AN ABSTRACT OF THE THESIS OF

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Title: AN ANALYSIS OF JAPANESE FOOD GRAIN POLICIES

Abstract approved: Gary L. Seevers

Food grain policies have a significant impact on income transfer, budget costs and foreign trade (imports) in Japan. The premise of this study is that a better understanding of these policies and their impact will aid the Pacific Northwest in adjusting to future changes in white wheat exports to Japan. Data for the period 1963-1969 were analyzed within a partial equilibrium framework. Rice and wheat policy models were developed to permit empirical estimation of farm income transfer, consumer transfer, and government budgetary costs associated with food grain programs. Specification of supply and demand curves was based largely on previous work with the exception of the wheat supply curve. Ordinary least squares regression was employed to estimate Japanese wheat acreage at various support prices and off-farm wage rates.

The policy of supporting farm prices of wheat and rice above

world prices increased estimated 1969 farm income $2.1 billion above a hypothetical free market situation. The government policy of re-selling food grains above the landed price of imports resulted in an estimated 1969 consumer cost of $1.8 billion over a hypothetical free market. Food grain programs also resulted in an estimated 1969 government budgetary deficit of $704.7 million.

Japan's internal food grain policies have been accompanied by highly protectionistic food grain trade policies. For example, in 1969 Japanese rice producers were protected by an equivalent ad valorem tariff of 121.62 percent. Wheat growers were protected by a 120.58 percent equivalent ad valorem tariff.

High consumer cost and increasing budgetary deficits will represent pressure for food grain policy changes during the 1970's. Future Japanese food policy should be viewed as a whole, with particular emphasis upon trends in dietary habits. The Japanese Government is placing increasing emphasis upon the livestock industry which could increase feed grain imports. The effects upon Pacific Northwest white wheat exports depends upon Japanese efforts to diversify sources of feed grain imports; and a policy change that would result in using domestic rice for livestock feed.

Shifting demand toward hard wheats (for bread) may reduce white wheat exports to Japan. However, reduced Japanese wheat

production may offset the effects of shifting demand. If area planted in wheat continues to decline, Japan may increase or at least maintain present levels of white wheat imports.

An Analysis of Japanese Food Grain Policies

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AN ANALYSIS OF JAPANESE FOOD GRAIN POLICIES

I. INTRODUCTION

The Pacific Northwest is an area containing all of Washington, Oregon, and the northern portion of Idaho. Wheat is the principal crop, with the most important wheat producing area being the Columbia Basin. This interior plateau occupies the central portion of Washington and north central Oregon. Nineteen counties located within the Columbia Basin produce over 90 percent of the Pacific Northwest wheat (36).

White Wheat Production in Pacific Northwest

White wheat is grown in most of the eleven western states, but about 85 percent of each year's crop comes from the Pacific Northwest. Washington is the most important producer, frequently accounting for over half the western white wheat crop (6). This heavy concentration of white wheat production makes the Pacific Northwest the major producing area for this class of wheat. Over one-half of the total United States white wheat production has been grown in the Pacific Northwest during recent years.

Utilization of Pacific Northwest White Wheat

Domestic disappearance[1/] for white wheat has been quite low, from 35 to 37 percent of total U.S. production in recent years. However, for Pacific Northwest white wheat, domestic use in recent years has required only 20 percent of production. Utilization of Pacific Northwest white wheat for crop years 1963-1967 was: (1) exports, 80 percent; (2) flour and related products, 15 percent; (3) feed, 3 percent, and (4) seed, 2 percent (34). With ample capacity to increase production in the future, pressure will mount to at least sustain and, if possible, expand export markets for white wheat.

Major Importing Countries

With such a high percentage of Pacific Northwest white wheat involved in international trade, it is relevant to review the major importing countries. Figure 1 indicates Pacific Northwest exports to Europe and Latin America for the crop years 1958-1968. By comparing Figure 1 with Figure 2, we observe how Asian exports dominate total exports. Japan is the most important cash market

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1/ Wheat for food (primarily cracker and pastry flour), feed, seed and industry. Includes military food used at home and abroad.

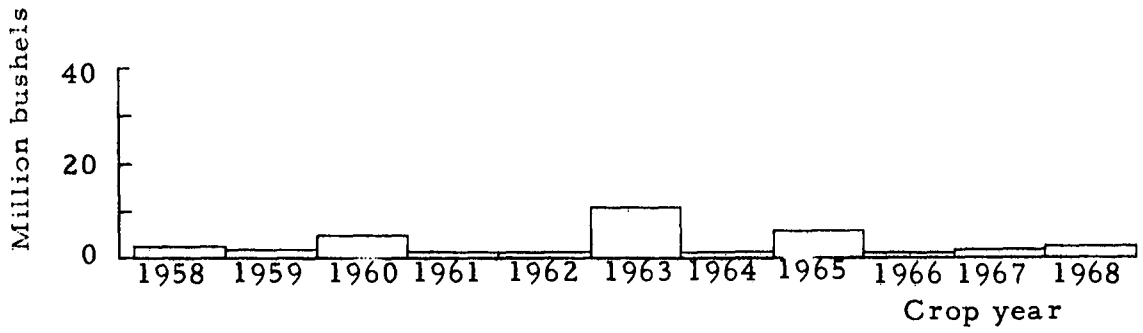

Figure 1. Pacific Northwest white wheat exports to Europe and Latin America, 1958-1968.

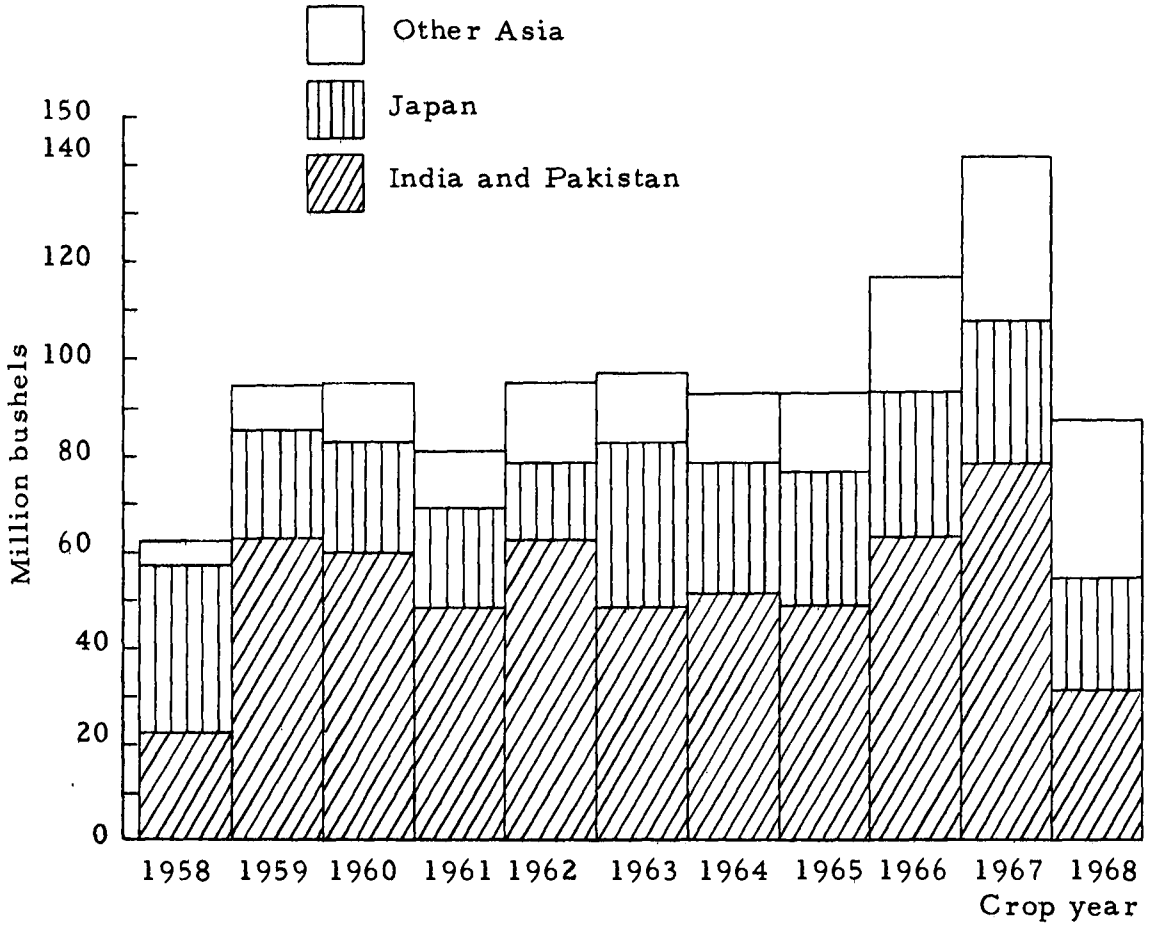

Figure 2. Pacific Northwest white wheat exports to Asia, 1958-1968.

in Asia for grain exported from the Pacific Northwest. In recent years exports to Japan have been on a commercial basis, primarily between the Japanese Food Agency and private U. S. grain exporters.

India and Pakistan comprise the most important concessional market for Pacific Northwest wheat exports. These exports are handled primarily under provisions of Public Law 480. Figure 2 indicates Pacific Northwest wheat shipments to India and Pakistan. When shipments to these two countries are combined with Japanese shipments over the period, they constitute 75 percent of total Pacific Northwest exports. Figures 1 and 2 are based upon data contained in Appendix B, Table 1.

Concessional sales under Public Law 480 are expected to decline in the future because of the trend toward self-sufficiency in less developed countries, a basic reshuffling of food aid programs, and a tight budget situation in the United States. Food aid shipments are expected to continue for the next decade, but the amount may be considerably less than the volume moved under the program in the past. If concessional sales do indeed decline, the importance of the cash market for Pacific Northwest wheat will increase.

Consequently, Japan is in a position to influence the future economy of the Pacific Northwest agricultural sector because it is the dominant cash market for white wheat. Thus, continued trade

with Japan is of vital importance to the Pacific Northwest.

The Problem

Agricultural trade is heavily influenced by internal and external agricultural policies of trading countries. These policies often lead to various forms of protection which alter trading patterns. D. Gale Johnson has suggested that most countries may be tending toward increased agricultural protectionism (15).

Agricultural protectionism usually involves insulating domestic producers from the international market. This is often required because a government maintains artificially high domestic agricultural prices, and must therefore restrict imports of agricultural commodities. Such actions stimulate domestic production and discourage domestic utilization, reducing the trade of exporting countries.

Although most countries engage in some form of agricultural protectionism, the food grain (wheat and rice) policies of Japan are of primary importance to the Pacific Northwest wheat industry. The basic premise of this study is that a better understanding of Japanese food grain policies will aid the Pacific Northwest in adjusting to future changes in wheat exports to Japan. A better understanding of influences in Japan may also enable us to foresee future developments in other parts of Asia.

Objectives

The general objective of this study is to analyze Japanese food grain policies in an attempt to better understand what influences Japan's wheat imports. Specific objectives include:

(1) To examine the effects of food grain policies upon farm income transfer, consumer transfer, and budgetary balance during the 1960's.

(2) To examine alternative Japanese food grain policies for the 1970's.

Study Organization

Chapter I has discussed the importance of Japan as a market for Pacific Northwest wheat. Food grain policies within Japan were suggested as important determinants of actual trade volume. Chapter II includes a general description and geometric formulation of Japanese wheat and rice policies. Chapter III discusses methodology and presents the estimated effects of wheat and rice policies upon farm income, consumer income, and government budgetary balance.

Chapter IV contains additional evaluative measures useful when making inter-country comparison of food grain policies. Chapter V reviews policy alternatives that may evolve from present Japanese food grain policies.

II. FRAMEWORK FOR ANALYSIS

Partial Equilibrium Model

The conceptual framework for this study is based upon a partial equilibrium model. Figure 3 employs the partial equilibrium concept to illustrate unrestricted wheat trade between the United States and Japan. Before trade equilibrium prices would

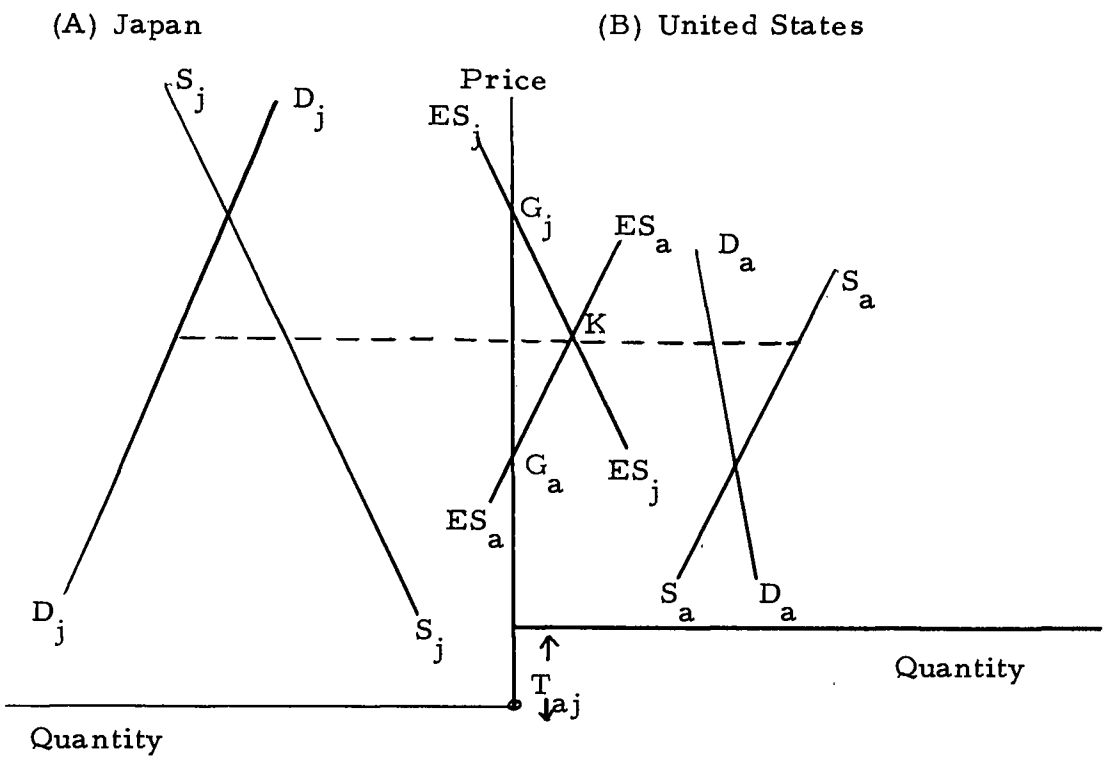

Figure 3. Partial price equilibrium theory of international trade in wheat, United States and Japan (25)

be G_j for Japan and G_a for the United States. At these prices the excess supply curves for Japan (ES_j) and the United States (ES_a) are at their zero points. With trade, wheat is exported from the United States to Japan because the differential between prices G_j and G_a exceeds transportation cost (T_{aj}). Equilibrium price is established at K, where the excess supply or exports of the United States equals the algebraically negative excess supply or imports of Japan.

Japanese Food Grain Policy

The above model indicates one equilibrium trade price for wheat. Obviously, U. S. -Japanese wheat trade is not in equilibrium because one price is not common to both countries. Part of the failure to attain equilibrium results from Japan's protectionistic agricultural policies. Most national devices for the protection of agriculture can be viewed as a combination of the following categories:

> "(1) devices which directly discourage imports (import duties, quantitative restrictions, state trading, multiple exchange rates)
>
> (2) devices which directly encourage exports (export subsidies, multiple exchange rates)
>
> (3) devices which directly encourage domestic production (price supports, deficiency payments)" (7, p. 83-84).

Under the third category, the Japanese Government conducts an extensive price-support and price-stabilization program in the production and marketing of food grains (28). The price-support programs are governed by conditions in the agricultural sector, while price-stabilization programs are designed to benefit consumers. Originally these programs were the result of government policy having the following objectives:

(1) To increase farm income,

(2) To maintain low consumer foodstuff prices,

(3) To conserve foreign exchange required for the import of industrial raw materials, and

(4) To increase Japan's self-sufficiency in food grain production (33).

In recent years with a rice surplus beginning to appear, the emphasis upon stimulating production has been reduced. Conserving foreign exchange has also decreased in importance as Japan continues to benefit from an expanding export market. Increasing farm income continues to be the most important objective of Japanese food grain policy. Maintaining low consumer foodstuff prices has been of secondary importance. However, another objective has emerged during the 1960's. The increasing cost of food grain programs to the government has become a source of concern to legislators. Thus Japanese food grain programs during the 1960's have had three main objectives: (1) increasing

farm income, (2) maintaining low foodstuff prices, and (3) preventing "excessive" government expenditures.

To attain these objectives the government has employed the following policy instruments:

(1) Food grain price supports to producers,

(2) Government purchase of domestic food grains at the support price and re-sale to processors at a lower price, and

(3) Government purchase of imported food grains at world prices and re-sale to processors at higher prices. This process will be referred to as "skimming".

This study will analyze the above policy instruments as they affect: (1) farm income, (2) consumer income, and (3) government revenue.

Relationship Between Objectives and Instruments

Similar objectives and instruments are used in Japanese wheat and rice policies. To save repetition, the relationship between objectives and instruments will be discussed only with reference to wheat policy. Figure 4 illustrates Japan's foreign and domestic wheat policies.

Under free trade conditions Japan's domestic wheat price would be P_w^m. With price supports the domestic price is increased to P_w^s. This results in the following deviations from free trade conditions. First, price supports aid in achieving the objective of increasing producers income. With free trade, producers

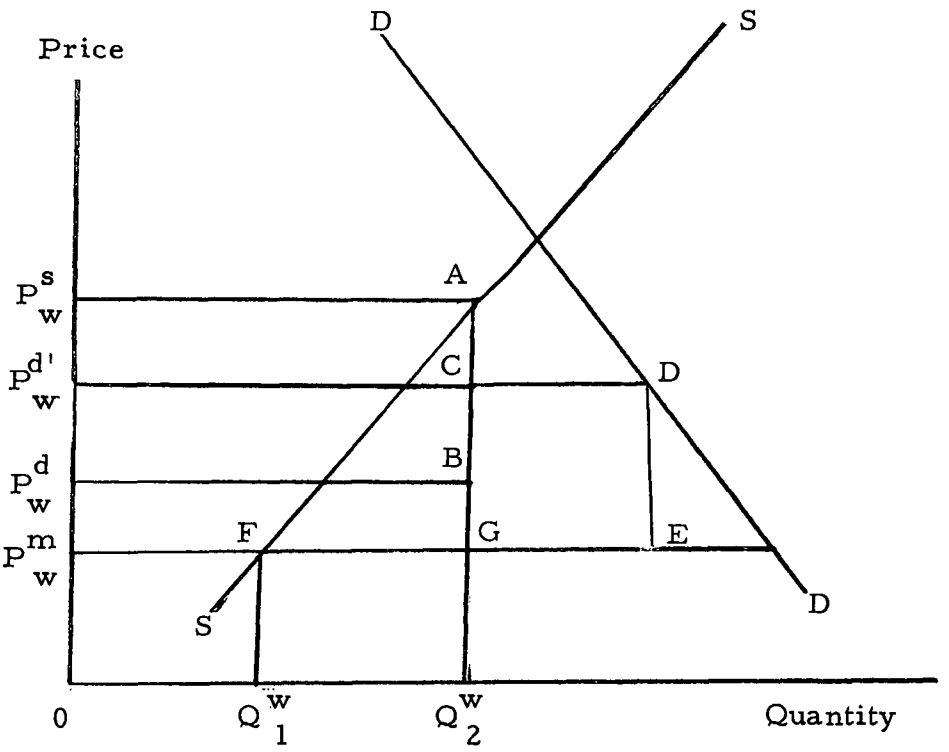

Figure 4. Japanese wheat policies

gross income is designated by area $OP^m_wFQ^w_1$ but with wheat price support this area is increased to $OP^s_wAQ^w_2$.

Second, price supports result in a budgetary cost of $P^d_wP^s_wAB$. The government purchases Q^w_2 at support price P^s_w and re-sells to millers at price P^d_w, sustaining a loss of $P^s_w - P^d_w$ per unit.

Third, price supports stimulate domestic production and reduce imports. Figure 5 provides an illustration of the effect of price supports on international trade. In the absence of supports the U.S. exports E_{aj}. Excess supply does not exist because price P_o adjusts to clear the market. However, the Japanese Government

supports domestic wheat prices at P_1. At this price more is produced and less is consumed domestically. The result is a reduced import demand for wheat, and surplus accumulation in the United States. Japan imports $-E_{aj} < E_{aj}$.

Part of the budgetary deficit of price support is offset by a second instrument; government "skimming" operations. The instrument of "skimming" has the following effects. First, "skimming" results in a government revenue of CDEG.[2/] Imported grain is purchased at world price P_w^m and re-sold to millers at price $P_w^{d'}$. This revenue (minus handling cost) helps offset the budgetary cost of price supports.

Second, the re-sale price $P_w^{d'}$ is determined by the government and aids in achieving the objective of keeping consumer prices below P_w^s. However, $P_w^{d'}$ is higher than free trade price P_w^m.

Third, "skimming" practices result in an equivalent tariff upon food grain imports.[3/] In Figure 6 P_o is the equilibrium trade price, and U.S. exports E_{aj} equal Japanese imports minus E_{aj}. If Japan imposes a prohibitive tariff equal to P_1-P_1' the situation

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2/ See Figure 4.

3/ The equivalent tariff concept will be discussed more fully in Chapter IV.

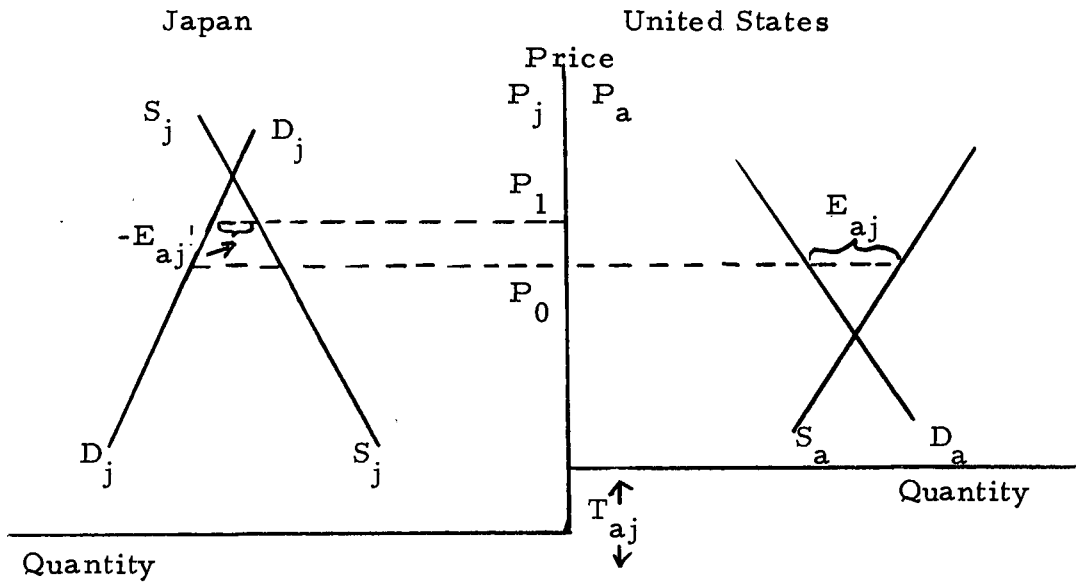

Figure 5. The effects of Japanese price supports on international wheat trade (excess supply curves omitted)

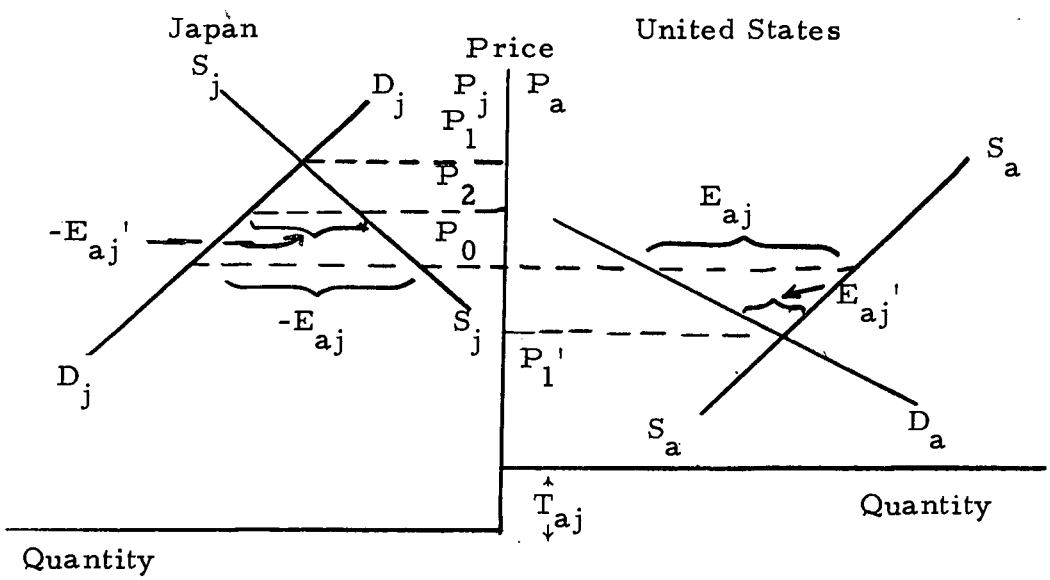

Figure 6. The effects of tariffs on international trade (excess supply curves omitted)

is one of no trade. The price in Japan would equal P_1 and in the United States P_1'. Current "skimming" operations do not result in a prohibitive tariff, but the policy of re-selling wheat above imported price reduces imports to $-E_{aj}' < -E_{aj}$. United States exports are also reduced to $E_{aj}' \leq E_{aj}$.

Rice Policy Model

Although this study is primarily concerned with Japanese wheat policy, it is necessary to consider rice in connection with wheat. Rice is the most important source of farm crop income. In 1966 the 3,149,000 hectares in rice accounted for approximately 60 percent of total crop receipts per farm. The 421,000 hectares in wheat accounted for only 2 percent of crop receipts per farm. Rice is the dominant source of total farm income, with 1966 rice sales accounting for 44 percent of total agricultural receipts (12).

Area planted to rice has been relatively constant during the 1960's. The high cost of irrigating and terracing prohibits quick conversion of dryland to paddy production.[4/] Low variable costs also tend to prevent reduction of the area in paddy rice. Because returns per hectare[5/] are considerably higher for rice than other

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[4/] Paddy rice accounts for approximately 99 percent of total rice production.

[5/] One hectare = 2.45 acres.

cereals, farmers maintain their paddy fields in rice production.[6/] Subsidy payments of $1,390 per hectare were provided in 1969 to encourage diversion of rice land, but the area planted was essentially the same as the 3.3 million hectares planted in 1968 (19).

Although area planted to rice is essentially constant, various exogenous factors such as weather and improved varieties cause rice yields to vary. Under these conditions the supply curve of rice is assumed to be vertical with respect to price, but it shifts from year to year. Rice yields have generally been increasing during the period covered by this study, and Japan has recently become self-sufficient in rice production.

Rice marketing is under direct control of the government, which acts through the Japanese Food Agency. The government sets the official purchase price and stands ready to acquire domestic production at that price. Farmers are required by law to sell all production, with the exception of home consumption, to the Food Agency. In recent years approximately 75 percent of total production has been sold to the Food Agency. In Figure 7, $P_r^s D$ represents government demand for domestic rice, while Q_6^r

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6/ Data based upon a survey of Japanese production costs (12) indicates that 1965 gross returns were $534 per hectare above production costs for paddy rice, while paddy wheat returns were $43.39 per hectare below production cost.

indicates total rice production per year.[7/] At price P_r^s quantity Q_3^r is delivered to the government, while $Q_6^r - Q_3^r$ is retained for home consumption.

In addition to purchases from farmers, the government has a carryover from the previous year. From 1963-1967 carryover accounted for approximately one-third to one-half of domestic rice consumption. During this period the government followed a first-in-first-out inventory policy. Since 1967 the inventory policy has been last-in-first-out, with 1967, 1968, and 1969 inventory being carried over into 1970. Figure 8 illustrates the supply of rice held by the government. Supply of domestic rice Q_4^r is comprised of carryover Q_1^r and domestic purchases Q_3^r. Total supply Q_5^r includes imported rice.

Total demand gradually increased from 1951-1961 as rice was substituted for other food grains (i.e., pressed barley and wheat vermicelli). However, food grain consumption over this period, expressed in calories, remained practically unchanged. Keinosuke Baba analyzed consumption data for the period 1951-1962 and concluded there were grounds for believing " . . . that the

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7/ Year will refer to Japanese fiscal year, beginning April 1 of year stated.

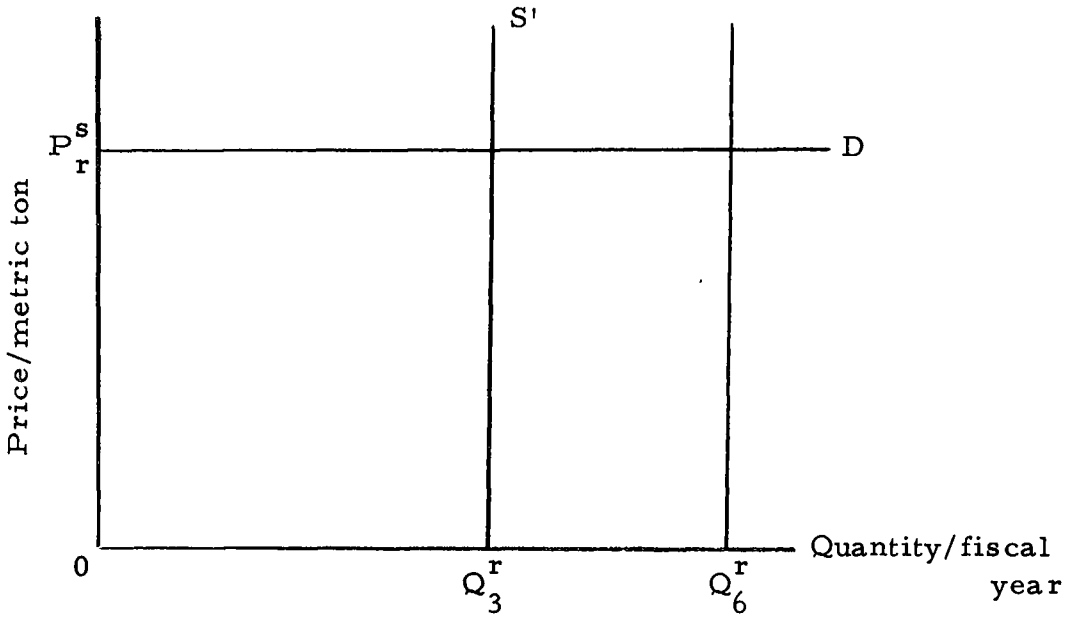

Figure 7. Government purchase of domestic rice

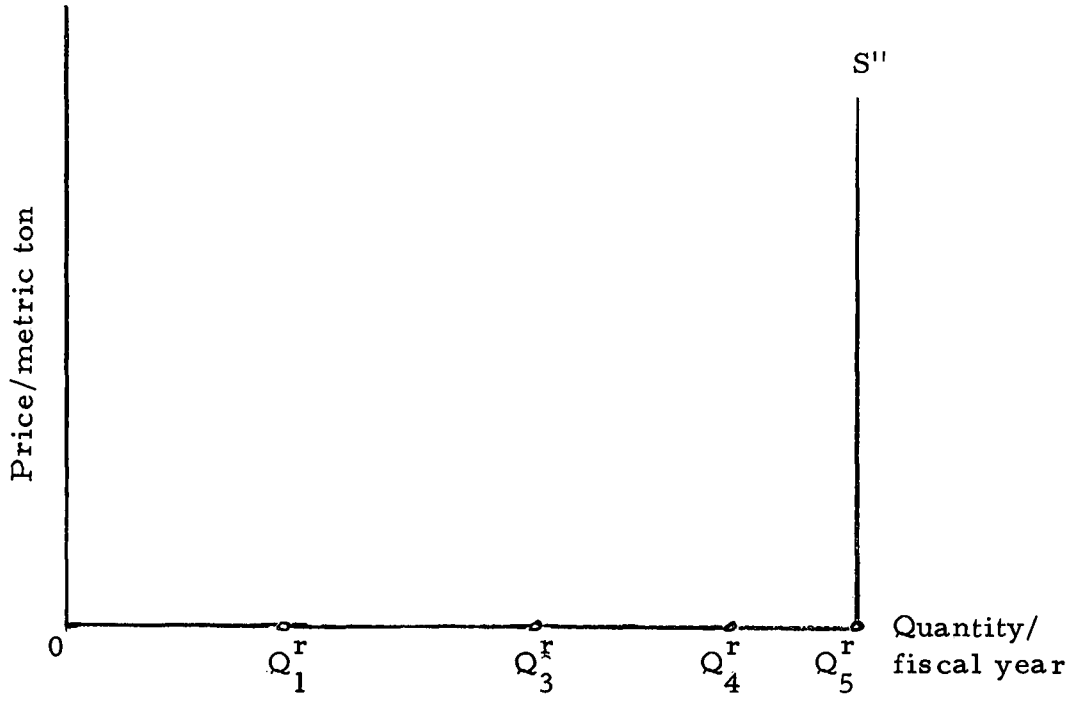

Figure 8. Government supply of rice

demand for rice will shortly reach the saturation point, and thereafter there will be no prospect of an increase in demand except in proportion to the increase in population." (1)

This point was evidently reached in 1961 when rice consumption was at a per capita rate of 258 pounds. Per capita consumption has gradually declined since 1961, with the 1966 rate being 230 pounds per capita. This decline in per capita consumption has been just about offset by the one percent growth in population (4). Although Food Agency re-sale price for domestic rice has increased from $242.81 per ton in 1963 to $348.39 in 1969 total rice consumption has stabilized at about 12 million tons (19). For these reasons the present study assumes the demand for rice is not responsive to price.

Total demand is composed of demand for domestic and imported rice. In Figure 9, D_D indicates demand for domestic rice, while D_T indicates total demand. The Food Agency buys and controls all imported rice ($Q_3^r - Q_2^r$). The government determines the quantity to be imported and purchases this through Japanese importers.

Imported rice is primarily Japonica type, making it substitutable for domestic rice. It is assumed that imported rice does not contribute to the carryover between fiscal years. Domestic carryover is assumed to be entirely held by the government and is indicated by ($Q_4^r - Q_3^r$).

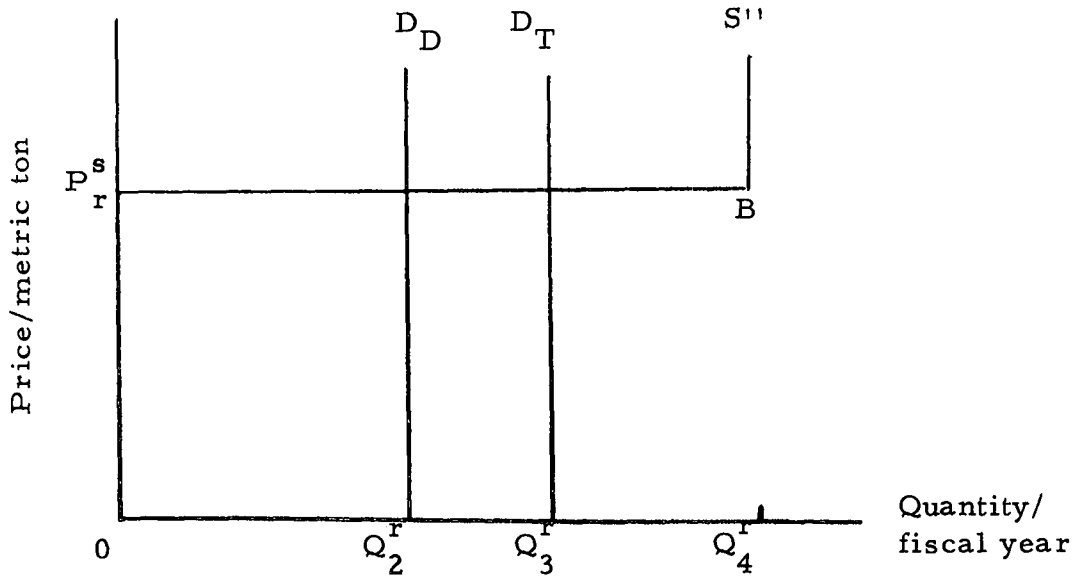

Figure 9. Demand for rice

All rice purchased by the Food Agency is sold at a fixed official price. Domestic rice is sold below government purchase cost, resulting in a budgetary deficit from the domestic rice program. In Figure 10, $P^{s'}_r$ represents government purchase cost per metric ton, but $P^d_r BS''$ becomes the government supply curve of domestic rice to processors at price P^d_r. At this price Q^r_2 domestic rice is purchased.

Imported rice is purchased on the international market, with government purchase cost including freight and importer fee. A budgetary surplus accrues from imported rice because Food Agency re-sale price ($P^{d'}_r$) is above purchase price (P^m_R). The government supply curve of imported rice to processors is AC. Quantity ($Q^r_3 - Q^r_2$) is purchased at price $P^{d'}_r$.

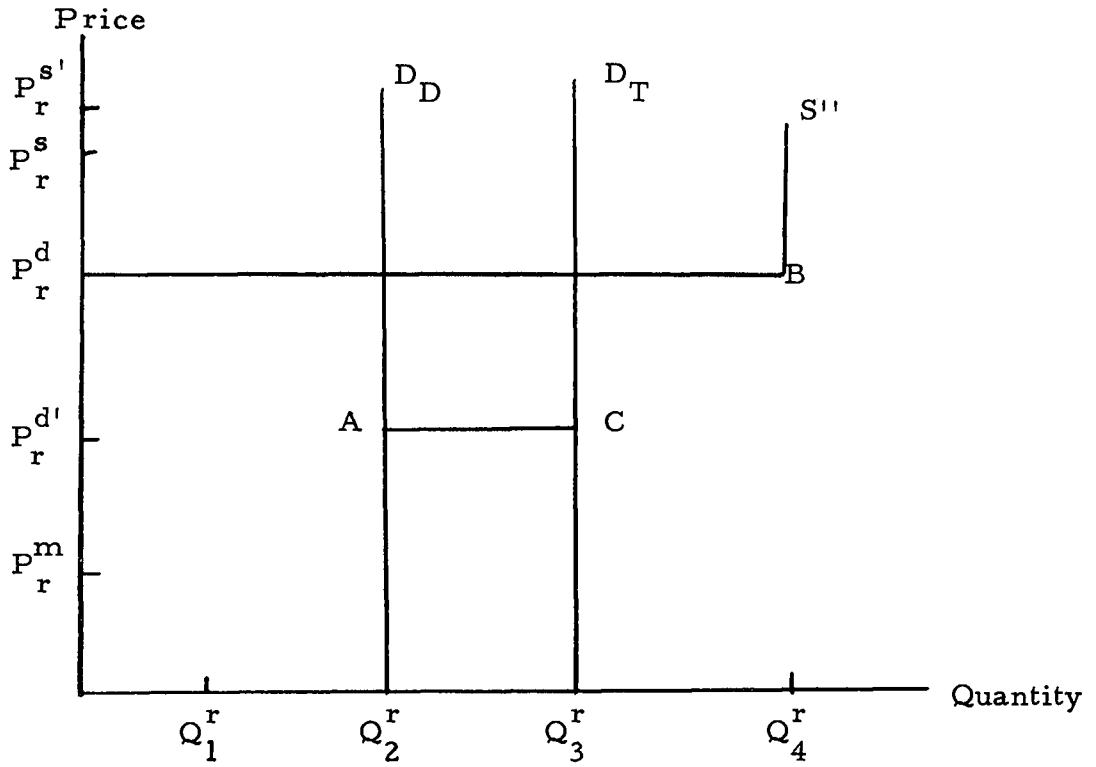

Figure 10. Rice supply and demand

Domestic Wheat Supply Model

Area planted to wheat has declined steadily from 649, 000 hectares in 1962 to 288, 000 hectares in 1969. Total production also declined from 1, 631, 000 metric tons to an estimated 904, 320 metric tons, respectively. Because domestic wheat production is assumed to be price responsive the effect of wheat policies upon farm income, consumer income, and government revenue will depend upon estimated production; given various price levels. This section develops a model to estimate domestic wheat supply.

Quantity of wheat produced can be separated into acreage adjustment and yield fluctuations. Production can then be defined as:

$$Q = A \cdot Y$$

where:

Q is quantity produced,

A is area planted, and

Y is average yield per hectare.

This study assumes that yield (Y) was largely beyond the control of producers from 1963-1969. Fluctuations in yields from year to year arise primarily from variations in growing conditions while trends in yields depend on the state of technology and the cost of inputs. Variations in growing conditions are postulated to be the result of weather which is beyond the control of producers. Technological progress is governed largely by government investment in research, and is also beyond the control of producers.

Land, labor, and capital are the primary inputs over which the producer has control, but it is assumed that nonland inputs are varied in proportion to land. Therefore, quantity of land planted to wheat indicates desired level of production. Wheat production is primarily a method of using winter farm labor, and it is hypothesized that area planted depends on price of wheat and alternative returns from winter labor. The primary alternative to

winter wheat production is off-farm employment. The importance of off-farm employment has been increasing over time and currently accounts for over 53 percent of total farm household income (22).

Since rice area is assumed constant, it is suggested that increased off-farm job opportunities will result in reduced planting of wheat. By this reasoning, area in wheat is a function of the relationship between farm price of wheat and off-farm wage rate. More farmers are expected to accept off-farm winter employment as wage rates increase relative to price of wheat. This in turn will reduce area planted to wheat. Area planted is expressed as:

$$A_w = f\,(P^{w*},\ J)$$

where:

A_w is actual area planted to wheat,

P^{w*} is the expected price of wheat per metric ton, and

J is off-farm job opportunities.

The above variables (A_w, P^{w*}, J) are defined for Japanese fiscal years. Price expectation is hypothesized to be based on the previous year's price:

$$P^{w*} = P^{w}_{t-1}$$

where:

P^{w*} is the expected price in period t, and

P^{w}_{t-1} is the actual price received in period t-1.

Data concerning yearly off-farm job opportunities were unavailable, so off-farm wage rate[8/] was used as a proxy variable. Years of rapid economic growth have provided more job opportunities than the supply of labor can fill.[9/] The result has been increasing wage rates. Thus increasing wage rates are a proxy for increasing off-farm employment opportunities. Therefore:

$$J = W_{t-1}$$

where:

W_{t-1} is average off-farm wage rate for period t-1.

The above model of wheat area determination is specified in the following linear [10/] form for statistical estimation:

$$Y_j = \beta_0 + \beta_1 \chi_{ij} + \varepsilon_j$$

where:

$Y_j = A_{w_t}$ is hectares planted to wheat in period t,

8/ Average male wage rate for all businesses employing 30 persons or more (12).

9/ Japanese unemployment is less than one percent of the approximately 53 million labor force (4).

10/ Assumptions for using linear regression include: (a) The model is linear in the parameters, (b) independent variables (X_j) are measured without error, (c) the disturbance term is a random variable with mean zero and constant variance, (d) the disturbances are normally and independently distributed; and (e) the disturbances are not correlated.

β_0 is a constant parameter,

β_1 is the regression coefficient,

χ_{ij} is $\frac{P^s_{w_{t-1}}}{W_{t-1}}$, a continuous random variable,

$P^s_{w_{t-1}}$ is dollars per metric ton received for wheat in period t-1,

W_{t-1} is off-farm wage rate (dollars per month) in period t-1, and

ε_j is the disturbance term.

The coefficient β_1 is expected to be positive, indicating A_w declines as W increases relative to P^s_w.

Economic theory and knowledge of Japanese price support programs suggest that P^s_w and W are important determinants of area planted to wheat. Independent variable χ_{ij} is specified as a ratio because of the high degree of multicollinearity between support price and off-farm wage rate. In broad terms, multicollinearity is an expression of common cause running through many economic variables (17). Recall that price supports were initiated to raise farm income to the level of nonfarm workers. Thus, as off-farm wage rates increase, the support price increases in an effort to equalize farm and nonfarm incomes. If P^s_w and W were specified individually the separate influences of each variable would be shown by their respective coefficients. However, these

coefficients would not be very precisely estimated because of multicollinearity.

The following parameter estimates were obtained when ordinary least squares estimation was applied to the data in Appendix B, Table 2. Standard errors are given in parentheses under the estimates.

$$\hat{Y} = -481,775.78 + 944,074.91x \qquad R^2 = .976$$
$$\quad (56,103.46) \quad (54,986.42) \qquad t = 17.16$$

The regression coefficient (b_1) is significantly different from zero at the .005 level. A 95 percent confidence interval estimate of b_1 is defined as:

$$L(\beta_1) = b_1 \pm t_{\frac{\alpha}{2}} \sqrt{\hat{V}(b_1)}$$

where:

b_1 is the regression coefficient,

$t_{\frac{\alpha}{2}}$ is the tabular "t" statistic with n-2 degrees of freedom at the $\frac{\alpha}{2}$ probability level, and $\sqrt{\hat{V}(b_1)}$ is the standard error of b_1.

$$L(\beta_1) = 944,074.91 \pm 2.571\ (54,986.42)$$

$$L(\beta_1) = 802,704.81 \text{ to } 1,085,445.01$$

Wheat Policy Model

From 1943 to 1952 farmers were required to sell all wheat production with the exception of home consumption, to the Food Agency (23). Since 1953 the government has set the support price for wheat and purchased all that producers wish to sell to the Food Agency. Approximately 90 percent of the marketable home-grown wheat has been purchased by the Food Agency in recent years (12). The wheat is re-sold to millers at a lower price. Figure 11 illustrates supply and demand for wheat within Japan.

Government support price of domestic wheat, P_w^s, results in government purchases of quantity Q_2^w. Farmers supply to the government is indicated by SS. The government supply curve of domestic wheat to millers is $P_w^d B$. Total demand is indicated by D_T, while $D_T - D_D$ indicates demand for imported wheat. Individual demand estimates are unavailable for each class and grade of wheat used by Japanese millers. However, the relative price elasticity for all wheat has been estimated at -.42 for the period 1951-1955 and -.06 for 1956-1960 (10). While these estimates do not cover the period under investigation, they do suggest that the elasticity of demand for wheat was nearly zero after 1960 and support the assumption of vertical demand for the period 1963-1969.

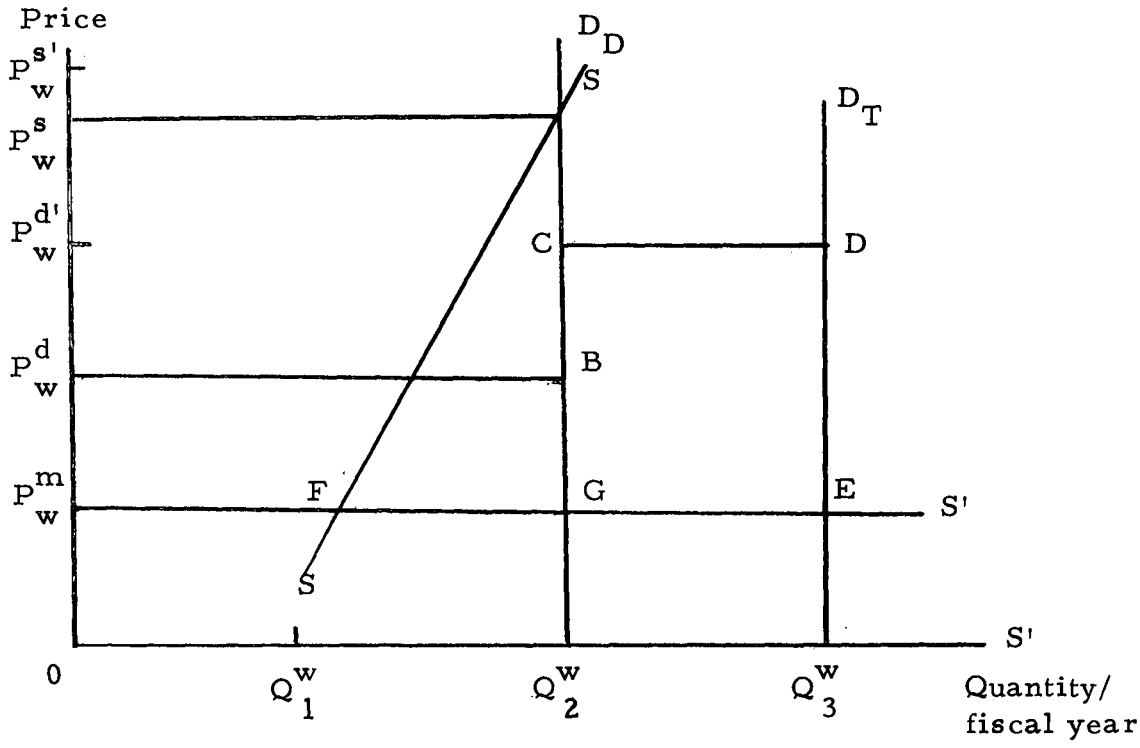

Figure 11. Japan : Wheat supply and demand

Japan is a state trader insofar as wheat and flour are concerned. Wheat and flour imports are subject to semiannual foreign exchange quotas.[11/] The government Food Agency decides how much wheat and flour will be imported, and from which countries. The actual importing is done by private Japanese traders who bid for import licenses. The bids are the prices at which importers sell wheat or flour to the Food Agency. The Agency

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11/ In 1969 the individual country quotas were officially discontinued. Presently the Japanese Food Agency states its willingness to purchase a certain quantity of a particular type of wheat. Then individual countries are free to compete for the sale.

re-sells the imported commodity in Japan at a higher price. Profit obtained from this "skimming" operation is used to help offset costs of Japanese rice and wheat price support programs (26). The Food Agency re-sells imported food wheat slighly higher than domestic wheat. In Figure 11, purchase price of imported wheat including freight and importer fee is P_w^m, while re-sale price is $P_w^{d'}$. The international supply curve of wheat, $P_w^m S'$ is assumed to be completely elastic. Japan is a major wheat importer, but Japanese imports averaged only five percent of world imports during 1964-1967 (11). The government supply curve of imported wheat to millers is CD.

The Japanese Food Agency also regulates the import of feed wheat. About 50 percent of the feed wheat is re-sold at a loss to small feed mills, with the Food Agency making a profit on wheat re-sold to larger more efficient feed mills. However, this study is concerned only with the food wheat program. Japanese wheat imports from the United States have been used primarily for food.[12/] The potential use of white wheat for feed will be discussed in Chapter V.

Chapter II has discussed food grain policies to be analyzed in

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12/ Approximately 70 percent have been food wheat imports for the period 1963-1969.

the remainder of the study. Currently the dominant instruments of Japanese food grain policy are price supports and state control of domestic and import purchases and sales. Chapter III will examine the effect of food grain policies upon farm income, consumer income, and the national budget. An analysis of these farm policy variables is crucial to understanding Japanese food grain policies. Food grain policies are determined by the political process, and future policies are likely to result from the effect of present policies upon farm income, consumer income, and the national budget.

III. BENEFITS AND COSTS OF INDIVIDUAL FOOD GRAIN PROGRAMS

Chapter III will examine the effects of Japanese wheat and rice policies upon (1) farm income transfer, (2) consumer transfer, and (3) budgetary balance. Each section contains a discussion of methodology and the presentation of results. All findings are calculated in U.S. dollars at ¥360 = $1.00.

The Japanese Government has embarked upon a program to make more nearly equal the distribution of income between farm and nonfarm workers. Determining the relative importance of additional money income to nonfarm and food grain producers is beyond the scope of this study. Therefore, income will be weighted equally whether spent by consumers or received by producers. Changes in income distribution as a result of wheat and rice programs will be analyzed as:

(1) Additions to food grain producers' incomes, and

(2) Incremental costs of wheat and rice to wholesalers.

Farm Income Transfer

In order to quantify the income added to total farm income as a result of government wheat and rice programs, a conceptual measure of the transfer will be developed. This will involve a

comparison of:

(1) Total money income received from food grains marketed under the price support programs, and

(2) Total money income which would have been received if domestic food grain prices had been equal to world food grain prices.

Total farm income transfer for each year will be obtained by summarizing additional income from the rice program and additional income from the wheat program. This approach will provide an indication of the relative importance of each program in the total farm income transfer.

Rice Program

Annual farm income transfer from the rice program is defined as (see Figure 10, Chapter II):

$$FIT_R = (P_r^s - P_r^m)(Q_4^r - Q_1^r)$$

where:

FIT_R is farm income transfer obtained from the rice program

P_r^s is support price of rice per metric ton,

P_r^m is landed price of imported rice per m.t.,[13/]

13/ Average government purchase price of imported rice (P_r^m) was obtained by dividing yearly value of imports by yearly

Q_1^r is quantity of imported rice per fiscal year, and

$(Q_4^r - Q_1^r)$ is quantity of domestic rice sold to the government.

The above definition was applied to individual years from 1963-1969. Table 1 indicates FIT_R has increased from $721 million in 1963 to $2 billion in 1969. Rising support prices coupled with relatively steady import prices have led to the continuous rise in FIT_R. The difference between support price and landed price has increased from $104.82 in 1963 to $209.53 in 1969. Support prices increased from $259.73 to $395.36 per m.t. during the same period, while landed price only increased from $134.08 to $165.00 per m.t. Appendix A, Table 1, contains data used in calculating FIT_R.

Wheat Program

Farm income transfer from the wheat program is defined as (see Figure 11, Chapter II):

$$FIT_W = P_w^s Q_2^w - P_{ww}^m Q_1^w$$

where:

FIT_W is farm income transfer from the wheat program,

P_w^s is farm support price of wheat per metric ton,

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volume of imports. This price reflects the average metric ton cost to the government, including freight and importer fee.

Table 1. Farm Income Transfer, Rice Program, JFY 1963-1969.

Fiscal year	$(P_r^s - P_r^m)$	$(Q_4^r - Q_1^r)$	FIT_R
	(dollars)	(metric tons)	(dollars)
1969	$209.53	9,600,000	$2,011,488,000
1968	206.43	10,044,174	2,073,720,164
1967	192.21	9,800,000	1,883,658,000
1966	167.07	9,820,000	1,640,627,400
1965	141.87	8,064,000	1,144,039,680
1964	120.49	7,203,000	867,889,470
1963	104.82	6,886,000	721,790,520

Q_2^w is quantity of domestic wheat sold to the government,

P_{ww}^m is landed price of White Wheat #2 per metric ton, and

Q_1^w is quantity of domestic wheat that would be produced at P_{ww}^m.

Quality differences between domestic and imported wheat are a potential source of error in calculating FIT_W. Accurate measurement requires comparison of domestic prices with the import price of equal quality wheat. To correct for quality differences the support price of Japanese wheat was compared to the landed price of Western White #2, which is most comparable to Japanese wheat. The landed price of W. W. #2 is below the average landed price of all classes of imported wheat. Thus FIT_W would be biased downward if domestic prices were compared with the average import price of all wheat.

Table 2 indicates that FIT_W increased from $21 million in 1963 to $107 million in 1968. The 1969 transfer was $99 million. Bad weather and poor yields caused the 1963 transfer to be exceptionally small. Table 2 also indicates Japanese farmers would have produced no wheat in 1968 or 1969 if the support price had been equal to the landed price of Western White #2. Area planted to wheat was estimated by the linear regression equation

$$Y = -481,755.78 + 944,074.91X^{14/}$$

where X is formed by the ratio $\frac{P^s_{w_{t-1}}}{W_{t-1}}$.

Table 2. Farm Income Transfer, Wheat Program, JFY 1963-1969.

Fiscal year	$(P^s_w Q^w_2)$	$(P^m_{ww} Q^w_1)$	FIT_W
	(dollars)	(dollars)	(dollars)
1969	99,107,928	0	99,107,928
1968	107,546,657	0	107,546,657
1967	99,773,280	1,249,818	98,523,462
1966	97,158,710	12,099,200	85,059,510
1965	99,788,580	25,850,380	73,938,200
1964	84,806,150	29,462,346	55,343,804
1963	41,371,110	19,735,680	21,635,430

Area that would be planted if support price was equal to import price is estimated by substituting P^m_{ww} for P^s_w in the above equation for

14/ This equation is discussed under "Wheat Production" Chapter II.

each year along with the W that existed in the corresponding year. Estimated area is multiplied by yield to obtain estimated yearly production. For instance, production at P^{m}_{ww} for 1966 is estimated in the following manner.

Given: $P^{m}_{ww_{1965}}$ = \$75.26 per m.t.

W_{1965} = \$129.44 per month

$Yield_{1966}$ = 2.432 m.t. per hectare

$$Y_{1966} = -481,755.78 + 944,074.91 \frac{\$75.26}{\$129.44}$$

Y_{1966} = 66,751.74 hectares

$Production_{1966}$ = 66,751.74(2.432)

$Production_{1966}$ = 162,340.23 metric tons

Appendix B, Table 3, contains estimated wheat production at import prices of Western White #2 for the period 1963-1969. Data employed in calculating FIT_W is contained in Appendix B, Table 4.

Total Farm Income Transfer

Total farm income transfer is a measure of additional income accruing to rice and wheat producers because of government price support activities. Figure 12 indicates that food grain price support programs are currently adding \$2 billion to Japanese

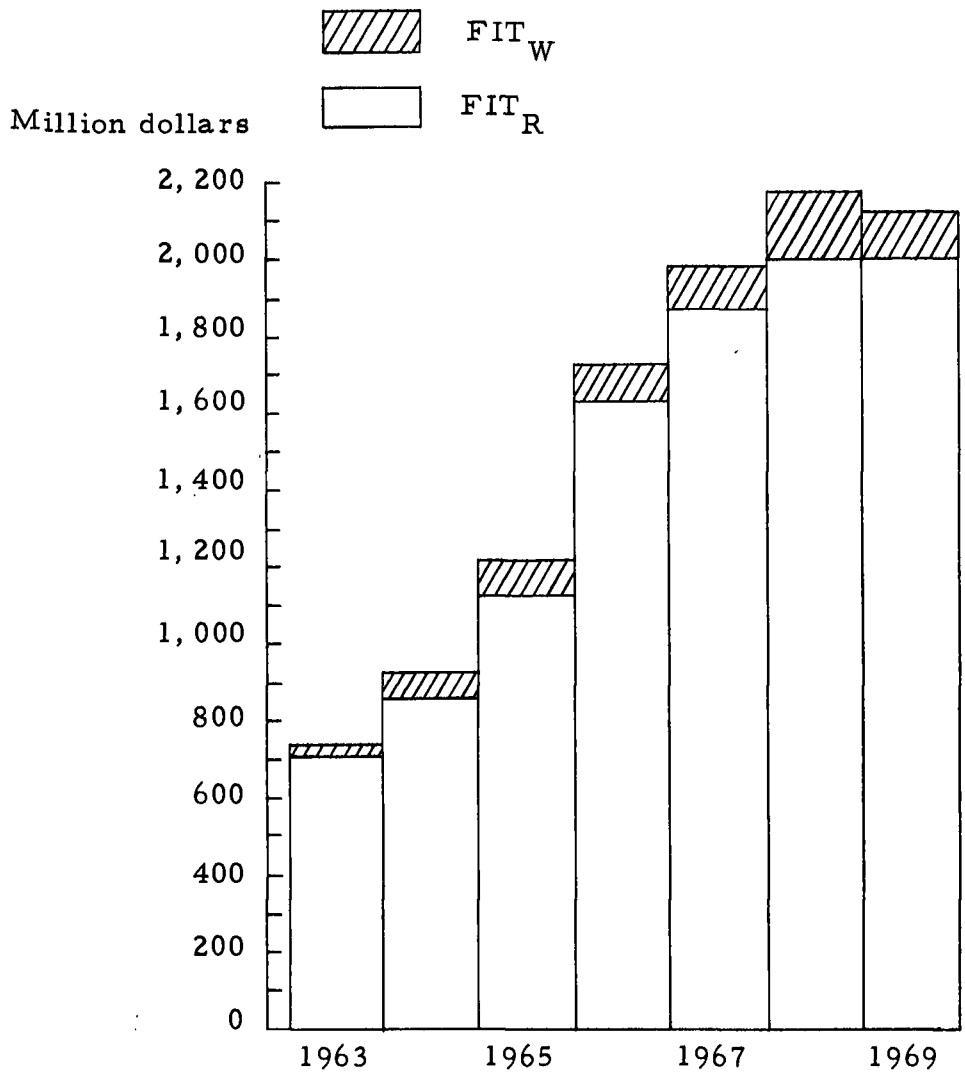

Figure 12. Total farm income transfer, JFY 1963-1969

farm income. This is approximately $174 per person engaged in farming operations, or $488 per household selling food grains. 15/

The rice program dominates farm income transfer because of high support prices and the large quantity of rice produced. Average 1969 farm price for brown rice (grade three) was $374.53 per metric ton compared to $165.00 per metric ton landed price for imported rice. Average 1969 farm price for wheat was $148.10 compared to $71.76 per metric ton landed price for imported food wheat.

Consumer Transfer

Food grain price supports are a social transfer payment with wheat and rice producers being supported by government budgetary deficits and higher consumer prices. Farm income transfer results in a government budgetary deficit because food grains are purchased at the high support price and re-sold at a lower price. To help reduce the deficit a policy is followed of re-selling domestic wheat and rice above the imported price of similar quality food grains. Thus, much of the potential budgetary

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15/ Based upon the following estimates (16, 12):
(1) 5,400,000 farm households with 80 percent selling food grains.
(2) 2.8 members per farming household.

deficit from price support activities is transferred to consumers in the form of higher wheat and rice prices.

Additional expense is originally incurred by millers (for wheat) and processors (for rice). The exact additional cost is assumed to be passed on to consumers. Consumer transfer will involve a comparison of:

(1) Expense resulting from purchasing wheat and rice at government re-sale price, and

(2) Expense which would have resulted from purchasing wheat and rice at import prices.

Rice Program

Consumer transfer from the rice program is defined as (see Figure 10, Chapter II):

$$CT_R = [(P_r^d - P_r^m)\ Q_2^r] + [(P_r^{d'} - P_r^m)(Q_3^r - Q_2^r)]$$

where:

CT_R is additional consumer expense resulting from the rice program,

P_r^d is government re-sale price of domestic rice per metric ton, excluding a small container charge,

$P_r^{d'}$ is government re-sale price of imported rice per metric ton,

P_r^m is landed price of imported rice per metric ton,

Q_2^r is quantity of domestic rice demanded, and

$(Q_3^r - Q_2^r)$ is quantity of imported rice.

Detailed purchase information was unavailable for rice so quality adjustments were not made between domestic and imported rice. Table 3 indicates the rice program is costing Japanese consumers approximately $1.7 billion annually. The increase in CT_R from the 1963 low of $803 million has resulted from increases in government re-sale prices. Re-sale price for domestic rice increased from $242.81 per m.t. in 1963 to $348.39 per m.t. in 1969. The re-sale price of imported rice increased somewhat more, from $207.42 per m.t. to $240.00 per m.t.[16/] During the same period landed price of imported rice only increased from $134.08 per m.t. to $165.00 per m.t. Appendix A, Table 1, contains data used to calculate CT_R.

Wheat Program

Consumer transfer from the wheat program is defined as (see Figure 11, Chapter II):

$$CT_W = [(P_w^d - P_w^m)\, Q_2^w] + [(P_w^{d'} - P_w^m)(Q_3^w - Q_2^w)]$$

where:

[16/] 1968 re-sale price of imported rice was $243.00 per m.t.

CT_W is additional consumer expense resulting from the wheat program,

P_w^d is government re-sale price of domestic wheat per metric ton,

$P_w^{d'}$ is government re-sale price of imported food wheat per metric ton,

P_{ww}^m is government import price of Western White #2 per unit,

P_w^m is average import price of all food wheat per metric ton,

Q_3^w is total quantity of wheat demanded, and

Q_2^w is quantity of domestic wheat sold to the government.

A quality adjustment was made by comparing government re-sale price of domestic wheat to the landed price of Western White #2. Table 4 indicates the wheat program is costing Japanese consumers $92 million annually. Approximately 84 percent of CT_W results from the government policy of selling imported wheat for a profit. Appendix B, Table 4, contains data used in calculating CT_W.

Total Consumer Transfer

Total consumer transfer is a measure of additional expense accruing to consumers as a result of government food grain policies. Figure 13 indicates Japanese food grain programs are costing consumers $1.8 billion per year in higher wheat and rice prices. This is an average cost of $18 per year for each of Japan's

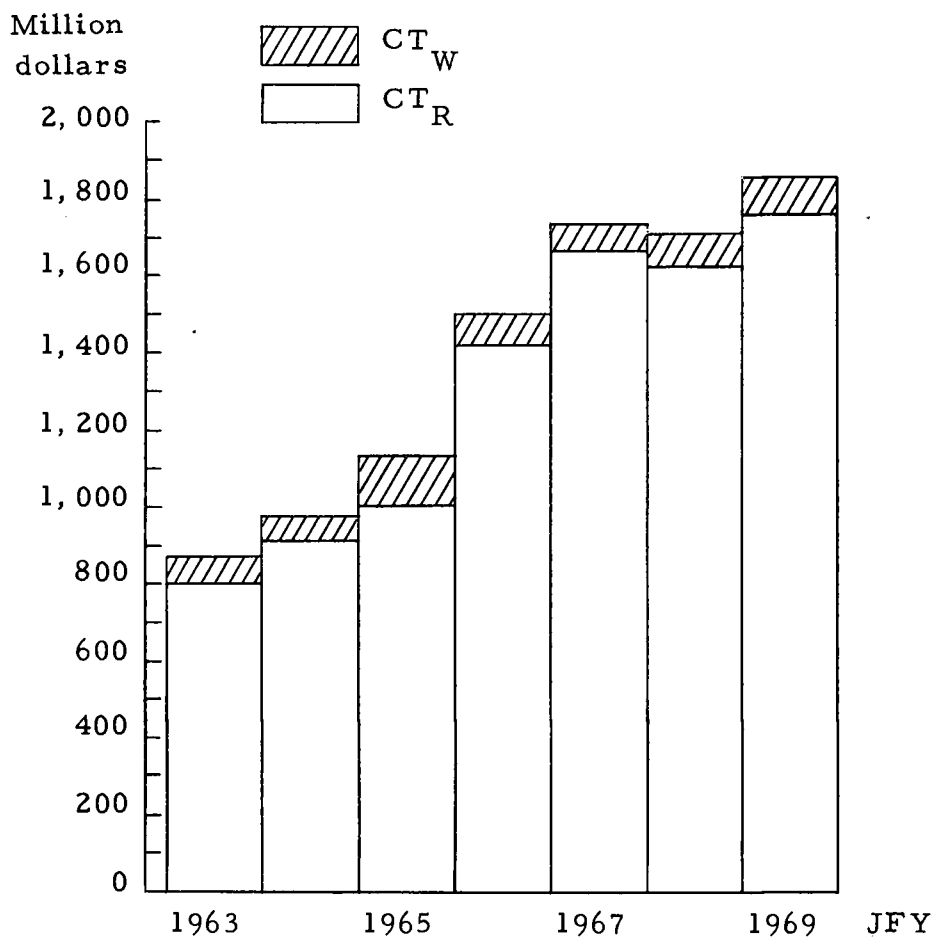

Figure 13. Total consumer transfer, JFY 1963-1969

Table 3. Consumer Transfer, Rice Program, JFY 1963-1969.

Fiscal year	Domestic (dollars)	Imports (dollars)	Total (dollars)
1969	1, 760, 544, 000	3, 750, 000	1, 764, 294, 000
1968	1, 621, 303, 841	13, 414, 500	1, 634, 718. 341
1967	1, 640, 470, 500	30, 734, 025	1, 671, 204, 525
1966	1, 375, 199, 750	53, 399, 664	1, 428, 599, 414
1965	994, 315, 390	72, 094, 014	1, 066, 409, 404
1964	874, 847, 280	44, 337, 025	919, 184, 305
1963	781, 116, 320	22, 179, 116	803, 295, 436

Table 4. Consumer Transfer, Wheat Program, JFY 1963-1969.

Fiscal year	Domestic (dollars)	Imports (dollars)	Total (dollars)
1969	15, 204, 133	77, 419, 990	92, 624, 123
1968	15, 988, 588	61, 629, 740	77, 618, 328
1967	12, 486, 020	58, 228, 901	70, 714, 921
1966	11, 408, 760	62, 671, 832	74, 080, 592
1965	12, 335, 400	54, 455, 709	66, 791, 109
1964	10, 589, 150	51, 983, 601	62, 572, 751
1963	6, 639, 270	61, 490, 775	68, 130, 045

approximately 100 million consumers. Approximately 95 percent of total consumer transfer results from the rice program.

In 1969 processors were required to pay $348. 39 per metric ton for 9, 600, 000 tons of domestic rice and $240. 00 per metric ton for 50, 000 tons of imported rice. These prices compare to $165. 00 per metric ton acquisition price for imported rice.

Millers were required to pay $89.86 per metric ton for 669,196 metric tons of domestic wheat and $98.39 for 3,203,144 tons of imported food wheat. This compares to $71.76 per metric ton average landed price for imported food wheat.

Budgetary Balance

Budgetary balance is a measure of net government cost resulting from the wheat and rice programs. This involves comparison of:

(1) Government budgetary deficit caused by re-selling domestic wheat and rice below the purchase (support) price,

(2) Government handling cost of imported and domestic grain, and

(3) Government revenue gained from re-selling imported wheat and rice at a profit.

Budgetary balance resulting from the wheat and rice programs will be presented in this chapter.

Rice Data

Government purchase price of domestic rice is based upon the national average purchase price of brown rice (grade 3), including a purchase charge. From 1963-1967, carryover from period t-1

supplied between one-third to one-half of domestic rice demand in period t. Thus government purchase price (P_r^s) of domestic rice sold in period t is a weighted average of the purchase price of carryover and the purchase price of current production. Weighting is based upon the proportion of carryover and current production sold during period t. This reflects the government's first-in-first-out inventory policy. After 1967 the inventory policy became last-in-first-out. Government purchase price of domestic rice sold to processors in 1968 and 1969 is the price paid for domestic production during the respective years.

Rice Program

Budgetary balance of the rice program is defined as (see Figure 10, Chapter II):

$$BB_R = [P_r^d Q_2^r - P_r^{s'} (Q_4^r - Q_1^r)] + [(P_r^{d'} - P_r^m)(Q_3^r - Q_2^r)] - (H_d^c Q_2^r) - [H_i^c (Q_3^r - Q_2^r)]$$

The above definition includes (1) cost of supporting domestic rice prices, (2) revenue from "skimming", and (3) cost of handling domestic and imported rice. The cost of supporting domestic rice prices is defined as :

$$[P_r^d Q_2^r - P_r^{s'} (Q_4^r - Q_1^r)]$$

where:

$P_r^{s'}$ is government cost per metric ton of domestic rice, including a purchasing charge. Therefore $P_r^{s'} > P_r^s$.

Government "skimming" revenue results from purchasing imported rice and selling to middlemen at a higher price. Revenue obtained from "skimming" operations is defined as:

$$[(P_r^{d'} - P_r^m) (Q_3^r - Q_2^r)]$$

Handling cost for domestic rice is defined as:

$$H_d^c Q_2^r$$

where:

H_d^c is government handling cost per metric ton of domestic rice, including transportation, storage, and administrative costs. H_d^c is assumed constant at \$27.74 per metric ton from 1963-1969 (3).

Handling cost for imported rice is defined as:

$$H_i^c (Q_3^r - Q_2^r)$$

where:

H_i^c is government handling cost per metric ton of imported rice, including storage, transportation, and administrative costs. H_i^c is assumed constant at \$9.70 per metric ton from 1963-1969 (3).

Table 5 indicates budgetary balance of the rice program for the period 1963-1969. The budgetary deficit ranges from \$224 million to \$993 million with the 1969 deficit being \$713

Table 5. Budgetary Balance, Rice Program, Japanese Fiscal Year 1963-1969[1/]

Japanese Fiscal Year	A Purchase Price: Domestic dollars/metric ton	B Re-Sale Price: Domestic dollars/metric ton	C Purchase Price: Imported dollars/metric ton	D Re-Sale Price: Imported dollars/metric ton	E Domestic Rice Purchased metric ton	F Rice Imported metric ton	G Domestic Rice Handling Cost dollars	H Imported Rice Handling Cost dollars	I Purchase Minus Re-Sale Domestic Rice (deficit) dollars	J Re-Sale Minus Purchased: Imported Rice (surplus) dollars	K Budgetary Balance of Total Rice Program[2/] dollars
1969	395.36	348.39	165.00	240.00	9,600,000	50,000	266,304,000	485,000	450,912,000	3,750,000	-713,951,000
1968	395.29	343.00	168.00	243.00	10,044,174	178,860	265,809,507	1,734,942	739,252,467	13,414,500	-993,382,416
1967	378.04	335.35	165.00	240.00	9,800,000	407,787	267,136,200	3,974,934	475,371,500	30,734,025	-715,748,609
1966	349.53	317.46	161.63	239.50	9,820,000	685,754	244,805,500	6,651,814	630,800,100	53,399,644	-828,857,750
1965	317.36	287.75	154.66	234.55	8,064,000	902,416	207,245,540	8,753,435	406,507,750	72,173,904	-550,332,821
1964	285.68	263.74	144.36	213.10	7,203,000	644,996	202,945,840	6,256,461	126,768,000	44,337,025	-291,633,276
1963	259.73	242.81	134.08	207.42	6,886,000	302,415	199,284,160	2,933,426	44,153,740	21,876,701	-224,494,625

1/ Japanese Fiscal Year, 1969, estimated.

2/ K = J - I - H - G

Sources: (12)

million.[17]

Rice imports have declined from a high of 902, 416 m. t. in 1965 to 50, 000 m. t. in 1969. The result has been corresponding declines in handling cost and "skimming" revenue. Handling costs[18] have declined from $8 million to $485 thousand while "skimming" revenue has been reduced from $72 million to $3 million.

Domestic price support and handling costs dominate the budgetary deficit. Costs associated with price support activities range from $44 million to $739 million with the 1969 cost being $450 million. Handling costs have ranged from $199 million to $267 million with 1969 handling cost being $266 million.

Government "skimming" operations cause the budgetary deficit to be negatively related to imports. Increasing imports results in increasing government revenue. However, government price support policy causes the budgetary deficit to be positively related to domestic production. So increasing domestic production and decreasing imports result in a larger budgetary deficit.

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[17] Does not include handling cost for approximately 5, 100, 000 metric tons of stored rice on hand at end of 1969.

[18] Handling costs are only calculated for quantity sold by the government.

Wheat Data

The support price of domestic wheat is based upon average price received for class 2, grade 3. Prices coincide with quantities purchased and sold during the Japanese fiscal year because total budgetary balance is calculated on a fiscal year basis.

Optimally, average purchase and re-sale prices of imported wheat would be based upon each class imported. Although information of such detail was unavailable, purchase and re-sale prices were obtained for the dominant class of wheat imported from each of Japan's major suppliers.

Primary sources of Japanese food wheat imports include the United States, Canada, and Australia. The dominant classes of wheat imported from these countries are: Western White #2, Manitoba #3, and Fair Average Quality (West), respectively. The weighted price of imported wheat was obtained by multiplying JFY food wheat imports from each country times price of the dominant class of wheat from each country. The total was divided by total JFY food wheat imports to obtain average JFY price of imported wheat. The re-sale price of imported wheat was calculated by multiplying food wheat imports from each country by the re-sale price of the dominant class imported from each country. The total was divided by total yearly food wheat imports to obtain

average re-sale price of imported wheat.

Wheat Program

Budgetary balance of the wheat program is defined as (see Figure 11, Chapter II):

$$BB_W = [(P_w^d - P_w^{s'})\, Q_2^w] + [(P_w^{d'} - P_w^m)(Q_3^w - Q_2^w)]$$

$$- H_d^c\, Q_2^w - H_i^c\, (Q_3^w - Q_2^w)$$

This definition includes (1) cost of supporting domestic wheat prices, (2) revenue from "skimming" operations, and (3) cost of handling domestic and imported wheat. The cost of supporting domestic wheat prices is defined as:

$$[(P_w^d - P_w^{s'})\, Q_2^w]$$

where:

$P_w^{s'}$ is government cost per metric ton of domestic wheat, including a charge for inspection and packing. Therefore, $P_w^{s'} > P_w^s$.

Revenue obtained from "skimming" operations is defined as:

$$[(P_w^{d'} - P_w^m)\, (Q_3^w - Q_2^w)]$$

Handling cost for domestic wheat is defined as:

$$H_d^c\, Q_2^w$$

where:

H_d^c is government handling cost per metric ton for domestic wheat, including storage, transportation, and administrative costs. H_d^c is assumed constant at $17.29 per metric ton from 1963-1969 (3).

Handling cost for imported wheat is defined as:

$$H_i^c (Q_3^w - Q_2^w)$$

where:

H_i^c is government handling cost per metric ton for imported wheat, including storage, transportation, and administrative costs. H_i^c is assumed constant at $4.34 per metric ton from 1963-1969 (3).

Government budgetary balance from the wheat program has been subject to considerable variation, from a $33.8 million surplus in 1963 to a $7.8 million deficit in 1967. Table 6 emphasizes the contribution of imported wheat toward obtaining a budgetary surplus. A high import dependency rate has contributed substantially to the budgetary surplus. Food wheat import dependency rate is calculated by dividing food wheat imports by domestic production plus food wheat imports. The 1969 import dependency rate was 77.98 percent.

Total Budgetary Balance

Total budgetary balance has been a continuous deficit from

Table 6. Budgetary Balance, Wheat Program, Japanese Fiscal Year, 1963-1969[1].

Japanese Fiscal Year	A Purchase Price: Domestic dol. /metric ton	B Re-Sale Price: Domestic dol. /metric ton	C Purchase Price: Imported dol. /metric ton	D Re-Sale Price: Imported dol. /metric ton	E Domestic Wheat Purchased metric tons	F Food Wheat Imported metric tons	G Domestic Wheat Handling Costs dollars	H Imported Wheat Handling Costs dollars	I Purchase Minus Re-Sale Domestic Wheat (deficit) dollars	J Re-Sale Minus Purchase Imported Wheat (surplus) dollars	K Budgetary Balance of Total Wheat Program[2] dollars
1969	153.68	89.86	71.76	97.39	669,196	3,203,144	11,570,399	13,901,645	42,708,088	77,419,970	9,239,858
1968	149.19	89.86	75.17	97.35	748,880	2,779,871	12,948,135	12,064,640	44,431,050	61,629,740	-7,814,086
1967	144.54	89.86	76.43	97.65	718,000	2,742,765	12,414,220	11,903,600	39,260,240	58,228,901	-5,349,159
1966	137.41	90.01	77.90	98.17	737,000	3,090,327	12,742,730	13,412,019	34,933,800	62,671,832	1,588,282
1965	130.01	90.66	78.39	98.95	801,000	2,648,624	13,849,290	11,495,028	31,631,490	54,455,704	-2,520,099
1964	124.19	91.25	78.37	100.11	715,000	2,391,150	12,362,350	10,377,591	23,552,100	51,983,601	5,691,560
1963	119.55	91.25	76.35	100.40	363,00	2,556,789	6,276,270	11,096,464	10,272,900	61,490,775	33,845,141

[1] 1969 estimated.

[2] K - J - I - H - G

Sources: (12, 13, 31, 35)

1963-1969.[19] Occasional budgetary surpluses from the wheat program have not offset continuous rice program deficits. Figure 14 indicates the 1969 budgetary deficit was $704 million, down from the 1968 high of $1 billion. The budgetary deficit involves a government expenditure of approximately $7 for each of Japan's estimated 100 million consumers. Total cost of the food grain programs per consumer (consumer transfer plus budgetary deficit) is estimated to be $21 per year.[20]

Potential Effect of the International Grains Arrangement (I. G. A.)

The International Grains Arrangement went into effect July 1, 1968, for a period of three years. This Arrangement replaced the International Wheat Agreement which expired July 30, 1967. The I. G. A. resulted from agreements reached in the Kennedy Round negotiations conducted within the framework of the

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[19] Total budgetary balance does not include government expenditure for food grain research, education, land development or advisory services.

[20] For an estimate of annual budgetary and excess food costs resulting from E. E. C. agricultural policy see (18). The Kruer and Bernston study includes costs of all agricultural programs so the results are not directly comparable with those of the present study.

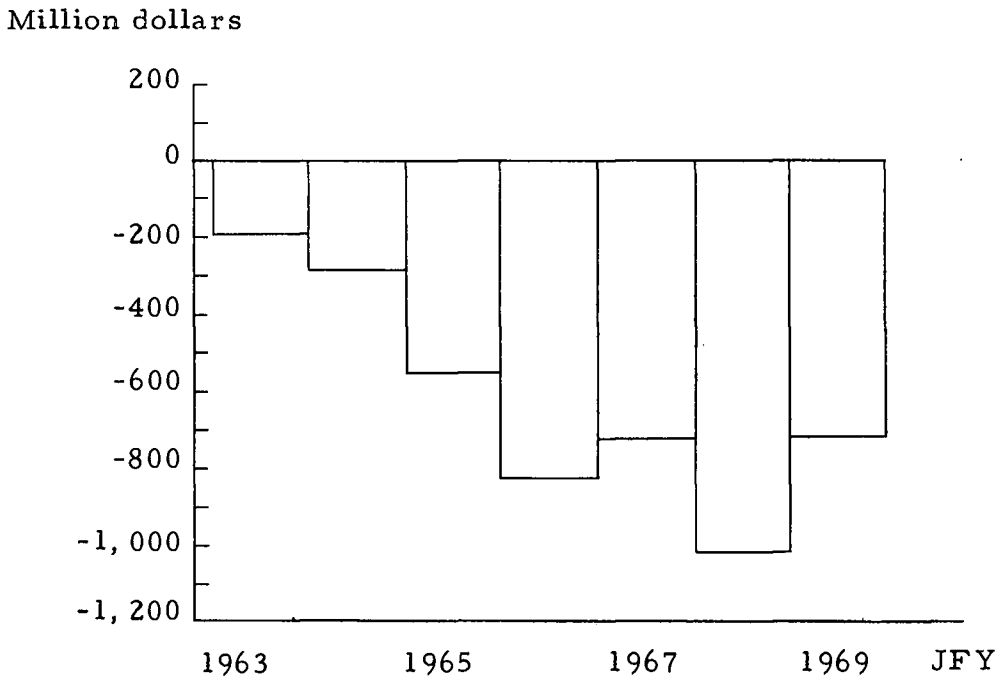

Figure 14. Total budgetary balance, JFY 1963-1969

General Agreement on Tariffs and Trade (32).

The I. G. A. consists of two parts, a Wheat Trade Convention and a Food Aid Convention. The Wheat Trade Convention set minimum and maximum prices for 14 major wheats moving in world trade. The minimum prices were higher than those established under the I. W. A. For instance, the minimum prices for most wheats, under the new Arrangement, were about 20 cents a bushel higher than the minimum under the I. W. A.

Failure to maintain the minimum prices has led to the collapse of the Wheat Trade Convention. Although a detailed analysis of factors leading to the collapse is beyond the scope of this study, the previous framework can be employed to study the potential impact of the I. G. A. upon FIT_W, CT_W, and BB_W within Japan.

Japanese fiscal year 1966 was chosen to illustrate the potential effect of the I. G. A. Raising world wheat prices 20 cents per bushel would have increased the 1966 landed price of Western White #2 (P^m_{ww}) from \$74.53 to \$81.88 per metric ton. The average landed price of all food wheat (P^m_w) would have increased from \$77.90 to \$85.25 per metric ton. Estimated area that would have been planted in wheat at a price of \$81.88 increased to 114,899 hectares. This raised estimated 1966 production (Q^w_1) from 162,340 m. t. to 279,434 m. t.

The impact of higher world wheat prices and greater domestic production would have decreased farm income transfer (wheat) 13 percent; from $85 million to $74 million. Consumer transfer (wheat) would have registered a 38 percent decline; from $74 million to $46 million. The greatest potential impact of I. G. A. upon Japanese wheat policy is reflected in the budgetary balance. The government budgetary balance (wheat) for 1966 under I. G. A. prices would have been a $21, 161, 525 deficit compared to the non-I. G. A. surplus of $1, 588, 282.

Chapter III has provided estimates of farm income transfer, consumer transfer, and budgetary balance associated with Japanese wheat and rice programs. Chapter IV will provide several additional measures for evaluating Japanese food grain policies.

IV. ADDITIONAL EVALUATIVE MEASURES OF JAPANESE FOOD GRAIN POLICIES

The preceding chapter provided measurements of absolute and relative effects of Japanese food grain policies upon: (1) farm income transfer, (2) consumer transfer, and (3) budgetary balance. Absolute measures are helpful when studying an individual country, but they can be misleading when comparing food grain policies of various countries. For example, a large absolute farm income transfer may be the result of a small subsidy rate to a large agricultural sector. Therefore, comparing absolute values among countries becomes somewhat misleading. To facilitate inter-country comparisons, Chapter IV will express the effect of Japanese food grain policies in terms of:

(1) Equivalent degree of producer protection,

(2) Equivalent rate of producer subsidy,

(3) Equivalent excise tax, and

(4) Equivalent Food Agency revenue tariff.

Equivalent Degree of Producer Protection

The use of official tariff rates to indicate trade barriers encounters many difficulties. In his early work Harberler suggests the different methods used to measure tariff rates make the concept ambiguous. He mentions the following ways to

measure tariff heights and their disadvantages:

(1) Protected imports as a percentage of total imports,

(2) Import duties as a percentage of total value of protected imports, and

(3) Import duty as a percentage of the value of the protected good (8).

The first two methods do not consider the prohibitive effect of tariffs. An extremely high tariff which prevents importing will result in a low degree of protection. The third method is not completely satisfactory because the price of the commodity which forms the basis for the tariff computation cannot be regarded as constant. The import duty may have influenced the commodity price. Nevertheless, Harberler considered the third method to be most reliable, but he emphasized that nontariff barriers were also an important aspect of protection. Nontariff barriers include such devices as:

(1) State trading,

(2) Import quotas, and

(3) Health regulations.

Table 7 shows the proportion of domestic agricultural production, and wheat and rice production, protected by nontariff trade barriers in selected countries around 1960.

Table 7. Proportion of the Value of Domestic Agricultural Production and Wheat and Rice Production Protected by Nontariff Trade Barriers in Selected Countries a/

Country	Domestic agricultural production	Rice and wheat
	(percent)	(percent)
Australia b/	41	100
Canada c/	41	87.98
Japan d/	76	100
United Kingdom c/	37	0
United States c/	26	21.59

a/ Source (29).
b/ Crop year 1961-62.
c/ Calendar year 1961
d/ Japanese fiscal year 1959.

The importance of nontariff trade barriers led Harberler to later suggest that:

> "In principle the best way of measuring the degree of total protection given to any line of agricultural production in any country by the combination of protective devices used in that country would be to measure the percentage change by which the price (including any subsidy) received by the domestic producer exceeded the price at which the product was available from foreign suppliers or could be sold to foreign consumers." (9, p. 83)

This concept leads to the measurement of an equivalent tariff, which is a tariff having the same effect on volume of imports as existing trade restrictions (7).

A review of current literature indicates the acceptance of Harberler's suggestion. The equivalent tariff concept was used

in 1961 by the United Nations to study protective margins for temperate zone agricultural commodities for Western European countries (27). Gavin McCone had previously used the equivalent tariff concept to estimate agricultural protection in Western Europe for 1955-56. His estimate of the equivalent tariff was the difference in the value of output measured at the prices received by farmers and the value of output at import prices of the same year (21). This is a percentage tariff, and is calculated as:

$$\frac{P-I}{P} \times 100$$

where:

P is producer price of a commodity, and

I is imported price of the same commodity.

Dardis and Learn also used the percentage equivalent tariff concept to study the degree of protection of agriculture in selected countries. They defined the equivalent tariff as:

> "the difference between producer and world market prices where the latter represent prices for which the commodity is traded on the world market." (5, p. 6)

D. Gale Johnson retained the equivalent tariff concept but slightly modified the estimation procedure. Johnson calculated degree of protection based upon imported price instead of producer price (14). This provides an ad valorem equivalent tariff, which is calculated as:

$$\frac{P-I}{I} \times 100$$

where:

P is producer price of a commodity, and

I is imported price of the same commodity.

The Japanese Government relies exclusively upon nontariff barriers to control imports of wheat and rice. For this reason a study of Japanese food grain policies necessitates the use of the equivalent tariff concept. Degree of protection to Japanese food grain producers will be expressed as an equivalent ad valorem tariff. The theoretical relationship between ad valorem and percentage tariffs will also be provided to facilitate comparison of the present findings with a greater number of other studies.

Many discussions of deviations from free trade compare domestic prices to "world" or import prices. For this reason the present study emphasizes the equivalent ad valorem tariff because it compares price differential to import price. Import price should include all costs associated with getting a commodity to the importing country. Tariff rates calculated with free-on-board import prices will be biased upward.

There are two potential sources of error when comparing the present findings with those of other studies. First, price comparisons should be made at the same marketing level. In the present study producer price is defined as the gross price received by the

farmer. Imports are valued at cost, insurance, freight, and importers fee. Thus import prices are higher than world prices, or the free-on-board prices of exporting countries.

The use of import prices to measure degree of protection assumes that such prices will remain relatively constant when protection is removed. The validity of this assumption depends on the elasticity of supply and the extent to which production controls and surplus disposal policies have affected quantities placed on the world market. This assumption applies to the "partial effect" caused by one country discontinuing price supports. If all countries simultaneously returned to free trade the assumption of constant world prices would probably be invalid.

A second source of error involves quality differences between domestic and foreign production. If the assumption of uniform quality is not valid the equivalent tariff will not accurately reflect degree of protection. When domestic production is of inferior quality the degree of protection will be understated, and conversely. In the present study, quality data were unavailable for imported rice. However, detailed quality data were available for wheat imports (35). Western White #2 is generally considered to be of slightly higher quality than Japanese wheat. Nevertheless, W. W. #2 is probably more comparable to Japanese wheat than other classes. For this reason Japanese wheat was compared with W. W. #2 in

calculating equivalent tariff rates.

Rice

Equivalent tariff rates will be used as a measure of the degree of protection from international competition. The ad valorem equivalent tariff rate is defined as:

$$T_R^A = \frac{(P_r^s - P_r^m)}{P_r^m} \times 100$$

where:

T_R^A is equivalent ad valorem tariff rate,

P_r^m is price of imported rice per metric ton, and

P_r^s is producer price of rice per metric ton.

Table 8 indicates the ad valorem tariff increased from 78.18 percent in 1963 to 122.89 percent in 1968. The 1969 rate was 121.62 percent. A steady increase in support prices has led to the rise in equivalent ad valorem rates. Import price increases from $134.08 to $169.00 per m. t. during the 1963-1969 period were overshadowed by support price increases from $238.90 to $374.53 per m. t.

Degree of protection from international competition can also be expressed as an equivalent percentage tariff. A percentage tariff compares price differential to the producer price. The equivalent percentage tariff increased from 43.88 percent in 1963

Table 8. Producer Subsidy Rate and Degree of Tariff Protection, Rice Program, JFY 1963-1969.

Fiscal year	Producer price P_r^s	Government re-sale price (domestic) P_r^d	Landed price (imported) P_r^m	Price differential (subsidy) $(P_r^s - P_r^d)$	Price differential (tariff) $(P_r^s - P_r^m)$	Equiv. ad val. tariff rate	Producer equiv. subsidy rate
	($/m.t.)	($/m.t.)	($/m.t.)	($)	($)	(%)	(%)
1969	374.53	348.39	169.00	26.14	205.53	121.62	7.50
1968	374.46	337.20	168.00	37.26	206.46	122.89	11.05
1967	357.21	335.35	165.00	21.86	192.21	116.49	6.52
1966	328.70	317.46	161.63	11.24	166.83	103.22	3.54
1965	296.53	287.75	154.66	8.78	141.87	91.73	3.05
1964	264.85	263.94	144.36	.91	120.49	83.46	.34
1963	238.90	242.81	134.08	-3.91	104.82	78.18	-1.61

to 55.14 percent in 1968. The 1969 rate was 54.88 percent.

The theoretical relationship between percentage and ad valorem tariffs is obtained by the following formula:

$$P = \frac{A}{1 + A}$$

where:

A is ad valorem tariff, and

P is percentage tariff.

Wheat

Imported prices of Western White #2 are used to correct for quality differences when computing equivalent tariffs for wheat. The ad valorem tariff is defined as:

$$T_W^A = \frac{(P_w^s - P_{ww}^m)}{P_{ww}^m} \times 100$$

where:

T_W^A is equivalent ad valorem tariff rate,

P_w^s is support price of wheat per metric ton, and

P_{ww}^m is import price of Western White #2 per metric ton, including cost, insurance, freight and importers fee.

Table 9 indicates that rising support prices and falling import prices of Western White #2 have caused the equivalent ad valorem

Table 9. Producer Subsidy Rate and Degree of Tariff Protection, Food Wheat Program, JFY 1963-1969.

Fiscal year	Producer price P_w^s	Govt. re-sale price P_w^d	Landed W.W.#2 P_{ww}^m	Price differential (subsidy) $(P_w^s - P_w^d)$	Price differential (tariff) $(P_w^s - P_{ww}^m)$	Equivalent ad valorem tariff rate	Producer equivalent subsidy rate
	($/m.t.)	($/m.t.)	($/m.t.)	($)	($)	(%)	(%)
1969	148.10	89.86	67.14	58.24	80.96	120.58	64.81
1968	143.61	89.86	68.51	53.75	75.10	109.62	59.82
1967	138.96	89.86	72.47	49.10	66.49	91.75	54.64
1966	131.83	90.01	74.53	41.82	57.30	76.88	46.46
1965	124.58	90.66	75.26	33.92	49.32	65.53	37.41
1964	118.61	91.25	76.44	27.36	42.17	55.17	29.98
1963	113.97	91.25	72.96	22.72	41.01	56.21	24.90

tariff to increase from 56.21 percent in 1963 to 120.58 percent in 1969. The 1969 equivalent ad valorem rate was 106.38 percent based upon average import price of all food wheat. This illustrates the error introduced by failure to correct for quality differences in wheat.

The equivalent percentage tariff rate comparing price differential to support price increased from 35.98 percent in 1963 to 54.67 percent in 1969. The 1969 percentage tariff uncorrected for quality differential is 51.55 percent.

Dardis and Learn used an equivalent percentage tariff to measure degree of protection given wheat by various importing and exporting countries (5). Quality corrections were made by reducing import prices by 12 percent. The degree of protection for exporting countries was calculated using export prices (f.o.b.). Because Dardis and Learn's findings were calculated for 1960, they will only be compared with the early years of the present study. Unfortunately, more recent comparable studies are not known to exist.

Table 10 shows the degree of protection to be greater in Japan than in other countries during the early 1960's. Degree of protection is calculated as an equivalent percentage tariff. To facilitate comparison with f.o.b. prices used by Dardis and Learn the import price of Western White #2 was reduced $11 per metric ton

Table 10. Degree of Protection in Selected Countries, Wheat. 1/

Country	Producer price P	Import or export price T	Gross margin (P-T)	Equivalent percentage tariff
	($/m. t.)	($/m. t.)	($/m. t.)	(%)
Japan:				
1963	113.97	61.96	52.01	45.63
1964	118.61	65.44	53.17	44.83
Importing countries:				
Italy (soft)	106.50	63.30	43.20	41
United Kingdom	73.60	61.80	11.80	16
West Germany	99.20	59.10	40.10	40
Exporting countries:				
Canada	51.10	63.80	-12.70	-25
France	75.60	64.50	11.10	15
United States	64.30	62.10	2.20	3

1/ 1960 for all countries except Japan.

2/ Source for importing and exporting countries (5).

(i. e., $4 transportation and $7 importers fee).

Equivalent Producer Subsidy

The Food Agency does not make an actual subsidy payment to food grain producers. However, the policy of supporting farm prices above re-sale prices results in a farm income transfer similar to that obtained from a subsidy. Equivalent producer subsidy rates associated with farm income transfer will be calculated

for wheat and rice. Comparison of equivalent subsidy rates are subject to the price errors discussed in connection with equivalent tariff rates. Price comparisons should be made at the same marketing level and on identical products.

Rice

The equivalent rate of subsidy to rice producers involves a comparison of government purchase and re-sale prices of domestic rice.

$$S_R = \frac{(P_r^s - P_r^d)}{P_r^d} \times 100$$

where:

S_R is equivalent subsidy payment rate to rice producers, and

P_r^d is government re-sale price of domestic rice per metric ton.

Table 8 shows rice producer equivalent subsidy rates for JFY 1963-1969. In 1969 Japanese rice producers received an equivalent subsidy of 7.50 percent, compared to the 1968 high of 11.05 percent. The 1963 subsidy was -1.61 percent, indicating support price was below government re-sale price.

Wheat

The subsidy payment rate comparing government support and re-sale price of food wheat is defined as:

$$S_W = \frac{(P^s_w - P^d_w)}{P^d_w} \times 100$$

where:

S_W is equivalent subsidy payment rate, and

P^d_w is government re-sale price of domestic food wheat per metric ton.

Wheat producers are currently receiving an equivalent subsidy of 64.81 percent above government re-sale price. Table 9 indicates equivalent subsidy rates have increased steadily from the 1963 low of 24.90 percent.

Equivalent Excise Tax Rate

Consumer transfer has been described as the loss of consumer income resulting from Japanese food grain policies. Loss of income is the result of Food Agency re-sale prices of domestic and imported food grains being higher than acquisition price of imported food grains. The difference between Food Agency re-sale price and acquisition price is equivalent to a tax which processors

pay when purchasing wheat and rice.[21/] Domestic and imported food grains require payment of the equivalent tax.

Rice

Equivalent ad valorem consumer tax payment rates will be calculated for domestic and imported rice. The equivalent tax on domestic rice is of primary importance. Declining rice imports have reduced the effect of an equivalent tax on imported rice. The equivalent ad valorem rate on domestic rice is defined as:

$$T_R^A = \frac{(P_r^d - P_r^m)}{P_r^m} \times 100$$

where:

T_r^A is equivalent ad valorem consumer tax payment rate on domestic rice,

Table 11 indicates the equivalent ad valorem excise tax rate has increased from 81.09 percent in 1963 to 106.14 percent in 1969. The increase has been caused by rising government re-sale prices of domestic rice.

The equivalent ad valorem consumer tax payment rate on imported rice ($T_{R'}^A$) is:

21/ This study assumes the tax is passed on to consumers.

Table 11. Excise Tax Payment Rate, Domestic and Imported Rice, JFY 1963-1969.

Fiscal year	Domestic rice			Imported rice			
	Govt. re-sale price P_r^d	Price differential $(P_r^d - P_r^m)$	Equivalent ad valorem consumer tax rate	Landed price P_r^m	Govt. re-sale price $P_r^{d'}$	Gross margin $(P_r^{d'} - P_r^m)$	Equivalent ad valorem consumer tax rate
	($/m.t.)	($/m.t.)	(%)	($/m.t.)	($/m.t.)	($/m.t.)	(%)
1969	348.39	179.39	106.14	169.00	240.00	71.00	42.01
1968	337.20	169.20	100.71	168.00	243.00	75.00	44.64
1967	335.35	170.35	103.24	165.00	240.00	75.00	45.45
1966	317.46	155.83	96.41	161.63	239.50	77.87	48.18
1965	287.75	133.09	86.05	154.66	234.55	79.89	51.66
1964	263.94	119.58	82.83	144.36	213.10	68.74	47.62
1963	242.81	108.73	81.09	134.08	207.42	73.34	54.70

$$T^{A}_{R'} = \frac{(P^{d'}_{r} - P^{m}_{r})}{P^{m}_{r}} \times 100$$

where:

$P^{d'}_{r}$ is government re-sale price of imported rice per metric ton.

The equivalent excise tax rate on imported rice has been declining since the 1965 high. The 1969 rate was 42.01, compared to 106.14 percent for domestic rice.

Wheat

Consumer transfer resulting from the wheat program can also be expressed as an equivalent excise tax. Quality differences must be considered when calculating tax rates for wheat because Japan imports many classes of wheat. Average yearly price of Western White #2 is used in the following calculations to correct for quality differences between domestic and imported wheat.

Equivalent ad valorem consumer tax rate (T^{A}_{W}) is:

$$T^{A}_{W} = \frac{(P^{d}_{w} - P^{m}_{ww})}{P^{m}_{ww}} \times 100$$

Table 12 indicates the policy of selling domestic wheat above the acquisition price of W. W. #2 results in an equivalent ad valorem tax rate of 33.84 percent. The equivalent excise tax on domestic wheat has increased each year since the 1964 low of 19.37 percent.

Table 12. Excise Tax Payment Rate, Domestic and Imported Wheat, JFY 1963-1969

Fiscal year	Domestic wheat			Imported wheat			
	Govt. re-sale price P^d_w	Gross margin $(P^d_w - P^m_{ww})$	Equivalent ad valorem excise tax rate	Landed price W. W. #2 P^m_{ww}	Govt. re-sale price W. W. #2 $P^{d'}_{ww}$	Gross margin $(P^{d'}_{ww} - P^m_{ww})$	Equivalent ad valorem excise tax rate
	($/m. t.)	($/m. t.)	(%)	($/m. t.)	($/m. t.)	($/m. t.)	(%)
1969	89.86	22.72	33.84	67.14	95.85	28.71	42.76
1968	89.86	21.35	31.16	68.51	96.24	27.73	40.48
1967	89.86	17.39	24.00	72.47	96.41	23, 94	33.03
1966	90.01	15.48	20.77	74.53	97.17	22.64	30.38
1965	90.66	15.40	20.46	75.26	98.02	22.76	30.24
1964	91.25	14.81	19.37	76.44	99.06	22.62	29.59
1963	91.25	18.29	25.06	72.96	99.96	27.00	37.00

An equivalent tax payment rate could be determined for each class of wheat imported. However, an equivalent rate was only calculated for Western White #2 because this class is of comparable quality to domestic wheat. Equivalent tax rates for W. W. #2 have been consistently higher than tax rates for domestic wheat. The equivalent ad valorem excise tax rate for W. W. #2 is calculated as:

$$T^{A}_{w'} = \frac{(P^{d'}_{ww} - P^{m}_{ww})}{P^{m}_{ww}} \times 100$$

where:

$T^{A}_{w'}$ is equivalent ad valorem consumer tax payment rate for W. W. #2, and

$P^{d'}_{ww}$ is Food Agency re-sale price of W. W. #2 per metric ton.

Equivalent Revenue Tariff

Government budgetary balance is the net result of deficits incurred on price support activities, and surpluses incurred by selling imported food grains for a profit.[22/] The process of selling imported food grains at a higher price has the same effect upon government revenue as levying a tariff on imports. Equivalent

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22/ Handling cost of domestic and imported food grains also add to the deficit.

revenue tariff rates for imported wheat and rice will be calculated to indicate government "skimming" profit as a percentage of acquisition cost.

Rice

The equivalent revenue tariff (R_R) levied upon imported rice is defined as:

$$R_R = \frac{(P_r^{d'} - P_r^m - H_i^c)}{P_r^m} \times 100$$

where:

H_i^c is government handling cost per metric ton of imported rice.

Table 13 indicates the Food Agency received a 39.58 percent equivalent revenue tariff on imported rice during JFY 1969. With the exception of 1963 and 1965 the equivalent revenue tariff has been approximately 40 percent.

Wheat

Food Agency profit obtained from imported wheat may also be expressed as an equivalent tariff. Purchase and re-sale prices are based upon a weighted average of the following classes of wheat: Western White #2, Manitoba #3, and Australian Fair Average Quality (West). Weights were determined by the quantity

Table 13. Revenue Tariff Levied on Imported Rice, JFY 1963-1969.

Fiscal year	Food Agency acquisition cost	Food Agency estimated handling cost	Food Agency re-sale price	Net profit per unit	Equivalent ad valorem revenue tariff
	($/m. t.)	($/m. t.)	($/m. t.)	($/m. t.)	(%)
1969	165.00	9.70	240.00	65.30	39.58
1968	168.00	9.70	243.00	65.30	38.87
1967	165.00	9.70	240.00	65.30	39.58
1966	161.63	9.70	239.50	68.17	42.18
1965	154.66	9.70	234.55	70.19	45.38
1964	144.36	9.70	213.10	59.04	40.90
1963	134.08	9.70	207.42	63.64	47.46

of food wheat imported from the United States, Canada, and Australia, respectively.

The equivalent tariff rate on imported wheat (R_w) is:

$$R_w = \frac{(P_w^{d'} - P_w^m - H_I^c)}{P_w^m} \times 100$$

where:

H_I^c is government cost per metric ton of handling imported wheat.

Table 14 indicates the 1969 equivalent revenue tariff on imported wheat was 29.56 percent. This is the highest rate of the 1963-1969 period, and results from reduced import prices of wheat.

Table 14. Revenue Tariff Levied on Imported Wheat, JFY 1963-1969.

Fiscal year	F.A. acquisition cost	F.A. est. handling cost	F.A. re-sale price	Net profit per unit	Equivalent ad valorem tariff
	($/m.t.)	($/m.t.)	($/m.t.)	($/m.t.)	(%)
1969	71.76	4.34	97.39	21.21	29.56
1968	75.17	4.34	97.35	17.84	23.73
1967	76.43	4.34	97.65	16.88	22.09
1966	77.90	4.34	98.17	15.93	20.45
1965	78.39	4.34	98.95	16.22	20.69
1964	78.37	4.34	100.11	17.40	22.20
1963	76.35	4.34	100.40	19.71	25.82

Summary

Chapter IV has provided several evaluative measures of Japanese food grain policies. Although rice producers only receive a 7.5 percent subsidy above domestic re-sale price, they are protected from the international market by a 121.62 percent equivalent ad valorem tariff. Wheat producers receive a 64.81 percent subsidy and enjoy the protection of a 120.58 percent equivalent ad valorem tariff.

The high degree of producer protection results in a loss of income to consumers. Consumers pay an equivalent excise tax with each purchase of wheat and rice because government re-sale prices are above import prices. Consumers must pay a 106.14 percent equivalent ad valorem excise tax on domestic rice, and a 33.84 percent tax on domestic wheat. The equivalent ad valorem excise tax payment rate is 42.01 percent for imported rice, and 42.76 percent for imported wheat.

High consumer excise tax rates and increasing government budgetary costs are potentially important factors for changing Japanese food grain policies. Chapter V will review alternative Japanese wheat and rice policies for the 1970's and discuss the implications for Pacific Northwest White Wheat exports.

V. SUMMARY AND IMPLICATIONS FOR PACIFIC NORTHWEST WHITE WHEAT EXPORTS

Summary

Japan's food grain policies have been partially successful in achieving the objectives of: (1) increasing farm income, (2) maintaining "low" consumer food grain prices, and (3) maintaining an "acceptable" level of government expenditure. Supporting the farm price of wheat and rice above world prices has substantially increased farm income above a hypothetical free market situation. Food grain programs currently (1969) result in a farm income transfer of $2.1 billion per year.

However, these programs have resulted in substantially higher consumer expenditures for wheat and rice. Government policy of re-selling food grains above the landed price of imports currently (1969) results in a cost of $1.8 billion to consumers. Perhaps a more important cost, in terms of potential changes in policy, is the sharply increasing government budgetary deficit. The budgetary problem, which in 1969 reflected a deficit of $704.7 million, has resulted in political pressure to alter food grain policies (20).

Accompanying Japan's internal wheat and rice policies have

highly protectionistic food grain trade policies. For example in 1969 Japanese rice producers were protected from the international market by an equivalent ad valorem tariff of 121.62 percent. Wheat growers enjoyed the protection of a 120.58 percent equivalent ad valorem tariff. Changes in internal or external policies could significantly alter Japan's food grain trade position.

Implications for Pacific Northwest White Wheat Exports

The interdependency of world trade patterns suggests that changing Japanese agricultural policies will have an impact upon many developed and developing countries. The implications of Japan's future policies for Pacific Northwest wheat exports must be viewed in this broad perspective. In particular, Japanese food policies should be viewed as a whole, with emphasis upon trends in dietary habits.

In 1966 the Ministry of Agriculture and Forestry predicted that total consumption of meat, milk and dairy products, and fruits would more than double within 10 years. The consumption of soybeans, green vegetables, sugar, fats and oils, and silk were also predicted to increase by more than 50 percent. Consumption of wheat and eggs were expected to increase substantially, but rice consumption was expected to remain about the same(24). This prediction reflects a substantial change in Japanese dietary

habits.

Japanese economic growth in commerce and industry has generated new consumer purchasing power. The result has been rising food prices because food supplies are constrained by production problems and state control of imports. This has led the government to adopt the following targets to deal with growing consumer purchasing power:

(1) Increase the per capita supply of all food in total to lessen nutritional deficiencies and help satisfy economic demand, and

(2) Increase supplies of high-cost energy faster than supplies of low-cost energy (2).

High-cost energy refers to fruits, vegetables, and animal products which absorb larger amounts of consumer purchasing power.

Increasing the supply of animal products could have an effect upon Pacific Northwest white wheat exports. The geography of Japan severely limits land area for cultivation of feed grains. Thus, any significant increase in supply of livestock products must be obtained through:

(1) Increasing the import of processed foods, or

(2) Increasing the import of feed grains to supply domestic livestock producers.

The Japanese Government has chosen the latter instrument and is

beginning to stimulate livestock production.[23] The decision to stimulate livestock production could have an impact on the Pacific Northwest by increasing feed wheat sales.

In 1969 Japan imported 420, 198 metric tons of feed wheat from the United States, including 30, 550 tons of white wheat.[24] This compares with feed wheat imports from the U.S. of 376, 550 metric tons in 1968 and 433, 660 metric tons in 1967. White wheat was not included in the 1968 and 1967 feed wheat imports. This suggests that white wheat is beginning to fill some of the increasing demand for feed grains. While the present amount is insignificant compared to food wheat exports, there is potential for increasing feed wheat sales.[25] Total Japanese feed grain imports will probably increase, but the particular import mix of feed grains is impossible to predict. If white wheat is competitively priced it should share in the expanding Japanese feed grain market.

However, Japan's long-term policy of diversifying sources of agricultural imports can prevent the expansion of Pacific

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[23] For a roughly chronological listing of policy decisions leading to the new food strategy see: (2, p. 22-24).

[24] JFY 1969 feed wheat imports also included: Australia, 694, 036 m. t.; France, 17, 000 m. t.; Bulgaria, 1, 000 m. t.

[25] JFY 1969 Japanese white wheat imports from the Pacific Northwest were: 659, 534 m. t. food, 30, 156 m. t. feed.

Northwest feed wheat exports. This policy has three main objectives:

(1) Providing a hedge against supplies being shut off by major suppliers,

(2) Improving Japan's bargaining strength with existing countries, and

(3) Encouraging other countries to purchase Japan's industrial products.

The policy of diversifying import supply is being implemented by Japan's foreign aid programs in all developing regions of the world. The commodities on which major emphasis is being placed are corn, grain sorghum, cassava (for animal feed), oil seeds, tropical fruits, and silk (24). Most of these products compete directly with wheat as a source of livestock feed. Table 15 shows the relative importance of wheat, corn, and sorghum as sources of Japanese feed grain imports. By 1975 Japan is expected to import 1.5-2 million metric tons of corn and 200,000-300,000 metric tons of grain sorghum from southeast Asia. An equivalent amount may also be imported from Australia (24).

Domestic rice also has the potential to compete with white wheat for the feed grain market. Rice is by far the dominant grain in Japan. With per capita consumption declining and total consumption stabilized at about 12 million metric tons, the rice surplus has grown to an eight month's domestic supply (20).

Table 15. Japanese Feed Grain Imports by Country of Origin; Averages 1955-1964, Annual 1965-1968 1/

Commodity and country	Average		Annual			
	1955-1959	1960-1964	1965	1966	1967	1968
	1,000 metric tons					
Wheat 2/	361	972	884	962	1,163	1,114
United States		267	277	363	423	377
White wheat		18 3/				
Hard wheat, 13%		47 4/	69	162	166	178
Hard wheat, ord.		202 5/	208	200	253	199
Soft red offgrade					4	
Canada	206 6/	322	206	223	236	77
Manitoba #4		180 7/	206	223	236	77
C. G. #5	127 9/	142 8/				
C. G. #6	79 10/					
Australia	155	358	401	376	504	658
FAQ (West)	34 11/	296	387	304	448	397
FAQ (Victoria)		19 12/	14	51		
FAQ (NSW)					1	15
Queensland				15	49	240
Offgrade	121 14/	43 13/		6	6	6
France		25 15/				

Continued

Table 15--Continued.

Commodity and country	Average		Annual			
	1955-1959	1960-1964	1965	1966	1967	1968
	1,000 metric tons					
Corn[16/]	557	2,275	3,434	3,598	3,960	5,144
United States	252	867	2,302	2,234	1,584	2,542
Burma	7	1	1	3		
Cambodia	25	29	26	29	20	15
Indonesia	2		4	65	120	10
Thailand	69	432	576	767	699	633
Sorghum[16/]	31	456	1,431	2,247	2,584	2,314
United States	25	425	1,284	2,005	2,242	1,887
Thailand		1	20	58	37	19

1/ Sources: (24, 35)
2/ Japanese fiscal year: April 1 of year stated to March 31 of the following year.
3/ 1963-1964
4/ 1961-1964
5/ 1962-1964
6/ 1956-1959
7/ 1961-1964
8/ 1960-1963
9/ 1957-1959
10/ 1957-1958
11/ 1958-1959
12/ 1962-1963
13/ 1960-1963
14/ 1959
15/ 1964
16/ Selected supplying countries listed.

Costs associated with the rice program have been increasing because of:

(1) Increasing support prices, and

(2) Increasing quantity held in storage.

The rice problem involves the entire structure of Japanese agriculture, and changes in rice policy have the greatest potential for affecting white wheat exports. Two policy changes were initiated by the Japanese Government in 1969 to reduce rice production. A subsidy payment was made available to encourage diversion of rice land, and the 1969 support price was held at the 1968 level. Subsidy payments of $1,362 per hectare were provided to encourage diversion of rice land, but the area planted was approximately equal to the 3.3 million hectares planted in 1968 (20). Although producer prices had been raised in each of the past 11 seasons, holding the 1969 price at the 1968 level had no effect on area planted. Thus diversion payments at the present rate coupled with holding support prices at the 1968 level seem to have no short term effect on area planted to rice. With a continued rice surplus the potential exists for using rice as livestock feed. In the past this has been prevented, but it might be accepted in the next few years if coupled with lower consumer prices for rice.

Shifting of demand toward hard wheats is another factor affecting future white wheat exports to Japan. As incomes rise,

Japanese consumers are buying more bread and less noodles and confectioneries. This increases the demand for hard wheats and decreases the demand for soft wheats. Bread is also increasing in popularity among young people, which further strengthens the demand for hard wheat.

The shift toward hard wheat means a significant increase in Japan's white wheat imports will not be forthcoming. Table 16 shows Japanese imports of white wheat for the period 1956-1969. Japan is not a guaranteed market for white wheat. As long as white wheat is in a favorable export position at a competitive price the Pacific Northwest should retain its current percentage of Japanese white wheat imports. But as Japanese food demand for white wheat declines, the absolute quantity imported from the Pacific Northwest may also decline.

Reduced Japanese wheat production may offset the effects of shifting demand to hard wheats. Hectares planted in wheat by Japanese farmers have declined steadily during the 1963-1969 period. If this trend continues, white wheat imports may be increased to offset declining domestic production. Off-farm wage rates and government wheat policy can be expected to affect future Japanese wheat production. Government policy can also affect the shift of demand to hard wheats by manipulating the re-sale prices of hard and soft wheats.

Table 16. Japanese Imports of Pacific Northwest White Wheat (food), JFY 1956-1969. 1/

Fiscal year	Quantity
	(metric tons)
1969	659,534
1968	527,643
1967	722,665
1966	747,438
1965	679,005
1964	611,801
1963	780,100
1962	470,854
1961	488,851
1960	642,949
1959	596,405
1958	803,314
1957	387,690
1956	681,937

1/ Purchase basis.
Source: (35).

The shifting demand toward hard wheat creates a problem for the United States and for the Pacific Northwest in particular. Most hard wheat must be shipped from the central part of the United States to West Coast ports. This increases its price and often means a delay in availability of wheat. The availability problem has been largely corrected by providing additional storage at West Coast ports. However, transportation costs still increase the f. o. b. price of hard wheats. 26/

26/ Assuming no government export subsidy.

Suggestions for Continued Investigation

Investigation is needed to determine more precisely the speed and extent to which Japanese demand is shifting to hard wheats. This will give some indication of the urgency of developing hard wheat varieties for the Pacific Northwest. Without satisfactory hard wheat varieties the Pacific Northwest will lose its relative advantage in supplying wheat for export to Japan.

Additional study is also needed to determine the quantity of resources Japan is shifting to livestock production. Resources may be shifted to livestock production directly as the result of agricultural laws or indirectly through reducing the cost of feed and other inputs. Government expenditures for livestock research and extension activities may also give an indication of the speed with which feed grain demand will increase.

Of course the Pacific Northwest may fail to benefit from increasing livestock demand if Japan is successful in diversifying its sources of feed grain supply. This program should be continuously monitored to assess the ability of developing areas to supply feed grain imports for Japan.

The model used in the present study specified completely inelastic supply and demand curves for rice and a completely

inelastic demand curve for wheat. This seemed to be consistent with other available empirical work. Any errors introduced by these assumptions were considered to be insignificant compared to the total magnitude of farm income transfer, consumer transfer and budgetary balance. Nevertheless, additional research to determine the magnitude of possible errors arising from the model specification would be useful. Such research could take two directions: (1) further empirical analysis of the supply and demand curves, and (2) a sensitivity analysis of the model using various combinations of hypothetical supply and demand elasticities.

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APPENDIX

Appendix A

Table 1. Data Employed in Calculating Farm Income Transfer, Consumer Transfer, Budgetary Balance and Other Evaluative Measures. Rice. Japanese Fiscal Year 1963-1969, Japan.

Japanese Fiscal Year	Area Planted 1,000 hectares	Delivery to Government metric tons	Quantity Imported metric tons	March 31 Carryover metric tons	Support Price: Brown Rice Grade 3 dollars/metric ton	Total Government Purchase Price dollars/metric ton	Average Import Price of Rice dollars/metric ton	Government Re-Sale Price of Domestic Rice dollars/metric ton	Government Re-Sale Price of Imported Rice dollars/metric ton	Government Handling Cost of Domestic Rice dollars/metric ton	Government Handling Cost of Imported Rice dollars/metric ton
1963	3,272	6,886,000	302,415	3,291,000	238.90	259.73	134.08	242.81	207.42	27.74	9.70
1964	3,260	7,203,000	644,996	2,993,000	264.85	285.68	144.36	263.94	213.10	27.74	9.70
1965	3,255	8,064,000	902,416	2,880,000	296.53	317.36	154.66	287.75	234.55	27.74	9.70
1966	3,254	9,820,000	685,754	3,473,000	328.70	349.53	161.63	317.46	239.50	27.74	9.70
1967	3,263	9,800,000	409,787	4,468,000	357.21	378.04	165.00	335.35	240.00	27.74	9.70
1968	3,300	10,044,174	178,860	4,638,000	374.46	395.29	168.00	337.20	243.00	27.74	9.70
1969	3,300	9,600,000	50,000	5,100,000	374.51	395.36	165.00	348.39	240.00	27.74	9.70

Sources: (3, 12, 13)

APPENDIX B: WHEAT DATA

Table 1. Pacific Northwest White Wheat Exports, Crop Year 1958-1968. 1/

Crop year	Europe	Latin America	India and Pakistan	Japan	Total Asia
			million bushels		
1968		2,234	31,457	23,255	88,100
1967		1,791	78,280	29,887	141,343
1966	598	1,094	63,458	29,593	117,402
1965	4,097	1,766	48,611	27,881	92,781
1964		1,194	51,670	26,971	92,679
1963	8,919	1,131	48,553	34,094	97,225
1962	260	1,567	60,356	17,920	95,149
1961	676	1,065	48,149	20,682	83,334
1960	1,481	3,445	59,915	22,908	94,832
1959	1,740	164	62,610	22,753	94,105
1958	2,031	224	31,910	25,343	61,976

1/ Crop year begins July 1 of year stated.
Source: (31).

Table 2. Data Employed in Regression Analysis, 1960-1969, Japan.

Japanese fiscal year	Area planted to wheat	Support price of wheat	Average off-farm wage rate
	(1,000 hectares)	($/m.t.)	($/month)
1960		99.25	80.63
1961	649	104.06	88.52
1962	642	109.60	97.26
1963	584	113.97	107.78
1964	508	118.61	118.33
1965	480	124.58	129.44
1966	421	131.83	144.17
1967	366	138.96	160.55
1968	322	143.61	177.66
1969	288		

Source: (12, 13).

APPENDIX B

Table 3. Estimated Wheat Production at Import Prices of Western White #2, 1962-1969, Japan.

Japanese fiscal year	Import price of W. W. #2	Average off-farm wage rate	Estimated area	Yield	Estimated production
	($/m. t.)	($/month)	(hectares)	(m. t. / hectare)	(m. t.)
1962	72.35	97.26			
1963	72.96	107.78	220,636	1.226	270,500
1964	76.44	118.33	157,383	2.449	385,431
1965	75.26	129.44	128,117	2.681	343,481
1966	74.53	144.17	66,752	2.432	162,340
1967	72.47	160.55	6,331	2.724	17,246
1968	68.51	177.66	0	3.140	0
1969			0	3.140	0

Source: (12, 13, 35).

Appendix B

Table 4. Data Employed in Calculating Farm Income Transfer, Consumer Transfer, Budgetary Balance and Other evaluative Measures. Wheat. Japanese Fiscal Year 1963-1969, Japan.

Japanese Fiscal Year	Area Planted 1,000 hectares	Delivery to Government metric tons	Quantity Imported metric tons	Support Price (Class 2, Grade 3) dollars/metric ton	Total Government Purchase Price dollars/metric ton	Average Import Price of Food Wheat dollars/metric ton	Average Import Price of Western White #2 dollars/metric ton	Re-Sale Price of Domestic Wheat dollars/metric ton	Average Re-Sale Price of Imported Food Wheat dollars/metric ton	Average Re-Sale Price of White Wheat #2 dollars/metric ton	Government Handling Cost: Domestic Wheat dollars/metric ton	Government Handling Cost: Imported Wheat dollars/metric ton
1963	584	363,000	2,556,789	113.97	119.56	76.35	72.96	91.25	100.40	99.96	17.29	4.34
1964	508	715,000	2,391,150	118.61	124.19	78.37	76.44	91.25	100.11	99.06	17.29	4.34
1965	480	801,000	2,648,624	124.58	130.16	78.39	75.26	90.66	98.95	98.02	17.29	4.34
1966	421	737,000	3,090,327	131.83	137.42	77.90	74.53	90.01	98.17	97.17	17.29	4.34
1967	366	718,000	2,742,765	138.96	144.55	76.43	72.47	89.86	97.65	96.41	17.29	4.34
1968	322	748,880	2,779,871	143.61	149.19	75.17	68.51	89.86	97.35	96.24	17.29	4.34
1969	288	669,196	3,203,144	148.10	153.69	71.76	67.14	89.86	97.39	95.85	17.29	4.34

Sources: (3, 11, 12, 13, 35)