NCCC-134
APPLIED COMMODITY PRICE ANALYSIS, FORECASTING AND MARKET RISK MANAGEMENT

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Suggested citation format:

Wahl, T. I., and G. W. Williams. 1987. "The Impact of Japanese Beef Import Quota Concessions: A Forecast Simulation Analysis." Proceedings of the NCR-134 Conference on Applied Commodity Price Analysis, Forecasting, and Market Risk Management. Chicago, IL. [http://www.farmdoc.uiuc.edu/nccc134].

THE IMPACT OF JAPANESE BEEF IMPORT QUOTA CONCESSIONS: A FORECAST SIMULATION ANALYSIS

Thomas I. Wahl and Gary W. Williams*

Although increasing rapidly over the last two decades, per capita consumption of beef in Japan remains much below levels in other developed countries for various reasons. Beef is a relatively new component of a highly diversified diet in Japan. Also, social and religious sentiments against eating meat, prevalent only 40 years ago, may persist to some extent, at least among the older generation. More importantly, perhaps, high costs of production and a limited land area, among other factors, have prevented a rapid shift to large-scale cattle fattening operations and restrained the growth in domestic beef supply. And even though the growing gap between domestic beef consumption and production in Japan is met by imports, a restrictive import quota limits both the size and growth rate of the gap.

Since at least the mid-1970s, Japan and its beef import suppliers, the U.S. and Australia in particular, have engaged in heated negotiations on the level of the quota. U.S. negotiators have demanded that Japan completely liberalize beef imports. The Japanese have responded in a piecemeal fashion, increasing the quota by comparatively small amounts in an apparent attempt both to appease U.S. interests and to minimize the opposition of the politically powerful domestic cattle producers. The most recent Japanese concession was an agreement in the fall of 1984 to expand the total beef import quota by 9,000 metric tons (mt) per year for four years, bringing total imports to 177,000 (mt) by early 1988. Unfortunately, little is known about the dynamic consequences of these quota concessions on the Japanese livestock industry or on the competing exporters' shares of Japanese beef imports. A better understanding of the potential effects over time of exporting countries' demands to increase the quota and of Japanese concessions to such demands would be of particular benefit in current efforts to negotiate a new agreement.

Previous analyses of Japanese beef import policy have considered various policy schemes designed to liberalize imports (Hayami, Anderson, Kagatsume and Zwart, and Williams). These studies, however, have not investigated the effects of the recent Japanese beef quota concessions. At the same time the studies have ignored the effects of a change in import policy on the responsiveness of domestic livestock producers to the consequent price changes. That is, the analytical models utilized have failed to distinguish between price changes perceived by producers to be temporary and those perceived to be permanent as a result of a change in import policy.

The general dynamic effects of the 1984 Japanese quota concession are measured in this study using an annual, simultaneous equations, econometric simulation model of the Japanese livestock industry. Beef imports are held

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constant at the 1984 level and the model is simulated through 1995 under various assumptions regarding the rate of adjustment of cattle prices to expected levels. The resulting changes in the supply, demand, and prices of cattle and beef in the model from the baseline forecast levels over the period can be considered to be measures of the likely range of effects of the quota concessions. The baseline forecast assumes that the total import quota increases by 9,000 mt per year both in the four-year period of the current agreement (1984 to 1988) as well as in the years beyond the current agreement (1989 to 1995).

First, some discussion of the Japanese beef and livestock industry is provided as background to the presentation of the analytical methodology and simulation results. Next, the theoretical basis for analyzing the effects of the quota concessions is considered. The econometric model and analytical technique utilized are then discussed followed by a simulation analysis of the effects of the 1984 Japanese quota concessions. Finally, some implications for current discussions on a new import quota agreement are drawn.

The Japanese Beef and Livestock Industry and Policy

Japanese cattle inventories are composed of native beef (Wagyu) and dairy cattle. Wagyu are raised in small herds by a large number of farmers, mostly as a sideline to crop production. In contrast, dairy farming is a highly specialized activity, and herds are correspondingly larger. However, both Wagyu and dairy heifers and steers are fattened for slaughter.

Until the 1960s, Wagyu cattle were used largely as draft animals. As machinery replaced animal power in Japanese agricultural production during the late 1950s and 1960s, however, the number of Wagyu cattle began to drop. The decline of the Wagyu industry continued until the early 1980s when inventories stabilized and began to increase slightly. The decline of the Wagyu industry occurred despite the preference of Japanese consumers for Wagyu beef and the government beef price support policy.

The national dairy herd was less than one-tenth the size of Wagyu inventories during the early 1950s. By the late 1960s, however, dairy cattle numbers had increased to about the size of the declining Wagyu herd. The growth of the dairy industry, however, has been more related to the increasing profitability of milk production over time than to the economics of beef production (Longworth). Beef from the slaughter of dairy cattle accounts for only about 10% of the income of most dairy farmers (BAE). Even so, dairy cattle accounted for about 65% of total slaughter in 1984 compared to 12% in 1962.

A rapid increase in per capita income in Japan has resulted in a rapidly increasing demand for beef. During the 1950s and 1960s, the Japanese government gradually increased the beef import quota allowing a slow increase in both imports and per capita consumption of beef. In 1973, however, the government more than doubled the quota in an effort to hold down beef prices and reduce general inflationary pressures (Longworth). The subsequent explosion of beef imports and consumption in that year reduced domestic beef production, prompting the government to suspend the quota in late 1973 and to completely close the Japanese beef market in 1974 through the first half of 1975. As a

consequence, the retail price of beef jumped by nearly 110% between 1972 and 1976 after increasing by only 5% over the previous five year period. Following the easing of controls on beef imports in 1975, per capita consumption of beef has continued to grow, although at a lower average annual rate than in previous years.

On average over the last 20 years, the per capita consumption of beef has not expanded nearly as rapidly as that of pork or chicken meat. In 1960, for example, per capita beef, pork, and chicken meat consumption were nearly the same at about 1 or 2 kg/year. By 1983, per capita pork and chicken meat consumption had jumped to 13.1 kg/year and 11.0 kg/year, respectively, compared to that of beef at only 5.2 kg/year. Given the restrictive beef import quota, this disparity in consumption growth rates reflects a similar disparity in relative rates of production and an opposite disparity in price movements over time. The more rapid production growth of pork and chicken meat has been due primarily to the rapid adoption of modern confinement feeding technology for hogs and chickens in Japan over the last 20 years. Consequently, the real retail price of beef in Japan increased by 41% between 1960 and 1983 while those of pork and chicken meat decreased by 44% and 46%, respectively.

Since Japanese beef imports began in the early 1950s, Australia has been the major export supplier. New Zealand entered the market in the late 1950s but has lost market share almost continually. By 1972, the Australian share of Japanese beef imports stood at about 91%. The U.S. became the second largest exporter of beef to Japan in 1973 with its first sizeable shipment of about 9,500 mt, about 7% of total imports. The U.S. share continued to grow after import restrictions were eased in 1975, reaching about 30% by 1985. Likely reasons for the relative increase in U.S. share include the decline in the import price of U.S. beef compared to Australian, New Zealand, and Japanese beef, the reported preference of Japanese consumers for U.S. grain-fed beef as opposed to grass-fed beef from other countries, and the cooperative effort of the U.S. Department of Agriculture and U.S beef producers to promote U.S. beef in Japan.

The import quota is the main tool of the Japanese government to support the domestic cattle industry and encourage beef production. Through the complicated import quota structure, the government attempts to maintain the established domestic beef target prices. Then through a fine tuning mechanism of purchasing and storing or releasing beef from stocks (the beef price stabilization scheme), the government stabilizes the domestic price of beef around the target within a politically and socially acceptable range (the upper and lower stabilization prices). As a consequence, Japanese domestic beef prices tend to be higher and more stable than otherwise might be the case.

Theoretical Considerations

Herd size decisions by cattle raisers can be represented by the following standard theoretical breeding cattle inventory model:

$$(1) \quad Y^*_t = f(P^e_{t+1}, Z_t),$$

where Y^*_t is the desired breeding herd size at the end of period t, P^e_{t+1} is the expected profitability of raising cattle in the following period (the

expected price of cattle deflated by feed price in period t+1), and Z_t represents other variables such as technical change that may affect the desired ending herd size in period t.

Jarvis has suggested that changes in beef prices could be expected to have two opposing effects on cattle raisers' herd size decisions. A cattle price increase, for example, would lead cattle producers to expect a continued increase in prices, leading them to retain more heifers to build the breeding herd and thereby profit from the expected higher prices in the future. This is essentially the Jarvis cattle producer investment behavior. On the other hand, a cattle price increase would induce farmers to cull out more cows immediately and sell off heifers otherwise suitable for replacement to profit from the higher prices. This is analogous to the Jarvis cattle producer consumption behavior. Empirical analysis of U.S. and Argentine cattle producer behavior suggest that the investment effects outweigh the consumption effects in those countries (Rucker, Burt, and LaFrance and Jarvis, respectively).

A standard form of equation (1) for estimation can be derived by assuming a partial adjustment framework for inventories and adaptive price expectations:

$$(2)\quad Y_t - Y_{t-1} = \tau(Y^*_t - Y_{t-1})$$

$$(3)\quad P^e_{t+1} - P^e_t = \Theta(P_t - P^e_t)$$

where τ is the coefficient of adjustment, Θ is the coefficient of expectation, and $0 \leq \tau$, $\Theta \leq 1$. Equation (2) suggests that primarily because of biological restrictions and the cost of adjustment, changes in the breeding herd size take time, i.e., the breeding herd cannot adjust fully in one year to the long-run desired level. Equation (3) assumes that the change in expected price in period t+1 is proportional to the current error in forecasting. In other words, producers update their expectations about future price movements based on current deviations in price from the expected level. If Θ is close to zero, then producers consider current deviations in price from expected levels to be temporary and do not substantially alter their expectations about future price movements. A value of Θ close to one, on the other hand, indicates that producers consider the deviations to be more permanent and update their expectations each year by about the full extent of the current forecast error.

Assuming a linear form of equation (1) and substituting equations (2) and (3) into that equation yields the following breeding inventory model for estimation:

$$(4)\quad Y_t = \alpha_0 + \alpha_1 P_t + \alpha_2 Y_{t-1} - \alpha_3 Y_{t-2} + \alpha_4 Z_t - \alpha_5 Z_{t-1}$$

where $\alpha_0 = \tau\Theta a$,
$\alpha_1 = \tau\Theta b$,
$\alpha_2 = [(1-\tau) + (1-\Theta)]$,
$\alpha_3 = (1-\tau)(1-\Theta)$,
$\alpha_4 = \tau c$, and
$\alpha_5 = \tau(1-\Theta)c$.

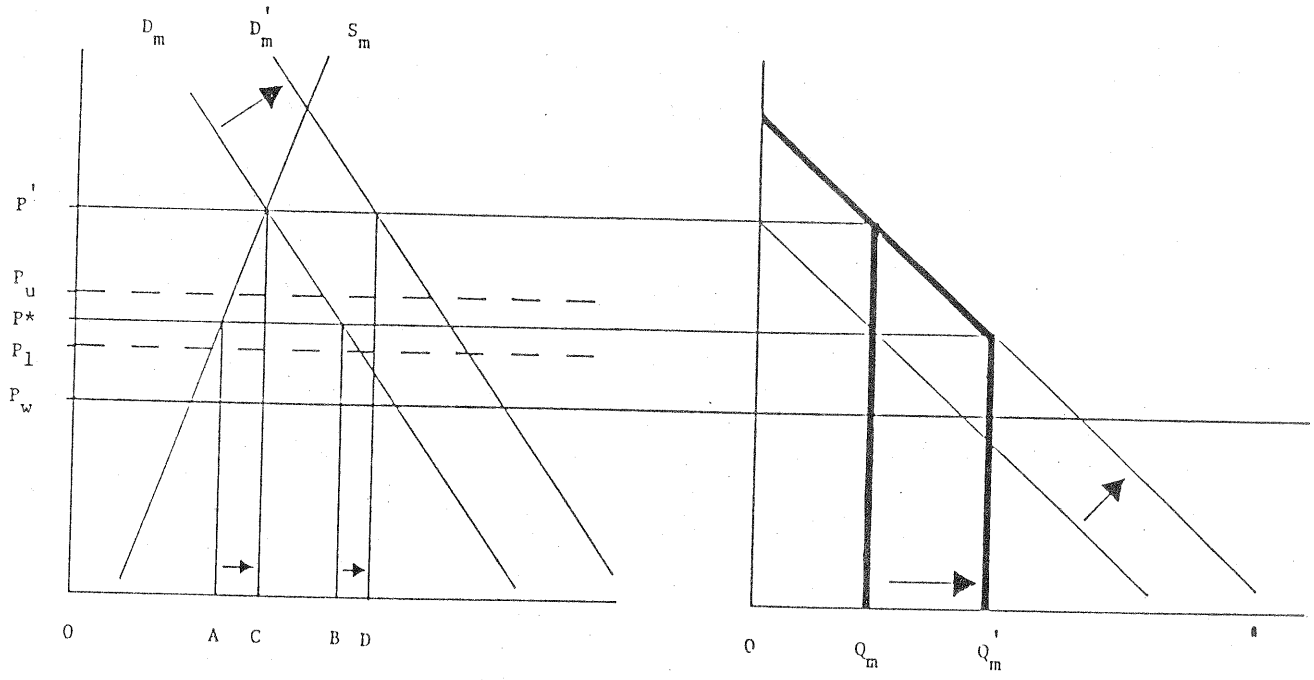
Also, a is the intercept and b and c are the coefficients of the variables in the linear form of equation (1) and other all variables are as previously defined.

The value of Θ can be calculated directly from the estimated coefficients of equation (4). The remaining parameters (τ, a, b, and c) can be derived by a procedure suggested by Maddala (pp. 144-146) given a value for Θ. Assuming no change in Japanese beef policy, equation (4) can be incorporated into a simultaneous equations model of the Japanese livestock industry to generate baseline forecasts of Japanese breeding cattle inventories. The forecasted values of inventories would help determine the baseline forecast levels of domestic beef supply and, therefore, of domestic beef prices and consumption in the simultaneous model.

The rapidly increasing demand for beef in Japan has required the government to allow imports to increase over time in order to keep prices from increasing significantly above the established stabilization range. As illustrated in figure 1, an increase in the domestic demand for beef from D_m to D'_m means that either the import quota must be allowed to increase from OQ_m to about OQ'_m or price will tend to rise above the stabilization range (P_u to P_l) to P'. Therefore, price changes within the established range are not considered by producers to be a signal of future price movements (a permanent change in prices) because the government is expected to intervene to keep prices within the established limits.

If the Japanese government refused to concede to exporter demands and held the import quota constant, the target around which the government stabilizes price would have to increase, inducing Japanese cattle producers to more fully incorporate the resulting price forecast errors into their expectations about future price movements. That is, if the price of cattle was greater than expected in any given year and producers believed that this was

Figure 1. Japanese Beef Import Quota Policy



the result of an announced change in policy to hold the quota constant, then producers would expect the price increase to continue. This implies that Θ would tend to increase if the government held the import quota level constant.

The Japanese Livestock Industry Model

The dynamic effects of the Japanese import quota concessions are measured in this study using an annual, simultaneous equations, econometric model of the Japanese livestock industry. The 56-equation model contains three simultaneous blocks: the Wagyu and dairy cattle and beef sector, the hog and pork sector, and the chicken and chicken meat sector. Each block contains two main components: (1) live animal supply (breeding herd, slaughter livestock inventories, animals raised, and imports) and slaughter demand and (2) meat supply (production and imports) and consumption.

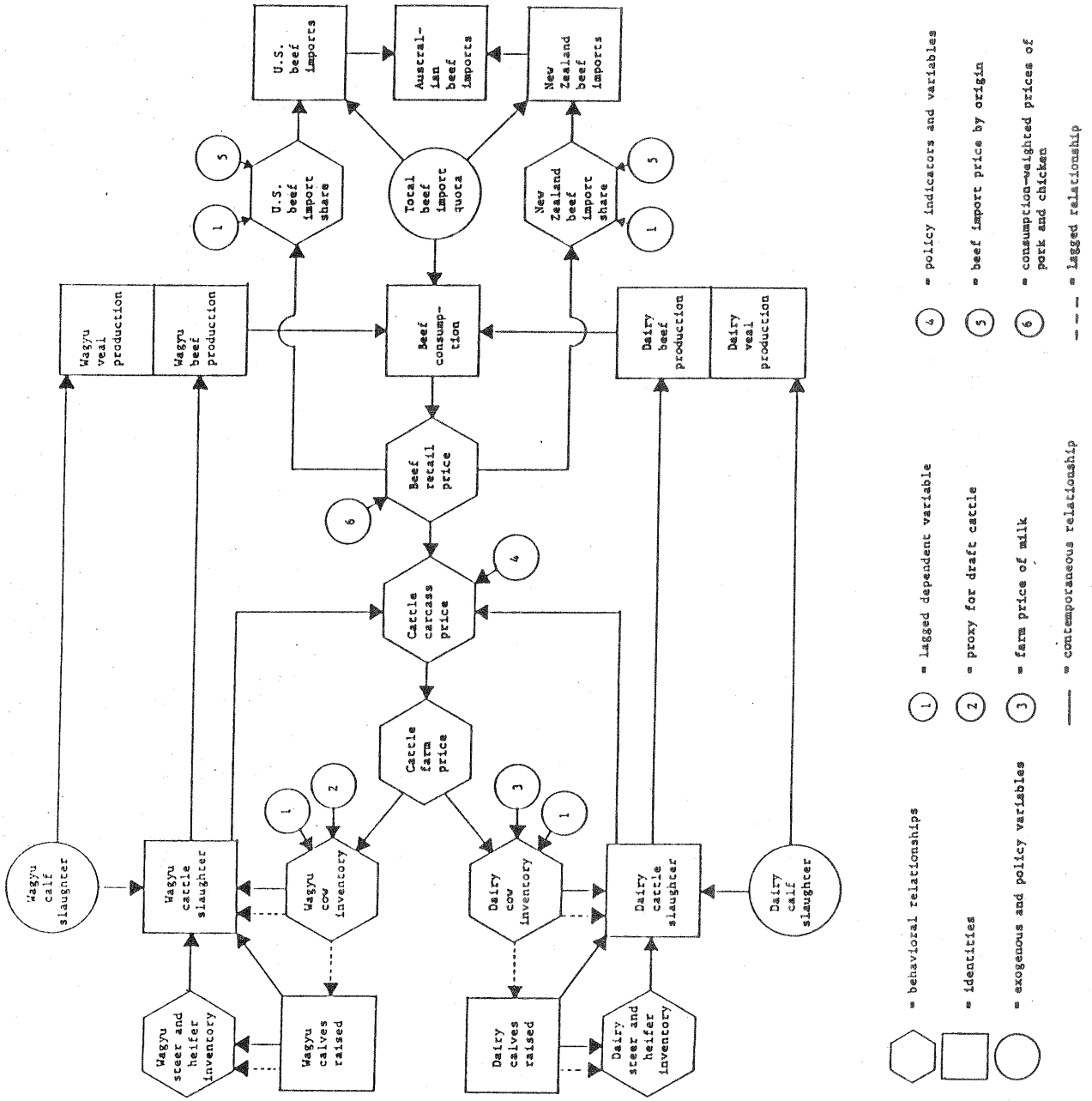
The parameters of the behavioral equations were estimated using three-stage least squares and data for 1962 to 1985. The statistical structure of the full model (a revised and expanded version of the original Japanese livestock industry model developed by Williams), along with validation statistics, is discussed elsewhere in detail (Wahl and Williams). Because of space limitations, only a general characterization of the model can be attempted here.

The major economic and biological relationships in the cattle and beef sector block of the model are schematically diagrammed in figure 2. The hog and chicken sector blocks are similar in structure to the cattle block. The latter is more complicated because it includes both the Wagyu and dairy cattle and beef subsectors, substantially increasing the number of equations in the block. Also some detail on Japanese beef imports by source is included (right-hand side of figure 2). Following the market share approach outlined by Meilke and Griffith, the shares of Japanese beef imports accounted for by competing beef exporting countries are specified as functions of real domestic and import prices of beef and a lagged dependent variable to represent partial adjustment behavior.

Wagyu cattle inventories include the cow or breeding herd (mature cows and heifers over two years old) and steers and heifers (upper left-hand side of figure 2). Specification of the Wagyu breeding inventory equation follows equation (4). A Wagyu cattle raiser responds to changes in the profitability of producing calves by adding heifers or culling cows to alter the size of the breeding herd. Heifers not added to the herd and cull cows are fed for slaughter. Some cows must be culled each year due to health problems, requiring some heifers to be added each year as replacements to maintain a given herd size. An approximation of the number of Wagyu cows used for draft purposes is included to account for the structural change in the Wagyu industry during the 1960s (Hayami and Ruttan).

Because the primary calving season in Japan is early spring and because the gestation period for cattle is less than a year (9 months), the size of the breeding herd at the beginning of the year determines the biological upper bound on the number of Wagyu calves raised during that year. Not every cow will successfully raise a calf in every year due to disease and adverse

Figure 2. Japanese Livestock Industry Model: Wagyu and Dairy Cattle and Beef Sectors



weather conditions so that the annual calving rate will be less than unity. The calving rate times the beginning cow inventory determines the number of calves raised during that period. Calves may be retained in the breeding herd, slaughtered for veal, or placed on feed depending on the relative profitability of the alternative uses.

Wagyu steer and heifer inventories at the end of a given year are determined primarily by the number of calves raised in the current and previous two periods using a polynomial lag structure. The estimated coefficients indicate that at the end of a given year 41% of the steers and heifers in inventory were born in the current year, 36% in the previous year, and 23% two years previously. This represents the flow of calves through the steer and heifer inventory as their age increases and is consistent with the biological process. Also variables are included to account for technological progress leading to a more lengthy feeding period and the structural change that led to a decline in the use of Wagyu cattle for draft purposes. Wagyu steers are placed on feed at about 10 months of age and then fed a ration that consists of an increasing proportion of corn. The feeding period has varied considerably over time in Japan. In the early 1960s cattle were fed for only about 6 months when the draft cattle herd was diminishing rapidly. The feeding period increased to about 19 months by the 1980s along with increasing consumer demand for highly marbled meat which requires a longer feeding period and a more mature animal. Most Wagyu heifers are fed for slaughter. However, those heifers of suitable quality for breeding are segregated from the other calves at about 10-12 months of age. These replacement heifers are kept until they are approximately 16-18 months of age at which time a decision is made to breed them or place them on feed. Of the heifers retained, those that are not successfully bred are also placed on feed.

Wagyu cattle slaughter is determined in the market clearing condition for Wagyu cattle as the difference between the supply of cattle (beginning inventories and cattle raised) and the number of cattle in inventories at the end of the year. Wagyu beef supply is calculated as the average Wagyu slaughter weight times the number of cattle slaughtered. Wagyu cattle slaughter weights are exogenous since they reached their approximate biological limits during the 1970s and are expected to gradually decline in the future (Simpson).

The structure of the dairy cattle subsector (lower left-hand side of figure 2) is similar to that of the Wagyu subsector. The major difference is that dairy cattle producers respond primarily to the profitability of producing milk relative to costs rather than to the price of slaughter cattle in making decisions about the breeding herd size. Since the late 1960s, there has been an increasing demand for dairy steers for feeding and slaughter to supplement the domestic supply of beef.

Since the primary decision that determines the supply of slaughter cattle is made by the cattle raisers, the supply of cattle ready for slaughter and, consequently, beef production (both Wagyu and dairy) at any point in time are relatively fixed due to the lengthy production lag. The biological restrictions and dynamics involved in the beef production process dictate that in the short run an increase in the profitability of feeding will have little effect on beef supplies except that farmers may take advantage of the higher prices to cull less productive cows. Over the intermediate run, overall slaughter and beef supply will decline as farmers add more heifers to the cow herd and

cull fewer cows. The long run effects, however, of the increase in profitability will be an increase in slaughter and beef supply as the larger breeding herd leads to an increase in inventories of slaughter steers and heifers.

Given the domestic beef production each year, the beef import quota level then determines the amount of beef available for consumption (converted to retail weight) which, in turn, determines the retail beef price level in the domestic market. The retail beef price is also affected by other variables such as changes in prices and relative consumption levels of pork and chicken meat.

The model also includes a policy reaction function based on the work of Williams and Thompson that endogenizes policymakers' behavior in setting the target wholesale (carcass) cattle price level. In setting the target price level each year, policymakers are primarily concerned about providing adequate support to cattle producers. However, they are also concerned about the cost of such support. As economic conditions deteriorate in the cattle sector, the tendency is to raise the target price. At the same time, an increase in demand and retail price of beef or a reduction in slaughter steer and heifer supply signals upward pressure on the carcass price and, thus, an increase in the cost of maintaining the target level. Consequently, the tendency is to allow the target price to rise slowly in response to these market forces.

The farm price of cattle, the price received by farmers for fed cattle, is determined by the wholesale price and enters the breeding inventory behavior equations. Most Wagyu cattle are raised and fed in small herds on the same farm.

Dynamic Simulation Analysis of Japanese Quota Concessions

To simulate the likely dynamic effects of the 1984 beef import quota concessions on the Japanese livestock industry, with particular emphasis on the cattle and beef sector, a forecast baseline was first established for 1986 through 1995.[1] The Japanese beef import quota was assumed to continue increasing by 9,000 mt per year through the end of the current agreement (1988) and beyond. Because of the Japanese policy to stabilize beef prices, albeit at a higher level than otherwise, the estimated values of the price expectations coefficient (θ) in the breeding inventory equations for both Wagyu and dairy cattle are significantly less than one (.55 and .63, respectively). Consequently, conditioning the forecast on an assumption of future increases in the import quota and using the coefficients estimated from the historical sample data for forecasting beyond the sample period amounts to assuming no significant change in Japanese import policy over the forecast period. This implies that producers continue to perceive price changes over the forecast period to be temporary to a large extent.

The key to measuring the effects of the quota concessions is to determine what would have happened if the quota had not been allowed to increase. What would have happened, however, depends crucially on how producers would have

[1]Actual data were available for all variables in the Japanese Livestock Industry Model only through 1985.

responded to a refusal by the government to increase the quota. The typical analytical procedure would be to assume that the Japanese government refused to concede to exporter demands by holding the exogenous quota level constant at the 1984 level and simulating the model over the forecast period. The changes in the model variables from their baseline values in the simultaneous system would be taken as a measure of the impact of the quota concessions on the Japanese livestock industry. Lucas, among others, however, has questioned this procedure because policy changes alter the underlying structure of a market. Thus, given a constant quota, i.e., a permanent change in beef import policy, growth in domestic beef demand would result in permanent changes in Japanese beef prices so that the estimated values of θ in the breeding inventory equations would be inappropriate to use for the policy analysis. This is because producers would likely be more responsive to price changes given a fixed quota than they otherwise would be. As a consequence, the typical simulation analysis would tend to underestimate the effects of the quota concessions.

A more representative measure of cattle producer and, therefore, domestic beef supply response to a fixed quota level over the forecast period is possible by using equation (4) to alter the estimated coefficients in the breeding inventory equations to reflect an increase in θ before simulating the effects of a fixed quota. Unfortunately, the extent to which θ should be increased is unknown so that any particular choice is arbitrary. All that is known is that, given no change in the quota, θ must lie between the historical, estimated level and one. Consequently, the appropriate procedure is to impose various values of θ on the inventory equations representing higher-than-historical producer response to price changes and generate a range of values of beef supply, demand, price, import shares, and the other model variables over the forecast period. The results will provide a more realistic indication of how producers would have responded to a fixed quota and, therefore, a more accurate measure of the likely effects of the quota concessions on Japanese livestock markets.

Accordingly, a set of alternative coefficients for the Wagyu and dairy breeding inventory equations were calculated over a range of values for θ. The model was simulated over the 1984 to 1995 period repeatedly under the assumption of a fixed quota using a different set of coefficients for each simulation. In essence, given some values for θ in the breeding inventory equations between the estimated levels and one, each simulation asked the question, "What would be the likely levels of Japanese beef production, demand, price, import shares, etc. over the period of the quota agreement (1984 to 1988) through 1995 if the Japanese government had not allowed the quota to increase above the 1984 level?"

Even though the maximum theoretical value for θ is one, the simulations suggested that the maximum feasible values for θ that are consistent with the biological restrictions on the year-to-year growth in the breeding herd size for Wagyu and dairy cattle are .77 and .81, respectively. Given the limited space available, only the results of three simulations, representing the maximum (TMAX) and the historical (THST) values of θ as well as a modest, 10% increase in θ above the historical level (TTEN), are discussed here. The simulated changes in the values of the model variables in each of the three scenarios from their baseline values approximate the range of likely effects of the quota concessions.

The baseline forecasts of Japanese beef consumption and production are presented in figure 3. Given the assumed increase in the quota, the rate of growth of domestic beef production in Japan is forecast to decline over the forecast period compared to previous years. Production is forecast to increase at an annual rate of only about 1% between 1987 and 1995 compared to an annual average increase of about 7% between 1976 and 1985. Although the average annual growth rate of total beef consumption (Wagyu, dairy, and imports) is also forecasted to decline (from 7% between 1976 and 1985 to 2% between 1987 and 1995), the gap between domestic production and total consumption continues to grow.

The simulated values of selected variables holding the quota fixed at the 1984 level for the three assumed levels of θ (THST, TTEN, and TMAX) are compared to their baseline values in figures 4 through 8. The results suggest that fixing the quota at the 1984 level would have boosted the Japanese cattle industry. That is to say, the negotiated quota increases are restricting the growth of the both Wagyu and dairy cattle inventories and Japanese beef production to lower levels than otherwise would have been the case. Assuming little price responsiveness of Japanese producers (the THST assumption), however, a constant quota would likely have pushed Wagyu cow inventories and beef production up by less than 1% over the baseline forecast by 1988, the end of the quota agreement (figures 4 and 5). In this case, the estimated effects of the quota concessions on the cattle industry would be estimated to be quite small with beef consumption and prices doing most of the adjusting. Beef consumption would be estimated to be 6% higher and prices 4% lower by 1988 as a result of the concessions under the THST assumption (figures 6 and 7). Because the price responsiveness of producers would likely have been greater given a constant quota than was the case historically, the THST results provide a lower bound on the effects of the quota concessions.

At the other extreme, if producers adjusted to the greatest extent possible to a constant quota (the TMAX assumption), Wagyu cow inventories and production would be a maximum of about 40% and 20% higher, respectively, than the forecast baseline by 1988 (figures 4 and 5). Consequently, the concession would be estimated to have a devastating effect on the Japanese cattle and beef industry, holding domestic beef supply down by more than the increase in imports. Thus, beef consumption would be lower and prices higher than otherwise. Under the TMAX assumption, beef consumption would be estimated to be 6% lower and prices 4% higher than if no increase in the quota had been allowed (figures 6 and 7). Because the TMAX assumption allows for the greatest possible reaction by producers to prices, these results provide an upper bound on the effects of the concessions.

Assuming a more likely, smaller increase in producer price responsiveness (the TTEN assumption), Wagyu cow inventories would be 9% higher and beef production 5% higher than the baseline forecast by 1988 as a result of a constant quota (figures 4 and 5). The estimated effect of the concessions in this case, therefore, is a reduction in domestic beef production by slightly less than the increase in imports, allowing only a small net increase in beef consumption of 2% by 1988 (figure 6).

In each scenario (THST, TMAX, and TTEN), the increase in the import quota crowds out domestic production to some extent. Consequently, the net estimated effect of the concessions on domestic beef consumption and price is

Figure 3. Beef Consumption, Production, and Imports

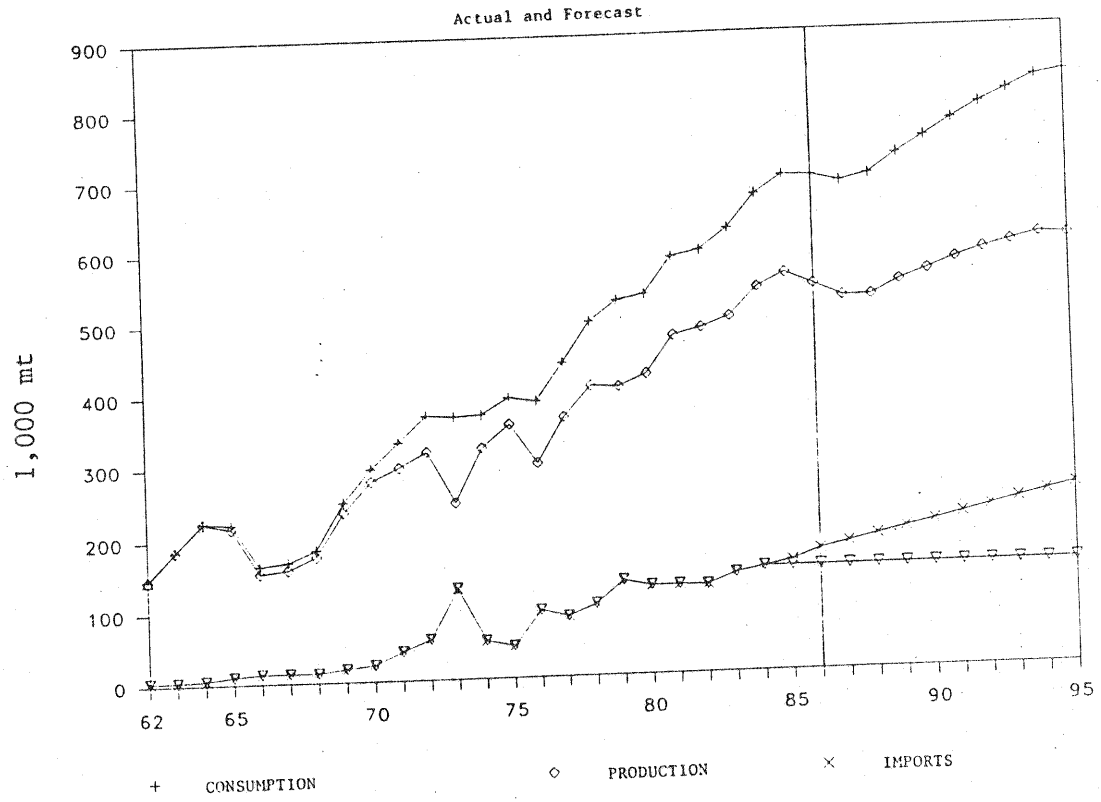


Figure 4. Wagyu Cow Inventory

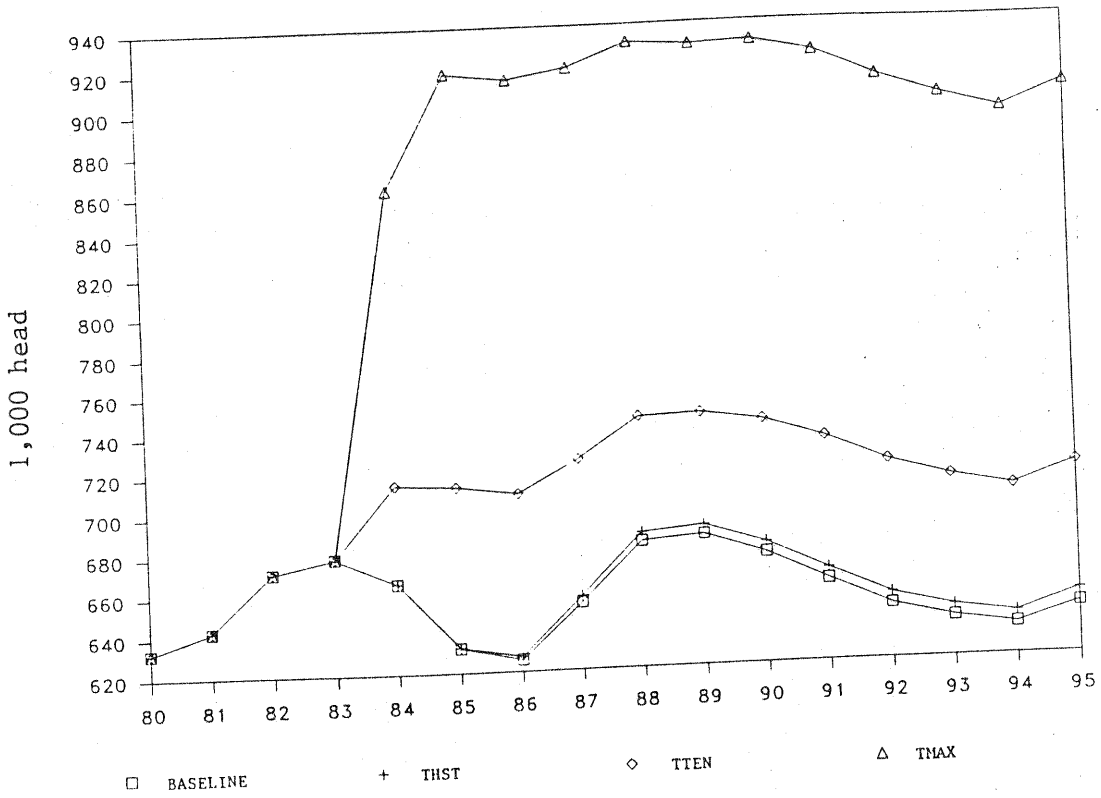


Figure 5. Total Beef Production

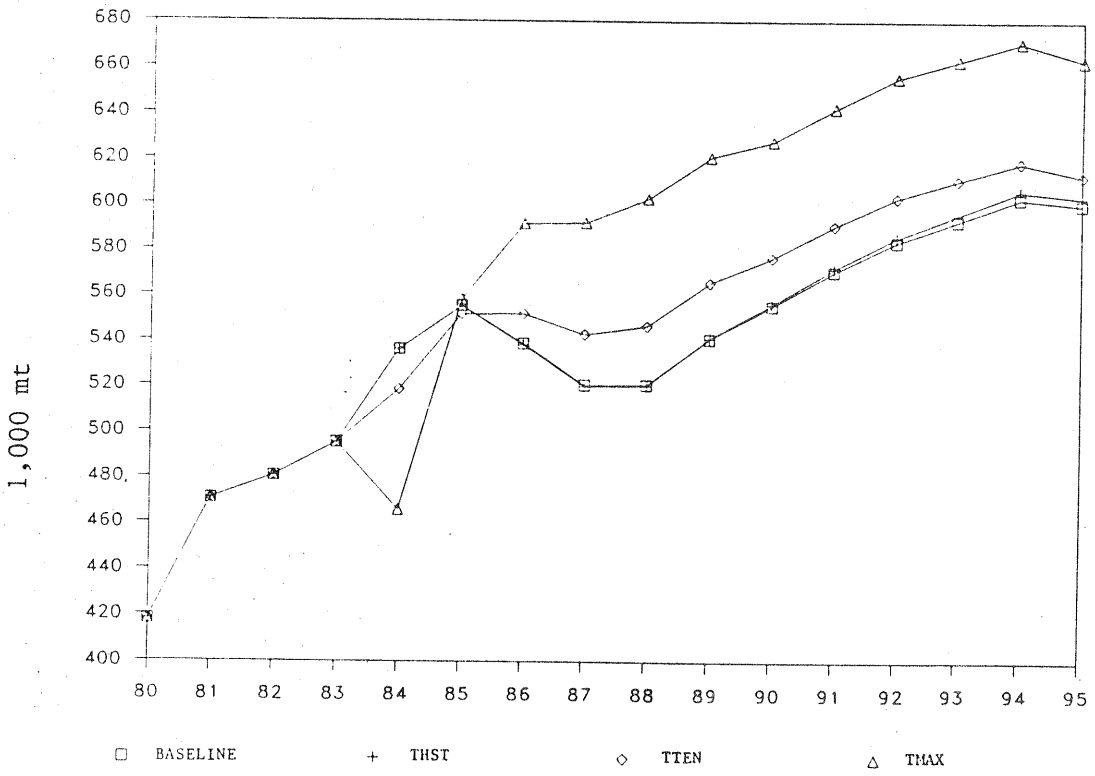


Figure 6. Beef Consumption (retail basis)

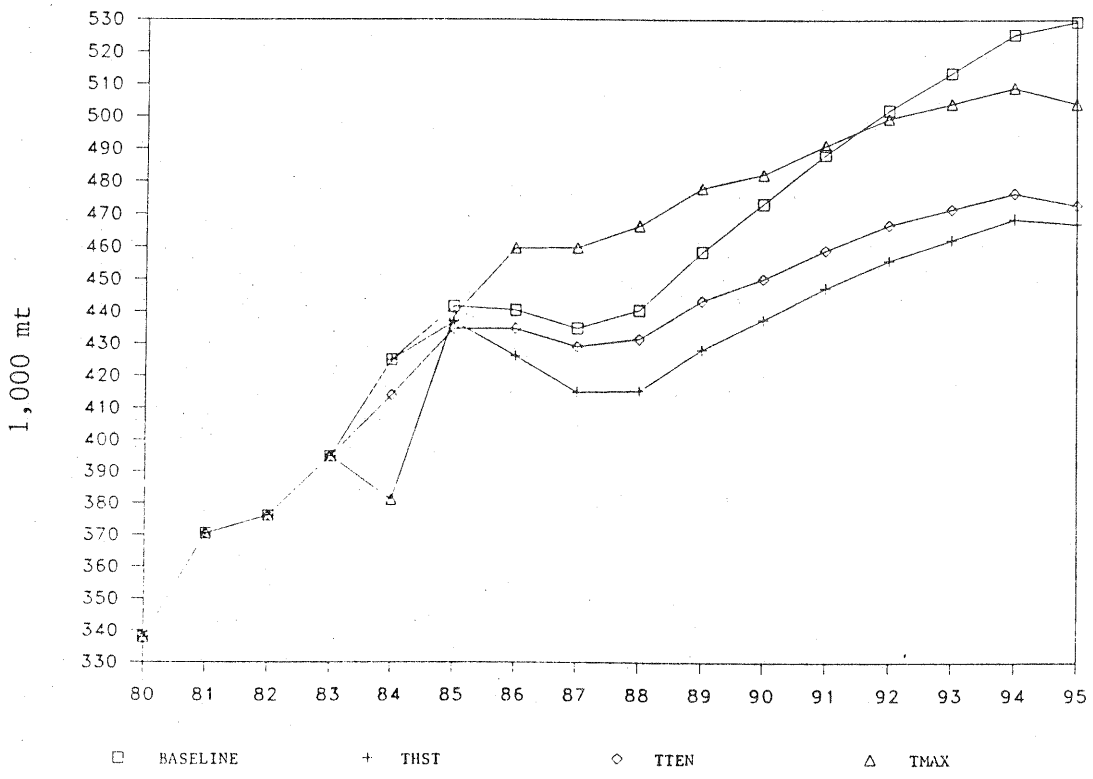


Figure 7. Retail Beef Price

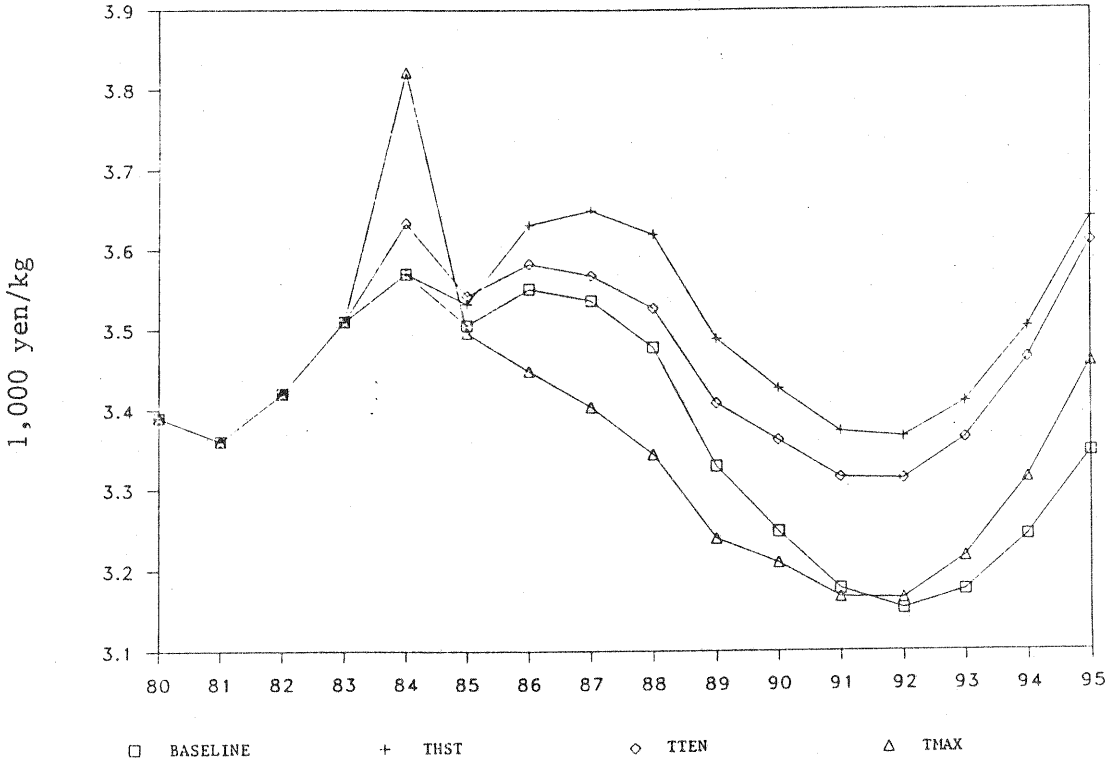
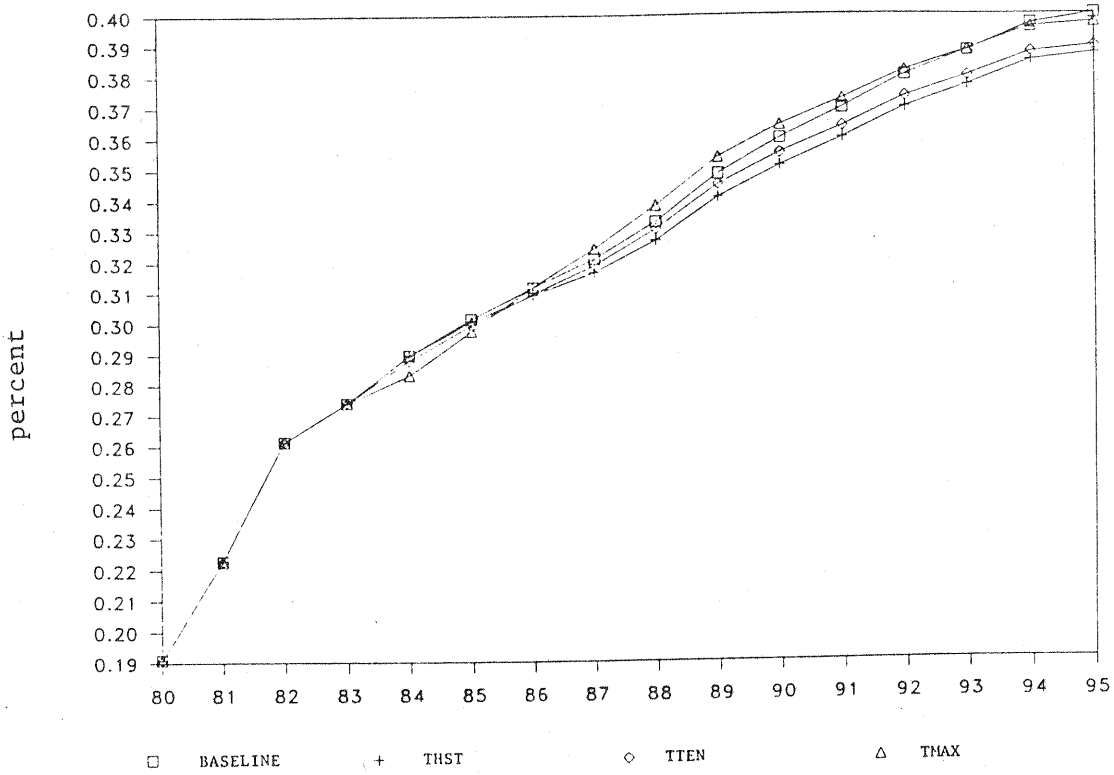


Figure 8. U.S. Beef Import Share



ambiguous. The maximum estimated change in total beef consumption and price as a result of the 1984 concessions is a range of ± 6% and ± 4%, respectively, of the forecast baseline. Interestingly, under the TMAX assumption, the increase in imports triggers a more than equal reduction in production by 1988. Consequently, beef consumption is actually lower by the end of the agreement period than otherwise would be the case (figure 6). The increase in beef imports, however, eventually outweighs the decline in beef output after about 9 years. This suggests that the net long-run effect of the quota concessions on consumption is likely positive.

The effects of the quota concessions on the U.S. share of Japanese beef imports and on the hog and chicken sectors of the livestock industry are also ambiguous. When domestic prices of beef decline and beef consumption increases (as in the THST and TTEN scenarios), the U.S. import share also increases. The opposite occurs under the TMAX assumption. However, the maximum estimated range of the U.S. import share is only ± 1% around the baseline.

The higher beef consumption and lower beef price as a result of the quota concessions under the THST and TTEN assumptions result in some substitution from pork and chicken meat into beef both in consumption and production. The effect is marginal, however, with pork and chicken meat consumption and prices dropping by less than 1% by 1988. Just the opposite is the case with the TMAX assumption. Even though the effects of the concessions on the pork and chicken industries are ambiguous, depending on the price responsiveness of beef producers under a fixed quota, the actual effect is likely to be small.

Summary and Implications for Current Negotiations

This paper utilizes dynamic simulation analysis to consider the likely consequences of the 1984 concessions by the Japanese government to exporter demands to increase the level of the beef import quota. Using a simultaneous model of Japanese livestock markets, a forecast baseline through 1995 was first established assuming that the import quota increases by 9,000 mt per year as in the 1984 agreement. Imports are then held constant at the 1984 level through the end of the forecast period under various assumptions regarding the responsiveness of Japanese cattle producers to a policy-induced change in price. The effects of the concessions are measured as the differences in the values of the model variables in the constant quota simulations from their baseline values. The analytical results lead to a number of conclusions and implications for current negotiations.

First, the extent of the likely effects of any import quota concession by the Japanese depends crucially on the extent to which Japanese cattle producers would react to a policy of no additional increases in the quota. Producers would likely react more to price changes given a fixed quota than under current policy. Consequently, because domestic beef consumption is growing, it is clear that domestic cattle inventories would tend to build and domestic beef output to grow unless increases in the quota were allowed over time.

Second, as a corollary to the first point, to the extent that the Japanese government intends to stabilize prices within the current price

stabilization band, imports must be allowed to increase or prices will tend to increase much beyond the upper limit over time. Consequently, the quota "concessions" agreed to in 1984 may be more of a convenience as a part of continuing government policy to stabilize prices. That is, the Japanese may have made little concession over what would likely have been necessary anyway under current government policy.

Third, by the end of the current agreement (1988), Wagyu breeding inventories and beef production will be a maximum of 40% and 20% lower, respectively, than would otherwise be the case. More likely, however, inventories and production will be around 9% and 5% lower, respectively, than if no increase in the quota had been allowed in 1984. The initial likely effect of a quota increase, however, is a larger supply of domestic beef than when the quota is held constant. This is because producers would attempt to build their breeding herds if the quota was fixed, leading initially to a lower slaughter and production of beef than if the quota was allowed to increase. Thus, in the first year or two following the 1984 agreement, the quota concessions likely resulted in a higher supply of domestic beef and a higher consumption of domestic beef relative to imported beef than if no quota increase had been allowed.

Fourth, the effects of the concessions on beef consumption and prices are ambiguous. Beef consumption could currently be lower and prices higher than might have been the case if producers would have greatly built inventories and increased beef output in the absence of the concessions. On the other hand, if producers would not have perceived a refusal by the Japanese government to increase the quota as a significant change in policy, production would be about the current level. Thus, current consumption would be larger by about the full amount of the additional imports and prices would be lower than in the absence of the concessions.

Finally, the effects on the U.S. share of imports and the pork and chicken sectors are also ambiguous. In both cases, however, the maximum impacts are quite small, less than $\pm$ 1% in most cases.

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