EFFECTIVENESS OF PRICE VS. NON-PRICE PROMOTION: THE CASE OF COTTON

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Abstract

A comparative static framework is used to analyze the effects of non-price promotion and price subsidies for the export market. Results indicate that both tools can be effective in raising domestic cotton price and lowering government costs for cotton programs. As export demand becomes less elastic, non-price promotion becomes the more effective tool.

Introduction

Commodity Credit Corporation net expenditures for the cotton program exceeded $2 billion in fiscal 1986, decreased considerably over the 1987-1991 period, then climbed to $1.4 billion in fiscal 1992. Net expenditures for the cotton program are again expected to exceed $2 billion in fiscal 1993 and 1994 (USDA, Agricultural Outlook). Concern about burgeoning U.S. budget deficits continues to place pressure on policy makers to reduce the cost of farm programs (Heflin). Thus, finding alternative, less-costly, methods of providing support to cotton farmers is an important undertaking.

Export subsidies have been shown to be a possible means of reducing government costs of domestic farm programs (Duffy and Wohlgenant), but little empirical effort has been expended in examining the potential economic effects of non-price export promotion. Accordingly, the purpose of this paper is to provide an estimate of the effects of price versus non-price promotion

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on U.S. cotton price, domestic use of cotton, exports of cotton, and the costs of cotton programs. A comparative static framework will be used, similar to the model used by Duffy and Wohlgenant to evaluate a price subsidy for exported cotton.

Background

Four basic methods can be used to increase exports: price subsidies, provision of commercial credit, food aid, and non-price promotion (Ackerman and Smith). Export subsidies increase exports by lowering the effective price paid by the importing nation. The increased exports, in turn, reduce the amount of product available domestically, causing domestic price to rise. Non-price promotion, by contrast, cause a rightward shift in the excess demand curve for the promoted commodity, raising the world (and domestic) price of the commodity. Export price subsidies are currently handled primarily through the Export Enhancement Program (EEP), with wheat being the commodity receiving the bulk of the expenditures. Non-price promotion comes primarily under the aegis of three programs, the Market Development Program, the Targeted Export Assistance Program, and the Market Promotion Program.

The Market Development (or Cooperator) Program provides subsidies for non-price promotion of cotton and other "generic" U.S. agricultural commodities. The program, established in 1955 under the authority of P.L. 480, focuses on bulk commodities, such as cotton and grains, and emphasizes long-term market development. Consumer promotions under this program are designed to increase demand for U.S. products by making foreign consumers more aware of U.S. products. Techniques used in this program include in-store demonstrations, distributions of free samples, and media advertising (Solomon and Kinnucan). Government funds provided through the Cooperator Program are matched by private sector and foreign third-party

cooperators in a ratio of about 2:1. Foreign Agricultural Service (FAS) expenditures for the Cooperator program rose from $18.2 million in 1980 to $33.4 in 1986, then declined somewhat during the latter years of the decade. Cotton's share of these expenditures during the 1980's ranged from about $.75 million to $1.8 million.

The Targeted Export Assistance Program (TEA) was authorized in the 1985 Farm Bill. Under the program, CCC generic commodity certificates are used to reimburse nonprofit organizations for eligible expenses incurred promoting U.S. agricultural products in specific foreign markets (Ackerman and Smith). Program levels were $110 million annually for 1986 through 1988 and $325 million for fiscal years 1989 and 1990. For cotton, expenditures under this program totalled $40.9 million over the 1987-1991 period. The Market Promotion Program (MPP), established in 1990 to replace TEA, is designed to emphasize value-added products. Authorized spending under MPP for the life of the 1990 Farm Bill is about $150 million annually. In 1991, cotton's share of MPP expenditures was $12 million. Expenditures for various export promotion programs for cotton, 1985-1991, can be found in Table 1.

In spite of increased interest in non-price export promotion, little empirical work has focused on the effects of these programs. Some previous studies have focused on orange juice (Lee and Brown, 1986), various specialty products (Moore and McCracken, 1991; Rosson, Humming, and Jones, 1986), wool (Dewbre, Richardson, and Beare, 1987), and soybeans (Williams, 1985). Only one study (Solomon and Kinnucan, 1993) has examined the effects of non-price promotion on U.S. market share of cotton in Pacific Rim countries. In this study, a modified Armington model was used to find the increase in U.S. market-share of cotton imports into the region attributable to non-price promotion techniques. Data used in the study covered the period 1965-85; thus, the Cooperator Program, but not TEA or MPP, was in effect over the study period.

Solomon and Kinnucan found that the short-run elasticity of export demand with respect to non-price promotion (advertising elasticity) was highest in Japan, with a value of 0.25. Hong Kong also had a relatively high advertising elasticity, 0.19. For other Pacific Rim nations, the values were smaller and/or not statistically significant. For the whole Pacific Rim region, the weighted advertising elasticity was approximately 0.12, derived under the assumption that non-price promotion shifted demand for U.S. cotton, but left total demand for cotton unchanged. (If total demand for cotton was affected by U.S. promotion, the elasticity would be higher.) The value of 0.12 is somewhat higher than values in the range of 0.02 to 0.08 that were found by Williams for soybeans and the value of 0.086 found by Dewbre, Richardson, and Beare for wool.

Comparative Statics

Following Duffy and Wohlgenant, the effects of price vs. non-price promotion are investigated in a comparative static framework, with modifications to account for the effects of advertising on export demand. Initial industry equilibrium can be described by:

(1) $Q_d = f(P_d)$

(2) $Q_x = g[(P_d - S), A]$

(3) $Q_s = h(P_d, G)$

(4) $Q = Q_s = Q_d + Q_x$

where Q_d is domestic demand, Q_x is export demand, Q_s is quantity supplied, P_d is the domestic cotton price, S is the per unit export subsidy, A is expenditure for non-price promotion in the foreign market, and G are

government program provisions that affect domestic supply. Under current market conditions and farm program provisions, most stocks are pipeline stocks; thus, only negligible changes in stocks would result from changes in international marketing programs. Accordingly, a stock equation is not included in the model.

Total differentiation of (1) through (4) yields:

(5) $d\ln Q_d = N_d \, d\ln P_d$

(6) $d\ln Q_x = N_x(d\ln P_d - s) + N_a \, d\ln A$

(7) $d\ln Q_s = E \, d\ln P_d$

(8) $d\ln Q_s = k_d \, d\ln Q_d + k_x \, d\ln Q_x$

where N_d is the own-price elasticity of domestic demand, N_x is the price elasticity of foreign demand for U.S. cotton, E is the elasticity of supply with respect to market price, and s represents the change in subsidy as a proportion of the initial market price ($s = dS/P_d$). The percentage change in quantity exported with respect to the percentage change in advertising is represented as an "advertising elasticity," N_a. The domestic share of total supply is represented by k_d and the export share by k_x.

Substituting (5) - (7) into (8) and solving for $d\ln P_d$ yields:

(9) $d\ln P_d = k_x (N_a \, d\ln A - N_x \, s)/(E - k_d N_d - k_x N_x)$.

Because N_a and E are positive, while N_d and N_x are negative, an increase in either direct subsidies or advertising (or both) always results in an increase in domestic price.

Government Programs

Domestically, U.S. cotton production is supported by a variety of farm program provisions. Under the 1990 Farm Bill, a producer with a cotton "base" is eligible (but not required) to participate in the farm program for cotton. Base is a three-year moving average of acreage planted or "considered planted" for program purposes; thus, any producer can acquire base for the future by planting cotton in a given year.

Cotton farmers participating in the farm program must limit cotton plantings to a portion of cotton base. In exchange, they receive a direct payment, the deficiency payment, on eligible acres, a portion of base. First, a specified percentage of the base, set by the Secretary of Agriculture, must be idled if an acreage reduction program (ARP) is in effect for that year. In addition, "triple base" provisions further limit payment acreage. Under the 1990 Farm Bill, 15 percent of a farmer's base acreage in a commodity is designated as "Normal Flex Acres" (NFA). On these acres, the farmer may plant the particular commodity for that base or a substitute crop, but will receive no deficiency payment. Also, an additional 10 percent of acres are designated as "Optional Flex Acres" (OFA). The farmer may plant these acres in the program crop and receive a deficiency payment, or plant them in an alternative crop and forfeit the deficiency payment. ARP, NFA, and OFA are "considered planted" in the commodity for the purpose of calculating future base acreage.

At the national level, total expenditures for domestic cotton programs (GC) can be approximated by:

$$(10)\quad GC = [TP - P_d]Q^0 + CCCX + S^*Q_x + \lambda A$$

where TP is the target price ($0.729/lb.), P_d is the domestic market price, Q^0

is the eligible production, and CCCX represents expenditures for domestic programs other than the deficiency payment program, primarily loan operations. (Because a marketing loan is in effect, the loan rate does not provide an effective price floor. If domestic price falls below the loan rate, part of the calculated direct payment, above, will involve payment for loan deficiency or producer option payment.) The final two terms represent costs of the subsidy and non-price promotion. Because industry is responsible for part of the costs of non-price promotion, government does not bear the full cost of this program and λ, the government share of costs, is less than one.

Simulation

The relationships in equations (1) through (10) were used to simulate the effects of both non-price promotion and an export subsidy on domestic price, domestic demand, export demand, and total government costs for cotton. Own-price demand elasticities used in the study were taken from Duffy and Wohlgenant: -0.3 for domestic demand, -2.00 for export demand. Because the elasticity of export demand is a highly important parameter in determining results, a sensitivity analysis with N_x of -1.0 was also performed. Over the past decade, domestic and foreign consumption have been roughly equal; thus, k_d and k_x were both set at 0.5. Supply elasticity was set at 0.0 for this study, under the assumption that producers respond primarily to government program provisions, rather than the market. Because estimated supply elasticities have been low (in the range of 0.3 or less), this assumption has little effect on the simulation outcomes (see Duffy and Wohlgenant for a more detailed discussion of supply response.)

The advertising elasticity, N_a, was initially set at 0.12, the value found by Solomon and Kinnucan for the Pacific Rim area, an area accounting for nearly half of all exports of U.S. cotton. Like the elasticity of export demand,

the advertising elasticity is a critical value in the simulations. Accordingly, sensitivity analysis was performed with N_a set at 0.06. For purposes of the simulation, λ was first set at 0.5, a number roughly in line with historical cost-sharing for non-price promotion. Alternatively, λ was set to one to check cost-effectiveness of non-price promotion more "equitably" against the direct price subsidy situation, where the government is assumed to bear all the costs.

The initial subsidy level, S^0, was assumed equal to zero, and the initial advertising level equal to $50 million, the U.S. total spending on cotton export promotion in 1991. Initial quantity, Q^0, was set equal to 6072 million pounds, and initial domestic price at 58 cents/lb. All changes were measured from these baselines. Results, reported in table 2, show the effects of moving from no subsidy to a $0.03 cent per pound subsidy, and the results of moving from $50 million in advertising per year to $143 million per year. Values were chosen so that the expenditure for the subsidy would equal the increase in advertising expenditure, about $93 million.

As can be seen, both types of export promotions reduce total government costs, and the relative effectiveness of the alternative programs depends on the elasticities. Non-price promotion is most effective in raising domestic price when the advertising elasticity is high (0.12) and the export demand elasticity is relatively low (-1.0). When the export demand elasticity is high, -2.0, and the advertising elasticity is low (0.06) the two programs are roughly comparable in raising U.S. price and reducing government costs, when it is assumed that the government pays the full cost of non-price promotion. Thus, the less price-elastic the export demand, the more effective non-price promotion relative to a price subsidy.

Conclusions

Results of this study indicate that non-price promotion can be an effective way to reduce government costs of the farm programs. This technique is particularly useful when the advertising elasticity of export demand is high and the own-price elasticity of demand for exports is relatively low. In addition, non-price promotion has an advantage over price subsidies in that non-price promotion does not violate GATT. Price subsidies, by contrast, are in opposition to GATT guidelines and may invite retaliation.

Further empirical work is needed to refine estimates of important elasticity values. If own-price and advertising demand elasticities vary across regions, selective promotion campaigns may be advisable. While Solomon and Kinnucan have provided estimates of the advertising elasticity of export demand for cotton in the Pacific Rim, no similar work has been undertaken in other important markets, such as Europe. Future empirical work on the effects of non-price promotion is therefore highly desirable.

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Table 1. Non-Price Export Promotion Expenditures for Cotton, United States, 1985-91, Million U. S. Dollars.

Fiscal Year	Government Expenditures			Industry Expenditures	Total
	Cooperator Program	TEA	MPP		
1985	1.7	---	---	4.8	6.5
1986	1.8	---	---	4.9	6.7
1987	0.7	6.3	---	7.8	14.8
1988	1.0	7.6	---	8.9	17.5
1989	1.1	7.7	---	7.9	16.7
1990	1.4	14.2	---	21.1	36.7
1991	1.6	5.1	12.0	31.3	50.0

Source: Allen Beach, National Cotton Council, Washington, D.C.

Table 2. Effects of a $0.03/lb. Price Subsidy vs. a $93 Million Increase in Promotion Expenditure on Equilibrium Price, Quantity, and Government Costs of U.S. Cotton Program[a]

Percent Change in:	Price Subsidy Only	Promotion only		Price subsidy and Promotion	
	S=$0.03	dA= $ 93 m		S=$.03 dA= $93 m	
		N_s=.12	N_s=.06	N_s=.12	N_s =.06
N_s = -2.00					
P_d	4.50	9.85	4.92	14.40	9.42
Q_d	-1.35	-2.95	-1.48	-4.30	-2.83
Q_s	1.35	2.95	1.48	4.30	2.83
GC(λ=0.5)[b]	-7.31	-32.3	-13.60	-39.6	-20.9
GC(λ=1.0)	-7.31	-26.6	-8.43	-33.9	-15.7
N_s = -1.00					
P_d	3.98	17.4	8.71	21.4	12.7
Q_d	-1.19	-5.23	-2.61	-6.42	-3.80
Q_s	1.19	5.23	2.61	6.42	3.80
GC (λ = 0.5)	-5.30	-61.0	-28.0	-66.3	-33.3
GC (λ = 1.0)	-5.30	-54.5	-22.4	-59.8	-27.7

[a] The $93 million increase (dA) is roughly equivalent to the government cost of a $0.03/lb. subsidy.

[b] Lambda represents the portion of the increased promotion expenditure paid for by the government.