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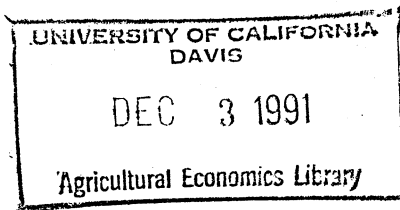
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DETERMINANTS OF PHILIPPINE SUGAR PRICING DECISIONS

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Sugar - Prices

DETERMINANTS OF PHILIPPINE SUGAR PRICING DECISIONS

Abstract

This paper develops and estimates a model of political-economic decision making with respect to domestic sugar prices in the Philippines. Results underscore the importance of distributional concerns, commodity and political market shifters, and the role played by the U.S. sugar quota in determining domestic prices.

Determinants of Philippine Sugar Pricing Decisions

Government intervention in commodity markets has long been the focus of academic and political debate. Traditionally, the rationale for government intervention has been to address market failure or distributional justice issues relating to the existence of public goods, externalities, or a socially unacceptable distribution of income. More recently, government behavior has been viewed as the result of a political-economic process influenced by political or rent-seeking pressure exerted by societal groups (Becker, Krueger, Peltzman). Given the importance of government intervention in agricultural commodity markets, several recent papers have addressed the economics of political action in agricultural markets (Gardner; Lopez; Riethmueller and Roe).

The Philippine sugar market provides an interesting case study for examining the political economy of agricultural pricing policies. First, the government has intervened in the market by setting domestic market quotas to shape consumer prices. This has required the balancing of the conflicting objectives of consumers and producers in the governmental decision process. Second, the U.S. sugar import quota has played a prominent role to the extent that the Philippines has been the largest U.S. foreign supplier of sugar after the Cuban embargo in 1961. Third, the government goals and weights placed on the welfare of various societal groups have allegedly changed markedly across political periods such as the import substitution drive, Marcos' years of political upheaval, and the recent platform of President Aquino.

The objective of this article is to model and examine the motivations behind Philippine government decisions with respect to domestic sugar prices in the postwar period. The article is organized as follows. The next section reviews the Philippine sugar policy history, with particular emphasis on government decision-making processes. The following section presents

a conceptual framework for government decisions based on distributional objectives. The empirical analysis rests on a regression model using the real domestic sugar price as the dependent variable, and a set of commodity and political market variables as regressors. The findings highlight some of the motives behind Philippine sugar pricing decisions, the changes in political preferences across administrations, and the central role played by the U.S. sugar import quota.

Postwar Philippine Sugar Policies

Four distinct periods of government intervention during the postwar years are discussed below. The motivations for government intervention apparently changed markedly across these four periods (Bautista; Nelson; Ilag; Intal and Power).

Period 1: WWII-1962. The proclaimed goal of the government was to promote and stabilize the sugar industry and to ensure reasonable consumer prices through the use of marketing quotas (Ilag). The decision making power rested in a sugar board in which the Sugar Quota Administration (SQA), representing the government, acted as chair, with members from the sugar mills and the sugarcane growers. The government also pursued an import-substitution and industrialization strategy that taxed export crops with overvalued exchange rates (Bautista, Intal and Power) and, hence, lowering the peso price of sugar exports. Since no imports were allowed, the domestic price of sugar remained well above the world price.

Period 2: 1963-74. Moderation of rising consumer prices became an important goal during this period. The escalation of consumer sugar prices was the result of expanded U.S.-bound exports after the reallocation of the Cuban quota and the devaluation of the peso after dismantling exchange rate controls (Nelson). Producers were required to first sell to the (lower-

priced) domestic market and then export to the United States. Sugar policy remained in the purview of the Sugar Quota Administration.

Period 3: 1974-85. Although not declared publicly, penalizing the producers for economic gains and political control apparently became an important goal of the Marcos government in this period (Nelson; Segal). External government regulation was replaced by direct control of sugar marketing and trade by governmental organizations. Following a brief period of relatively free trade in U.S. sugar (1974-81), the U.S. government reintroduced significantly lower import quotas after 1982. Marcos was ousted in February 1986 when the Aquino government took over.

Period 4: 1986-90. One of the goals expressed by the Aquino government was to restore the economic prosperity of the sugar industry. The government went back to external regulation by using the old system of domestic quotas utilized prior to 1974. Since exports of sugar to the United States played a smaller role than before, the domestic market has apparently assumed greater importance relative to exports as a source of support producer prices.

Conceptual Framework

This article focuses on the domestic consumer price for sugar as an indicator of government objectives for the industry. By choosing the level of domestic market quota, the government has simultaneously determined the domestic price level.

For simplicity, consider the typical case where sugar imports and exports to countries other than the United States are zero. Let inverse demand and industry marginal cost be depicted by $P = P(Q, Z^d, \alpha)$ and $MC = MC(Q_s, Z^s, \beta)$, where P is the domestic price, MC is the marginal cost of sugar, Q is the domestic quota, Q_s is domestic sugar production, Z^s and Z^d

denote other exogenous variables, and α and β denote demand and cost parameters. Domestic production can be allocated to two markets: the domestic quota (Q), and exports to the United States (X^{us}). Thus, $Q_s = Q + X^{us}$. If one assumes linear demand and marginal cost curves, they can be expressed as

$$P = \alpha_0 - \alpha_1 Q, \quad (1)$$

$$MC = \beta_0 + \beta_1(Q + X^{us}), \quad (2)$$

where the constant terms subsume other factors Z^d and Z^s that remain constant. Using the consumer surplus (CS) and the producer surplus (PS) as money-metric measures of consumer and producer welfare, they are given by

$$CS = .5\alpha_1 Q^2, \quad (3)$$

$$PS = P_{us} X_{us} + PQ - \beta_0(Q + X_{us}) - .5\beta_1^2(Q + X_{us})^2, \quad (4)$$

where P_{us} is the U.S. price.

Following Riethmueller and Roe, and Lopez, let the utility function of the subgovernment agency that enacts sugar policies be reflected by $U = U(CS, PS, \phi)$ where CS is the consumer surplus, PS is the producer surplus, and ϕ is a vector of government behavior parameters.

To illustrate, let the government utility function be approximated by a linear function. Then, the optimization problem for a social planner is given by
with respect to Q . The first order condition and interior solution for Q are given by

$$\text{Max } U = \phi_1 CS + \phi_2 PS \quad (5)$$

$$\frac{\partial U}{\partial Q} = \phi_1[\alpha_1 Q] + \phi_2[\alpha_0 - 2\alpha_1 Q - \beta_0 - \beta_1(Q + X_{us})] = 0, \quad (6)$$

$$Q^* = \frac{\phi_2[\beta_0 + \beta_1 X_{us} - \alpha_0]}{\phi_1 \alpha_1 - \phi_2[2\alpha_1 + \beta_1]} \quad (7)$$

Using (1) and (7) the effects of selected exogenous factors (Z) on the market quota and the domestic price can be classified as follows:

Exogenous (Z)	$\partial Q^*/\partial Z$	$\partial P^*/\partial Z$	dP^*/dZ
U.S. Quota (X_{us})	-	+	\pm
Size of Demand (α_0)	+	-	+
Size of Supply ($-\beta_0$)	+	-	-
Consumer Welfare Weight (ϕ_1)	+	-	-
Producer Welfare Weight (ϕ_2)	-	+	+

For instance, letting marginal cost and demand have equal slopes ($\beta_1 = \alpha_1$), $\partial Q^*/\partial X_{us} = 1/(\phi_1 - 3\phi_2)$ which is expected to be negative. The partial effect of an increase in the U.S. quota on the domestic price is positive. However, if producer welfare weight changes with changes in the U.S. quota ($\partial\phi_2/\partial X_{us} \neq 0$), then we are interested in the total net effect of the U.S. quota on P^* . Although the U.S. quota endows producers with resources for rent-

seeking, suggesting a positive sign, the government may be more inclined to cross-subsidize domestic consumers when the U.S. quota is large, suggesting a negative sign. Thus, we expect dP^*/dX_{us} to be negative for large levels of U.S. quotas as the redistributive concern overpowers the rent seeking pressure.

Likewise, if $\beta_1 = \alpha_1$, $\partial P^*/\partial \alpha_0 = \phi_2/(\phi_1 - 3\phi_2) < 0$ and $dP^*/d\alpha_0 = \alpha_1(4\phi_2 - \phi_1)/\phi_2 > 0$.

Thus, the ultimate effect of an increase in demand is to increase the domestic price. It can also be shown that increases in supply and consumer welfare weight results in lower domestic prices while the reverse is expected for increases in producer welfare weight.

More generally, government choices with respect to the domestic price can be expressed as

$$P^* = f_i(Z^s, Z^d, X_{us}; \alpha, \beta, \phi). \quad (8)$$

Thus, equation (8) can be thought of as representing a reduced form equation describing political economic behavior.

Empirical Procedures

Equation (8) provides the theoretical foundation for the empirical model. The real price of sugar (adjusted for domestic inflation) is used as the dependent variable.

Political market variables to capture the effects of shifts in ϕ include the share of total sugar revenues in the GDP, the U.S. quota, U.S. quota squared, and dummy variables to account for pricing decision shifts during the Philippine sugar policy periods mentioned above. Exogenous demand shifters include per capita gross domestic product and population. Exogenous supply shifters included the price of rice, the wage rate, lagged acres of sugarcane

planted, and a Stallings' index to measure weather (ratio of actual sugarcane yields to yields predicted by a linear trend).

An inverse relationship is expected between the domestic price of sugar and sugar's share of the GDP due to its changed relative importance as a taxation base (Anderson and Hayami). The expected signs of the coefficients relating the sugar price to the U.S. quota are expected to be positive for the linear term and negative for the squared term. Following the four Philippine sugar policy periods, three dummy variables are included in the model, excluding the one for the 1962-74 period. Thus, the coefficients associated with these dummy variables measure pricing decision shifts relative to 1962-74, the baseline period.

The models were applied to 1952-88 annual data on the Philippines. Domestic consumer prices up to 1983 are from Nelson (1988). Other data sources include *International Financial Statistics*; *Sugar Yearbook*; and Intal and Power. Sugar prices were expressed in pesos per metric ton of raw sugar. The wholesale price of sugar (delivered in Manila) was used as a measure of the consumer price. The GDP was measured in billions of pesos. All figures are expressed in real pesos using the consumer price index as a numéraire. The model was corrected for serially correlated error terms. The results are presented below.

Empirical Results

The empirical results for the pricing equations are presented in Table 1. The results indicate that the higher the U.S. quota, the more inclined the Philippine government would be to tax producers (subsidize consumers) by setting lower consumer prices. The effect of the U.S. quota on domestic prices is given by $(6.76 - 2 \times .003X_{us})$ which becomes negative when the U.S. quota exceeds 1.038 million metric tons of raw sugar. This result may, in part, explain the dramatic increase in sugar consumer prices in the Philippines in recent years. As U.S.-bound

exports dropped, the domestic consumers were the only source available to maintain domestic producer prices.

The coefficient of the dummy variable for the 1952-62 (industrialization) period shows no discernible difference from the benchmark period (1963-74) in terms of consumer-pricing biasedness. Contrary to expectations, no measurable difference in consumer prices was found between the period of Marcos' direct control of sugar marketing (1974-85) and the 1962-74 period. Some of the ways of penalizing the industry in this period were not related to the level of consumer prices *per se* but rather to delays in payment to producers, and mismanagement of sugar trading and credit. The dummy variable representing the Aquino administration has a significant (at the 5% level) and positive impact on consumer prices. In contrast to the 1962-74 period, the government of President Aquino further increased consumer prices to support producer prices. Since 1987, a year after Aquino took power, the wholesale price of sugar in the Philippines has exceeded that of the United States.

The sugar share of GDP did not seem to have a significant effect on domestic consumer price. Only the coefficients of population and lagged sugarcane area were significantly different from zero (at 5% level) among the supply and demand shifters. However, all the coefficients had the expected sign. Finally, the lagged dependent variable coefficient failed to indicate a strong degree of partial adjustment and stability regarding consumer prices.

Concluding Comments

This article empirically analyzed political-economic decision-making with respect to Philippine consumer prices for sugar. The conceptual framework rested on the assumption that government authorities respond to distributional welfare consequences, where the welfare weights are determined in the political market.

Regression analysis was performed using the real consumer price for sugar as dependent variables, and a set of commodity and political market variables as regressors. The empirical results supported the notion that, in terms of Philippine sugar prices, the government has responded to distributional concerns. Furthermore, the weights placed on various societal groups appear to have changed markedly only during the recent platform of President Aquino (since 1986). In particular, changes in the U.S. quota have played a prominent role in political-economic decision-making with respect to domestic sugar prices.

The new agenda of President Aquino calls for stabilization and expansion of rural employment and agricultural exports where sugar is a priority. Given the low level of sugar exports relative to historical levels, President Aquino has resorted to higher domestic prices to maintain producer prices. However, the effects of continued favorable producer prices may be hampered by uncertainties over the U.S. sugar quota and Philippine land reform.

Table 1. Estimated Parameters for the Equation Explaining the Sugar Price Level.

Dependent Variable: Real Domestic Price of Sugar

Explanatory Variable	Estimated Coefficient	T-Ratio	Elasticity at Mean Value
U.S. Quota	6.758**	3.290	-.934
U. S. Quota Squared	-.003**	-2.893	-.500
Sugar Share of GDP	273.30	1.619	.119
Industrialization (52-62)	487.93	.954	.019
Marcos (1974-85)	436.20	.796	.026
Aquino (1986-88)	2185.9**	2.199	.032
Per Capita Income	59974	.312	.123
Population	.250**	4.017	1.704
Price of Rice	322.22	1.086	.335
Wage Rate	59.948	.975	.328
Weather	-937.72	-.864	-.163
Lagged Cane Area	-14.921**	-3.537	-.917
Lagged Dependent Variable	.222	1.141	.213
Intercept	-7561.0	-1.721	--
<hr/>			
R ²	.947		
n	35		
ρ_1	-.525	-4.348	
ρ_2	-.700	-5.802	

Notes: Sample includes 1954-88 years. All figures are expressed in real pesos using the consumer price index (1988=1.0). The first- and second -rder serial correlation coefficients are ρ_1 and ρ_2 , respectively.

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