IMPORT DEMAND FOR RICE IN THE EEC:
IMPLICATIONS OF U. S. MARKET PROMOTION*

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The European Economic Community (hereafter referred to as EEC) market for rice has been undergoing significant reorganization since the formation of the economic union in 1957, and the initiation of the common agricultural policy in 1962 in general and the common rice policy in particular, which became effective September, 1964. The rice trade policies of the EEC have continually influenced the domestic consumption demand, production, exports and imports of rice. Although the proportion of the EEC imports of rice from the United States increased from 28 percent in the pre-common rice policy period to 41 percent in the post-common rice policy period, the effects of these policies on rice imports into the EEC continue to concern exporters of rice.

Under the Agricultural Trade Development and Assistance Act of 1954 (commonly referred to as P.L. 480), the American Rice Council, in cooperation with the U.S. Foreign Agricultural Service and trade organizations has been trying to maintain and expand sales of U.S. rice in foreign countries for the past decade. Primary emphasis has been given to the EEC because about 25 percent (or about 168,000 metric tons) of the commercial exports of U.S. rice in 1968 was destined for the EEC market and it was the single most important hard currency market for U.S. rice.

The purpose of this paper is to point out the role of the U.S. market promotion in the EEC in affecting demand for U.S. and other rices and in offsetting the impact of the EEC variable levies on the imports of rice, by source, in the EEC, and to draw some implications therefrom.

THE ECONOMIC FRAMEWORK

It seems obvious that the import demand for rice in the EEC does not operate in an economic vacuum. The quantity of rice domestically demanded in the EEC affects not only their own production and export supply but also the imports of rice from various sources, and vice versa. Furthermore, one import supply source competes with another import supply source in supplying rice to the EEC.

The theoretical issues can be cast in a framework of classical commodity trade theory. The importing country (EEC) experienced demands for the various rices in excess of the supply capabilities of its domestic producers at the existing world prices. The exporting blocs experienced excess supplies from their domestic production. The EEC imported rices from the exporting countries in order to satisfy its excess demands. In order to protect domestic rice producers, the importer (EEC) adopted a system of tariffs (variable levies) applicable to rices imported. The levies are intended to have an effect of adjusting the price of rice from exporters upward in such a way that at the world price, exporters can sell less rice in the EEC and domestic producers receive higher prices. This effect can be represented by shifts to the left in the demand relationships for the imported rices and, of course, a shift to the right in the demand for rice for domestic producers.

In order to expand its own market in the EEC and to offset a portion of the effect of the levies on the demand for its rice, an enterprising exporter, the U.S.A., established a promotional program in the

EEC. The promotional program was designed to shift to the right the demand for all rice and U.S. rice in the EEC. This export policy also directly affected the demand relationships for rices from other exporting blocs.[1]

Given the considerations just mentioned, further detail must be provided on the operation of the two trade policies and their possible affects in the EEC rice market. As mentioned above, the EEC has adopted a variable levy system to regulate its rice market. It fixes a threshold price (minimum entry price) of rice higher than the prevailing world price to protect the domestic producers from the competition given by the imports. It also fixes a standardized c.i.f. price on a weekly basis, which is closer to the prevailing world price. The variable levy, D_t, is the difference between the threshold price and the c.i.f. price. As long as there are open trade practices, the variable levies should have a depressing effect on imports.

The U.S. market promotion may tend to increase sales of rice from some exporting blocs and hinder sales from others. A priori, promotion should positively effect the import demand for U.S. rice. The U.S. promotes its long-grain rice in the EEC. The market promotion should have some positive effects on sales of medium, short-grain and broken rice because of increased awareness about rice. On the other hand, because of a stronger substitutability the market promotion could hinder sales of long-grain rice imported from other sources. Although detailed data on types of rice imported into the EEC are not available, the evidence available from GATT [2] and FAO [8] suggests that the rice imports from the United States and Middle East are predominantly of long-grain and medium-grain rice, respectively; imports from Asia and Latin America are predominantly of broken rice; and the imports from Madagascar and Surinam are of long-grain and medium-grain, respectively. However, Asia, particularly Thailand, supplies a substantially large tonnage of long-grain rice to the EEC. Surinam also supplies broken rice in large quantities to the EEC. U.S. promotional efforts should effect demands for rice from these exporting blocs according to the degree of substitutability for U.S. rice.

THE ECONOMETRIC MODEL

It is not possible to present the structural model employed in this study, but some description of its nature is essential to the discussion.[2] The model is of the type suggested by Harberger [3] for international trade studies. In this formulation, import demand quantities are determined jointly in the structural relationships. That is, quantity demanded of rice from a particular exporter is specified to be dependent on its price, income, and other factors but is jointly determined with quantities demanded from other exporters rather than prices. Such partially reduced demand relationships may allow the modeller to incorporate a considerable amount of information on substitution among import demands that would not be obtainable from the use of prices alone.[3]

The structural model incorporated import demands for rice from the U.S., Asia, the Middle East, Latin America, and from the associate EEC members, Madagascar and Surinam. Also included were relationships for domestic EEC disappearance and exports of rice from the EEC. An identity specifying equilibrium in the EEC rice market completed the system. The system, therefore, contained 9 endogenous variables, 13 exogenous variables and 9 structural equations. All stochastic equations were overidentified. Because of the simultaneity among the endogenous variables and the overidentification, the structural parameters were estimated using the two-stage least squares procedure.

The data used in the estimation were the calendar year averages collected from various sources, predominantly from publications of the United Nations and Organization for Economic Cooperation and Development [6,7,8,9,10]. All quantities were on the basis of per 1,000 population of the EEC, and all prices and the variable levy were in U.S. dollars per metric ton. The sample time period was 1953 through 1968.

In this paper we present only the elasticities of import demands for rice from the U.S., Asia, the Middle East, and Latin America, and the associate EEC members, Madagascar and Surinam, with respect to the U.S. market promotion and the EEC variable levies.

Since the statistical properties are not generally

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[1] The theoretical considerations are explained in detail in the Junghare Ph.D. Dissertation [5, pp. 52-59].

[2] The a priori model, the variables, and the results of econometric estimation are presented in detail in the Junghare Dissertation [5, pp. 59-104].

[3] This is simply an allowance in part for imperfections in the EEC markets for the different rices.

known for parameters estimated by the two-stage least squares method for finite samples, traditional tests of significance for the estimated parameters are not appropriate [1, p. 75; 2, p. 16] .[4] Therefore, no statements of confidence in these estimates can be made. However, if a computed elasticity was based on a coefficient which was smaller than its standard error a guarded interpretation is given. The elasticities were computed at the data averages for the 1965-68 period. The EEC market policy for rice was fully implemented during this period and such elasticities may be reflective of recent trends in the EEC rice market.

Elasticities of Import Demands with Respect to U.S.

Market Promotion

As shown in Table 1, the model indicates that an increase of 1 percent in the U.S. expenditures on market promotion in the EEC increases the import demand for U.S., Middle Eastern, Latin American, and Surinam rice by 0.27 percent, 1.23 percent, 1.03 percent, and 0.40 percent, respectively; whereas the same percent increase in the U.S. market promotion decreases the import demand for Asian and Madagascar rice by 0.06 percent and 0.57 percent, respectively.[5] Since the elasticities of Asian rice and Surinam rice are based on the coefficients which were smaller than their individual standard errors, they may be of questionable value.

These responses in the EEC import demands for rice indicate that the U.S. market promotion in the EEC may be increasing total imports from other sources more than from the U.S. itself. This appears to be so both in relative terms and in absolute terms. The effect, as given by the model, of a 1 percent increase in the dollar expenditures of U.S. market promotion on the import quantities demanded from

the various sources is shown in Table 2, with the data for 1968 as a base. The total import demands would increase by 1,030 metric tons, of which 453 metric tons, or 44 percent, would be from the U.S.; 323 metric tons, or 31 percent, would be from the Middle East; and 23 percent and 11 percent, respectively, would be from Latin America and Surinam, other things being constant.[6]

A one percent increase in market promotion represents an expenditure of approximately $2,900 is associated with an increase in rice demand at the 1968 U.S. price of $76,684, a gross gain of about 26 to 1. This U.S. gain in value of demand amounted to 48 percent of the total increase. In addition to the U.S. gain, Middle East, Latin America and Surinam benefited by a total of $103,058, while Asia and Madagascar lost a total of $20,602.[7]

It is thus evident that the increase in the quantity of U.S. rice demanded resulting from an increase in the U.S. market promotion appears to carry along with it the rice import demands for Middle East, Latin America, and Surinam, although not to the same extent.

Elasticities of Import Demands with Respect to the

EEC Variable Levies

As shown in Table 1, a 1 percent increase in the EEC variable levies would decrease the import demand for U.S. rice by 0.32 percent; the import demands for Asia, Middle East, and Madagascar would decrease by 0.17 percent, 0.74 percent, and 0.38 percent, respectively; whereas the import demands for Latin America and Surinam would increase by 0.56 percent and 0.15 percent, respectively. This increase is, of course, theoretically inconsistent. The imports of rice from Surinam are on a preferential basis because of its associate membership

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[4] As there are 13 exogenous variables and only 16 observations in the system, some readers may become confused about degrees of freedom, efficiency in estimation, and the ability to solve for the structural parameter estimates. The degrees of freedom is the rank of a matrix of a quadratic form and is an important parameter if the quadratic form happens to be the chi-square distributed random variable. Since the chi-square distribution cannot be legitimately applied to the quadratic forms in question, any concern about degrees of freedom is irrelevant. As there are asymptotically more efficient estimates for the structural parameters than two-stage least squares, higher levels of efficiency might be obtained. As a larger number of data points always contains at least as much information as a smaller number, it is possible that increases in efficiency in estimation could occur if more than 16 observations were on hand. However, since the exact statistical distributions of these estimates are not known inferences about efficiency cannot be made. Unique parameter estimates can be obtained because the equations are all overidentified and the moment matrices are of full rank. Multicollinearity did not appear to cause difficulty in estimation.

[5] U.S. expenditures for rice market promotion in the EEC amounted to a yearly average of $189,000 during 1965-68 and $420,000 during 1969-71.

[6] It should be remembered that these are responses in demand, not in equilibrium quantities.

[7] It is possible that changing consumption patterns also result from other less easily measured factors than market promotion.

Table 1.

Table 1.   ELASTICITIES OF IMPORT DEMANDS FOR RICE WITH RESPECT TO U. S. MARKET PROMOTION AND THE EEC VARIABLE LEVIES[a]

Elasticities of	Elasticities with Respect to	
	U. S. Market Promotion	EEC Variable Levies
Import Demand for:		
U. S. Rice	+0.27	- 0.32
Asian Rice	- 0.06[b]	- 0.17[b]
Middle East Rice	+1.23	- 0.74
Latin American Rice	+1.03	+0.56
Madagascar Rice	- 0.57	- 0.38
Surinam Rice	+0.40[b]	+0.15[b]

[a]These are the partial elasticities computed at the averages for the 1965-68 period.
[b]Based on a coefficient smaller than its standard error.

Table 2.   THE EFFECT OF A 1 PERCENT INCREASE IN U. S. MARKET PROMOTIONAL EXPENDITURES ON THE EEC RICE IMPORTS

Import Demand for:	Quantity		Value	
	Metric Tons	Percent	Dollars	Percent
U. S. Rice	453	44.0	76,684	48.2
Asian Rice	- 25	- 2.4	- 3,103	- 1.9
Middle East Rice	323	31.4	45,889	28.8
Latin American Rice	236	22.9	34,480	21.6
Madagascar Rice	- 76	- 7.4	- 17,499	- 11.0
Surinam Rice	119	11.5	22,689	14.3
NET TOTAL	1,030	100.0	159,140	100.00

in the EEC. In the case of Latin America, tacit trade agreements, bilateral agreements and/or government-to-government contracts are suspected. The slope coefficients on which the elasticities of the Asian rice and Surinam rice are based were smaller than their individual standard errors.

ROLE OF U.S. MARKET PROMOTION IN MODIFYING THE IMPACT OF VARIABLE LEVIES ON RICE IMPORTS

Generally speaking, the increase in the import quantity of U.S. rice demanded resulting from the market promotion appears to carry along with it some increases in rice import demands from other sources. The impact of the EEC variable levies on the import demands works largely in the opposite direction. Questions immediately arise concerning (1)

the extent to which U.S. market promotion might need to be increased in order to offset the negative effect of a 5 percent increase, for example, in the EEC variable levies; and (2) the impact that might be expected from such an increase on import demands for rice from other sources, other things being constant?

Now, suppose that the EEC has increased the variable levies by 5 percent. The elasticity of import demand for U.S. rice with respect to the EEC variable levies is -0.32 (Table 1). Therefore the hypothetical 5 percent increase in the variable levies would decrease the import demand for U.S. rice by 1.60 percent. This decrease amounts to 2,683 metric tons if the import demand for U.S. rice were at the 1968 level of 168,000 metric tons. In order for the United States to maintain their sales at the 1968 level, the U.S. market promotion would have to be increased. Given

the elasticity of 0.27 for the import demand for U.S. rice with respect to the U.S. market promotion (Table 1), the U.S. market promotion in the EEC would need to be increased by $\frac{1.60}{0.27}$ = 5.93 percent. This increase amounts to $17,200 if the U.S. expenditures for market promotion in the EEC were at the 1968 level of $290,000. Thus, the United States has not gained a net increase in their sales to the EEC by increasing the market promotion by 5.93 percent, but offset the 2,683 metric ton decrease in the quantity demanded in the EEC that would otherwise have occurred due to the hypothetical increase in the variable levies.

The hypothetical 5 percent increase in the EEC variable levies and the offsetting 5.93 percent increase in the U.S. market promotion needed to maintain the sales of U.S. rice in the EEC lead to marketwide changes in all the sectors of the EEC rice economy. For example, the hypothetical 5 percent increase in the EEC variable levies would decrease the import demand for Middle East rice by $\frac{5.00}{0.74}$ = 3.70 percent; whereas the increase of 5.93 percent in the U.S. market promotion would increase the import demand for Middle East rice by 5.93 X 1.23 = 7.23 percent, thus yielding a net increase of 7.23 - 3.70 = 3.53 percent. When translated into the quantity data for 1968, this net increase amounts to 929 metric tons. Similar calculations were done for the remaining import sources in the EEC and the results are presented in Table 3. When the EEC variable levies are increased by the hypothetical 5 percent and the offsetting 5.93 percent increase in the U.S. market promotion expenditures is achieved, the total import demands in the EEC increase by 2,712 metric tons. In the absence of U.S. market promotion, the total quantity imported in the EEC would have decreased by 3,386 metric tons; whereas, in the absence of variable levies, it would have increased by 6,098 metric tons.

Table 3. IMPACT OF A 5 PERCENT INCREASE IN VARIABLE LEVIES AND AN OFFSETTING 5.93 PERCENT INCREASE IN U. S. MARKET PROMOTION ON IMPORT DEMANDS FOR RICE IN THE EEC - 1968 BASE

Import Demand of	U. S. Market Promotional Activities		Variable Levies		Net Change	
	% change in imports	Quantity change in imports	% change in imports	Quantity change in imports	% change in imports	Quantity change in imports
U. S.	1.60	2,683	- 1.60	- 2,683	0.0	0
Asia	- 0.35	- 144	- 0.85	- 351	- 1.20	- 495
Middle East	7.23	1,903	- 3.70	- 974	3.53	929
Latin America	6.11	1,402	2.80	643	8.91	2,045
Madagascar	- 3.38	- 453	- 1.90	- 255	- 5.28	- 708
Surinam	2.37	707	0.75	234	3.12	941
NET CHANGE		6,098		- 3,386		2,712

IMPLICATIONS

U.S. market promotion in the EEC tends to offset in a rather gross manner the negative impact of the EEC variable levies and helps to maintain the import demands for rice. This may be true for other agricultural products the U.S. is promoting in the EEC. The EEC is successful, of course, in controlling prices of rice internally through the variable levy system and thus in partially reducing the competition offered by generally lower-priced imported rice. This policy aspect of a common market over which third countries do not have any overt control can, however, be overcome through concerted market promotion as long as net returns from such activities are greater than or equal to the costs incurred.

A question arises concerning which country should foot the bill for such market promotional activities? According to the model, U.S. market promotion for rice in the EEC yields a gross return ratio vs. cost in terms of demand generated of about 26 to 1. Total gross return to the U.S. and all other countries and/or regions combined was approximately 54 to 1 from U.S. market promotion in 1968, with 48 percent of the gross returns going to the U.S. This is so because the U.S. had 56 percent of the import rice market of the EEC in 1968. Thus, the country with the largest share of this import market is apparently gaining the most from market promotion. In the case of rice, the U.S. is paying all the costs of market promotion in the EEC. The Middle East, Latin America and Surinam benefited by as much as $103,058 from the U.S. market

promotion in 1968. Therefore, a question arises as to whether or not these countries should promote their own rice, or if they should share in the U.S. promotion costs. If a Pareto criterion were applied to international transactions, it would be apparent that U.S. promotion could adjust the market toward a sub-optimal position under the assumption that higher rice export demand is preferable to the individual countries.

U.S. market promotion, though not designed to affect other countries, resulted in large net beneficial effects to other countries, particularly those of the Middle East, Latin America, and Surinam; whereas, there were adverse effects on import demands for rice from Asia and Madagascar. The pattern of promoting sales of agricultural products from some countries and hindering sales from others is expected whether

the U.S. or some other country is a party to market promotion. However, one generalization that emerges from this study is that U.S. market promotion tends to hinder sales of the same type of rice as the U.S. rice that is imported from other sources and promote sales of rice which is not a strong substitute for the U.S. rice. This pattern seems reasonable and may well occur for other commodities, but not necessarily.

It is apparent from the model that Latin America and Surinam benefited for the U.S. market promotion as well as the EEC variable levies. This may very well be true for countries which are associate members of a common market or are having some tacit agreement, bilateral agreement and/or government-to-government contract between importing and exporting parties.

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