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Measuring the Effectiveness of U.S. Rice Export Promotion Programs

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Since 1984, the U.S. government has used export promotion as a means to increase rice exports to other countries. Three main types of government programs have been used to encourage expansion of U.S. rice exports. First, the U.S. sells rice on concessional credit terms and donates rice to needy countries bilaterally or through the World Food Program (P.L. 480, Section 416(b), Food for Progress). Second, the U.S. Department of Agriculture (USDA) provides export credit guarantees for commercial financing of U.S. agricultural exports (GSM-102, GSM-103, and Supplier Credit Guarantee Program). Finally, USDA funds the creation, expansion, and maintenance of foreign markets for U.S. rice through its market development programs (the Market Access Program and the Foreign Market Development Program). Several other USDA programs, such as the Emerging Market Program, the Quality Samples Pilot Program, the Cochran Fellowship Program, and the Section 108 Program also support U.S. rice exports.

The focus of the research reported here is on the effectiveness of USDA's market development programs for U.S. rice exports. The Market Access and Foreign Market Development Programs (MAP and FMDP) are partnerships between the U.S. government (through the Foreign Agricultural Service (FAS)) and numerous nonprofit private-sector commodity and regional associations. The FMDP is the oldest of these market development programs and is also known as the cooperator program. Created in 1955, FMDP embodies the FAS's primary goal of developing, maintaining, and expanding long-term export markets for U.S. agricultural products. Under the partnership, FAS/USDA and the cooperators pool their technical and financial resources to conduct market development activities outside the United States. The cooperators compete for USDA funding annually based on the activities they propose. A past cooperator that has succeeded in expanding export markets and contributed a substantial amount of its own funds is more likely to get increased funding. Under FMDP, only generic promotions are funded. Thirty-two cooperator groups received funding in 1997, covering a broad range of agricultural commodities. One-half of the $27.5 million invested by the U.S. government that year under FMDP was spent on feed grains, wheat, and soybeans. Most of the remaining funds went to forest product, meat, rice, and poultry exporters.

MAP began in 1985 as the Targeted Export Assistance Program (TEAP), which was created by the 1985 Farm Bill to offset adverse impacts from other countries' unfair trade practices on U.S. agricultural exporters. The 1990 Farm Bill replaced TEAP with the Market Promotion Program (MPP) and shifted the focus of the effort from compensating applicants for unfair trade to increasing U.S. agricultural exports in promising foreign markets. The 1996 Farm Bill changed the program's name to the Market Access Program. Like FMDP, MAP helps U.S. producers, exporters, private companies, and other trade organizations finance promotional activities for U.S. agricultural products. While it funds many of the same types of activities as the FMDP, MAP is intended for shorter-term, consumer-oriented promotions. It is primarily used for high-value and processed products whereas FMDP is geared towards bulk products. Unlike FMDP, branded promotions are permitted under MAP. Both MAP and FMDP use funds from USDA's Commodity Credit Corporation.

There are two private cooperators for U.S. rice export promotion: USA Rice Federation (USARF) and US Rice Producers Association (USRPA). Each group receives program funds for promoting rice exports. USARF is a collection of producer, miller, and allied industry groups whose mission is to increase rice consumption domestically and abroad and includes the USA Rice Producers' Group, the USA Rice Millers' Association, the USA Rice Council and the USA Rice Merchants' Association. Like the USARF, the USRPA has as one of

its objectives enhancing domestic and international consumption of U.S. rice, U.S. Rice Producers is a producer group. Both USARF and USRPA are public-private cost-share programs, and together they generate more than $4 million annually to promote U.S. rice of all varieties. For 2000, FAS supported USARF with nearly $2 million from MAP and almost $1.8 million from FMDP, accounting for 2.2% and 5.2%, respectively, of the programs' total allocations (Wang, 2005). The USARF has supplemented its request for nearly $6 million in MAP and FMDP funds with an additional $1.9 million in special programming requests.

MAP funding for the U.S. rice industry topped $2.9 million in 2004 and reached $4.7 million in 2006. However, rice industry allocations from FMDP dropped from $1.8 million in 2003 to $1.7 million in 2004 and further declined to $1.46 million in 2006. International rice promotion has been focused on educating foreign consumers about the nutrition of rice and emphasizes the high quality, versatility, and dependability of U.S. rice. FMDP has a statutory baseline total allocation for all agricultural commodities of around $34 million. MAP funding, however, is legislated to grow over the life of the Farm Bill. It reached the goal level established by the 1990 Food, Agriculture, Conservation, and Trade Act of $200 million in 2006. The proportion of MAP money allocated to the U.S. rice industry has declined over time. U.S. rice exports' share of the world market decreased from 20% of global rice exports in the 1980s to 14% in the 1990s and only 12% in the current decade (Patricio Mendez del Villar, personal communication).

The objective of this research is to empirically measure the responsiveness of demand for U.S. rice exports with respect to U.S. rice export promotion, and to evaluate the overall effectiveness of U.S. rice export promotion programs in terms of benefits relative to costs.

Econometric Model and Data

In this study, we estimate an export demand equation for U.S. rice in logarithmic form using annual data for 1984 through 2005. Rice exports from Japan, South Korea, and Taiwan were deleted because U.S. rice export promotion is not targeted to these countries, and there were WTO sales to these countries from 1995-2005 and export promotion had no impact on these sales. In order to net out the effect of other U.S. export programs that enhance U.S. rice exports (e.g., Export Enhancement Program, PL480, Section 416(b), Food for Education, Food for Progress, and CCC African relief exports), the dependent variable is U.S. rice exports net of these other export programs (and Northeast Asia). Rice exports are measured on a milled basis and are for each calendar year.

The following export demand determinants are included to ascertain their impacts on annual export demand for U.S. rice: price for U.S. milled rice exports in dollars per ton, prices for Thai and Vietnamese milled rice exports (dollars per ton), the sum of gross domestic products (GDPs) for major U.S. rice importers, and U.S. rice export promotion expenditures. All prices and GDP are deflated by the world price index. Export promotion expenditures are multiplied by a measure of world currency values relative to the U.S. dollar (Special Drawing Rights) and then this product is deflated by the world price index.

The estimated equation indicates that the price of U.S. rice is an important factor in explaining annual variations in demand for exports. The estimated own-price elasticity is –3.27, i.e., a 1 percent increase in U.S. price results in a 3.27 percent decrease in U.S. exports. Unlike domestic demand, it is common, indeed expected, to find elastic own-price elasticities for export demand of commodities. We also find that the prices received for rice exports from other countries that compete with the U.S. are important factors in the equation. The cross-price elasticities of U.S. rice export demand with respect to Thai and Vietnamese rice export prices in this analysis are 1.65 and 1.37, respectively. These results suggest that both countries are major competitors of the United States.

The sum of deflated GDPs for the major U.S. rice importers is an important determinant of the export demand for U.S. rice. The coefficient associated with GDP in countries that are top U.S. rice importers is 2.31, indicating that U.S. rice is a normal good.

Finally, the coefficient associated with the rice export promotion variable is positive and statistically different from zero. The statistical evidence supports the notion that U.S. rice export promotion programs, which are public-private contributions, have the effect of increasing the export demand for U.S. rice. The estimated export promotion elasticity is 0.21.

Simulation Analysis

According to the econometric results, it is clear that rice promotion expenditures have a positive and statistically significant

impact on U.S. rice exports to the world market. Next, we simulate the estimated equation to address the remaining objectives of this study. Two scenarios are of interest: (1) a baseline scenario in which export promotion programs are in effect and expenditures on promotion are set at historic levels; and (2) a counterfactual scenario with no U.S. rice export promotion. In the first scenario, all rice export demand determinants are set equal to historic levels. The second scenario is identical to the first except that U.S. rice export promotion expenditures are set to a small amount (note that due to the logarithmic functional form, export promotion expenditures are set proportionally to 2% of historic levels in this scenario because the log of zero is undefined). The difference between the two scenarios gives the total impact of the export promotion programs on U.S. rice exports to all trading partners.

Collectively for 1984 through 2005, FMDP and MAP expenditures increased U.S. rice exports by a total volume of 27,590,233.91 metric tons and an average of 1,254,101.541 metric tons per year. In percentage terms, export promotion increased U.S. rice exports by 56% over this period. Hence, U.S. rice export promotion has had a large impact on total U.S. rice exports.

While the results indicate a positive impact of export promotion on U.S. rice exports, the impact that promotion has on industry producer surplus compared with its cost remains a key concern. The increase in export demand due to promotion just described assumes that all other demand determinants, including price, would remain constant. To evaluate the full effect of U.S. rice export promotion programs on quantity and price, one must incorporate an excess supply response for U.S. rice into the model. To do this, we assume several levels for the own price elasticities of supply ranging from 2 to 8.

Table 1 presents average annual impacts and BCRs (for 1984 through 2005) for U.S. rice export promotion efforts for the various assumed own-price elasticities of excess supply. Promotion of U.S. rice exports has had a positive impact on the export price over this period under all supply response scenarios. The average increase in price ranges from $51.05 per ton in the case of the most inelastic supply response (e = 2) to $24.90 per ton in the case of the most elastic supply response (e = 8). The positive price impacts decline as the assumed supply response gets larger because producers under larger supply responses dampen the positive price impacts of the increased demand by increasing the quantity supplied to the world market relative to smaller supply response scenarios. Focusing on the mid-point elasticity of 5, which is plausible for export supply, the average increase in price is $33.45 per ton. In other words, had there not been U.S. rice export promotion, the average rice export price for 1984 through 2005 would have been $33.45 (or 9. 6%) lower than it actually was.

U.S. rice export promotion has had a positive impact on producer surplus over this period as well. The average increase in producer surplus due to export promotion ranges from $98.0 million per year in the case of the least elastic supply response (e = 2) to $42.1 million per year in the case of the most elastic supply response (e = 8). The same negative relationship between supply elasticities and producer surplus occurs. At the midpoint elasticity (e = 5), the increase in average producer surplus is $58.9 million. Hence, it is clear that U.S. export promotion has had a significant and positive impact on industry profits since 1984.

How does the gain in producer surplus compare with the costs of export promotion? To answer that question, we compute an average BCR (see the bottom row of Table 1). The average BCR exceeds 1.0 for every supply response considered in the simulation. For the least elastic supply response (e = 2), the average BCR is 14.48. This implies that, on average over the period 1984–2005, the benefits of the promotion programs have been more than 14.48 times greater than the cost. At the opposite end of the spectrum in supply response (e = 8), the average BCR is 6.21, implying that the benefits of the rice promotion programs are 6.21 times greater than the cost. Given the wide range of supply responses considered in this analysis and the fact that the BCR exceeds 1.0 in all cases, there is significant evidence that U.S. rice export promotion has been profitable for the industry. The average BCR for the midpoint elasticity (e = 5) is 8.70, i.e., the benefits of U.S. rice export promotion are 8.7 times greater than the cost.

Questions often arise about the accuracy of such estimates of BCRs in economic evaluations of commodity promotion programs. The resulting BCRs are generally large because promotion expenditures are exceedingly small relative to product value so only a small

demand effect is needed to generate large positive returns. For example, average U.S. rice export promotion expenditures in 2005 were 1% of the value of rice sales by farmers. Still, this relatively small investment in U.S. rice export promotion has increased producer surplus by more than $68.0 million per year since 1994 (based on e = 5). Therefore, the resulting BCR is quite large.

To make allowances for the error inherent in any statistical estimation, we calculate a 95% confidence interval for the average BCRs. The estimated lower bound of the average BCR for the smallest assumed supply response for the period 1984–2005 is 7.37. This result demonstrates that one can be confident 95% of the time that the true average BCR for this assumed supply response is not less than 7.37. The estimated lower bound for the average BCR for the highest assumed supply response for the period is 3.13. Hence, it is reasonable to conclude that the lower bounds from the confidence intervals give credence to the previous finding that the benefits rice promotion programs have been considerably greater than the cost.

Table 1. Average annual world market impacts and benefit-cost ratios due to U.S. rice export promotion, 1984–2005.

	Own-Price Elasticity of Excess Supply						
	2	3	4	5	6	7	8
Change in Producer Price ($/ton)	51.05	43.44	37.8	33.45	30.00	27.2	24.9
Change in Producer Surplus(million $)	97.99	80.23	67.91	58.86	51.93	46.5	42.05
Change in Promotion Cost (million $)	7.87	7.87	7.87	7.87	7.87	7.87	7.87
Benefit-Cost Ratio	14.48	11.86	10.04	8.7	7.68	6.87	6.21

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