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Price Policy and Agricultural Development in Ecuador

by

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Abstract

Price Policy and Agricultural Development in Ecuador

by

Wayne R. Thirsk

Agriculture has taken on the appearance of a badly lagging sector in Ecuador. Three factors which help to explain this poor performance are domestically set product prices for many agricultural commodities which are below international levels, generous incentives for import substitution in the industrial sector and a failure to adjust the tariff structure to take account of surplus labor. Each one of these factors depresses the rewards that can be earned in agricultural activities and contributes to lower real incomes in the economy as a whole. This paper examines the nature and magnitude of these pricing distortions and speculates on the probable income distribution consequences that would emerge if more favorable terms of trade were established for Ecuadorian agriculture. It is concluded that the present price structure serves the interests of neither efficiency nor equity.

Price Policy and Agricultural Development in Ecuador

Ecuador is a classic example of the Latin American pattern of growth and change. That country, like so many of its immediate neighbors, has attempted to develop and industrialize through the pursuit of an inward-looking strategy of import substitution. Trade policy has been the main instrument used by the government to redirect economic activity toward the industrial sphere and away from the historically large agricultural sector. This paper examines some of the consequences of this policy on the performance of the agricultural sector, laying particular emphasis on the way in which the policy-induced shift in the domestic terms of trade has hampered its contribution to the growth process.

Three different price distortions have combined to produce an adverse shift in the terms of trade against agriculture. These are: (1) relatively high excise taxes on both agricultural exports and import competing products. For import competing products the tax has taken the form of a domestically controlled price set below world price levels; (2) as a result of tariffs, import licensing and other trade controls, relatively high rates of effective protection favoring industrial sector output; (3) imperfect factor markets, in particular, the presence of substantial surplus labor in most areas of the country. The first two distortions represent errors of commission on the part of policymakers,

while the latter is more nearly one of omission. Both the excise taxes on import competing products and the high degree of industrial protection have had the effects of encouraging an excessive reliance on imports in the agricultural sector. As with most import substitution strategies, the one in Ecuador has been unduly promiscuous--it has drawn resources away from the agricultural sectors in which there was a strong initial comparative advantage. The sin of omission, on the other hand, has been the failure to adopt a rational, second-best, tariff policy which would structure the system of tariffs to take account of the existence of surplus labor. This factor market imperfection, as it is later shown, would indicate that agriculture, rather than industry, deserves some protective shelter from world prices.

The next section of this paper discusses the recent evolution of the agricultural sector in Ecuador and the progress of the economy over the last couple of decades. Subsequent sections are concerned with measuring the economic impact of the previously mentioned price distortions.

1. Background and profile of Ecuador's economy

The single dominating factor in the performance of Ecuador's economy for the past few years, and likely into the future, has been the exportation of newly discovered supplies of oil. As a result, there has been a rapid and unusually large increase in foreign exchange earnings since 1972. For example, over the period 1972-73 total merchandise exports rose by 93 percent while imports, freed from most licensing restrictions, rose by only 35 percent. During the same period government revenues increased by 60 percent and growth of GDP was well over 10 percent in real terms.

Realization of this new oil wealth has presented the economy with some short-run problems and some longer-run opportunities. The major benefit accruing to the economy from the exploitation of oil is in the form of vastly augmented government revenues since the generation of oil exports is highly import-intensive and creates few direct employment gains. Endowed with these resources, the government has been enabled to directly, and indirectly through loans to the private sector, entertain and plan ambitious investment programs affecting all sectors of the economy. These plans promise to lay the basis for sustained high rates of economic growth long after existing oil reserves are depleted.

In the short run, however, the oil boom has sparked an inflationary episode of deep concern to government authorities. As measured by the Consumer Price Index, the only index of prices in Ecuador, price increases averaged 4.2 percent over the decade 1960-1970. By 1972 the rate of inflation had climbed to 7.6 percent. It nearly doubled in 1973 to a rate of 12.4 percent, and then doubled again in 1974 to reach a disturbingly high rate of 23.3 percent. By 1975, price pressures seemed to have abated slightly.

Essentially two explanations help to interpret this recent inflationary experience. In the first place, as a small, open economy with an overall import--GDP ratio of about .25, Ecuador could not shield itself from worldwide inflationary pressures as long as it maintained a fixed exchange rate. Secondly, the balance of payments surplus created by the oil boom, and its counterpart of growing foreign exchange reserves, have fueled a purely domestic inflationary process. By maintaining a fixed exchange rate government authorities have been forced

to purchase excess foreign exchange earnings with domestic currency and, as a result, the domestic money supply and domestic credit have expanded rapidly. Between October 1973 and October 1974, the money supply in Ecuador grew by 37 percent. Despite some attempts at import liberalization, Ecuador was faced with a choice between domestic inflation and revaluation of the Sucre. Revaluation as an option was rejected by both government officials and some economists since it was felt that such a step would have harmed Ecuador's other export products.

This argument fails to realize that essentially the same outcome, discouragement of other export activities, would also happen if the exchange rate were maintained, only in this case the mechanism would be rising input costs and costs of production instead of declining output prices. The point is that there are automatic market adjustments which serve to eliminate an export (current account) surplus once it appears. These occur partly through a reduction in other exports and partly through an expansion of imports, and they occur regardless of whether the exchange rate is fixed or flexible. Through either domestic inflation or revaluation, Ecuadorian price levels were bound to increase relative to world price levels as the economy adjusted to its significant balance of payments surplus. A large part of Ecuador's inflation, at least that part in excess of worldwide rates, could have been avoided by a revaluation of the sucre.

Another feature of the oil boom is that it has likely had negative consequences for the growth of employment and thus for income distribution in general. The reason is that expansion of capital and land intensive exports of oil has kept the price of more labor-intensive agricultural exports the same while bidding up their costs

of production. This change in the composition of exports has undoubtedly diminished employment within the export sector by some unknown magnitude.

In order to combat strong inflationary tendencies, the government reduced import duties by an average of around thirty percent in 1973, removed prior import deposit requirements and abandoned its long established import licensing system. Import licenses are now granted almost automatically. Capital goods and agricultural inputs received the largest tariff reduction with average rates for these items currently in the range of 10- 25 percent. Competitive intermediate inputs bear a tariff of 50 percent, while non-luxury and luxury consumption items face rates between 50-110 and 110-190 percent, respectively.

Until the recent oil boom, agricultural exports provided nearly 85-90 percent of export revenues. By 1972 this percentage had dropped to 70 percent and by 1973 it was only 52 percent. The important agricultural export commodities are, in order of significance, bananas, coffee, cacao and sugar. In the 1960s about 40 percent of total agricultural output was exported. At the same time, some crops are imported and imports of agricultural products have been rising at a rate of 8 percent a year for the last decade and now account for about 20 percent of total imports. In 1974 domestic agricultural production supplied close to 85 percent of the country's food needs compared to nearly 95 percent only five years previously in 1969. The major import item is wheat, in which case foreign purchases furnish roughly two-thirds of domestic consumption. Next in importance are edible fats and oils as only about 60 percent of total consumption

is met from domestic production. Castorbeans are the country's only major fat or oil export while African oil palm is the primary source of domestic edible oil. Other imports which ordinarily appear in any given year include barley, rice, soybeans, and corn--the latter mainly for feed purposes.

Significant export taxes, of the order of about 25 percent of fob price until very recently, are imposed on the four major agricultural export commodities noted above. These taxes are meant to perform a number of diverse functions. Until oil revenues started flowing into government coffers, they were an important revenue source in a country where income taxes yield relatively little. To avoid windfall gains to producers after the November 1971 devaluation of the Sucre, most of these taxes were raised by 10-15 percentage points. In the case of sugar and coffee, these taxes serve to adjust supply to the demand that is determined by an international quota. Coffee export taxes of 26.6 percent are based on referential prices which in most years have been lower than actual prices. In the case of cocoa the tax of 25 percent on the raw, unprocessed, product has stimulated the export of processed cocoa products which also receive a 10 percent CAT subsidy (Certificado de Abono Tributario). The 24 percent export tax on sugar mills has recently been cut to 12 percent in order to encourage expansion of the industry and overcome domestic supply shortages. To some extent these taxes are of a benefit nature as they finance expenditures which aid the growth of the taxed sector. A portion of the taxes are used to cover the costs of export promotion and, in the case of bananas, almost half the tax is returned to the sector through a plant disease control program. In addition, there

are often implicit export taxes which occur when the government refuses permission to export until it is assured that domestic requirements have been staisfied at existing domestic prices. For instance, the government has steadfastly discouraged the export of livestock and livestock products. With sugar the government has refused export licenses until domestic demands have been met at a price which has not been changed for the past 27 years. In 1974, the result was that Ecuador underfilled its U.S. sugar quota by some 37,000 short tons.

Agriculture has traditionally performed a dual function in Ecuador's economic development, that of supplying the foreign exchange needed to implement an ambitious program of import substituting industrialization, and that of feeding a domestic population growing at the relatively high rate of 3.5 percent annually. Until some point between the middle and the end of the 1960s agriculture achieved both tasks reasonably well. When world agricultural prices improved after World War II, the economy experienced a growth spurt at annual real rates of 5 percent and better. With deteriorating terms of trade and slower growth of exports after 1955-56, the pace of overall growth slackened as restrictions were placed on the growth of aggregate demand and imports to avoid balance of payments problems. Throughout the period 1950-64 agricultural output grew at an average rate of 3.5 percent and kept even with the rate of growth of population although its rate of growth of labor productivity was the lowest of any sector. Since 1966 agriculture has taken on the appearance of a badly lagging sector.

Lack of new investment and the absence of technical change seem to be the proximate causes of the disturbingly slow rate of growth of agricultural output in recent years. These problems, in turn, are apparently rooted in an inappropriate pricing structure, government expenditure neglect, and some defects in markets that supply inputs to the sector. Relative to other sectors of the economy, agriculture has been starved of resources which would spur its rate of growth of output and productivity. Before examining these matters in greater detail, it is useful to turn to Table 1, which outlines some of the dimensions of agriculture's plight. Until the 1970s agriculture accounted for roughly one-third of total output while employing over half the country's labor force. In more recent years the share of output has fallen to about 20 percent, while the employment share remains close to 50 percent.

Over the period 1965-73 other sectoral output shares have been more or less stable except for mining (petroleum essentially) which has grown from 1.9 to 7.7 percent, and construction which has grown from 3.6 to 5.1 percent. Employment in agriculture has been increasing steadily at an annual rate of 2 percent compared to a rate of 5.3 percent in nonagricultural sectors. Modern manufacturing has been absorbing labor at the rate of only 3 percent a year, causing the informal trade and services to expand rapidly to take up the slack caused by rapid rural-to-urban migration. Annual growth rates of agricultural output have fallen to around 2 percent, well below the average rates of 2.5-3.5 percent reached in earlier years.[1] Correspondingly, labor

[1]Because of a new system of accounting at the Central Bank, data before and after 1971 are not entirely comparable. Under the older

TABLE 1: Major Characteristics of Ecuadorian Agriculture

Period	Share of output[a/]	Share of employment	Share of bank credit	Share of intermediate inputs	Share of capital goods	Share of public goods	Share of public investment	Rate of growth of output	Rate of growth of labor productivity
1950-62[b/]	.36	.56	.084	-	.084	-	-	3.5%	1.5%
1960-69[b/]	.33	.56	.084	-	-	-	-	2.5%	.5%
1965-70	.27	.55	.13	-	-	-	-	.65%	-1.35%
1972	.23	-	.117	.036	.095	-	-	.4%	-1.6%
1973	.213	-	.12	.038	.09	.25[c/]	.10[c/]	2.5%	.5%
1974	.194	.50	.198	.14	.04	-	-	2 %	0

[a/] Current values

[b/] Charles R. Gibson, Foreign Trade in the Economic Development of Small Nations, The Case of Ecuador (New York: Praeger, 1971). Data for other years are from the Cuentas Nacionales, Banco Central del Ecuador except for columns (6) and (7).

[c/] PREALC, "Situación y Perspectivas del Empleo en Ecuador," Santiago, Chile (February, 1975).

productivity growth declined from positive rates to zero or negative rates. The ratio of average labor productivity in agriculture relative to that in nonagricultural sectors dropped from .59 in 1965 to .4 in 1973.

Explanations for this stagnant output performance are not hard to find. As can be seen from Table 1, agriculture received (until 1974) only about 10-13 percent of total bank credit. This low share of credit was due in part to a perverse interest rate structure which required banks to charge no more than a 9 percent legal maximum, while commercial loans were allowed a 10 percent rate. Naturally, banks preferred the latter over the former type of loan. More recently the government has attempted to direct more bank loans to agriculture. In 1973 banks were ordered to allocate 20 percent of their new loan capacity to agricultural projects and in January 1975 rediscount rates at the Central Bank, according to Resolution 775, were altered so as to make loans to agriculture, fishing, and handicraft industry slightly more profitable than loans to industry and much more profitable than loans to the commercial sector. As can also be seen from Table 1, agriculture has received relatively small shares of intermediate inputs (3.5-5 percent), capital goods (5-10 percent), and public expenditure and investment (25 and 10 percent, respectively). Although there are no statistics on the sectoral composition of investment and sectoral capital-output ratios, it seems likely that the bulk of the economy's investment resources have been siphoned off by the nonagricultural sectors. It also seems likely that large landlords with

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system rates of growth of total agricultural output for the period 1971-73 appeared to be well below one percent.

their own investment funds have been attracted towards the high rates of return on investment in modern manufacturing made possible by the high rate of effective protection this sector has received.[1] Coupled with the low level of public infrastructural investment in rural areas, it is probable that some capital, as well as labor, has been shifted from rural to urban employments. Finally, given the small amounts of credit and intermediate inputs committed to the agricultural sector and an ineffective extension service, it is not too surprising that average agricultural yields have shown no tendency to rise during the period in question. In short, agriculture as an engine of economic development has been "squeezed" in order to facilitate the growth of other sectors, and almost squeezed dry, if recent output figures are reliable indicators of performance.

As the average productivity of labor has not increased in the last few years, and may even have declined, it is unlikely that real wages earned in the agricultural sector have risen. Thus, it would be surprising if there were any alteration in the marked concentration in rural income distribution. In 1965, it has been estimated that the top ten percent of income recipients received 58 percent of total agricultural income while the bottom six deciles captured only 17 per-

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[1] Another factor alleged to be of some importance in deterring agricultural investment is the threat of expropriation under Ecuador's agrarian reform law which has been in force since 1964. There is no doubt that the activities of the agrarian reform institute, IERAC, have fostered some uncertainty among large landowners, but it is uncertain how much impact this has had on levels of investment in the agricultural sector.

cent of total income.[1] Generally, the agricultural sector can be characterized as a repository of excess labor, labor that is not fully occupied over the course of an entire year. PREALC calculates that 60 percent of rural workers earn $140 per year on average, or one-half of what they would earn were they making the minimum agricultural wage for twelve months of the year.[2] This implies that, on a full year basis, approximately thirty percent of the labor force in rural areas is underemployed. Another feature of the labor market is its highly segmented nature due to imperfect labor mobility between the costa and sierra regions of the country. In 1967 daily wages paid in the sierra were only 6 sucres compared to anywhere from 10 to 20 sucres in the coastal regions.[3] This sizeable wage differential has persisted so that in 1975 cost estimates of production per hectare typically charged 30-35 sucres for labor employed in sierra crops and 60-70 sucres for crops grown on the coast.[4]

While food prices to the consumer have risen somewhat faster than any other price category, they have not risen fast enough to spur adequate levels of output growth on the part of producers. The Frente Economico, a board composed of top government ministers, sets most

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[1] El Desarrollo del Ecuador, 1970-1973, Junta Nacional de Planificación y Coordinación Economica.

[2] PREALC, "Situación y Perspectivas del Empleo en Ecuador," Santiago, Chile, February, 1975.

[3] Charles R. Gibson, Foreign Trade in the Economic Development of Small Nations, the Case of Ecuador (New York: Praeger, 1971), p. 279. It is unlikely that differences in regional price levels could explain all of this regional variation in wage rates although it might explain part of it.

[4] Ministerio de Agricultura y Ganadería, 1975.

producers' prices on a commodity by commodity basis as it tries to balance consumers' interests against cost pressures experienced by producers. Until very recently the Frente Económico has been much more attuned to consumer welfare than to the wishes of different producers' organizations. It has attempted to shield Ecuadorian consumers from the worldwide trend toward relatively higher food prices with the result that a growing gap has emerged between world crop prices and those recieved by Ecuadorian producers. The most prominant example of this policy is the case of wheat. In 1973 the Frente Económico took the decision to subsidize the price of wheat in excess of the cost of $125.96 per metric ton, cif Guayaquil. As a consequence of this decision the wheat subsidy is estimated to have cost the government $16.6 million or about $96.74 per metric ton that was imported. Smaller subsidies were incurred for other crops.

2. The appropriate level of agricultural prices

There are obvious economic dangers in setting the level of agricultural prices, and therefore the terms of trade between agriculture and industry, at levels either too high or too low. If prices are set too low, the depression of agricultural incomes and output will encourage excessive rural-to-urban migration and contribute to urban under- and unemployment. Exports of agricultural goods may be damaged while imports of crop commodities would almost certainly rise. On the other hand, if prices are set too high, higher real industrial wages will lead to premature mechanization of industry and slower growth of the industrial sector and industrial sector employment. Recognizing these dangers, however, does not offer much guidance to what the precise level

of agricultural prices should be. They only indicate what may go wrong and suggest the need for more refined criteria to guide agricultural price determination.

Compelling reasons of economic efficiency make it worthwhile for Ecuador to consider achieving a closer correspondence between domestic and world crop prices. Before discussing these advantages, however, there is a question concerning the appropriate basis of comparison between domestic and world crop prices. Should producers' prices plus the cost of transport to a domestic purchaser be compared to CIF imported prices, or should the transport margin be ignored? There is no hard and fast answer to this question. If the average distance between the port of entry and the buyer is about the same as that between the Ecuadorian farmer and buyer, CIF import prices should be compared to ex-farm prices. If transport costs are not the same in the two situations, ex-farm prices should be compared to CIF import prices plus the cost of transport to the point of use less transport from an Ecuadorian farm to the same destination. Offsetting transport costs are assumed in what follows. Table 2 presents some time series estimates of prices received by producers for some major agricultural crops. As the notes to this table indicate, farm prices may vary as much as 10-15 percent in either direction from those that are listed. In many cases only government purchase prices could be obtained and these were frequently in excess of average prices received in any given year because of the government's limited storage capacity, and thus limited capacity to guarantee the price it set.

TABLE 2: Estimates of producer's Prices for Major Agricultural Crops
(Sucres per Quintal)

Year	1975	1974	1973	1972	1971	1970	1969	1963
Crop								
Wheat	180	175	140	115	112	102	99	75
Barley		160	130	88	74	75	70	55
Corn (soft)	160*	155	140	95	85	80	75	35
Corn (hard)	100	115	110	60	50	50	45	
Rice (paddy)	300*	150*	103	83	70	58	58	42
Sesame	460*	275	200*	200*	200*	190*		
Soybeans	300*	250	250*(202)	250*	250*	120*	90	
Beans		390	392			250	250	120
Cotton (seed)								
a. Coker	700*	285-345*	285-345*	210-258*	186-216*	200	190-230*	100*(180)
b. Criollo	220*	220*	220*	170*	170*	170*	170*	155*(120)

Notes: Data for 1963 are from Gibson, op. cit., pp. 289-90.

1. Prices refer to an average grade unless otherwise specified as in the case of cotton. For example, prices for malting barley would be somewhat higher than those indicated.

2. Since prices vary within each year and by region, price estimates refer to averages over the entire year and country.

3. 1975 refers to the crop year 1974-75 and so forth for earlier years.

4. Some prices are those paid by the processing plant, as in the case of cotton, and may exceed the prices received by the farmer if he did not transport to the plant. 1975 prices include a credit for the purchase of fertilizer and seed which may accrue to intermediaries.

5. An asterisk refers to the official government support price which in most cases exceeds actual prices by a margin of 10-25%.

6. One quintal equals 100 pounds.

SOURCES: Agricultural Attaché, U. S. Embassy, Quito, and Ministerio de Agricultura y Ganaderia.

For the years 1970, 1973, and 1974, Table 3 provides a comparison between domestic producers' prices and world prices of the five major crops for which reliable data could be obtained. In 1970, domestic crop prices, although generally below world prices, were not badly out of line with them, the possible exception being rice. By 1973 and 1974, domestic prices began progressively to fall behind world prices. The cost of this price development to the Ecuadorian economy is captured in the measurement of the implicit or effective exchange rate for each crop in various years. The implicit exchange rate, as shown in Table 3, is the ratio of the domestic price to the foreign CIF price measured in dollars. In 1970 only rice received a price well below the world price with the result that its implicit exchange rate of 13.2 sucres/dollar was significantly less than the official or actual exchange rate of 21.7 sucres/dollar. In this situation Ecuador was importing rice and paying for those imports with export-based resources worth 21.7 sucres per dollar of rice imported, and possibly more than that if the exports involved received a subsidy of any kind. On the other hand, Ecuador could have produced rice domestically using only 13.2 sucres of domestic resources for every dollar of rice imports displaced by domestic production. At the margin, an additional unit of domestic rice production would have saved the country about 7.5 sucres for every dollar of rice imports foregone. This saving could have been realized if higher domestic producers' prices for rice had elicited greater domestic production.

By 1973, and especially 1974, the potential for savings of a similar nature had become enormous. By then only barley did not have

TABLE 3: Implicit Exchange Rates for Various Crops
1970, 1973, and 1974

	Wheat	Barley	Rice (Paddy)	Corn (hard)	Soybeans
1970					
Domestic producer price (S/MT)	2,244	1,650	1,276	1,100	2,640
World price (S/MT)	1,900	1,656	2,100	1,250	2,600
Implicit exchange rate (S/$)	25.6	21.6	13.2	19.7	21.8
1973					
Domestic producer price	3,080	2,860	2,266	2,420	5,500
World price	3,480	2,540	2,820	3,030	8,330
Implicit exchange rate	21.9	27.9	19.7	19.8	15.5
1974					
Domestic producer price	3,850	-	3,300	2,200	6,600
World price	6,480	-	6,580	3,366	13,640
Implicit exchange rate	14.76	-	12.5	16.3	12.02

Notes: 1. Implicit exchange rates are defined as the ratio of the domestic to the world price (in dollars), both expressed in metric tons.

2. The actual (official) exchange rate in 1970 was 21.7 per dollar, while in 1973 and 1974 it was about 24.9 for the entire year.

3. Problems of quality variation between domestic and imported items for any crop may cause some distortion in the price comparisons.

SOURCE: Table 3, Anuario de Comercio Exterior, Permisos de Importación Concedidos, and U. S. Department of Agriculture Guide to Commercial sales.

an implicit exchange rate markedly inferior to the official (actual) exchange rate of about 24.9 sucres per dollar. In 1973 implicit exchange rates were in the neighborhood of 20 sucres per dollar for wheat, rice, and corn, and 15.5 sucres per dollar for soybeans. Thus, if domestic prices for these crops had been raised extra domestic production would have saved the country about 5 sucres worth of resources per dollar of imports in the case of wheat, rice, and corn, and about 10 sucres in the case of soybeans. In 1974, implicit exchange rates for these crops had fallen to the range of 12-16 sucres per dollar, again indicating that higher domestic prices for these crops would have been desirable on grounds of economic efficiency. Had domestic prices been higher, and therefore domestic production greater and imports less, Ecuador could have saved at the margin from 9-13 sucres for every dollar's worth of imports of these crops. Exactly how much Ecuador could have saved in each of these years depends critically on the supply elasticities of the various crops. Assuming that each crop has a supply elasticity of unity, it is estimated that Ecuador suffered a loss in real income equal to 3.5 percent of the value of wheat, rice, corn, and soybeans produced domestically in 1973, and that in 1974 this cost had climbed to 22.3 percent of the same value due to inappropriate pricing of these products.[1] That is, these costs, reaching sizeable amounts in 1974, could have been avoided if domestic producer's prices had been geared to levels reflecting world prices.

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[1] These estimates of welfare cost, W, are based on the following, easily derived, formula, $W = 1/2\ \eta\ (\frac{P_w - P_d}{P_d})^2\ V_o$ where V_o is the original value of production, P_w and P_d are the world and domestic

Another way of stating this conclusion is to note that, relative to the rest of the world, Ecuador is an efficient producer of these crops but that this efficiency has not been realized due to a domestic pricing policy which unwisely suppressed domestic production and, instead, promoted the importation of these products.[1] Alternatively, when food becomes more scarce in the world and the terms on which it can be obtained become more expensive, it is worthwhile to capitalize on the comparative advantage in food, to grow more of it at home and not pretend, via artificially maintained low domestic prices, that it is cheap to consume these goods.

Another consideration in agricultural pricing policy is the social value of foreign exchange. World prices have to be converted at some exchange rate, and it has so far been assumed that the actual or official exchange rate is the appropriate one to use. If the official

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prices, both in domestic currency, and η is the supply elasticity of the crop in question. Only the latter component of this formula cannot be observed directly. Reducing the assumed value for the elasticity by one-half would have the effect, for example, of also cutting the estimated cost in half.

Values in V_o were extracted from "La Agricultura en Cifras," Technical Bulletin No. 9, INIAP (Quito, 1974).

[1] Of course, the argument is meant to be perfectly symmetrical in the sense that Ecuador should not engage in the production of crops which require prices substantially in excess of world prices. For example, if a crop has an implicit exchange rate of 50 sucres per dollar the country could save, at the margin, 25 sucres of domestic resources for every additional unit that it did not produce and instead imported. The only exception to this rule would be in the case of those crops expected to experience rapid and strong productivity growth in the future and which require temporary price protection in order to realize these productivity gains. These may be classified as "infant industry" crops and protection would have to be justified solely on the merits of each individual case.

exchange rate accurately reflected the social value of foreign exchange, the value to the economy of another unit of foreign exchange earned or saved, there would of course be no problem. However, in an economy structured along the lines of Ecuador's, no such simplicity exists. This is because high rates of tariff protection serve to make the internal value (to consumers) of another unit of foreign exchange greater than the cost of supplying it through more exports at the official exchange rate.

Following a methodology developed by Harberger, we define the shadow exchange rate (the social value of foreign exchange) S^* as the internal value consumers place upon the consumption of additional imports plus the marginal factor cost of exports produced to pay for the imports.[1] Let the "import exchange rate" be represented by $S_M = S(1+t)$ where S is the official exchange rate, and t is a weighted average of individual tariff rates. Similarly, an "export exchange rate" is given by $S_x = (1+r)S$, where r is the average tax or subsidy rate applied to different exports.

According to the previous definition, $S^*dB = S_x dX - S_M dM$ where dB is a small change in the amount of foreign exchange, and B = M-X, the current account deficit. Thus

$$S^* = S_x\left(\frac{dX}{dS}\right)\left(\frac{dS}{dB}\right) - S_M\left(\frac{dM}{dS}\right)\left(\frac{dS}{dB}\right) \quad \text{and} \quad \frac{dB}{dS} = \frac{\partial M}{\partial S} - \frac{\partial X}{\partial S}$$

Making the appropriate substitutions from above, it is easily seen that

$$\frac{S^*}{S} = \frac{(1+r)\frac{dX}{dS} - (1+t)\frac{dM}{dS}}{\frac{\partial X}{\partial S} - \frac{\partial M}{\partial S}} = \frac{(1+r)E_x X/M - (1+t)E_m}{E_x X/M - E_m} \quad \text{where } E_x \text{ and } E_m,$$

[1] A. C. Harberger, "Survey of Literature on Cost-Benefit Analysis," in Project Analysis (Chicago: Markham, 1973). This concept of a shadow rate rests on the notion that an increase in demand for

are the supply and demand price elasticities for exports and imports, respectively. The shadow rate is a weighted average of the import and export exchange rates with weights reflecting the proportions in which suppliers or users of foreign exchange would be the sources of extra foreign exchange were its price, relative to domestic prices, higher.

Applying this formulation to the current Ecuadorian situation involves considerable guesswork. We assume a value for r of zero as export taxes may largely cancel the CAT export subsidies on average.[1] In 1973 the ratio of the value of exports to the value of imports (X/M) was about .75. A cursory examination of the new schedule of tariff rates suggests that a crude average value for t may be in the neighborhood of .6 to .7.[2] Greater uncertainties surround the determination of suitable values for the parameters E_x and E_m. Both E_x and

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foreign exchange will raise the price of foreign goods relative to domestic ones causing the demand for foreign exchange to decline and its supply to increase. This shadow price of foreign exchange is calculated on the assumption that quantitative controls such as licensing are not an important factor in determining the allocation of foreign exchange.

[1] With more than one tariff and subsidy-tax rate the equation for the shadow exchange rate is more accurately expressed as:

$$\frac{S^*}{S} = \frac{\sum_i E_{xi}(1+r_i)X_i - \sum_i E_{mi}(1+t_i)M_i}{\sum_i E_{xi}X_i - \sum_i E_{mi}M_i}$$

Note that a uniform rate of export subsidy and import tariff gives rise to the same rate of adjustment in the official exchange rate.

[2] Using the well-known Cordon measurement of the effective protection rate for the j^{th} activity, $R_j = t_j - \Sigma A_{ij}t_i/1-\Sigma A_{ij}$, it was estimated that, as a rough order of magnitude, industry may benefit from a rate of 130 percent. This calculation is based on the following values: $t_j = .7$; $t_i = .1$; and $\Sigma A_{ij} = .5$.

Given that import-competing crops were provided with negative protection, it was also estimated that industry was entitled to use about three times as many domestic resources per dollar of foreign exchange saved in imports as were allowed in the production of many agricultural crops. This large disparity illustrates the enormous imbalance in intersectoral investment incentives.

are likely to be relatively small (less than one) in the Ecuadorian context: E_m because most import demand is for intermediate and capital goods for which there are no close domestic substitues, and E_x because many agricultural exports cannot be expanded rapidly.[1]

For example, if $E_m = -.2$ and $E_x = .5$, it is found that $S^*/S = 1.21$ if $t = .6$ and 1.24 if $t = .7$. On the other hand, if E_m and E_x are of equal absolute size, $S^*/S = 1.34$ if $t = .6$ and 1.4 if $t = .7$. Even for a wider range of values, most values for S^*/S cluster in the interval of 1.2 to 1.45, as shown below.

TABLE 4: Sensitivity of the Shadow Exchange Rate to Alternative Assumptions

Case	(1)	(2)	(3)	(4)	(5)
E_m	- 1	-1.5	- 1	-1.5	- .2
E_x	.5	1	1	.5	1

Case	$S^*/S, t=.6$	$S^*/S, t=.7$
(1)	1.43	1.5
(2)	1.40	1.46
(3)	1.34	1.40
(4)	1.48	1.56
(5)	1.13	1.15

[1] Apparently only one attempt has been made to empirically ascertain the price elasticity of demand for Ecuadorian imports. It is by Charles R. Gibson and Clarence Zuvekas, Jr., in their unpublished paper, "The Demand for Imports in Small Developing Countries: The Case of Ecuador," September, 1969. (Mimeographed.) In their demand function for imports they introduce a relative price variable, the ratio of an index of import prices to an index of domestic prices, but find it is not statistically significant except in a single instance. This result most likely occurs because the price effect is emasculated by another quasi-price variable used to capture the impact of import restrictions. This variable is measured as the sum of all tariffs collected, including surcharges, over the sucre value of all imports. It is statistically significant and indicates that a unit rise in tariffs restricts import demand by about nine million sucres. If this measure is used as a proxy for price changes, it suggests a price elasticity of .6 when the variables are measured at their respective means. However, this procedure is crude at best.

This means the shadow rate for foreign exchange in Ecuador is likely to be some 20 to 45 percent greater than the official rate.[1] It also means that an efficient agricultural pricing policy would convert world prices at an exchange rate between 20 to 45 percent greater than the official exchange rate. This would be in addition to, and not in place of, any tariffs that were needed to correct for imperfections in the labor market. It might also be added that, according to this calculation of the shadow exchange rate, subsidy rates of between 20 to 45 percent for nontraditional exports would be warranted, much higher than the 4-15 percent CAT subsidies currently allowed.[2]

As in many less developed countries, there is at least some circumstantial evidence to suggest that rural factor markets in Ecuador overprice abundant labor (and perhaps underprice scarce capital, although not much is known about this possibility). In view of the regional immobility of labor noted earlier, the shadow price of labor, as measured by workers' supply price in a given area, may be extremely location, and thus crop, specific. In this situation the role of pricing policy is to set prices according to the social costs of producing each output. Given an initial equilibrium based on private production costs, the exact price adjustment required in each case will depend on the labor intensity and locale of the crop in question.

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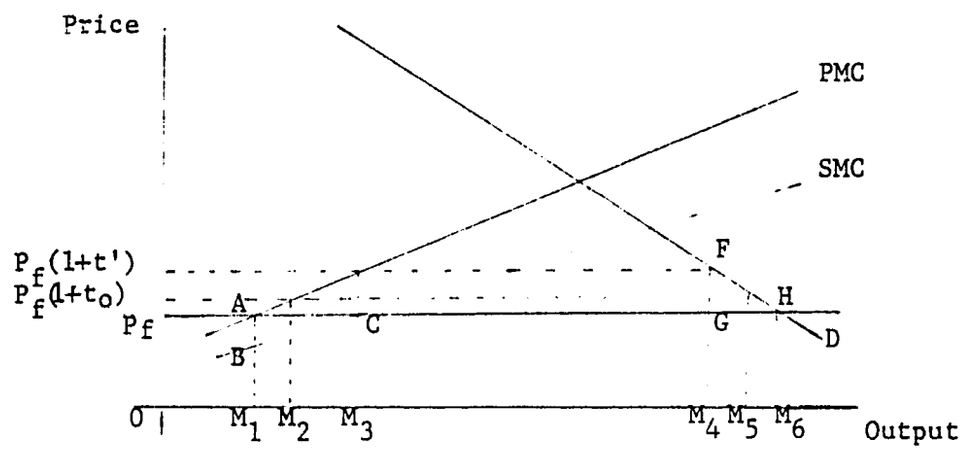
[1]Note that this increase is relative to an official exchange rate which is assumed to generate a balance of payments equilibrium given the existing structure of import tariffs and export taxes or subsidies. In an earlier section it was argued that, on macroeconomic grounds, an appreciation of the exchange rate was needed to adjust the level of exports and imports. The present argument is essentially microeconomic, taking as given a prior macroeconomic equilibrium, and is thus couched in terms of the ratio of exports to imports as the equation in the text indicates.

[2]This is desirable if the resource cost of earning a unit of foreign exchange is to be the same as that for saving a unit of foreign exchange.

Ideally, economic policy should bring about these price changes by subsidizing the cost of labor. Such a solution is undoubtedly beyond the administrative, if not fiscal, capacity of a country like Ecuador. Thus, as part of a second-best policy strategy, tariff policy can play a useful role in adjusting the levels of crop production to more optimal levels.

For example, if the social value of labor were one-half the market wage and the share of labor was also one-half, a price increase for the crop of one-quarter would make the social costs of obtaining a unit of crop output from either imports or domestic production equal at the margin and a proper balance between imports and domestic production would be struck. However, while an efficient production structure would be achieved, maximum economic efficiency would not obtain because the legitimate interests of consumers would have been ignored.[1] This last point is most easily explained with the aid of the diagram below.

Diagram I



[1] For discussion of a model which treats only the supply side, see L. Dudley and R. J. Sandilands, "The Side Effects of Foreign Aid: The Case of Public Law 480 Wheat in Colombia," Economic Development and Cultural Change, Vol. XXIII, No. 2 (January, 1975).

In the diagram, P_f represents the fixed world price, PMC is the supply curve of a crop in private cost terms, while SMC is the supply curve defined according to social costs. The line D indicates domestic demand for the product. At unadjusted world prices OM_1 would be produced domestically and the amount M_1M_6 would be imported. However, the social cost of importing at this equilibrium, the amount AM_1, exceeds the social cost of domestic production, given by BM_1, so some expansion of domestic production is warranted. An ad valorem tariff of t' would equalize the marginal social cost of obtaining a unit of output from either source of supply. Domestic price would rise to $P_f(1 + t')$, domestic production would expand to OM_3, and imports would fall to M_3M_4. While there would be a real resource gain in economic efficiency on the side of production, by the amount of the triangle ABC, consumers would experience an even greater welfare loss of FGH. An optimal tariff, somewhere between zero and t', would balance the marginal production gain against the marginal consumer loss. As shown in the diagram, t_o is just such a tariff, since at the domestic price $P_f(1 + t_o)$ the marginal production benefits from a slightly higher price would be exactly offset by larger marginal losses imposed on consumers.

It is readily seen that the production gain stemming from higher domestic prices will be less if supply is relatively inelastic. By itself, this situation argues for small tariff. If, on the other hand, consumer demand is relatively inelastic, consumption losses due to higher prices (the loss of consumer surplus) will be smaller. A larger tariff is justified in these circumstances.

To impart greater precision to the problem of determining the welfare-maximizing tariff when the market price of labor exceeds its social value, let d be the proportionate gap between private and social costs of production; S(Q) be the supply price of output Q; D(Q) be the demand price for output Q. Referring to the diagram, the production gain, G, from a higher product price is represented by $G = \int_{M_1}^{M_3}(P_f - \frac{S(Q)}{1+d})dQ$ while the corresponding consumption loss, L, is $L = \int_{M_6}^{M_4}(D(Q) - P_f)dQ$. The problem is to select a price (or tariff rate) that maximizes the net gain, G-L.

If this net gain is represented by φ, differentiating φ with respect to the price of output P and setting the result equal to zero gives rise to the following expression:

$$\frac{P_f}{P} = \frac{n_s(\frac{1}{1+d}) - n_d D/S}{n_s - n_d D/S}$$

If there were no labor market distortion, i.e., d = o, domestic prices should equal world prices, or $P = P_f$. The same conclusion holds if n_s = o, or if product supply is perfectly inelastic. However, if demand is perfectly inelastic, i.e., n_d= o, domestic prices should exceed world prices by the same fraction that private costs of production exceed social costs, or $P = P_f(1+d)$. These particular cases have intuitive appeal. If supply is perfectly inelastic, only a consumption loss can occur. On the other hand, if demand is perfectly inelastic, there is no consumption loss at all.

Generally, the parameters D/S and d will vary with the crop in question. If D/S = 1 and the supply and demand elasticities are of equal absolute size, it is easily established that $P = 1.11\ P_f$, or the optimal tariff of 11 percent should be about 44 percent of the

private-social cost discrepancy, which in percentage terms can be taken to be about 25 percent for many crops. Since, for a wide variety of crops, empirical estimates of supply elasticities typically tend to be larger in absolute magnitude than those for demand elasticities, a rough judgment is that the optimal tariff would be less than one-third of the cost divergence in most cases.

The formula for the optimal price is $P_f + \lambda\theta_L t_o$ where λ is the percentage discrepancy between private and social labor costs, θ_L is the share of labor and t_o is the optimum tariff as a fraction of the discrepancy between the private and social cost of output. Relating this to Ecuador's experience requires some information on labor shares in different crops. Obtaining this bit of data is made difficult by the wide diversity of farm sizes engaged in the growing of any particular crop. Large farms typically employ an advanced technology with a relatively low labor share in contrast to smaller farms which use labor intensive techniques. Thus, the labor share for any crop will be a function of the composition of farm sizes in the crop sector and could conceivably change noticeably from one year to the next. Table 5 sets forth some tentative estimates of crop labor shares based on the ratio of labor value per hectare to output value per hectare. It has been assumed that daily labor costs 25 sucres for sierra crops and 35 sucres for crops grown predominantly in the coastal region. This is undoubtedly a gross simplification since the regional dispersion of wages is probably much wider than this. Alternative wage assumptions would change the size, but not the ranking of the labor shares. For what they are worth, the estimated crop shares vary from a low of .18 for soybeans to a high of .82 for tobacco. Applying the price formula to these

TABLE 5: Estimates of Labor Shares in Total Cost by Crops 1972

Crop	(1) Daily Wage (sucres)	(2) Mandays per hec.	(3) Labor value	(4) Yield	(5) Price	(6) Output value	(7) Labor (6) share
Wheat	25[S]	24.5	612.5[S]	1.0	115[S]	2,530[S]	.24
Barley	25	24.5	612.5	.9	85	1,683	.36
Rice	25	106.5	2.656	2.4	85	4,488	.60
Corn (soft)	25	50.25	1.256	1.0	95	2,090	.60
Corn (hard)	25	48	1.200	1.2	60	1,584	.75
Sesame	35	58.8	2.058	.9	200	3,960	.52
Soybeans	35	32.1	1.1245	1.2	250	6,600	.18
Cotton	35	94.25	3.297	1.2	200	5,280	.62
Tobacco	25	200	5.000	.9	275	6,050	.82
Bananas	35	102	3.570	20	413.2	8,268	.43
Cacao	35	46	1.610	.27	500	2,970	.54
Coffee	35	95	3.325	.29	640	4,290	.77
Sugarcane	35	53	1.855	65.7	84.35	5,5426	.34

[1]Labor and output values are on a per hectare basis.

[2]Column (3) is the product of the first two columns.

[3]Output yields are expressed in metric tons per hectare.

[4]Except for sugar and bananas, prices are measured in Sucres per quintal. One quintal equals 100 pounds. Sugarcane and banana prices are in metric tons.

SOURCES: 1) Mandays are taken from internal estimates of the Junta de Planificacion.

2) Price data is courtesy of the Agricultural Attaché, U.S. Embassy, Quito.

3) With minor exceptions, yield data are extracted from "La Agricultura en Cifras," INIAP Technical Bulletin No. 9, July 1974.

crop shares, assuming $\lambda = 1/2$, $t_o = 1/3$, an optimal pricing policy would suggest tariffs of the following magnitude: for wheat, 4 percent; for barley, 6 percent; for corn, 10 percent; for rice, 10 percent; and for soybeans, 3 percent. In other words, when account is taken of imperfections in the labor market, the result is a proposal for tariff protection of very modest size.

Since labor is employed in industry as well as agriculture, the preceding argument is a perfectly general one in favor of some small amount of tariff protection everywhere. If this pricing scheme were followed, two factors point to the likelihood that the terms of trade would swing in favor of agriculture. Although it has not been clearly established, it is likely, first of all, that the share of labor is higher in agriculture than it is outside of agriculture.[1] Moreover, the demand for food items is relatively inelastic which would call for a relatively high optimum tariff.

3. Further thoughts and conclusions

The theme emerging from the previous analysis is that uneconomic import substitution in some sectors of the economy will invite uneconomic import promotion in other sectors. Alternatively, it has been seen that discrimination in favor of industry is really discrimination against agriculture. The price (or tariff) subsidies used to stimulate

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[1] According to the 1963 industrial census the share of wages and fringe benefits in value added for all of manufacturing was .36. An unweighted average of all the crop shares in Table 5 is .52. A weighted average of those crops most likely affected by higher prices, rice, wheat, corn, and soybeans, is .60. Neither estimate is as strong as desirable.

industrial sector growth have been shown to be equivalent to the imposition of a production tax on agriculture, the largest and poorest sector in the economy. When viewed in this light, it becomes harder to acclaim the merits of a generalized import substitution scheme which may destroy old, but efficient, activities simply for the sake of adding new names to the economy's performance list. Some implications of abandoning these practices are explored in this section.

Agricultural price increases of the size envisioned should elicit significant growth in agricultural output. All importable crops would become more profitable to produce and thus more land would be incorporated in their production (the extensive margin) and more yield increasing inputs would be applied to the land (the intensive crops and those with the widest gap between domestic and world prices would be particularly favored.

Higher food prices would exert upward pressures on wage levels as labor unions tried to recoup losses in real income and as industrial sector labor became more scarce due to the increased attractiveness of employment in the countryside. This will have serious consequences for the performance of labor-intensive, nontraditional exports produced in the industrial sector. In addition, growers of traditional agricultural export crops may be attracted into the production of importable crops. These effects can, and should be, offset by appropriate adjustments in the size of the CAT subsidy received by nontraditional exports and in the amount of export tax levied against traditional exports in order to prevent the disappearance of efficient export activities.

If these measures were adopted, a permanent reduction in agricultural imports implies increased longer run growth of nonagricultural imports

and consequently slower growth of industrial or nonagricultural sectors. Nonagricultural imports will increase either because a current account surplus sparks a domestic inflation in costs or because the exchange rate will be revalued. These adjustments, it should be emphasized, will restore greater balance in the growth of the industrial and agricultural sectors and remove the distortions which gave undue and lopsided encouragement to industrial sector growth at the expense of growth in the agricultural sector. It is difficult to see how Ecuador's economy can prosper in the long run if industrial sector growth is occurring at annual rates of 13 percent, while agriculture becomes a backwash sector growing at rates of 2 percent or less, as has been the experience of the last few years.

Employment effects of higher crop prices for importables will by and large mirror the output adjustments that have been just described. Employment opportunities will expand for the agricultural sector and contract for most nonagricultural sectors. As a result of this sectoral shift in the demand for labor, migration of labor from rural to urban areas will be slowed and pressures to expand urban infrastructure will be reduced. At the same time there would be greater need than ever for expanded levels of public infrastructural investment in the rural sector in the form of electricity, housing, roads and so forth. If current migration rates are excessive, in the sense that most migrants must be absorbed in the low productivity petty commerce and services sector, the change in employment emphasis, like that for output, should be regarded as desirable. In fact, if the marginal product of labor in the informal urban sector is close to

zero, as it well might be for services such as lottery sales, the encouragement of agricultural sector employment should raise overall labor productivity in the economy.

There is no doubt that urban consumers, in particular poor ones, would become worse off as a result of higher food prices.[1] There are, however, ways of avoiding this outcome. It may well lie within the administrative capacity of the Ecuadorian government to establish a system of food vouchers for the existing urban poor.[2] This would be a much more efficient subsidy to food consumption than maintaining artificially low food prices which benefit both rich and poor and is more costly in a budgetary sense. Some conflict may exist then, between achieving higher real incomes and income distribution objectives in the absence of special measures to subsidize the nutritional needs of the urban poor.

In lieu of any special measures, the major distributional consequence of higher food prices will be a transfer of real income to rural groups at the expense of urban groups. In terms of functional income distribution, the share of labor income in total income should increase if labor's share of agricultural income is higher than its share of non-agricultural income. How the size distribution of income is affected will depend to a large extent on how the extra agricultural income is divided between large and small farmers. On the one hand, if the incomes

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[1] Of course, prices charged to consumer would rise by only a fraction of the percentage gain realized by producers given the importance of transport and distribution costs that are included in the price paid by the consumer.

[2] How such a scheme might be organized has been discussed by S. Reutlinger and M. Selowsky, "Malnutrition and Poverty," World Bank Occasional Papers, No. 23 (1976).

of small farmers increase, the overall distribution of personal incomes will improve, since this group is at the very bottom of the income scale. Small farmers who produce entirely for their own subsistence would, of course, be immune to any movement of prices. On the other hand, higher agricultural prices will help larger farmers the most since they produce more and sell a larger fraction of their output. Since many large farmers have above-average incomes for the country, this effect would make the distribution of personal incomes more unequal. The net effect on the dispersion of personal incomes is uncertain, especially since any gains realized by large farmers would be offset by lower nonlabor incomes in the industrial sector. Only if the terms of trade issue were analyzed in a general equilibrium framework, would it be possible to make a more precise determination of this matter.

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