected as the best of 255 yearling steers (averaging 915 pounds) and were to be fed until the following October. Confident that the feed trials were making sufficient progress, Nichiro purchased the steers at $.80 per pound, effective October 1, 1991. As with the previous feed trial, the steers were to be fed according to a program provided by Nichiro.

In February of 1992, Mr. Marchi was notified that, should the ten head grade a minimum of B3 and the moisture problem be solved, then Nichiro's demand will expand to three-hundred carcasses per month, considerably higher than the one-hundred per month previously expected. Should this be the case, substantial expansion of Mr. Marchi's feedlot

capacity and White's Meats refrigeration space would be needed. The possibility of a joint venture between Nichiro, Marchi Angus Ranches, and White's Wholesale Meats had been discussed in earlier negotiations. The prospect of a joint venture involving all three, or any two of the three parties, remained a possibility. In addition, should the project prove successful, Mr. Marchi was assured that he would be the exclusive exporter of chilled beef from the United States for Nichiro Corporation.

Speaking for Nichiro, Mr. Yamamura informed Mr. Marchi that Nichiro was interested in importing "U.S. Standard meat" as well as chilled "B3 or better." Mr. Yamamura explained that, though Australian and New Zealand beef was relatively cheap in Japan, it was not acceptable as table meat because it was grass fed. He also reported that, though Australia was developing grain-fed beef, the Australian product was priced the same as the U.S. product. At the same price, the Japanese prefered U.S. beef.

Mr. Yamamura also reported that, after 1993 when the import ad valorem tax would be renegotiated (70 percent in 1991, 60 percent in 1992, 50 percent in 1993), the expected level was 30 percent to 40 percent. Mr. Aoyama expects this level to drop further, to as low as 25 percent, though it may do so incrementally. At this level, Mr. Yamamura claims that Marchi beef would compete with higher quality Japanese beef (Kobe and Matsuzaka categories) because of its

significantly lower price. Mr. Yamamura reported that Nichiro hoped Mr. Marchi would be able to fill its demand for higher-quality as well as lower-quality (U.S. Standard) beef. Mr. Yamamura reiterated Nichiro's interest in making a financial investment in the Marchi and White operations should Mr. Marchi and Mr. White so desire.

Mr. Aoyama and Mr. Iwasaki visited the Marchi Ranch in June of 1992. After observing the steers Mr. Aoyama thought they would be ready for slaughter in October, and he thought 60 to 70 percent of them (six or seven head) would grade B3. He expected the remainder (three or four head) to grade B2 and some to grade A3. He stated that, if the steers were Wagyu, he would expect them to grade A3 to A4.

CHAPTER 20

WASHINGTON STATE UNIVERSITY AND THE JAPANESE BEEF MARKET

In an attempt to increase the likelihood of success, additional research in product development was essential. State-of-the-art research on developing this type of beef for the Japanese market was being conducted at Washington State University (WSU) in Pullman, Washington. To learn what the researchers at WSU had learned, with the intention of gaining insight into product development as well as guidance on how to proceed, Mr. Marchi and Mr. Hibbard (the author of this paper) visited WSU in February, 1992.

The team of researchers who received Messrs. Marchi and Hibbard at WSU included: Dr. Kristen A. Johnson, animal nutritionist; Dr. Charles T. Gaskins, geneticist; Dr. Jerry J. Reeves, reproductive endrocrinologist; Dr. Raymond W. Wright, Jr., embryologist; Dan Coonrad, beef herdsmanager; and Drs. Thomas I. Wahl, Raymond J. Folwell, and James C. Barron, agricultural economists. Research at WSU on this subject had been conducted since 1989, including visits to Texas A&M (which has pioneered research in this area) and Japan by team members. Two feed trials have been conducted and a third is underway. Much of WSU's effort in product

development involved experimentation with different feed rations, different length of feeding periods, and different breeds of cattle.

WSU Feed Trials

In the first trial, Black Angus and Wagyu crossbreds were put on feed at 500 to 600 pounds and fed to gain no more than 2.2 pounds per day. A ration of 50:50 or 60:40 concentrate-to-roughage (grain-to-hay) was fed until the cattle reached 1,000 pounds. From 1,000 to 1,500 pounds the ration was increased to 80:20 grain-to-hay. The cattle were slaughtered once they reached 1,500 pounds.

At the beginning of the first trial, the Angus were a full year younger than the Wagyu (six months versus eighteen months). At slaughter all Wagyu graded Prime plus. One Angus graded Choice, all other Angus graded Prime.

The results of the first trial were instrumental in designing the second trial. The second trial, completed in 1991, consisted of 4 Black Angus steers, 4 Longhorn steers, and 3 Wagyu crossbred steers (two 3/4 bloods and one 7/8 blood Wagyu). Four Wagyu crossbreds began the feed trial but one died of unrelated causes.

The researchers found the Angus to be more efficient than Wagyu in terms of pounds gained per pounds of ration fed. Whereas a Wagyu can only be fed about 1.7 percent of their body weight in feed concentrates per day, Angus can be

pushed to at least 3 percent (Pitts 1990, 8). Wagyu, which tend to be fine-boned and gentle, even docile, were less aggressive than the Angus and Longhorn and were "out competed" at the feed bunk. They tended to be "finicky," sometimes "going off feed" for no predictable reason, all of which translated into less feed efficiency relative to Longhorn and Angus, which translates to higher costs-of-gain.

At the time of slaughter, the researchers thought the cattle were not yet ready in spite of being fed for 365 days. Nonetheless, slaughter proceeded in order to supply the carcasses at the time required by WSU's outlet in Japan. The cattle were slaughtered at Washington Beef in Yakima, Washington, a Japanese-owed packing plant. The Angus did not marble as well as the researchers had hoped:

Table 16
Cattle Performance, 1991 WSU Feed Trial

	Angus	Longhorn	Wagyu
Initial Wt (avg lbs)	728	569	765
Final Live Wt	1590	1266	1585
Birthdate (avg)	Jan '88	Mar '88	Mar '88
Avg Daily Gain (lbs)	1.72	1.41	1.65
Feed Efficiency	15.8	16.3	15.7
U.S. Grade	Ch(0)	P-	P+
	P-	Ch+	P+
	P-	Ch+	P+
	P+	Ch(0)	n/a
Japanese Grade	B4	B4	A4
	C4	C3	B4
	B4	B4	B5
	C4	B5	n/a

Source: Johnson et al. 1991, 8b-9b.
Note: U.S. beef grades: Ch = USDA Choice; P = USDA Prime. For marbling grade: - = minimum; 0 = average; + = maximum.
Note: Re: Japanese beef grades, grading was done by WSU staff, not by certified Japanese beef graders.

Though the initial and final weights of the Black Angus were quite close to those of the Wagyu, the Angus were about nine months younger. This placed the Angus at a disadvantage in terms of structural maturity. The Longhorn performed quite well relative to the Angus in terms of feed efficiency and Japanese grade.

Marbling and Carcass Development in Wagyu and Angus

A primary difference in marbling between Wagyu and Angus lies in the type of intramuscular fat each deposits.

Wagyu tend to deposit small flecks of fat, often described as "fine," "feathery," or "lacy." Angus tend to deposit intramuscular fat in chunks. In other words, whereas a premium Wagyu steak would be peppered with bits of fat, so that it would resemble salami in terms of fat interlaced with meat, relative to Wagyu a premium Angus steak tends to have more fat on the external edge with pieces of fat, smaller in number but larger in size, broadly scattered throughout the steak. The premium Japanese market demands the former.

Dr. Charles Gaskins, A WSU geneticist, believes that Angus are genetically incapable of producing marbling equivalent to that of Wagyu. According to Dr. Gaskins, genetics are the single most important factor in developing marbling. That is, over 50 percent of marbling is determined by an animal's genetic make-up. Relatively little data has been collected regarding the genetic marbling ability of Angus sires since that has not been a primary consideration of Angus breeders. In order to collect this data, carcass identity would need to be maintained through the cutting and grading process. Slaughter operations in the U.S. are not currently set up to do this. To select Angus sires for their ability to foster marbling in their progeny, then, is difficult at best.

Dr. Gaskins thought that marbling might be determined by a single gene in Wagyu, which geneticists may be able to

isolate. In the case of Angus, however, marbling may well not be limited to a single gene, which makes it more difficult to isolate, and therefore more difficult to trace. Because marbling is considered to be 50 to 70 percent heritable, its identification could have significant implications for speeding the development of marbling in the Angus breed.

According to the WSU researchers, the primary factors which contribute to marbling are:

(1) genetics;
(2) length of feeding period (the longer the better);
(3) maturity (to an extent, the older the better); and
(4) feed ration (70 to 80 percent Total Digestible Nutrients, or TDN).

The WSU researchers also reported that, of the beef breeds in the U.S., the old-style Angus comes closest to matching the marbling ability of the Japanese Wagyu.[10] The old-style Angus (popular in the 1950s) was very short and compact, and very fat, perhaps best described as "dumpy," and is found only in isolated pockets. These pockets include one in Pennsylvania (old-style Angus owned by the Amish), one in North Carolina, and one in Ellensburg,

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[10]"Certain breeds have different muscle structures which help determine those which deposit marbling and those that do not. The predominantly white muscle fibers of breeds such as Charolais, Maine Anjou, Limousin and Gelbvieh use mainly glucose or sugar as a source of energy for the muscle to contract or relax....On the other hand, such breeds as Angus, Shorthorn, Jersey and Longhorn deposit high levels of marbling. Their predominantly red muscle fibers use fatty acids, stored nearby as marbling, as a source of energy" (Kester 1988, 11).

Washington (owned by Agri-Beef).

Dr. Reeves reported that genetics also account for some of the yellow tinge found in the fat of some feedlot beef. Genetics may in fact have more of an influence on the degree of yellowing than does feed. Nonetheless, it was recommended that beta-carotene, found in corn and to some extent in alfalfa, be kept out of the diet. Dr. Reeves also said that eighteen degrees fahrenheit was a critical temperature. When the temperature fell below this level, increased energy was required in the steer's feed ration if weight loss was to be prevented.

The WSU research team also had trouble with moisture, or watery meat, and thought a longer dry-lot time might be the answer. The research staff were not in universal agreement on this issue, however. One thought an extended dry-lot time, as was customary in Japan, would not have a significant affect on reducing moisture, and would in fact induce stress and would therefore have an adverse affect on marbling. Another thought that feed ration and animal maturity both affected water content in meat (rice straw and older maturity causing drier meat), but that a dry stand of twenty-four hours prior to slaughter may be the single most effective thing one could do to prevent weepiness. On the other hand, Japanese producers think watery or moist meat is primarily a factor of age (to avoid a moisture problem, Japanese producers will not slaughter dairy cattle before

eighteen months of age or Wagyu before twenty-four months of age) (Lin and Mori 1991, 112).

There were also two schools of thought among the WSU researchers interviewed regarding in-weights and length of feeding period. One school maintained that if the steers which enter the feed trial are "backgrounded"[11] for twelve to eighteen months, then a feed-period of less than one year should be adequate to achieve an acceptable degree of marbling. The other school thought that in-weights ought to be in the 650 to 700 pound range, and that a feeding period of four-hundred days would be necessary. That is, one called for starting cattle at older ages and heavier weights and feeding for a shorter period of time, the other for younger cattle fed for a longer period of time. Additional feed trials would be necessary to determine which approach provided the best results.

Dr. Wright recommended the following as an ideal approach to achieving high-quality marbling: slaughter the fat cattle at thirty months of age after a feeding period of four-hundred days with a steer that is at least a half-blood Wagyu (a 7/8 to 3/4-blood Wagyu is preferable). The cross which Dr. Wright recommended was Holstein and Angus, which

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[11]"Backgrounding" typically refers to feeding a weaned calf on pasture when adequate pasture is available, and hay with modest grain supplements when pasture is not available, for a period of time, usually several months. In this case, backgrounding for 12 to 18 months would put the steer at 1-1/2 to 2 years of age at the start of the feed trial.

was then crossed to Wagyu, giving a crossbred steer which was 1/4 Holstein, 1/4 Angus, and 1/2 Wagyu -- recommended in part because of a Japanese preference for the Holstein-Wagyu cross.

According to Dr. Wright, unless straight Angus are from a high-marbling genetic line, and inadequate information exists to determine this, they will grade B2. A 3/4 to 7/8-blood Wagyu (15/16 is considered a purebred, of which there are about two-hundred in the U.S.) is needed if consistent grading of B4 to A4 is to be realized. Another researcher, however, thought that U.S. Wagyu would never break into the Japanese A market simply because it is U.S. beef. Even if it did, U.S. Wagyu would in all likelihood never grade A5 (the highest grade attainable) because part of the grade is determined by local reputation. That is, some locales in Japan are known for producing superior beef, and beef from those locales are automatically graded higher for that reason.

In addition to its superior marbling ability, Wagyu also has the advantage of the peculiar chemical composition of its fat. Due to the presence of a particular enzyme in Wagyu,[12] only one-third of Wagyu fat is saturated

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[12]According to the 1991 McGregory Field Day report, Wagyu fat was found to be lower in palmitic acid than is most U.S. beef, and it was found to have "an unusually high concentration of oleic acid...Clinical trials have demonstrated that palmitic acid increases serum cholesterol when ingested by humans, while oleic acid does not increase (or may actually decrease) serum cholesterol" (Ford 1991 19).

(saturated fat has been linked to heart disease) compared to half for typical U.S. cattle (Dorgan 1990, 6A). When grilled, more fat is cooked out of Wagyu than from Angus. Fat on the chilled Angus carcass is hard, but fat on the chilled Wagyu carcass is soft. Therefore, though Wagyu has more untrimmable fat than does Angus, Wagyu fat is perceived as being less of a potential health hazard than is Angus fat. Because of this, in Dr. Wahl's opinion, in the long run the type of fat rather than the amount of marbling may be the key issue.

The common perception that Wagyu is more flavorful than other beef was borne out by controlled and uncontrolled taste tests. A controlled taste test utilizing a trained taste panel in Canada, and an uncontrolled taste test conducted at WSU drew the same conclusions: of the beef fed, Japanese Wagyu was judged the most flavorful, followed by American Wagyu, Angus, and Longhorn, in that order.

The importance of developing well-marbled carcasses has to do with the translation of tenderness and flavor into higher wholesale prices. This explains why there is a significant price increase from carcasses which grade B3 to carcasses which grade B4. As explained by Dr. Cross, an animal scientist at Texas A&M, "a 5 percent change in marbling will increase the value of the animal by $200" (Ford 1991, 17).

In order to achieve a carcass which would grade B3 or

better with some degree of consistency, several criteria seemed to emerge. First, an animal with some degree of Wagyu genetics, and in all likelihood, at least a half-blood, was required. Second, a feeding period of four-hundred days, beginning with an animal which was about eighteen months old, and fed with a ration of 80:20 grain-to-hay with a TDN of 70 to 80 percent for an average daily gain of about two pounds, was also required. Third, in order to avoid a moisture problem, dry-lotting the cattle for up to forty-eight hours prior to slaughter may be necessary. All reasonable steps should also be taken in order to avoid animal stress at all times.

An unknown is how well a Wagyu-Angus cross would perform on an extended feeding trial. A current WSU feed trial, to be completed in April of 1993, will provide information about the performance of this cross when the trial is complete. In an ideal scenario, this cross would combine the superior marbling ability, flavor, texture, and unsaturated fat of the Wagyu with the feed efficiency and milking ability of the Angus.

Market Considerations

Dr. Thomas Wahl expected the tariff to decrease to around 30 percent, but to no lower than 25 percent, and will probably occur in increments of 2 percent per year beginning in 1994. Dr. Wahl expected the feeding of dairy cattle in

Japan for beef consumption to decrease substantially in the long run, but he also expected the Wagyu sector to remain indefinitely.

Dr. Wahl categorized the market as having three segments: a high-end segment which demanded premium Wagyu, served for business lunches and in high class restaurants; a middle market which constituted the majority of the Japanese restaurant trade and home sales, and which demanded beef in the quality range of B4; and a lower market which used frozen cuts for barbecue and other casual consumption.

Dr. Wahl expects the bulk of growth to be in the middle market. He expects some growth to occur in the upper market assuming stability in Japanese tax laws regarding the deductibility of business expenses. Dr. Reeves, however, expects the bulk of growth in beef consumption in Japan to be on the lower end, in outlets such as McDonalds, where the U.S. producer cannot compete with producers in Australia. What is not clear is how closely growth in volume consumed equates with the growth in value of a particular market segment. That is, in terms of value, smaller volume growth in the upper-end market should outpace a much larger growth in volume in the lower market due to the difference in value of the meats consumed.

Drs. Wahl and Wright thought that a better market for premium beef raised in the U.S. to Japanese standards would be the domestic U.S. rather than the Japanese market. At

present, WSU beef which does not qualify for the Japanese market is sold domestically at three-times the U.S. wholesale price. The university could sell all of its premium beef domestically if it were not trying to service a Japanese client. Because of the Japanese tariffs, which depresses the price the Japanese importer can offer to the U.S. exporter, Dr. Wright thought that the U.S. market was more profitable than the Japanese market.[13] Specialty restaurants in the U.S. have a significant demand for this type of beef, and at present that market is larger than domestic supply. In dealing with a domestic market the producer also avoids a myriad of complexities associated with servicing a foreign market, including communication, transportation, and exchange rates. The saturation point for that domestic market, however, is unknown.

In addition to Japan, newly industrializing countries (NICs) may be emerging markets for premium beef. According to Dr. Barron, as the income level of a population or population segment rises, so does its demand for expensive foods. Therefore, if a premium product is developed for Japan, additional market outlets may be cultivated in NICs.

As the price of beef declines, Dr. Wahl maintains that mid-level consumption will increase dramatically. The question is whether the price will decline. For price to

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[13]At present, according to Dr. Wright, while the Japanese tariff on imported U.S. beef is 60 percent, the U.S. tariff on imported Japanese beef (Wagyu) is 3 percent.

decline significantly, the distribution system in Japan must be modernized. To what extent this will happen, and when it will happen if it does happen, is unknown. Nonetheless, Dr. Wahl reported that beef restaurants are doing very well in Japan, due in part to an increase in demand for beef among younger Japanese. As the population ages, consumer demand will shift more towards beef as the consumption of rice and fish decline. The gap in price is expected to narrow between beef and fish as fish gets more expensive relative to beef. This change in price structure reflects a dwindling supply of fish and an expected decrease in beef prices as import duties decline.

Dr. Wahl also believes that the Japanese could double their per capita consumption of beef and: (1) it would still not be a major factor in their diet; (2) beef consumption would still be at a healthy level; and (3) U.S. exports of beef would increase dramatically.

In Dr. Wahl's assessment, consistency and high quality, and a good working relationship with a Japanese contact who will push the exporter's product through the distribution system, are key. In this regard, early adopters, or those who "get in on the ground floor," will have the advantage in the Japanese market in terms of developing contacts and "getting ahead on the learning curve." Dr. Wahl sees opportunity in pre-packaging seasoned, marinated beef in the U.S. to serving-sizes desired by the Japanese consumer.

Japanese labor costs will continue to increase, and it will therefore be cheaper to cut and package beef in the U.S. prior to shipment.

Dr. Wright indicated that beef exports to Japan are limited to chilled, frozen, and processed beef. In 1991, six live cattle were shipped to Japan, total, from all sources.

Dr. Reeves reported that air freight to Japan for carcass beef was $.93 per pound, compared to $.19 to $.23 per pound by ship. Ocean freight from Seattle or Oakland to Japan takes eleven days -- which gives western states an advantage over midwestern states.

Ultrasound

With the use of ultrasonics, cattle can be tested while on feed to determine how well they are marbling. If the particular animal is found to be marbling well, then that animal is left to continue the feed trial. If not, then the animal is sold before reaching a carcass type which will be discounted in the U.S. market and which will not be accepted in the Japanese market.

The importance of this technology to a cattle feeder who is feeding for a select, premium market cannot be over emphasized. For instance, Mr. Marchi could cull those animals which stood little if any chance of reaching a carcass grade of B3 or better while they were still valuable

to the U.S. market, and Nichiro could be assured of receiving only those carcasses which met their specifications. Carcasses would perhaps be judged according to three standards: those that would meet Japanese specifications, those that would qualify for specialty markets in the U.S., and those that would do neither. Each animal could then be sorted, fed, and marketed accordingly. Mr. Marchi sees an important place for ultrasound even if the genetics of premium, highly-marbled beef are determined because of variation within genetically similar animals.

To date, ultrasonics has not been developed to the extent necessary to make these determinations with a reliable degree of accuracy. Though WSU researchers have done little research with ultrasound, they are in contact with a Canadian researcher who has, and who claims good success, and who will conduct ultrasound tests on WSU cattle in June, 1992. A fair conclusion would be that ultrasonics may be a tool of vital importance to this specialized feeding industry, and that more research needs to be done before it can be judged dependable and cost effective.

CHAPTER 21

ZENCHIKU LAND AND LIVE STOCK, INC.

> [Because Zenchiku's managers understand the Japanese market and style of doing business,] all these things that are unique to Japan are hurdles to everyone else but me.
>
> John W. Morse, Jr., President of Zenchiku Land and Live Stock, Inc. (Dennison 1990).

> The Selkirk Ranch is the single largest U.S. exporter of carcass beef to Japan.
>
> Matthew Cohn, Pacific Rim Trade Officer, Montana Department of Commerce (telephone interview 1992).

In October of 1988, Zenchiku Company Ltd., Japan's largest meat importer (Cullison 1991, 10A) with 1988 revenues of $1.5 billion (Eisenstodt 1988, 37), purchased the Selkirk Ranch in Montana. Located ten miles southeast of Dillon, Zenchiku paid about $13 million for the 77,000 acre ranch (Atchison 1989). The 1988 calf crop was included in the purchase (the ranch reportedly runs about six-thousand cattle). Also formerly known as the Lazy 8, Zenchiku Land and Live Stock, Inc., was chartered as a Montana corporation and is a wholly-owned subsidiary of Zenchiku Company Ltd. According to Mr. John Morse, President of Zenchiku Land and Live Stock Co., the mission for the ranch is to produce beef suitable to Japanese taste,

including packaging and presentation of product.[14] ZL&L is free to pursue that mission in any manner it sees fit.

Zenchiku has six divisions through which its imported beef must pass prior to entering the distribution system. Each of these six divisions imposes a price markup before the product passes to the next division. Once the product has passed through these six divisions, Zenchiku then deals with fifty-four distributors, each of which is free to buy beef from other suppliers. To remain competitive, then, Zenchiku must offer beef to these distributors at competitive prices (interview with Matthew Cohn, 1992).

As a point of reference concerning price markups, Mr. Aoyama said that wholesale price in recent Tokyo markets for a B3 boxed carcass was 900 yen per kilogram (about $3.15 per pound). Once this carcass was fabricated, it would sell to a Japanese supermarket for a wholesale price of 1,800 to 2,000 yen per kilogram (about $6.30 to $7.00 per pound). Once the carcass was cut-up to serving size, the per kilogram retail price became 3,000 to 3,500 yen (about $10.50 to $12.25 per pound) (interview with Hiroshi Aoyama, 1992). Markups in this scenario approach 300 percent.

ZL&L's 1989 sales were about $1.5 million. Nearly two-thirds of its cattle were shipped to Japan to supply a mid-range market. ZL&L is not attempting to produce a super-

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[14]Mr. Morse granted an interview to Messrs. Marchi and Hibbard on February 21, 1992.

high grade of Japanese beef. Rather, it sees its product equivalent to Certified Angus Beef and better, i.e., high Choice and above, with 30 percent of ZL&L's product surpassing U.S. Prime. Mr. Morse sees Zenchiku's niche as between U.S. grain-fed beef and Japanese Wagyu. As such it is shipping carcasses which have as much as 40 percent intramuscular fat, compared to 5 to 10 percent for most U.S. beef, and 80 percent for Japanese Kobe (Balzar 1991, F6).

Included in Zenchiku Company's 1991 revenue of $2 billion are sales of beef, pork, poultry, and assorted processed meats. According to Mr. Morse, Zenchiku "grinds more hamburger in Japan than anyone." McDonalds of Japan is one of Zenchiku's customers.

Zenchiku Co. Ltd. is not limited to purchasing U.S. beef solely from Zenchiku Land and Livestock Co., and in fact, ZL&L must keep its prices competitive if it is to market its beef in Japan. ZL&L will also contract with other producers, who will use ZL&L's genetics, to increase its feedlot inventories to the levels necessary to provide Zenchiku Co. Ltd. with a consistent supply of "Selkirk Beef."

After being raised on the Montana ranch, the cattle are shipped to feedlots in other states as are most calves raised in Montana. With its feedlot and ranch cattle, ZL&L has a current inventory of about eight-thousand head. Though ZL&L has had cattle in as many as four feedlots with

"nearly mirror image results," it currently has cattle in feedlots in Kansas and Idaho. Mr. Morse selects feedlots according to the type of feed a given feedlot offers. For instance, the feedlot in Idaho may feed corn, barley, wheat, and/or other feed grains dependent upon whichever represents the best value. The Kansas feedlot feeds a milo-based ration which includes corn.

After being fed to Zenchiku's specifications, the cattle are processed at a relatively large U.S. plant (seventeen-hundred per day capacity) before being shipped to Japan. ZL&L has had cattle slaughtered every week for the past two-and-one-half years. The carcasses are loaded in refrigerated containers at the packing plants and are shipped to Japan via ocean freight from San Pedro or Oakland, California. Transit time to Japan from the slaughter house is fifteen days. According to Mr. Morse, ZL&L's boxed beef (some is boxed and some is shipped as carcass quarters) has a shelf-life of ninety days.

ZL&L's minimum target is to ship one container per week (about 30 carcasses) with a goal of 150 carcasses every two weeks, or 300 per month. In addition to the chilled carcasses, Mr. Morse reports that ZL&L will also ship as many as 45 carcasses of boxed beef each week.

Chilled beef produced by ZL&L ranges between B2 and B4. The Beef Marbling Score (BMS) is Zenchiku's primary indicator of quality, however, and Mr. Morse reports that

ZL&L's cattle have been marbling well.[15] To achieve this carcass quality, ZL&L weans calves at 525 to 550 pounds, backgrounds them with rolled oats and hay at an ADG of two pounds per day until they reach 600 to 650 pounds. The cattle are then fed a higher concentrate grain ration from 300 to 400-plus days. Live finished weight is in the area of 1600 pounds. The goal is to produce a carcass that weighs 950 to 1050 pounds, with 850 pounds the minimum acceptable carcass weight.

ZL&L's carcass weights have been as high as 1345 pounds and have been fed for as long as five-hundred days with an ADG of 2.48 pounds and a slaughter age of thirty months. Growth implants are not used (nor are they in the Marchi cattle) because they promote growth of red meat and inhibit the formation of intramuscular fat, and consequently have a substantial negative affect on carcass grade.

Final live weights will, in Mr. Morse's opinion, settle back to 1300 to 1400 pounds. He believes the key to producing quality beef in the feedlot is to feed cattle to the point where they quit gaining, and then feed for another sixty days in order to develop the proper color in the fat and meat. Mr. Morse also believes that the mineral content

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[15]BMS scores ranged from 3 to 6 for the bulk of ZL&L's recent two shipments preceding the date of interview. BMS scores of 3 and 4 qualify for yield grade 3 (as in B3) for this one criteria of quality grade (there are 4 criteria). BMS scores of 5 and 6 qualify for yield grade 4 (as in B4). Refer to Chapter 11, "Beef Grading in Japan," for clarification.

of feedlot water affects meat color.

Mr. Morse claims no loss in efficiency up to a feeding period of 400 days. He also claims that he is able to feed cattle to 1150 pounds for less than $.50 per pound of gain, and to 1350 pounds for less than $.70 per pound of gain. Mr. Morse says that he can place high quality chilled beef in Japan at a break-even cost of less than $1.50 per pound (C&F basis, i.e., cost includes product and freight to Japan). His price to the Zenchiku wholesaler has been less than $2.00 per pound for as long as ZL&L has shipped beef to Japan.

According to Mr. Morse, beef produced at the Montana ranch may sell in Japan under ZL&L's trademark as Certified Selkirk Beef. Mr. Morse has been pleased with the ability of Angus to produce the quality he wants, in part because Angus does not give up its feed efficiency in doing so. He does not anticipate introducing Wagyu into the ZL&L herd and would prefer to continue use of the best available Angus genetics for "classic" Angus herd development.

Like Mr. Marchi and WSU, ZL&L has had some experience with a moisture problem in its meat. Mr. Morse believes that moisture is a function of age, average daily gain, and days on feed more so than drinking water. He thought no benefit would be realized by withholding water from cattle for an extended period of time prior to slaughter. His cattle are dry-lotted overnight prior to slaughter, and the

cattle which are trucked from Kansas to a Los Angeles area packing plant are provided with free-choice water with electrolytes for the 1400 mile trip.

ZL&L owns an ultrasound machine but Mr. Morse has been disappointed with its success. He did report that ultrasonics may be useful in determining which cattle to sell as regular domestic U.S. cattle, but it cannot detect which animals are developing the best marbling.

Mr. Morse expects overall beef consumption in Japan to increase to twenty-five or twenty-six pounds by the year 2000, and that 60 to 70 percent of that increase will be in high-quality U.S. beef. He reported that, according to the U.S. Meat Export Federation, beef in Japan enjoys an elasticity factor of 2-to-1, that is, for every one-dollar drop in price, demand will increase by two dollars. He reported that the Japanese dairy feeding industry is in decline but that the Wagyu industry is stable, and that the market in Japan for B2 and B3 carcasses has been instable over the last twelve months. Mr. Morse expects this instability to continue until the market settles to its equivalent U.S. values (plus costs).

CHAPTER 22

SUMMARY OF FINANCIAL ANALYSIS

With its custom feeding arrangement with Nichiro Corporation, Marchi Angus Ranches is in the unique position of being able to sell its agricultural products (cattle, roughage and feed grains) at cost plus a 20 percent markup. The uniqueness of this is apparent when the particular marketing framework of agricultural products is considered. Historically, producers of agricultural products are price takers, not price setters. Cattle and feed prices are set by a market over which no single producer has influence, let alone control. In a relative sense, then, by pursuing this custom feeding arrangement Mr. Marchi is allowing himself the opportunity to set prices for his products.

The variables with the most potential for volatility are: loss on costs of gain, i.e., cost per pound and numbers of pounds gained in excess of $.83 per pound; death loss, which may vary from 2 to 5 percent of the numbers of cattle on feed; interest payments, which vary according to market rate and amount of debt; amortization costs, which are also a function of market rates and amount of land financed; and income tax, which may be influenced by ranch

operations as a whole.

Other expense items may vary due to a myriad of factors which occupy any business climate as well as those peculiar to ranching and feedlot operations, including prices attainable through economies-of-scale, weather conditions, quality of feed, and market prices for agricultural commodities. Income may vary due to market conditions at the beginning of a given feed trial, when the feeder steers are sold to Nichiro. The degree to which Nichiro Corporation is willing to accept markups on cattle and feed may also affect income.

For the current feed trial (ten head, to be completed in October 1992), net income after depreciation, interest and taxes of about $900 is expected, for a per-head profit of roughly $90. Due to the small size of this feed trial, Nichiro will not be billed for any expenses until its completion. This will cause modest negative cash flows in the second and third quarters ($318 and $315 respectively) and is not cause for concern. Once larger quantities of cattle are involved (from ten head per month to a potential high of three-hundred head per month) Nichiro will be billed monthly for yardage, feed, veterinary, transportation, and livestock processing costs, which will mitigate potential cash flow problems.

Best and worst case income and expense scenarios were examined for different quantities of cattle (ten, fifty,

one-hundred, and three-hundred head per month). The highest per-animal return to cash flow is expected with the present trial, explained by the fact that all feed is raised, but is sold at market cost plus 20 percent. The effective markup on raised feed then becomes 260 percent for hay (raised for $20 per ton, sold at $60 plus 20 percent), and 300 percent for grain (raised at $45 per ton and sold at $150 plus 20 percent). However, the lowest per-head net income is also for the current period. This discrepancy is explained by the lower costs assigned to feed production on a cash flow basis (actual production cost) than on an income and expense basis (market cost). This discrepancy does not carry through to the fifty-head scenarios due to the high proportion of purchased feed under those models.

Under the worst case scenario for fifty head per month, net cash balance remains positive, in excess of $80,000 for the year, with net income (before land capitalization costs) of nearly $70,000. Per-head profit, after taxes, interest, depreciation and capitalized land payments, is expected to exceed $100. Under the best case scenario, per head profit (net income after taxes, interest, depreciation and capitalized land payments) should approach $244.

Under the best case scenario for fifty head per month, a return on assets (ROA) of about 22 percent is expected, with roughly a 29 percent return on investment (ROI). Under the worst case scenario these ratios change to 10.5 percent

and 14.3 percent respectively.

The current ratio and debt ratio indicate good debt service ability, likely placing the operation in a favorable light from a lender's perspective. Even under the worst case scenario, adequate cash flow should be generated to service debt.

Per-head profit figures and financial ratios for the 50-head-per-month best and worst cases assume the operating expenses of the current feed trail are adjusted to reflect costs associated with feeding six-hundred head per year (fifty head per month). That is, it is assumed that Angus only are fed, that all feed is sold at market price plus 20 percent, and that 60 to 70 percent of the cattle will grade B3, thereby allowing the cattle (under the best case scenario) to be sold at a 20 percent markup. It also assumes that land payments are made only on that land which is occupied by the feedlot space required to feed six-hundred head at any given time.

CHAPTER 23

CONCLUSION

> Many producers are now beginning to think of ways to produce beef that meets specifications, rather than producing generic beef and then trying to sell it. Reported in "Livestock News" (Farris 1991, 8).

Feeding beef for the premium Japanese market should be a profitable venture for Marchi Angus Ranches. Because the Marchi Project involves developing a premium product per the request of a large company, those cattle are sold at a premium price, as high as 20 percent over market. Because the cattle are sold when they enter the feedlot, their sale weight is something less than half their final weight. As a custom feeder, however, Mr. Marchi is compensated through yardage fees and mark-ups on feed in addition to the premiums paid for the feeder cattle. Yardage not only covers the overhead costs associated with feeding cattle, it also provides a revenue stream which helps defray labor costs.

With the Japanese market, Mr. Marchi also has more marketing options for his feeder cattle, which provides more potential for profit. He also has the flexibility of

deciding when a feed trial will begin and when the cattle will be slaughtered. With the Japanese option he has the security of a ready market for his feed crops, which is particularly important in those years of feed surplus when many farmers are unable to market their crops at acceptable prices. As a custom feeder, he is able to sell that feed at a predetermined price with no freight costs in any given year.

Another advantage is the spreading of risk within the feedlot. Mr. Marchi retains ownership of some cattle in his feedlot, and with the Japanese cattle, custom feeds others. If the market falls, as it does periodically in the cattle business, Mr. Marchi has the cushion of a revenue stream from the owner of the custom-fed cattle.

Strictly from the standpoint of feedlot operation, then, developing a long-term relationship with a Japanese client on the magnitude that Mr. Marchi and Nichiro Corporation are attempting makes good business sense. The profit in such a relationship, and in developing a product which is the focus of that relationship, will be from the flexibility, diversification, and revenue streams provided to a custom feedlot operation as described above. Of equal if not greater importance are the premiums paid for the feeder cattle (assuming the cattle make grade) and the markups on feed. For Marchi Angus Ranches, the profit will likely not be in the difference between wholesale and retail

value. Given the new-found concern of the Japanese consumer for cheaper prices (Ono 1992, B1), a "windfall" may never occur for Marchi Angus Ranches or for Nichiro Corporation.

In terms of product development, much was learned in discussions with the WSU research team and with Mr. Morse of Zenchiku Land and Live Stock Co. Length of feed trial, feed ration composition, feed trial in- and out-weights and ages, and expected average daily gains, though not necessarily in agreement, have provided concrete suggestions which can be implemented.

An important step which Mr. Marchi can take to hasten product development is to introduce genetics predisposed to high-quality marbling into his registered Angus cow herd on a trial basis. Wagyu offer those genetics, as do the classic Angus of the 1950s. By artificially inseminating some of his registered cows with Wagyu semen, Mr. Marchi is now in the process of doing so. Mr. Aoyama said that genetics account for 75 percent of a steer's ability to marble, with the remaining 25 percent determined by feed (interview with Hiroshi Aoyama, 1992). Attention to genetic predisposition to marbling, then, appears to be crucial.

It is clear that the market in Japan for premium beef is growing beyond Japan's capability to service that market, and that the U.S. is well positioned to take advantage of that market development. Some economists expect U.S. beef exports to increase by about 4 percent in 1992, fueled

primarily by the drop in the Japanese import duty from 70 percent to 60 percent (Doane's 1992a).

It can also be argued that Montana is better positioned than many States to capitalize on this emerging market. Montana's abundance of wheat and barley; its clean, mountain environment; its cold winter weather; its proximity to Seattle seaports; and its stature as the number one producer of Black Angus cattle in the U.S.; all give it competitive advantage in developing beef tailored to Japanese taste.

Many authorities believe that tariffs on imported beef in Japan will decline beyond the 1993 level of 50 percent, and some believe it will decline steadily to as low as 25 percent. The waning of rural political strength in Japan, combined with: (1) a growing consumer voice for cheaper prices and increased access to foreign goods; and (2) external pressures from foreign governments to allow greater market access for their products; will keep an insurmountable political voice within Japan in abeyance.

Like Mr. Morse at Zenchiku Land and Live Stock Co., Mr. Marchi is in the enviable position of having a well established contact with a major Japanese food company. Not only does this bring a "window to the final consumer," it also provides direct access to one of the most complicated distribution systems in the world. The benefit of this should be amplified with the development of "Steake Restaurant," where Mr. Marchi will get very direct feedback

on consumer acceptance of the Marchi-Nichiro product. As with Mr. Morse, so many of the barriers which impede foreign access to the Japanese market simply don't exist for Mr. Marchi. The "functional integration" (Smith 1990) implicit in producers, packers, processors and retailers pushing toward a common goal will be instrumental in the timely development of an acceptable product.

Much progress has been made. Much more needs to be made before the Marchi Project has any real and lasting economic significance for Marchi Angus Ranches, for Montana, and for Nichiro Corporation. To continue progress toward the goal of providing three-hundred premium (B3 and better) carcasses per month as a profitable business for Marchi Angus Ranches, a number of things should occur. These include the following:

(1) Genetic improvement. The use of Wagyu and possibly "classic" Angus genetics should (and is) be pursued with some degree of urgency.

(2) Expand facilities. Additional feedlot space, and additional feed mill capacity will be required to service the numbers of cattle necessary to provide the expected quantity. Refrigeration space at White's Wholesale Meats will also need expansion. To raise the capital necessary for these investments in capital, a joint venture with Marchi Angus Ranches, White's Wholesale Meats, and Nichiro Corporation may need to be pursued.

(3) Load containers at the packing plant for ocean freight. To be competitive, freight costs must be reduced once a significant quantity of carcasses begins to be shipped on a regular basis. Shelf-life would also be improved by doing so.

(4) Vacuum-pack pre-seasoned, serving-sized portions of beef for microwave use. With the increasing numbers

of working women in Japan, this ready-to-use, premium product would cater to a growing market.

(5) Failing numbers three or four above, Nichiro Pacific, Ltd. should pursue fabricating the carcasses in its Seattle facility. This would include cutting, packaging, storing, and shipping the finished product to outlets in Japan.

(6) Develop a trademark. Like Certified Selkirk Beef, Marchi beef should be readily identifiable to the Japanese consumer. Particular attention should be given to how the product is presented. In developing a trademark, it must be mutually agreed that only beef of well-defined quality be acceptable for branding.

(7) Develop a collaborative, working relationship with the research team at Washington State University. Mr. Marchi is well on the way toward doing so. Each will benefit from the information exchange implicit in such a relationship, which should assist in product development in a cost-effective manner.

(8) Research concerning the use of ultrasonics in determining carcass marbling should continue. Should funding permit, Mr. Marchi may collaborate with Montana State University in doing so. Research completed or underway at other institutions should be investigated. Should this technology be developed, not only would a feedlot operator have more options available in marketing cattle, he would also have more efficient costs-of-gain.

(9) Consideration should be given to feeding heifers as well as steers. Though heifers tend to grade better than do steers under the Japanese grading system (Mr. Aoyama said that virgin females graded highest in terms of quality), lower feed efficiencies of heifers may make it uneconomical to feed them to premium weights.

(10) Renegotiate the $.83 cap on cost-of-gain. As Wagyu genetics are introduced into the cow herd, efficiencies of gain will likely decline. Costs will therefore increase. Mr. Marchi should not be expected to accept this risk unilaterally.

(11) Locate secondary or auxiliary markets. These may either be domestic or foreign.

The venture is not without risk. However, enough has been learned to warrant further feed trials, hopefully

involving more cattle so the results may have real statistical significance. Mr. Yamamura's concern about developing an acceptable product to be in place as the import duty declines should be heeded. There is concern that, in spite of Mr. Marchi's and Nichiro's best efforts, other enterprises undertaken by other concerns in other parts of the U.S. and in Australia may gain the advantage of the early adopter.

A number of concurrent feed trials, involving more cattle in each trial (20 to 30), and different bloodlines, ages, feed rations, daily gains, and length of feed period would provide more information in a shorter period of time. Much of this research is being conducted at WSU, but may be augmented by coordinated feed trials with the Marchi operation. A joint venture between Nichiro and Marchi Angus Ranches, established to provide the necessary capital and to spread the financial risk involved in such an undertaking and hopefully the financial reward, may be required.

An Investor's Perspective

Under the best case scenario, ROA is expected to be 22 percent. Though this compares favorably with the current returns of the stock and bond markets, it may not be competitive with other businesses seeking venture capital. There is also a significant degree of risk. Given the reputation of Japanese businessmen as tough negotiators, the

expected 20 percent markups on market price of feed and feeder cattle may not materialize. Carcass grades may not be satisfactory in terms of quality or consistency, and Nichiro may decide to abandon the project or change its goal. For instance, should carcasses which consistently grade B3 or better not be attainable, Nichiro may change its focus to the intermediate market. If this were the case, it may not be necessary to pay premiums to secure high quality cattle.

It is significant that the income and expense projections are based on historical costs associated with feeding Angus steers for Nichiro. These projections assume that Angus cattle, or cattle of similar performance, will continue to be fed and that an acceptable number will grade B3. Once Wagyu genetics are introduced and the cow herd is altered significantly in order to accommodate the Nichiro enterprise, a number of crucial measures will change. The livestock breeding herd, and the land necessary to carry that herd, will be added to assets (property, plant and equipment). Liabilities and owners' equity will increase in like measure, though to which degree for each category is uncertain. As a result, ROA will decrease in response to this increase in total assets and a decrease in net income.

That is, total income will likely show no significant change with the addition of Wagyu, at least initially. Expenses, however, are expected to increase due to the

higher costs-of-gain for the less feed-efficient Wagyu. In spite of the increased cost associated with Wagyu, without these genetics it may well be that total income will decline due to an inability to have significant numbers of cattle grade well (relative to Japanese grading standards and Nichiro's goal), thereby precluding a 20 percent premium. Not only may Wagyu be necessary for Marchi Angus Ranches to maintain this premium, but with satisfactory development of Wagyu genetics premiums exceeding 20 percent may be attainable.

Once the cow herd, or a significant portion of that cow herd, is dedicated to the Nichiro operation by changing its genetic structure for that purpose, capitalized land costs will increase substantially. This will reduce net cash flows as those land payments are made, and it will reduce net profit (net income after taxes, interest, depreciation and amortized land payments). A worst case scenario of fifty head per month will likely show a net profit between break-even and $20,000. The best case may register a net profit of about $100,000.

A venture capitalist who is motivated primarily by high rates of return would likely not be attracted by the Marchi enterprise. For an investor who is motivated in part by creating a value-added product in Montana, however, the Marchi-Nichiro enterprise may be quite appealing.

MARCHI ANGUS RANCHES
Summary of Financial Data, Nichiro Steer Operation

	First 12 months	Best Case 50 hd/month	Worst Case 50 hd/month
CASH FLOWS ($)			
Receipts:			
Total	21,920	1,400,500	1,289,500
Per head	2,192	2,334	2,149
Disbursments (1):			
Total	15,000	1,252,200	1,209,100
Per head	1,500	2,087	2,015
Net Cash Flow:			
Total	6,920	148,300	80,400
Per head	692	247	134
INCOME & EXPENSE ($)			
Income:			
Total	23,870	1,531,065	1,411,065
Per head	2,387	2,552	2,352
Expenses:			
Total	22,010	1,267,115	1,283,855
Per head	2,201	2,112	2,140
Net Income:			
Total	894	151,170	69,126
Per head	89	252	115
Net Income/Income:	3.75%	9.87%	4.90%

(1) For the 50 head per month scenarios, cash disbursements for the worst case exceeded cash disbursements for the best case, which resulted in lower Net Incomes Before Interest and Taxes (NIBIT). This in turn allowed for substantial reductions in income tax, as follows:

Change in Cash Disbursements	50 hd/mo
increase in cash disbursements, worst case over best case	11,600
tax reduction	54,700
net reduction in cash disbursements, for worst case	43,100

Total and per-head cash disbursements are therefore lower for the worst case scenario than they are for the best case scenario.

MARCHI ANGUS RANCHES
Financial Ratios -- Nichiro Steer Operation
50 head per month (Best Case)

LIQUIDITY:

Working Capital (1)	$670,000
Current Ratio (2)	3.48

LONG-TERM DEBT SERVICE ABILITY:

Debt Ratio (3)	0.60
Debt/Equity (4)	1.48

PROFITABILITY:

Return on Assets (5)	21.87%
Return on Investment (6)	28.94%

(1) Working capital = current assets - current liabilities.

(2) Current Ratio = current assets / current liabilities.

(3) Debt ratio = total liabilities / total assets.

(4) Debt/equity = total liabilities / owners' equity.

(5) Return on assets = (net income before interest and income tax / total assets.

(6) Return on investment = net income before interest and income tax + [interest expense x (1-tax rate)] / long-term liabilities + equity.

MARCHI ANGUS RANCHES
Financial Ratios -- Nichiro Steer Operation
50 head per month (Worst Case)

LIQUIDITY:

Working Capital (1)	$670,000
Current Ratio (2)	3.48

LONG-TERM DEBT SERVICE ABILITY:

Debt Ratio (3)	0.60
Debt/Equity (4)	1.48

PROFITABILITY:

Return on Assets (5)	10.54%
Return on Investment (6)	14.34%

(1) Working capital = current assets - current liabilities.

(2) Current Ratio = current assets / current liabilities.

(3) Debt ratio = total liabilities / total assets.

(4) Debt/equity = total liabilities / owners' equity.

(5) Return on assets = (net income before interest and income tax / total assets.

(6) Return on investment = net income before interest and income tax + [interest expense x (1 - tax rate)] / long-term liabilities + equity.

MARCHI ANGUS RANCHES
Pro Forma Balance Sheet, Nichiro Steer Operation
50 head per month

ASSETS		
Current Assets:		
Cash and cash equivalents	$55,000	
Investments	10,000	
Accounts receivable	260,000	
Livestock (feeder cattle)	540,000	
Feed inventory	75,000	
Total Current Assets		$940,000
Property, Plant and Equipment		
Feedlot, scale, fences and imprvmnts	200,000	
Equipment and vehicles	80,000	
Total Depreciable Assets	280,000	
Less accumulated depreciation	18,000	
Net depreciable assets		262,000
Land		5,000
TOTAL ASSETS		$1,207,000
LIABILITIES AND OWNERS' EQUITY		
Current Liabilities:		
Accounts payable	$100,000	
Notes payable	130,000	
Current maturities on long-term oblig.	40,000	
Total Current Liabilities		$270,000
Long-term Liabilities		450,000
Total Liabilities		$720,000
Owners' Equity:		
Capital stock	200,000	
Additional contributed capital	250,000	
Retained earnings	37,000	
Total Stockholders' Equity		487,000
TOTAL LIABILITIES AND OWNERS' EQUITY		$1,207,000

MARCHI ANGUS RANCHES
Pro Forma Statement of Income and Expenses, Nichiro Steer Operation
November 1, 1991 through October 31, 1992

INCOME:		
Sale of steers: 10 strs @ 1122.5# @ $.80		$8,980
Sale of feed:		
57 ton grain mixture @ $180	$10,260	
20 ton hay @ $72	1,440	
mineral	50	11,750
Yardage: $.50 x 10 strs x 360 days		1,800
Veterinary care: 10 strs @ $15		150
Transportation:		
Marchi to White's @ $3 per head	30	
White's to Seattle @ $.06 per pound	530	560
Livestock processing fees:		
slaughter @ $25 per head	250	
packaging and handling @ $20 per head	200	
meat inspection: 10 hours @ $18	180	630
TOTAL INCOME		$23,870

OPERATING EXPENSES:		
Cost of steers: 10 strs @ 1122.5 # @ $.80		$8,980
Cost of feed:		
57 ton grain mixture @ $150	$8,550	
20 ton hay @ $60	1,200	9,750
Ranch labor:		
animal handling, feeding, facility mntnc.	40	
payroll taxes	10	50
Ranch supplies		10
Veterinary care:		
medicines	40	
vaccinations	65	
needles, syringes, misc. supplies	15	120
Feedlot maintenance (materials, tools)		200
Feedlot utilities		150
Brand inspection		10
Telephone, fax, postage		20
Legal and accounting		50
Travel		50
Membrshps., publs., mktg.		50

Transportation:		
Marchi feedlot to White's @ $3 per head	30	
White's to Seattle @ $.06 per pound	530	560
Livestock processing costs:		
slaughter @ $24 per head	240	
packaging and handling @ $20 per head	200	
meat inspection: 10 hours @ $18	180	620
Commission of Trading House ($1 per live cwt)		110
Insurance		80
Loss on cost of gain (excess above $.83/#)		650
Livestock death loss		100
Property tax		100
Depreciation		350
TOTAL EXPENSES		$22,010
NET INCOME BEFORE INTEREST AND TAXES		1,860
Interest expense		370
Allowance for income tax		596
NET INCOME		$894

MARCHI ANGUS RANCHES
Sensitivity Analysis -- Best Case (1)
Pro Forma Statement of Income and Expenses, Nichiro Steer Operation
Years 2 through 5

	10 hd/mo 1993	50 hd/mo 1994	100 hd/mo 1995	300 hd/mo 1996
INCOME:				
Sale of steers	$129,600	$648,000	$1,296,000	$3,888,000
Sale of feed	140,400	702,000	1,404,000	4,212,000
Yardage	21,600	108,000	216,000	648,000
Veterinary care	1,800	9,000	18,000	54,000
Transportation:				
Marchi to White's	360	1,740	3,300	9,000
White's to Seattle	7,200	36,000	72,000	216,000
Lvstk. processing fees:				
slaughter	3,000	14,400	26,400	72,000
pkg and hndlg	2,400	11,400	20,400	54,000
meat inspection	350	525	700	875
TOTAL INCOME	$306,710	$1,531,065	$3,056,800	$9,153,875
OPERATING EXPENSES:				
Cost of steers sold	$108,000	$540,000	$1,080,000	$3,240,000
Cost of feed:				
grain	102,600	513,000	1,026,000	3,078,000
hay	14,400	72,000	144,000	432,000
Labor:				
general ranch work	500	7,500	15,000	30,000
payroll taxes	100	1,500	3,000	6,000
Ranch supplies	600	2,400	3,600	7,200
Veterinary care:				
medicines	600	3,000	6,000	18,000
vaccinations	960	4,800	9,600	28,800
supplies	240	1,200	2,400	7,200
Feedlot mntnc. and sup	400	1,000	2,000	4,000
Feedlot utilities	500	600	800	1,000
Brand inspection	140	690	1,380	4,140
Phone, fax, postage	1,200	4,500	6,000	10,800
Legal and accounting	600	1,800	2,100	2,700
Travel	720	2,700	3,900	5,400
Membrs, publs, mktg	300	400	500	600
Transportation:				
Marchi to White's	360	1,650	3,000	8,100
White's to Seattle	7,200	36,000	66,000	180,000
Lvstk. processing costs:				
slaughter	2,880	13,200	24,000	64,800
pkg and hndlng	2,400	10,800	19,200	50,400
meat inspection	350	525	700	875
Commission	1,380	6,900	13,800	41,400

Insurance	720	2,550	4,500	11,700
Loss on cost of gain	1,800	3,600	5,400	8,100
Livestock death loss	2,160	10,800	21,600	64,800
Property tax	1,200	6,000	12,000	36,000
Depreciation	3,600	18,000	36,000	108,000
TOTAL EXPENSES	$255,910	$1,267,115	$2,512,480	$7,450,015
NIBIT (2)	50,800	263,950	544,320	1,703,860
Interest expense	4,800	12,000	60,000	120,000
Allowance for income tax	18,400	100,780	193,728	633,544
NET INCOME	$27,600	$151,170	$290,592	$950,316

(1) ASSUMPTIONS

Income: steers and feed sold at cost plus 20 percent; yardage @ $.50 per head per day (360 days); veterinary care at cost; modest markups on transportation and livestock processing.

Expenses: costs for hay @ $60 per ton and grain $ $150 per ton remain constant; economies of scale (lower per-unit costs) for ranch supplies, transportation, slaughter, packing and handling, and insurance.

Assumed a reduction in pounds per head exceeding the cap on cost of gain ($.03 per pound, from 500 pounds for 10 head per month to 75 pounds for 300 head per month). Livestock death loss @ 2 percent throughout; property tax @ $10 per head; income tax @ 40 percent. Other increases are assumed to be consistent with increases in livestock volume.

(2) NIBIT = Net Income Before Interest and Taxes

MARCHI ANGUS RANCHES
Sensitivity Analysis -- Worst Case (1)
Pro Forma Statement of Income and Expenses, Nichiro Steer Operation
Years 2 through 5

	10 hd/mo 1993	50 hd/mo 1994	100 hd/mo 1995	300 hd/mo 1996
INCOME:				
Sale of steers	$108,000	$540,000	$1,080,000	$3,240,000
Sale of feed	140,400	702,000	1,404,000	4,212,000
Yardage	21,600	97,200	172,800	453,600
Veterinary care	1,800	9,000	18,000	54,000
Transportation:				
Marchi to White's	360	1,740	3,300	9,000
White's to Seattle	7,200	36,000	66,000	180,000
Lvstk. processing fees:				
slaughter	3,000	13,800	25,200	68,400
pkg and hndlg	2,400	10,800	19,200	50,400
meat inspection	350	525	700	875
TOTAL INCOME	$285,110	$1,411,065	$2,789,200	$8,268,275
OPERATING EXPENSES:				
Cost of strs sold	$108,000	$540,000	$1,080,000	$3,240,000
Cost of feed:				
grain	102,600	513,000	1,026,000	3,078,000
hay	14,400	72,000	144,000	432,000
Labor:				
general ranch work	500	7,500	15,000	30,000
payroll taxes	100	1,500	3,000	6,000
Ranch supplies	1,000	5,000	8,000	11,000
Veterinary care:				
medicines	600	3,000	6,000	18,000
vaccinations	960	4,800	9,600	28,800
supplies	240	1,200	2,400	7,200
Feedlot mntnc. and sup	400	1,000	2,000	4,000
Feedlot utilities	600	800	1,000	1,300
Brand inspection	140	690	1,380	4,140
Phone, fax, postage	1,200	4,500	6,000	10,800
Legal and accounting	600	2,000	2,500	4,000
Travel	720	3,500	5,000	8,000
Membrs, publs, mktg	300	500	750	950
Transportation:				
Marchi to White's	360	1,740	3,300	9,000
White's to Seattle	7,200	36,000	66,000	180,000
Lvstk. processing costs:				
slaughter	3,000	13,800	25,200	68,400
pkg and hndlng	2,400	10,800	19,200	50,400
meat inspection	350	525	700	875
Commission	1,380	6,900	13,800	41,400

Insurance	720	2,700	5,100	14,400
Loss on cost of gain	1,800	9,000	18,000	54,000
Livestock death loss	3,240	16,200	43,200	162,000
Property tax	1,440	7,200	14,400	43,200
Depreciation	3,600	18,000	36,000	108,000
TOTAL EXPENSES	$257,850	$1,283,855	$2,557,530	$7,615,865
NIBIT (2)	27,260	127,210	231,670	652,410
Interest expense	4,800	12,000	60,000	120,000
Allowance for income tax	8,984	46,084	68,668	212,964
NET INCOME	$13,476	$69,126	$103,002	$319,446

(1) ASSUMPTIONS

Income: steers sold at break-even; feed sold at cost plus 20 percent; yardage @ $.50 per head per day (360 days) for 10 head per month, decreasing incrementally (minimum of $.35 per head per month) as quantity increases; veterinary care, transportation and livestock processing at cost.

Expenses: costs for hay @ $60 per ton and grain @ $150 per ton remain constant; though to a lesser extent than the "best case" scenario, economies of scale (lower per-unit costs) were assumed for ranch supplies, transportation, slaughter, packing and handling, and insurance.

No reduction in pounds per head exceeding the cap on cost of gain was assumed (500 pounds per head @ $.03). Livestock death loss from 3 percent for 10 head per month to 5 percent for 300 head per month. Property tax @ $12 per head; income tax @ 40 percent. Increases in other categories assume less favorable pricing or increase in volume purchased. Allowance for income tax declined due to lower NIBIT.

(2) NIBIT = Net Income Before Interest and Taxes

MARCHI ANGUS RANCHES
Statement of Cash Flows, Nichiro Steer Operation
November 1, 1991 through October 31, 1992 (1)

	Quarters (2)				Total
	1st	2nd	3rd	4th	12 mos.
CASH RECEIPTS (per head):					
Sale of steers	$898	$0	$0	$0	$898
Sale of feed	0	0	0	980	980
Yardage	0	0	0	180	180
Veterinary care	0	0	0	15	15
Transportation	0	0	0	56	56
Livestock processing fees	0	0	0	63	63
Total Cash Receipts	$898	$0	$0	$1,294	$2,192
CASH DISBURSEMENTS (per head):					
Cost of steers sold (3)	$200	$200	$200	$225	$825
Cost of feed purchased:					
hay	0	0	0	0	0
grain	0	0	0	0	0
Cost of feed raised:					
fertilizer	0	18	0	0	18
seed	0	10	0	0	10
irrigation	0	0	18	11	29
fuel, oil, grease	4	10	4	1	19
equipment maintenance	1	10	11	7	29
labor	9	9	9	6	33
misc. supplies	0	0	3	3	6
grain processing	0	0	0	143	143
Ranch labor	0	1	2	2	5
Ranch supplies	0	0	1	0	1
Veterinary care:					
medicines	1	1	1	1	4
vaccinations	6	0	0	0	6
supplies	1	1	0	0	2
Feedlot mntnc. and sup.	6	6	5	3	20
Feedlot utilities	5	4	3	3	15
Brand inspection	0	0	0	1	1
Leases	3	2	3	2	10
Telephone, fax, postage	1	1	0	0	2
Legal and accounting	0	0	5	0	5
Travel	1	2	1	1	5
Membrshps, publs, mktg	2	1	2	0	5
Transportation:					
Marchi to White's	0	0	0	3	3
White's to Seattle	0	0	0	53	53

Lvstk. processing costs:					
slaughter	0	0	0	24	24
pkg and hndlng	0	0	0	20	20
meat inspection	0	0	0	18	18
Commission	11	0	0	0	11
Insurance	2	2	2	2	8
Interest	10	9	9	9	37
Amortization of land pmts	15	16	16	16	63
Property tax	5	0	5	0	10
Income tax	15	15	15	15	60
Total Cash Disburs.	$298	$318	$315	$569	$1,500
NET CASH FLOW (per head)	$600	($318)	($315)	$725	$692
CASH BALANCE (per head)	$600	$282	($33)	$692	$692

(1) 10 head on feed

(2) Quarter 1: November 1 through January 31
Quarter 2: February 1 through April 30
Quarter 3: May 1 through July 31
Quarter 4: August 1 through October 31

(3) Production cost is based on the break-even, total (or economic) cost of raising steer calves for export to Japan as carcass beef. Production costs were calculated as follows: $.90 per pound up to 500 pounds ($450), plus $.60 per pound from 500 to 1125 pounds ($375), for a total production cost of $825 for an 1125 pound steer.

MARCHI ANGUS RANCHES
Sensitivity Analysis -- Best Case (1)
Statement of Cash Flows, Nichiro Steer Operation
1994: 50 head per month

	Quarters (2)				Total
	1st	2nd	3rd	4th	12 mos.
CASH RECEIPTS (1000s):					
Sale of steers	$148.5	$148.5	$148.5	$148.5	$594.0
Sale of feed	156.4	156.4	156.4	156.3	625.5
Yardage	27.0	27.0	27.0	27.0	108.0
Veterinary care	2.3	2.3	2.2	2.2	9.0
Transportation	0.0	0.0	0.0	37.7	37.7
Lvstk. processing fees	0.0	0.0	0.0	26.3	26.3
Total Cash Receipts	$334.2	$334.2	$334.1	$398.0	$1,400.5
CASH DISBURSEMENTS (1000s):					
Cost of steers sold:					
steers raised (3)	$10.3	$10.3	$10.3	$10.3	$41.2
steers purchased (4)	113.4	113.5	113.4	113.5	453.8
Cost of feed purchased:					
hay	0.0	0.0	0.0	0.0	0.0
grain	122.6	122.6	122.6	122.6	490.5
Cost of feed raised (5):					
fertilizer	0.0	1.7	1.7	0.0	3.4
seed	0.0	1.0	0.9	0.0	1.9
irrigation	0.0	0.0	2.5	3.0	5.5
fuel, oil, grease	0.5	0.5	1.3	1.3	3.6
equipment maintenance	1.0	1.0	1.5	2.0	5.5
labor	1.0	1.0	2.0	2.1	6.1
misc. supplies	0.0	0.3	0.4	0.4	1.1
grain processing	0.0	0.0	1.9	1.9	3.8
Ranch labor	0.6	0.6	0.8	0.9	2.9
Ranch supplies	0.3	0.3	0.3	0.4	1.3
Veterinary care:					
medicines	0.8	0.8	0.7	0.7	3.0
vaccinations	1.2	1.2	1.2	1.2	4.8
supplies	0.3	0.3	0.3	0.3	1.2
Feedlot mntnc. and sup.	0.2	0.2	0.3	0.3	1.0
Feedlot utilities	2.5	2.5	0.5	0.5	6.0
Brand inspection	0.2	0.2	0.2	0.1	0.7
Leases	0.0	0.0	5.0	5.0	10.0
Telephone, fax, postage	1.1	1.1	1.1	1.2	4.5
Legal and accounting	0.4	0.5	0.4	0.5	1.8
Travel	0.6	0.7	0.7	0.7	2.7
Membrshps, publs, mktg	0.1	0.1	0.1	0.1	0.4
Transportation:					
Marchi to White's	0.4	0.4	0.4	0.5	1.7

White's to Seattle	9	9	9	9	36.0
Livestock processing costs:					
slaughter	3.3	3.3	3.3	3.3	13.2
pkg and hndlng	2.7	2.7	2.7	2.7	10.8
meat inspection	0.2	0.1	0.1	0.1	0.5
Commission	1.8	1.7	1.7	1.7	6.9
Insurance	0.6	0.7	0.6	0.7	2.6
Interest	3.0	3.0	3.0	3.0	12.0
Amort. of land pmts	1.3	1.2	1.3	1.2	5.0
Property tax	3.0	0.0	3.0	0.0	6.0
Income tax	25.2	25.2	25.2	25.2	100.8
Total Cash Disburs.	$307.6	$307.7	$320.4	$316.4	$1,252.2
NET CASH FLOW (1000s)	$26.6	$26.5	$13.7	$81.6	$148.3
CASH BALANCE (1000s)	$26.6	$53.1	$66.7	$148.3	$148.3

(1) ASSUMPTIONS

Receipts: steers and feed sold at cost plus 20 percent; yardage @ $.50 per head per day; other cash receipts are reimbursements at cost.

Disbursements: all cash disbursements are based on costs that are known or on costs that can be reasonably expected under normal operating conditions.

(2) Quarter 1: November 1 through January 31
Quarter 2: February 1 through April 30
Quarter 3: May 1 through July 31
Quarter 4: August 1 through October 31

(3) No more than 50 raised steers, based on a resident herd of 100 mother-cows. Production costs were calculated as follows: $.90 per pound up to 500 pounds ($450), plus $.60 per pound from 500 to 1125 pounds ($375), for a total production cost of $825 for an 1125 pound steer.

(4) Purchased steers are bought at weaning at 500 pounds @ $.90 per pound. Cost of gain from 500 pounds to 1125 pounds @ $.60 per pound.

(5) Feed raised for feedlot consumption is produced at average costs of $20 per ton for hay and $45 per ton for grain. 1200 tons of hay and 150 tons of grain are raised by Marchi Angus Ranches, for total feed production of 1350 tons.

MARCHI ANGUS RANCHES
Sensitivity Analysis -- Worst Case (1)
Statement of Cash Flows, Nichiro Steer Operation
1994: 50 head per month

	Quarters (2)				Total
	1st	2nd	3rd	4th	12 mos.
CASH RECEIPTS (1000s):					
Sale of steers	$123.7	$123.8	$123.7	$123.8	$495.0
Sale of feed	156.4	156.4	156.4	156.3	625.5
Yardage	24.3	24.3	24.3	24.3	97.2
Veterinary care	2.3	2.3	2.2	2.2	9.0
Transportation	0.0	0.0	0.0	37.7	37.7
Lvstk. processing fees	0.0	0.0	0.0	25.1	25.1
Total Cash Receipts	$306.7	$306.8	$306.6	$369.4	$1,289.5
CASH DISBURSEMENTS (1000s):					
Cost of steers sold:					
steers raised (3)	$10.3	$10.3	$10.3	$10.3	$41.2
steers purchased (4)	113.4	113.5	113.4	113.5	453.8
Cost of feed purchased:					
hay	0.0	0.0	0.0	0.0	0.0
grain	122.6	122.6	122.6	122.6	490.5
Cost of feed raised:					
fertilizer	0.0	1.7	1.7	0.0	3.4
seed	0.0	1.0	0.9	0.0	1.9
irrigation	0.0	0.0	2.5	3.0	5.5
fuel, oil, grease	0.5	0.5	1.3	1.3	3.6
equipment maintenance	1.0	1.0	1.5	2.0	5.5
labor	1.0	1.0	2.0	2.1	6.1
misc. supplies	0.0	0.3	0.4	0.4	1.1
grain processing	0.0	0.0	1.9	1.9	3.8
Ranch labor	0.6	0.6	0.8	0.9	2.9
Ranch supplies	0.9	1	1	1	3.9
Veterinary care:					
medicines	0.8	0.8	0.7	0.7	3.0
vaccinations	1.2	1.2	1.2	1.2	4.8
supplies	0.3	0.3	0.3	0.3	1.2
Feedlot mntnc. and sup.	0.2	0.2	0.3	0.3	1.0
Feedlot utilities	3.0	3.0	1.0	1.0	8.0
Brand inspection	0.2	0.2	0.2	0.1	0.7
Leases	0.0	0.0	6.0	6.0	12.0
Telephone, fax, postage	1.1	1.1	1.1	1.2	4.5
Legal and accounting	1.0	1.0	1.0	1.0	4.0
Travel	1.0	1.0	1.0	0.5	3.5
Membrshps, publs, mktg	0.2	0.1	0.1	0.1	0.5
Transportation:					
Marchi to White's	0.4	0.4	0.4	0.5	1.7

White's to Seattle	9	9	9	9	36.0
Livestock processing costs:					
slaughter	3.5	3.4	3.5	3.4	13.8
pkg and hndlng	2.7	2.7	2.7	2.7	10.8
meat inspection	0.2	0.1	0.1	0.1	0.5
Commission	1.8	1.7	1.7	1.7	6.9
Insurance	0.7	0.7	0.6	0.7	2.7
Interest	3.0	3.0	3.0	3.0	12.0
Amort. of land pmts	1.3	1.2	1.3	1.2	5.0
Property tax	3.6	0.0	3.6	0.0	7.2
Income tax	11.5	11.5	11.5	11.5	46.1
Total Cash Disburs.	$297.0	$296.1	$310.6	$305.2	$1,209.1
NET CASH FLOW (1000s)	$9.7	$10.7	($4.0)	$64.2	$80.4
CASH BALANCE (1000s)	$9.7	$20.3	$16.3	$80.4	$80.4

(1) ASSUMPTIONS

Receipts: steers sold at cost; feed sold at cost plus 20 percent; yardage @ $.45 per head per day; other cash receipts are reimbursements at cost.

Disbursements: Increases in ranch supplies, feedlot utilities, leases, legal and accounting, travel, marketing, slaughter, and insurance. A reduction in taxes is due to lower NIBIT.

(2) Quarter 1: November 1 through January 31
Quarter 2: February 1 through April 30
Quarter 3: May 1 through July 31
Quarter 4: August 1 through October 31

(3) No more than 50 raised steers, based on a resident herd of 100 mother-cows. Production costs were calculated as follows: $.90 per pound up to 500 pounds ($450), plus $.60 per pound from 500 to 1125 pounds ($375), for a total production cost of $825 for a 1125 pound steer.

(4) Purchased steers are bought at weaning at 500 pounds @ $.90 per pound. Cost of gain from 500 pounds to 1125 pounds @ $.60 per pound.

(5) Feed raised for feedlot consumption is produced at average costs of $20 per ton for hay and $45 per ton for grain. 1200 tons of hay and 150 tons of grain are raised by Marchi Angus Ranches, for total feed production of 1350 tons.

NICHIRO CORPORATION
Pro Forma Profit and Loss -- Carcass Sale in Japan (Wholesale)
Scenario I
November 1992

COST:		
Nichiro's cost, FOB SeaTac:		
10 carcasses @ 1800 lbs @ 60% yield @ $2.03/lb	$21,924	
Airfreight to Tokyo:		
10,800 lbs @ $.80/lb	8,640	
Ad valoreum tax (import duty):		
10 head @ 1125 lbs @ $.80 @ 70% tariff (1)	6,300	
Total Cost, 10 Carcasses FOB Tokyo		$36,864
REVENUE:		
Sales price (wholesale):		
4898 kg @ 60% B3 @ 900 yen/kg (2)	$20,345	
4898 kg @ 40% B2 @ 700 yen/kg	10,549	
Total Revenue, 10 Carcasses Wholesale Tokyo		$30,895
NET PROFIT (LOSS)		($5,969)
NER PROFIT (LOSS) PER HEAD		($597)

(1) Ad valoreum tax based on price at which Nichiro purchased the steers (October 1991).

(2) Conversion factors used: 2.205 lbs/kg; 130 yen per dollar.

NICHIRO CORPORATION
Pro Forma Profit and Loss -- Carcass Sale in Japan (Wholesale)
Scenario II
November 1992

COST:		
Nichiro's cost, FOB SeaTac:		
10 carcasses @ 1800 lbs @ 60% yield @ $2.03/lb	$21,924	
Airfreight to Tokyo:		
10,800 lbs @ $.80/lb	8,640	
Ad valoreum tax (import duty):		
10 head @ 1125 lbs @ $.80 @ 70% tariff (1)	6,300	
Total Cost, 10 Carcasses FOB Tokyo		$36,864
REVENUE:		
Sales price (wholesale) (1):		
1 carcass @ A3 @ 1600 yen/kg (2)	$6,028	
3 carcasses @ A2 @ 1300 yen/kg	14,694	
3 carcasses @ B3 @ 900 yen/kg	10,173	
3 carcasses @ B2 @ 700 yen/kg	7,912	
Total Revenue, 10 Carcasses Wholesale Tokyo		$38,807
NET PROFIT (LOSS)		$1,943
NET PROFIT (LOSS) PER HEAD		$194

(1) Ad valoreum tax based on price at which Nichiro purchased the steers (October 1991).

(2) Carcass weights @ 489.8 kg (1080 lbs).

(3) Conversion factors used: 2.205 lbs/kg; 130 yen per dollar.

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