POLITICAL ECONOMY OF PRICING POLICIES:
THE CASE OF PHILIPPINE SUGAR

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A. Introduction

Government intervention in commodity markets has long been the focus of academic and political debate. Traditionally, the rationale for government intervention has been to correct market failures, such as in the area of the public good or for externalities, in order to increase social welfare or economic efficiency. When markets do not fail, however, government intervention is often justified on distributional grounds. From this standpoint, societal groups or their representatives are willing to forego some economic efficiency in order to induce a more acceptable distribution of income. More recently, government behavior has been viewed as a political-economic process driven by rent-seeking pressure exerted by interest groups.[1] Regarding government behavior in the absence of market failures, Bhagwati [5] characterizes government behavior as being either self-willed or of the clearing-house types, depending upon whether political decisions are driven by redistribution principles or by opportunistic behavior that responds to political leverage.[2] In a more general framework, however, both types of government behavior could well and likely coexist.

This article examines the political economy of government pricing decisions using the Philippine sugar market as a case study. The key characteristics of this market are as follows. First, the government has intervened in the market by impeding imports and setting domestic market quotas in order to determine the price consumers pay.[3] This has required the balancing of the conflicting interests of consumers and producers in the governmental decision process. Second, through its sugar policy, the United States has traditionally guaranteed sizable Philippine sugar exports at a premium price under an import quota. In fact, 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 changed markedly across administrations. Note-

[1] See [4] [5] [6] [15] [22].
[2] A similar classification has been made, among others, by Lavergne [16]—principled and vote-seeking behaviors—and Rausser [23]—productive and predatory policies.
[3] See [19] [21].

worthy political periods include the import substitution drive in the 1950s and
1960s, Marcos' years of political upheaval, and the political period 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 presents a
conceptual framework for government decisions based on an income distribution
objective with welfare weights that are determined by principled and/or rent-
seeking behavior. The empirical analysis rests on regression models that use the
real domestic and the ratio of domestic/world sugar prices as dependent variables,
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 presidential administrations, and the central role
played by sugar exports to the U.S. market.

B. *The Political-Economic Equilibrium Price*

Government intervention has been an important determinant of Philippine
sugar prices (Figure 1). Except for the years of abnormally high world prices,
the government has kept domestic prices above world prices. Figure 2 concep-
tualizes the Philippine sugar market under the typical situation where the country
deals only with the United States as the foreign market.[4] We let D and MC
denote the domestic demand and industry marginal cost curves. Producers are
required to sell in the domestic market under a government-set quota Q^* at
resulting price P^* in order to export sugar under a U.S.-set quota (X_{us}) at the
U.S. price (P_{us}). There are no incentives to export to the rest of the world
because the world price (P_w) is usually below the Philippine marginal cost.[5]

Let the inverse demand and marginal cost be given by

$$P = \alpha_0 - \alpha_1 Q + \alpha_2 Z_d, \tag{1}$$

$$MC = \beta_0 + \beta_1(Q + X_{us}) + \beta_2 Z_c, \tag{2}$$

where Z_d and Z_c are demand and marginal cost shifters. Keep the shift variables

[4] The Philippine government has banned sugar imports except for relatively small amounts
imported in 1977, 1987, and 1988. Exports to the rest of the world occurred mainly in
the mid-1970s and early 1980s during Marcos' control of sugar trade and severe changes
in U.S. sugar import policies. Another reason for the lack of exports to the rest of the
world is the high cost of production which is often above the world price (see [18]).
Excluding the 1974–81 period of U.S. program suspension, Philippine sugar exports to the
United States have accounted for over half of total sugar production and over 86 per cent
of total sugar exports between 1952 and 1990. Furthermore, the role of the U.S. quota
was especially critical before 1974; between 1952 and 1973 Philippine sugar exports to
the United States accounted for over 70 per cent of total production and 99 per cent of
total sugar exports. Nelson [19] identifies a few years when exports to the United States
were slightly less than the allocated U.S. quota.
[5] This argument assumes that the domestic and U.S. quotas are efficiently shared among
sugar producers. If they are not, then the MC under quotas will be above the lowest MC
curve.

Fig. 1. Philippine Sugar Prices, 1952–90

(Thousand 1990 pesos / MT)
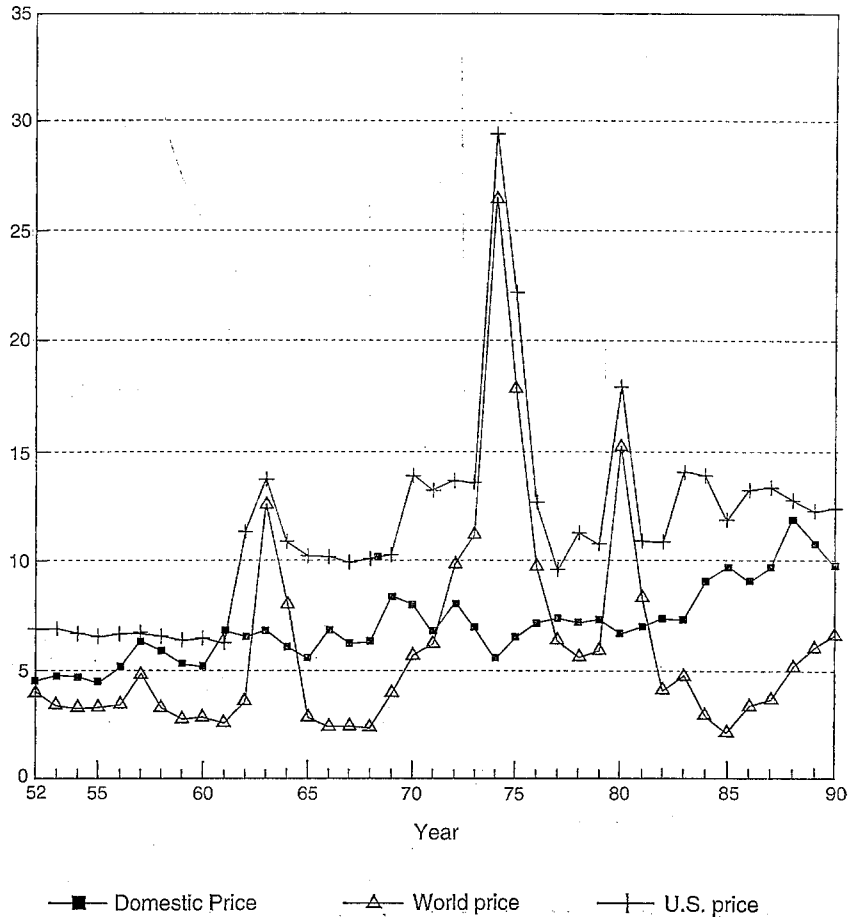
constant so that $\bar{\alpha}_0 = \alpha_0 + \alpha_2 Z_d$ and $\bar{\beta}_0 = \beta_0 + \beta_2 Z_c$ become intercepts of the corresponding demand and MC curves. Using the consumer surplus (CS) and the producer surplus (PS) as money-metric measures of consumer and producer welfare [14, Chap. 8], their estimates are given by

$$CS = 0.5\alpha_1 Q^2, \tag{3}$$

$$PS = P_{us}X_{us} + PQ - \bar{\beta}_0(Q + X_{us}) - 0.5\beta_1(Q + X_{us})^2. \tag{4}$$

Following Lopez [17], let the utility function of the government agency that

Fig. 2.   Typical Situation in the Philippine Sugar Market
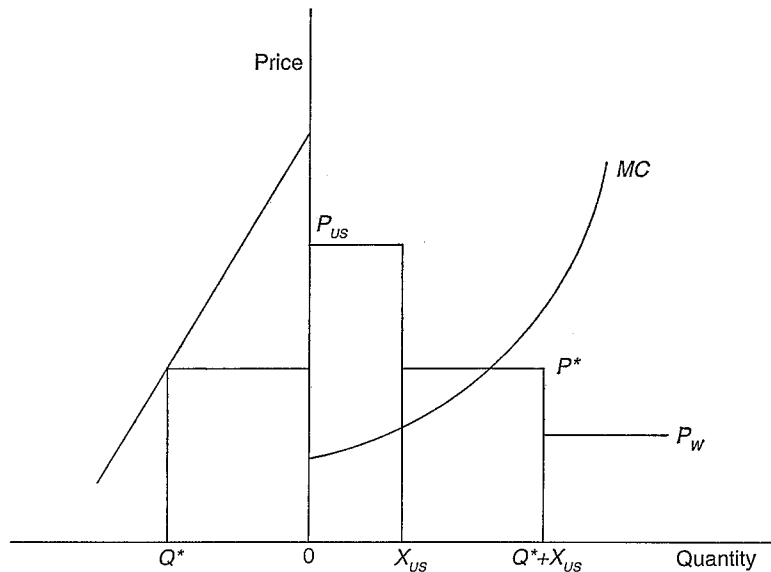
enacts sugar policies be reflected by $U = U(CS, PS)$ where CS is the consumer surplus and PS is the producer surplus. Letting the government utility function be approximated by a linear function, the optimization problem for a social planner that takes into account the welfare of interest groups is to choose Q to

$$\text{Maximize } U = CS + \theta PS. \tag{5}$$

The term θ indicates the relative welfare weight given to producers, i.e., the political strength of producers vis-à-vis consumers. Note that $\theta = 1$ denotes the case where consumers and producers welfare have equal weights in the government utility function, while $\theta > 1$ denotes the case where producers have more political clout than consumers. When $\theta \leftarrow \infty$, the government sets the domestic quota so as to maximize producers surplus, i.e., the monopoly/cartel solution. The first-order condition for government utility maximization is given by

$$\frac{\partial U}{\partial Q} = \alpha_1 Q + \theta[\bar{\alpha}_0 - 2\alpha_1 Q - \bar{\beta}_0 - \beta_1(Q + X_{us})] = 0 \tag{6}$$

Letting the first term denote the marginal consumer surplus (MCS) and the term in brackets the marginal producer surplus (MPS), condition (6) can be rewritten so that $MCS/MPS = -\theta$, as in Gardner's [7] political economic equilibrium. A change in the relative political clout of sugar producers results in a change in the political-economic price equilibrium. Let θ change with changes in the U.S. sugar quota and in exogenous political conditions. Nelson [20] suggests that the U.S. quota has provided producers with resources (and incentives)

for rent-seeking activities, suggesting a positive impact. In addition, these had been important changes in government objectives in the postwar periods.[6] To account for these factors, let the producer welfare weight be determined by

$$\theta = \gamma_0 + \gamma_1 X_{us} + \gamma_2 Z_p,$$

(7)

where Z_p is an exogenous welfare-weight shifter other than the U.S. quota.[7]

Solving for Q^* in equation (6) and using equations (6) and (1), the political-economic price equilibrium is now given by

$$P^* = \alpha_0 + \alpha_2 Z_d - \alpha_1 \cdot \frac{\beta_0 + \beta_2 Z_c + \beta_1 X_{us} - \alpha_0 - \alpha_2 Z_d}{\alpha_1 (\gamma_0 + \gamma_1 X_{us} + \gamma_2 Z_p)^{-1} - 2\alpha_1 - \beta_1}.$$

(8)

Using comparative statics, the impact of cost and demand shifters on the domestic price can be characterized as follows:

$$\frac{dP^*}{dZ_c}, \ \frac{dP^*}{dZ_d} > 0.$$

(9)

Thus, changes in the demand and industry marginal cost conditions change the political-economic equilibrium price. For instance, an increase in population (an increase in Z_d) results in an increase in the domestic quota. However, the ultimate effect of an increase in demand is to increase the domestic price.[8] An exogenous increase in the industry marginal cost, such as an increase in the wage rate (an increase in Z_c), results in an increase in the domestic sugar price set, ceteris paribus. Also note that such changes also represent a decrease in supply since, under competitive conditions, equation (2) denotes an inverse supply curve.

Based on equation (8), the impact of the U.S. quota on the domestic sugar price can be characterized as follows:

$$\frac{dP^*}{dX_{us}} > 0 \ \text{and} \ \frac{d^2 P^*}{dX_{us}^2} < 0.$$

(10)

That is, although the U.S. sugar quota has a positively impact on the domestic price, it does so at a decreasing rate. This implies that the marginal influence of the producers decreases as the U.S. quota increases.

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[6] See [2] [3] [10] [19].

[7] Equation (4) suggests the inclusion of both X_{us} and P_{us} in equation (7). However, X_{us} occupies a distinct place in equation (7) for the following reasons. First, the key rent-seeking factor regarding U.S. exports to the Philippines is the Philippine sugar quota, since it involves a policy decision specifically tailored to the Philippines (see [19] [20]). In contrast, P_{us} is set by the U.S. domestic farm programs, with U.S. objectives in mind. Second, the P_{us} is inversely related to X_{us}, since the P_{us} overall has been mainly supported by setting a global import quota share among some thirty-nine countries [17], although the Philippines receives a sizable portion of the global import quota. The partial correlation coefficient between X_{us} and P_{us} for the 1952–90 period is -0.80. Third, P_{us} is partially accounted for in the empirical model by including a variable for the ratio of total sugar revenues to the GDP. The latter is included in Z_p in equatoin (7).

[8] To illustrate, let $\beta_1 = \alpha_1$, and use equation (7), to obtain $dP^*/d\alpha_0 = (1-2\theta)/(1-3\theta) > 0$, which is positive because $\theta > 0.5$.

C. Empirical Procedures

Equation (8) provides the theoretical foundation for the empirical model. Equation (8) is highly nonlinear in the parameters and is based on the assumption of linear demand and marginal cost curves. For the sake of simplicity, a linear functional form is used for the empirical pricing equation.[9] Generalizing from equation (8), one could assert that the government pricing decisions for domestic sugar are driven by the U.S. quota (X_{us}), marginal cost shifters (Z_c), demand shifters (Z_d), and political market conditions (Z_p).

Exogenous demand shifters (Z_d) include per capita gross domestic product (GDP) and population. Exogenous marginal cost shifters (Z_c) include the agricultural wage rate and lagged acres of sugarcane planted. According to McCoy [18], labor is the most important cost item in Philippine sugarcane production. Political market variables include the U.S. quota and nonquota factors (Z_p), such as the share of sugar revenues in the GDP and dummy variables to account for changes in producers' influence across presidential administrations. Since the impact of the U.S. quota on the domestic price was hypothesized to increase at a decreasing rate, the U.S. quota and U.S. quota squared were included in the model. Accordingly, the 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. A dummy variable is included for the 1974–81 period to capture the impact of the suspension of the U.S. sugar program in those years. The exports flows to the United States during this period were used in lieu of U.S. quotas.[10]

The producers' influence across Philippine presidential administrations is likely to have changed along with changes in government objectives in the postwar period.[11] Up to the 1960s, when the country pursued industrialization and import

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[9] For the purpose of this article, only the reduced-form equation (analogue of equation 8) is estimated. A system of equations approach with cross-equation parameter restrictions (using equations 1, 2, and 8) was not pursued given the nonlinearities and complexities of the price-setting equation and the lack of data to estimate the industry marginal cost function. According to the order condition, each equation is overidentified since the number of excluded exogenous (1) is greater than the number of included endogenous less 1 (0). Applying a procedure outlined by Judge et al. [13, pp. 359–61], the rank condition —a sufficient condition for identification—is satisfied by equations (1) and (2) as long as none of the slope parameters is zero. In fact, the equations are overidentified. The empirical model includes two marginal and two demand shifters (instead of one), increasing the likelihood of overidentification. Finally, since equations (1) and (2) were not estimated, the rank condition cannot be confirmed empirically in terms of the statistical significance of the slope coefficients. The empirical results for equation (8), however, seem consistent with identified underlining marginal cost and demand equations.

[10] The use of a dummy variable for the 1974–81 U.S. quota suspension is an oversimplification since such change in policy may have changed the structure of the whole model. The theoretical derivation of P^* for that period will differ somewhat since the U.S. price approximated the world price, and the Philippines had to compete in the open market to penetrate the U.S. sugar market. Several attempts to include slope shifters to account for structural changes failed to improve the results or to provide further insight into the political economy of sugar pricing in the Philippines.

[11] See [2] [3] [10] [19].

substitution, sugar producers had a great deal of influence on domestic quota decisions when sugar policy was in the hands of the Sugar Quota Administration [9, pp. 25–32]. From 1965 to 1985 Marcos was president; from 1974 to 1985 he took direct control of sugar marketing and trade, and penalizing the producers through lower prices apparently became an important goal.[12] From 1986 to 1992 a main the goal of the Aquino government was to restore the economic prosperity of the industry. The 1952–64 period was selected as the benchmark to measure the pricing bias of the other two sugar policy periods. The expected impacts on domestic prices are: negative for the Marcos period and positive for the Aquino government.

Besides the government attitude toward the industry, the political strength of interest groups is also determined by the cost and effectiveness of organizing lobbying activities and of demanding favorable regulation [22].[13] Agricultural policies tend to favor consumers at the expense of producers (i.e., lower prices) the higher the share of food in the consumer's budget and the higher the importance of the agricultural sector in the economy.[14] Although sugar has been important in the Philippine economy, its share of the Philippine household budget is small relative to rice (which is the staple food commodity). Given this fact and the lack of data on food consumption expenditures, the share for sugar in the household budget was not included. However, sugar's share of the GDP was included given the economic importance of the sugar industry in the Philippines. Furthermore, an inverse relationship is expected between the domestic price of sugar and sugar's share of the GDP in accordance with its importance as a taxation base.[15]

A second version of the model was estimated where the dependent variable used was the domestic price of sugar relative to the world price, as an approximation of the degree of consumer taxation, since it is the relative price wedge created through government intervention. Although it is obvious that the world price is not a choice variable for Philippine policymakers, the second model allows comparison to previous work using the nominal protection coefficient as the dependent variable. In addition, the world price in domestic currency units (the denominator) should partially reflect the government's exchange rate and macroeconomic policies.

The models were applied to 1952–90 annual data. The wholesale price of sugar (delivered in Manila) was used as a measure of the domestic price. Data sources included [19] [21] [10] [11] [12, various issues] [24, various issues]. All figures are expressed in real pesos using the consumer price index as a *numèraire*. Both versions of the model were tested for serially correlated error terms. Based on these tests, the first model was corrected for second-order correla-

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[12] See [19] [25].

[13] In this regard, Philippine sugar producers are well organized, geographically concentrated in the Island of Negros, and production is dominated by a few large specialized sugar estates. Although Philippine consumers are not formally organized, they have been known to demonstrate in the capital city over price increases of staples.

[14] For example, see [1] [8].

[15] See [1] [8].

TABLE I

ESTIMATED PARAMETERS FOR THE EQUATION EXPLANING
THE SUGAR PRICE LEVEL

Explanatory Variable	Estimated Coefficient	t-Ratio	Elasticity at Mean Value
U.S. quota (1,000 MT)	9.182***	5.467	1.001
U.S. quota squared	−0.005***	−5.323	−0.533
U.S. program suspension (1974–81)	−701.60**	−2.100	−0.021
Sugar share of GDP (100%)	−549.31***	−3.356	−0.187
Marcos (1965–85)	−786.47***	−3.012	−0.059
Aquino (1986–90)	90.502	0.129	0.002
Per capita income (1,000 pesos)	0.131	1.094	0.272
Population (1,000)	0.787***	3.898	1.611
Wage rate (pesos/day)	−0.636	−0.027	−0.004
Lagged cane area (1,000 ha)	−6.539**	−2.195	−0.319
Lagged dependent variable	0.178	0.592	0.103
Intercept	−4,887.2***	−3.175	−0.689
R^2	0.941		
n	39		
ρ_1	−0.548	−6.052	
ρ_2	−0.825	−9.100	

Notes: 1. Dependent variable: real domestic price of sugar (pesos/MT).
2. Sample includes 1952–90 years.
3. All figures are expressed in real pesos using the consumer price index as a deflator (1990=1.0).
*** Significant at 1 per cent level.
** Significant at 5 per cent level.
* Significant at 10 per cent level.

tion while the second model was corrected for first-order correlation. The second model also included an additional explanatory variable, the world sugar stocks, to control for extreme fluctuations in the world price.[16] The results are presented below.

D. *Empirical Results*

The empirical results for the pricing equations are presented in Tables I and II. Most estimated parameters have the expected sign and most are significant at the 10 per cent level. In the results in Table I, where the deflated price of sugar is used as the dependent variable, eight out of twelve coefficients are significantly different from zero at the 10 per cent level. In the results in Table II, eleven out of thirteen of the coefficients were statistically significant at the 10 per cent level. The first version of the price equation model explains approximately 94 per cent of the variation of the real consumer price, while the second version explains approximately 89 per cent of the domestic/world sugar price ratio variation.

[16] The inclusion of world sugar stocks significantly improved the overall statistical results of the second version of the model since it greatly explains variation in the denominator of the dependent variable, P/P_w.

The results in Table I confirmed that although increases in the size of the U.S. quota increase domestic consumer prices, they do so at a diminishing rate. The results for the U.S. free trade period point out that the removal of a guaranteed Philippine quota results in a decline in the domestic sugar price, thus directly benefiting consumers while hurting producers. It should be pointed out that this period also coincided with the Marcos government's direct control of sugar marketing and trade so that the negative impact of the 1974–81 dummy variable reflects the composite of the U.S. sugar program suspension as well as Marcos' policies. It should also be noted that this period was also one of abnormally high world sugar prices (Figure 1), well above the ones normally guaranteed by a U.S. sugar quota.

The coefficient of the dummy variable for the 1965–85 period indicates that relative to the benchmark (1952–64) period, the Marcos period showed pro-consumer (anti-producer) pricing decisions. In addition to facing lower domestic prices, sugar producers were also penalized via delays in payment and mismanagement of sugar trading and credit. Contrary to expectations, the coefficient associated with the Aquino administration was not significantly different from zero (at the 10 per cent level). That is, there is no measurable difference between Aquino's policies per se and the pre–Marcos period of strong producer influence.

The coefficient for the sugar share of GDP was statistically significant at the 1 per cent level, but its sign was contrary to expectations. Except for the wage rate coefficient, all the coefficients associated with demand and marginal cost shifters had the expected sign. However, the wage rate and per capita income did not show discernible effects on the domestic price. Finally, the lagged dependent variable coefficient indicates a weak degree of partial adjustment, being statistically insignificant at the 10 per cent level.

Table II presents the results for the equation explaining the degree of consumer taxation, i.e., the ratio of the domestic to world sugar price. Overall, the results for the second version of the model (Table II) are analogous to those in Table I. In general, the level of significance of the individual variables increased in the second model. Eight out of twelve of the common explanatory variables had coefficients with higher t-ratios in the second model vis-à-vis the first model. Also, four coefficient signs are reversed in the second model relative to the first model: the one associated with the Aquino dummy variable (negative), per capita income (negative), wage rate (positive, the expected sign), and the intercept (positive).

The results show that as the importance of sugar in the economy (sugar's share of GDP) increases, consumers tend to be subsidized, which is consistent with Honma and Hayami's [8] findings for agricultural sectors as a whole. The estimated coefficient for the 1965–85 dummy variable in Table II suggests that during the Marcos presidency there was an increase in the degree of consumer taxation (ratio of domestic price relative to the world price). Perhaps higher consumer prices provided partial compensation to producers for indirect taxation through exchange rates. The negative sign of the Aquino coefficient indicates that her administration resulted in a lower degree of consumer taxation relative to the 1963–73 period, when controlling for other factors.

TABLE II

ESTIMATED PARAMETERS FOR THE EQUATION EXPLANING
THE DEGREE OF CONSUMER TAXATION

Explanatory Variable	Estimated Coefficient	t-Ratio	Elasticity at Mean Value
U.S. quota (1,000 MT)	0.002**	2.376	1.109
U.S. quota squared	-9.9×10^{-7}*	-1.773	-0.515
U.S. program suspension (1974–81)	0.113	0.548	0.016
Sugar share of GDP	-0.366***	-3.958	-0.614
Marcos (1965–85)	-0.823***	-5.052	-0.305
Aquino (1986–90)	-1.489***	-4.195	-0.131
Per capita income (1,000 pesos)	-0.0006***	-8.323	-5.945
Population (1,000)	0.0002***	6.765	4.163
Wage rate (pesos/day)	0.066***	4.904	1.931
Lagged cane area (1,000 ha)	-0.005***	-4.013	-1.221
World stocks (million MT)	9×10^{-5}***	6.968	1.236
Lagged dependent variable	0.519***	8.216	0.511
Intercept	0.231	0.283	0.159
R^2	0.885		
n	39		
ρ_1	-0.524	-3.710	

Notes: 1. Dependent variable: ratio of wholesale to world sugar price.
        2. Sample includes 1952–90 years.
        3. All figures are expressed in real pesos using the consumer price index as
            a deflator (1990=1.0).
 *** Significant at 1 per cent level.
  ** Significant at 5 per cent level.
   * Significant at 10 per cent level.

The quota suspension variable did not show a discernible impact on the level
of the domestic sugar price relative to the world price. Interestingly enough, the
coefficient associated with the lagged dependent variable became significant in
the second model, indicating a significant degree of rigidity or inertia in the degree
of consumer taxation via sugar prices relative to world prices. This was not the
case in the results explaining the sugar price level alone (Table I). Perhaps the
world price is used as a reference price, and hence does play an important
role in the decision-making process. This would certainly be consistent with
the renewed reliance on the world market as the U.S. quota had been dramatically
reduced in the 1980s.

The sign of the coefficient associated with per capita income is contrary to
expectations while the sign of the coefficient for the wage rate is the expected
one since increases in labor costs are expected to increase the political-economic
price equilibrium via equation (9). Finally, except for the variables related to
the U.S. quota, the magnitudes of the computed elasticities at mean values did
increase dramatically in the second model relative to the first model. This suggests
that the degree of consumer taxation, in terms of the nominal rate of protection, is

more sensitive to political-economic factors than the domestic sugar price itself.

E. *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 by the U.S. quota and the political market conditions. Regression analyses were performed using the real consumer price and the ratio of domestic/world sugar prices as dependent variables, and commodity and political market variables as regressors. The model gave plausible results, whether explaining the price level or the ratio of the domestic to the world sugar price.

The empirical results supported the notion that the Philippine government has responded to distributional concerns, with welfare weights determined by government principles and political leverage. The welfare weights have changed markedly across presidential administrations, particularly between those of the Marcos government and those of President Aquino. The U.S. quota has played a prominent role in political-economic decision making with respect to domestic sugar prices.

The agenda of President Aquino called for stabilization and expansion of rural employment and agricultural exports where sugar was a priority. However, these efforts may have been hampered by uncertainties over the U.S. sugar quota and the Philippine land reform. Furthermore, given the high cost of production for Philippine sugar, there has not been any compelling comparative advantage or a priori reason other than the existence of the U.S. quota for the country to export sugar. If the Philippines were to continue to receive sizable U.S. sugar quotas, then the domestic welfare-maximizing strategy would be to import sugar to keep consumer prices down while fulfilling the higher-priced U.S. quota.

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