Agricultural Development and Trade in Latin America: Prospects for Reform

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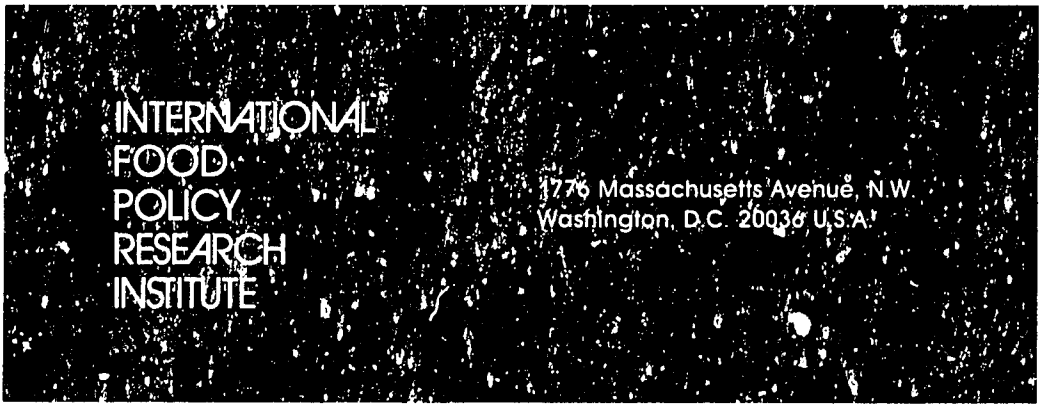

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chapter three

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The first part of this chapter presents an overview of the trends in consumption, production, and trade of food and nonfood agricultural products in Latin America since 1960. I discuss the dynamics of agricultural growth and analyze diverse problems in a food security strategy for the region.

This is followed by an attempt to characterize the two principal policy instruments governments use for agriculture: government expenditures and incentives policies. These two sets of policies are used extensively to influence agricultural performance, and they represent the "revealed" development strategies toward agriculture. I also present a quantitative description of the level and impact of government expenditure policies on agricultural growth in nine Latin American countries from 1950 to 1980.

The last part of the chapter examines agricultural production incentive policies for selected South American countries from 1960 to 1983. I end my discussion with an examination of the long-run effects of incentives on the performance of agriculture in Argentina and Chile since 1960.

Food Consumption in Latin America, 1960–1980

Developments in Food Consumption and Nutrition

Food consumption in Latin America since 1960 has grown at an annual rate of 2.8 percent, about the same rate as population growth.[1] During the same period, total animal feed use of grain grew at close to 5.4 percent a year due to the rapid increase in the consumption of meat and dairy products. Total livestock production during the 1970s rose 3.6 percent annually, a rate higher than that of food consumption as a whole.

It is risky to specify what aggregated figures such as these imply in terms of welfare and nutrition; I identify only general trends here. Some analysts

maintain that the nutritional state of the lowest income groups in Latin America has worsened.[2] Many support that view with estimates of the extent of malnutrition arrived at after comparing caloric requirements and supply at certain points in time.[3] This is a critical subject on which there is substantial disagreement.

A very brief overview suggests the following—at an aggregate level, the average caloric intake in Latin America has risen moderately since 1960. Between 1961–1965 and 1979–1981, it increased from 2,432 to 2,591 calories per capita a day; calories originating from animal sources increased from 403 to 455 calories per capita a day. The rate of protein intake in the region has been quite stable, and the average protein supply per capita has been greater than the minimum recommended level in each of the countries in the region.[4] The regional average (around 65 grams a day) is close to the world average, although considerably less than the average for developed nations.[5]

These averages do not necessarily indicate that the lowest income groups have maintained their portion of total consumption. One might deduce that the number of people with nutritional problems has increased to the extent that the present income distribution is less balanced than before. Nevertheless, available information on shifts in income distribution does not definitively answer whether income distribution is in fact less balanced than before. Instead (and as an illustration), it is useful to cite results of three recent studies that rigorously examine some indicators of nutrition.

Mohan, Wagner, and Garcia estimated the extent of malnutrition in two Colombian cities for 1973 and 1978 and concluded that in 1978 the ratio of population with a food intake below the required level in Colombia had declined since 1973.[6] Miguel Urrutia examined the evolution of family income and expenditures of the lowest income groups in the Cali region of Colombia in 1970, 1974, 1976, and 1980.[7] He found that the family income of these groups increased substantially in real terms between 1970 and 1980 and that the budget share spent on food declined from 79 percent in 1970 to 51 percent in 1980. At the same time, Urrutia found that real wages of the lowest income groups in Cali (farm workers and noncontract female workers) rose more rapidly than the national income per capita in the 1970s. Finally, a study by Castaneda in Chile found a constant and dramatic decline in that country's infant mortality rate between 1955 and 1983.[8] Mortality for children less than one year old dropped from 116.5 per 1,000 live births in 1955 to 21.0 per 1,000 in 1983, in spite of the increase in urban unemployment between 1975/76 and 1982/83.

It is difficult to reconcile these findings in Colombia and Chile with the opinion that the nutritional state of the lowest income groups in these countries has worsened. Measuring the deficit in caloric supply in middle-income countries at a certain point in time can be misleading. Recent analyses are critical of the estimates of the nutrition gap based on aggregate

caloric supply and requirements.[9] Indeed, it seems that we can learn more about nutrition by examining trends in food consumption, family expenditure, and other, indirect indicators.

The fact that malnutrition seems to be diminishing in Latin America does not mean it has disappeared. Malnutrition does exist, and to a large extent its existence is contingent on the purchasing power of the poorest families. Agricultural development can contribute directly to solving malnutrition in rural areas by raising the family incomes of small farmers and rural wage earners. Agricultural growth also plays a significant albeit declining role in overall economic growth, which in the long-run is the principal solution to poverty in Latin America.

Changes in Food Consumption Patterns

In addition to the changes in total calorie and protein consumption in Latin America that were pointed out above, there has been a significant modification in the composition of the region's diet. Indeed, Latin America is gradually developing the diet patterns of more developed nations. There has been an increase in wheat and rice consumption per capita, but direct human consumption of maize and other indigenous cereals typical of the traditional regional diet has gone down significantly. (Cereals as a whole continue to account for approximately 40 percent of total calories.) In addition, the consumption per capita of vegetable oils has greatly accelerated. Vegetable and fruit consumption also has risen. Furthermore, the consumption per capita of roots and tubers (cassava, potatoes) and dry legumes (beans), typical staples of the traditional Latin American diet, has decreased substantially. Finally, there has been an increase in per capita consumption of meats (especially poultry), eggs, and dairy products.

The fact that diet has recently diversified to include a more ample variety of staples containing more protein and vitamins confirms the view that the measurement of caloric intake exclusively is not appropriate in assessing the trends in food consumption and nutrition in Latin America. Reasons for these changes in the diet of the average Latin American are various. They include rural-urban migration, income growth, the growing participation of women in formal labor markets, and relative price changes resulting from technological change and price policies.

The pronounced rural-urban migration in most Latin American countries has indeed brought about substantial changes in dietary habits.[10] Urbanization favors the consumption of more storable processed foods, such as wheat derivatives, rice, and vegetables, which take less time to prepare; urbanization disfavors the consumption of typical foods like cassava, potatoes, quinoa (for Andean countries), and dry legumes. Also, the growing participation of women in formal labor markets suggests that food preparation time at the household level is very important in determining consumption. Although the deeply rural population continues to follow more traditional

habits, these urban consumption patterns are spreading slowly to outlying rural areas as the number of wage earners who must buy a large portion of their food increases.

Income growth also has played a large role in changing consumption patterns in Latin America. It is to be expected that as per capita income rises, the consumption of foods with high income elasticity of demand will increase. Because most of the demand comes from middle- and higher-income groups, the supply of products they demand will expand. Conversely, low-income elasticity products will diminish in relative importance, especially among middle- and high-income groups.

The modification of relative prices as a result of technological changes and price policies also has affected consumption. An example of the impact of technological change is the large increase in the consumption of poultry in many Latin American countries. It has been suggested that this could be a consequence of the fall in poultry prices due to the adoption of modern cost-saving, marketing-improving technology. Another example is rice. In Colombia and other countries the spread of modern rice varieties led to a substantial increase in rice production and, given export restrictions, reduced its relative price to consumers.

With regard to price policy, one of the permanent concerns of Latin American governments is keeping food prices stable and, when necessary, low. Because of the importance of certain staples in the consumer basket (as reflected in the Consumer Price Index, or CPI), especially in middle- and low-income urban areas, controlling food prices is often a convenient way to regulate wages and inflation. The variety of mechanisms used to control food prices include direct price controls, differential tariffs, export quotas and taxes, and exchange rate policy. The dominant group of commodities in the CPI in several Latin American countries is meats and meat derivatives, followed by cereals and cereal derivatives. In individual products, wheat and wheat derivatives fluctuate between 3.2 and 7 percent of the total CPI, with rice and maize lower. Beef ranges from 3.2 percent (Peru) to 15 percent (Paraguay), and accounts for about 6 percent of the CPI in other countries. Milk ranks after wheat and beef, but beans, cassava, and pork have less weight. High-share CPI items are attractive targets for price controls in urban areas; price controls thus reinforce high-share item consumption as well as the prevailing consumption pattern.

Food and Agricultural Production, 1960–1980

Food Production

Between 1961 and the middle of the 1970s, food production in Latin America grew at an annual rate of 3.2 percent, 0.5 percent faster than population

growth in the region. This was the fastest food production growth rate in the developing world. During the same period Asia's food production growth rate was 2.6 percent, North Africa and the Middle East's were 2.5 percent, and sub-Saharan Africa's was only 1.5 percent. Among Latin American subregions, the Mexican, Central American, and Caribbean subregion had the highest growth rates in food production, followed closely by tropical South America. The southern cone of the continent had the lowest growth rate, but in all three subregions, food production rose at a faster pace than did population.

The situation changed in the second half of the 1970s. During this period food production in the Third World as a whole accelerated, while in Latin America it diminished sharply from an average of 4.2 percent annually for 1961–1970 to only 1.7 percent for 1971–1980. This was true for all three subregions. (To a large extent this decline could have resulted from the fall in the real exchange rate during the last decade after the massive flow of foreign credit to the region, a hypothesis I develop later.)

The main reason for the increase in Latin American food production during the 1960s and 1970s was the expansion in cultivated area. During the 1960s, cultivated area expanded at an annual rate of 2.7 percent, while yields increased 1.5 percent. In the 1970s, the increase in cultivated area diminished to 0.6 percent a year, and the rise in yields went down slightly to around 1 percent a year. The contribution of expanded cultivated land to the rise in food production decreased from 65 percent in the 1960s to 37 percent in the 1970s. The relative contribution of expanded farm area and yield increases varies with each subregion. Mexico, Central America, and the Caribbean maintained high rates of yield increases (more than 2 percent), and yield increases for the southern cone rose from 0.9 percent in the 1960s to 2 percent in the 1970s. Yield increases in tropical and subtropical South America decreased from 0.8 percent in the 1960s to 0 in the 1970s; the expansion of cultivated land diminished drastically from 3.7 percent to 1.8 percent annually. In sum, temperate and subtropical zones in Latin America have increased their yield per hectare, while tropical Latin America has not.

It is no surprise then that the growth of farm output in Latin America varied greatly during the 1970s. Four countries (Brazil, Colombia, Guatemala, and Paraguay) had annual farm growth rates greater than 4 percent. Five others, on the other hand (Haiti, Honduras, Panama, Peru, and Uruguay), had growth rates lower than 2 percent. On average, the gross value of agricultural production per capita in Latin America went up 0.8 percent annually during this period.

It is useful to point out the disparity in the growth rates of different groups of farm products. During the 1970s, production growth was greatest in livestock products, poultry, hogs, eggs, and milk, followed by oilseeds (particularly soybeans), vegetables, and fruits.[11] The growth rates of cereals,[12]

beverages, dry legumes, and beef were lower. A third group of products (including roots, tubers, and vegetable fibers, but not cotton) had a negative growth rate. This disparity in growth rates is closely related to the diverse growth of export markets and, of course, of domestic demand. For example, domestic demand and exports of soybeans rose markedly during this period. Fruits, citrus, and apple production also expanded rapidly, but bananas did not.

In some countries (Brazil, Argentina, Paraguay), the expansion in farmland was largely in the area planted to soybeans. Land devoted to cereals (not less than 50 percent of total cultivated land) expanded at a much lower rate (0.7 percent). Other crops that showed higher than average rates of land expansion were sugar cane, vegetables, and tobacco. It is also important to note that there were negative growth rates in yields for cassava, dry legumes, and vegetable fibers.

Crop production (food and industrial crops) continued to rise as a result of the expansion of cultivated land. Nevertheless, the relative contribution of yield to this increase went up in the 1970s. In the 1960s, one-third of crop production growth was a result of yield increases, compared to two-fifths in the 1970s.[13]

Livestock production rose at a faster pace than crop production (around 3.3 percent annually), and the production of poultry and eggs was the most dynamic. Beef production had the slowest growth rate (2.1 percent annually), lower than the population growth rate. The low relative price of beef has made the intensive use of advanced inputs less profitable than in the United States and Europe. In Latin America it has been more profitable to raise cattle production by expanding pasture area than by increasing the carrying capacity per hectare.[14]

Area Expansion Versus Yield Increases

The increase in productivity in Latin America can be associated with more extensive use of fertilizers and pesticides, and increased planting of new crop varieties. In contrast, machinery tends to substitute for labor and promotes expanded cultivation. The region increased its use of both tractors and fertilizers during the 1950s and 1960s but not in the late 1970s. (Although there is no hard data to support this thesis, the cutback in the use of fertilizers and tractors during this period might be explained by the increase in the relative price of oil derivatives, especially after 1973 and again in 1979. Some countries—Brazil and Venezuela—did establish subsidies to compensate for the rise in costs. In addition, during the late 1970s and early 1980s the real exchange rate aggravated the squeeze in profitability in agricultural production in several Latin American countries.)

Although on the surface, Latin America appears to have an elastic supply of land but a less elastic supply of labor, this perception is oversimplified.

With few exceptions, Latin American countries have increased the productivity of land as well as labor. For example, the use of fertilizers and pesticides before the late 1970s rose more rapidly than did the use of machinery (this would seem not to have happened if land was in surplus).

Some observers believe that this inconsistency may be more apparent than real and that the simultaneous increase in area and productivity is probably due to the heterogeneous nature of Latin American agriculture.[15] The current costs of expanding cultivated lands in most tropical countries of the region is high and not as profitable as raising the productivity of the land already in use. The uneven distribution of farmlands is another problem, for the small farmer can only raise production by means of raising yields per hectare. In contrast, larger farms that have greater area and that hire labor invest more in machinery to substitute for labor, which suggests a dualism in land and labor markets.

Land expansion, mechanization, labor substitution, and, in general, the decisions affecting the relative use of productive factors in agriculture are not really independent of established economic policies and institutional factors. Some policies unintentionally have favored overvaluation, and minimum wage legislation has brought about implicit subsidies for the use of machinery and a rise in the price of labor. What is the final impact of economic policies on the input mix? Do they favor more intensive use of labor or of land? These are questions that bear further investigation. At any rate, production elasticities of land and labor vary greatly from one country to another.[16] This strengthens the hypothesis that it might be inappropriate to generalize on the best ways to expand production.

Finally, it should be noted that the composition of domestic and foreign demand will affect the (derived) demand for purchased inputs, land, and labor. It is possible that there is a surplus of land that is potentially advantageous for the production of crops with very limited domestic and foreign demand. This is the case, for example, for cassava. But this is an area for which there is no hard evidence.

Food Security

Stabilization of food supplies (especially cereals in urban areas) is a basic food security concern in Latin America. This concern derives, in part, from the risk associated with dependence on foreign supplies to cover part of domestic consumption. Experience shows that this risk has not proved problematic in wheat, but the situation is different for rice and white maize, which have "thin" international markets, are dependent on only a few suppliers, and are subject to delay and interruption in shipment.

The second cause for concern is the short-term instability of international prices. These do not offer a reliable base for planning imports or for

establishing a long-term policy for domestic production. Fluctuations in the world price of cereals increased drastically during the 1970s in comparison with the 1960s—much more than could be explained by the modest increase in the variability of world production.

The third reason Latin American countries worry about supply is financial insecurity—that is, the capacity of each country to finance growing and fluctuating food imports in the face of an unstable supply of foreign exchange. To what extent could the current economic crisis in Latin America seriously limit its capacity to finance food imports in the near future? The ratio of the dollar value of food imports to total export revenues from goods and services is a reasonable measure of the pressure food imports exert on the balance of payments.

Estimates of the average food import/export revenue ratio in six Latin American countries were computed for various periods between 1965 and 1981. These estimates were made for two alternative definitions of food. In the first definition, food includes cereals only. The second definition of food is much broader and includes vegetable oils, dairy products, fruits, vegetables, and sugar, which are all significant imports. If the restricted definition is used, the average ratio in these countries is relatively low and rises to a maximum of 10 percent in Brazil and Peru in exceptionally unfavorable years. Estimates for Asian and African countries indicate that, at least in cereals, foreign exchange constraints are more serious in other regions, where several countries average import/export revenue ratios of more than 10 percent.[17]

Using the wider definition of food, including noncereals, the food import bill goes up significantly. Chile and Peru were the countries with the steepest food import bills, with average ratios of 11 and 12 percent respectively. Even so, these figures are much lower than comparable estimates for African and Asian countries, several of which had averages greater than 45 percent. As for long-term tendencies, there are no clear indications that financial pressure intensified before 1980/81. Nevertheless, these estimates should be reassessed to take into account the foreign debt situation and current restrictions on the supply of foreign exchange.

Another point to consider is that for a few countries, imported food accounts for a high proportion of total domestic food supply. This is sometimes considered risky. Calculations for Peru illustrate how much that country depends on imports to satisfy domestic consumption of certain staples.[18] Since 1960, Peru's imports of edible oils and cereals (maize, wheat, and rice) have increased dramatically and now account for more than 80 percent of domestic consumption!

Export Potential and Import Demand

Agricultural exports still account for more than 50 percent of total foreign exchange revenues (exports of goods and services) in Argentina, Brazil, Co-

lombia, Costa Rica, El Salvador, Guatemala, and the Dominican Republic. This ratio varies between 25 and 48 percent in Ecuador, Mexico, and Peru.[19] Thus, changing conditions in world markets and in domestic supply and demand of exportable agricultural products have macroeconomic repercussions in these countries and make price policy management much more complex.

From 1972 to 1979, the most dynamic Latin American farm exports were vegetable oils, fats, processed foods, and alcoholic beverages (wine). At the other end of the spectrum, exports of sugar, furs, hides, rubber, oil, processed fats, livestock, meat, textile fibers, and animal oils and fats decreased in absolute value. More than 70 percent of all Latin American farm exports are sold to industrialized countries, and only 7 to 9 percent are exported to other nations of the region.

The agricultural export potential of Latin America is good. World markets for oilseeds, vegetable oils, poultry, meat, tobacco, beverages, fruits, and vegetables are among the most dynamic, and it would be profitable to stimulate their export. Given that Latin America's share in world exports in these commodities is small (except for coffee), the continent can maintain its share in the most dynamic international markets without affecting world prices.

As for imports, approximately 70 percent of total agricultural and livestock imports in Latin America come from industrialized nations, and another 26 to 28 percent come from the region itself. This last share has not varied in a long time. The region as a whole is largely self-sufficient in coffee, tea, sugar, fruits, vegetables, fibers, and meats.[20] Cereals have been dominant in total regional imports; wheat ranks first, then maize and cereal preparations. Other significant food imports to or through the region are, in order of diminishing importance, fruits and vegetables, dairy products, and vegetable oils. There was a marked increase in oilseeds and vegetable oil imports between 1962 and 1979.

Government Policies as a Determinant of Agricultural Growth

Governments act principally through expenditures and related incentives policies to affect agriculture. Victor Elias examined government expenditures for Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Mexico, Peru, and Venezuela for the period 1950 to 1978.[21] All expenditures directed toward the rural sector were considered, including research and extension, irrigation, marketing, transportation, education, health, administration, and some transfer payments. In addition, various levels of government spending were included—central and state governments and decentralized government agencies—although the state government and decentralized agency figures are less complete.

Figure 3.1 shows that government expenditures climbed steadily in real terms for all countries except Argentina, which maintained a low but stable growth rate. There was an upward surge in the trend for many countries around 1964. When the averages for the nine countries are taken together, the aggregate average rate of growth per year is 8 percent in real terms. These graphs, however, show the wide variation from Argentina's almost stable 2.5 percent growth rate to Bolivia's startling rise in government spending of 18.7 percent. In 1970 the nine countries together spent a total of $6.3 billion in 1980 dollars. This is about 15 percent of what the U.S. government spends annually on agriculture (transfer payments included).

How significant are government expenditures on agriculture in these Latin American economies? By examining the degree of variation in agricultural expenditures from year to year we can tell how much they are subject to changes in government policies. By comparing such expenditures with the value added of agriculture, we can tell the extent to which fluctuations in expenditures influence agricultural output. Finally, by comparing them with Gross Domestic Product (GDP) we can judge how strongly governments in each country emphasize agriculture.

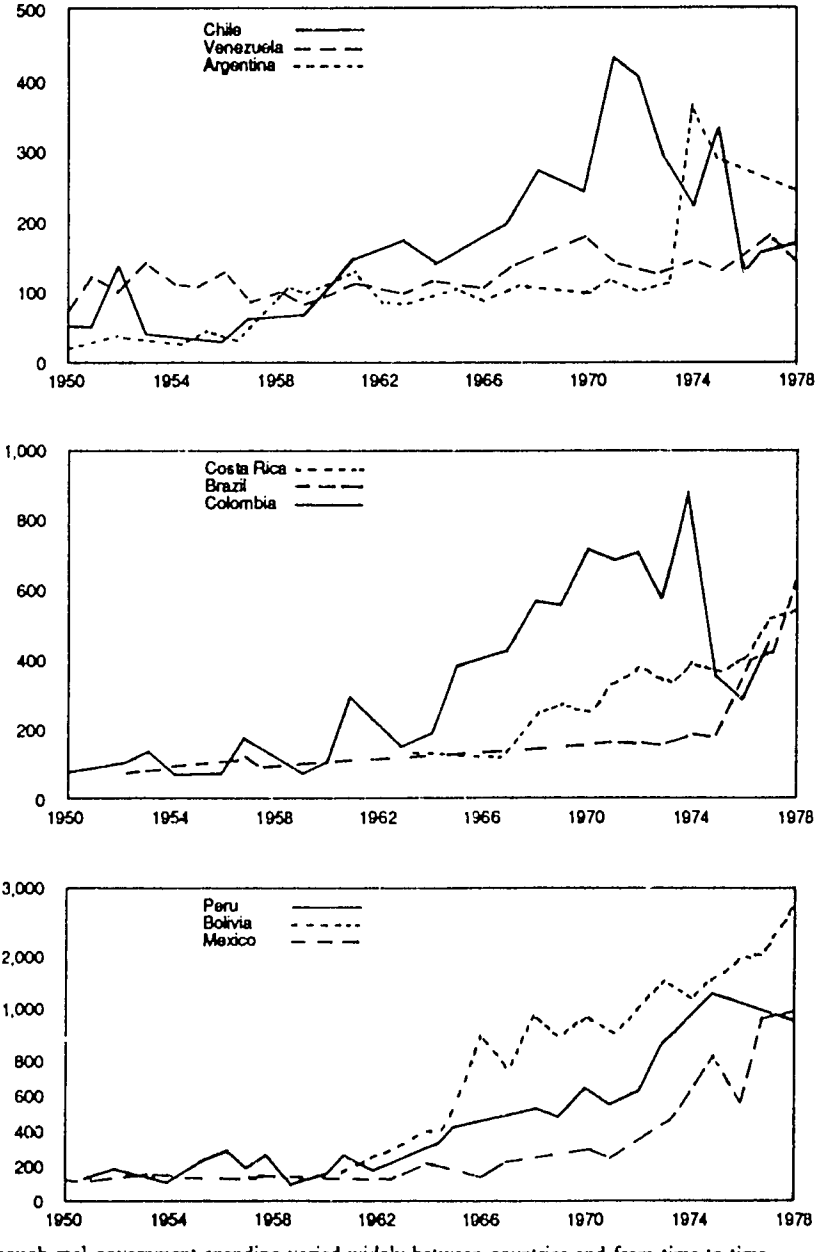
As shown in Table 3.1, the 5 percent average share of government expenditures on agriculture in the total government budgets of the major Latin American economies is a much smaller share than that of the education, health, or transport and communications sectors. This ratio also varies to a greater extent from country to country than do other expenditures. However, this ratio also varies widely in other countries, such as the United States, possibly because of transfer payments.

Table 3.2 shows government expenditures on agriculture relative to total government expenditure (GA/G), to value added of agriculture (GA/A), and to gross domestic product (GA/Y) from 1950 to 1978 for nine Latin American countries. The variability in the ratio of government expenditures on agriculture to the GDP from year to year appears to be explained largely by fluctuations in the share of government expenditures on agriculture in the total government budget. This could indicate that government expenditure policies are extremely active in Latin America.

To complement his aggregate analysis, Elias also examined variations in the major components of government expenditures on agriculture—research and extension, irrigation, education, and health. Although the percentage of total government expenditures on agriculture by each country in each category varies greatly, education and irrigation appear to receive more funds than the others.

The effects of government expenditure policies on agriculture in the same nine countries of Latin America were examined in a more recent study by Elias.[22] He found that the contribution of government expenditure to agriculture (GEA) was high in countries where GEA per hectare was high. On

Figure 3.1 Indexes of Government Expenditures in Latin America, 1950–1978 (In real terms)



Although real government spending varied widely between countries and from time to time, the trend is upward for all except Argentina, which is stable. To find expenditures in real terms, figures in current prices are deflated to 1960 dollars by the Gross Domestic Price index and, for the most recent years, by the wholesale price index.

Source: V. Elias, *Government Expenditures on Agriculture in Latin America*, Research Report no. 23 (Washington, D.C.: IFPRI, May 1981).

Table 3.1 Shares of Various Components of Central Government Expenditures, 1950, 1960, 1975 (in percentage)

Country	Agriculture			Education			Health			Transport and Other[a]		
	1950	1960	1975	1950	1960	1975	1950	1960	1975	1950	1960	1975
Argentina	2.9	2.5	1.5	10.4	10.9	15.7[b]	5.3	5.8	6.0[b]	14.5	23.9	16.6[b]
Bolivia	n.a.[c]	4.2	23.3[b]	n.a.	n.a.	16.4[b]	n.a.	n.a.	7.4[b]	n.a.	n.a.	8.5[b]
Brazil	4.6	3.9	1.1	n.a.	6.8	6.2[b]	n.a.	4.0	1.6[b]	n.a.	21.6	16.4[b]
Chile	3.3	4.0	5.5[b]	n.a.	12.1	12.6	n.a.	10.2	8.1	n.a.	17.6	14.5
Colombia	4.9	4.5	5.6	5.6	n.a.	19.8	4.6	n.a.	9.3	46.5	n.a.	32.7[b]
Costa Rica	n.a.	1.8	2.9	n.a.	n.a.	22.0	n.a.	n.a.	2.1	n.a.	n.a.	16.7
Mexico	16.6	4.5	10.1	6.4	9.5	15.7	3.1	2.4	3.8	10.8	8.0	15.1
Peru	5.9	2.6	8.5	n.a.	n.a.	21.4	n.a.	n.a.	5.3	n.a.	n.a.	4.3
Venezuela	5.5	7.0	8.6	5.9	7.5	21.3[b]	6.3	6.7	13.3	34.3	23.3	21.3

Source: Victor Elias, *Government Expenditures on Agriculture in Latin America*, Research Report no. 23 (Washington, D.C.: IFPRI, May 1981).

[a]Includes transport, communications, and public works.
[b]Refers to 1970.
[c]Not available.

Table 3.2 Arithmetic Means, Standard Deviations, and Coefficients of Variation of the Ratios GA/G, GA/A, and GA/Y, 1950–1978[a] (in percentage)

Ratios	Argentina	Bolivia	Brazil	Chile	Colombia	Costa Rica	Mexico	Peru	Venezuela
GA/G									
Mean	2.82	18.80	2.96	3.82	8.33	2.34	8.03	6.26	6.58
Standard deviation	0.63	7.70	1.53	1.61	3.89	0.60	2.79	2.32	1.41
Coefficient of variation	0.22	0.41	0.52	0.42	0.47	0.26	0.35	0.37	0.21
GA/A									
Mean	3.58	10.44	3.07	11.74	14.33	1.79	9.48	6.68	24.00
Standard deviation	0.74	6.91	0.56	7.14	4.95	0.69	6.73	4.31	12.56
Coefficient of variation	0.21	0.66	0.18	0.61	0.35	0.39	0.71	0.64	0.52
GA/Y									
Mean	0.57	1.97	0.70	0.97	3.90	0.38	1.12	1.07	1.53
Standard deviation	0.15	1.10	0.16	0.46	1.14	0.12	0.51	0.53	0.60
Coefficient of variation	0.25	0.56	0.23	0.47	0.29	0.32	0.46	0.50	0.39

Source: Victor Elias, *Government Expenditures on Agriculture in Latin America*, Research Report no. 23 (Washington, D.C.: IFPRI, May 1981).

[a] GA/G = share of government expenditures on agriculture in total government expenditures;
GA/A = share of government expenditures on agriculture in the value added of agriculture;
GA/Y = share of government expenditures on agriculture in the Gross Domestic Product.

the average, GEA contributed almost 8 percent of the growth of total agricultural output. This is comparable to the contribution of modern inputs. The rest is explained both by the growth of traditional inputs and by the residual. In countries where the rate of growth of agricultural output was lower, GEA's contribution was smaller. The contribution of GEA to agricultural growth was found to be higher as the share of the irrigation or the research and extension components of GEA increased.

The components of GEA also were associated with the growth of private inputs. Positive correlations were found between research and extension expenditures and the use of fertilizers and between land reform expenditures and the use of irrigation. A small negative association was found between education and health expenditures and the use of labor. Also, the contention that public investment crowds out private investment seemed to be true only when public investment accelerated rapidly.

Approximately 60 percent of the growth of agricultural output is explained by the growth of traditional inputs—land, labor, and capital. These inputs increased at an average annual rate of slightly more than 2 percent. In most countries, the amount of agricultural land increased, on average, about 2 percent annually. The number of people in the agricultural labor force increased about 1 percent annually, and the amount of capital—agricultural equipment, farm construction, and land improvements—increased about 1 percent annually.

In three of the four countries with the lowest rates of farm output growth (Argentina, Bolivia, and Peru) the contribution of capital to growth was the largest. In contrast, in the countries with the highest rates of growth (Brazil, Costa Rica, and Venezuela) the 40 percent of that growth unexplained by traditional factors of production made the largest contribution. This 40 percent residual can be accounted for, in part, by the growth of GEA and by the growth of such private modern inputs as tractors, fertilizers, and irrigation. Modern inputs and GEA each accounted for almost 20 percent of the growth of the residual in the nine countries. This added between 0.1 and 0.7 percent to annual growth rates. On the whole, modern inputs grew faster than capital, but their contributions to growth were small because, according to the elasticities estimated from production functions, output increases only a fraction of any increase in modern inputs in Latin America. Modern inputs contributed the most to agricultural growth in Brazil, Colombia, and Costa Rica. The size of the residual was positively associated with the rate of growth of capital. Because the residual includes most technological changes, this implies a positive relationship between capital accumulation and technological change.

All these components are of course a part of expenditure policy. An analysis of GEA should include estimates of expenditures on price policies as well, but the information needed for such estimates (transfer payments,

including food subsidies) is not available. However, estimates of credit subsidies made for Argentina, Brazil, Chile, Colombia, Mexico, and Venezuela show the subsidies to have been highly variable, perhaps because the size of the subsidies depends mainly on the real rate of interest. This in turn depends on the difference between the nominal rate of interest and the actual rate of inflation, which was itself variable in Latin America.

Agricultural Trade and Macroeconomic Policies

Agricultural growth interacts very closely with developments in other sectors of the economy, particularly with trade and macroeconomic policies. Intervention in agricultural markets is widespread in Latin America. Direct price intervention policies include agricultural trade restrictions (import tariffs, export subsidies or taxes, import or export licensing) and price support and price fixing in input and output markets.

There are other policies involving the macroeconomic management of the economy that affect nominal exchange rates, government spending, wages, international capital flows, and industrial protection that have special significance for agriculture in Latin America, in part because the agricultural sector is a highly tradable one. The consequences of these policies can reinforce or neutralize policies directed solely at agriculture. In several Latin American countries import substitution-based industrial growth pursued through tariffs and other import restrictions appear to have had a strong bias against agriculture, which has resulted in a structure of incentives that could have had deleterious effects on long-term agricultural production. In small, open economies, including most of Latin America, it could well happen that trade and macroeconomic policies may have a stronger and even opposite effect on agricultural prices than policies designed specifically to benefit agriculture.

The real exchange rate, defined as the ratio of the price of tradables to nontradables (or home goods, as they are called), plays a central role in the profitability of agricultural tradables—both import competing (such as cereals) and exportables. Indeed, it is mostly through the real exchange rate that macroeconomic management of the economy affects agriculture. The distinction between home goods and services and tradables becomes crucial where the prices of tradables are exogenously determined by foreign prices, nominal exchange rates, and trade policy. In contrast, the prices of home goods will clear domestically and could be influenced indirectly by macroeconomic and trade policies.

The tradable component in agriculture is larger than it is in other sectors of the Latin American economy. Tradables represent more than two-thirds of the agricultural sector in Argentina, Colombia, and Chile. In contrast, the nonagricultural sectors in most countries are characterized by a

much larger proportion of nontradables. In Colombia it is estimated that more than 50 percent of nonagricultural production is derived from nontradables such as commerce, public services, transportation, construction, housing, and banking.[23]

Sustained overall sectoral growth involves resource flows between sectors, such as labor and capital that adjust to the relative opportunities between those flows. Thus, in analyzing the long-run effects of incentives on production, we must have an economywide view of returns to these factors. The real exchange rate approach is applied because it is relevant in studying such sectoral movements resulting from trade and macroeconomic policies. Unfortunately, although some realize that the macroeconomic setting is important to agricultural performance, so far macroeconomics has remained outside the scope of an appropriate strategy for agricultural development in Latin America.

Since the late 1970s and early 1980s, Latin American countries have faced complex issues of adjustment and growth. Their economic difficulties have been attributed to both the international economic environment and domestic economic policies. Although international economic conditions —such as lower export prices for several products and higher real interest rates in the early 1980s—are crucial to understanding the current economic setting, I have thus far chosen to emphasize economic policies. The domestic policy environment has simply not been adequate for stimulating agricultural growth in Latin America.

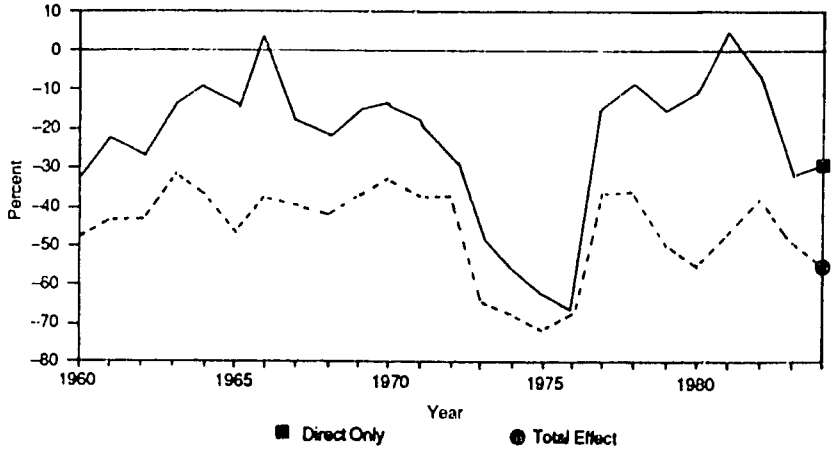
Current external and macroeconomic conditions should not be ignored—they may offer an opportunity to revitalize the agricultural sector in Latin America. Export diversification and expansion may constitute the principal structural change that many countries in the region need to make. The success of such change could depend on agricultural growth. One thing is certain—correct real exchange rate alignment is crucial for taking advantage of the growth opportunities offered by international trade for agriculture in Latin America.

Measuring the Agricultural Terms of Trade

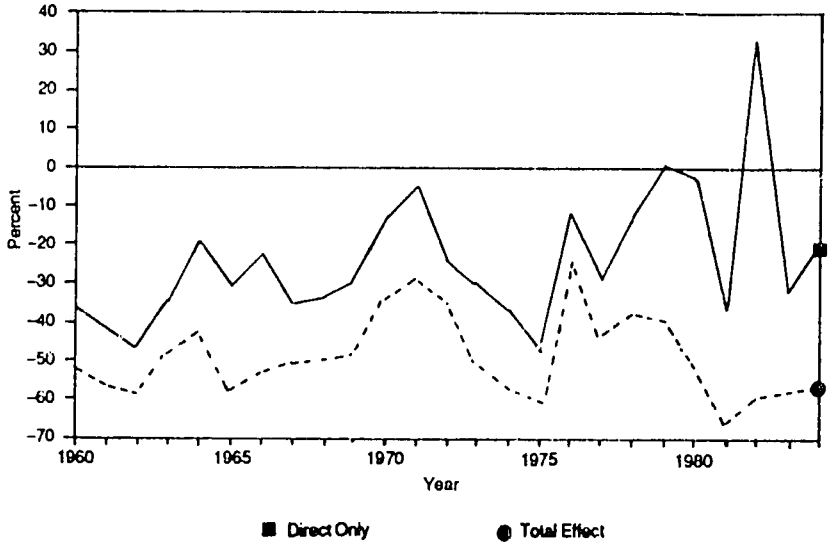
For an analysis at the sectoral level, it is useful to compare the effects of what can be called "direct price" intervention, which results from explicit agricultural price policies including trade policies, relative to the effect of "indirect" or economywide policies affecting the sector's relative prices. The results of a comparison of the level of price intervention on representative products in three countries—Argentina, Chile, and Colombia—are presented in Figures 3.2, 3.3, and 3.4.

In Argentina between 1960 and 1984, both agricultural and economywide policies have taxed the production of wheat and beef (Figure 3.2). This could have been anticipated given the existence of an explicit export tax on

Figure 3.2 Argentina: Direct and Indirect Interventions in Wheat

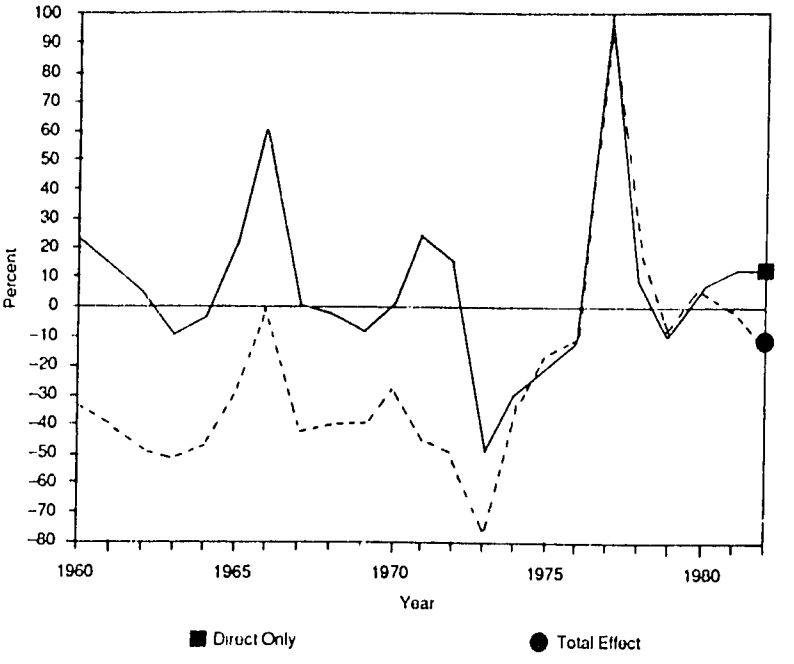


Argentina: Direct and Indirect Interventions in Beef



agricultural exports (the highest of which was applied during years of high world prices, such as 1974/75). Direct price interventions reduced the domestic price between 12 and 42 percent for wheat and between 11 and 35 percent for beef. Economywide (indirect) interventions added substantially to the total taxation of the production of these goods. For example, during the period 1981–1984, the effect of economywide price interventions added 29.2 and 39.5 percent to the total tax on wheat and beef respectively over and above the direct (sectoral) taxation of 17.3 and 13.8 percent. On the other hand, a subsidy occurs with respect to domestic consumers in Argen-

Figure 3.3 Chile: Direct and Indirect Interventions in Wheat



Chile: Direct and Indirect Interventions in Milk

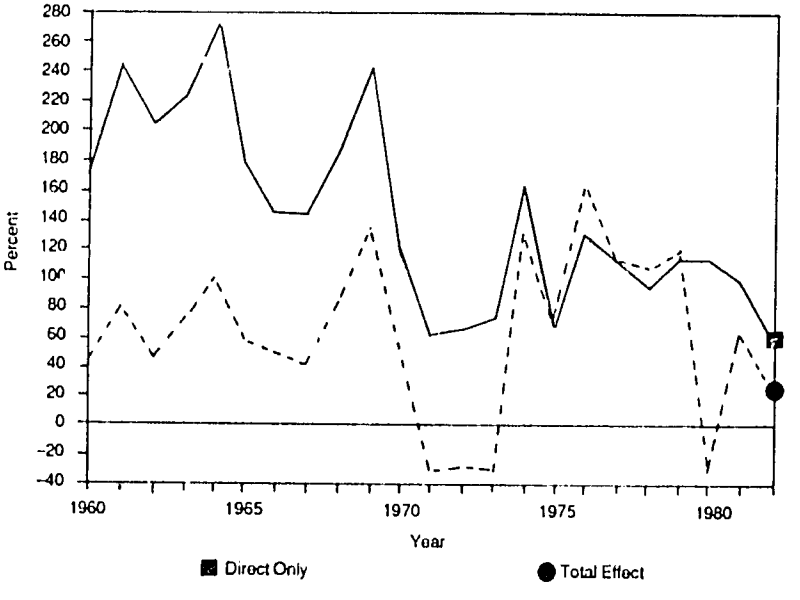
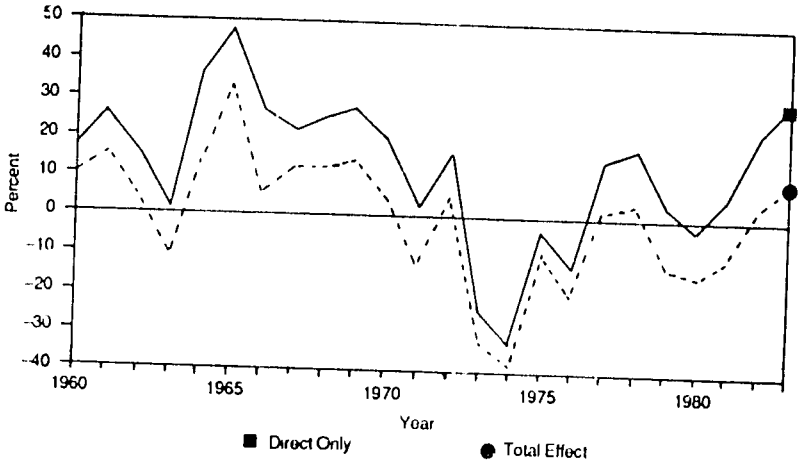
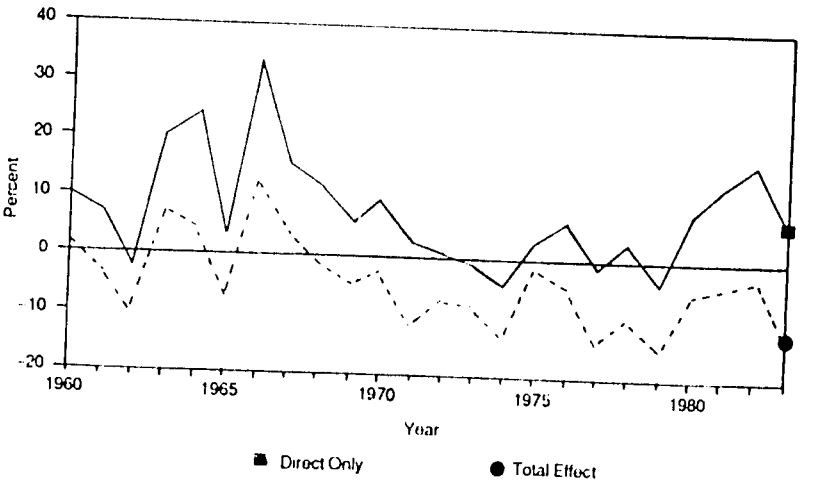


Figure 3.4 Colombia: Direct and Indirect Interventions in Wheat



Colombia: Direct and Indirect Interventions in Cotton



tina. As a result of direct taxation to exports, and aside from other possible price interventions applied at actual levels, prices to domestic consumers during 1960–1984 were subsidized between 12 and 42 percent for wheat and 11 and 35 percent for beef. Fiscal revenue objectives and a cheap food policy for urban consumers were undoubtedly very strong forces behind the taxation of agricultural exports.

The situation in Chile (Figure 3.3) indicates a relatively stronger effect of economywide policies on incentives to farmers. Wheat growers received

slightly positive nominal protection (except during 1971–1975, a period coinciding with two years of high world prices), and dairy farmers received a very substantial level of nominal protection during the entire period. Economywide intervention substantially reduced the net level of protection of milk production (with a net effect of taxation in 1971–1975) but nonetheless left that sector with levels of protection of around 25.3 to 93.0 percent through the period 1960–1980. For wheat, on the other hand, the slightly positive direct protection is overwhelmed by substantial indirect taxation, resulting in an overall taxation for the period 1960–1975. Positive protection of 20.8 percent prevailed in 1976–1980.

In Colombia, coffee producers were taxed consistently throughout the 1960–1983 period. However, there is a real question as to how much of this export tax was applied to improve coffee prices as part of an international commodity agreement between large coffee exporters. Wheat and cotton in Colombia (Figure 3.4) present the opposite case—that of an import-competing product and an exportable, respectively, with substantial nominal protection for wheat production (except 1971–1975) and lower protection (positive) for cotton. Adjustment for economywide interventions substantially reduces real protection for wheat and cotton production. In fact, there was negative (total) protection for wheat and cotton between 1971 and 1980 and negative protection for cotton, except during 1966–1970.

As can be observed for all three countries, the effect on agriculture's relative prices attributable to economywide policies in most cases has been equal to or greater than the effect of sector-specific (direct) price policies. This measured economywide effect represents in essence the impact of the real exchange rate on the region's trade, fiscal,and monetary policies.

Agriculture's Output Response

Much of the Latin American literature on development strategies during the 1940–1970 period assumed that agriculture was destined for a static role technologically; industry, on the other hand, was supposed to be dynamic. This reasoning implied that although individual crop output responds to price movements, the aggregate supply of agricultural products from the sector as a whole was quite unresponsive to incentives—the so-called (aggregate) supply inelasticity of agriculture in Latin America. If that really were the case, then the social cost of viewing agriculture as a tax base for economic development would be low. Agricultural taxation here meant not land or income taxes, but an implicit tax affecting agricultural terms of trade vis-à-vis the rest of the economy.

This assumption is highly questionable. If we examine the conventional arguments for the subsidization of infant industries, we can establish easily that these same arguments are as relevant for agriculture as they are for industry because technological change can and has occurred as much, if not

more, in agriculture as in industry. One expects the aggregate supply response to price movements to be lower than that of individual crop output because the cost of switching resources between sectors, required for aggregate supply response, is higher than it is for switching resources between crops. But the usual prescription that has discriminated in favor of industry on the grounds of agriculture's static technology and low price responsiveness is a bad one.[24]

Recent work on aggregate agricultural supply response in Latin America—which measures supply response through a much fuller specification of rural-urban linkages in the labor and capital markets—is beginning to challenge the pessimistic view of the supply response of the agricultural sector. Some of the best technical work on this question has been done at the International Food Policy Research Institute (IFPRI) by Cavallo and Mundlak on Argentina,[25] and Coeymans and Mundlak on Chile.[26]

In their analysis of Argentina during the 1950–1971 period, Cavallo and Mundlak simulated two alternative policies—one, which liberalized trade, eliminated the tax on agricultural exports and the tariff on nonagricultural imports. Results indicated that the elimination of the export tax would have led to a substantial expansion of agricultural output. However, the resulting decline in real exchange rates diluted the effect of the tax reduction on agricultural growth. This, together with the elimination of tariffs on imports, resulted in a decrease in the per capita output of the nonagriculture sector that was more than the corresponding per capita increase in the agricultural sector.

The alternative was to keep the real exchange rate from falling in response to liberalized trade. In the simulation, the combination of liberalized trade and managed real exchange rates produced impressive increases in both agricultural and nonagricultural per capita output. But trade liberalization caused the price of food to increase more than nominal nonagricultural wages. (This suggests that it might be useful to examine the use of food subsidies to compensate wage earners for the improved economic environment for agriculture.)

A follow-up study by Cavallo for Argentina showed that agricultural output response to permanent changes in relative prices converged gradually to an elasticity close to 1.0—that is, a 10 percent increase in relative agricultural prices generates a 10 percent increase in aggregate output. Cavallo observed a high elasticity for capital with respect to price. Trade liberalization scenarios for Argentina show an impressive increase in capital utilization in agriculture. Despite a relatively low response of labor to prices and with an elasticity of cultivated land with respect to prices of 0.4, this high response of capital and significant response of land results in a strong overall agricultural output response to relative prices in Argentina.

In the Chilean study, the economy was divided into five sectors linked

by an input-output matrix for the period 1962–1982. Coeymans and Mundlak showed that a permanent increase of 10 percent in agricultural (relative to nonagricultural) prices generates an increase in output of 20 percent, implying an implicit long-run elasticity of about 2.0.[47]

These values are not consistent with the unresponsiveness of agricultural output to prices presumed by the structuralist view of inflation and growth in the 1950s and 1960s in South America. These results suggest that the cost to agricultural as well as overall growth can be substantial. Indeed, the benefits might not have justified the costs.

Notes

1. The definition of food used here includes cereals, vegetables, roots, tubers, plantains, and bananas; noncereals were converted to their equivalent in wheat according to basic caloric content. This estimate takes into account the consumption of livestock, poultry products, fruits, and vegetables. Consumption is determined as production plus imports less exports.

2. J. M. Caballero and H. Maletta, "Estilos de desarrollo y políticas agroalimentarias: Tendencias y dilemas an América Latina," CEPAL/FAO. (Santiago, Chile: Consulta de Expertos Sobre Estilos de Desarrollo y Políticas Agrícolas, November 1983): 137.

3. See S. Reutlinger and M. Selowsky, *Poverty and Malnutrition* (Baltimore, Md.: Johns Hopkins University Press, 1976).

4. See C. Seré and L. Rivas, "Some Thoughts About Nutrition and Animal Protein Consumption in Latin America," *Trends in CIAT Commodities* (Cali, Colombia: CIAT, March 1983).

5. Seré has classified countries of the region in three levels according to their protein intake: Group 1 (greater than 80 grams per person, per day) includes Argentina, Paraguay, and Uruguay, countries with comparable advantages in cattle production; Group 2 (less than 80 grams and greater than 60 grams) includes Brazil, Chile, Cuba, Guyana, Jamaica, Mexico, Nicaragua, Trinidad and Tobago, and Venezuela; and Group 3 (less than 60 grams) includes Bolivia, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Panama, and Peru.

6. R. Mohan, J. Garcia, and M. Wagner, *Measuring Urban Malnutrition and Poverty: A Case Study of Bogota and Cali, Colombia,* Staff Working Paper no. 447 (Washington, D.C.: World Bank, April 1981).

7. M. Urrutia, *Winners and Losers in Colombia's Recent Growth Experience* (Baltimore, Md.: Johns Hopkins University Press for the World Bank, 1985).

8. T. Castaneda, "Determinantes de la reducción de la mortalidad infantil en Chile, 1955–83," *Cuadernos de Economia* (August 1985).

9. T. Poleman, "World Hunger, Extent, Cause and Cures," and T. N. Srinivasan, "Hunger: Defining It, Estimating Its Global Incidence, and Alleviating It," in D. Gale Johnson and G. Edward Schuh, eds., *The Role of Markets in the World Economy* (Boulder, Colo.: Westview Press, 1983).

10. During the period 1970–1976, rural population grew at an annual rate of 0.91 percent while urban population rose 3.71 percent annually.

11. L. López Cordovez, "Trends and Recent Changes in the Latin American Food and Agriculture Situation," *CEPAL Review* (April 1982):7–41.

12. Maize production rose at a slower pace than other cereals, and the ratio destined for human consumption diminished.

13. Cordovez, "Trends and Recent Changes."

14. L. Jarvis, "Latin American Livestock Development: Issues and Prospects" (Paper prepared for the World Bank, Washington, D.C., April 1984).

15. See John Lynman, "Agricultural Production in Latin America: Performance, Growth Components, and Rural-Urban Migration," (Cali, Colombia: CIAT, September 1980). Mimeo.

16. Production elasticity is defined as the proportionate change in production caused by proportionate change in inputs.

17. See A. Siamwalla and A. Valdés, "Food Insecurity in Developing Countries," *Food Policy* 5, no. 4 (November 1980):258–272.

18. See A. Valdés and E. Alvares, *Government Policy and Food Supply Management in Peru: 1950–1981* (Washington, D.C.: IFPRI, March 1984).

19. A. Valdés, "Latin America's Food Situation and Perspective Within a Global Context" (Paper presented to the Club of Rome, Budapest Conference, September 1983.

20. Ibid.

21. V. Elías, *Government Expenditures on Agriculture in Latin America,* Research Report no. 23 (Washington, D.C.: IFPRI, May 1981).

22. V. Elías, "Government Expenditures on Agriculture and Agricultural Growth in Latin American Countries" (Paper presented at IFPRI Seminar, Washington, D.C., February 1984).

23. See J. Garcia and G. Montes, *Foreign Trade Regimes and Incentives to Agriculture in Colombia* (Washington, D.C.: IFPRI, forthcoming).

24. There are, of course, other possible arguments for taxing agriculture. There are essentially two. One is to trade taxes in order to help finance government. The second, the distributive argument, concerns cheap food policy and a presumed lower demand for labor

25. D. Cavallo and Y. Mundlak, *Agriculture and Economic Growth in an Open Economy: The Case of Argentina,* Research Report no. 36 (Washington, D.C.: IFPRI December 1982).

26. J. Coeymans and Y. Mundlak, *Agricultural Growth and Real Exchange Policy: The Case of Chile, 1960–1982* (Washington, D.C.: IFPRI, forthcoming).

27. These values are consistent with estimates of the aggregate long-run supply elasticity for agriculture for the United States by Griliches (1959), who obtained a value of about 1.2; Tweeten and Quance (1969) obtained values of about 1.5; for Australia, Pandey (1982) obtained values close to 1.0.