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Government Intervention in Latin American Agriculture, 1982-87

Donna Roberts
Paul Trapido

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ABSTRACT

This study examines the pattern of government intervention in the agricultural markets of the six largest economies in Latin America during 1982-87. Producer and consumer subsidy equivalents (PSE/CSE's) are used to summarize the effects of a wide range of commodity, sector, and economy-wide policies that can be compared across commodities, across countries, and across time. Six chapters provide background material on the economy and policies of each country along with documented subsidy equivalent estimates. During 1982-87, Latin American policymakers abandoned the statist approach to development, but adhered to import-substitution strategies, which required some government intervention. In addition to commodity specific and/or sectoral policies, economy-wide measures---particularly exchange rate policies---had a decided effect on transfers to and from the agricultural sector in all six countries.

Keywords: Latin America, agricultural policy, government intervention, subsidy equivalents, Argentina, Brazil, Chile, Colombia, Mexico, Venezuela

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AGRICULTURAL POLICY REFORM: ISSUES AND IMPLICATIONS FOR LATIN AMERICA

Carl Mabbs-Zeno, Donna Roberts, Tom Vollrath, and Barry Krissoff

Introduction

Agricultural policy is now high on the reform agenda throughout most of the world. Following a period of general optimism associated with the expansion of agricultural trade, governments are blaming their own or their neighbors' policies for declining productivity and profits in the agricultural sector.

In the industrialized market economies (IME's) that export agricultural commodities, support for production has led to surplus stocks and contributed to budget deficits. Competition among the IME's elicited a proliferation of programs to enhance their own exports. The effects of these programs have largely offset each other, while further raising the governments' budgetary burdens. The less developed countries (LDC's) have not often been troubled by surplus production, but a variety of other problems has forced the reevaluation of policies affecting agricultural production, consumption, and trade. Many countries in Latin America face falling per capita food production, despite the enormous amount of public sector investment in agriculture during the past 30 years. They also face falling international prices for their principal agricultural exports, despite their participation in commodity cartels.

The approach to policy reform has varied widely throughout the world although the global rhetoric is clearly in the direction of liberalization, that is, of reducing the role played by national government institutions and, thus, greater dependence on market mechanisms. For the IME exporters, reduced government participation directly addresses their problem of budget deficits. And although liberalization could exacerbate some conspicuous social problems in LDC's, especially in the short run, their large external debts are forcing policymakers to consider reducing the government's role in agricultural markets.

The urgency of some of these fiscal problems has led to some unilateral reforms in both IME's and LDC's. Many countries have postponed further changes until the General Agreement on Tariffs and Trade (GATT) negotiations on multilateral liberalization reforms have been concluded. The ministerial declaration that opened the current round of negotiations set its first goal "to halt and reverse protectionism and to remove distortions to trade" (9).¹ This "Uruguay Round" of the GATT began in 1986 and was scheduled to end in December 1990. The reforms in domestic agricultural policies proposed by the European Community (EC) were insufficient to gain the approval of the United States and countries that belong to the Cairns Group. The Cairns Group, which includes Argentina, Brazil, Chile, Colombia, and Uruguay, is

¹ The underscored numbers in parentheses are listed in References at the end of this section.

a group of 14 developed and developing country exporters that share the U.S. goal of substantially and progressively reducing market access barriers, export subsidies, and internal support measures.

Participants in the Uruguay Round are attempting to negotiate some reductions in government intervention in agriculture, which has been exempt from most GATT disciplines since 1955. The exclusion of agriculture over the past 35 years has especially affected LDC's because agriculture often constitutes their largest export sector. The outcome of the GATT negotiations is important to countries because unilateral liberalization may threaten an exporter's share of the world market or an importer's self-sufficiency goal. Through multilateral negotiations, each country can pace reductions in its government support of agriculture with reductions made by other nations.

The process of both unilateral and multilateral policy reform can be assisted by quantitative assessment of current policy effects to determine the effect of liberalization. A common standard for estimating levels of government involvement is particularly important for multilateral trade negotiations so that the participating countries feel that reductions are being set at equivalent levels in each economy. This report provides detailed estimates of the level of government intervention in agricultural markets in the six largest economies in Latin America. Each section in this report offers data to compare government intervention across commodities, across policies, between producers and consumers, and through time for one country.

How Governments Intervene in Agriculture

When national governments intervene in agricultural markets, their policies tend to alter the trade balance from what it would have been in a freely competitive market. This occurs even though the trade balance may not have been targeted by the policy. How trade is affected depends on whether the policy is directed toward a single commodity, a single sector, or the entire economy.

Commodity-specific policies usually function through effects on prices. Governments throughout the world have implemented a variety of price-support or stabilization schemes to aid producers. Border policies (such as tariffs or quotas) are used to maintain producer prices at an administratively determined level or within an administratively determined band. In Latin America, most minimum prices are maintained by imposing import licensing requirements, which raise domestic prices above world levels. The use of price adjustment implies that some of the transfers resulting from the program are paid by consumers of the supported commodities.

Latin American governments usually try to shield some or all consumers from the effects of these higher prices. The governments do this by using public sector resources to subsidize the cost of storing, transporting, and processing a commodity. Governments in the region generally established parastatals to handle a wide range of these activities, from storing grain in Argentina to processing sugarcane in Mexico. Marketing boards are also used to control prices, particularly for exportable crops. The fundamental goal of such policies in LDC's is usually to generate government

revenue rather than to provide incentives to producers. Coffee marketing boards have most often been used to raise revenue in Latin America.

Another form of commodity-specific policy is embodied in international commodity agreements. These commodity agreements were formed to control the production and export of numerous goods, (such as wheat, cocoa, and rubber); however, only a few agreements successfully limited the supply of commodities in international markets (20).

Even input policies can be commodity-specific. The linkage of input policies to specific commodities may be explicit, as with subsidized transportation for grain, or it may be implicit, as with irrigation subsidies that shift production away from those commodities that would otherwise be grown in the irrigated areas.

Sector-specific policies may be implemented through domestic policy instruments. Policies to develop rural infrastructure or provide agricultural credit are two examples of sectoral policies that can be neutral with respect to commodity. Public sector support of research and extension activities is usually classified as a sectoral policy, although funds are sometimes allocated for individual crops. Sectoral policy might also be implemented through an exchange rate regime that provides a separate rate for agricultural trade. Venezuela established a separate exchange rate for agricultural imports in the early 1980's to reduce the domestic costs of buying foreign grains and oilseeds. The preferential exchange rate was used to compensate importers for paying more than international market prices when purchasing the domestic crop.

Economy-wide policies are not explicitly directed toward change in any particular commodity or sector. These policies come in four forms: 1) monetary policy, operating through control of the money supply by the central bank; 2) fiscal policy, operating through government revenue generation and expenditure; 3) exchange rate policy, operating through the central bank's control of the money supply and governmental participation in currency markets; and 4) the formation of trade blocs with other countries. Even though these policies are broad in their impact, the particular form of a policy or the structure of the economy can focus the effects in agricultural areas. For example, exchange rate controls are more important to the agricultural sector of countries in which agriculture provides a large share of trade.

Monetary policy is important because of its effects on inflation, interest rates, exchange rates, and, under some circumstances, real national income. Rapid increases in money supply were critical among causes of the hyperinflation experienced in Latin America. The money supply has also been important in determining levels of U.S. agricultural trade. The relative responsiveness of agricultural producers and consumers to changes in prices within an economy determines how a change in money supply affects agriculture.

Fiscal policy tends to be most effective in altering national income when real interest rates are high, that is, when monetary policy is least effective. Fiscal policy has often played an important role in the transfer of resources in and out of agriculture in both

IME's and LDC's. Fiscal policy affects intersectoral resource allocation by affecting the structure of incentives as well as by the pattern of public sector expenditures.

In addition to the effects of monetary and fiscal policy on the equilibrium exchange rate, many governments directly control the price of their national currency. This leads to some currency exchanges at official, but not equilibrium rates, the actual proportion depending, in part, on the strength of state control. LDC's have often used overvalued currencies to make imports relatively cheap, favoring consumers of imports, including those who use machinery and raw material. More recently, a number of LDC's, including all six of the Latin American countries in this report, have devalued their currency, attempting to promote net exports and domestic savings.

Countries have also formed trading blocs to increase net national income. The LDC's have established organizations to foster South-South trade, but IME trading blocs (such as the European Community) have generally been far more successful. Agreements that include a limited number of developed and LDC participants, with favorable trading terms for the LDC's (such as the Lome Convention), have been effective as well (17). Within Latin America, several regional organizations have been invigorated recently, including the Central American Common Market, the Andean Pact, and the Southern Cone Free Trade Pact. The United States is taking steps to expand its preferential trading relationship with Latin America through the negotiation of a free trade agreement with Mexico.

How Is Government Intervention Measured?

Most quantitative international comparisons of government intervention have compared domestic prices with international prices after accounting for transportation and quality differences. Several measures have been developed to express the magnitude of the price gaps, the most common of which is the nominal protection rate. It is calculated as the ratio of the price difference between domestic prices and world prices to the world price. A positive protection rate indicates that government programs in the aggregate have raised the price received by producers.

The wide use of protection rates, as measured by various interpretations of the gap between local and world prices, attests to the interest in quantitative measures of policy impact. Such measures are essential to evaluating past policy effects and as a basis for anticipating future impacts. Even so, no one has compiled a set of protection measures that covers all types of countries over several years with a common measurement procedure. Regional and global patterns remain obscured by the informational noise inherent when drawing data from independent research efforts. Recent major efforts by the Organization for Economic Cooperation and Development in developed countries (21) and by the World Bank in LDC's (26) are providing greatly improved estimates of the effects of policies in agriculture, but the ERS project that provided the estimates reported in this paper has the broadest agricultural coverage to date (26).

In addition to inadequate coverage among existing estimates of protection, available measures have inherent weaknesses that limit their usefulness. When the effect of

government intervention is estimated according to the price difference from world levels that results from all policies simultaneously, there is no way to quantitatively attribute effects to specific policies. Thus, the estimates do not permit the comparison of the effects of several policies within one country or the comparison of the effects of one policy in several countries. Such protection measures also fail to account for policies that do not have an immediate price effect, such as input policies and direct payments.

This report features measures known as the producer subsidy equivalent (PSE) and the consumer subsidy equivalent (CSE). These subsidy equivalents show the amount producers or consumers would be willing to pay or receive to replace all government programs with a single subsidy. PSE and CSE components are derived in two ways: (1) by looking at government expenditures, and (2) by looking at the wedge that a policy instrument drives between domestic and external prices. Where several policy instruments are functionally linked, such that they jointly affect producers and consumers, subsidy equivalents measure the net effect of the package of policies. The general procedures used in calculating subsidy equivalents are described in (7).

Figure 1 illustrates how the contribution of one policy, the ad valorem tariff in Chile, would be estimated in a PSE. The world price (P_1) is below the intersection of domestic supply (S) and demand (D), so imports would amount to $I_1 (= QD_1 - QS_1)$ in a free market where the world price prevails. Chile's ad valorem tariff rotates its excess demand curve leftward from ED_1 to ED_2 , raising the price in domestic markets to P_2 which reduces imports to $I_2 (= QD_2 - QS_2)$.

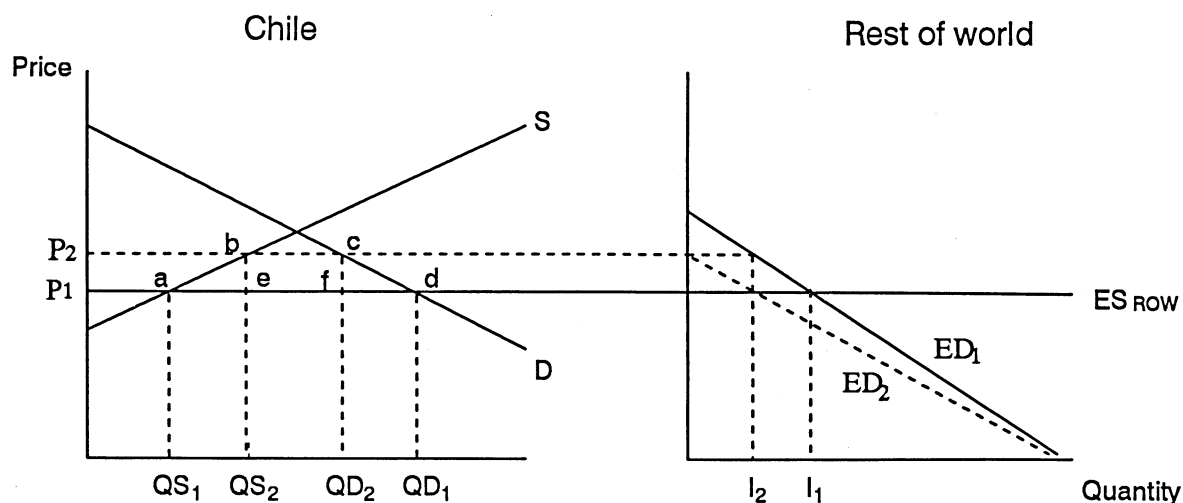
The increase in welfare experienced by domestic producers as a result of the tariff is represented by the area $P_1 P_2 a b$. PSE estimates, however, are based on levels of production and consumption observed in the presence of the tariff and are, therefore, not exact measures of producer welfare. The effect of a tariff on producers is estimated as the product of the tariff ($P_2 - P_1$) and the quantity produced (QS_2). The PSE, expressed as a percentage of the value of production, is

$$\frac{100 \cdot (P_2 - P_1) \cdot QS_2}{P_2 \cdot QS_2} \quad (1)$$

Although the welfare cost of the tariff to consumers is represented by the area $P_1 P_2 c d$, the CSE is estimated as the product of the tariff ($P_1 - P_2$) and the quantity consumed (QD_2). A positive PSE/CSE indicates a subsidy; a negative PSE/CSE indicates a tax.

Subsidy equivalents may be expressed in many forms. The total subsidy equivalent that represents the value of all policies to producers or consumers is usually calculated first in terms of local currency. The percentage PSE/CSE (illustrated above), which is calculated by dividing the policy transfer by producer revenue, facilitates international comparisons.

Figure 1
Measurement of a tariff in a subsidy equivalent calculation



For most policies, the procedures used in estimation reflect compromises between the conceptual goal and the practical difficulty of analyzing numerous countries with fundamental differences in economic structure and data availability. The subsidy equivalents reported here for Argentina, Brazil, Chile, Colombia, Mexico, and Venezuela were subject to several measurement problems, despite the compromises undertaken to simplify estimation. Data were not available on the basis of any consistent annual unit. Tariff and trade data were typically reported for calendar years, agricultural data were reported for crop years that varied among crops and countries, and government budgetary data were generally reported for fiscal years. Some data were available only at an inappropriate point in the marketing chain. For example, commodities like sugarcane are processed before being exported, so the international price is imperfect for comparison with producer prices. International prices were also questionable in years when a particular commodity was little traded. The accuracy of the price-gap measurement was hampered by a lack of data on internal transportation cost and on the value of quality differences between a particular country's production and the world standard.

Estimation of shadow exchange rates to represent what rate would have prevailed in the absence of government controls often yielded controversial results, yet the calculated subsidy equivalents for these six countries were particularly sensitive to such estimates. For that reason, two estimates of each calculated producer and consumer subsidy equivalent are presented in the summary section. The official U.S. Department of Agriculture, Economic Research Service (USDA/ERS), PSE is calculated using an estimated equilibrium exchange rate. The PSE accounts for the effects on a traded agricultural commodity of an exchange rate that is not permitted by the government to float freely in international financial markets. The second estimate is calculated using the official exchange rate.

Treatment of these problems required modifications of the estimation method for each country. Cooperation among the authors improved the confidence that they place in the comparability of their results, but the subsidy equivalents must be read as estimates capable of specifying trends and patterns, but not providing multiple significant digits of accuracy.

Summary of Government Intervention in Latin American Agriculture

Krueger and others observed that LDC's often overvalue their exchange rates; use marketing boards, export taxes, or quotas to suppress the producer price of agricultural exports; and compensate producers for product price disincentives by subsidizing inputs and capital-intensive projects such as irrigation districts (14). The findings here provide corroboration for most of those observations. However, this description omits one of the most notable features in pattern of government intervention in Latin America; the degree to which price policies were used from 1982-87 to stimulate production of import-substitute crops.

The PSE's for import-substitute crops were generally positive and large, while most export crop PSE's were negative (tables 1 and 2). Producers of commodities that were least suited to the soil and climate of their particular country were offered the most support. Government transfers often accounted for more than half of the value of production of Brazilian rice, Mexican corn, Venezuelan coarse grains, Chilean wheat, and Colombian soybeans. On the other hand, the PSE's for export crops in Argentina, Brazil, and Colombia were generally negative throughout the period. Although Colombia frequently subsidized its producers of grains, soybeans, and sugar, it taxed coffee producers to such an extent that its aggregate PSE was negative throughout the period. Chile's exchange rate distortions heavily taxed its fruit exporters over the first half of the period, but the effect was reversed as the government began to devalue the peso more rapidly. Those who produced for export in Mexico fared better. Both cotton and sesame seed registered positive PSE's during most of the period because of the combination of government input subsidies and an undervalued exchange rate.

The most significant effect of intervention in agricultural markets during 1982-87 was to reduce the region's trade in food grains, feed grains, and oilseeds. With exporters taxing and importers subsidizing their grain and oilseed producers, both imports and exports were smaller than they would have been in the absence of domestic policies. This effect is illustrated in figure 2 for the region's largest exporter (Argentina) and importer (Mexico) of these commodities. Argentina's export tax (rotating its excess supply curve to ES_2) and Mexico's import licensing requirement (in effect a quota, making Mexico's excess demand curve ED_2 perfectly inelastic at the quantity I_2) reduced exports to X_2 and imports to I_2 . Without these commercial policies in place, Argentina and Mexico's exports and imports would have increased to X_1 and I_1 .

Macroeconomic policies---particularly exchange rate policies---had a decided effect on transfers to and from the agricultural sector in all six countries. Only Mexico consistently undervalued its currency during 1982-87, providing an implicit subsidy to its producers that averaged approximately 15 percent of the value of production

Table 1—PSE's for import substitution crops, 1982-87¹

Country and commodity ²	1982	1983	1984	1985	1986	1987
	<u>Percent</u>					
Brazil:						
Wheat	68.3 (83.7)	44.3 (47.9)	53.3 (58.0)	55.1 (58.2)	42.4 (51.5)	43.2 (55.9)
Corn	42.5 (58.5)	35.5 (33.0)	12.1 (13.9)	45.1 (42.9)	47.1 (55.5)	8.1 (24.9)
Rice	41.9 (56.6)	52.8 (47.4)	34.5 (35.6)	67.2 (67.9)	59.5 (67.0)	95.1 (112.8)
Chile:						
Wheat	-65.2 (15.1)	8.3 (38.9)	26.0 (47.3)	54.5 (50.0)	55.1 (52.5)	44.4 (43.7)
Corn	-53.5 (13.6)	2.8 (35.1)	26.2 (47.4)	38.6 (32.7)	26.8 (23.4)	20.2 (19.5)
Sugar	-67.1 (16.7)	21.5 (48.0)	50.4 (69.8)	109.9 (106.9)	58.8 (56.3)	50.1 (49.4)
Rapeseed oil	-77.9 (16.8)	-17.8 (28.6)	-10.2 (20.6)	40.8 (35.1)	54.4 (51.8)	48.8 (48.2)
Colombia:						
Wheat	-11.9 (14.6)	-2.7 (14.0)	-.9 (11.1)	13.6 (9.3)	19.3 (10.6)	30.2 (21.6)
Rice	-29.5 (2.2)	-5.0 (5.1)	12.7 (9.6)	38.8 (10.7)	25.3 (1.5)	19.2 (.9)
Sorghum	-8.5 (13.9)	-1.5 (15.4)	-.3 (11.1)	16.0 (12.0)	22.4 (13.6)	25.7 (18.9)
Soybeans	39.3 (31.1)	37.2 (27.9)	53.2 (45.0)	68.0 (59.9)	66.0 (51.3)	63.0 (35.6)
Sugar	-24.4 (0.0)	-10.2 (6.3)	-4.6 (6.1)	7.5 (4.4)	17.4 (6.5)	21.0 (7.9)
Mexico:						
Wheat	9.7 (-16.5)	17.2 (-12.4)	23.8 (18.6)	34.0 (28.5)	34.2 (3.9)	35.3 (8.1)
Corn	71.3 (58.3)	41.3 (23.3)	42.9 (39.5)	57.1 (53.8)	61.7 (45.5)	74.4 (63.0)
Sorghum	34.7 (14.8)	14.5 (-14.2)	39.8 (35.5)	44.7 (40.1)	70.8 (53.6)	65.4 (48.7)
Soybeans	35.9 (18.9)	31.5 (10.4)	35.0 (31.1)	49.9 (46.2)	51.4 (31.9)	59.6 (45.2)
Drybeans	-2.7 (-33.2)	-43.1 (-81.2)	-62.9 (-71.2)	35.0 (30.7)	10.2 (-18.7)	-14.9 (-48.1)
Venezuela:						
Corn	65.5 (65.5)	50.4 (56.7)	71.9 (85.7)	76.6 (90.7)	79.9 (84.8)	77.6 (97.1)
Rice	47.7 (53.7)	42.3 (48.9)	53.4 (78.5)	62.8 (83.1)	65.9 (73.5)	39.5 (84.5)
Sorghum	53.7 (47.7)	42.0 (50.0)	61.2 (73.7)	66.1 (82.1)	67.4 (72.6)	59.5 (72.8)

¹ The PSE's were calculated using an estimated equilibrium exchange rate. This adjustment reflects the effect of the government's policy to distort the value of its currency on the value of the subsidy equivalents. The PSE's were also calculated using each country's official exchange rate; these estimates appear in parentheses.

² PSE's for Argentine import-substitute crops were not estimated.

Table 2—PSE's for export crops, 1982-87¹

Country and commodity ²	1982	1983	1984	1985	1986	1987
	<u>Percent</u>					
Argentina:						
Wheat	-34.2 (-23.9)	-46.2 (-49.8)	-64.8 (-58.8)	-26.4 (-45.4)	-7.0 (-13.3)	15.1 (4.2)
Corn	-51.5 (-38.8)	-38.4 (-42.2)	-48.3 (-42.2)	-39.3 (-62.2)	-13.7 (-21.1)	-14.5 (-30.0)
Sorghum	-67.3 (-51.1)	-64.0 (-69.3)	-102.6 (-93.6)	-70.0 (-101.6)	-57.8 (-69.2)	-27.9 (-48.6)
Soybeans	-39.3 (-29.1)	-31.2 (-34.3)	-69.0 (-63.1)	-42.1 (-62.1)	-40.1 (-47.6)	-1.4 (-13.2)
Brazil:						
Soybeans	-3.0 (22.9)	1.0 (-2.7)	-12.8 (-10.3)	-4.4 (-8.7)	31.7 (43.5)	2.7 (17.4)
Beef	11.1 (27.2)	4.1 (3.1)	-9.4 (-7.4)	-7.3 (-6.0)	-5.5 (4.9)	-79.9 (-54.4)
Poultry	1.9 (18.0)	23.3 (23.9)	10.8 (13.5)	4.4 (6.1)	-.3 (10.3)	-85.3 (-59.7)
Chile:						
Apples	-143.5 (8.5)	-54.5 (9.3)	-73.9 (9.4)	25.0 (9.8)	20.6 (8.9)	9.3 (6.5)
Grapes	-307.6 (8.5)	-108.1 (9.3)	-100.3 (9.4)	47.7 (9.8)	27.7 (8.9)	9.6 (6.5)
Colombia:						
Coffee	-107.2 (-36.7)	-88.6 (-43.3)	-93.2 (-59.4)	-65.4 (-79.8)	-81.8 (-118.4)	-34.7 (-62.9)
Mexico:						
Cotton	19.6 (.3)	23.2 (5.5)	8.2 (4.9)	10.8 (6.2)	59.7 (33.7)	29.0 (11.8)
Sesameseed	25.7 (3.4)	6.8 (-21.9)	22.8 (18.0)	24.8 (19.3)	36.8 (10.8)	-34.6 (-80.8)

¹ The PSE's were calculated using an estimated equilibrium exchange rate. This adjustment reflects the effect of the government's policy to distort the value of its currency on the value of the subsidy equivalents. The PSE's were also calculated using each country's official exchange rate; these estimates appear in parentheses.

² PSE's for Venezuelan export crops were not estimated.

each year. However, government intervention in currency markets usually penalized producers (table 3). Overvalued currencies implicitly taxed Colombian and Chilean farmers during 1982-85, and Brazilian and Venezuelan producers during 1986-87.

These countries' overvalued exchange rates were designed to promote rapid industrialization; the effective taxation of the agricultural sector by means of the exchange rate regime was generally unintentional. Nonetheless, the magnitude of this form of taxation was often significant, offsetting other forms of support provided by the government.

The exchange rate policies adopted by these six countries had a mixed effect on trade in grains and oilseeds. Mexico and Argentina's policy of frequent devaluations

Figure 2
Effects of domestic policies on agricultural trade

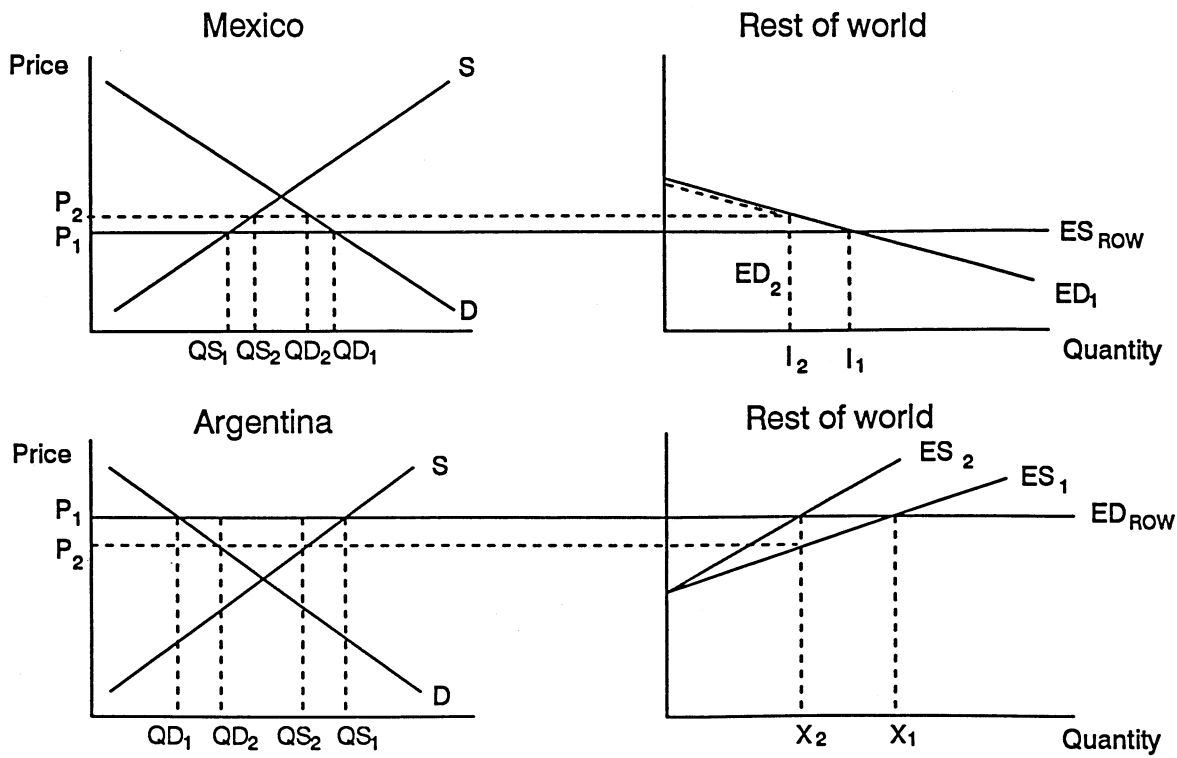


Figure 3
Effects of exchange rate policies on agricultural trade

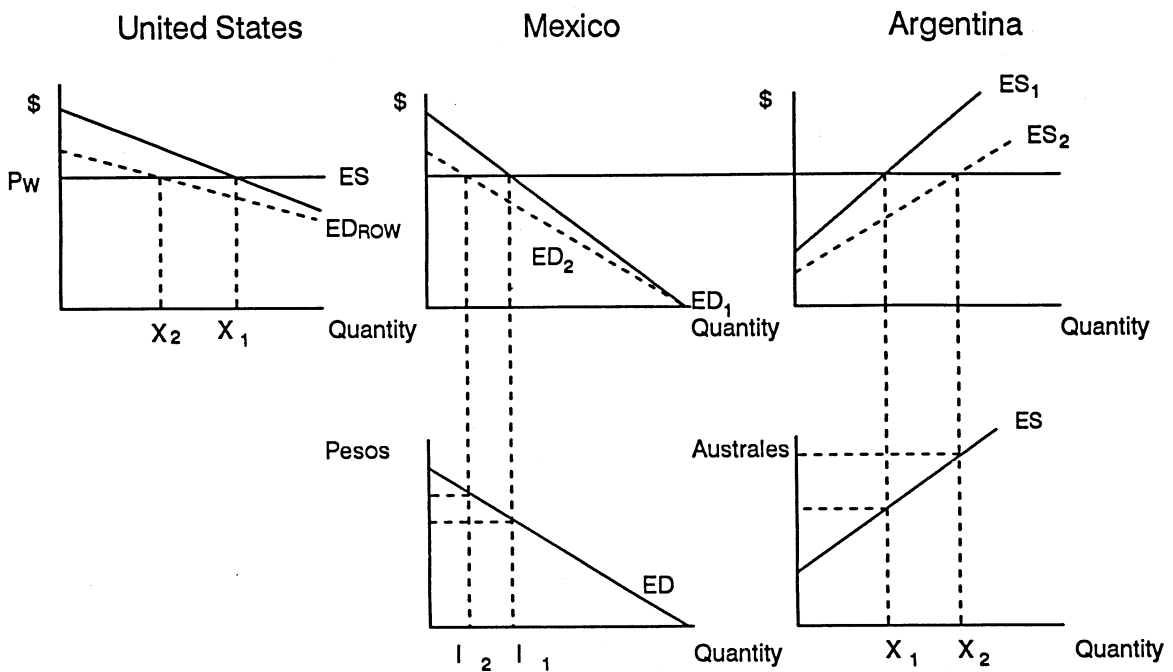


Table 3—PSE's by policy component, 1982-87

Policy and country	1982	1983	1984	1985	1986	1987
	<u>Percent</u>					
Price wedge:						
Brazil	28.8	11.0	11.7	27.4	29.6	4.9
Chile	4.2	7.6	12.1	13.8	9.3	9.1
Colombia	-23.2	-25.2	-32.5	-43.0	-7.0	-38.4
Mexico	3.8	-10.5	16.3	32.6	23.4	31.1
Venezuela	60.4	56.8	69.3	78.6	70.9	74.2
Exchange rate:						
Argentina	-11.7	3.8	-6.3	21.3	7.4	12.6
Brazil	-18.2	2.0	-2.3	.7	-9.7	-18.3
Chile	-77.7	-33.2	-21.2	7.2	4.4	1.1
Colombia	-51.5	-32.8	-23.2	9.6	26.9	21.8
Mexico	18.3	22.3	4.1	4.0	20.5	16.7
Venezuela	0.0	-6.9	-16.5	-16.0	-5.5	-23.2
Credit:						
Brazil	27.7	32.1	19.6	18.2	27.8	28.3
Colombia	1.4	1.3	1.4	1.3	.7	.9
Mexico	18.8	10.8	7.6	8.3	5.0	4.5
Venezuela	0.0	0.0	2.7	.9	1.2	1.1
Fertilizer:						
Colombia	4.6	2.9	3.1	1.8	1.1	.7
Mexico	3.4	3.5	2.3	2.2	3.3	3.1
Venezuela	-4.9	-4.4	8.6	7.4	7.8	14.5
Taxes:						
Argentina	-32.5	-46.8	-59.4	-59.5	-32.2	-12.7
Brazil	-16.5	-24.5	-24.7	-19.4	-16.9	-23.0

increased the price of traded commodities in terms of pesos and australes, thereby reducing Mexico's imports to I_2 and increasing Argentina's exports to X_2 from levels that would have prevailed under free-floating exchange rates (fig. 3). For a third country, such as the United States, these two changes implied a reduced level of grain and oilseed exports during 1982-87.

Transfers to or from the agricultural sector resulting from input subsidies were often less important than the transfers produced by exchange rate policies. With the exception of Brazilian credit policies, input subsidies usually accounted for less than 15 percent of the value of production in Colombia, Mexico, and Venezuela. Fiscal policy transfers, however, dominated exchange rate policy transfers in Brazil and Argentina.

Every country in this sample was concerned with reducing fiscal deficits and generating trade surpluses in order to finance huge external debts during 1982-87. Larger trade surpluses were achieved by using currency devaluations to stimulate exports and by increasing domestic subsidies to reduce imports. Even though governments often used indirect means of subsidizing import substitute commodities, some direct public expenditures were also necessary to achieve production goals.

The latter, of course, undermined government efforts to reduce fiscal deficits. The two countries in this sample compensated for the increased costs of larger producer subsidies by reducing direct and indirect consumer subsidies (table 4). Both Colombia and Mexico's aggregate CSE declined by approximately 30 percent of the value of consumption during 1982-87. These two governments also withdrew from the provision of marketing services through parastatals. The budgets of many parastatals were reduced; other parastatals were eliminated.

Table 4—CSE's for Colombia and Mexico¹

Country and commodity	1982	1983	1984	1985	1986	1987
	<u>Percent</u>					
Colombia:						
Rice	16.6 (0.0)	5.8 (-6.0)	-4.1 (-12.1)	-16.3 (-13.4)	-10.1 (0.0)	-10.2 (0.0)
Sorghum	15.0 (-7.4)	6.8 (10.1)	5.0 (-6.4)	-10.0 (-5.9)	-19.3 (-10.5)	-21.8 (-14.9)
Soybeans	13.1 (-7.1)	7.0 (-8.9)	1.8 (-8.5)	-11.7 (-8.0)	-23.1 (-14.4)	-38.4 (-28.4)
Sugar	14.0 (0)	6.9 (-4.1)	3.5 (-4.3)	-5.5 (-3.2)	-12.8 (-4.8)	-15.6 (-5.8)
Wheat	13.2 (-6.0)	3.8 (-7.1)	3.5 (-4.5)	-7.0 (-4.3)	-17.3 (-9.5)	-17.9 (-13.0)
Five-commodity aggregate	15.5 (-1.2)	6.0 (-6.0)	.4 (-8.0)	-10.9 (-8.0)	-13.4 (-4.5)	-16.3 (-7.5)
Mexico:						
Wheat	23.5 (44.1)	86.2 (109.5)	50.2 (54.3)	8.2 (12.5)	-1.6 (22.3)	-14.9 (6.5)
Corn	-27.8 (-16.3)	-1.8 (14.0)	-9.3 (-6.3)	-20.5 (-17.6)	-32.0 (-17.8)	-57.4 (-47.5)
Dry beans	67.7 (95.8)	75.6 (110.6)	95.3 (102.9)	0.4 (4.4)	9.5 (36.0)	87.9 (118.4)
Sorghum	-4.2 (11.8)	33.7 (56.7)	-8.3 (-4.9)	-26.0 (-22.3)	-44.9 (-31.2)	-45.4 (-32.1)
Soybeans	-14.2 (0.7)	3.4 (21.9)	13.4 (16.8)	-32.0 (-28.7)	-34.7 (-17.6)	-48.6 (-36.0)
Five-commodity aggregate	-7.4 (7.9)	23.3 (43.3)	9.4 (12.9)	-16.3 (-12.9)	-26.8 (-9.7)	-38.6 (-24.6)

¹ The CSE's were calculated using an estimated equilibrium exchange rate. This adjustment reflects the effect of the government's policy to distort the value of its currency on the value of the subsidy equivalents. The CSE's were also calculated using each country's official exchange rate; these estimates appear in parentheses.

Effects of Agricultural Policy Reforms on Latin American Countries

The PSE/CSE estimates, which measure net transfers, do not take into account the welfare consequences of the policy interventions. Welfare consequences can be quantified, however, within a comparative statics model using the concept of producer and consumer surplus. The effect of a policy is assessed by comparing market outcomes with and without policy intervention.

Several studies have examined the welfare implications of agricultural reform. In the partial equilibrium analysis undertaken by ERS, different scenarios were evaluated using the Static World Policy Simulation Model (SWOPSIM) (13). In the different scenarios, IME's, LDC's, or both were assumed to reform agricultural policies by reducing or eliminating the policy components that comprised each PSE/CSE.

Three scenarios are considered in the report by Krissoff and others (13). Two scenarios reflect liberalization by only the IME's, with different assumptions regarding the degree to which changes in world prices are allowed to affect domestic prices in the LDC's; the third scenario reflects a global liberalization.² With commodity prices generally increasing in the base period (1986) under each scenario of trade liberalization, producers tend to gain while consumers tend to lose. There are exceptions to this generalization. Under a global liberalization scenario, even though world grain prices rise, Venezuelan grain producers and consumers face lower domestic prices because of the elimination of government policies; hence, consumer surplus increases while producer surplus decreases.

According to the SWOPSIM results, the increase in net welfare for Latin American countries increases as the degree of liberalization increases.³ Both net importers and net exporters of the agricultural commodities experience net welfare gains under a global liberalization scenario. While the loss to consumers exceeds the gain to producers, the reduction in government outlays accounts for the positive net welfare effects. Argentina gains the most in this scenario (\$637 million). Mexico and Venezuela, both net agricultural importers of the 22 commodities included in the SWOPSIM analysis, register gains of \$505 million and \$400 million.

Other economic linkages may exist that are not captured in the ERS analysis. An increased level and stability of world prices associated with the permanent reduction of IME government intervention could increase the profitability of agriculture and, therefore, raise productivity growth. In a recent study in which these effects are measured, Anderson and Tyers project net welfare gains equal to nearly \$3.9 billion, \$4.9 billion, and \$.04 billion (1985 dollars), by 1995 for Argentina, Brazil, and

² The commodity coverage includes ruminant and nonruminant meats, dairy products, grains, oilseeds and products, cotton, sugar, and tobacco.

³ The sum of producer surplus, consumer surplus, changes in government expenditures, and economic rent equals net welfare.

Mexico (2). The net welfare figures represent considerably larger gains than those in the ERS analysis in which productivity increases were not considered.

The Anderson and Tyers report also points out that many developing countries indirectly and adversely affect agriculture by pursuing commercial policies that protect the manufacturing sector. The protection of the manufacturing sector lowers the price of agricultural goods relative to nonagricultural goods. A structural adjustment of LDC policies that reduces government intervention in manufacturing along with agriculture may significantly raise the relative price of agricultural goods. Anderson and Tyers show that most developing countries improve their welfare when food policies in both IME's and LDC's are liberalized along with nonfood policies of LDC's. The Latin American agricultural sector achieves even greater trade and welfare benefits when policies in all sectors are liberalized: Argentina, Brazil, and Mexico have net welfare gains of \$7.3 billion, \$3.7 billion, and \$1.4 billion (1985 dollars) under this scenario.

Loo and Tower find that an IME agricultural liberalization results in even larger net welfare gains for Latin American countries in their general equilibrium model (15). Their results show that an IME liberalization can improve the average real wage, the agricultural real wage, and real income in LDC's, assuming that higher world agricultural prices are transmitted to LDC domestic markets. More specifically, Loo and Tower indicate that LDC's could gain \$26 billion in real income in their base period (1986-87), \$13 billion going to the most highly indebted countries, which include Argentina, Brazil, Mexico, and Venezuela.

Conclusion

The logic of the basic neoclassical trade model is applicable to Latin American agriculture. This model demonstrates the benefits of international trade for countries that open their borders to the international market. The model shows that gains from trade are derived from producers shifting their resource use and consumers adjusting their consumption patterns in response to changes in relative prices so as to increase net welfare in all countries.

When countries have closed economies, resources are not often used efficiently and domestic goods are produced at prices that generally do not conform to the existing international price structure. As a result, consumers in a closed economy usually pay more for commodities that are produced locally but could be imported at a lesser price under a liberalized trade agreement. A closed economy diminishes societal well-being because higher consumer prices for importable commodities can significantly decrease real income and consumption.

Changes in the pattern of comparative advantage affect the development process and the composition of production. The changing nature of comparative advantage underscores the importance of not distorting the system of incentives against commodities in which a comparative advantage either already exists or could be developed, contrary to recently observed behavior in Latin America. The most significant role played by international trade may be that it can provide signals as to a country's composition of comparative advantage, which is especially important to the

growth process that avoids the creation of insulated, high-cost, inefficient sectors. Domestic barriers that inhibit trade distort prices and prevent the disclosures of comparative advantage.

Comparative advantage is a simple, yet profound idea with strong welfare implications and implementation. Domestic economic growth accelerates with its identification because the global prices mechanism induces change in economic activity that more closely approaches economic optimality. History shows that countries experience more rapid structural transformation after having become exposed to the international market. Domestic efforts to establish closer links to the international market and to become more responsive to the world economy are, therefore, considered to be cost-effective approaches to development.

But however compelling the case for free trade, politicians in Latin America have judged that the benefits of intervening in agricultural markets to correct perceived market imperfections or achieve social goals outweighed the costs---just like their counterparts in developed countries. The politicians recognize that the short-run social and political costs associated with dismantling their complex policy network could be high. Both the demand for and supply of assistance tend to increase when there is a policy shift toward freer trade because there is a need to address the concerns of those who would lose with the adoption of a new mandate. Without some form of compensation, special interest groups adversely affected by proposed legislation might block freer trade initiatives. Current research indicates that programs designed to enable governments to deliver transfers to target groups without introducing distortions into price formation in agricultural markets represent the best solution to this impasse.

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ARGENTINA

Donna Roberts and Paul Trapido

Introduction

Argentina is a major world producer and exporter of grains, oilseeds, livestock, and many specialty products. Unlike many of its competitors, Argentina offers little or no assistance to its producers or its customers. Although Argentina produces large exportable surpluses, it has the potential to significantly expand production of temperate climate commodities at a relatively low cost.

Argentine officials have concluded that their country stands to gain from the proposals to reduce global government intervention in agricultural markets currently under consideration at the multilateral GATT negotiations. Argentina has been an active member of the Cairns Group, a group of developed and developing country exporters that have urged other GATT participants to reduce tariff and nontariff barriers to trade. Regardless of the outcome of the GATT negotiations, it is clear that unilateral policy reforms, adopted by many developing countries that have been unable to continue subsidizing inefficient agricultural production, will affect Argentina's agricultural sector in the 1990's.

External constraints to trade have clearly limited Argentina's ability to exploit its comparative advantage in agriculture. But just as clearly, Argentina's exploitation of its comparative advantage has been hampered over the years by internal constraints. This report examines the pattern of the government's intervention in production and trade of wheat, corn, sorghum, and soybeans during the 1982-87 period .

Economic and Agricultural Developments, 1982-87

Argentina's farm sector accounts for 15 percent of the country's gross domestic product (GDP) and employs 15 percent of the labor force, facts that understate the sector's importance to the national economy. Argentina has long relied on its farmers to produce exportable surpluses that earn most of its foreign exchange and provide an important source of taxable revenues. Unfortunately for Argentina, declining world prices for primary agricultural commodities coincided with the onset of the debt crisis in the early 1980's. The country's external accounts deteriorated rapidly, and the 1982 South Atlantic conflict with Great Britain accelerated this deterioration. Capital flight increased, investment plummeted, and the economy contracted by more than 11 percent in 2 years. In view of the worsening economic and political situation, the military government turned its power over to a civilian government in 1983.

The Radical Party, elected to office in 1983, launched an "activist" economic program, increasing government intervention in the economy. Despite the government's avowed goal to reduce the rate of inflation, it continued to print money to meet its financial obligations. Relative prices became more and more distorted. Producers in the agricultural sector, as in other sectors of the economy, began to channel

resources from productive enterprises toward speculative activities to protect their existing assets from the effects of Argentina's hyperinflation.

Inflation fell from more than 600 percent in 1985 to 90 percent in 1986 as a result of government reforms. The Government of Argentina (GOA) also succeeded in reducing the fiscal deficit to 3.6 percent of GDP, far below previous years, due to increased revenue collection following the drop in inflation. While the GDP contracted by 4.5 percent in 1985, the economy did show signs of improvement in the latter half of the year and expanded by 5.5 percent in 1986 (6).¹ The agricultural sector did not profit as much as other sectors from the measure of stability that government reforms had established in the Argentine economy. Depressed world commodity prices and poor weather led to a contraction in the 1986 farm economy. The value of agricultural exports fell to \$4.8 billion in 1986, the lowest level since 1978.

By the end of 1987, it was clear that the government's continued failure to attack the structural problem of excessive government expenditures for inefficient state enterprises was undermining any progress toward stabilizing the economy. Inflationary pressures continued to mount. By year's end, Argentina's Consumer Price Index (CPI) had increased by 130 percent over the 1986 level. The economy expanded modestly in 1987, but Argentina's balance of payments continued to deteriorate as world agricultural prices continued to decline. The GOA became increasingly obliged to focus on the management of a succession of short-term crises as the support of both the Argentine public and the international financial community sharply eroded.

Policies in the 1980's

In addition to agricultural policies, macroeconomic and trade policies have also had a major influence on the performance of the Argentine agricultural sector because it produces predominantly tradeable commodities. The following two sections summarize major policy developments in Argentina during 1982-87.

Macroeconomic and Trade Policy Developments

In the early 1980's, Argentina's military government maintained a policy of open capital markets, flexible exchange and interest rates, and selective import restrictions. This changed in 1983 when power was transferred to a civilian government. Economic policy in Argentina from 1983 to mid-1985 was characterized by the implementation of a series of stabilization programs that attempted to achieve moderate growth in the presence of a large public sector, a limited tax base, and the need to service an external debt of \$50 billion. The GOA's policies rested heavily on a series of shortrun wage and price agreements negotiated with the unions and industry associations. These agreements were to provide a foundation for long-term structural reform of the

¹ The underscored numbers in parentheses are listed in References at the end of this section.

economy, including the privatization of several large state enterprises that operate railroads, communications, and airlines.

The government's highest priority during this period was the control of accelerating inflation. In June 1985, the GOA launched the Austral Plan to break the inflationary spiral and reduce the government's role in the economy. The key components of this drastic reform program were 1) a 9-month freeze on wages and prices, 2) the introduction of a new currency unit (the austral) valued at 0.80 australes to the U.S. dollar, 3) a sharp cut in the public sector deficit, and 4) a reduction in interest rates.

The Plan was initially successful in establishing some stability in the economy. But when the GOA, fearful of social and economic disruption, continued to postpone politically difficult decisions on proposed structural reforms, all progress toward the goal of "growth with stability" evaporated in late 1986 and 1987. The GOA alternated between periods in which it controlled prices and periods in which the resulting disequilibria forced the government to temporarily abandon its controls.

Agricultural Policy Developments

The principal form of agricultural policy intervention during the past decade in Argentina was a system of taxes levied on exporters at the port.² Exchange rate policies had a significant effect on the agricultural sector. Argentina intermittently controlled the value of its currency to achieve its growth and stabilization goals; inevitably, those who produced tradeable goods were affected by the decision to overvalue or undervalue the currency. The effects of government intervention on agricultural input markets were minor compared with the GOA's export tax and exchange rate policies during the 1980's.

Export Taxes

The export tax system is used to raise revenue for general budget expenditures. Agricultural products typically account for more than 75 percent of the value of total exports; consequently, export taxes on agricultural commodities represent an important source of revenue. In some years, taxes on agricultural exports provided the government with more than \$1 billion in revenue, representing 15 percent of the annual government revenue. These export taxes were convenient to collect in a country where few people comply with other tax assessments.

The export tax system also established a price wedge between world and domestic prices so that consumers paid less than the world price for grains, oilseeds, and beef. In Argentina where wheat products and beef are important items in the average household budget, the export tax system resulted in a significant transfer to domestic consumers. By lowering the cost of living, Argentina's border taxes complemented

² Most of the taxes collected in this manner are from soybeans, wheat, corn, sunflower, sorghum, and beef exporters.

national industrial policies that aim to maintain the country's competitiveness in world markets.

The government also used part of the revenues generated by the collection of export taxes to fund the national agricultural research institute (INTA). INTA conducts economic research at its headquarters in Buenos Aires in addition to its agronomic research at 15 agricultural experiment stations throughout the provinces.

The GOA operates its export tax system as a variable export levy to modify the effect of world price movements on its economy. For example, when world prices were depressed, tax rates were lowered to ensure adequate farm profitability. In times of sharp world price increases, export taxes were often raised to control the increase in food prices for Argentine consumers. Tax rates on individual commodities varied by more than 45 percent during 1982-87.

Exchange Rate Policy

The Argentine peso was overvalued in 1982 and 1984, which penalized grain, oilseed, and beef producers and subsidized consumers of these products. After the introduction of the austral in 1985, the new currency was undervalued over the next 2 years, reversing the direction of transfers.

Input Policies

The Government of Argentina intervened in agricultural input markets on a limited basis. It periodically provided subsidized credit to a few small farmers in years when low international commodity prices threatened the solvency of these producers. The National Grain Board (JNG) operated a barter program whereby small and medium farmers who could not finance their operations could swap grain for production inputs such as diesel fuel, fertilizer, and seed. No firm data exist, but it is estimated that at least 30 percent of Argentine farmers use some type of barter program. Most producers, however, try to avoid relying on barter arrangements or outside financing because annual interest rates can range up to 5,000 percent.

Estimation of Policy Intervention in Agriculture

The commodities covered in this study include wheat, corn, soybeans, and sorghum. These four crops comprised 80 percent of the area planted in grains and oilseeds in 1987; they also constituted 90 percent of 1987 grain and oilseed production. These commodities figure importantly in Argentina's trade balance. Exports of wheat, corn, sorghum, soybeans, and soybean products accounted for 10.5 million tons of the 11 million tons of grains and oilseeds that Argentina exported in 1986/87.

Argentine producers plant and harvest more wheat than any other crop. Wheat products, primarily in the form of bread and pasta, together with beef are the most important components of the Argentine diet.

Soybeans represent Argentina's most valuable crop and is second only to wheat in terms of planted area.³ Although domestic consumption of soybean products has increased, almost all of the soybean crop continues to be exported, either as unprocessed beans or, as soymeal and soyoil.

Corn is still an important crop in Argentina, although low prices and lack of significant increases in yields resulted in stagnant output during 1982-87. Many farmers in the humid pampas region have turned to soybeans or the double crop alternative of wheat and soybeans because they are both more profitable and less risky alternatives.

Production of sorghum declined sharply during the 1982-87 period. Yields remained steady, but planted area fell more than 50 percent during this period. Faced with declining world prices, farmers began to plant new higher-yield hybrid varieties of sunflower in the arid regions of the Pampas. The continually increasing costs of transporting sorghum to the coast, caused by the steady deterioration in Argentina's infrastructure, also prompted farmers to abandon the cultivation of sorghum. Sunflowerseed is processed locally into meal and oil, products that can be more easily transported to Argentina's cities and ports.

Policy Coverage

The subsidy equivalent calculations for Argentina include the estimated impacts of Argentina's export taxes and exchange rate policies. The impacts of the Government's credit subsidies or the JNG's grain-for-inputs barter program could not be included in the subsidy equivalent measurements because of the lack of sufficient data.

PSE Results by Commodity

The aggregate subsidy equivalents for the four commodities included in this report indicate that the net effect of Argentine policies from 1982-87 was to tax producers (table 1). The level of producer taxation peaked at more than 65 percent in 1984 before declining dramatically by the end of the period.

Table 1—Summary of Argentine PSE's

Item	1982	1983	1984	1985	1986	1987
	<u>Percent</u>					
Wheat	-34.2	-46.2	-64.8	-26.4	-7.0	15.1
Soybeans	-39.3	-31.2	-69.0	-42.1	-40.1	-1.4
Corn	-51.5	-38.4	-48.3	-39.3	-13.7	-14.5
Sorghum	-67.3	-64.0	-102.6	-70.0	-57.8	-27.9
Four-commodity aggregate	-44.1	-43.0	-65.7	-38.2	-24.8	-.1

³ Approximately 30 percent of soybeans are double-cropped with wheat.

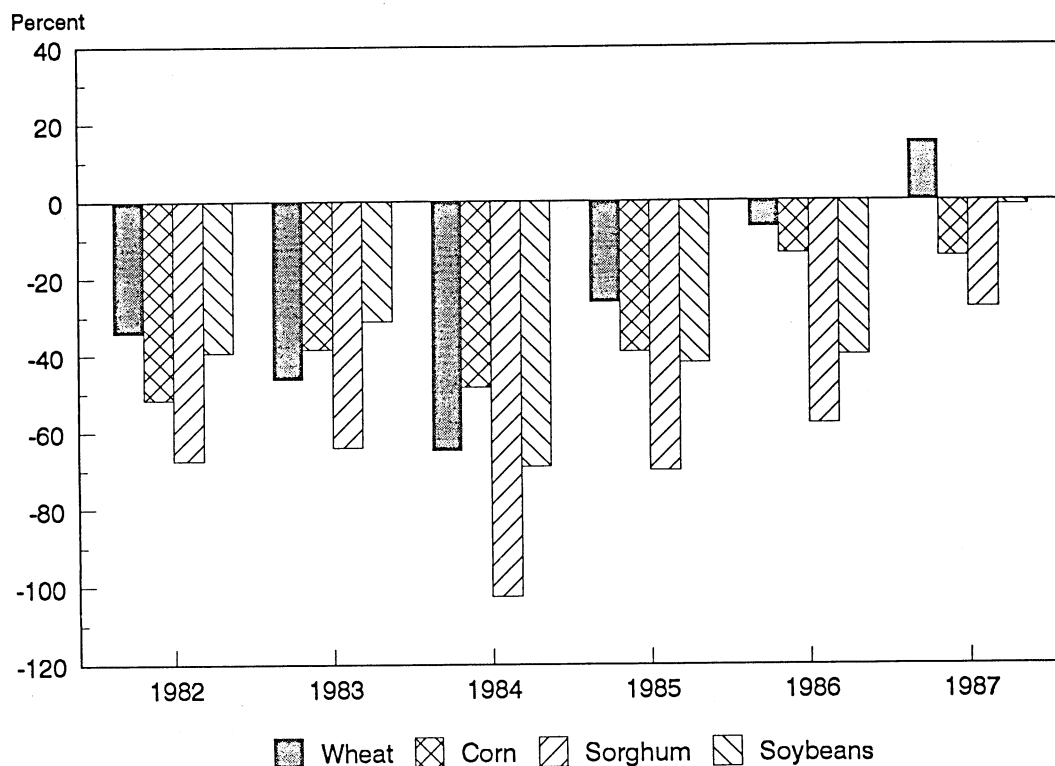
The measured PSE's indicate that GOA policies taxed sorghum producers more than producers of the other three commodities reviewed in this report. This, however, is an artifact of the methodology used to calculate the export tax component of the PSE's. In fact, the export tax rates for sorghum were often lower than those for wheat, corn and soybeans. The large negative sorghum PSE's reflect large producer-to-wholesale marketing margins rather than a GOA strategy to collect proportionally more revenue from sorghum producers (see Methodology Appendix).

On average, wheat, soybean and corn producers were taxed at virtually the same level over the first half of the period. From 1985-87, GOA policies favored wheat producers relative to corn and soybean producers. The average impact of Government policies on corn and soybean farmers was approximately equal over these three years, but the annual PSE's for each crop varied significantly from year to year (fig. 1).

PSE Results by Policy

Argentina's export tax was the most important policy component of the estimated subsidy equivalents, providing significant transfers from producers to consumers. The

Figure 1
Argentine PSE's by commodity



GOA steadily increased export taxes rates for grains, oilseeds and livestock during 1982-85 to finance a burgeoning external debt. In 1985, the value of Argentine agricultural exports began to fall because of both lower prices and reduced quantities (5). The government reduced the tax rates over the next 2 years, hoping to stimulate exports enough so that total tax revenues would increase (table 2).

The GOA's overvalued exchange rate policy implicitly taxed its producers in 1982 and 1984, although to a far lesser degree than export taxes. After the introduction of the austral in 1985, the GOA undervalued the currency by means of a series of mini-devaluations over the remainder of the period, hoping to stimulate exports. This policy shift had the effect of reversing the direction of exchange rate transfers from 1985-87. The undervalued exchange rate somewhat mitigated the effects of export taxes during these 3 years, increasing the value of the negative PSE's.

Table 2--Argentine PSE's by policy component

Item	1982	1983	1984	1985	1986	1987
	<u>Percent</u>					
Wheat:						
Export tax transfers	-23.9	-49.8	-58.8	-45.4	-13.3	4.2
Exchange rate adjustment	-10.4	3.7	-6.0	19.0	6.3	10.9
Total	-34.2	-46.2	-64.8	-26.4	-7.0	15.1
Corn:						
Export tax transfers	-38.8	-42.2	-42.2	-62.2	-21.1	-30.0
Exchange rate adjustment	-12.7	3.9	-6.0	22.8	7.4	15.5
Total	-51.5	-38.4	-48.3	-39.3	-13.7	-14.5
Sorghum:						
Export tax transfers	-51.1	-69.3	-93.6	-101.6	-69.2	-48.6
Exchange rate adjustment	-16.2	5.3	-9.0	31.6	11.4	20.7
Total	-67.3	-64.0	-102.6	-70.0	-57.8	-27.9
Soybeans:						
Export tax transfers	-29.1	-34.3	-63.1	-62.1	-47.6	-13.2
Exchange rate adjustment	-10.2	3.2	-5.9	20.0	7.5	11.8
Total	-39.3	-31.2	-69.0	-42.1	-40.1	-1.4
Four-commodity aggregate:						
Export tax transfers	-32.5	-46.8	-59.4	-59.5	-32.2	-12.7
Exchange rate adjustment	-11.7	3.8	-6.3	21.3	7.4	12.6
Total	-44.1	-43.0	-65.7	-38.2	-24.8	-1

Conclusion

Argentine policymakers recognize that, although the system of export taxes achieves the objectives of revenue collection and urban-biased food prices, it reduces output and lowers productivity in the agricultural sector. The GOA attempted to wean itself from this source of revenues in the wake of the limited success of the Austral Plan; the

government eliminated export taxes in late 1987. However, when the international financial community withdrew its support in early 1988 in response to Argentina's marked noncompliance with a structural readjustment program, the GOA introduced a discriminatory differential exchange rate for the agricultural sector to raise revenue. The GOA's continued failure to dismantle or streamline the huge public sector bureaucracy propelled the economy into another round of accelerating inflation in 1988. In order to alleviate the underlying causes of inflationary pressures---namely its large budget deficits and foreign debt---the government reinstated export taxes in early 1989.

A new civilian government assumed office in July 1989, and the agenda of incoming President Carlos Menem included a gradual, but substantial, reduction in farm taxation. The new government abandoned the multi-tier exchange rate regime in December 1989, but once again raised export taxes just prior to the March 1990 coarse grain and oilseed harvests to provide the government with some desperately needed capital.

The new administration's stated policy continues to stress a reduction in, and ultimately the elimination of, export taxes. However, given the current unstable macroeconomic situation in Argentina, the GOA will likely continue to raise revenues by taxing its most productive sector to prop up an economic structure that was erected in more profligate times.

Sustained unilateral agricultural policy reform in Argentina is unlikely until some level of economic stability and prosperity can be reestablished. If developed countries agree to reduce the level of support for their agricultural sectors in the current GATT negotiations, the resulting higher prices for temperate commodities would likely contribute to the prerequisite improvement in the Argentine economy. Such action on the part of subsidizing exporters might prompt the GOA to replace trade-distorting export taxes with trade-neutral land or income taxes.

Permanently rescinding export taxes would certainly improve the incentive structure faced by Argentine producers. But if the agricultural sector is ever to realize its full potential, the government needs to develop and pursue an economic program that will foster economic growth and stability. General economic instability has obliged Argentine farmers to opt for low-risk, low-input technologies over the years. A continuation of the economic disorder of the 1980's could be expected to restrict the agricultural sector's adoption of new yield-increasing technologies and expansion of planted area in the 1990's.

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Methodology Appendix

PSE's are estimated by tallying the quantifiable effects of two measures: Argentina's export taxes and exchange rate policies. The export tax component includes the research funding taxes levied on agricultural products in Argentina. The exchange rate adjustment reflects the implicit taxation or subsidization of producers of agricultural products caused by the GOA's systematic manipulation of the value of its currency.

Export Taxes

The difference between annual average f.o.b. (free on board) (Buenos Aires) prices and annual average wholesale prices is multiplied by the amount of domestic production to quantify the effects of the GOA's export tax policy.⁴ This methodology overstates the degree to which producers are taxed for two reasons.

First, the difference between the two prices includes storage, loading, and inspection fees at the port of Buenos Aires, in addition to export taxes. These fees are standard marketing costs and ideally would be included in the wholesale price, shrinking the difference between the two prices. If separate data for these services had been available, the f.o.b. price could have been subtracted from an adjusted wholesale price to correctly assess the export tax on each ton of wheat, corn, sorghum, or soybeans. Since these data were not available, the absolute values of the estimated PSE's are larger than they should be.

Secondly, a small, unknown portion of the revenues from the collection of export taxes is allocated to INTA for agricultural research and extension. The costs of Argentina's research network are accounted for; however, the benefits of research and extension could not be assessed in the absence of separate data on INTA's budget or expenditures. This omission implies that the estimated PSE's overstate the degree to which Argentine producers are taxed, but the effect of this omission is small.

Exchange Rate Adjustment

The effect of Argentina's distorted exchange rate is assessed by first subtracting each commodity's annual average f.o.b. dollar price (multiplied by the official exchange rate) from its annual average f.o.b. dollar price (multiplied by the equilibrium exchange rate); this difference is then multiplied by the level of production for the PSE's. The equilibrium exchange rate was estimated by assuming that purchasing power parity existed between Argentina and the United States in 1960, and then using the ratio of the two countries' wholesale price indexes to adjust the austral/dollar ratio in

⁴ The f.o.b. (Buenos Aires) price is converted from dollars into australes using the official exchange rate.

subsequent years. Using this methodology, the exchange rate was overvalued during 1982-84 and undervalued during 1985-87.⁵

The sum of the value of the two policy components is then divided by the the value of production to estimate the subsidy equivalents on a percentage basis. The value of production is calculated by multiplying the domestic production of each crop by the farm-level price, which is equal to the wholesale price minus an internal marketing margin. The internal marketing margin is estimated as 20 percent of the wholesale price of wheat, 30 percent of the price of corn, 45 percent of the price of sorghum, and 15 percent of the price of soybeans (5).

⁵ The choice of a base period was essentially arbitrary; however, Centro de Economía Internacional, in Argentina calculated PSE's using three different base periods (including 1960) and found that the three sets of estimated PSE's varied only slightly from one to another (1).

Appendix table 1--Calculation of Argentine producer subsidy equivalents

Item	Unit	Definitions and sources
A. Production	Mil. tons	Source: (5).
B. Wholesale price	As./tons	Source: (2).
C. Marketing margins	Pct.	Wholesale - farmgate marketing margin. Source: (5).
D. Producer price [B-(B*C/100)]	As./tons	
E. Producer value (D*A)	Mil. As.	
F. Policy transfers to producers:		
1. Export taxes--		
a. Border price	\$/tons	F.O.B., Buenos Aires. Source: (2).
b. Export tax transfers [B-(1a*2a)]*A	Mil. As.	
2. Exchange rate adjustment--		
a. Official exchange rate	As./\$	Source: (2).
b. Equilibrium exchange rate	As./\$	Purchasing power parity equilibrium exchange rate estimated by multiplying the 1960 exchange rate by the ratio of the Argentine WPI to the U.S. WPI. Source: Argentine WPI, (2); 1960 exchange rate (1); U.S. wholesale price index (U.S. Department of Labor).
c. Exchange rate transfers (2a-2b)*1a*A	Mil. As.	
G. Total policy transfers to producers:		
1. Total (1b+2c)	Mil. As.	
2. Producer subsidy equivalents (G1/E)*100	Pct.	

Appendix table 2--Wheat: Calculation of Argentine producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Production	Mil. tons	8.3	15.0	12.8	13.2	8.5	8.9
B. Wholesale price	As./tons	.3	1.0	6.2	46.8	75.1	200.3
C. Marketing margins	Pct.	20.0	20.0	20.0	20.0	20.0	20.0
D. Producer price [B-(B*C/100)]	As./tons	.2	.8	5.0	37.4	60.1	160.2
E. Producer value (D*A)	Mil. As.	2.0	12.5	63.5	493.7	510.8	1430.9
F. Policy transfers to producers:							
1. Export taxes--							
a. Border price	\$/tons	163.0	138.0	135.0	106.0	88.0	90.0
b. Export tax transfers [B-(1a*2a)]*A	Mil. As.	-.5	-6.2	-37.3	-224.1	-67.8	60.1
2. Exchange rate adjustment--							
a. Official exchange rate	As./\$	.002	.011	.068	.601	.944	2.150
b. Equilibrium exchange rate	As./\$	.002	.010	.070	.534	.901	1.957
c. Exchange rate transfers (2a-2b)*1a*A	Mil. As.	-0.2	0.5	-3.8	93.7	32.0	155.4
G. Total policy transfers to producers:							
1. Total (1b+2c)	Mil. As.	-.7	-5.8	-41.1	-130.4	-35.8	215.5
2. Producer subsidy equivalents (G1/E)*100	Pct.	-34.2	-46.2	-64.8	-26.4	-7.0	15.1

Appendix table 3--Soybeans: Calculation of Argentine producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Production	Mil. tons	4.2	4.2	7.0	6.8	7.0	9.7
B. Wholesale price	As./tons	.4	2.1	11.2	79.9	126.4	383.0
C. Marketing margins	Pct.	15.0	15.0	15.0	15.0	15.0	15.0
D. Producer price [B-(B*C/100)]	As./tons	.3	1.8	9.5	67.9	107.4	325.6
E. Producer value (D*A)	Mil. As.	1.4	7.5	66.7	458.3	784.4	2278.9
F. Policy transfers to producers:							
1. Export taxes--							
a. Border price	\$/tons	223.0	259.0	254.0	203.0	188.0	198.0
b. Export tax transfers [B-(1a*2a)]*A	Mil. As.	-.4	-2.6	-42.1	-284.6	-373.1	-300.0
2. Exchange rate adjustment--							
a. Official exchange rate	As./\$	.002	.011	.068	.601	.944	2.150
b. Equilibrium exchange rate	As./\$	.002	.010	.070	.534	.901	1.957
c. Exchange rate transfers (2a-2b)*1a*A	Mil. As.	-0.1	.2	-3.9	91.7	58.7	268.0
G. Total policy transfers to producers:							
1. Total (1b+2c)	Mil. As.	-.5	-2.4	-46.0	-192.9	-314.4	-32.0
2. Producer subsidy equivalents (G1/E)*100	Pct.	-39.3	-31.2	-69.0	-42.1	-40.1	-1.4

Appendix table 4--Corn: Calculation of Argentine producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Production	Mil. tons	9.6	9.0	9.5	11.9	12.4	9.3
B. Wholesale price	As./tons	.2	1.1	7.2	46.1	68.3	142.2
C. Marketing margins	Pct.	30.0	30.0	30.0	30.0	30.0	30.0
D. Producer price [B-(B*C/100)]	As./tons	.1	.8	5.1	32.3	47.8	99.5
E. Producer value (D*A)	Mil. As.	1.2	6.9	48.0	383.8	592.6	920.7
F. Policy transfers to producers:							
1. Export taxes--							
a. Border price	\$/tons	109.3	134.0	138.0	110.0	83.0	80.0
b. Export tax transfers [B-(1a*2a)]*A	Mil. As.	-.5	-2.9	-20.3	-238.6	-125.3	-276.2
2. Exchange rate adjustment--							
a. Official exchange rate	As./\$	.002	.011	.068	.601	.944	2.150
b. Equilibrium exchange rate	As./\$	.002	.010	.070	.534	.901	1.957
c. Exchange rate transfers (2a-2b)*1a*A	Mil. As.	-.2	.3	-2.9	87.6	44.0	143.1
G. Total policy transfers to producers:							
1. Total (1b+2c)	Mil. As.	-.6	-2.6	-23.2	-151.0	-81.2	-133.2
2. Producer subsidy equivalents (G1/E)*100	Pct.	-51.5	-38.4	-48.3	-39.3	-13.7	-14.5

Appendix table 5--Sorghum: Calculation of Argentine producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Production	Mil. tons	8.0	8.1	6.9	6.2	4.2	3.1
B. Wholesale price	As./tons	.2	.9	4.8	33.2	49.3	115.4
C. Marketing margins	Pct.	45.0	45.0	45.0	45.0	45.0	45.0
D. Producer price [B-(B*C/100)]	As./tons	.1	.5	2.6	18.2	27.1	63.5
E. Producer value (D*A)	Mil. As.	.7	3.9	18.2	113.1	113.8	196.8
F. Policy transfers to producers:							
1. Export taxes--							
a. Border price	\$/tons	98.0	114.0	107.0	86.0	72.0	68.0
b. Export tax transfers [B-(1a*2a)]*A	Mil. As.	-.4	-2.7	-17.0	-114.9	-78.7	-95.6
2. Exchange rate adjustment--							
a. Official exchange rate	As./\$	.002	.011	.068	.601	.944	2.150
b. Equilibrium exchange rate	As./\$	.002	.010	.070	.534	.901	1.957
c. Exchange rate transfers (2a-2b)*1a*A	Mil. As.	-.1	.2	-1.6	35.7	12.9	40.8
G. Total policy transfers to producers:							
1. Total (1b+2c)	Mil. As.	-.5	-2.5	-18.6	-79.2	-65.7	-54.9
2. Producer subsidy equivalents (G1/E)*100	Pct.	-67.3	-64.0	-102.6	-70.0	-57.8	-27.9

BRAZIL

Emily McClain, John Link, and Ricardo Krajewski

Introduction

Government intervention in Brazil's economy strongly influenced the pattern of agricultural growth during the past decade. Many sources of international credit evaporated in the 1980's, so changes were prompted by the need for foreign exchange to service external debt obligations. Brazil's adjustment to financial austerity was complicated by the country's transition to a civilian government in 1985. Internal problems with domestic debt and inflation placed additional constraints on economic growth and stabilization, with both direct and indirect effects on agricultural policy.

This report summarizes the changes in government intervention in Brazilian agriculture during the adjustment period of the 1980's. Producer subsidy equivalents (PSE's), which aggregate many policies into a single measure of support, are used to assess the effects of Brazilian policies on six major commodities. Comparisons of the PSE's calculated for the 1982-87 period show changes in the level and means of support resulting from changes in government policies.

The concluding section discusses the outlook for Brazil's agriculture with a look at current reforms. The newest reform plan reduces the government's role in both domestic and external markets, a departure from past economic reforms. PSE's are used as reference points when projecting the effects of new policies on future agricultural performance.

Economic and Agricultural Developments, 1982-87

Brazil registered modest rates of economic and agricultural growth during 1982-87. The general economy grew 3.2 percent per year during this period, while agricultural output increased by an annual average of 2.4 percent. Overall economic growth was constrained by inflation and domestic and external debt. The uncertain economic climate also slowed investment in the agricultural sector, especially for crops grown primarily for domestic consumption. Two years of bad weather hampered agricultural growth as well.

The modest expansion in both the general economy and the agricultural sector was led by export growth, following a major devaluation in 1983. This upward export trend was reinforced by the lagged investment effect of export promotion policies adopted early in the 1980's.

Programs that promote the production of import-substitution crops and export crops were adopted for the agricultural sector at the beginning of the decade and caused shifts in agricultural output. The wheat sector, a highly supported import-substitute sector, exhibited one of the fastest growth rates during 1982-87. Resources were also

attracted to export sectors (such as soybean and orange juice) in which Brazil enjoyed a strong comparative advantage.

Growth in agricultural exports followed the positive trend in total exports, which increased from -\$2.8 billion (1980) to \$19.1 billion (1988), the world's third largest trade surplus. On average, agricultural exports maintained their 35- to 40-percent share in total export earnings, led by the soy complex, coffee, and orange juice.

Policies in the 1980's

Macroeconomic and Trade Policy Developments

Brazilian policymakers were forced by developments in international commodity and capital markets to radically change macroeconomic, trade, and sectoral policies in the 1980's. Some changes reduced resource allocation distortions; others exacerbated them.

To offset the disappearance of international credit and meet large debt-service commitments, Brazil began the 1980's with an austerity program and developed sectoral policies to promote expansion in both import-substituting and export sectors. Restrictive trade policies, including expansion of a list of prohibited imports, were tightened until the end of 1987.

Export growth accelerated in 1983 with the devaluation of the official exchange rate by 30 percent in real terms. This real devaluation was maintained until 1986 through frequent minidevaluations. The new civilian government in 1986 launched the Cruzado Plan, freezing prices, wages, and nominal exchange rates in an attempt to halt inflation. This freeze reinstated currency overvaluation, which proved to be a growing tax on exports.

As inflation became harder to contain, the Government of Brazil (GOB) increasingly depended upon price indexation and freezes, subjecting producers, consumers, and investors to volatile markets where prices were set by presidential decree. Indexation was partially effective in protecting consumers and producers from high inflation, while allowing economic expansion, but it reinforced the inflationary cycle. The full indexation of financial instruments to inflation reduced the appeal of holding agricultural commodities as a hedge against inflation, depressing investment in the sector, and depressing agricultural prices in general.

Successive civilian governments introduced three other "major" economic reforms after the Cruzado Plan: the Cruzado Plan II (1987), the Bresser Plan (1988), and the Summer Plan (1989). Each plan briefly stabilized the economy. But the government found that balancing the responsibilities of large external debt-service commitments against populist pressures to stimulate economic growth was difficult. Thus, whenever the economy began to show signs of recovery, the GOB eased fiscal and monetary restrictions. Inflation and domestic debt progressively worsened with each failure, requiring that each successive reform be more drastic.

An emerging consensus at the end of the 1980's was that most of Brazil's problems were caused by excessive public sector expansion and the heavy reliance on indexation to protect producers and consumers from inflation. When the latest reforms were introduced in March 1990 (the Collor Plan), inflation had reached a 12-month rate of 4,854 percent.

Agricultural Policy Developments

Agriculture is an important sector in Brazil's economy. Although only 10 percent of gross domestic product (GDP) is contributed by the sector, it generates over one-third of total export earnings and employs one-fourth of the labor force.

Brazil had no consistent agricultural policy during the 1980's; policies were changed frequently to achieve a series of short-term production goals. This situation may be rectified if Brazil's first farm bill is passed. This piece of legislation defines national agricultural policy and goals, but remains stalled in an election year Congress.

Brazilian agricultural policies, while variable, have always been quite nationalistic and oriented toward self-sufficiency. The GOB tries to maintain adequate domestic food supplies at "fair and stable prices," regardless of pressures for exports earnings. In order to achieve this goal, the government has used policies that simultaneously subsidize and tax farmers.

Production Policies

Brazil directly supports agriculture through two main programs: a subsidized credit program and a minimum price program. In a typical year, minimum prices and credit terms are adjusted to stimulate or discourage production on a commodity-by-commodity basis to achieve consumption, export, or import substitution objectives. At the beginning of the decade, Brazil's high inflation rate effectively increased credit subsidies and reduced price-support subsidies. To rectify this situation, the GOB phased in a program to tie subsidized interest rates and minimum prices to the rate of inflation.

Producers still realize substantial subsidies from the credit program, which provides financing for production, marketing, and investment activities, because real interest rates remain below market levels. Current interest rates on official agricultural credit are set at 12 percent in excess of inflation, far below the market rate of 30 percent.

The minimum price program covers 30 products and is administered through marketing loan and crop acquisition programs similar to U.S. nonrecourse loans.¹

¹ Wheat producers are subsidized through a separate program. The GOB acts as the sole buyer of wheat in domestic and external markets, establishing a guaranteed market and market price for producers. The GOB then sells the wheat to millers at below cost. The consumer price is controlled as well, so in effect, processing and retailing margins are determined by the government.

Real minimum prices for corn, rice, and wheat were substantially increased in 1985 when the new democratic government launched its program to achieve self-sufficiency in domestic food crops. Prices for these three commodities were indexed more closely to inflation in 1986, making support prices more effective.

Trade Policies

Brazil has both supported and taxed producers through its trade policies. The government's authority to regulate trade flows (through temporary bans and licensing requirements) has given it the power to influence domestic prices and thus stimulate or discourage production. Domestic prices have been kept above world levels for commodities, such as wheat and corn. On the other hand, imports have sometimes been authorized to keep domestic food prices low to dampen inflation; the GOB has even sold imports at a loss to attain this objective. The GOB intermittently resorted to temporary export bans during the mid- to late 1980's in times of tight supplies of commodities (such as beef, corn, and soybeans) to keep consumer food prices stable.

Taxes

A value-added tax is levied on all agricultural commodities at the state level in Brazil, regardless of the end market, domestic or international. Specific export taxes are levied only on coffee and cocoa. The state value-added tax that is levied on exported commodities, such as soybeans, is in effect an export tax. To enhance the competitiveness of Brazilian products, exporters of high-value products were sometimes granted tax credits, tax forgiveness, and subsidized financing on export operations. These policies have since been phased out.

Research

Most government-funded agricultural research is carried out by EMBRAPA, a research institute attached to the Ministry of Agriculture. EMBRAPA's research agenda is broad, ranging from yield enhancement to environmental policy. The institute operates several state and local community research units. It is also responsible for coordinating the research produced by universities, cooperatives, various scientific and technical organizations, and private industry.

Consumption Policies

The maintenance of adequate food supplies at stable prices is considered necessary for social stability, because food expenditures are a dominant budgetary item for the country's largely poor population. The GOB tries to maintain stable prices directly (by freezing prices and implementing indexation policies) and indirectly (by adjusting producer support programs and regulating trade flows to meet domestic supply targets). The direct measures are principally implemented to offset the effects of Brazil's turbulent monetary situation. The indirect measures are employed to adjust domestic supplies when policies or weather produce unanticipated production shortfalls or surpluses.

Presumably, consumers benefit from policies that shift the supply curve to the right, such as research expenditures and credit subsidies. On the other hand, Brazil's value-added tax and minimum price policy penalizes domestic consumers, because there are no policies in place to insulate consumers from the higher prices that these policies produce.² Brazil's distorted exchange rate also affected consumers during 1982-87. Brazil both undervalued and overvalued its currency during 1982-87. An undervalued currency reduced consumers' purchasing power, while an overvalued currency increased it.

Estimation of Policy Intervention in Agriculture

This section details the PSE's that were estimated for six major Brazilian agricultural commodities. The PSE's presented in this report measure the value of policy transfers as a percentage of the value of production for each commodity on an annual basis during 1982-87.

Commodity Coverage

PSE's were estimated for six commodities, ranging from domestic food staples (such as wheat, rice, and corn), to commodities (such as soybeans, beef and veal, and poultry) that are important in both internal and external markets. These six commodities account for about 50 percent of the total value of agricultural production in Brazil.

Wheat is the only food commodity that Brazil imports in large quantities. Wheat imports averaged 3.2 million tons per year during 1982-87. The United States used to be a major supplier of Brazil's wheat imports; in recent years, however, Brazil has bought most of its wheat from Argentina under the terms of various bilateral trade agreements. In 1987, highly subsidized French wheat displaced most other competitors in the Brazilian wheat market.

Brazil is basically self-sufficient in rice, one of the country's most important staple foods. When domestic production falls short of demand, however, Brazil's purchases can easily disrupt the international market because rice is so thinly traded.

Corn is Brazil's primary livestock feed and the country's most extensively cultivated crop. Occasionally, large quantities of corn have been imported to meet weather-induced production shortfalls.

Brazil is one of the largest producers and exporters of soybeans and soybean products in the world. These commodities have been the country's most important exports in terms of value in recent years, accounting for roughly 10 percent of total export earnings.

² Except for wheat; see footnote 1.

Brazil's poultry sector has been growing in importance in both domestic and external markets. Per capita consumption nearly tripled during 1975-87, while exports grew from 9,000 to 216,000 tons over the same period. Brazil's beef and veal exports were relatively stable during 1982-87, averaging 400,000 metric tons per year. Domestic consumption of beef also did not grow appreciably during this period.

PSE Policy Coverage

The PSE calculations include the effects of four agricultural policies: credit subsidies, producer price (or price wedge) policies, research expenditures, and taxes. The effect of Brazil's distorted exchange rate on the agricultural sector is also estimated in the PSE's. Estimates of the effects of other sectoral policies (land taxes and subsidized storage) and of economy-wide policies (government expenditures on infrastructure and tight restrictions on industrial imports that include fertilizer, chemicals, and machinery) are not included in the present PSE calculations because of insufficient data. The bias introduced by these omissions is unclear; these policies both subsidize and tax producers.

Sectoral PSE Results

The PSE results for all six commodities were combined to indicate the level of aggregate governmental support to the agricultural sector during 1982-87. The aggregate PSE was calculated first using the equilibrium exchange rate (the standard procedure in this report) and then using the official exchange rate to feature the effect of Brazil's exchange rate policies on producers (fig. 1). Brazil's overvalued exchange rate effectively decreased the level of support for the producers of these six commodities at the beginning and ending of the period.

The aggregate PSE highlights the variation in agricultural support over time. Support fell sharply during 1983-84, as more rigorous austerity plans were adopted by the GOB. During 1985-86, support increased temporarily as the new civilian government re-emphasized self-sufficiency in agriculture and increased support to offset the contractionary effects of a severe drought. Then, in 1987, the government was forced to reduce agricultural sector support because of its escalating deficit. Support of the agricultural sector, measured in terms of the aggregate PSE, averaged 24 percent of the value of production during the 6-year period.

PSE Results by Policy

The aggregate PSE measures the net effect of intervention, not the amount of intervention. In the case of Brazil, exchange rate policies combine with tax policies to partially offset price and credit support for most of the period; therefore, the aggregate PSE measure obscures the true scope of government intervention in the agricultural sector. Analyzing the contribution of each policy to the aggregate PSE illuminates the extent of GOB involvement in the farm sector.

Subsidized credit and price wedge policies were the two largest measured components of the PSE's (fig. 2). Price supports overtook subsidized credit as the

Figure 1
 Aggregate producer subsidy equivalent for Brazil
 Percent

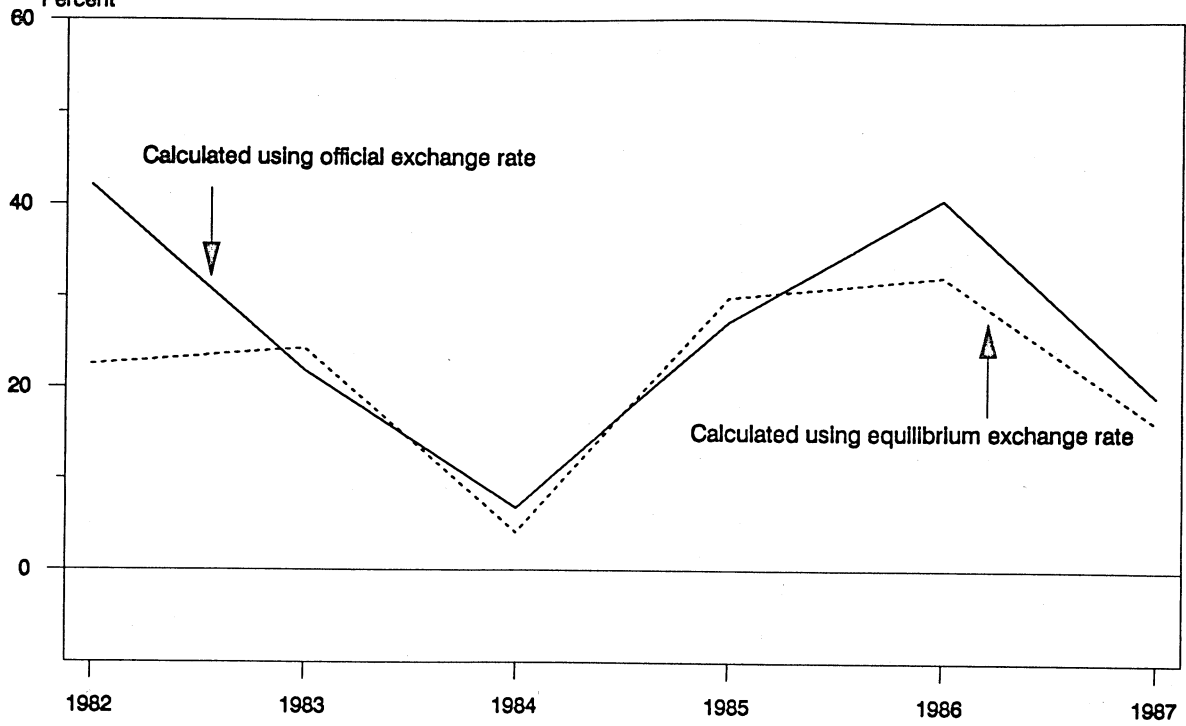
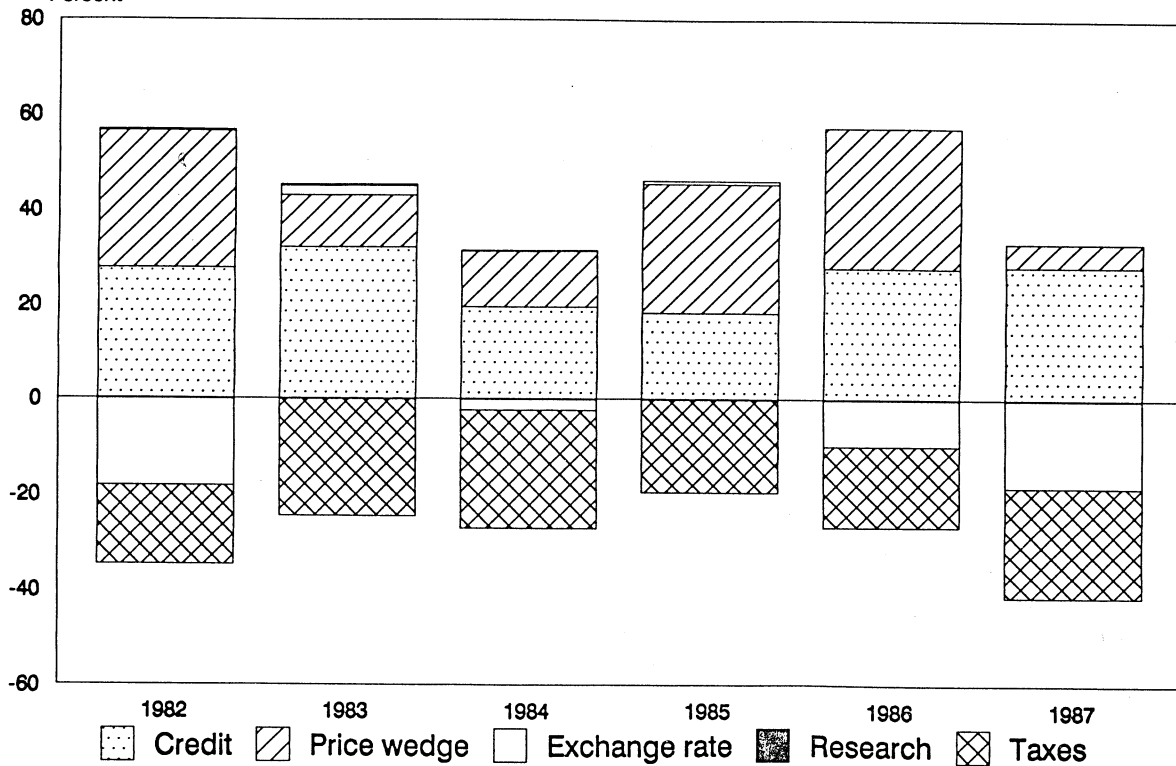


Figure 2
 Brazilian PSE's by policy component
 Percent



most important agricultural subsidy in 1985, when the new government substantially increased the minimum prices for wheat, corn, and rice. Effective indexation maintained these favorable prices throughout 1986. As a result of this policy, the GOB was forced to buy most of the Brazilian crop during 1985-86. To reduce the fiscal drain, real minimum prices were allowed to decline significantly in 1987, and once again credit subsidies became the most important form of producer support.

Taxes created large negative transfers from producers, especially for exportable commodities that are generally taxed at higher rates (table 1). Research transfers, while always positive, were quite small and declined to negligible amounts by the end of the period.

Exchange rate policies have both implicitly subsidized and taxed agricultural producers during the period under review. Note that the effect of the exchange rate adjustment may vary by commodity within a given year; given that the exchange rate varies significantly from month to month, the rates reported during the heaviest marketing period for each commodity were used to evaluate the effect of exchange rate policy on a particular sector. The estimated effect of Brazil's distorted exchange rate on wheat, which is marketed in December and January, could therefore differ significantly from the estimated effect on soybeans, which is marketed 3 months later.

PSE's by Commodity

Examination of Brazil's PSE's by commodity shows higher levels of support for the domestic market crops (wheat, rice, and corn) than for exportable commodities (soybeans, beef, and poultry) (fig. 3). Support was highly variable in the case of soybeans, and relatively low or negative in the poultry and beef sectors. The 6-year average PSE's for both livestock sectors were actually negative.

Benefits to rice producers from government policies averaged 58.5 percent during 1982-87, higher than any other commodity examined. Support for rice producers averaged 73.9 percent of the value of production during 1985-87, compared with 43.1 percent during 1982-84. The 6-year average PSE estimated for wheat was 51 percent, representing the second highest level of government support. This pattern of support reflects the priority given to domestic food production by the civilian government that took office in 1985.

The corn sector ranked third in terms of overall support, averaging 31.7 percent for the period. This reflects the government's commitment to increasing domestic food production after the transition to democracy in 1983.

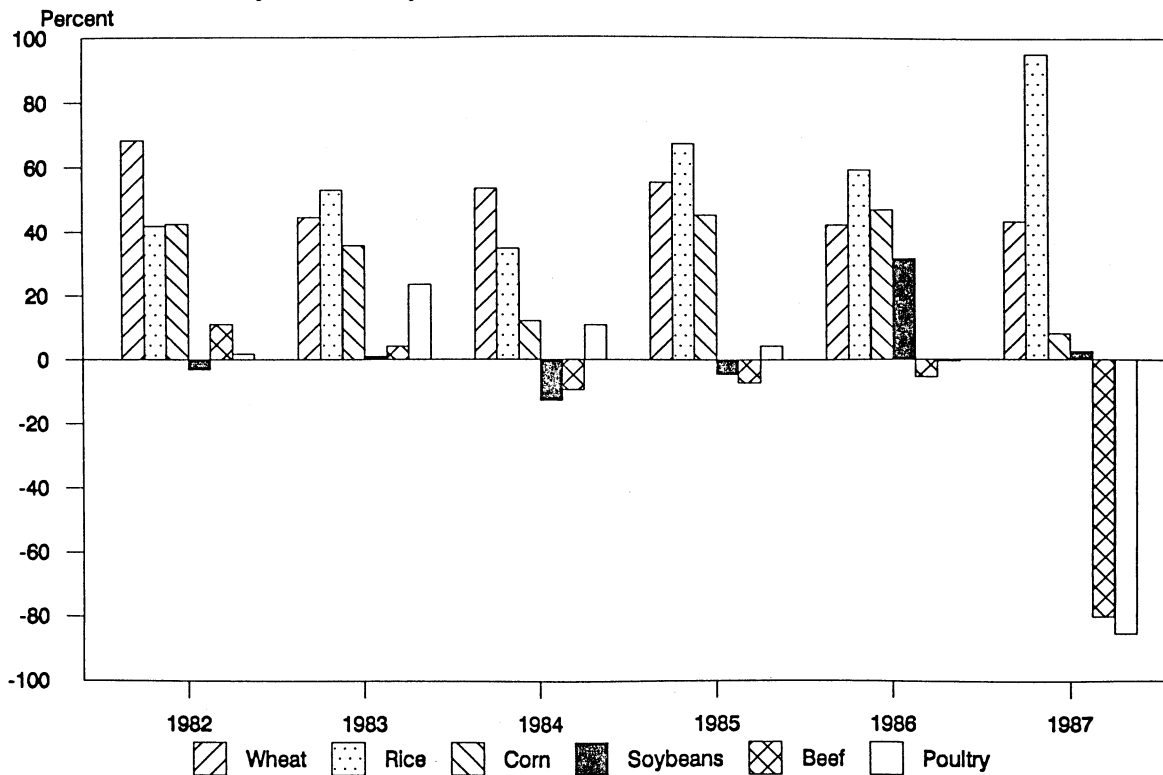
The PSE's for soybeans show low levels of support, registering an average subsidy of only 2.5 percent for the study period. The net effect of government intervention was actually negative in 1982, 1984, and 1985.

Beef producers were supported by the sum of government policies in 1982 and 1983, but taxed during 1984-87. The average net effect of all government policies on beef was -14.5 percent for the study period, the highest measured level of taxation.

Table 1--Brazilian PSE's by policy component

Item	1982	1983	1984	1985	1986	1987
			<u>Percent</u>			
Wheat:						
Credit	64.3	56.2	45.3	29.7	5.4	18.3
Price wedge	22.4	-2.8	17.2	32.2	48.8	40.5
Exchange rate	-15.4	-3.6	-4.7	-3.1	-9.1	-12.7
Research	.4	.3	.2	0	0	0
Taxes	-3.3	-5.8	-4.6	-3.7	-2.6	-2.9
Total	68.3	44.3	53.3	55.1	42.4	43.2
Rice:						
Credit	30.6	51.4	34.2	22.3	37.4	117.8
Price wedge	39.2	13.9	19.1	55.6	40.8	11.8
Exchange rate	-14.8	5.5	-1.1	-.7	-7.5	-17.7
Research	.4	.6	.3	0	0	0
Taxes	-13.5	-18.5	-17.9	-10.0	-11.2	-16.7
Total	41.9	52.8	34.5	67.2	59.5	95.1
Corn:						
Credit	33.8	33.5	19.8	14.8	37.7	43.7
Price wedge	41.4	29.8	25.4	50.8	35.6	7.3
Exchange rate	-16.0	2.5	-1.8	2.1	-8.5	-16.8
Research	.5	.6	.3	0	0	0
Taxes	-17.2	-30.9	-31.5	-22.7	-17.8	-26.1
Total	42.5	35.5	12.1	45.1	47.1	8.1
Soybeans:						
Credit	34.2	38.9	22.3	20.4	59.8	23.2
Price wedge	7.8	-10.2	-3.3	.1	10.5	19.1
Exchange rate	-25.9	3.7	-2.5	4.4	-11.8	-14.7
Research	.5	.4	.2	0	0	0
Taxes	-19.6	-31.8	-29.5	-29.2	-26.8	-24.9
Total	-3.0	1.0	-12.8	-4.4	31.7	2.7
Beef:						
Credit	10.7	12.9	6.3	10.4	2.8	4.1
Price wedge	33.0	11.3	8.0	5.3	20.3	-29.1
Exchange rate	-16.1	1.0	-2.1	-1.3	-10.4	-25.5
Research	0	0	0	0	0	0
Taxes	-16.6	-21.2	-21.7	-21.6	-18.2	-29.5
Total	11.1	4.1	-9.4	-7.3	-5.5	-79.9
Poultry:						
Credit	8.7	10.4	5.0	4.1	1.2	8.2
Price wedge	29.5	33.8	29.3	24.4	29.6	-31.8
Exchange rate	-16.1	-.7	-2.7	-1.8	-10.5	-25.6
Research	.1	.1	0	0	0	0
Taxes	-20.3	-20.3	-20.8	-22.3	-20.5	-36.1
Total	1.9	23.3	10.8	4.4	-.3	-85.3
Summary:						
Credit	27.7	32.1	19.6	18.2	27.8	28.3
Price wedge	28.8	11.0	11.7	27.4	29.6	4.9
Exchange rate	-18.2	2.0	-2.3	.7	-9.7	-18.3
Research	.3	.3	.2	0	0	0
Taxes	-16.5	-24.5	-24.7	-19.4	-16.9	-23.0
Total	40.2	18.9	6.9	26.2	40.5	10.1

Figure 3
Brazilian PSE's by commodity



Government intervention in the poultry sector resulted in an average taxation of 7.6 percent of the sector. In 1987, the net tax on each sector reached 80 percent of the value of total production. This dramatic rise in the level of taxation is the result of the decline of domestic prices with respect to world market prices and the growing overvaluation of Brazil's currency. Domestic beef prices fell below world market prices because of the GOB's export ban. Domestic poultry prices were depressed because production that was originally destined for export could not compete with subsidized U.S. poultry exports.

Conclusion

Since 1987, agricultural support has constantly declined. Government austerity has forced reductions in subsidized credit and real cuts in some price supports. High inflation has reduced the effectiveness of indexation so that farm profitability has suffered from rising input costs, weak demand from falling real incomes, and an increasingly overvalued exchange rate. The reforms that Brazil enacted over the past 6 years have clearly failed to establish stable economic growth. Brazil's new Collor Plan represents a dramatic departure from previous economic reforms in that it contains provisions for several market-oriented policy changes that will likely influence the structure of the agricultural sector.

The plan includes three major changes that will affect agriculture: a move to a floating exchange rate, removal of nontariff trade barriers (including the end of trade licensing), and new farm income taxes. Brazil's currency was estimated to be 30-50 percent overvalued when the new exchange system began in early 1990, and the new flexible exchange rate should result in a gradual devaluation. In the PSE's, the devaluation would be reflected as an elimination of the exchange rate component because the exchange rate should move toward some longrun equilibrium level. Because the exchange tax averaged -18.3 percent for all commodities in 1987 and was probably much larger in early 1990, the devaluation should provide a substantial stimulus to export sectors. Part of the devaluation stimulus will be offset by an increase in the tax on export profits from 18 percent to 30 percent and by increased prices on imported inputs.

The removal of nontariff barriers to trade should diversify agricultural trade substantially because imports of many items have been prohibited. However, potential effects are unclear because tariffs are being revised to offset lost nontariff protection. Tariff levels could rise in the medium run and dampen import demand; this would show up in PSE calculations as an increase in support under the price wedge measure. But by 1995, Brazil plans to achieve a substantial reduction in tariff levels for all products.

Agricultural growth may be accelerated by implementation of new income taxes to be paid by farmers on farm profits that are not reinvested in the sector. This new tax could spur agricultural investment and growth, but few details are available on the timing and mechanics of implementation.

Brazil's unilateral moves toward market liberalization have yet to include the wheat sector where intervention remains high. New support prices for the 1990 wheat crop are the equivalent of 200 U.S. dollars per metric ton, considerably above world price levels. However, the new climate of competition in Brazil suggests that the wheat sector will be privatized at some point.

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Methodology Appendix

The calculations of PSE's for six Brazilian commodities includes: 1) credit subsidies; 2) an estimate of a price wedge that accounts for the effects of farm price supports plus accompanying border policies; 3) the effect of Brazil's exchange rate; 4) governmental expenditures on research, and 5) taxes.

Credit

All the credit subsidies were estimated by using published data on each of Brazil's six credit programs (breeding herd, feeder cattle, investment, marketing, poultry flock, and crop production). Published data on the amount of capital loaned for each commodity under each of the six different programs in each region were multiplied by the interest rate that corresponded to the program and the region. The calculated interest for each of the six programs, which provided both short- and long-term loans, was then discounted back to the same period (usually a harvest or marketing period) for each commodity. To compute the opportunity cost of Brazilian capital, similar calculations were made using Brazil's treasury bill rate. The difference in interest that would be paid when using the subsidized rates instead of the treasury bill rate reflects the credit subsidy provided by the GOB to the participants in each of the six credit programs.

Price Wedge

The price wedge was calculated by 1) subtracting a calculated reference price (multiplied by the official exchange rate in order to convert the dollar price into cruzeiros) from an average producer price, and 2) multiplying this difference by the amount of production of each commodity. The reference prices were defined as a f.o.b. or c.i.f. price minus a marketing margin, which reflected such factors as international transportation and insurance, port fees, domestic transportation, insurance, finance charges and product conversions (such as paddy to milled rice and live animals to carcass weight). Average producer prices were, in some cases, national average producer prices; in other instances, they were the average prices received by farmers in the major production area.

Exchange Rate

An equilibrium exchange rate was estimated to examine the effect of Brazil's distorted exchange rate on producers of the six commodities included in this study. Equilibrium exchange rates for 1982-87 were calculated based on a World Bank estimate of a 1980 equilibrium rate. The 1980 equilibrium rate was multiplied by the ratio of Brazil's wholesale price index (WPI) to the United States' WPI for each year during 1982-87. The exchange rate subsidy or tax was calculated by first subtracting the estimated equilibrium rate from the official exchange rate and multiplying that difference by the reference price. This amount was then multiplied by the level of production for each commodity to assess the effects of currency distortion on producers.

The effect of the exchange rate adjustment may vary by commodity within a given year because exchange rate variation is quite high. Rates that were reported during the heaviest marketing period for each commodity were used and considered most representative of the effect of exchange rate policy on a particular sector.

Research

Published annual data on government expenditures for agricultural research were allocated to each of the five commodities based on that product's share of total crop value.

Taxes

Published data and information on taxes were used to calculate adjusted reference prices. These adjusted reference prices were multiplied by the amount of production and then subtracted from the value of production without taxes.

Appendix table 1--Calculation of Brazilian producer subsidy equivalents

Item	Unit	Description and sources
A. Production	Mil. tons	Sources: (3,13).
B. Average producer price	1,000 Cruzeiros/ton	Source: (4).
C. Producer value (A*B)/1,000	Bil. Cruzeiros	
D. Policy transfer to producers:		
1. Credit--		ERS estimates based on Brazilian data for interest rates, amortization schedules, and loan amounts. Source: (5).
a. Breeding herd credit	Bil. Cruzeiros	
b. Feeder cattle credit	Bil. Cruzeiros	
c. Production credit	Bil. Cruzeiros	
d. Marketing credit	Bil. Cruzeiros	
e. Poultry investment credit	Bil. Cruzeiros	
f. Poultry flock credit	Bil. Cruzeiros	
g. Credit transfers (1a+1b+1c+1d+1e+1f)	Bil. Cruzeiros	
2. Price wedge--		
a. Reference price	\$/ton	Monthly weighted average f.o.b. (Brazilian ports) prices for beef, poultry, and soybeans minus marketing margins. Source: prices (2); marketing margins, ERS estimates. Monthly weighted average f.o.b. (Buenos Aires) price for wheat and corn minus marketing margins. Source: prices (10); marketing margins, ERS estimates. Monthly weighted average f.o.b. (Bangkok) price for rice minus marketing margin. Source: prices (12); marketing margins, ERS estimates.
b. Price wedge transfer ((B-((2a*3a)/1,000))*A)	Bil. Cruzeiros	
3. Exchange rate adjustment--		
a. Official exchange rate	Cruzeiros/\$	Monthly weighted average (based on commodity's harvest or market period). Source: (9). ERS estimate.
b. Parity exchange rate	Cruzeiros/\$	
c. Exchange rate transfers ((3a-3b)*2a)*A/1,000	Bil. Cruzeiros	
4. Research	Bil. Cruzeiros	Published budget data allocated to individual crops and livestock by value of production. Source: (8).
5. Taxes--		
a. Tax rate	Pct.	Source: (1).
b. Tax transfers -(C*5a)	Bil. Cruzeiros	
E. Total policy transfers:		
1. Total (1g+2b+3c+4+5b)	Bil. Cruzeiros	
2. Producer subsidy equivalents (E1/C)*100	Pct.	

Appendix table 2--Wheat: Calculation of Brazilian producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Production	Mil. tons	1.8	2.1	1.9	4.3	5.6	6.1
B. Average producer price	1,000 Cruzeiros/ton	55.4	150.8	525.5	2,020.8	3,340.0	9,927.0
C. Producer value (A*B)/1,000	Bil. Cruzeiros	102.4	316.6	998.5	8,689.4	18,704.0	60,545.9
D. Policy transfers to producers:							
1. Credit--							
a. Breeding herd credit	Bil. Cruzeiros	--	--	--	--	--	--
b. Feeder cattle credit	Bil. Cruzeiros	--	--	--	--	--	--
c. Production credit	Bil. Cruzeiros	65.8	178.0	452.1	2,582.0	1,003.5	11,068.0
d. Marketing credit	Bil. Cruzeiros	--	--	--	--	--	--
e. Poultry investment credit	Bil. Cruzeiros	--	--	--	--	--	--
f. Poultry flock credit	Bil. Cruzeiros	--	--	--	--	--	--
g. Credit transfers (1a+1b+1c+1d+1e+1f)	Bil. Cruzeiros	65.8	178.0	452.1	2,582.0	1,003.5	11,068.0
2. Price wedge--							
a. Reference price	\$/ton	192.4	187.6	167.4	158.6	121.2	102.6
b. Price wedge transfer $((B - ((2a * 3a) / 1,000)) * A)$	Bil. Cruzeiros	22.9	-8.7	171.3	2,797.6	9,126.9	24,501.6
3. Exchange rate adjustment--							
a. Official exchange rate	Cruzeiros/\$	223.3	826.0	2,600.2	8,637.2	14,115.3	57,600.0
b. Parity exchange rate	Cruzeiros/\$	267.7	854.7	2,746.4	9,028.4	16,623.8	69,860.5
c. Exchange rate transfers $((3a - 3b) * 2a) * A / 1,000$	Bil. Cruzeiros	-15.8	-11.3	-46.5	-266.9	-1,702.0	-7,672.2
4. Research	Bil. Cruzeiros	.4	.9	1.7	--	--	--
5. Taxes--							
a. Tax rate	Pct.	3.3	5.8	4.6	3.7	2.6	2.9
b. Tax transfers $-(C * 5a)$	Bil. Cruzeiros	-3.4	-18.5	-46.0	-323.1	-491.7	-1,751.3
E. Total policy transfers:							
1. Total $(1g + 2b + 3c + 4 + 5b)$	Bil. Cruzeiros	69.9	140.4	532.6	4,789.5	7,936.6	26,146.0
2. Producer subsidy equivalents $(E1/C) * 100$	Pct.	68.3	44.3	53.3	55.1	42.4	43.2

Appendix table 3--Rice: Calculation of Brazilian producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Production	Mil. tons	9.7	7.7	9.0	9.4	10.3	10.4
B. Average producer price	1,000 Cruzeiros/ton	33.3	64.3	196.6	1,071.7	2,433.3	2,840.0
C. Producer value (A*B)/1,000	Bil. Cruzeiros	324.4	498.0	1,773.3	10,032.9	25,243.5	29,607.2
D. Policy transfers to producers:							
1. Credit--							
a. Breeding herd credit	Bil. Cruzeiros	--	--	--	--	--	--
b. Feeder cattle credit	Bil. Cruzeiros	--	--	--	--	--	--
c. Production credit	Bil. Cruzeiros	73.4	174.2	463.0	1,042.6	8,654.7	16,164.0
d. Marketing credit	Bil. Cruzeiros	25.8	82.0	142.7	1,191.2	790.6	18,705.1
e. Poultry investment credit	Bil. Cruzeiros	--	--	--	--	--	--
f. Poultry flock credit	Bil. Cruzeiros	--	--	--	--	--	--
g. Credit transfers (1a+1b+1c+1d+1e+1f)	Bil. Cruzeiros	99.3	256.2	605.7	2,233.8	9,445.3	34,869.1
2. Price wedge--							
a. Reference price	\$/ton	133.0	126.8	114.5	101.0	103.6	99.7
b. Price wedge transfer $((B - ((2a * 3a) / 1,000)) * A)$	Bil. Cruzeiros	127.1	69.1	337.9	5,582.4	10,292.1	3,480.5
3. Exchange rate adjustment--							
a. Official exchange rate	Cruzeiros/\$	152.4	436.8	1,389.6	4,704.9	13,840.0	25,136.7
b. Parity exchange rate	Cruzeiros/\$	189.4	406.1	1,408.4	4,779.3	15,622.3	30,168.6
c. Exchange rate transfers $((3a - 3b) * 2a) * A / 1,000$	Bil. Cruzeiros	-47.9	27.2	-19.5	-70.4	-1,902.2	-5,230.0
4. Research	Bil. Cruzeiros	1.1	2.9	5.2	--	--	--
5. Taxes--							
a. Tax rate	Pct.	13.5	18.5	17.9	10.0	11.2	16.7
b. Tax transfers $-(C * 5a)$	Bil. Cruzeiros	-43.8	-92.3	-317.1	-1,001.5	-2,818.7	-4,948.9
E. Total policy transfers:							
1. Total (1g+2b+3c+4+5b)	Bil. Cruzeiros	135.8	263.1	612.2	6,744.3	15,016.5	28,170.7
2. Producer subsidy equivalents $(E1/C) * 100$	Pct.	41.9	52.8	34.5	67.2	59.5	95.1

Appendix table 4--Corn: Calculation of Brazilian producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Production	Mil. tons	21.8	18.7	21.2	22.0	20.5	26.8
B. Average producer price	1,000 Cruzeiros/ton	16.9	43.9	151.6	578.0	1,395.0	2,494.6
C. Producer value (A*B)/1,000	Bil. Cruzeiros	369.1	823.1	3,208.7	12,726.5	28,640.7	66,821.1
D. Policy transfers to producers:							
1. Credit--							
a. Breeding herd credit	Bil. Cruzeiros	--	--	--	--	--	--
b. Feeder cattle credit	Bil. Cruzeiros	--	--	--	--	--	--
c. Production credit	Bil. Cruzeiros	109.7	247.7	555.8	1,497.5	10,623.7	29,009.1
d. Marketing credit	Bil. Cruzeiros	15.2	28.5	78.0	383.3	177.3	216.3
e. Poultry investment credit	Bil. Cruzeiros	--	--	--	--	--	--
f. Poultry flock credit	Bil. Cruzeiros	--	--	--	--	--	--
g. Credit transfers (1a+1b+1c+1d+1e+1f)	Bil. Cruzeiros	124.8	276.2	633.8	1,880.7	10,801.1	29,225.4
2. Price wedge--							
a. Reference price	\$/ton	58.7	59.2	68.2	49.6	64.9	60.0
b. Price wedge transfer ((B-((2a*3a)/1,000))*A	Bil. Cruzeiros	152.8	245.2	816.4	6,466.0	10,196.2	4,893.6
3. Exchange rate adjustment--							
a. Official exchange rate	Cruzeiros/\$	168.7	520.9	1,657.2	5,732.8	13,840.0	38,523.3
b. Parity exchange rate	Cruzeiros/\$	214.8	502.3	1,698.0	5,482.6	15,659.6	45,515.1
c. Exchange rate transfers ((3a-3b)*2a)*A/1,000	Bil. Cruzeiros	-59.1	20.7	-58.9	273.3	-2,424.9	-11,239.2
4. Research	Bil. Cruzeiros	1.8	4.6	8.2	--	--	--
5. Taxes--							
a. Tax rate	Pct.	17.2	30.9	31.5	22.7	17.8	26.1
b. Tax transfers -(C*5a)	Bil. Cruzeiros	-63.6	-254.3	-1,011.8	-2,883.1	-5,090.4	-17,453.5
E. Total policy transfers:							
1. Total (1g+2b+3c+4+5b)	Bil. Cruzeiros	156.8	292.4	387.6	5,736.9	13,481.9	5,426.3
2. Producer subsidy equivalents (E1/C)*100	Pct.	42.5	35.5	12.1	45.1	47.1	8.1

Appendix table 5--Soybeans: Calculation of Brazilian producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Production	Mil. tons	13.1	14.8	15.5	18.3	14.1	17.0
B. Average producer price	1,000 Cruzeiros/ton	33.0	79.3	345.0	880.8	2,146.0	5,970.0
C. Producer value (A*B)/1,000	Bil. Cruzeiros	433.8	1,170.2	5,361.6	16,098.3	30,258.6	101,363.6
D. Policy transfers to producers:							
1. Credit--							
a. Breeding herd credit	Bil. Cruzeiros	--	--	--	--	--	--
b. Feeder cattle credit	Bil. Cruzeiros	--	--	--	--	--	--
c. Production credit	Bil. Cruzeiros	86.4	271.6	1,060.7	2,163.4	17,491.0	20,649.0
d. Marketing credit	Bil. Cruzeiros	62.1	183.5	137.1	1,124.4	616.9	2,865.6
e. Poultry investment credit	Bil. Cruzeiros	--	--	--	--	--	--
f. Poultry flock credit	Bil. Cruzeiros	--	--	--	--	--	--
g. Credit transfers (1a+1b+1c+1d+1e+1f)	Bil. Cruzeiros	148.4	455.1	1,197.8	3,287.8	18,107.9	23,514.6
2. Price wedge--							
a. Reference price	\$/ton	181.6	168.1	215.1	153.6	138.9	125.3
b. Price wedge transfer ((B-((2a*3a)/1,000))*A	Bil. Cruzeiros	33.9	-119.5	-178.3	8.7	3,162.9	19,381.3
3. Exchange rate adjustment--							
a. Official exchange rate	Cruzeiros/\$	167.7	520.0	1,657.2	5,732.8	13,840.0	38,523.3
b. Parity exchange rate	Cruzeiros/\$	214.7	502.7	1,698.0	5,482.6	15,659.6	45,515.1
c. Exchange rate transfers ((3a-3b)*2a)*A/1,000	Bil. Cruzeiros	-112.2	42.9	-136.5	702.3	-3,562.4	-14,879.6
4. Research	Bil. Cruzeiros	2.0	5.2	9.2	--	--	--
5. Taxes--							
a. Tax rate	Pct.	19.6	31.8	29.5	29.2	26.8	24.9
b. Tax transfers -(C*5a)	Bil. Cruzeiros	-85.1	-372.5	-1,580.8	-4,699.6	-8,110.0	-25,233.2
E. Total policy transfers:							
1. Total (1g+2b+3c+4+5b)	Bil. Cruzeiros	-13.0	11.2	-688.5	-700.8	9,598.4	2,783.1
2. Producer subsidy equivalents (E1/C)*100	Pct.	-3.0	1.0	-12.8	-4.4	31.7	2.7

Appendix table 6--Beef and Veal: Calculation of Brazilian producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Production	Mil. tons	2.4	2.4	2.2	2.1	1.9	2.1
B. Average producer price	1,000 Cruzeiros/ton	153.0	330.5	1,440.4	3,498.4	13,813.1	33,620.3
C. Producer value (A*B)/1,000	Bil. Cruzeiros	364.9	780.0	3,101.2	7,472.7	25,554.3	71,846.6
D. Policy transfers to producers:							
1. Credit--							
a. Breeding herd credit	Bil. Cruzeiros	9.0	19.4	37.4	42.8	--	--
b. Feeder cattle credit	Bil. Cruzeiros	2.7	4.3	11.6	38.0	--	--
c. Production credit	Bil. Cruzeiros	16.8	54.1	78.1	557.2	526.6	2,580.2
d. Marketing credit	Bil. Cruzeiros	10.5	22.8	68.3	138.5	185.4	393.4
e. Poultry investment credit	Bil. Cruzeiros	--	--	--	--	--	--
f. Poultry flock credit	Bil. Cruzeiros	--	--	--	--	--	--
g. Credit transfers (1a+1b+1c+1d+1e+1f)	Bil. Cruzeiros	39.0	100.6	195.6	776.4	711.9	2,973.7
2. Price wedge--							
a. Reference price	\$/ton	687.6	730.6	998.5	736.9	828.1	1,746.4
b. Price wedge transfer $((B - ((2a * 3a) / 1,000)) * A)$	Bil. Cruzeiros	120.5	88.3	247.3	393.3	5,192.8	-20,922.0
3. Exchange rate adjustment--							
a. Official exchange rate	Cruzeiros/\$	149.0	401.2	1,327.6	4,497.5	13,290.7	24,856.7
b. Parity exchange rate	Cruzeiros/\$	184.3	396.7	1,357.6	4,559.7	15,025.1	29,765.0
c. Exchange rate transfers $((3a - 3b) * 2a) * A / 1,000$	Bil. Cruzeiros	-58.6	7.7	-64.7	-98.0	-2,657.1	-18,318.5
4. Research	Bil. Cruzeiros	.1	.4	.7	--	--	--
5. Taxes--							
a. Tax rate	Pct.	16.6	21.2	21.7	21.6	18.2	29.5
b. Tax transfers $-(C * 5a)$	Bil. Cruzeiros	-60.5	-165.2	-671.5	-1,615.6	-4,646.7	-21,170.7
E. Total policy transfers:							
1. Total (1g+2b+3c+4+5b)	Bil. Cruzeiros	40.5	31.8	-292.7	-543.9	-1,399.1	-57,437.5
2. Producer subsidy equivalents $(E1/C) * 100$	Pct.	11.1	4.1	-9.4	-7.3	-5.5	-79.9

Appendix table 7--Poultry: Calculation of Brazilian producer subsidy equivalents¹

Item	Unit	1982	1983	1984	1985	1986	1987
A. Production	Mil. tons	1.5	1.5	1.4	1.5	1.6	1.8
B. Average producer price	1,000 Cruzeiros/ton	126.3	356.8	1,255.4	3,667.0	10,000.0	23,120.0
C. Producer value (A*B)/1,000	Bil. Cruzeiros	190.4	531.4	1,701.5	5,436.4	16,173.2	41,592.7
D. Policy transfers to producers:							
1. Credit--							
a. Breeding herd credit	Bil. Cruzeiros	--	--	--	--	--	--
b. Feeder cattle credit	Bil. Cruzeiros	--	--	--	--	--	--
c. Production credit	Bil. Cruzeiros	6.1	38.7	63.4	201.2	180.9	3,394.9
d. Marketing credit	Bil. Cruzeiros	7.6	11.0	15.2	9.2	--	--
e. Poultry investment credit	Bil. Cruzeiros	2.1	4.1	5.0	2.1	2.8	--
f. Poultry flock credit	Bil. Cruzeiros	0.7	1.4	1.8	10.3	5.7	--
g. Credit transfers (1a+1b+1c+1d+1e+1f)	Bil. Cruzeiros	16.5	55.2	85.3	222.8	189.4	3,394.9
2. Price wedge--							
a. Reference price	\$/ton	495.8	409.2	480.0	447.0	515.3	775.3
b. Price wedge transfer ((B-((2a*3a)/1,000))*A	Bil. Cruzeiros	56.2	791.7	499.1	1,324.5	4,790.6	-13,218.5
3. Exchange rate adjustment--							
a. Official exchange rate	Cruzeiros/\$	179.5	577.0	1,848.0	6,205.4	13,657.1	39,300.0
b. Parity exchange rate	Cruzeiros/\$	220.5	582.9	1,919.9	6,351.4	15,703.5	46,927.1
c. Exchange rate transfers ((3a-3b)*2a)*A/1,000	Bil. Cruzeiros	-30.7	-3.5	-46.8	-96.8	-1,705.2	-10,637.5
4. Research	Bil. Cruzeiros	0.1	0.3	0.5	--	--	--
5. Taxes--							
a. Tax rate	Pct.	20.3	20.3	20.8	22.3	20.5	36.1
b. Tax transfers -(C*5a)	Bil. Cruzeiros	-38.6	-108.0	-354.6	-1,213.1	-3,320.1	-15,016.7
E. Total policy transfers:							
1. Total (1g+2b+3c+4+5b)	Bil. Cruzeiros	3.5	123.6	183.6	237.4	-45.3	-35,477.8
2. Producer subsidy equivalents (E1/C)*100	Pct.	1.9	23.3	10.8	4.4	-0.3	-85.3

¹ The effect of poultry feed subsidies (in effect prior to 1984) could not be assessed due to the lack of sufficient data.

CHILE

James H. Nelson, Donna Roberts, and David Orden

Introduction

Over the past 25 years, Chile's economic policy goals have changed dramatically. Both the public and private sectors have been buffeted by shifting domestic policies as well as by shocks to the international economy. Agriculture has been one of the sectors profoundly transformed by these forces. While swings in Chilean political ideology have mitigated in the past decade, the effects of world and internal policy adjustments have remained pronounced. To quantify the potential effects of further policy adjustments on Chile's agricultural sector, this report provides estimates of producer subsidy equivalents (PSE's) for eight agricultural products for 1982-87.

Economic and Agricultural Developments, 1982-87

The Chilean economy was in the midst of a severe recession in 1982. Net capital inflows dropped precipitously in the wake of the Latin American debt crisis at the same time that the price of copper, Chile's most important export commodity, plummeted (20, 26).¹ Rising real international interest rates produced an acute balance-of-payments crisis, because the private sector had borrowed liberally in the late 1970's and the early 1980's (9). The exchange rate, which had been fixed in 1979, became increasingly overvalued.

The turmoil in Chile's financial markets produced disastrous results for its real economy. The sharp contraction in real liquidity produced a sharp downturn in productivity. Real GDP fell by over 14 percent in 1982, while unemployment rose to 19 percent (21). The currency distortion encouraged imports, displacing domestic production of import-competing goods; the currency distortion also implicitly taxed the commodities that Chile's export sector produced. A large number of firms faced bankruptcy, particularly in the import-substituting industries, which had enjoyed strong government protection in the past.

The Government of Chile (GOC) began to actively intervene in the economy to arrest this downward economic spiral. Its efforts were moderately successful, but its ability to reactivate the economy continued to be severely constrained by its restricted access to external resources. The imbalance in Chile's external accounts became more pronounced when prices for copper, fishmeal, and wood products, (Chile's principal exported commodities) fell sharply (13).

¹ Underscored numbers in parentheses are listed in References at the end of this section.

The international financial community compelled the GOC in 1985 to liberalize its trade regime as a condition for approval of loans for structural adjustment and debt rescheduling (24, 26).

Ensuing policy reforms encouraged the production of nontraditional exports and import-substituting goods. These reforms revitalized and transformed Chile's economy over the following years. Led by the agricultural and manufacturing sectors, the economy expanded vigorously during the last half of the decade. The trade surplus increased dramatically, and the export share of nontraditional goods (such as fruits, vegetables, and wood products) also increased. In fact, copper's share of export revenues fell from over 80 percent in the 1970's to about 40 percent in 1987 (20).

In conjunction with export expansion policies, the GOC made a concerted effort to develop self-sufficiency in several of its staple commodities, principally wheat, sugar, and vegetable oil. The Government's import-substitution strategies were clearly successful in stimulating domestic production and reducing Chile's food import bill. Agricultural production increased by an annual average of 4.8 percent, and the total value of agricultural imports fell by 65 percent during 1982-87 (20).

Policies in the 1980's

Chile adopted the standard import substitution strategy to develop its industry after World War II. The government intervened in factor and product markets to lower the costs of raw materials needed by industry and to lower the cost of food for urban workers. A fundamental reform in economic policy began with the military regime in 1974, but further reforms of both macroeconomic and sectoral policies were necessary in the 1980's to facilitate the efficient allocation of resources in the Chilean economy.

Macroeconomic and Trade Policy

The critical economic situation the country faced in 1982 forced the GOC to reformulate its economic policies. First, the fixed official exchange rate was abandoned in order to revive import-substitution and export industries. During the first 6 months of 1983, the government devalued the peso by more than 85 percent in nominal terms.² The government also gradually increased its uniform tariff rate 10-35 percent to protect domestic industries, to raise government revenue, and to reduce the outflow of foreign exchange. A program of fiscal austerity was adopted by the government as well (26).

² Following a period of experimentation, a three-tier exchange rate system was adopted. It featured a preferential rate for debt repayment, an official rate, and a parallel rate that was primarily used for relatively small, unpublished tourist transactions (6).

Further restructuring of Chile's economic policy occurred in 1985. The GOC negotiated a new 3-year Extended Fund Facility (EFF) with the International Monetary Fund (IMF) and obtained a two-part structural adjustment loan from the World Bank (26). The terms of credit designated by these multilateral institutions have basically established the direction of Chilean economic policy ever since.

The policy reform agenda featured an export-led growth strategy, which included a liberalized trade structure and the maintenance of a realistic real exchange rate. Chile reduced its uniform tariff rates and continued its crawling peg exchange rate system, which devalued the peso based on the difference between domestic and international inflation (10). At the same time, the GOC maintained a relatively tight monetary policy that reduced its inflation rate; Chile also reduced the size of its public sector and external credit dependence over the next few years.

Chile has been singularly diligent in terms of debt rescheduling and IMF/World Bank program compliance. Its creditworthiness has increased markedly since the early 1980's, even though it remains saddled with an external debt that has totaled over 100 percent of gross domestic product (GDP) since 1984. Because of its dependence on copper and the increasing percentage of GDP generated by international trade in goods and services, the economy of Chile is highly exposed to movements in international prices. Interest rate fluctuations also exercise a powerful effect on the economy, as almost 80 percent of Chile's debt is repayable at variable interest rates (15).

Agricultural Policy Developments

Government policy toward agriculture during 1982-87 was focused, with few exceptions, on the expansion of export production and the support of import-substitution commodities. The GOC's policies were aimed at increasing domestic employment, while reducing Chile's food import bill. The Government's commitment to these goals was underscored by its use of direct measures in addition to its foreign exchange policy.

Direct agricultural commodity support measures were reinstated in 1982 (after virtual elimination in 1979) in response to rising import levels, shrinking foreign exchange reserves, and some sense of frustration with its short-lived effort to pursue development through an open economy. The government provides direct support to its agricultural producers primarily through price-support measures that are reinforced by border policies. The GOC does not offer direct input subsidies; however, it does invest government revenues in physical and institutional infrastructure to lower the costs of producing and marketing agricultural commodities. The GOC's value-added tax also affected the profitability of the Chilean farming sector.

Price Supports

The government began to directly intervene in the agricultural sector by establishing a price-support system for sugar beets in 1982. It was the first step of a 5-year plan that aimed to achieve self-sufficiency in sugar. IANSA, the government-owned sugar

agency, was given authority to issue contracts to producers prior to the next season's planting, granting a guaranteed minimum harvest price.

Shortly thereafter, a price-support program for grain was instituted as well. (COPAGRO), a government-subsidized cooperative, was authorized to guarantee a minimum price to corn and rice producers, and for 1 year, to wheat producers. In early 1986, the c.i.f price of corn plus the tariff fell below the established support price. With no other border measures in place to protect it, COPAGRO was drawn into bankruptcy as Chilean feed manufacturers purchased cheaper imported corn rather than accumulated COPAGRO stocks. Price supports, which had been funnelled through COPAGRO to corn and rice producers since 1983, were terminated.

The GOC also began to provide output price support in the form of minimum prices reinforced by import price bands in 1983. This regime was initially used to support wheat prices; ultimately, the government began to support the prices of edible oils, sugar, and dairy products with this form of intervention.³ Output price support operates by ensuring that the imported price of a commodity is at least as great as the government-mandated domestic minimum price. A variable surtax is added to the sum of each commodity's c.i.f. price and ad valorem tariff in order to bring the import price up to the specified level.

Border Policies

Chile's trade barriers established a wall of protection behind which the government maintained support for domestic output prices. The GOC's uniform ad valorem tariff represented an important component of this protection. The tariff, which was levied on all imports, ranged from 10-35 percent during 1982-87. The government also used variable surcharges from time to time to ensure that Chileans could not obtain commodities from foreign sources that were cheaper than domestic supplies; these surcharges were used to reinforce Chile's minimum price policy. These two measures at times provided an enormous amount of protection for domestic commodities. For example, in 1987, the uniform tariff plus the variable surcharge equaled 77 percent of c.i.f. price of wheat (24).

In addition, a per-unit surtax was levied on imported sugar from mid-1984 to early 1986 in an effort to reduce IANSA stock buildups. The surtax was justified by Chilean policymakers as a buffer against "price competition from the highly subsidized international market" (26).

Government Expenditures

The government allocates resources to a number of activities that support the development of physical and institutional infrastructure. Most notably, the GOC has invested in storage, refrigeration, and inspection services for exported fruit. The

³ The government established COTRISA, a government-capitalized grain storage and marketing corporation, to implement its wheat price-support program.

government also implemented a program in 1986 that subsidizes 75 percent of the cost of some irrigation and drainage projects. This 8-year program is designed to reduce unemployment and to encourage the expansion of nontraditional, labor-intensive production for export (24).

Chilean officials have also spent money on a variety of foreign market development activities. The GOC has sought to increase foreign exchange earnings by lobbying foreign governments to open new markets and to continue favorable treatment of Chile's products (26).

A value-added tax (VAT) of 20 percent was levied on most domestically produced and imported products during 1982-87. Since 1979, it has represented the major source of tax revenue from agriculture (11). Officials exempted certain inputs for producers of exportable goods in 1985; exemptions for the exported goods were granted in following years. Although detailed information about VAT rebates and exemptions is sketchy, it is safe to conclude that Chilean producers of crops destined for the domestic market were more penalized by the VAT than were Chile's fruit producers.

Foreign Exchange Policies

Indirectly, the GOC's official exchange rate has both taxed (1982-85) and subsidized (1986-87) its producers of tradable agricultural goods during the 6-year period. Since 1985, the government has employed a crawling peg to maintain an exchange rate that approximates an equilibrium, or free market, rate. This policy has had a profound effect on the agricultural sector; Chile's agricultural trade balance improved from a trade deficit of \$193 million in 1982 to a surplus of \$678 million in 1987.

Estimation of Policy Intervention in Agriculture

In an effort to obtain a quantitative measure of government intervention in Chilean agriculture, PSE's were calculated for eight commodities. The PSE's estimated in this report include measures of domestic and border policies that directly and indirectly affected commodity prices.

Commodity Coverage

PSE's were estimated for a mix of crops that 1) included both traditional and nontraditional products; 2) included at least one commodity from the cereal, vegetable, industrial crop, and fruit groups; and 3) represented products grown almost exclusively for export, those specifically designated as import substitutes, and those primarily grown for domestic consumption (table 1). The selected cereal, vegetable and industrial commodities generate approximately 80 percent of the value

Table 1—Commodity coverage of Chilean PSE's

Commodity group	Commodity	Category
Cereals	Wheat	Import substitution
	Corn	Import substitution
	Oats	Domestic consumption
Vegetables	Potatoes	Domestic consumption
Industrial crops	Rapeseed	Import substitution
	Sugar	Import substitution
Fruit	Apples	Export
	Table grapes	Export

of production of Chile's 14 "traditional" crops.⁴ Apples and table grapes accounted for over 50 percent of the total value of all agricultural exports in 1987 (24).

Policy Coverage

The Chilean PSE estimates reflect the effects of both direct and indirect intervention on the part of the Government. The PSE's measure the level of support or taxation resulting from the six policies. Two policies affected all eight commodities: Chile's foreign exchange policy and government expenditures on physical and institutional infrastructure. The effects of price supports, whether established by means of a mandated minimum price in conjunction with an import price band (for wheat, rapeseed oil, and sugar) or through a marketing board (for corn and wheat), are also assessed in this report. The effects of two border policies, Chile's ad valorem tariff (on wheat, corn, sugar, and vegetable oil imports) and its additional fixed surtax on sugar imports, are also evaluated.

Chilean marketing margins for the commodities could not be estimated because of the lack of data. This omission has the effect of magnifying the difference between domestic and international reference prices, and increases the magnitude of the measured PSE's. The lack of sufficient data about rebates and exemptions from Chile's 20-percent VAT precluded the measurement of its effect on the farm sector; this omission, too, biases the PSE estimates upwards.

PSE's by Commodity and Policy

In the context of the ranking system used by Ballenger to gauge relative levels of assistance and taxation, the aggregate PSE value of the eight commodities analyzed

⁴ Chile's 14 traditional crops (wheat, corn, sugar beets, potatoes, barley, rice, oats, rye, beans, lentils, green peas, sunflower seeds, and rapeseed), account for approximately 30 percent of the value of all Chilean agricultural production.

Table 2--Summary of Chilean PSE's

Item	1982	1983	1984	1985	1986	1987	1983-87
	Percent						
Wheat	-65.2	8.3	26.0	54.5	55.1	44.4	37.6
Corn	-53.5	2.8	26.2	38.6	26.8	20.2	22.9
Oats	4.2	4.6	4.7	4.9	4.4	3.3	4.4
Potatoes	2.8	3.1	3.1	3.3	3.0	2.2	2.9
Sugar	-67.1	21.5	50.4	109.9	58.8	50.1	58.1
Rapeseed oil	-77.9	-17.8	-10.2	40.8	54.4	48.8	23.2
Apples	-143.5	-54.5	-73.9	25.0	20.6	9.3	-14.7
Grapes	-307.6	-108.1	-100.3	47.7	27.7	9.6	-24.7
Eight-commodity aggregate	-68.2	-9.6	8.2	49.9	39.4	28.7	23.3

in this report were at the lower end of the middle subsidy range during 1983-87 (2).⁵ Chilean sugar falls into the high-subsidy range; wheat is in the middle of the moderate range; rapeseed and corn occupy the high end of the low-subsidy range; and oats and potatoes show almost no support (table 2). Apple and table grape producers are taxed at a rate that falls in the low segment of of the producer tax range.

The relatively high and positive PSE values for sugar, wheat, rapeseed, and corn are the consequence of government policies that were designed to achieve self-sufficiency in these import-substitution commodities (fig. 1a and 1b). Production of all of these commodities expanded dramatically during 1982-87, generating a significant reduction in the level of imports. During 1982-87, wheat imports declined by over 97 percent, sugar imports by 87 percent, and vegetable oil imports by 44 percent.⁶ Because these items represent Chile's major agricultural imports, these reductions have been a significant factor in turning the agricultural balance of trade in Chile's favor.

Producers of export and nontraded crops received far less support from the government. In fact, the net effect of GOC policies was to tax export crop producers during 1982-84. Government subsidies amounted to less than 5 percent of the value of production of oats or potatoes.

⁵ Chile's policy intervention can be more accurately assessed when 1982's policy effects are omitted. The severely overvalued exchange rate had an overwhelming effect on the PSE estimates that year. The distorted exchange rate reflected a temporary market aberration rather than planned GOC strategy; therefore, 1983-87 PSE averages were used to gauge the level of GOC policy intervention in agricultural markets.

⁶ Vegetable oil imports are cited here because Chile does not import rapeseed oil. Soybean oil is the dominant vegetable oil import. Chilean imports of vegetable oil have also been affected by the growth in domestic sunflower seed production; however sufficient data to calculate a PSE for sunflowerseed could not be obtained.

Figure 1a
Chilean PSE's by commodity
Percent

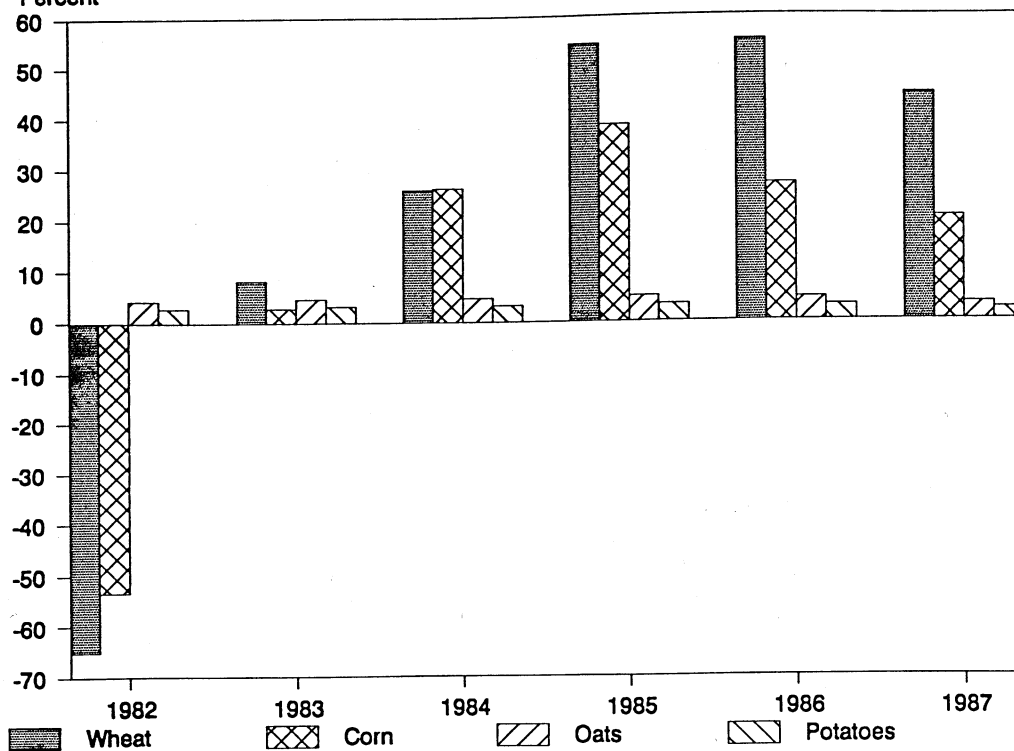


Figure 1b
Chilean PSE's by commodity
Percent

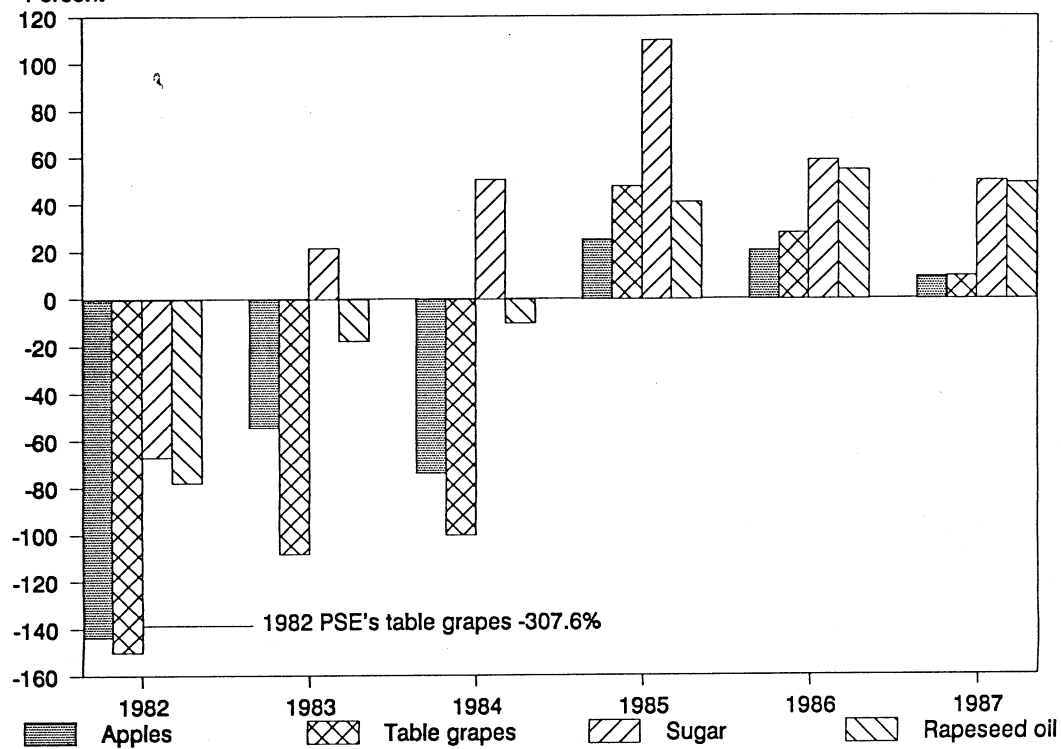
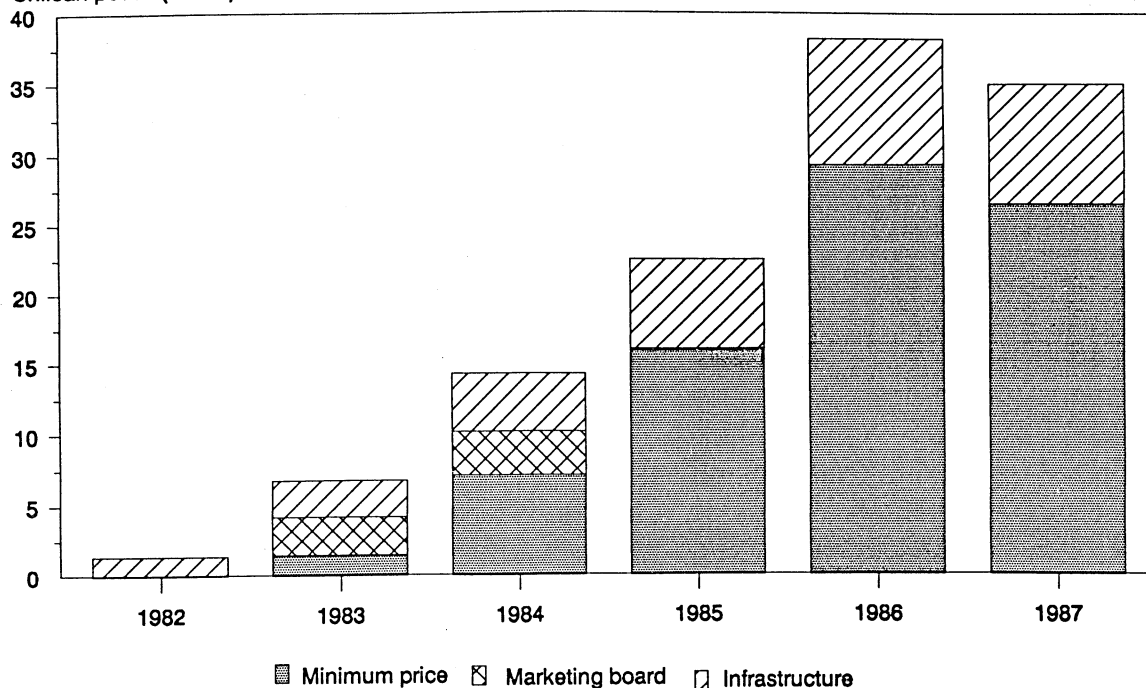


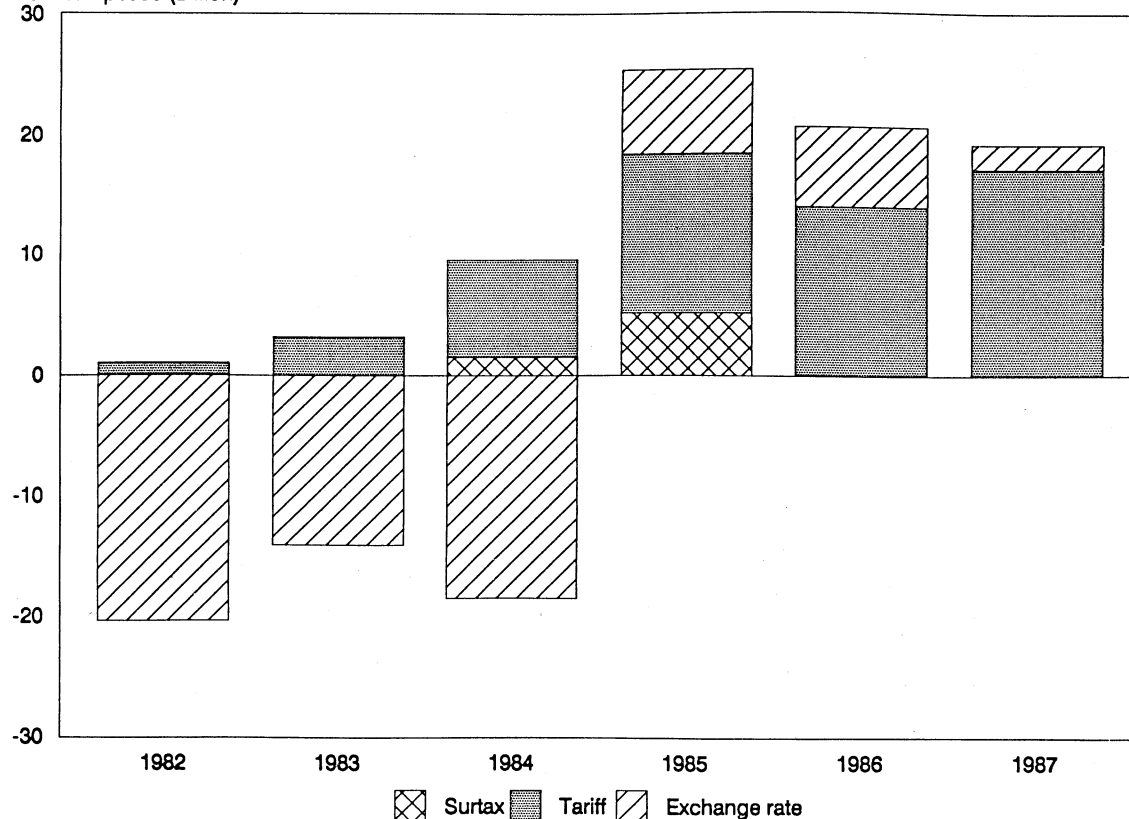
Figure 2a
 Chile: Total transfers to producer by policy
 Chilean pesos (Billion)



Because of its extremely overvalued exchange rate in 1982, the net effect of government intervention was negative in that year. The PSE estimates show a marked increase in the level of support provided by the GOC to its agricultural producers during 1983-85 for all but the nontraded commodities. Government support began to decline for all commodities (except for wheat and rapeseed oil) in 1986; by 1987 the eight commodity average PSE had declined by more than 20 points from the peak value recorded in 1985.

Chile's foreign exchange policy represented the most important component of the PSE's for all traded goods during 1982-84 (figs. 2a and 2b). The overvaluation of the peso either minimized or nullified the gains from concurrent government subsidy programs through 1984. The currency overvaluation did not imply a focused government effort to discriminate against the agricultural sector; instead, it was a manifestation of macroeconomic policies that did not work as expected in the late 1970's and early 1980's. The Chilean Government, in contrast to many developing countries, has not singled out the agricultural sector for taxation.

Figure 2b
 Chile: Total transfers to producers by policy
 Chilean pesos (Billion)



The Government's minimum price policy served as the most important means of support for the producers of wheat, sugar, and rapeseed oil. Chile's tariff also provided a significant level of support to producers of these same commodities. The output price guarantees offered through the marketing board proved to be the most important form of policy intervention for corn producers in 1984; however, the tariff on imported corn was the most important means of support in all other years. Government expenditures on infrastructure accounted for less than 10 percent of the value of production of all eight commodities throughout the period (table 3).

Conclusion

Two problems face Chilean policymakers at present. The declining market value of Chile's major agricultural export products, apples and table grapes, are putting strong pressure on the government to diversify its export products. The country's relatively recent experience with national economic and social shocks generated by its copper industry's sudden decline emphasizes the risk of single-product dependence.

Table 3—Chilean PSE's by policy component

Item	1982	1983	1984	1985	1986	1987
	<u>Percent</u>					
Wheat:						
Marketing board	0	18.0	0	0	0	0
Minimum price	0	0	22.2	24.0	33.2	24.1
Tariff	9.5	14.7	18.8	19.4	13.4	15.2
Exchange rate	-80.3	-30.6	-21.2	4.5	2.6	.7
Infrastructure	5.7	6.2	6.3	6.6	5.9	4.4
Total	-65.2	8.3	26.0	54.5	55.1	44.4
Corn:						
Marketing board	0	13.3	22.4	.8	0	0
Tariff	7.9	15.6	18.7	25.3	17.5	15.1
Exchange rate	-67.0	-32.3	-21.2	5.8	3.4	4.4
Infrastructure	5.6	6.2	6.3	6.6	5.9	4.4
Total	-53.5	2.8	26.2	38.6	26.8	20.2
Oats:						
Infrastructure	4.2	4.6	4.7	4.9	4.4	3.3
Total	4.2	4.6	4.7	4.9	4.4	3.3
Potatoes:						
Infrastructure	2.8	3.1	3.1	3.3	3.0	2.2
Total	2.8	3.1	3.1	3.3	3.0	2.2
Sugar:						
Minimum price	1.2	29.0	28.9	50.8	38.0	31.3
Surtax	0	0	.2	.4	0	0
Tariff	9.9	12.8	17.2	12.6	12.4	13.7
Exchange rate	-83.8	-26.5	-19.4	2.9	2.4	.6
Infrastructure	5.7	6.2	6.3	6.6	5.9	4.4
Total	-67.1	21.5	50.4	109.9	58.8	50.1
Rapeseed oil:						
Minimum price	0	0	-12.9	4.1	32.3	29.8
Tariff	11.2	22.4	27.3	24.5	13.5	14.1
Exchange rate	-94.7	-46.4	-30.8	564.5	2.7	.7
Infrastructure	5.7	6.3	6.3	6.5	5.9	4.4
Total	-77.9	-17.8	-10.2	40.8	54.4	48.8
Apples:						
Exchange rate	-29.3	-63.8	-83.3	15.2	11.7	2.8
Infrastructure	8.5	9.3	9.4	9.8	8.9	6.5
Total	-143.5	-54.5	-73.9	25.0	20.6	9.3
Table grapes:						
Exchange rate	-316.1	-117.4	-109.7	37.8	18.8	3.1
Infrastructure	8.5	9.3	9.4	9.8	8.9	6.5
Total	-307.6	-108.1	-100.3	47.7	27.7	9.6
Eight-commodity aggregate						
Minimum price	.1	3.6	10.7	16.6	19.6	14.0
Marketing board	0	6.4	4.7	.1	0	0
Surtax	0	0	2.3	5.3	0	0
Tariff	4.1	7.6	12.1	13.8	9.3	9.1
Exchange rate	-77.7	-33.2	-21.2	7.2	4.4	1.1
Infrastructure	5.4	6.1	6.1	6.7	6.0	4.5
Total	-68.2	-9.6	8.2	49.9	39.4	28.7

The second problem is caused by domestic programs that encourage self-sufficiency but create products that are not competitive in international markets. As production increases are achieved through distorted price and protection mechanisms, the option to eliminate domestic surplus through the export market is closed unless explicit export subsidies are instituted. With an external debt burden of overwhelming proportions, continuing to support the prices of some commodities far above world market levels has become prohibitively expensive for Chile. The general decline in world market prices of traded agricultural products has brought additional pressure to bear on the Chilean Government, and recent currency devaluations have only partially alleviated this pressure. Price-support measures are coming under scrutiny as a growing number of industry and consumer groups argue for a reduction in both agricultural support and imported product barriers.

Chilean policymakers view a multilateral reduction in trade barriers as at least a partial solution to their problems. Chile's participation in the Cairns Group, a group of agricultural exporters that supports a reduction in trade barriers, indicates that the government has decided that it has more to gain than lose from trade liberalization. In a liberalized trade environment, policymakers reason, Chilean farmers could prosper by producing high-value products for export to Northern Hemisphere markets, given the combination of Chile's resources, climate, and location in the Southern Hemisphere. These market opportunities could attract resources away from the production of lower value, import-substitution commodities, such as grains. A multilateral reduction in trade barriers would simultaneously widen Chile's export base and reduce its public sector expenditures.

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Methodology Appendix

The Chilean PSE calculations include the estimates of the effects of 1) the minimum price policy for wheat, rapeseed oil, and sugar; 2) price supports maintained by means of a marketing board for corn and wheat; 3) the uniform ad valorem import tariff; 4) the surtax on sugar imports; 5) foreign exchange policies; and 6) governmental expenditures on infrastructure and market development activities.

Minimum Price

The minimum price policy provided output price support for wheat and rapeseed producers from 1984-87 and for sugar producers from 1982-87. To calculate the minimum price component of the wheat, rapeseed oil, and sugar PSE's, each commodity's reference price (multiplied by the official exchange rate) was subtracted from its minimum price; this price difference was then multiplied by the quantity of domestic production of each of these three commodities. The minimum price component of the PSE reflects the effects of both the minimum price and the variable surcharges levied on imports that were used to reinforce these prices.

Marketing Board

A marketing board was used to support corn prices during 1982-85 and wheat during 1982-83. The marketing board's estimated effect was calculated by subtracting the reference price (multiplied by the official exchange rate) from the average producer price and then multiplying the price difference by the quantity of domestic production.

Tariff

The effect of Chile's uniform ad valorem tariff has been estimated for each of the four imported commodities (wheat, corn, sugar, and rapeseed) by first calculating an annual average tariff value and then multiplying it by the reference price. This dollar amount is converted to pesos using the official exchange rate and then multiplied by the quantity of domestic production to quantify the tariff's contribution to each commodity's measured PSE.

Tariffs, of course, could affect the price of imported inputs as well as the producer price of imported commodities. While imported inputs sometimes account for a significant share of production costs in Chile, agricultural inputs were generally exempted from import duties. Thus, the effect of Chile's tariff on the costs of producing agricultural commodities is probably small. The effect of the tariff on imported inputs has not been assessed in this report; the impact of this omission on the PSE estimates is likely negligible.

Surtax

In 1984 and 1985, Chile imposed a fixed-dollar surtax on sugar imports in addition to its uniform tariff. This surtax was converted to pesos using the official exchange rate

and then multiplied by the level of refined sugar production in Chile in order to measure the surtax component of the sugar PSE.

Foreign Exchange Policies

A government's foreign exchange policy can constitute an indirect subsidy or tax on producers of tradeable commodities if the official exchange rate varies from the equilibrium exchange rate. The end-of-year 1987 official exchange rate was chosen as an equilibrium rate from which annual equilibrium rates for 1982-86 were calculated. The ratio of the 1986 Chilean GDP deflator to the 1986 U.S. GDP deflator was multiplied by the 1987 equilibrium exchange rate to determine the 1986 equilibrium exchange rate; equilibrium exchange rates for 1982-85 were calculated in the same manner. The difference between the official and the calculated equilibrium exchange rates in each year was then multiplied by the commodity reference price and multiplied again by the amount of production to determine the exchange rate policy component of each commodity's PSE.

Government Expenditure

Data on government expenditures for institutional and physical infrastructure are often difficult to obtain on a per crop basis. The Organization for Economic Cooperation and Development (OECD) allocates government expenditures among individual commodities according to a commodity's share of the total value of production (5). The assumption that the value of wheat production divided by the value of total agricultural production is representative of wheat's share of public sector expenditures is inconsistent with the thrust of Chile's agricultural development programs. Export and import substitution crops receive a larger share of public funds allocated to infrastructure and market development than crops such as oats and potatoes (19, 24, 26).

Using the OECD methodology to assess the share of government expenditures on each crop overstates public sector investment in some crops and underestimates investment in others. The estimates provided by this methodology were, therefore, revised: the estimated expenditures on oats and potatoes were reduced by 25 percent and 50 percent, and the estimated expenditures on apples and table grapes were increased by 50 percent each. The initial estimate of the share of government expenditures allocated to rapeseed appears to be undervalued, particularly for the 1982-84 period. However, in view of the small number of hectares planted in rapeseed, the original estimate was left as initially calculated. This methodology, while simplistic, produces estimates approximating actual government expenditures that were occasionally reported in the referenced sources.

Appendix table 1--Calculation of Chilean producer subsidy equivalents

Item	Unit	Definition and sources
A. Production	1,000 MT	Sources: (17,18).
B. Average producer price	Pesos/MT	Arithmetic calendar year average of reported monthly farmgate prices. Source: (12).
C. Producer value (A*B)/1,000	Mil. pesos	
D. Policy transfers to producers:		
1. Price transfers--		Source: (12).
a. Average producer price	Pesos/MT	F.o.b. (Gulf) price plus freight and insurance for wheat and
b. Reference price	\$/MT	maize. Source: (prices, 23). Sources: (freight plus insurance, 16,24). C.i.f. (Chile) price for rapeseed oil and sugar. Sources: (3,24). Export unit values for apples and table grapes. Source: (22).
c. Surtax	\$/MT	Weighted annual average surtax. Source: (24).
d. Tariff	Pct.	Weighted annual average tariff. Source: (24).
e. Minimum price transfer $(1a-(1b*2a))*A/1,000$	Mil. pesos	For wheat, sugar and rapeseed oil.
f. Marketing board transfer $(1a-(1b*2a))*A/1,000$	Mil. pesos	For corn and wheat.
g. Surtax transfer $(1c*2a)*A/1,000$	Mil. pesos	For sugar only.
h. Tariff transfers $(1d*(1b*2a))*A/1,000$	Mil. pesos	
2. Exchange rate adjustment--		Source: (14).
a. Official exchange rate	Pesos/\$	ERS estimates. Sources: official exchange rate, (14,24).
b. Equilibrium exchange rate	Pesos/\$	Source: GDP deflator: (21).
c. Exchange rate transfer $(2a-2b)*1b*A/1,000$	Mil. pesos	
3. Infrastructural support	Mil. pesos	ERS estimates based on government data. Sources: (5,24).
E. Total policy transfers:		
1. Total $(1e+1f+1g+1h+2c+3)$	Mil. pesos	
2. Producer subsidy equivalents $(E1/C)*100$	Pct.	

Appendix table 2--Wheat: Calculation of Chilean producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Production	1,000 MT	650.5	586.0	988.3	1,164.7	1,625.8	1,874.0
B. Average producer price	Pesos/MT	9,427.8	16,602.1	21,004.2	31,745.8	36,815.3	36,254.2
C. Producer value (A*B)/1,000	Mil. pesos	6,132.3	9,728.0	20,758.0	36,974.1	59,854.6	67,940.3
D. Policy transfers to producers:							
1. Price transfers--							
a. Average producer price	Pesos/MT	9,427.8	16,602.1	21,004.2	31,745.8	36,815.3	36,254.2
b. Reference price	\$/MT	175.37	172.74	165.65	149.75	127.35	125.27
c. Surtax	\$/MT	--	--	--	--	--	--
d. Tariff	Pct.	10.0	18.0	24.2	25.6	20.0	20.0
e. Minimum price transfer $(1a-(1b*2a))*A/1,000$	Mil. pesos	--	--	4,606.5	8,879.7	19,890.4	16,402.0
f. Marketing board transfer $(1a-(1b*2a))*A/1,000$	Mil. pesos	--	1,748.0	--	--	--	--
g. Surtax transfer $(1c*2a)*A/1,000$	Mil. pesos	--	--	--	--	--	--
h. Tariff transfers $(1d*(1b*2a))*A/1,000$	Mil. pesos	580.7	1,434.0	3,900.6	7,178.1	7,992.8	10,307.7
2. Exchange rate adjustment--							
a. Official exchange rate	Pesos/\$	50.9	78.8	98.7	161.1	193.0	219.5
b. Equilibrium exchange rate	Pesos/\$	94.1	108.3	125.6	151.6	185.5	217.5
c. Exchange rate transfer $(2a-2b)*1b*A/1,000$	Mil. pesos	-4,924.4	-2,979.8	-4,410.3	1,653.4	1,567.4	483.6
3. Infrastructural support	Mil. pesos	346.5	602.7	1,301.7	2,422.5	3,532.7	2,961.1
E. Total policy transfers:							
1. Total $(1e+1f+1g+1h+2c+3)$	Mil. pesos	-3,997.2	807.9	5,398.5	20,133.7	32,983.3	30,154.4
2. Producer subsidy equivalents $(E1/C)*100$	Pct.	-65.2	8.3	26.0	54.5	55.1	44.4

-- = Not applicable.

Appendix table 3--Corn: Calculation of Chilean producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Production	1,000 MT	484.1	511.6	721.4	771.8	721.3	617.0
B. Average producer price	Pesos/MT	8,027.1	13,841.7	19,104.2	20,541.7	22,013.9	25,462.5
C. Producer value (A*B)/1,000	Mil. pesos	3,885.5	7,080.7	13,781.6	15,853.7	15,878.4	15,710.4
D. Policy transfers to producers:							
1. Price transfers--							
a. Average producer price	Pesos/MT	8,027.1	13,841.7	19,104.2	20,541.7	22,013.9	25,462.5
b. Reference price	\$/MT	124.66	152.14	150.22	126.47	99.51	87.77
c. Surtax	\$/MT	--	--	--	--	--	--
d. Tariff	Pct.	10.0	18.0	24.2	25.6	20.0	20.0
e. Minimum price transfer (1a-(1b*2a))*A/1,000	Mil. pesos	--	--	--	--	--	--
f. Marketing board transfer (1a-(1b*2a))*A/1,000	Mil. pesos	--	944.8	3,090.1	131.1	--	--
g. Surtax transfer (1c*2a)*A/1,000	Mil. pesos	--	--	--	--	--	--
h. Tariff transfers (1d*(1b*2a))*A/1,000	Mil. pesos	307.2	1,102.6	2,582.0	4,017.1	2,770.8	2,377.8
2. Exchange rate adjustment--							
a. Official exchange rate	Pesos/\$	50.9	78.8	98.7	161.1	193.0	219.5
b. Equilibrium exchange rate	Pesos/\$	94.1	108.3	125.6	151.6	185.5	217.5
c. Exchange rate transfer (2a-2b)*1b*A/1,000	Mil. pesos	-2,605.0	-2,288.9	-2,919.4	925.3	543.3	111.6
3. Infrastructural support	Mil. pesos	219.5	438.7	864.2	1,038.7	937.2	684.7
E. Total policy transfers:							
1. Total (1e+1f+1g+1h+2c+3)	Mil. pesos	-2,078.2	197.2	3,616.9	6,112.3	4,251.3	3,174.1
2. Producer subsidy equivalents (E1/C)*100	Pct.	-53.5	2.8	26.2	38.6	26.8	20.2

-- = Not applicable.

Appendix table 4--Oats: Calculation of Chilean producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Production	1,000 MT	117.6	146.3	163.0	170.4	124.4	128.0
B. Average producer price	Pesos/MT	8,097.3	10,545.8	12,700.0	12,562.5	20,106.9	27,125.0
C. Producer value (A*B)/1,000	Mil. pesos	952.4	1,543.2	2,070.6	2,140.2	2,500.3	3,472.0
D. Policy transfers to producers:							
1. Price transfers--							
a. Average producer price	Pesos/MT	8,097.3	10,545.8	12,700.0	12,562.5	20,106.9	27,125.0
b. Reference price	\$/MT	--	--	--	--	--	--
c. Surtax	\$/MT	--	--	--	--	--	--
d. Tariff	Pct.	10.0	18.0	24.2	25.6	20.0	20.0
e. Minimum price transfer $(1a-(1b*2a))*A/1,000$	Mil. pesos	--	--	--	--	--	--
f. Marketing board transfer $(1a-(1b*2a))*A/1,000$	Mil. pesos	--	--	--	--	--	--
g. Surtax transfer $(1c*2a)*A/1,000$	Mil. pesos	--	--	--	--	--	--
h. Tariff transfers $(1d*(1b*2a))*A/1,000$	Mil. pesos	--	--	--	--	--	--
2. Exchange rate adjustment--							
a. Official exchange rate	Pesos/\$	50.9	78.8	98.7	161.1	193.0	219.5
b. Equilibrium exchange rate	Pesos/\$	94.1	108.3	125.6	151.6	185.5	217.5
c. Exchange rate transfer $(2a-2b)*1b*A/1,000$	Mil. pesos	--	--	--	--	--	--
3. Infrastructural support	Mil. pesos	40.4	71.7	97.4	105.2	110.7	113.5
E. Total policy transfers:							
1. Total $(1e+1f+1g+1h+2c+3)$	Mil. pesos	40.4	71.7	97.4	105.2	110.7	113.5
2. Producer subsidy equivalents $(E1/C)*100$	Pct.	4.2	4.6	4.7	4.9	4.4	3.3

-- = Not applicable.

Appendix table 5--Potatoes: Calculation of Chilean producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Production	1,000 MT	841.6	683.6	1,036.2	908.7	791.1	727.0
B. Average producer price	Pesos/MT	9,168.5	14,447.1	10,786.5	11,199.9	26,010.5	36,467.1
C. Producer value (A*B)/1,000	Mil. pesos	7,715.8	9,876.5	11,176.4	10,176.8	20,577.4	26,511.6
D. Policy transfers to producers:							
1. Price transfers--							
a. Average producer price	Pesos/MT	9,168.5	14,447.1	10,786.5	11,199.9	26,010.5	36,467.1
b. Reference price	\$/MT	--	--	--	--	--	--
c. Surtax	\$/MT	--	--	--	--	--	--
d. Tariff	Pct.	10.0	18.0	24.2	25.6	20.0	20.0
e. Minimum price transfer (1a-(1b*2a))*A/1,000	Mil. pesos	--	--	--	--	--	--
f. Marketing board transfer (1a-(1b*2a))*A/1,000	Mil. pesos	--	--	--	--	--	--
g. Surtax transfer (1c*2a)*A/1,000	Mil. pesos	--	--	--	--	--	--
h. Tariff transfers (1d*(1b*2a))*A/1,000	Mil. pesos	--	--	--	--	--	--
2. Exchange rate adjustment--							
a. Official exchange rate	Pesos/\$	50.9	78.8	98.7	161.1	193.0	219.5
b. Equilibrium exchange rate	Pesos/\$	94.1	108.3	125.6	151.6	185.5	217.5
c. Exchange rate transfer (2a-2b)*1b*A/1,000	Mil. pesos	--	--	--	--	--	--
3. Infrastructural support	Mil. pesos	218.0	306.0	350.4	333.4	607.3	577.7
E. Total policy transfers:							
1. Total (1e+1f+1g+1h+2c+3)	Mil. pesos	218.0	306.0	350.4	333.4	607.3	577.7
2. Producer subsidy equivalents (E1/C)*100	Pct.	2.8	3.1	3.1	3.3	3.0	2.2

-- = Not applicable.

Appendix table 6--Sugar (refined): Calculation of Chilean producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Production ¹	1,000 MT	115.7	197.3	263.5	255.2	316.9	378.9
B. Average producer price ²	Pesos/MT	15,660.3	26,329.4	33,158.5	54,333.9	65,741.8	72,267.5
C. Producer value (A*B)/1,000	Mil. pesos	1,811.6	5,195.6	8,738.7	13,865.2	20,835.0	27,380.6
D. Policy transfers to producers:							
1. Price transfers--							
a. Average producer price	Pesos/MT	15,660.3	26,329.2	33,158.5	54,333.9	65,741.8	72,267.5
b. Reference price	\$/MT	304.00	237.00	239.00	166.00	211.00	226.00
c. Surtax	\$/MT	--	--	56.3	125.0	--	--
d. Tariff	Pct.	10.0	18.0	24.2	25.0	20.0	20.0
e. Minimum price transfer (1a-(1b*2a))*A/1,000	Mil. pesos	21.2	1,508.41	2,524.4	7,041.7	7,927.7	8,582.1
f. Marketing board transfer (1a-(1b*2a))*A/1,000	Mil. pesos	--	--	--	--	--	--
g. Surtax transfer (1c*2a)*A/1,000	Mil. pesos	--	--	1,529.9	5,138.1	--	--
h. Tariff transfers (1d*(1b*2a))*A/1,000	Mil. pesos	179.0	662.6	1,500.7	1,743.4	2,581.5	3,759.7
2. Exchange rate adjustment--							
a. Official exchange rate	Pesos/\$	50.9	78.8	98.7	161.1	193.0	219.5
b. Equilibrium exchange rate	Pesos/\$	94.1	108.3	125.6	151.6	185.5	217.5
c. Exchange rate transfer (2a-2b)*1b*A/1,000	Mil. pesos	-1,518.1	-1,375.4	-1,696.9	401.6	506.2	176.4
3. Infrastructural support	Mil. pesos	102.4	321.9	548.0	908.4	1,229.7	1,193.4
E. Total policy transfers:							
1. Total (1e+1f+1g+1h+2c+3)	Mil. pesos	-1,215.5	1,117.5	4,406.2	15,233.2	12,245.0	13,711.6
2. Producer subsidy equivalents (E1/C)*100	Pct.	-67.1	21.5	50.4	109.9	58.8	50.1

-- = Not applicable.

¹ Refined sugar production was calculated as 0.143 multiplied by sugar beet production.² Refined sugar price was calculated as 6.793 multiplied by sugar beet price.

Appendix table 7--Rape oil: Calculation of Chilean producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Production ¹	1,000 MT	5.6	1.2	1.7	13.4	40.8	39.9
B. Average producer price ²	Pesos/MT	22,619.1	33,805.8	68,280.5	108,135.1	114,067.6	124,702.4
C. Producer value (A*B)/1,000	Mil. pesos	125.5	41.6	117.4	1,449.0	4,651.7	4,980.6
D. Policy transfers to producers:							
1. Price transfers--							
a. Average producer price	Pesos/MT	22,619.1	33,805.8	68,280.5	108,135.1	114,067.6	124,702.4
b. Reference price	\$/MT	496.10	534.10	781.40	644.00	400.00	399.00
c. Surtax	\$/MT	--	--	--	--	--	--
d. Tariff	Pct.	10.0	18.0	24.2	25.0	20.0	20.0
e. Minimum price transfer (1a-(1b*2a))*A/1,000	Mil. pesos	--	--	-15.2	59.0	1,503.1	1,482.1
f. Marketing board transfer (1a-(1b*2a))*A/1,000	Mil. pesos	--	--	--	--	--	--
g. Surtax transfer (1c*2a)*A/1,000	Mil. pesos	--	--	--	--	--	--
h. Tariff transfers (1d*(1b*2a))*A/1,000	Mil. pesos	14.0	9.3	32.0	355.2	629.7	699.8
2. Exchange rate adjustment--							
a. Official exchange rate	Pesos/\$	50.9	78.8	98.7	161.1	193.0	219.5
b. Equilibrium exchange rate	Pesos/\$	94.1	108.3	125.6	151.6	185.5	217.5
c. Exchange rate transfer (2a-2b)*1b*A/1,000	Mil. pesos	-118.9	-19.3	-36.2	81.8	123.5	32.8
3. Infrastructural support	Mil. pesos	7.1	2.6	7.4	94.9	274.6	217.1
E. Total policy transfers:							
1. Total (1e+1f+1g+1h+2c+3)	Mil. pesos	-97.8	-7.4	-12.0	590.9	2,530.9	2,431.8
2. Producer subsidy equivalents (E1/C)*100	Pct.	-77.9	-17.8	-10.2	40.8	54.4	48.8

-- = Not applicable.

¹ Rape oil production was calculated as 0.42 multiplied by rapeseed production.² Rape oil producer price was calculated as 2.381 multiplied by rapeseed producer price.

Appendix table 8--Apples: Calculation of Chilean producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Production	1,000 MT	345.0	365.0	410.0	425.0	515.0	550.0
B. Average producer price	Pesos/MT	11,141.7	14,897.5	10,569.2	21,009.2	23,464.2	31,639.3
C. Producer value (A*B)/1,000	Mil. pesos	3,843.9	5,437.6	4,333.4	8,928.9	12,084.1	17,401.1
D. Policy transfers to producers:							
1. Price transfers--							
a. Average producer price	Pesos/MT	11,141.7	14,897.5	10,569.2	21,009.2	23,464.2	31,638.3
b. Reference price	\$/MT	392.33	323.21	326.72	336.94	363.94	428.45
c. Surtax	\$/MT	--	--	--	--	--	--
d. Tariff	Pct.	10.0	18.0	24.2	25.6	20.0	20.0
e. Minimum price transfer (1a-(1b*2a))*A/1,000	Mil. pesos	--	--	--	--	--	--
f. Marketing board transfer (1a-(1b*2a))*A/1,000	Mil. pesos	--	--	--	--	--	--
g. Surtax transfer (1c*2a)*A/1,000	Mil. pesos	--	--	--	--	--	--
h. Tariff transfers (1d*(1b*2a))*A/1,000	Mil. pesos	--	--	--	--	--	--
2. Exchange rate adjustment--							
a. Official exchange rate	Pesos/\$	50.9	78.8	98.7	161.1	193.0	219.5
b. Equilibrium exchange rate	Pesos/\$	94.1	108.3	125.6	151.6	185.5	217.5
c. Exchange rate transfer (2a-2b)*1b*A/1,000	Mil. pesos	-5,843.3	-3,469.6	-3,608.8	1,356.4	1,418.8	485.4
3. Infrastructural support	Mil. pesos	325.8	505.3	407.6	877.5	1,069.8	1,137.6
E. Total policy transfers:							
1. Total (1e+1f+1g+1h+2c+3)	Mil. pesos	-5,517.5	-2,964.2	-3,201.2	2,233.9	2,488.7	1,623.1
2. Producer subsidy equivalents (E1/C)*100	Pct.	-143.5	-54.5	-73.9	25.0	20.6	9.3

-- = Not applicable.

Appendix table 9--Table grapes: Calculation of Chilean producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Production	1,000 MT	162.7	196.4	225.0	276.2	307.5	370.0
B. Average producer price	Pesos/MT	10,345.6	16,895.5	23,262.5	24,332.7	43,173.0	68,121.8
C. Producer value (A*B)/1,000	Mil. pesos	1,683.0	3,318.3	5,234.1	6,720.7	13,275.7	25,205.1
D. Policy transfers to producers:							
1. Price transfers--							
a. Average producer price	Pesos/MT	10,345.6	16,895.5	23,262.5	24,332.7	43,173.0	68,121.8
b. Reference price	\$/MT	757.56	674.69	947.01	971.15	1,073.41	1,015.32
c. Surtax	\$/MT	--	--	--	--	--	--
d. Tariff	Pct.	10.0	18.0	24.2	25.6	20.0	20.0
e. Minimum price transfer (1a-(1b*2a))*A/1,000	Mil. pesos	--	--	--	--	--	--
f. Marketing board transfer (1a-(1b*2a))*A/1,000	Mil. pesos	--	--	--	--	--	--
g. Surtax transfer (1c*2a)*A/1,000	Mil. pesos	--	--	--	--	--	--
h. Tariff transfers (1d*(1b*2a))*A/1,000	Mil. pesos	--	--	--	--	--	--
2. Exchange rate adjustment--							
a. Official exchange rate	Pesos/\$	50.9	78.8	98.7	161.1	193.0	219.5
b. Equilibrium exchange rate	Pesos/\$	94.1	108.3	125.6	151.6	185.5	217.5
c. Exchange rate transfer (2a-2b)*1b*A/1,000	Mil. pesos	-5,320.2	-3,897.1	-5,740.3	2,542.8	2,498.7	773.9
3. Infrastructural support	Mil. pesos	142.6	308.4	492.3	660.5	1,175.3	1,647.8
E. Total policy transfers:							
1. Total (1e+1f+1g+1h+2c+3)	Mil. pesos	-5,177.6	-3,588.7	-5,248.0	3,203.3	3,674.0	2,421.7
2. Producer subsidy equivalents (E1/C)*100	Pct.	-307.6	-108.1	-100.3	47.7	27.7	9.6

-- = Not applicable.

COLOMBIA

Carl Mabbs-Zeno and Maria-Elena Pomar

Introduction

This study estimates the effects of government policies on producers and consumers of important traded commodities in Colombia. We use producer and consumer subsidy equivalents to indicate how well these policies have supported some of the government's goals through time, which policies have the largest effects, and how the costs and benefits of these policies were distributed among commodity markets. We conclude with some implications of policy reform as it is likely to occur in Colombia in the near future.

Economic and Agricultural Developments, 1982-87

The performance of the Colombian economy is tied closely to the coffee market. While the agricultural sector accounts for slightly more than 20 percent of Colombia's gross domestic product (GDP), coffee alone provides over 35 percent of foreign exchange earnings. High coffee prices in 1977-79 gave Colombia an opportunity to build up its exchange reserves and allowed the country to avoid the debt rescheduling and recession that most Latin American countries experienced in the early 1980's.

In 1982, however, a worldwide recession reduced international prices for many agricultural commodities, including coffee. Overall economic growth was also disrupted by the guerrilla activity associated with the processing and trafficking of narcotics. Guerrilla activities interfered with both petroleum and agricultural production, while burdening the government budget with increasing efforts to constrain the narcotics industry.

In view of its growing balance-of-payments deficit the new government embarked on an austerity program in 1982 that featured reduced government expenditures and increased market protection. The government also increased the rate of the devaluation of the peso against the dollar. Both the general economy and the agricultural sector recorded meager growth rates through 1985, but by the end of 1985, the Government of Colombia (GOC) had succeeded in reducing the public sector deficit from 7.5 percent to 3.7 percent of GDP.

In 1985-86, coffee prices rose strongly, raising international reserves and permitting the government to redirect its policies. The government's primary objective was to achieve stable economic growth. A key strategy for obtaining this goal was to develop sources of government revenue that were less volatile than those derived from the international coffee market. The GOC relaxed the 1982-84 trade restrictions and began to invest in activities to encourage export growth and diversification.

Colombia's real GDP grew by more than 5 percent in both 1986 and 1987 as a result of the coffee boom and the GOC's policies. Both the coal and oil industries grew significantly and, as of 1986, began to contribute to exports. The agricultural sector also recorded increased growth rates in both 1986 and 1987. Production growth (excluding coffee) exceeding 4 percent was achieved through a mix of policies aimed at stimulating agricultural growth. Increased production of both food and export crops contributed to the healthy growth rates.

Although coffee prices fell in 1989, the value of Colombia's agricultural exports grew by 6 percent. The increase in the export value of cocoa beans, sugar, tropical fruits, cut flowers, beef, and other commodities offset declining coffee export value, validating Colombia's strategy of diversifying exports.

The outlook for future coffee export earnings has dimmed following the cessation of coffee quotas assigned by the International Coffee Organization and the simultaneous collapse of coffee prices. Negotiations on a new international agreement are proceeding, but the likelihood that quotas will be reinstated is small (17).¹

Policies in the 1980's

The GOC principally relied on two policy instruments between 1982 and 1984 to correct its growing balance-of-payments deficit: devaluation of the peso and increased import controls. In 1985, coffee prices increased, which allowed the government to redirect its policies toward export growth and diversification.

Macroeconomic and Trade Policy Developments

For many years prior to 1984, Colombia's inflation rate had exceeded most of its trading partners' inflation rates, contributing to an overvaluation of the Colombian peso. This lowered returns and hurt the agricultural sector more than other sectors. The growing balance-of-payments deficit prompted the GOC to accelerate its rate of devaluation.

Colombian policymakers also increased market protection and trade restrictions in an effort to offset increasing external imbalances at the beginning of the 1980's. The GOC had long employed a wide array of policies--tariffs, quotas, licensing, foreign exchange restrictions, and outright import bans--to protect a number of sectors, including agriculture, from foreign competition. Licensing showed a bias for manufacturing, adversely affecting the agriculture and mining sectors. The foreign exchange budget was also cut to limit imports; requests for licenses were denied when the value of imports would have exceeded the restricted foreign exchange budget. The Government increased tariffs as well. Tariffs on consumer goods typically averaged 50 percent, while raw materials and capital equipment faced tariffs

¹ Underscored numbers in parentheses are listed in the References at the end of this section.

around 20 percent. These policies achieved the GOC's goal; by the end of 1984, imports of goods had fallen more than 26 percent from 1982 levels.

After 1984, the GOC strengthened its efforts to promote export-led growth and diversification. Restrictions on import licenses were lowered, tariff rates declined, and the foreign expenditure allowance allocated for imports increased. Colombia also began to substantially depreciate its currency in real terms, allowing an expansion of the tradable sector and increasing the profitability of its exports. The total depreciation of the peso in real terms during 1984-87 was approximately 40 percent. Even though the real exchange rate has offered some stimulus to exports, incentives to noncoffee exports have been less than expected through this foreign exchange regime.

Agricultural Policy Developments

The professed policy goals of the government for the agricultural sector have been:

1. To encourage the growth of real rural income by reducing production costs and increasing competitiveness of domestic production compared with imports,
2. To ensure an adequate supply of food through the development of agricultural marketing channels, and
3. To promote agricultural exports (12).

Colombia uses a variety of private, government, and international institutions to implement its agricultural goals. International memberships include the International Coffee Organization (ICO) and the General Agreement on Tariffs and Trade (GATT), through which Colombia is currently promoting liberalization of agricultural policies globally. Private organizations include private producer federations in coffee and sugar, which cooperate with the government in setting producer prices. Other commodity markets are organized by the government-owned Agriculture Marketing Institute (IDEMA), which sets domestic prices, imports basic foodstuffs, and maintains buffer stocks of nonperishable commodities. The array of agricultural policies is grouped for analytical purposes into price and input policies. Because policy categorization is especially problematic in the coffee subsector, coffee policies are profiled separately.

Pricing Policies

Domestic price policies can only be effective if there are some border controls. Otherwise, goods from beyond the border will be attracted to price supports, and domestic goods will avoid taxation by sales abroad. Because most Colombian agricultural trade is controlled at the border through producer federations or IDEMA, price policies can be implemented.

IDEMA has a price-support program covering the purchase and sale of rice, sesame, barley, edible beans, corn, sorghum, soybeans, wheat, and cotton. IDEMA's prices

for its purchases are usually marginally higher and, in some instances, below the prices received by producers for non-IDEMA purchases.

The price support from IDEMA to grain producers is not apparent in the data before accounting for location. The prices that IDEMA paid were often below prices of imports measured at the port, but internal transportation costs were apparently high enough that the IDEMA prices were better than what an open market would have paid. The marketing board tries to reach domestic producers by purchasing their products in the producing regions rather than relying on private transportation systems.

IDEMA bought only a small portion of the soybean crop in some years, and none in other years. The rates were sometimes above and sometimes below alternative prices in the domestic market. IDEMA does not serve as a buyer of last resort in years of subsidized prices, so market prices at the margin respond to competition from the international market rather than to IDEMA purchases.

The sugar federation (ASOCANA) controls sugar prices. Because these controls are relatively free from government influence, they are not treated as government intervention in this study. This producer collusion, however, raises consumer prices to approximately three times the level of international prices. Producers apparently accept a smaller market for the higher prices. In spite of this, consumer prices in Colombia are lower than in most Latin American countries and substantially lower than consumer prices in the industrialized countries (16).

Input Policies

Over 50 percent of the fertilizers are sold to farmers by the coffee and rice producer federations and the Agricultural, Industrial, and Mining Credit Bank (Caja Agraria). The rest is sold by private distributors. Only the coffee federations subsidize farmers through lower fertilizer prices, and reduced charges for storage and transportation. Private distributors buy the fertilizers at the subsidized government price and distribute it through local retail outlets, regional warehouses for later distribution, or directly to large producers. The Caja Agraria sells a substantially smaller percentage of total fertilizers through its retail outlets.

Virtually all producers receive direct or indirect subsidized credit from the government. The two primary sources of credit for agricultural production are the Fondo Financiero Agropecuario (FFAP) and the Caja Agraria. The FFAP has the specific objectives of capitalizing the agricultural sector, expanding its productive capacity, strengthening the export sector, and alleviating food deficiencies in Colombia. Its activities tend to support larger farmers. The Caja Agraria finances a large share of the total lending for crop farming, especially to small and medium farmers. It operates at a loss even though rates charged by Caja Agraria are consistently higher than those charged by the FFAP. Subsidized credit is also available from the Banco Cafetero to medium and small coffee farmers.

Most pesticides are imported. Pesticides face a moderate tariff, raising their Colombian prices. The National Federation of Coffee Growers (FEDERACAFE), however, responded to severe rust problems on coffee by providing financial assistance for disease control. This subsidy began in 1984 and grew rapidly. Beginning in 1988 FEDERACAFE began to incorporate the coffee rust subsidy in the price it paid to producers for coffee.

Coffee Policies

International coffee trade has been regulated by treaty in most years since 1942. The ICO was formed in 1962 and has been renewed four times, most recently in 1989. This organization administered subsequent coffee agreements which often included provisions for a trade quota system that covered nearly all exporters and most importers until 1989. The system was designed to stabilize and raise coffee prices, compared with free market levels. The September 1989 agreement maintains the ICO in an administrative role and provides for future negotiations on renewal of the quota system (13).

FEDERACAFE is a private organization which, under contract to the GOC, administers the National Coffee Fund and performs other regulatory functions. FEDERACAFE controls coffee exports and stocks and regulates domestic pricing policy to comply with ICO rules. Each year, FEDERACAFE establishes a guaranteed price at which it will purchase federation-type coffee from producers. Producers may sell to FEDERACAFE, which accepts only federation-type coffee, or to private exporters who determine their own requirements for origin, blend, and quality. The actual producer price differs from the announced price in years when the processors and exporters are willing to pay more than FEDERACAFE. Although this seldom occurs, FEDERACAFE's share of exports has varied, from a low of approximately 20 percent in the mid-1970's to a high of 98 percent for the 1979/80 production year. On average, FEDERACAFE exports about 60 percent of Colombia's coffee exports.

Since 1967, coffee exporters have paid a retention tax to the producer federation in coffee beans and in cash. The tax paid by exporters in cash varies with both the price and quantity produced. Coffee exporters also pay the equivalent of 6.3 kilograms of unprocessed coffee, or its equivalent in Colombian pesos, for every 70-kilogram bag of green coffee exported. Each exporter also pays an in-kind export tax to FEDERACAFE. This is paid in the form of a quantity of low-grade coffee equivalent in weight to a specified percentage of the exported superior quality. The lower grade coffee is consumed in Colombia.

The government also levies an ad valorem tax, which is a specified percentage of the foreign exchange repatriated. The tax was gradually reduced from 26 percent in 1967 to 6.5 percent in 1989. A portion of this tax goes to the National Coffee Committees who, in turn, distribute their allocation to subcommittees at the regional level.

Prices paid to coffee growers by the producer federation, however, result from export taxes enforced by the government. The difference between the producer price on

coffee and the international price is measured here as a result of government intervention.

Current Policies

The current direction of agricultural policy favors greater food self-sufficiency for Colombia. In late 1988 and early 1989, higher support prices were announced for the major foods, including rice, corn, soybeans, and beans. Purchased input costs were lowered by reducing import duties on pesticides and agricultural machinery. Land and other input costs, however, are rising such that profitability of agriculture is not likely to improve immediately (14).

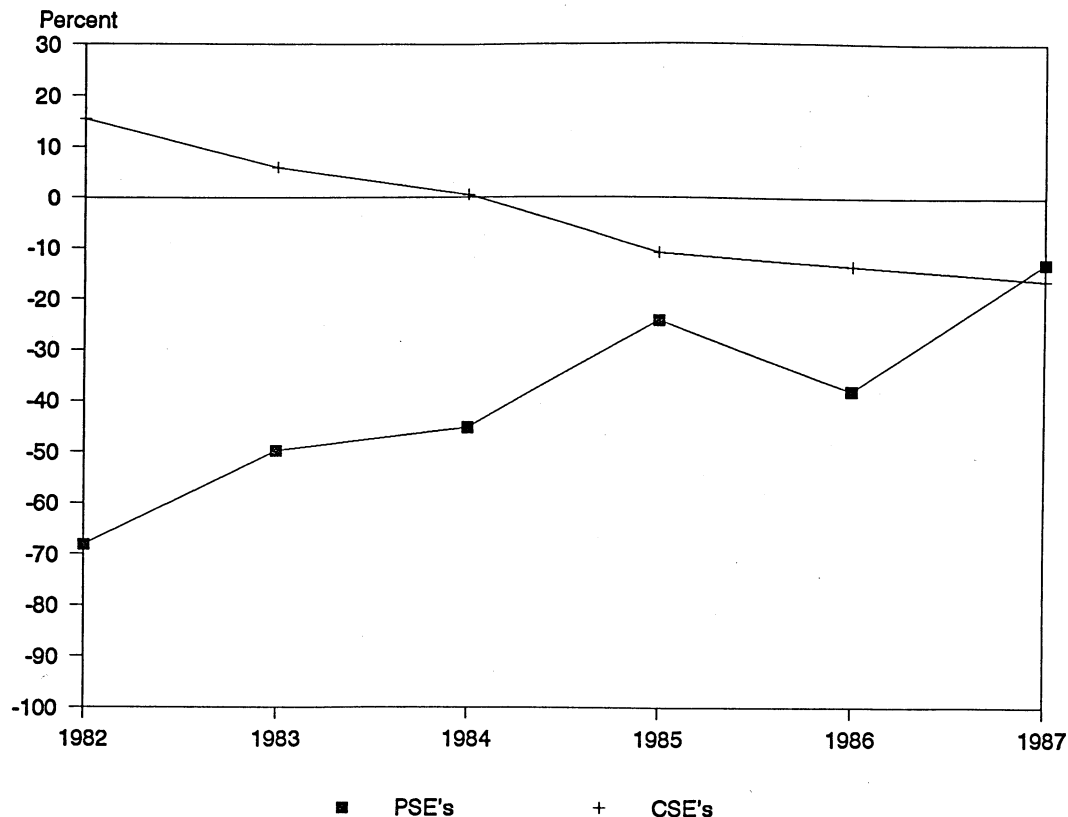
Estimation of Policy Intervention in Agriculture

The commodities that we chose for quantitative evaluation are targeted for most of the government intervention in agriculture. Because coffee is such a large portion of trade and provides most of the government revenue from agriculture, it is the most important crop to include. The producer effects were estimated, because the quality of coffee consumed in Colombia is inferior to the quality in international trade, and because coffee is relatively unimportant in consumption. Sugar was included to represent the smaller export crops. Traded food staples are represented by rice, wheat, sorghum, and soybeans. Rice is the leading cereal in Colombia, accounting for about one-half of domestic cereal production although the pressure of large wheat imports has led to attempts by the GOC to emphasize wheat production.

Sectoral Levels of Government Intervention

Government intervention in Colombia had a net taxing effect on producers of the six commodities studied. Producer tax rates averaged 32 percent of producer revenues as producer subsidy equivalents (PSE's) rose from -68 percent in 1982 to -10 percent in 1987 (fig. 1). The strong tendency for the aggregate PSE to approach zero indicates a generally declining effect of government intervention even though some programs increased their effect during 1982-87. As taxes were lifted from producers of food crops, consumers experienced, first, reduced subsidies, and then, increased taxes. The consumer subsidy equivalents (CSE's) for the commodities studied fell from over 15 percent in 1982 to -16 percent in 1987. Most of this decline in support stemmed from the continued decline in the value of the Colombian peso against the dollar, thereby reducing the Colombian consumer's purchasing power.

Figure 1
Subsidy equivalents for Colombia



PSE and CSE Results by Commodity

Coffee was the dominant commodity in establishing the pattern of net taxation of producers. Coffee producers were taxed at a rate of nearly 70 percent of producer revenue, while all other studied commodities were supported by government programs. Because coffee is such a high-valued crop, the taxes on its producers were sufficient to offset the effects on the other crops combined. The tax effect on coffee declined or was nearly unchanged each year, except 1986, accounting for the same pattern in the combined PSE of all crops (fig. 2a).

In contrast to coffee producers, producers of the other commodities were rarely taxed (fig. 2b). Soybean producers were supported throughout the study period. Their support approximately doubled in real terms, ending the period with an annual average value of \$27 million and a PSE of over 60 percent. PSE's for the other four commodities all rose from moderate taxing levels in 1982, became positive in 1983 and 1984, and concluded the period with moderate subsidies (table 1).

Soybean consumers (processors) experienced a substantially increased taxing effect in 1986 and 1987 due to higher tariff rates. Sugar, wheat, and sorghum CSE's all declined from similar low positive levels in 1982, became negative in 1985, and ended the period reflecting a moderate taxing effect. Their similarity derives from the

Figure 2a
Colombia: Total transfers to coffee producers

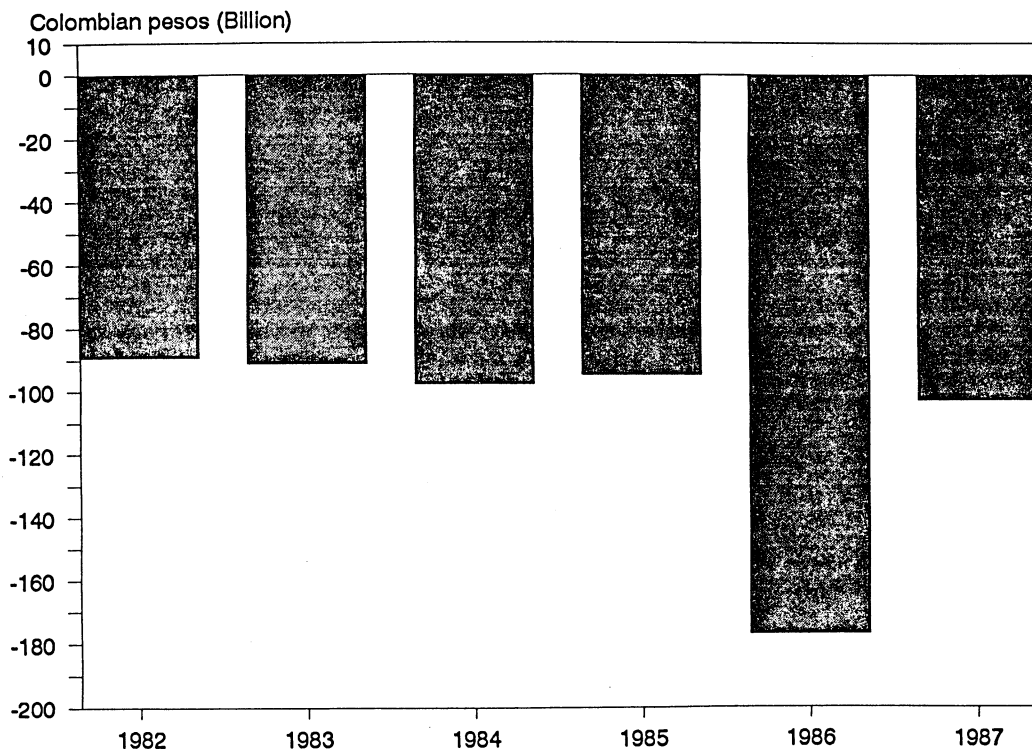


Figure 2b
Colombia: Total transfers to producers by commodity

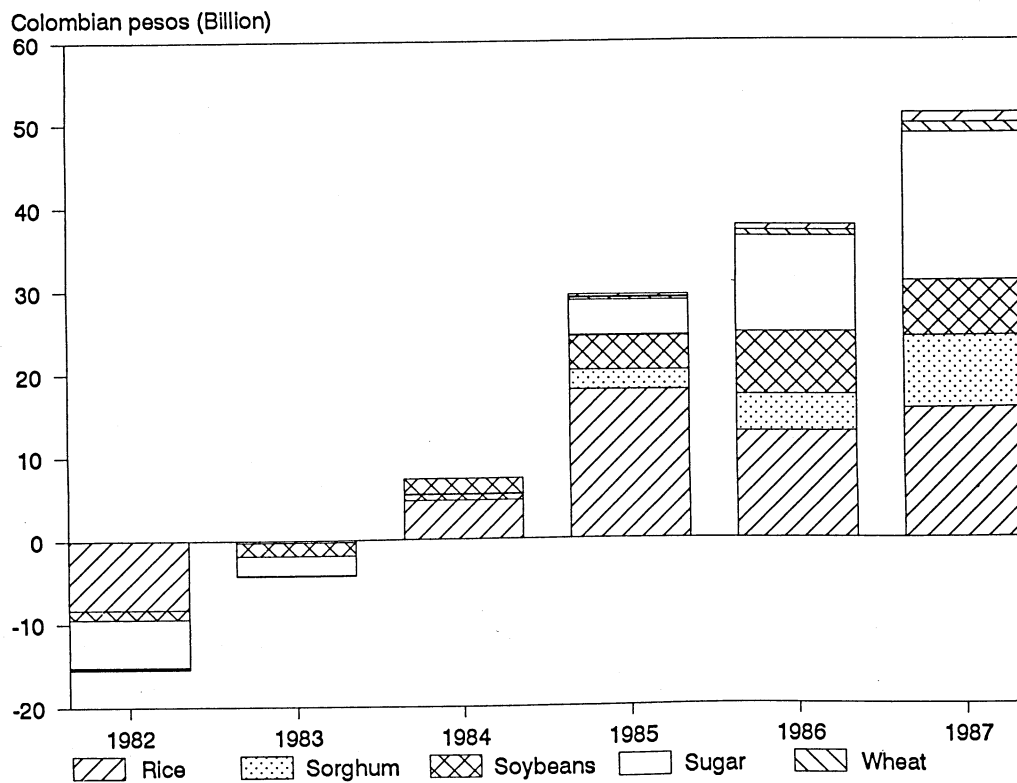


Table 1--Summary of Colombian PSE's and CSE's

Item	1982	1983	1984	1985	1986	1987
	<u>Percent</u>					
Coffee:						
PSE	-107.2	-88.6	-93.2	-65.4	-81.8	-34.7
Rice:						
PSE	-29.5	-5.0	12.7	38.8	25.3	19.2
CSE	16.6	5.8	-4.1	-16.3	-10.1	-10.2
Sorghum:						
PSE	-8.5	-1.5	-.3	16.0	22.4	25.7
CSE	15.0	6.8	5.0	-10.0	-19.3	-21.8
Soybeans:						
PSE	39.3	37.2	53.2	68.0	66.0	63.0
CSE	13.1	7.0	1.8	-11.7	-23.1	-38.4
Sugar:						
PSE	-24.4	-10.2	-4.6	7.5	17.4	21.0
CSE	14.0	6.9	3.5	-5.5	-12.8	-15.6
Wheat:						
PSE	-11.9	-2.7	-.9	13.6	19.3	30.2
CSE	13.2	3.8	3.5	-7.0	-17.3	-17.9
Six-commodity aggregate PSE	-68.1	-49.9	-45.3	-24.1	-38.0	-10.4
Five-commodity aggregate CSE	15.5	6.0	.4	-10.9	-13.4	-16.3

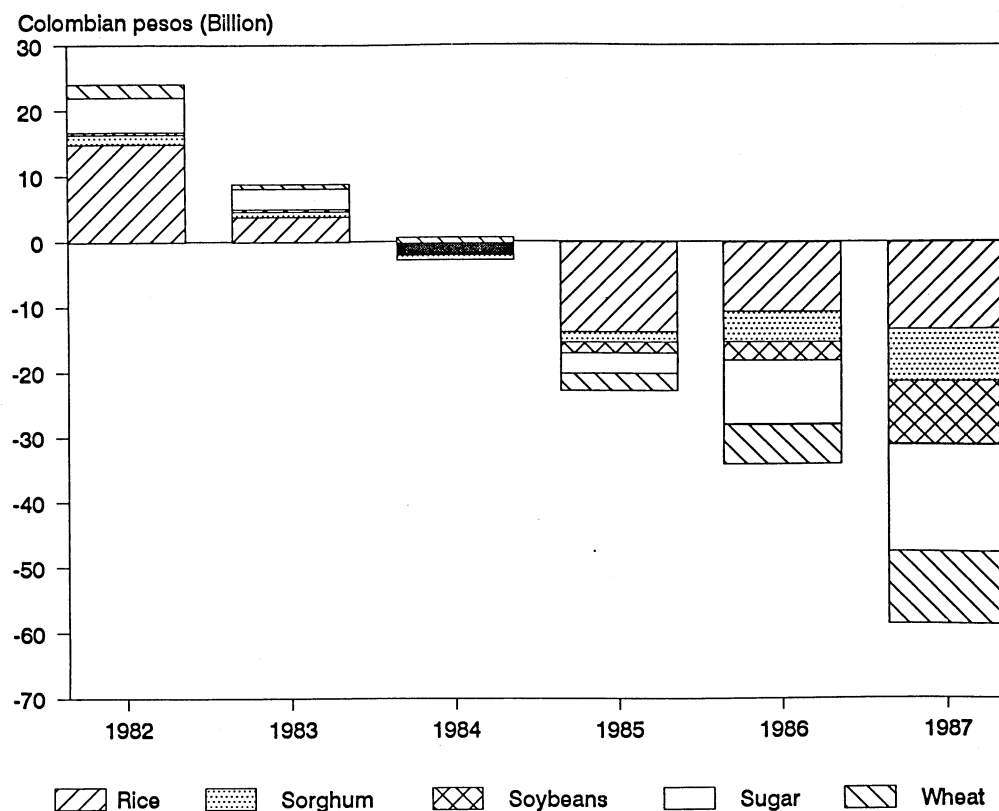
importance of exchange rate policy to the CSE's in these commodities. Rice CSE's declined sharply in 1983-85 when export subsidies took effect. In other years, Colombia did not export rice, and the rice CSE was highest of the commodities studied (fig. 3).

PSE and CSE Results by Policy

In 1982-83, foreign exchange policies were the most influential of the seven types of policies studied for producers (table 2). Price policies had the greatest effect during 1984-87, but both policies were important in all years. These two policies averaged 10 times the effect of any of the other five policies.

Because the Colombian peso switched from overvalued to undervalued in 1985, the foreign exchange policy before 1985 favored consumers by lowering the price of traded commodities, and favored producers after 1985. The effect of foreign exchange controls extended uniformly across all tradable commodities, including those outside agriculture. Unlike other policies, foreign exchange policy adjustments affected the competitiveness of specific agricultural commodities only in relation to nontradable domestic commodities as a group or tradable foreign commodities as a group.

Figure 3
Colombia: Total transfers to consumers by commodity



Price control policy demonstrated the government's bias among commodities. Soybean producers received substantial support through price controls, while coffee producers were heavily taxed. The support to food crop producers showed little pattern across time, although the price controls apparently served to stabilize prices compared with variation in their international counterparts. The effective tax on coffee producers, however, increased in real terms every year except 1987.

Under the assumption that consumer prices were not directly affected by producer price control policies, only three policy categories were considered for consumers. Frequently the effect of tariffs on consumers was larger than that from foreign exchange controls after 1983 (table 3). The effect of export subsidies is relatively small.

Table 2—Colombian PSE's by policy component

Item	1982	1983	1984	1985	1986	1987
	<u>Percent</u>					
Coffee:						
Price policy	-45.4	-49.3	-66.2	-84.2	-122.1	-67.0
Foreign exchange	-70.5	-45.3	-33.7	14.3	36.5	28.2
Fertilizer subsidy	8.5	5.4	6.0	3.4	1.9	1.1
Credit subsidy	.3	.5	.4	.3	.1	.1
Disease control	0	0	.3	.8	1.8	2.8
Total	-107.1	-88.7	-93.2	-65.4	-81.8	-34.7
Rice:						
Price control	.4	.1	0	-.3	-0	-.1
Foreign exchange	-35.8	-21.3	-13.9	5.5	19.1	16.0
Credit subsidy	4.0	3.5	3.8	4.0	2.8	3.0
Export subsidy	0	10.8	20.9	25.0	0	0
Total	-29.5	-5.0	12.7	38.8	25.3	19.2
Sorghum:						
Price control	.4	.1	0	-.3	-0	-.1
Foreign exchange	-22.5	-16.8	-11.4	4.1	8.8	6.8
Tariff	7.4	10.1	6.4	5.9	10.5	15.0
Credit subsidy	4.4	2.8	4.6	5.4	2.7	4.0
Total	-8.6	-1.5	-.3	16.0	22.4	25.7
Soybeans:						
Price control	50.4	41.5	50.5	51.0	40.0	22.0
Foreign exchange	-23.5	-16.5	-9.9	3.8	8.9	9.6
Tariff	8.3	9.3	8.2	8.2	14.7	27.5
Credit subsidy	4.4	2.8	4.6	5.4	2.7	4.0
Total	39.6	37.1	53.3	68.5	66.2	63.2
Sugar:						
Foreign exchange	-24.5	-16.5	-10.7	3.0	10.8	13.1
Credit subsidy	.1	.2	.2	.1	.1	.1
Export subsidy	0	6.2	5.9	4.3	6.5	7.8
Total	-24.5	-10.2	-4.6	7.5	17.4	21.0
Wheat:						
Price control	4.4	3.1	3.1	2.0	-.2	2.1
Foreign exchange	-27.2	-17.4	-11.9	4.4	8.7	8.6
Credit subsidy	1.7	1.1	1.3	1.0	.5	.7
Tariff	8.9	10.4	6.6	6.3	10.4	18.9
Total	-12.2	-2.8	-.9	13.6	19.5	30.3
Six-commodity aggregate:						
Price policy	-23.2	-25.2	-32.5	-43.0	-70.0	-38.4
Foreign exchange	-51.5	-32.8	-23.2	9.6	26.9	21.8
Fertilizer subsidy	4.6	2.9	3.1	1.8	1.1	0.7
Credit subsidy	1.4	1.3	1.4	1.3	0.7	0.9
Disease control	0.0	0.0	0.2	0.4	1.1	1.6
Export subsidy	0.0	3.1	5.1	5.2	1.2	1.3
Tariff	0.6	0.9	0.6	0.6	1.1	1.7
Total	-68.1	-49.9	-45.3	-24.1	-38.0	-10.4

Table 3—Colombian CSE's by policy component

Item	1982	1983	1984	1985	1986	1987
	<u>Percent</u>					
Rice:						
Foreign exchange	16.6	11.7	8.0	-2.9	-10.1	-10.2
Export subsidy	0	-6.0	-12.1	-13.4	0	0
Total	16.6	5.8	-4.1	-16.3	-10.1	-10.2
Sorghum:						
Foreign exchange	22.4	16.9	11.4	-4.1	-8.8	-6.8
Tariff	-7.3	-10.1	-6.4	-5.9	-10.5	-14.9
Total	15.0	6.8	5.0	-10.0	-19.3	-21.7
Soybeans:						
Foreign exchange	20.2	15.8	10.2	-3.7	-8.7	-10.0
Tariff	-7.1	-8.9	-8.5	-7.9	-14.4	-28.4
Total	13.1	7.0	1.8	-11.7	-23.1	-38.4
Sugar:						
Foreign exchange	14.0	11.0	7.8	-2.3	-8.0	-9.8
Export subsidy	0	-4.1	-4.3	-3.2	-4.8	-5.8
Total	14.0	6.9	3.5	-5.5	-12.8	-15.6
Wheat:						
Foreign exchange	19.2	10.9	8.0	-2.7	-7.8	-4.8
Tariff	-6.0	-7.1	-4.5	-4.3	-9.6	-13.0
Total	13.2	3.8	3.5	-7.0	-17.3	-17.9
Five-commodity aggregate:						
Foreign exchange	16.7	11.9	8.4	-2.8	-9.0	-8.8
Export subsidy	-1.2	-2.1	-1.7	-1.8	-3.0	-5.8
Tariff	0	-3.9	-6.2	-6.3	-1.5	-1.7
Total	15.5	6.0	.4	-10.9	-13.4	-16.3

Conclusion

The measures of government intervention in Colombian agriculture facilitate analysis of policy reform. Several forms of reduced intervention are suggested by developments in the late 1980's. First, Colombia faces pressures to reduce its intervention as a result of conditional lending or rescheduling of loans with the World Bank and other international lenders. Second, Colombia must reconsider its government intervention in response to a reduced role for the International Coffee Organization. Third, Colombia might reduce its support of temperate products as a result of global agricultural liberalization negotiations through the GATT.

Unilateral liberalization of agriculture in 1987 would have altered the revenue of producers by the amounts estimated in the 1987 PSE's and of consumers by the amounts indicated by the 1987 CSE's. Liberalization would have aided food consumers and coffee producers, while harming other producers. The effect of liberalizing in the future depends, however, not only on the pattern of subsidy equivalents but also on future international price levels. Subsidy equivalents fail to indicate how much producers and consumers adjust the quantity they produce or consume with altered incentives. If coffee prices were to increase, for example,

producers would likely produce more and benefit by more than the amount indicated by the previous PSE level. To the extent that the most recent PSE indicates current policies and future international prices, it indicates the shortrun effects of unilateral liberalization on producers.

Liberalization by all countries would differ from unilateral liberalization mainly because world prices of commodities that Colombia trades heavily would be affected. In the case of coffee, a model of the global market indicates that multilateral liberalization would bring prices low enough that Colombia's trade revenues would decline. Colombian coffee farmers would greatly increase their revenue in a liberalized environment, but government revenue would, by definition, be zero (11). Despite the widespread tendency toward reduced government intervention in agriculture, there is considerable economic incentive for coffee-producing nations to collude to hold up coffee prices.

Agricultural liberalization emerging from the GATT may require that governments cease trade-distorting support of temperate products. Some of Colombia's input subsidies might be defended as support that is not distorting, but most of the agricultural support would likely not be acceptable.² The loss of these subsidies would be minor compared to the effect within Colombia of liberalization by the world's major exporters and liberalization of the sugar market.³ Global liberalization would raise international prices, raising the food import bill and, in turn, making imports less competitive with domestic production (10).

² Foreign exchange policy is usually not treated by the GATT.

³ Although cane sugar is a tropical product, it competes with sugar beets and is included with temperate products in the GATT.

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Methodology Appendix

The PSE's and CSE's are estimated using two basic procedures. When an intervention incurs either GOC costs or revenues, the budgetary effect of the program is used as an estimate of the effect on producers or consumers. Second, when the producer or consumer price differs from the international price because of policies by the GOC, the price difference is multiplied by the quantity of production or consumption to estimate the subsidy equivalent of those programs. For example, a 10-percent tariff on corn would have raised producer and consumer prices of corn by 10 percent of the border price. The difference between the domestic and border price of corn multiplied by the quantity of production yields a positive PSE. Multiplying the quantity of consumption by the difference between the border and domestic price of the same commodity yields a negative CSE, but of a different magnitude than the PSE.

Estimates of subsidy equivalents for price policies, foreign exchange policy, tariffs, and export subsidies were based on price effects. Estimates for input subsidies, including credit fertilizer and disease control, were based on budgetary effects. Procedures varied among commodities because programs and data varied among commodities.

Price Policies

Domestic producer prices were compared with international prices for coffee, rice, sorghum, soybeans, and wheat. Sugar PSE's contained no price policy component because the export subsidy was assumed to account for all price effects of government intervention. Dollar prices used internationally were converted to local currency using official exchange rates (8).

The price difference for coffee was observed at the border by comparing export unit values for green coffee with producer prices for parchment (6). Parchment prices were expressed on a green coffee basis by assuming a ratio of 0.8 for parchment to green coffee by weight with the cost of processing offset by the salvage value of the waste.

The international price of rice was observed in Thailand because Thai rice best represents the quality of rice exported from Colombia (8). A 10-percent cost for transportation was assumed for Thai rice to compete in the regional markets served by Colombia.

The international price for sorghum was based on the f.o.b. gulf ports price for U.S. No. 2 yellow sorghum (8); the transportation cost from the gulf to Colombia was added to yield a border price (5). The international price for wheat was also based on gulf port prices plus ocean freight rates. Domestic prices were not adjusted for internal transportation cost because costs from farms to consumers of domestic production were assumed to offset costs from the port to consumers of imports.

C.i.f. Rotterdam prices were used for international soybean prices (8). No further adjustment for transportation was made under the assumption that costs to Colombia

from exporting nations would be equal to those to Rotterdam. Again, internal transportation costs for soybeans were assumed similar for imports and domestic products. Producer prices were reported by the U.S. Department of Agriculture (USDA) (14).

Foreign Exchange Controls

The level of overvaluation was estimated based on measurements of the equilibrium exchange rate by Garcia and Llamas (4). Their estimates were used for 1982-83, but because their data ended in 1983, subsequent years were assessed by comparing changes in inflation with changes in the official exchange rate. For each year, the change in percent overvaluation of the Colombian peso was assumed equal to the percentage change in the equilibrium value of the peso due to inflation compared with the percentage change in official value (8). Inflation was measured as the change in the Colombian consumer price index compared with the change in the U.S. consumer price index (8).

The percent overvaluation (or undervaluation) was multiplied by the production or consumption value to show the effect of exchange controls. Overvaluation was represented as a negative effect on producers and as a positive effect on consumers.

Coffee Fertilizer Subsidy

The value of the fertilizer subsidy was imputed from the price reduction observed between international nitrogen prices (8) and prices in Colombia (14). The price difference was multiplied by use in coffee production (3). This is an estimate of the public cost of fertilizer subsidy as well as an estimate of the value to producers.

Credit Subsidy

The subsidy rate on credit was estimated by comparing the commercial interest rate in Colombia (18) with the interest rate applied by the Agricultural Finance Fund (2). The amount lent was calculated as the sum of the lending to producers of each crop by the Agricultural, Industrial, and Mining Credit Bank, and the Agricultural Finance Fund (7).

Tariffs

Tariff rates for the imported commodities (sorghum, soybeans, and wheat), were reported by USDA (14). These rates were multiplied by the border price and the quantity of production to determine their benefit to producers. The same tariff rates were multiplied by the border price and the quantity of consumption to determine their cost to consumers.

Export Subsidies

When rice and sugar were exported, the export subsidy to producers was calculated by multiplying the subsidy rate (14) by the border price and the quantity of production

for each commodity. The cost of the export subsidies to consumers is the same subsidy rate multiplied by the border price and the quantity of consumption.

Coffee Disease Control

The subsidy cost for disease control on coffee and, presumably, the benefit to producers was reported by FEDERACAFE (3).

Appendix table 1--Calculation of Colombian producer subsidy equivalents

Item	Unit	Description and sources
A. Area harvested	1,000 ha	Sources: coffee (14); all other commodities (5).
B. Production	1,000 tons	Sources: coffee (6); rice (5); sugar (1); all other commodities (5).
C. Average producer price	Pesos/ton	Sources: rice and coffee (6); soybeans (14); sorghum and wheat (5); sugar (1).
D. Producer value (B*C)/1,000	Mil. pesos	
E. Policy transfers to producers:		
1. Price policy--		
a. Border price	Pesos/ton	Coffee: Unit value of marketing year (Oct.-Sept.), green coffee exports. Rice: f.o.b. (Bangkok) price plus 10-percent premium to account for transportation costs. Sorghum: f.o.b. (gulf) price for No. 2 yellow plus 1985 ocean freight rate. Soybeans: c.i.f. (Rotterdam) price. Wheat: f.o.b. (gulf) price for Hard Red Winter wheat plus 1985 ocean freight rates. All prices converted from dollars to pesos using the official exchange rate. Sources: prices coffee (6); rice (5); all others (8); ocean freight charges (5).
b. Price support (C-1a)*B/1,000	Mil. pesos	Rice, wheat, and sorghum subsidy on IDEMA purchases only. No price support on sugar. A 20-percent marketing cost was added to the farmgate price to estimate the producer price at the border for coffee. A 13-percent marketing cost was used for soybeans. Tariffs were subtracted from the price wedge for soybeans.
2. Foreign exchange policy--		
a. Official exchange rate	Pesos/U.S. \$	Source: (8).
b. Equilibrium exchange rate	Pesos/U.S. \$	Source: 1982-83, (4); 1984-87, ERS estimates based on a comparison of the consumer price indices of the United States and Colombia. Source: CPI (8).
c. Foreign exchange subsidy (2a-2b) *(1a/2a)*B/1,000	Mil. pesos	
3. Fertilizer subsidy--		
a. Border price	Pesos/ton	Source: (8).
b. Domestic price	Pesos/ton	Source: (14).
c. Fertilizer use	Mil. tons	Source: coffee (3).
d. Fertilizer subsidy (3a-3b)*3c	Mil. pesos	
4. Credit--		
a. Commercial interest rate	Pct.	Source: (2). CDT rate.
b. Agricultural interest rate	Pct.	Agricultural Finance Fund rate. Source: (2).
c. Principal loaned	Mil. pesos	Sum of loans by crop from FFAP and Caja Agraria. Source: (7).
d. Credit subsidy 4c*(4a-4b)/100	Mil. pesos	
5. Tariffs--		
a. Tariff rate	Pct.	For sorghum, soybeans, and wheat. Source: (14).
b. Tariff subsidy (5a/100)*1a*B/1,000	Mil. pesos	
6. Export subsidy--		
a. Subsidy rate	Pct.	For rice and sugar. Source: (14).
b. Export subsidy (6a/100)*1a*B/1,000	Mil. pesos	In years with exports only. A 10-percent marketing cost was subtracted from the international price of rice to give the border price.
7. Disease control subsidy	Mil. pesos	Source: coffee (3).
F. Total transfers to producers:		
1. Total (1b+2c+3d+4d+5b+6b+7)	Mil. pesos	
2. Producer subsidy equivalents (F1/D)*100		

Appendix table 2--Coffee: Calculation of Colombian producer subsidy equivalents¹

Item	Unit	1982	1983	1984	1985	1986	1987
A. Area harvested	1,000 ha	955	955	945	930	925	992
B. Production ²	1,000 tons	739	778	662	706	645	792
C. Average producer price ³	Pesos/ton	112,550	131,640	157,570	204,000	334,560	374,380
D. Producer value (B*C)/1,000	Mil. pesos	83,190	102,434	104,327	143,991	215,871	296,509
E. Policy transfers to producers:							
1. Price policy--							
a. Border price	Pesos/ton	186,214	222,801	293,371	416,535	810,173	700,143
b. Price support $(1.2*C-1a)*B/1,000$	Mil. pesos	-37,811	-50,449	-69,049	-121,218	-263,710	-198,703
2. Foreign exchange policy--							
a. Official exchange rate	Pesos/U.S. \$	64	79	101	142	194	243
b. Equilibrium exchange rate	Pesos/U.S. \$	91	100	119	132	165	206
c. Foreign exchange subsidy $(2a-2b)*(1a/2a)*B/1,000$	Mil. pesos	-58,623	-46,430	-35,196	20,613	78,862	83,730
3. Fertilizer subsidy--							
a. Border price	Pesos/ton	57,931	50,790	58,448	53,972	44,938	48,979
b. Domestic price	Pesos/ton	15,400	19,250	23,545	29,196	30,600	38,250
c. Fertilizer use	Mil. tons	166	177	180	197	281	313
d. Fertilizer subsidy $(3a-3b)*3c/1,000$	Mil. pesos	7,076	5,567	6,266	4,874	4,026	3,358
4. Credit--							
a. Commercial interest rate	Pct.	12.6	14.5	18.0	14.2	11.7	6.9
b. Agricultural interest rate	Pct.	0.1	4.4	6.1	1.7	4.7	-3.7
c. Principal loaned	Mil. pesos	1,746	5,066	3,585	3,162	3,018	3,294
d. Credit subsidy $4c*(4a-4b)/100$	Mil. pesos	218	512	427	395	211	349
5. Tariffs--							
a. Tariff rate	Pct.	--	--	--	--	--	--
b. Tariff subsidy $(5a/100)*1a*B/1,000$	Mil. pesos	--	--	--	--	--	--
6. Export subsidy--							
a. Subsidy rate	Pct.	--	--	--	--	--	--
b. Export subsidy $(6a/100)*1a*B/1,000$	Mil. pesos	--	--	--	--	--	--
7. Disease control subsidy	Mil. pesos	--	--	362	1,098	3,962	8,365
F. Total transfers to producers:							
1. Total $(1b+2c+3d+4d+5b+6b+7)$	Mil. pesos	-89,139	-90,800	-97,190	-94,238	-176,649	-102,900
2. Producer subsidy equivalents $(F1/D)*100$	Pct.	-107.1	-88.7	-93.2	-65.4	-81.8	-34.7

-- = Not applicable.

¹ All data are on a green coffee basis.² Bags of green coffee were converted to tons by multiplying by 0.06.³ Average quarterly prices of parchment coffee on a per ton basis were multiplied by 0.8 so that parchment coffee prices could be converted to prices of green coffee per ton.

Appendix table 3--Milled rice: Calculation of Colombian producer subsidy equivalents¹

Item	Unit	1982	1983	1984	1985	1986	1987
A. Area harvested ¹	1,000 ha	386	336	304	326	303	353
B. Production ²	1,000 tons	1,253	1,099	1,044	1,110	1,018	1,171
C. Average producer price ³	Pesos/ton	23,462	29,231	36,062	41,496	50,000	69,231
D. Producer value (B*C)/1,000	Mil. pesos	29,405	32,116	37,640	46,074	50,921	81,059
E. Policy transfers to producers:							
1. Price policy--							
a. IDEMA price (paddy basis)	Pesos/ton	18,044	21,791	24,861	29,340	36,178	45,557
b. Producer price (paddy basis)	Pesos/ton	15,250	19,000	23,400	26,973	32,500	45,000
c. IDEMA purchases (paddy basis)	1,000 tons	242	223	499	831	477	429
d. Price support (1a-1b)*1c/1,000	Mil. pesos	676	622	709	1968	1756	239
2. Foreign exchange policy--							
a. Official exchange rate	Pesos/U.S. \$	64	79	101	142	194	243
b. Equilibrium exchange rate	Pesos/U.S. \$	91	100	119	132	165	206
c. Border price	U.S.\$/ton	308	294	274	230	325	302
d. Foreign exchange subsidy (2a-2b)*2c*B/1,000	Mil. pesos	-10,537	-6,832	-5,216	2,543	9,714	12,942
3. Fertilizer subsidy--							
a. Border price	Pesos/ton	--	--	--	--	--	--
b. Domestic price	Pesos/ton	--	--	--	--	--	--
c. Fertilizer use	Mil. tons	--	--	--	--	--	--
d. Fertilizer subsidy (3a-3b)*3c	Mil. pesos	--	--	--	--	--	--
4. Credit--							
a. Commercial interest rate	Pct.	12.6	14.5	18.0	14.2	11.7	6.9
b. Agricultural interest rate	Pct.	0.1	4.4	6.1	1.7	4.7	-3.7
c. Principal loaned	Mil. pesos	9,221	11,201	11,941	14,750	20,181	22,611
d. Credit subsidy 4c*(4a-4b)/100	Mil. pesos	1,190	1,131	1,421	1,844	1,413	2,397
5. Tariffs--							
a. Tariff rate	Pct.	--	--	--	--	--	--
b. Tariff subsidy (5a/100)*1a*B/1,000	Mil. pesos	--	--	--	--	--	--
6. Export subsidy--							
a. Subsidy rate	Pct.	9	15	30	35	14	9
b. Export subsidy (6a/100)*(2c/1.1)*2a*B/1,000	Mil. pesos	--	3,479	7,851	11,542	--	--
7. Disease control subsidy	Mil. pesos	--	--	--	--	--	--
F. Total transfers to producers:							
1. Total (1c+2c+3d+4d+5b+6b+7)	Mil. pesos	-8,671	-1,600	4,764	17,898	12,883	15,577
2. Producer subsidy equivalents (F1/D)*100	Pct.	-29.5	-5.0	-12.7	-38.8	25.3	19.2

-- = Not applicable.

¹ Harvested area of paddy rice.² Paddy rice production multiplied by 0.65.³ Paddy rice price divided by 0.65.

Appendix table 4--Sorghum: Calculation of Colombian producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Area harvested	1,000 ha	291	272	238	192	241	259
B. Production	1,000 tons	568	595	590	499	604	704
C. Average producer price	Pesos/ton	15,360	18,249	21,475	29,542	32,641	48,224
D. Producer value (B*C)/1,000	Mil. pesos	8,731	10,858	12,662	14,753	19,728	33,940
E. Policy transfers to producers:							
1. Price policy--							
a. IDEMA price	Pesos/ton	15,782	18,508	21,504	25,842	32,600	40,657
b. IDEMA purchases	1,000 tons	84	38	21	10	67	3
c. Price support (1a-C)*1b/1,000	Mil. pesos	35	10	1	-39	-3	-21
2. Foreign exchange policy--							
a. Official exchange rate	Pesos/U.S. \$	64	79	101	142	194	243
b. Equilibrium exchange rate	Pesos/U.S. \$	91	100	119	132	165	206
c. Foreign exchange subsidy (2a-2b)*(1a/2a)*B/1,000	Mil. pesos	-1,955	-1,834	-1,444	603	1,736	2,320
3. Fertilizer subsidy--							
a. Border price	Pesos/ton	--	--	--	--	--	--
b. Domestic price	Pesos/ton	--	--	--	--	--	--
c. Fertilizer use	Mil. tons	--	--	--	--	--	--
d. Fertilizer subsidy (3a-3b)*3c	Mil. pesos	--	--	--	--	--	--
4. Credit--							
a. Commercial interest rate	Pct.	12.6	14.5	18.0	14.2	11.7	6.9
b. Agricultural interest rate	Pct.	0.1	4.4	6.1	1.7	4.7	-3.7
c. Principal loaned	Mil. pesos	4,131	5,591	5,033	7,441	8,769	12,778
d. Credit subsidy [4c*(4a-4b)]/100	Mil. pesos	533	565	599	930	614	1,355
5. Tariffs--							
a. Tariff rate	Pct.	14	16	10	10	18	33
b. Tariff subsidy (5a/100)*1a*B/1,000	Mil. pesos	643	1,096	809	873	2,071	5,071
6. Export subsidy--							
a. Subsidy rate	Pct.	--	--	--	--	--	--
b. Export subsidy (6a/100)*1a*B/1,000	Mil. pesos	--	--	--	--	--	--
7. Disease control subsidy	Mil. pesos	--	--	--	--	--	--
F. Total transfers to producers							
1. Total (1b+2c+3d+4d+5b+6b+7)	Mil. pesos	-744	-164	-36	2,367	4,418	8,725
2. Producer subsidy equivalents (F1/D)*100	Pct.	-8.6	-1.5	-0.3	16.0	22.4	25.7

-- = Not applicable.

Appendix table 5--Soybeans: Calculation of Colombian producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Area harvested	1,000 ha	49	60	51	54	78	65
B. Production	1,000 tons	99	122	94	104	167	128
C. Average producer price	Pesos/ton	28,606	35,818	52,188	58,946	69,169	82,197
D. Producer value (B*C)/1,000	Mil. pesos	2,821	4,384	4,916	6,142	11,544	10,538
E. Policy transfers to producers:							
1. Price policy--							
a. Border price	Pesos/ton	15,669	22,211	28,438	31,938	40,488	52,343
b. IDEMA purchases	1,000 tons	1.13	.03	--	--	21.68	.34
c. IDEMA price	Pesos/ton	28,791	34,003	41,546	58,108	69,169	82,197
b. Price support [(1.13*C-1a)*(B-1b)/1,000]-5b+[1b*(C-1c)]	Mil. pesos	1,411	1,828	2,474	3,114	4,598	2,312
2. Foreign exchange policy--							
a. Official exchange rate	Pesos/U.S. \$	64	79	101	142	194	243
b. Equilibrium exchange rate	Pesos/U.S. \$	91	100	119	132	165	206
c. Foreign exchange subsidy (2a-2b)*(1a/2a)*B/1,000	Mil. pesos	-658	-728	-485	233	1,019	1,013
3. Fertilizer subsidy--							
a. Border price	Pesos/ton	--	--	--	--	--	--
b. Domestic price	Pesos/ton	--	--	--	--	--	--
c. Fertilizer use	Mil. tons	--	--	--	--	--	--
d. Fertilizer subsidy (3a-3b)*3c	Mil. pesos	--	--	--	--	--	--
4. Credit--							
a. Commercial interest rate	Pct.	12.6	14.5	18.0	14.2	11.7	6.9
b. Agricultural interest rate	Pct.	0.1	4.4	6.1	1.7	4.7	-3.7
c. Principal loaned	Mil. pesos	991	1,238	1,874	2,650	4,380	4,003
d. Credit subsidy $4c*(4a-4b)/100$	Mil. pesos	124	125	223	331	307	424
5. Tariffs--							
a. Tariff rate	Pct.	15	15	15	15	25	43
b. Tariff subsidy $(5a/100)*1a*B/1,000$	Mil. pesos	232	408	402	499	1,689	2,885
6. Export subsidy--							
a. Subsidy rate	Pct.	--	--	--	--	--	--
b. Export subsidy $(6a/100)*1a*B/1,000$	Mil. pesos	--	--	--	--	--	--
7. Disease control subsidy	Mil. pesos	--	--	--	--	--	--
F. Total transfers to producers:							
1. Total $(1b+2c+3d+4d+5b+6b+7)$	Mil. pesos	1,108	1,632	2,614	4,177	7,614	6,635
2. Producer subsidy equivalents $(F1/D)*100$	Pct.	39.6	37.1	53.3	68.5	66.2	63.2

-- = Not applicable.

Appendix table 6--Sugar (raw): Calculation of Colombian producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Area harvested ¹	1,000 ha	93	94	100	110	104	104
B. Production ²	1,000 tons	1,318	1,340	1,177	1,367	1,272	1,293
C. Average producer price ³	Pesos/ton	21,198	28,988	35,368	41,326	51,871	65,249
D. Producer value (B*C)/1,000	Mil. pesos	27,940	38,850	41,634	56,488	65,987	84,399
E. Policy transfers to producers:							
1. Price policy ⁴ --							
a. Border price	Pesos/ton	12,180	17,895	20,930	17,800	37,288	56,721
b. Price support (C-1a)*B/1,000	Mil. pesos						
2. Foreign exchange policy--							
a. Official exchange rate	Pesos/U.S. \$	64	79	101	142	194	243
b. Equilibrium exchange rate	Pesos/U.S. \$	91	100	119	132	165	206
c. Foreign exchange subsidy (2a-2b)*(1a/2a)*B/1,000	Mil. pesos	-6,838	-6,423	-4,465	1,706	7,156	11,079
3. Fertilizer subsidy ⁴ --							
a. Border price	Pesos/ton	--	--	--	--	--	--
b. Domestic price	Pesos/ton	--	--	--	--	--	--
c. Fertilizer use	Mil. tons	--	--	--	--	--	--
d. Fertilizer subsidy (3a-3b)*3c	Mil. pesos	--	--	--	--	--	--
4. Credit--							
a. Commercial interest rate	Pct.	12.6	14.5	18.0	14.2	11.7	6.9
b. Agricultural interest rate	Pct.	0.1	4.4	6.1	1.7	4.7	-3.7
c. Principal loaned	Mil. pesos	109	600	683	632	717	512
d. Credit subsidy $4c*(4a-4b)/100$	Mil. pesos	14	61	81	79	50	54
5. Tariffs ⁴ --							
a. Tariff rate	Pct.	--	--	--	--	--	--
b. Tariff subsidy $(5a/100)*1a*B/1,000$	Mil. pesos	--	--	--	--	--	--
6. Export subsidy--							
a. Subsidy rate	Pct.	10	10	10	10	9	9
b. Export subsidy $(6a/100)*1a*B/1,000$	Mil. pesos	--	2,398	2,464	2,433	4,269	6,603
7. Disease control subsidy ⁴	Mil. pesos	--	--	--	--	--	--
F. Total transfers to producers:							
1. Total $(1b+2c+3d+4d+5b+6b+7)$	Mil. pesos	-6,824	-3,964	-1,919	4,218	11,476	17,736
2. Producer subsidy equivalents $(F1/D)*100$	Pct.	-24.5	-10.2	-4.6	7.5	17.4	21.0

-- = Not applicable.

¹ Harvested area of cane sugar.² Cane sugar production was multiplied by 0.05 to convert production to a refined sugar basis.³ Cane sugar prices were converted to prices on a refined sugar basis by multiplying by 20.⁴ No policy on this commodity.

Appendix table 7--Wheat: Calculation of Colombian producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Area harvested	1,000 ha	45	50	43	45	39	41
B. Production	1,000 tons	71	78	59	76	74	74
C. Average producer price	Pesos/ton	18,880	22,860	26,725	36,627	46,706	53,395
D. Producer value (B*C)/1,000	Mil. pesos	1,335	1,779	1,585	2,787	3,433	3,962
E. Policy transfers to producers:							
1. Price policy--							
a. Border price	Pesos/ton	11,728	14,209	17,673	22,813	26,750	30,520
b. IDEMA purchases	1,000/ton	42	41	27	31	20	19
c. IDEMA price	Pesos/ton	20,218	24,177	28,556	38,427	46,401	57,628
d. Price support (1c-C)*1b/1,000	Mil. pesos	57	53	49	55	-6	82
2. Foreign exchange policy--							
a. Official exchange rate	Pesos/U.S. \$	64	79	101	142	194	243
b. Equilibrium exchange rate	Pesos/U.S. \$	91	100	119	132	165	206
c. Foreign exchange subsidy (2a-2b)*(1a/2a)*B/1,000	Mil. pesos	-353	-296	-190	122	297	342
3. Fertilizer subsidy--							
a. Border price	Pesos/ton	--	--	--	--	--	--
b. Domestic price	Pesos/ton	--	--	--	--	--	--
c. Fertilizer use	Mil. tons	--	--	--	--	--	--
d. Fertilizer subsidy (3a-3b)*3c	Mil. pesos	--	--	--	--	--	--
4. Credit--							
a. Commercial interest rate	Pct.	12.6	14.5	18.0	14.2	11.7	6.9
b. Agricultural interest rate	Pct.	0.1	4.4	6.1	1.7	4.7	-3.7
c. Principal loaned	Mil. pesos	169	177	172	216	239	251
d. Credit subsidy 4c*(4a-4b)/100	Mil. pesos	22	18	20	27	17	27
5. Tariffs--							
a. Tariff rate	Pct.	14	16	10	10	18	33
b. Tariff subsidy (5a/100)*1a*(B-1b)/1,000	Mil. pesos	116	177	106	176	354	747
6. Export subsidy--							
a. Subsidy rate	Pct.	--	--	--	--	--	--
b. Export subsidy (6a/100)*1a*B/1,000	Mil. pesos	--	--	--	--	--	--
7. Disease control subsidy	Mil. pesos	--	--	--	--	--	--
F. Total transfers to producers:							
1. Total (1b+2c+3d+4d+5b+6b+7)	Mil. pesos	-159	-48	-14	380	661	1,198
2. Producer subsidy equivalents (F1/D)*100	Pct.	-12.2	-2.8	-0.9	13.6	19.5	30.3

-- = Not applicable.

Appendix table 8--Calculation of Colombian consumer subsidy equivalents

Item	Unit	Description and sources
A. Consumption	1,000 tons	Sources: sugar (1), soybeans (5), and all other commodities (14).
B. Average consumer price	Pesos/ton	Sources: sugar (1), rice and wheat (2), soybeans (14) and sorghum (5). The producer price was used for sorghum.
C. Consumer cost (A*B)/1,000	Mil. pesos	
D. Policy transfers to consumers:		
1. Foreign exchange policy--		
a. Official exchange rate	Pesos/U.S. \$	Source: (8).
b. Equilibrium exchange rate	Pesos/U.S. \$	Sources: 1982-83, (4); 1984-87, ERS estimate based on a comparison of respective consumer price indices. Source: CPI (8).
c. Border price	U.S. \$/ton	Rice: f.o.b. (Bangkok) price plus 10 percent premium to account for transportation costs of competitors. Sorghum: f.o.b. (gulf) price for No. 2 yellow plus 1985 ocean freight rate. Soybeans: c.i.f. (Rotterdam) price. Wheat: f.o.b. (gulf) price for Hard Red Winter wheat plus 1985 ocean freight rates. Sources: prices (8); ocean freight charges (5).
d. Foreign exchange subsidy (1b-1a)*1c*A/1,000	Mil. pesos	
2. Tariffs--		
a. Tariff rate	Pct.	For sorghum, soybeans, and wheat only. Source: (14).
b. Tariff subsidy -(2a/100)*1a*1c*A/1,000	Mil. pesos	
3. Export subsidy--		
a. Subsidy rate	Pct.	For rice and sugar only. Source: (14).
b. Export subsidy (3a/100)1c*1a*A/1,000	Mil. pesos	Years with exports only.
E. Total transfers to consumers:		
1. Total (1c+2b+3b)	Mil. pesos	
2. Consumer subsidy equivalents (E1/C)*100	Pct.	

Appendix table 9--Milled rice: Calculation of Colombian consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Consumption	1,000 tons	1,772	1,257	1,080	1,087	1,120	1,200
B. Average consumer price	Pesos/ton	50,640	52,970	62,170	77,740	94,200	10,8160
C. Consumer cost (A*B)/1,000	Mil. pesos	89,729	66,583	67,144	84,503	105,504	129,792
D. Policy transfers to consumers:							
1. Foreign exchange policy--							
a. Official exchange rate	Pesos/U.S. \$	64	79	101	142	194	243
b. Equilibrium exchange rate	Pesos/U.S. \$	91	100	119	132	165	206
c. Border price	U.S. \$/ton	308	294	274	230	325	302
d. Foreign exchange subsidy (1b-1a)*1c*A/1,000	Mil. pesos	14,896	7,817	5,397	-2,490	-10,683	-13,264
2. Tariffs--							
a. Tariff rate	Pct.	--	--	--	--	--	--
b. Tariff subsidy $-(2a/100)*1a*1c*A/1,000$	Mil. pesos	--	--	--	--	--	--
3. Export subsidy--							
a. Subsidy rate	Pct.	9	15	30	35	14	9
b. Export subsidy $-(3a/100)*1c*1a*A/1,000$	Mil. pesos	--	-3,980	-8,124	-11,300	--	--
E. Total transfers to producers:							
1. Total (1c+2b+3b)	Mil. pesos	14,896	3,837	-2,726	-13,789	-10,683	-13,264
2. Consumer subsidy equivalents (E1/C)*100	Pct.	16.6	5.8	-4.1	-16.3	-10.1	-10.2

-- = Not applicable.

Appendix table 10--Sorghum: Calculation of Colombian consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Consumption	1,000 tons	663	642	645	549	725	760
B. Average consumer price	Pesos/ton	15,360	18,249	21,475	29,542	32,641	48,224
C. Consumer cost (A*B)/1,000	Mil. pesos	10,184	11,716	13,851	16,215	23,664	36,650
D. Policy transfers to consumers:							
1. Foreign exchange policy--							
a. Official exchange rate	Pesos/U.S. \$	64	79	101	142	194	243
b. Equilibrium exchange rate	Pesos/U.S. \$	91	100	119	132	165	206
c. Border price	U.S. \$/ton	126	146	134	121	98	90
d. Foreign exchange subsidy $(1b-1a)*1c*A/1,000$	Mil. pesos	2,280	1,979	1,580	-663	-2,082	-2,506
2. Tariffs--							
a. Tariff rate	Pct.	14	16	10	10	18	33
b. Tariff subsidy $-(2a/100)*1a*1c*A/1,000$	Mil. pesos	-749	-1,183	-885	-959	-2,484	-5,476
3. Export subsidy--							
a. Subsidy rate	Pct.	--	--	--	--	--	--
b. Export subsidy $(3a/100)*1c*1a*A/1,000$	Mil. pesos	--	--	--	--	--	--
E. Total transfers to producers:							
1. Total (1d+2b)	Mil. pesos	1,531	797	695	-1,622	-4,567	-7,982
2. Consumer subsidy equivalents $(E1/C)*100$	Pct.	15.0	6.8	5.0	-10.0	-19.3	-21.7

-- = Not applicable.

Appendix table 11--Soybeans: Calculation of Colombian consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Consumption	1,000 tons	96	147	195	232	176	326
B. Average consumer price	Pesos/ton	33,000	37,580	50,420	60,250	70,330	79,130
C. Consumer cost (A*B)/1,000	Mil. pesos	3,165	5,521	9,852	13,990	12,364	25,765
D. Policy transfers to consumers:							
1. Foreign exchange policy--							
a. Official exchange rate	Pesos/U.S. \$	64	79	101	142	194	243
b. Equilibrium exchange rate	Pesos/U.S. \$	91	100	119	132	165	206
c. Border price	U.S. \$/ton	245	282	282	224	208	216
d. Foreign exchange subsidy (1b-1a)*1c*A/1,000	Mil. pesos	640	874	1,007	-520	-1,074	-2,573
2. Tariffs--							
a. Tariff rate	Pct.	15	15	15	15	25	43
b. Tariff subsidy $-(2a/100)*1a*1c*A/1,000$	Mil. pesos	-225	-489	-834	-1,112	-1,779	-7,328
3. Export subsidy--							
a. Subsidy rate	Pct.	--	--	--	--	--	--
b. Export subsidy $(3a/100)*1c*1a*A/1,000$	Mil. pesos	--	--	--	--	--	--
E. Total transfers to producers:							
1. Total (1c+2b+3b)	Mil. pesos	415	384	173	-1,632	-2,853	-9,902
2. Consumer subsidy equivalents (E1/C)*100	Pct.	13.1	7.0	1.8	-11.7	-23.1	-38.4

-- = Not applicable.

Appendix table 12--Sugar (raw): Calculation of Colombian consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Consumption	1,000 tons	1,010	1,026	983	1,044	1,101	1,208
B. Average consumer price	Pesos/ton	36,933	43,758	48,433	55,072	69,938	87,797
C. Consumer cost (A*B)/1,000	Mil. pesos	37,289	44,900	47,611	57,475	77,011	106,019
D. Policy transfers to consumers:							
1. Foreign exchange policy--							
a. Official exchange rate	Pesos/U.S. \$	64	79	101	142	194	243
b. Equilibrium exchange rate	Pesos/U.S. \$	91	100	119	132	165	206
c. Border price	U.S. \$/ton	190	227	208	125	192	234
d. Foreign exchange subsidy (1b-1a)*1c*A/1,000	Mil. pesos	5,238	4,918	3,728	-1,302	-6,194	-10,343
2. Tariffs--							
a. Tariff rate	Pct.	--	--	--	--	--	--
b. Tariff subsidy (-2/100)*1a*1c*A/1,000	Mil. pesos	--	--	--	--	--	--
3. Export subsidy--							
a. Subsidy rate	Pct.	10	10	10	10	9	9
b. Export subsidy (3a/100)*1c*1a*A/1,000	Mil. pesos	--	-1,836	-2,058	-1,858	-3,695	-6,165
E. Total transfers to producers:							
1. Total (1c+2b+3b)	Mil. pesos	5,238	3,081	1,671	-3,160	-9,890	-16,507
2. Consumer subsidy equivalents (E1/C)*100	Pct.	14.0	6.9	3.5	-5.5	12.8	-15.6

-- = Not applicable.

Appendix table 13--Wheat: Calculation of Colombian consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Consumption	1,000 tons	584	616	638	712	710	800
B. Average consumer price	Pesos/ton	27,546	32,091	39,533	53,370	50,439	77,266
C. Consumer cost (A*B)/1,000	Mil. pesos	16,087	19,768	25,222	38,000	35,812	61,813
D. Policy transfers to consumers:							
1. Foreign exchange policy--							
a. Official exchange rate	Pesos/U.S. \$	64	79	101	142	194	243
b. Equilibrium exchange rate	Pesos/U.S. \$	91	100	119	132	165	206
c. Border price	U.S. \$/ton	183	180	175	160	138	126
d. Foreign exchange subsidy (1b-1a)*1c*A/1,000	Mil. pesos	3,085	2,150	2,027	-1,015	-2,784	-2,996
2. Tariffs--							
a. Tariff rate	Pct.	14	16	10	10	18	33
b. Tariff subsidy $-(2a/100)*1a*1c*A/1,000$	Mil. pesos	-959	-1,400	-1,144	-1,649	-3,419	-8,057
3. Export subsidy--							
a. Subsidy rate	Pct.	--	--	--	--	--	--
b. Export subsidy $(3a/100)*1c*1a*A/1,000$	Mil. pesos	--	--	--	--	--	--
E. Total transfers to producers:							
1. Total (1c+2b+3b)	Mil. pesos	2,126	749	883	-2,664	-6,203	-11,053
2. Consumer subsidy equivalents (E1/C)*100	Pct.	13.2	3.8	3.5	-7.0	-17.3	-17.9

-- = Not applicable.

MEXICO

Myles J. Mielke

Introduction

Mexico has long protected its economy from foreign influences in order to develop its own industrial base. In the case of Mexico, the familiar "infant industry" position included tariff and nontariff barriers, a cheap food policy that subsidized industrial production and wages, and the promotion of industrial exports. The Government of Mexico (GOM) also tried to accelerate industrial development by subsidizing energy byproducts and transportation.

Many countries finance their industrial development schemes by taxing their agricultural sector. However, Mexico, with its oil export revenues, insulated its agricultural sector from the world economy and promoted its industrial sector. Over the past 30 years, the GOM has erected a vast network of subsidies and trade barriers to protect agriculture, reflecting its social significance in terms of employment and political stability.

Since the early 1980's, Mexico has been forced to open its economy in response to internal and external economic pressures. This study attempts to quantify the effects of some agricultural policy adjustments that have been made as Mexico moves toward economic and trade liberalization.

Economic and Agricultural Developments, 1982-87

The Mexican economy passed through one of the more difficult periods in the country's history during the past decade. Since 1982, economic growth has been slow and erratic as the economy struggles to recover from a huge foreign and domestic debt burden, low petroleum prices, high unemployment, falling real wages, and high inflation. Agriculture has contributed to Mexico's modest economic recovery by leading most other sectors in export expansion since the fall of oil prices.

Agricultural exports averaged \$2.3 billion during 1986-88, up considerably from the average of \$1.6 billion for the previous 4 years; as a result, agriculture's share of total exports increased from a 7-percent average during 1982-85 to over a 12-percent average during 1986-88. The fastest growing agricultural exports include fresh and frozen vegetables, live feeder cattle, and fresh fruits. The United States is the major market for these exports, as well as for coffee.

In tandem with expanding exports, favorable grain and oilseed production during most of the 1980's held import growth in check. Nevertheless, Mexico remains a major importer of agricultural products and represents one of the top four U.S. export markets, importing wheat, coarse grains, soybeans, oilseed products, dried beans, meats, nonfat dry milk, inedible tallow, and cattle hides. Total agricultural imports

averaged \$1.5 billion during 1982-87, but weather-damaged crops and direct government imports to control food prices doubled the value of agricultural imports to an average \$3 billion in 1988 and 1989.

Policies in the 1980's

During the 1980's, there has been a gradual reversal of what were perceived as inward-oriented economic and trade policies. The government undertook a number of economic reforms across all sectors in response to the debt crisis of 1982, the sharp drop in petroleum prices during the mid-1980's, and pressure from its international creditors.

Macroeconomic and Trade Policy Developments

The GOM instituted economic reforms in both fiscal and monetary policy during the past decade. Policy changes included monetary reforms, a reduction in trade barriers, the selling of state-owned enterprises, and the reduction in many producer and consumer subsidies.

Financial reforms were conducted largely through exchange rate and interest rate adjustments. The GOM overvalued the peso during 1973-81. Since the onset of the debt crisis, however, it has undervalued its currency in order to promote exports and discourage imports. The GOM has also realigned the interest rates that it sets for different economic sectors. Real interest rates were negative for several years prior to 1982, but are now positive. These changes have improved the prospects for Mexico's current account balance by attracting foreign capital through higher real interest rates and by favoring exports over imports with an undervalued peso.

In 1983, the Mexican Government began to alter its import regime by reducing tariffs and nontariff barriers. The process was accelerated when Mexico joined the General Agreement on Tariffs and Trade (GATT) in August 1986. Import tariffs are being substituted for volume controls, and tariff rates are being reduced and rationalized. The maximum ad valorem tariff, for example, was reduced from 100 percent in 1986 to 20 percent in 1988. Only about 3 percent of total imports are still subject to import license controls, but the majority of these are imposed on agricultural imports.

Price subsidies on goods and services have been reduced since the early 1980's, as part of a debt-reduction strategy. Sales of government-owned enterprises were initiated, although this program has moved more slowly than other reforms. The government has also been reducing its direct involvement in trade, primarily by allowing the private sector to purchase a larger share of total imports.

Domestic economic reforms were temporarily set back during 1988-89 when the government conducted an anti-inflationary program. The GOM increased consumer price subsidies and directly imported food in order to control domestic prices, which increased public deficit spending and reduced the foreign trade balance. Although these programs were successful in reducing inflation from 160 percent in 1987 to 52 percent in 1988 and 20 percent in 1989, Mexico paid a high price to control inflation:

unemployment and underemployment rose, real wages fell, capital flight accelerated, and the record foreign exchange reserve of 1988 sharply eroded.

Agricultural Policy Developments

Mexican farm programs were originally designed to protect low-income producers and to promote food self-sufficiency. At the same time, national economic policies were to benefit urban wage earners by subsidizing food. These goals resulted in policies that were not always compatible. The economic crisis of the 1980's, however, has brought divergent policies closer together by reducing government intervention.

Production Policies

Policies that have influenced agricultural production are of two types: (1) those that affect output prices (guaranteed farm prices and trade volume controls); and (2) those that subsidize production (input subsidies, preferential interest rates on agricultural credit, subsidized crop insurance premiums, and irrigation subsidies). Low-income producers have also received additional production and marketing subsidies as part of the government's commitment to economic equity.

Internal and external economic pressures of the 1980's forced the GOM to make significant changes in its farm programs. Guaranteed (support) prices for major crops have not been fully adjusted for inflation since the early 1980's, resulting in declining real producer prices. New support prices are no longer announced before planting; they are now announced only at harvest, which has added uncertainty to the government's intentions for crop production. According to recent reports, the GOM is preparing to phase out the guaranteed price program, except for corn and dry beans (18).¹

Producer input price subsidies have also been reduced since the early 1980's. Mexican farmers are receiving fewer subsidies on fertilizers, seeds, pesticides, irrigation, and agricultural credit (18). Indirect farm subsidies on fuels, electricity, and transportation have been reduced, as prices for these products and services have increased (18).

Consumption Policies

Mexican food, feed, and fiber consumption has been influenced by price controls and subsidies on basic commodities. The prices of basic commodities are controlled by CONASUPO, the state agricultural marketing agency. CONASUPO imports food and purchases domestically produced commodities under the producer price guarantee program. The agency then resells these commodities to food and feed processors, often at a loss. CONASUPO also has thousands of wholesale and retail outlets in which food staples are sold at fixed prices.

¹ Underscored numbers in parentheses are listed in the References at the end of this section.

Consumer food price subsidies were reduced during the 1980's. The GOM reduced or eliminated many of the food subsidies that existed before 1982, but price subsidies continue for products such as corn tortillas, corn flour, wheat bread, wheat flour, milk, and eggs. Direct government intervention in food marketing has also declined. CONASUPO purchases less of the domestic crop and imports less, allowing the private sector a larger role in marketing agricultural commodities. These changes help to lower government expenditures as well as to open agricultural markets.

Trade Policies

Agricultural imports have been regulated through the use of licensing requirements and tariffs. Importers of most grains, oilseeds, and livestock products are required to obtain permits prior to purchasing imports. CONASUPO, which imports for its own account and for resale to the private sector, is usually not subject to the same import controls as private importers. To prevent imports from displacing domestic production, import permits are not issued until the domestic crop is purchased. There is no tariff paid on agricultural imports under license.

Trade of agricultural exports has been controlled through several means, including export duties, permits to export, and exchange rate controls. Major agricultural exports have been regulated by state marketing agencies, such as INMECAFE (coffee), AZUCAR, S.A. (sugar), ABAMEX (cotton), and TABAMEX (tobacco). The GOM is in the process of reducing the activities of many of these parastatals. The government has already sold a number of assets that belonged to these marketing agencies so that public funds once used for milling or processing agricultural products could be used to provide public sector services (such as grading and disease control).

Estimation of Policy Intervention in Agriculture

Subsidies or taxes that affect Mexican producers and consumers were estimated for seven crops using PSE's and CSE's. The PSE's measured in this report include policies that affect producer prices and production input subsidies. The CSE's include measures of border and domestic policies that affect consumer prices and direct subsidies to consumers. An additional measure to account for the effect of the GOM's exchange rate policy on PSE's and CSE's is included in the aggregate subsidy measures.

Commodity Coverage

The commodities covered in this report represent five imported items (wheat, corn, dry beans, sorghum, and soybeans) and two export commodities (cotton and sesameseed). Together, the seven commodities account for half the value of all crops, occupy about 60 percent of all cropland, and account for about two-thirds of all irrigated land. The five imported commodities represent nearly 40 percent of the value of agricultural imports; the two export crops account for 3 percent of the export value of all items.

Trade in all seven commodities is significant. Corn and sorghum imports normally represent about 25 percent of domestic supply. Wheat imports average 10-15 percent of domestic supply, although imports accounted for a record high of 40 percent in 1988. Foreign markets provide an average of 5-10 percent of domestic supplies of dry beans. Mexico is very reliant on the world soybean market; since 1982, soybean imports have usually been twice as large as domestic production. The two export commodities included in this study are heavily traded. Mexican sesameseed producers typically export over half of their domestic production. Mexico exported 45 percent of its cotton supply during 1983-84; however, exports have averaged 30 percent of domestic supplies in recent years.

Of the seven commodities, two are traditional food staples in Mexico: corn and dry beans. Wheat bread is a more recent food staple in the urban diet. Grain sorghum and soybeans are the primary feed inputs for the Mexican livestock sector. Cotton and sesame seed are major inputs in the Mexican food and fiber industry, as well as export commodities.

PSE Policy Coverage

The PSE estimates for Mexico were based on estimates of the value of producer price policies, credit subsidies, and fertilizer subsidies. A separate measure was calculated to account for the effect of intervention in the exchange rate market during 1982-87. The effects of these policies were estimated separately and then combined to generate the aggregate PSE. Other important policy interventions, principally irrigation subsidies, were not included due to the lack of sufficient data. The irrigation subsidy (for both capital and operations) is probably the largest input subsidy for the principal irrigated crops--wheat, soybeans, and cotton. Hence, the PSE's for these three crops are biased downward.

PSE Results by Commodity

The Mexican PSE's were positive, on average, indicating a net subsidy transfer to Mexican producers (figs. 1 and 2). This is particularly true for 1982-86 when all but dry beans registered positive PSE's. The principal imported crops (corn, sorghum, and soybeans) were generally more protected than the export crops (cotton and sesameseed). Except for dry beans, there was a tendency for the PSE's of the imported crops to increase after 1984.

The PSE's for 1982-87 fell into three categories: (1) relatively high and positive PSE's, (2) modest and positive PSE's, and (3) mostly negative PSE's (table 1). Corn, sorghum, and soybeans averaged relatively high and positive PSE's, especially since 1984. Modest, yet mostly positive, PSE's were calculated for wheat, cotton, and sesameseed since 1984. Only the PSE's for dry beans were negative most of the time, indicating that, on average, producers were taxed during 1982-87.

The relatively high and positive PSE's for corn, sorghum, and soybeans can be explained in large part by two factors. First, Mexican agricultural policies have tended to favor low-income producers, which include most corn and sorghum producers.

Figure 1
 Mexican PSE's for imported commodities

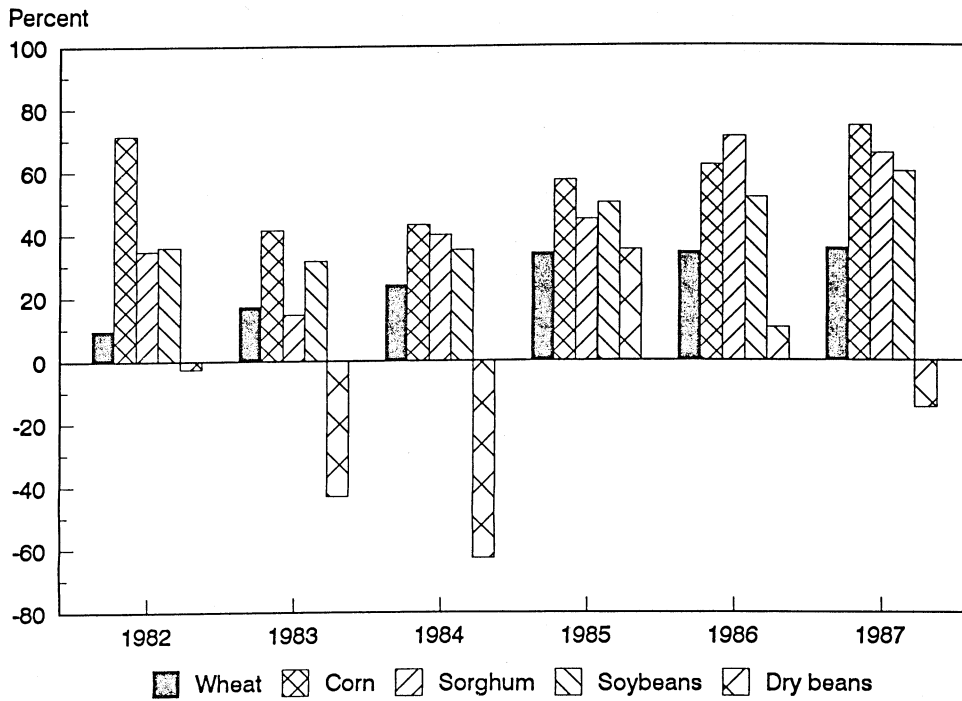
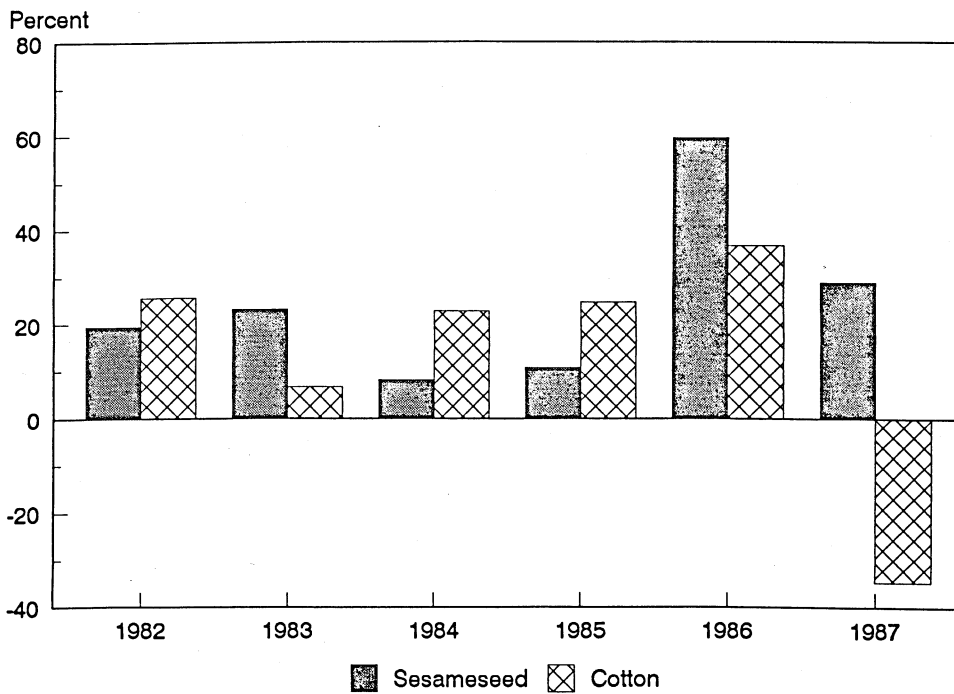


Figure 2
 Mexican PSE's for exported commodities



Second, the GOM has also been concerned with reducing import costs following the debt crisis. Because these three crops are among the largest agricultural imports, the GOM attempted to stimulate production in order to limit imports.

Wheat, cotton, and sesameseed tend to be produced for commercial sale. The more modest support estimated for these commodities is, therefore, consistent with the GOM policy goal of favoring low-income farmers.

Table 1—Summary of Mexican PSE's

Item	1982	1983	1984	1985	1986	1987
	<u>Percent</u>					
Wheat	9.7	17.2	23.8	34.0	34.2	35.3
Corn	71.3	41.3	42.9	57.1	61.7	74.4
Sorghum	34.7	14.5	39.8	44.7	70.8	65.4
Soybeans	35.9	31.5	35.0	49.9	51.4	59.6
Dry beans	-2.6	-43.1	-62.9	35.0	10.2	-14.9
Sesameseed	25.7	6.8	22.8	24.8	36.8	-34.6
Cotton	19.6	23.2	8.2	10.8	59.7	29.0
Seven-commodity aggregate	44.3	26.1	30.3	47.1	52.3	55.3

The negative PSE's measured for dry beans were inconsistent with the GOM's policy of assisting low-income farmers. Producers of dry beans generally have small farms, low incomes, and produce other traditional crops, such as corn. Part of the problem with the dry bean PSE estimate may be with the choice of an international reference price used to calculate the producer price wedge. Trade unit values were used to calculate the dry bean PSE, but they may not have been appropriate reference prices because dry beans were thinly traded in most years.²

PSE Results by Policy

An analysis of PSE's by policy component indicates that producer price intervention policies were generally the largest component of the PSE measure (figs. 3 and 4). The positive price wedge component of the PSE's tended to increase for corn, sorghum, and soybeans after 1984. However, the fertilizer and credit subsidy components of the PSE's declined in 1986 and 1987. Both of these results were consistent with GOM goals in the 1980's of continuing to support farm prices, while reducing budget expenditures by cutting input subsidies. The reduction in input

² Import and export unit values were used as proxies for international prices for both dry beans and sesameseed. Unit values are calculated by dividing the total value of a traded commodity by the volume traded. If small quantities are traded, the unit price may be much higher than when larger volumes are traded.

Figure 3
 Mexican PSE's by policy for imported commodities,
 1982-87 average

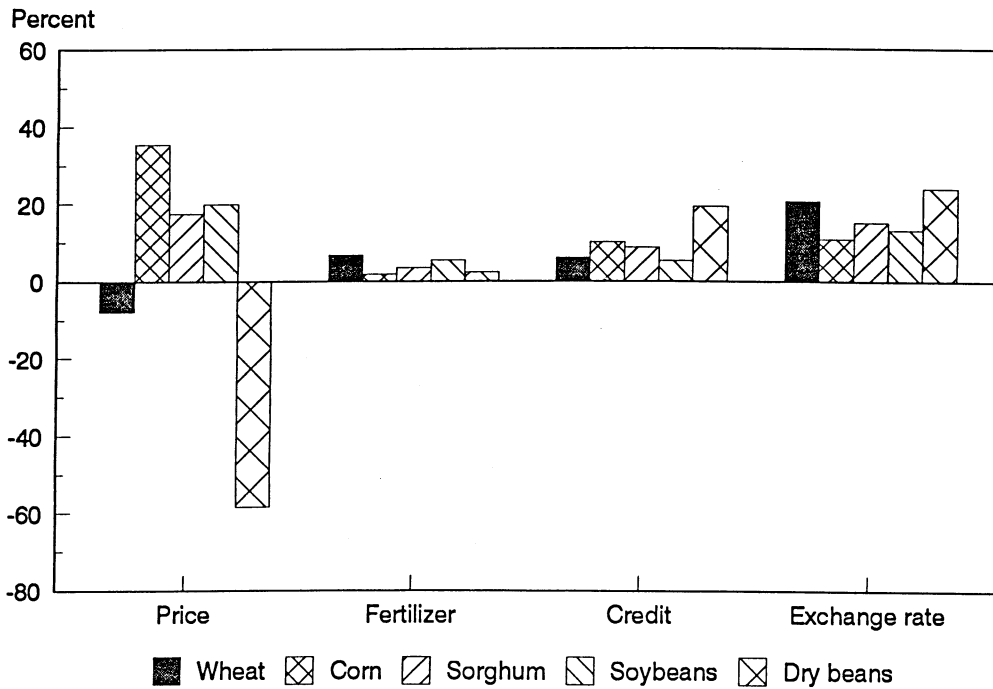
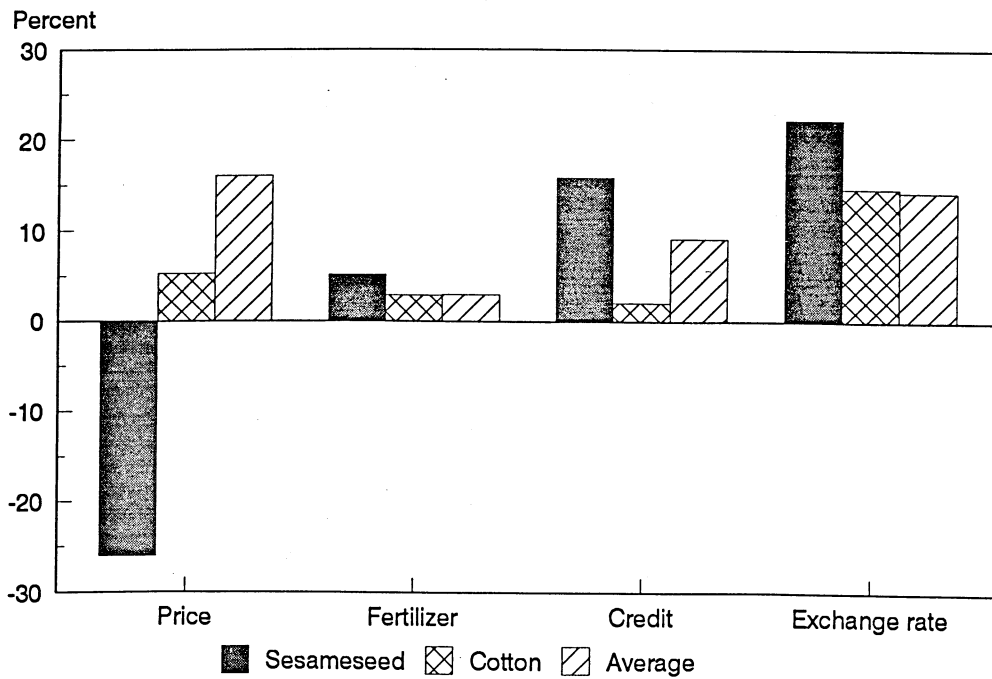


Figure 4
 Mexican PSE's by policy for exported commodities,
 1982-87 average



subsidies is more clearly reflected in the decline in the credit subsidy PSE during 1986-87.

Price Wedge

Policies that separate, or drive a wedge between, domestic and international prices are normally associated with producer price supports and non-tariff trade controls that cannot be quantified by other means. In Mexico, the guaranteed producer price and the import license controls were the most important policies contributing to the difference between domestic and reference prices (table 2). The price wedge component of the PSE was positive for four of the seven of the measured crops, indicating that producer prices were higher than international reference prices. Negative price wedges indicated that producer prices were below reference prices.

Input Subsidies

The measured effects of input subsidies assessed in this report are generally minor for most commodities. However, fertilizer and credit subsidies for wheat were large enough to offset the negative price support during most years. Although not as important as price-support policies, these input price subsidies do provide additional support to Mexican farmers, particularly small, low-income producers.

Exchange Rate Adjustment

International reference prices were converted to Mexican pesos using the official exchange rate. Because the official rate was undervalued during 1982-87, an adjustment was made in the price wedge calculations to compensate for the undervaluation. Alternative estimates of the PSE's, excluding and including the exchange rate adjustments, are presented in Table 1 in the first chapter of this report. In every case, the exchange rate adjustment significantly increased the value of the PSE's. This adjustment corrects the downward bias of the PSE estimates caused by using the official exchange rate to calculate the initial price wedges.

Table 2--Mexican PSE's by policy component

Item	1982	1983	1984	1985	1986	1987
			<u>Percent</u>			
Wheat:						
Price wedge	-28.5	-31.0	7.6	16.6	-7.9	-4.1
Fertilizer subsidy	6.0	8.4	4.9	5.0	7.8	8.7
Credit subsidy	5.9	10.2	6.1	7.0	3.9	3.6
Exchange rate adjustment	26.2	29.5	5.2	5.5	30.4	27.2
Total	9.7	17.2	23.8	34.0	34.2	35.3
Corn:						
Price wedge	31.8	11.7	31.1	44.3	37.8	56.2
Fertilizer subsidy	2.1	2.0	1.3	1.3	2.2	2.0
Credit subsidy	24.4	9.7	7.2	8.3	5.5	4.9
Exchange rate adjustment	13.0	18.0	3.4	3.3	16.1	11.3
Total	71.3	41.3	42.9	57.1	61.7	74.4
Sorghum:						
Price wedge	1.6	-34.6	23.6	28.0	45.4	41.2
Fertilizer subsidy	3.4	5.2	2.8	2.6	3.3	3.3
Credit subsidy	9.8	15.2	9.4	9.5	4.9	4.2
Exchange rate adjustment	20.0	28.7	4.3	4.6	17.2	16.7
Total	34.7	14.5	39.8	44.7	70.8	65.4
Soybeans:						
Price wedge	6.8	-6.3	20.8	35.4	22.1	40.3
Fertilizer subsidy	6.6	7.8	4.7	4.8	6.5	2.5
Credit subsidy	5.4	8.8	5.7	5.9	3.3	2.4
Exchange rate adjustment	17.0	21.2	3.8	3.7	19.5	14.4
Total	35.9	31.5	35.0	49.9	51.4	59.6
Dry beans:						
Price wedge	-83.1	-106.8	-92.2	17.8	-26.8	-59.9
Fertilizer subsidy	3.5	3.0	2.1	0.9	1.6	2.9
Credit subsidy	46.3	22.6	19.0	12.0	6.5	8.9
Exchange rate adjustment	30.6	38.2	8.3	4.3	28.9	33.1
Total	-2.6	43.1	62.9	35.0	10.2	-14.9
Sesameseed:						
Price wedge	0.0	-41.2	-1.7	-1.6	-6.4	-105.0
Fertilizer subsidy	5.9	3.4	3.1	3.8	8.0	6.7
Credit subsidy	19.0	15.8	16.5	17.1	9.2	17.6
Exchange rate adjustment	22.2	28.7	4.8	5.5	26.0	46.2
Total	25.7	6.8	22.8	24.8	36.8	-34.6
Cotton:						
Price wedge	-5.8	-.7	-0.1	.8	29.0	9.0
Fertilizer subsidy	3.9	3.5	2.4	2.5	3.3	1.9
Credit subsidy	2.2	2.6	2.6	2.9	1.4	0.8
Exchange rate adjustment	19.4	17.6	3.3	4.6	26.0	17.2
Total	19.6	23.2	8.2	10.8	59.7	29.0
Seven-commodity aggregate:						
Price wedge	-3.8	-10.5	16.3	32.6	23.4	31.1
Fertilizer subsidy	3.4	3.5	2.3	2.2	3.3	3.1
Credit subsidy	18.8	10.8	7.6	8.3	5.0	4.5
Exchange rate adjustment	18.3	22.3	4.1	4.0	20.5	16.7
Total	44.3	26.1	30.3	47.1	52.3	55.3

CSE Policy Coverage

There were three policies in the CSE analysis that were common to all commodities: (1) the price wedge component, (2) the exchange rate component, and (3) CONASUPO price subsidies. The consumer price wedge resulted from the same policies that affected the producer price wedge, namely, farm price supports and import volume controls (see previous discussion on PSE's). The exchange rate component reflected the effects of Mexico's undervalued currency on the purchasing power of Mexican consumers. The CONASUPO price subsidy was directed at controlling consumer prices; CONASUPO bought raw materials and then sold them to food and feed processors below purchase prices. The resulting subsidy to food processors was then passed along the marketing chain to consumers. The consumers of poultry, pork, and dairy products benefitted indirectly from price subsidies on sorghum and soybeans.

There was an additional direct CONASUPO subsidy for wheat and corn during 1983-86 that was paid to millers to further compensate them for fixed retail prices of wheat bolillos and corn tortillas. This program was discontinued in 1987, but was reinstated in 1988-89 as the government again fixed consumer prices to control inflation.

The final component in the CSE estimate was the subsidy for low-income consumers of corn tortillas. Low-income Mexicans have been offered coupons with which to purchase tortillas at prices below official fixed prices since 1986. This "food stamp" program covered an estimated 6 million people in 1986 and an estimated 15 million in 1987 (9).

Other GOM programs subsidized consumer prices, but were not included in the CSE estimates because of the lack of data. The CSE estimates do not include subsidies for transportation, storage, and other marketing services that CONASUPO occasionally provided to keep down the acquisition costs of food and feed processors.

CSE Results

Initial estimates of the Mexican CSE's indicate that consumers were generally subsidized from 1982-84, then taxed from 1985-87. This policy shift is congruent with the government's goal of reducing food and feed subsidies to lower public sector deficits. The one exception was dry beans, which had a positive CSE during 1982-87 (table 3 and fig. 5).

The consumer price wedge was generally negative, reflecting the opposite effect of the producer price wedge (table 4 and fig. 6). The three CONASUPO consumer subsidies were designed to offset high farm price supports and tended to offset the negative consumer price wedge during 1982-84, but the subsidies generally were inadequate after 1984. The exchange rate adjustment was negative for all years because using the undervalued official exchange rate in the initial price wedge calculations biased the estimates upward.

Table 3—Summary of Mexican CSE's

Item	1982	1983	1984	1985	1986	1987
	<u>Percent</u>					
Wheat	23.5	86.2	50.2	8.2	-1.6	-14.9
Corn	-27.8	-1.8	-9.3	-20.5	-32.0	-57.4
Dry beans	67.7	75.6	95.3	0.4	9.5	87.9
Sorghum	-4.1	33.7	-8.3	-26.0	-44.9	-45.4
Soybeans	-14.2	3.4	13.4	-32.0	-34.7	-48.6
Five-commodity aggregate	-7.4	23.3	9.4	-16.3	-26.8	-38.6

Table 4—Mexican CSE's by policy component

Item	1982	1983	1984	1985	1986	1987
	<u>Percent</u>					
Wheat:						
Price wedge	22.4	24.4	-6.0	-13.0	6.2	3.3
CONASUPO price subsidy	21.7	23.3	13.1	3.0	11.8	3.3
CONASUPO direct subsidy	0.	61.7	47.1	22.6	4.3	0.
Exchange rate adjustment	-20.6	-23.3	-4.1	-4.3	-23.9	-21.4
Total	23.5	86.2	50.2	8.2	-1.6	-14.9
Corn:						
Price wedge	-27.8	-10.3	-27.2	-38.8	-33.1	-49.2
CONASUPO price subsidy	11.5	20.7	17.6	13.6	9.9	.6
CONASUPO direct subsidy	0	3.5	3.3	7.6	4.8	0
Low-income subsidy	0	0	0	0	.6	1.0
Exchange rate adjustment	-11.4	-15.8	-3.0	-2.9	-14.1	-9.9
Total	-27.8	-1.8	-9.3	-20.5	-32.0	-57.4
Sorghum:						
Price wedge	-1.3	27.7	-18.6	-22.5	-36.4	-33.0
CONASUPO price subsidy	13.1	28.9	13.7	.2	5.2	.9
Exchange rate adjustment	-16.0	-23.0	-3.4	-3.7	-13.8	-13.4
Total	-4.2	33.7	-8.3	-26.0	-44.9	-45.4
Soybeans:						
Price wedge	-6.0	5.5	-18.2	-31.0	-19.3	-35.3
CONASUPO price subsidy	6.7	16.5	35.0	2.3	1.7	-.7
Exchange rate adjustment	-14.9	-18.5	-3.4	-3.2	-17.1	-12.6
Total	-14.2	3.4	13.4	-32.0	-34.7	-48.6
Dry beans:						
Price wedge	76.3	98.1	84.7	-16.3	24.6	55.0
CONASUPO price subsidy	19.5	12.6	18.2	20.7	11.4	63.4
Exchange rate adjustment	-28.1	-35.0	-7.6	-3.9	-26.5	-30.4
Total	67.7	75.6	95.3	.4	9.5	87.9
Five-commodity aggregate:						
Price wedge	-5.4	12.1	-14.8	-28.1	-20.7	-29.6
CONASUPO price subsidy	13.3	21.7	18.6	8.4	8.3	4.9
CONASUPO direct subsidy	0	9.5	9.2	6.8	2.6	0
Exchange rate adjustment	-15.3	-20.0	-3.6	-3.4	-17.1	-14.0
Total	-7.4	23.3	9.4	-16.3	-26.8	-38.6

Figure 5
Mexican CSE's by commodity

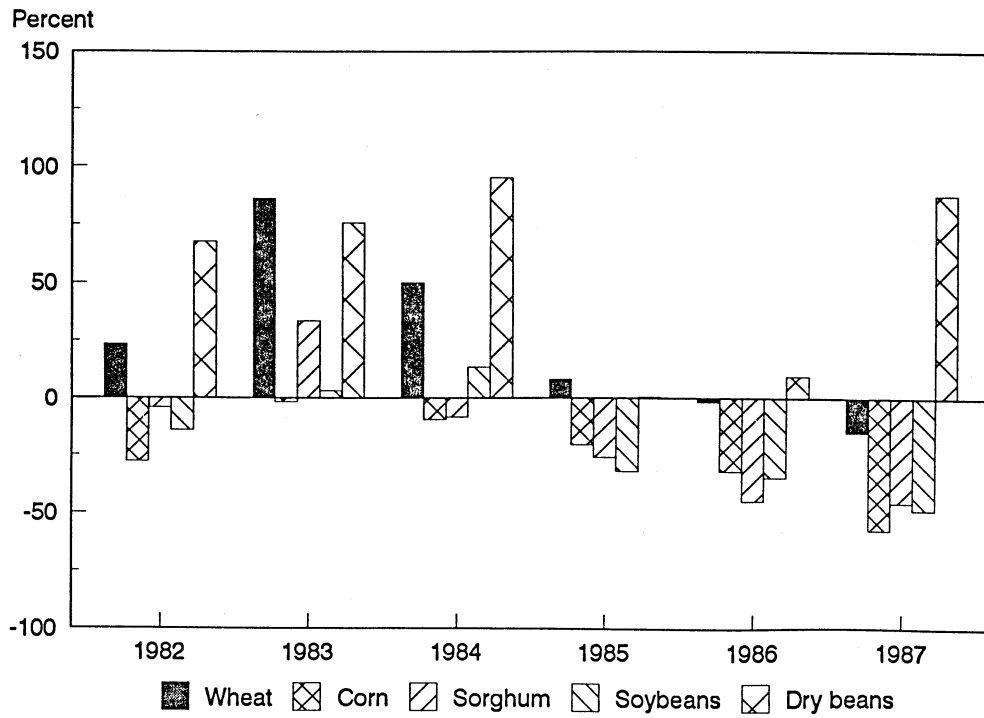
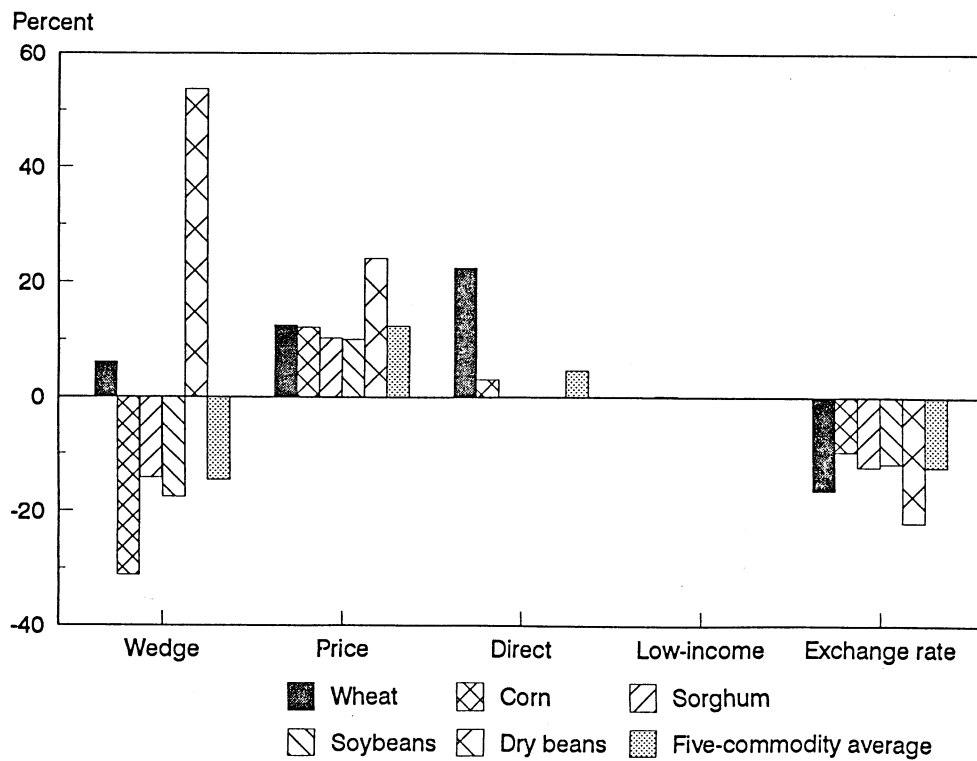


Figure 6
Mexican CSE's by policy



Conclusion

An inventory of GOM intervention in the agricultural sector reveals several areas where further liberalization could be accomplished. Mexico is moving toward dismantling some components of the expensive network of protectionism that was erected over the past 20 years; however, the GOM may resist changing current policies aimed at promoting food security, rural development, and balance-of-payments goals.

The GOM would likely want to continue production subsidies for low-income farmers in the form of price supports and input subsidies in order to achieve its rural development goals. Mexico, however, may not resist a GATT directive to reduce support to larger commercial producers. The social cost of such a directive would not likely be great; furthermore, it would be consistent with the GOM's goals to reduce budget expenditures.

Current consumer policies (including processing subsidies, administered retail prices, and government retail outlets) will likely continue. The GOM, however, has been moving in the direction of reducing consumer price subsidies to reduce budget deficits; in fact, CONASUPO's expenditures on the aforementioned programs were scheduled to decline in 1990. Although the GOM may have moved away from its original objective to subsidize its infant industries through cheap food policies, it is still committed to protecting the poorest segments of the population from inadequate nutrition.

If the GATT negotiations produce an agreement to reduce trade barriers, pressure from foreign suppliers would probably focus on the elimination of Mexican import license requirements for basic agricultural products. Although trade liberalization has already eliminated many barriers, control of agricultural imports is one area where there has been little change. The GOM has been reluctant to abolish the requirement of import licenses for primary agricultural commodities because, despite the fact that this policy increases food subsidy costs, the licenses are integral in the network of policies that protect Mexican producers.

Mexico's anti-inflation program of the late 1980's has delayed unilateral economic and trade liberalization. Economic controls that were reimposed during 1988-89 were extended in 1991. It is not certain at this time what long-term effects this temporary reversal of economic liberalization will have on Mexican trade and agricultural policies, but the GOM will likely continue to aim at opening its economy to help reduce public deficits. At the same time, the Mexican government is acutely aware of the political risks associated with reducing the protection of some segments of the population, especially now that the ruling party no longer commands overwhelming voter support.

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Methodology Appendix

Producer subsidy equivalents were estimated for seven commodities in Mexico, including those destined for food consumption (corn, dry beans, and wheat), feed consumption (sorghum and soybeans) and export (cotton and sesame seed).

Estimation of the PSE's

The Mexican PSE estimates included: (1) the calculation of a price wedge to account for the effect of farm price supports and trade controls on the price of each commodity, (2) subsidized fertilizer prices, (3) preferential interest rates for agricultural credit, and (4) the effect of the undervalued Mexican currency.

Price Wedge

The price wedge was estimated by first taking the difference between the domestic price in pesos and an international reference price converted to pesos at the official exchange rate. The difference, measured in nominal pesos, was then multiplied by the volume of production to obtain the total value of the price wedge transfer (subsidy or tax) attributable to policies that distorted producer prices. Domestic and international reference prices are adjusted for transportation and marketing costs so that both prices can be compared at a common market level.

Fertilizer Subsidy

Fertilizer subsidies were reported on a nutrient basis for nitrogen, phosphate, and potassium (6). The individual nutrient subsidies were added together to obtain the total value for the fertilizer subsidy. The fertilizer subsidy was then allocated by crop, according to its share of total irrigated area.³

Credit Subsidy

Estimates of agricultural credit subsidies were more complicated because of the existence of multiple lending institutions, the use of different interest rates for each producer income class, and the scarcity of information about the allocation of credit by crop. The three primary lenders were: BANRURAL, the rural development bank; FIRA, the Bank of Mexico institution that funnels international loans to the agricultural sector; and the commercial (nationalized) bank sector. Each of these lending sources had a specific amount of its agricultural loans allocated to a different producer income class.

³ Information on fertilizer use by crop was not available, but this method of allocating the fertilizer subsidy was considered a close proxy under the assumption that little fertilizer was being applied to rainfed areas because of the higher risk of water shortages.

Farm interest rate subsidies were only estimated for operational (short-term) loans, which are used primarily to finance crop production.⁴ Loans to low-income farmers accounted for about two-thirds of total operational loans, whereas the remainder of these loans were distributed evenly between middle- and upper-income producers (8, 21). The shares of short-term operational loans that farmers in each income category borrowed were used to weight the different interest rates.

This process resulted in a weighted-average interest rate for crop loans. The difference between this rate and a commercial interest rate was multiplied by the value of the short-term loans to calculate the aggregate credit subsidy.⁵ The agricultural credit subsidy was then allocated by crop using BANRURAL's distribution of loans by crop area (6).

Exchange Rate

The value of the exchange rate adjustment for the price wedge calculation was estimated by first subtracting the border price converted to pesos at the controlled exchange rate from the border price converted to pesos using the parity exchange rate. This difference was then multiplied by the level of production.

The purchasing power parity exchange rate was estimated based on the difference between the Mexican and U.S. wholesale price indices (WPI), using 1960 as the base year (2, 11). The use of the U.S. WPI was justified on the grounds that the United States is Mexico's primary trading partner, accounting for two-thirds of Mexico's total trade and 75-85 percent of its agricultural trade.

Estimation of the CSE's

The Mexican CSE analysis included: (1) the calculation of a price wedge to account for the effect of farm price supports and trade controls on the price of each commodity; (2) CONASUPO price subsidies; (3) a direct subsidy paid to wheat and corn millers; (4) a tortilla subsidy for low-income consumers, and (5) the effect of the undervalued exchange rate.

⁴ Although capital development loans accounted for about 30 percent of all farm loans during the reporting period, they were excluded because most of these loans were for livestock production.

⁵ The commercial rate was based on the "average cost of funds," which is a widely used indicator of Mexican commercial interest rates and is currently being used by the GOM to set agricultural interest rates (2).

Price Wedge

The price wedge calculation for the CSE was similar to that for the PSE, except that the difference between the border price (converted to pesos at the official exchange rate) and the domestic price was multiplied by the volume of consumption to get the total value of the transfer. The CSE price wedge is basically the mirror image of the PSE price wedge that indirectly measures the effect of producer price supports and import volume controls. As with the PSE calculation, prices were adjusted for transportation and marketing costs.

CONASUPO Price Subsidies

The price subsidy reflects CONASUPO's transfers to consumers in its purchases and sales of commodities. A weighted average purchase price was estimated for each commodity based on CONASUPO's domestic purchases and imports. The domestic purchase price was estimated as the value of CONASUPO purchases from domestic producers divided by the volume purchased. Prices of CONASUPO's imports were calculated by dividing the import value by import volume. The resulting import unit values and domestic purchase prices were then averaged (weighted by their respective volumes) to estimate the average weighted price that CONASUPO paid to acquire its supplies.

An average CONASUPO sale price was calculated as the value of sales divided by the volume of sales for each commodity. The difference between CONASUPO's average purchase price and average sale price was used as the per unit subsidy. The unit subsidy was multiplied by CONASUPO sales to estimate the total value of the price subsidy.

Other Consumer Subsidies

Data on direct subsidy to wheat and corn millers were provided by a study based on internal CONASUPO documents (9). These same documents also provided data on the amount of the GOM's 1986-87 tortilla subsidy for low-income consumers.

Exchange Rate

The exchange rate adjustment for the CSE's is similar to the one estimated for the PSE's. The parity exchange rate multiplied by the border price was subtracted from the controlled exchange rate multiplied by the same price; the difference was then multiplied by the level of consumption for that commodity to estimate the exchange rate adjustment.

Appendix table 1--Calculation of Mexican producer subsidy equivalents

Item	Unit	Definition and sources
A. Area harvested	Mil. ha	Source: (5).
B. Production	Mil. ton	Source: (5).
C. Average producer price	Pesos/ton	Sources: (6, 17).
D. Producer value (B*C)	Mil. pesos	
E. Policy transfers to producers:		
1. Price wedge--		
a. Wholesale price	Pesos/ton	Average producer price plus internal marketing margin. Sources: prices (5); marketing margins (5).
b. Border price	\$/ton	f.o.b. (gulf) price plus ocean freight for all crops except dry beans and sesame seed. Trade unit values plus ocean freight for dry beans and sesame seed. Sources: prices (4, 6); ocean freight (World Bank); trade unit values (1, 13).
c. Reference price	Pesos/ton	Border prices converted to pesos at the official exchange rate plus marketing margins. Sources: exchange rate (2); marketing margins (5).
d. Price wedge transfers (1a-1c)*B	Mil. pesos	
2. Exchange rate adjustment--		
a. Official exchange rate	Pesos/\$	Source: (2).
b. Equilibrium exchange rate	Pesos/\$	Parity exchange rate based on the relationship between U.S. and Mexican wholesale price indices (2, 11). Source: USDA/ERS estimates.
c. Exchange rate subsidy [(1b*2a)-(1b*2b)]*B	Mil. pesos	
3. Fertilizer--		
a. Fertilizer subsidy	Mil. pesos	Total subsidy was allocated to individual crop according to its share of total irrigated area. Source: (5).
4. Credit--		
a. Average commercial cost of funds	Pct.	Source: (2).
b. Agricultural interest rate	Pct.	Weighted-average interest rate for short-term production loans; shares of loans that farmers in each income category borrowed were used as weights. Source: (8)
c. Principal loaned	Mil. pesos	Total credit subsidy was allocated to each crop using BANRURAL's distribution of loans by crop area. Source: (8).
d. Credit subsidy [(4a-4b)/100]*4c	Mil. pesos	
F. Total policy transfers to producers--		
1. Total (1d+2c+3a+4d)	Mil. pesos	
2. Producer subsidy equivalents (F1/D)*100	Pct.	

Appendix table 2--Corn: Calculation of Mexican producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Area harvested	Mil. ha	5.6	7.4	7.1	7.6	6.4	6.8
B. Production	Mil. ton	10.1	13.1	12.9	14.1	11.7	11.6
C. Average producer price	Pesos/ton	9,766.0	20,252.0	34,950.0	52,587.0	91,050.0	23,3542.0
D. Producer value (B*C)	Mil. pesos	98,920.0	264,511.0	451,973.0	741,634.0	1,067,197.0	2,710,722.0
E. Policy transfers to producers:							
1. Price wedge--							
a. Wholesale price	Pesos/ton	11,153.0	23,128.0	39,913.0	60,054.0	103,979.0	266,705.0
b. Border price	\$/ton	121.2	149.4	149.8	123.8	98.4	85.8
c. Reference price	Pesos/ton	8,050.0	20,754.0	29,051.0	36,765.0	69,520.0	135,511.0
d. Price wedge transfers (1a-1c)*B	Mil. pesos	31,431.0	31,002.0	140,471.0	328,445.0	403,894.0	1,522,763.0
2. Exchange rate adjustment--							
a. Official exchange rate	Pesos/\$	57.4	120.2	167.8	257.0	611.4	1,366.7
b. Equilibrium exchange rate	Pesos/\$	46.9	95.8	159.8	243.1	461.9	1,058.6
c. Exchange rate subsidy [(1b*2a)-(1b*2b)]*B	Mil. pesos	12,906.0	47,612.0	15,400.0	24,228.0	172,292.0	305,898.0
3. Fertilizer--							
a. Fertilizer subsidy	Mil. pesos	2,085.0	5,172.0	5,172.0	9,437.0	23,112.0	54,205.0
4. Credit--							
a. Average commercial cost of funds	Pct.	40.4	56.7	51.1	55.9	80.5	95.1
b. Agricultural interest rate	Pct.	12.0	28.6	34.3	37.3	67.3	83.7
c. Principal loaned	Mil. pesos	85,058.7	91,008.4	192,407.0	328,776.3	445,578.6	1,147,365.8
d. Credit subsidy [(4a-4b)/100]*4c	Mil. pesos	24,157.0	25,528.0	32,394.0	61,230.0	58,681.0	131,775.0
F. Total policy transfers to producers:							
1. Total (1d+2c+3a+4d)	Mil. pesos	70,578.0	109,315.0	193,978.0	423,340.0	657,979.0	2,015,486.0
2. Producer subsidy equivalents (F1/D)*100	Pct.	71.3	41.3	42.9	57.1	61.7	74.4

Appendix table 3--Wheat: Calculation of Mexican producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Area harvested	Mil. ha	1	0.9	1	1.2	1.2	1
B. Production	Mil. ton	4.5	3.5	4.5	5.2	4.8	4.4
C. Average producer price	Pesos/ton	6,899.0	14,039.0	25,203.0	37,159.0	62,129.0	139,509.0
D. Producer value (B*C)	Mil. pesos	30,783.0	48,575.0	113,565.0	193,747.0	296,355.0	615,932.0
E. Policy transfers to producers:							
1. Price wedge--							
a. Wholesale price	Pesos/ton	8,762.0	17,830.0	32,008.0	47,192.0	78,904.0	177,176.0
b. Border price	\$/ton	171.9	170.0	165.2	147.0	126.2	123.3
c. Reference price	Pesos/ton	10,726.0	22,186.0	30,103.0	41,036.0	83,794.0	182,966.0
d. Price wedge transfers (1a-1c)*B	Mil. pesos	-8,763.0	-15,073.0	8,584.0	32,099.0	-23,327.0	-25,560.0
2. Exchange rate adjustment--							
a. Official exchange rate	Pesos/\$	57.4	120.2	167.8	257	611.4	1,366.7
b. Equilibrium exchange rate	Pesos/\$	46.9	95.8	159.8	243.1	461.9	1,058.6
c. Exchange rate subsidy [(1b*2a)-(1b*2b)]*B	Mil. pesos	8,063.0	14,352.0	5,919.0	10,642.0	89,960.0	167,690.0
3. Fertilizer--							
a. Fertilizer subsidy	Mil. pesos	1,841.0	4,094.0	5,574.0	9,688.0	23,148.0	53,342.0
4. Credit--							
a. Average commercial cost of funds	Pct.	40.4	56.7	51.1	55.9	80.5	95.1
b. Agricultural interest rate	Pct.	27.9	28.6	34.3	37.3	67.3	83.7
c. Principal loaned	Mil. pesos	14,667.9	17,675.3	41,256.1	72,625.9	88,909.0	190,603.1
d. Credit subsidy [(4a-4b)/100]*4c	Mil. pesos	1,831.0	4,960.0	6,945.0	13,527.0	11,703.0	21,903.0
F. Total policy transfers to producers:							
1. Total (1d+2c+3a+4d)	Mil. pesos	2,973.0	8,334.0	27,021.0	65,957.0	101,484.0	217,375.0
2. Producer subsidy equivalents (F1/D)*100	Pct.	9.7	17.2	23.8	34.0	34.2	35.3

Appendix table 4--Sorghum: Calculation of Mexican producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Area harvested	Mil. ha	1.3	1.5	1.6	1.9	1.5	1.9
B. Production	Mil. ton	4.7	4.8	5.0	6.6	4.8	6.3
C. Average producer price	Pesos/ton	6,403.0	12,212.0	24,268.0	34,159.0	81,790.0	153,242.0
D. Producer value (B*C)	Mil. pesos	30,203.0	59,179.0	120,709.0	255,347.0	395,291.0	965,118.0
E. Policy transfers to producers:							
1. Price wedge--							
a. Wholesale price	Pesos/ton	7,991.0	15,241.0	30,286.0	42,630.0	102,074.0	191,246.0
b. Border price	\$/ton	121.6	143.5	130.1	113.9	94.0	83.0
c. Reference price	Pesos/ton	7,887.0	19,468.0	24,643.0	33,052.0	64,908.0	128,088.0
d. Price wedge transfers (1a-1c)*B	Mil. pesos	490.0	-20,484.0	28,073.0	63,189.0	179,624.0	397,772.0
2. Exchange rate adjustment--							
a. Official exchange rate	Pesos/\$	57.4	120.2	167.8	257	611.4	1,366.7
b. Equilibrium exchange rate	Pesos/\$	46.9	95.8	159.8	243.1	461.9	1,058.6
c. Exchange rate subsidy [(1b*2a)-(1b*2b)]*B	Mil. pesos	6,029.0	16,967.0	5,145.0	10,432.0	67,915.0	161,033.0
3. Fertilizer--							
a. Fertilizer subsidy	Mil. pesos	1,021.0	3,087.0	3,412.0	5,820.0	13,093.0	31,596.0
4. Credit--							
a. Average commercial cost of funds	Pct.	40.4	56.7	51.1	55.9	80.5	95.1
b. Agricultural interest rate	Pct.	27.9	28.6	34.3	37.3	67.3	83.7
c. Principal loaned	Mil. pesos	23,607.6	32,151.3	67,456.2	114,510.7	145,769.3	351,479.2
d. Credit subsidy [(4a-4b)/100]*4c	Mil. pesos	2,948.0	901.05	11,360.0	21,328.0	19,191.0	40,368.0
F. Total policy transfers to producers:							
1. Total (1d+2e+3a+4d)	Mil. pesos	10,488.0	8,585.0	47,990.0	100,769.0	279,823.0	630,820.0
2. Producer subsidy equivalents (F1/D)*100	Pct.	34.7	14.5	39.8	44.7	70.8	65.4

Appendix table 5--Soybeans: Calculation of Mexican producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Area harvested	Mil. ha	0.4	0.4	0.4	0.5	0.4	0.5
B. Production	Mil. ton	0.6	0.7	0.7	0.9	0.7	0.8
C. Average producer price	Pesos/ton	15,382.0	32,822.0	59,602.0	86,064.0	163,579.0	464,000.0
D. Producer value (B*C)	Mil. pesos	9,968.0	22,516.0	40,827.0	79,953.0	115,978.0	384,192.0
E. Policy transfers to producers:							
1. Price wedge--							
a. Wholesale price	Pesos/ton	17,566.0	37,483.0	68,065.0	98,285.0	186,807.0	529,888.0
b. Border price	\$/ton	248.7	284.6	287.2	228.2	213.2	216.9
c. Reference price	Pesos/ton	16,513.0	39,536.0	55,694.0	67,792.0	150,708.0	342,736.0
d. Price wedge transfers (1a-1c)*B	Mil. pesos	682.0	-1,408.0	8,474.0	28,328.0	25,594.0	154,962.0
2. Exchange rate adjustment--							
a. Official exchange rate	Pesos/\$	57.4	120.2	167.8	257.0	611.4	1366.7
b. Equilibrium exchange rate	Pesos/\$	46.9	95.8	159.8	243.1	461.9	1058.6
c. Exchange rate subsidy [(1b*2a)-(1b*2b)]*B	Mil. pesos	1,694.0	4,764.0	1,564.0	2,943.0	22,593.0	55,344.0
3. Fertilizer--							
a. Fertilizer subsidy	Mil.pesos	659.0	1,765.0	1,927.0	3,838.0	7,581.0	9,562.0
4. Credit--							
a. Average commercial cost of funds	Pct.	40.4	56.7	51.1	55.9	80.5	95.1
b. Agricultural interest rate	Pct.	27.9	28.6	34.3	37.3	67.3	83.7
c. Principal loaned	Mil. pesos	4,338.4	7,056.5	13,736.9	25,515.1	29,360.6	80,438.0
d. Credit subsidy [(4a-4b)/100]*4c	Mil. pesos	540.0	1,980.0	2,315.0	4,748.0	3,864.0	9,233.0
F. Total policy transfers to producers:							
1. Total (1d+2c+3a+4d)	Mil. pesos	3,576.0	7,100.0	14,280.0	39,857.0	59,632.0	229,100.0
2. Producer subsidy equivalents (F1/D)*100	Pct.	35.9	31.5	35.0	49.9	51.4	59.6

Appendix table 6--Dry beans: Calculation of Mexican producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Area harvested	Mil. ha	1.6	2.0	1.7	1.8	1.8	1.8
B. Production	Mil. ton	0.9	1.3	1.0	0.9	1.1	1.0
C. Average producer price	Pesos/ton	19,451.0	31,243.0	50,067.0	156,421.0	270,888.0	490,396.0
D. Producer value (B*C)	Mil. pesos	18,342.0	40,654.0	48,765.0	142,656.0	293,913.0	502,166.0
E. Policy transfers to producers:							
1. Price wedge--							
a. Wholesale price	Pesos/ton	21,182.0	34,024.0	54,523.0	170,342.0	294,997.0	534,041.0
b. Border price	\$/ton	566.3	488.5	522.8	483.1	523.8	527.5
c. Reference price	Pesos/ton	37,342.0	67,354.0	100,699.0	142,513.0	367,590.0	827,682.0
d. Price wedge transfers (1a-1c)*B	Mil. pesos	-15,239.0	-42,784.0	-44,975.0	25,381.0	-78,764.0	-300,688.0
2. Exchange rate adjustment--							
a. Official exchange rate	Pesos/\$	57.4	120.2	167.8	257.0	611.4	1,366.7
b. Equilibrium exchange rate	Pesos/\$	46.9	95.8	159.8	243.1	461.9	1,058.6
c. Exchange rate subsidy [(1b*2a)-(1b*2b)]*B	Mil. pesos	5,612.0	15,282.0	4,049.0	6,115.0	84,918.0	166,440.0
3. Fertilizer--							
a. Fertilizer subsidy	Mil. pesos	644.0	1,214.0	1,001.0	1,292.0	4,781.0	14,743.0
4. Credit--							
a. Average commercial cost of funds	Pct.	40.4	56.7	51.1	55.9	80.5	95.1
b. Agricultural interest rate	Pct.	12.0	28.6	34.3	37.3	67.3	83.7
c. Principal loaned	Mil. pesos	29,918.0	32,219.4	54,902.0	92,223.4	145,459.2	387,701.2
d. Credit subsidy [(4a-4b)/100]*4c	Mil. pesos	8,497.0	9,036.0	9,246.0	17,178.0	19,154.0	44,525.0
F. Total policy transfers to producers:							
1. Total (1d+2c+3a+4d)	Mil. pesos	-485.0	-17,253.0	-30,680.0	49,966.0	30,089.0	-74,980.0
2. Producer subsidy equivalents (F1/D)*100	Pct.	-2.6	-43.1	-62.9	35.0	10.2	-14.9

Appendix table 7--Sesameseed: Calculation of Mexican producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Area harvested	Mil. ha	0.1	0.2	0.1	0.1	0.1	0.1
B. Production	Mil. ton	0.0	0.1	0.1	0.1	0.1	0.1
C. Average producer price	Pesos/ton	35,058.0	58,902.0	106,364.0	142,845.0	277,370.0	360,389.0
D. Producer value (B*C)	Mil. pesos	1,122.0	5,124.0	6,488.0	10,713.0	16,365.0	18,380.0
E. Policy transfers to producers:							
1. Price wedge--							
a. Wholesale price	Pesos/ton	35,058.0	58,902.0	106,364.0	142,845.0	277,370.0	360,389.0
b. Border price	\$/ton	741.5	692.0	644.4	565.0	482.6	540.7
c. Reference price	Pesos/ton	42,590.0	83,154.0	108,119.0	145,195.0	295,031.0	738,964.0
d. Price wedge transfers (1a-1b)*B	Mil. pesos	-241.0	-2,110.0	-107.0	-176.0	-1,042.0	-19,307.0
2. Exchange rate adjustment--							
a. Official exchange rate	Pesos/\$	57.4	120.2	167.8	257	611.4	1,366.7
b. Equilibrium exchange rate	Pesos/\$	46.9	95.8	159.8	243.1	461.9	1,058.6
c. Exchange rate subsidy [(1b*2a)-(1b*2b)]*B	Mil. pesos	249.0	1,469.0	313.0	588.0	4,255.0	8,496.0
3. Fertilizer--							
a. Fertilizer subsidy	Mil. pesos	66.0	176.0	202.0	408.0	1,307.0	1,223.0
4. Credit--							
a. Average commercial cost of funds	Pct.	40.4	56.7	51.1	55.9	80.5	95.1
b. Agricultural interest rate	Pct.	27.9	28.6	34.3	37.3	67.3	83.7
c. Principal loaned	Mil. pesos	1,709.1	2,881.6	6,368.1	9,837.2	11,372.1	28,228.2
d. Credit subsidy [(4a-4b)/100]*4c	Mil. pesos	214.0	811.0	1,070.0	1,835.0	1,498.0	3,237.0
F. Total policy transfers to producers:							
1. Total (1d+2c+3a+4d)	Mil. pesos	288.0	346.0	1,478.0	2,656.0	6,017.0	-6,351.0
2. Producer subsidy equivalents (F1/D)*100	Pct.	25.7	6.8	22.8	24.8	36.8	-34.6

Appendix table 8--Cotton: Calculation of Mexican producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Area harvested	Mil. ha	0.2	0.2	0.3	0.2	0.1	0.2
B. Production (lint cotton)	Mil. ton	0.2	0.2	0.3	0.2	0.1	0.2
C. Average producer price	Pesos/ton	82,663.0	211,864.0	285,745.0	322,505.0	764,161.0	2,401,256.0
D. Producer value (B*C)	Mil. pesos	15,541.0	46,186.0	77,151.0	70,951.0	106,218.0	528,276.0
E. Policy transfers to producers:							
1. Price wedge--							
a. Wholesale price	Pesos/ton	82,663.0	211,864.0	285,745.0	322,505.0	764,161.0	2,401,256.0
b. Border price	\$/ton	1,522.9	1,776.6	1,706.7	1,243.7	982.3	1,571.6
c. Reference price	Pesos/ton	87,474.0	213,497.0	286,340.0	319,572.0	600,535.0	2,147,953.0
d. Price wedge transfers (1a-1c)*B	Mil. pesos	-904.0	-302.0	-112.0	551.0	30,762.0	47,021.0
2. Exchange rate adjustment--							
a. Official exchange rate	Pesos/\$	57.4	120.2	167.8	257	611.4	1,366.7
b. Equilibrium exchange rate	Pesos/\$	46.9	95.8	159.8	243.1	461.9	1,058.6
c. Exchange rate subsidy [(1b*2a)-(1b*2b)]*B	Mil. pesos	3,009.0	8,150.0	2,551.0	3,245.0	27,596.0	91,037.0
3. Fertilizer--							
a. Fertilizer subsidy	Mil. pesos	609	1,629	1,847	1,756	3,515	10,060
4. Credit--							
a. Average commercial cost of funds	Pct.	40.4	56.7	51.1	55.9	80.5	95.1
b. Agricultural interest rate	Pct.	27.9	28.6	34.3	37.3	67.3	83.7
c. Principal loaned	Mil. pesos	2,723.2	4,356.4	12,008.4	11,143.7	11,372.1	38,720.2
d. Credit subsidy [(4a-4b)/100]*4c	Mil. pesos	340	1,222	2,020	2,075	1,498	4,436
F. Total policy transfers to producers:							
1. Total (1d+2c+3a+4d)	Mil. pesos	3,053.0	10,693.0	6,307.0	7,627.0	63,370.0	153,155.0
2. Producer subsidy equivalents (F1/D)*100	Pct.	19.6	25.2	8.2	10.8	59.7	29.0

Appendix table 9--Calculation of Mexican consumer subsidy equivalents

Item	Unit	Definition and sources
A. Consumption	Mil. ton	Commercial production plus imports. Source: (6, 18).
B. Wholesale price	Pesos/ton	Average producer price plus an internal marketing margin. Sources: prices (6); marketing margins (5).
C. Consumer value (A*B)	Mil. pesos	
D. Policy transfers to consumers:		
1. Price wedge--		
a. Border price	Pesos/ton	F.o.b. (gulf) price plus ocean freight for all crops except dry beans and sesameseed. Trade unit values plus ocean freight for dry beans and sesameseed. Sources: prices (6); ocean freight (World Bank); trade unit values (1, 13).
b. Reference price	\$/ton	Border prices converted to pesos at the official exchange rate, plus marketing margins. Sources: exchange rate (2); marketing margins (5).
c. Price wedge transfer (1b-B)*A	Mil. pesos	
2. Exchange rate adjustment--		
a. Official exchange rate	Pesos/\$	Source: (2).
b. Equilibrium exchange rate	Pesos/\$	Parity exchange rate based on the relationship between U.S. and Mexican wholesale price indices (2, 11). Source: USDA/ERS estimates.
c. Exchange rate subsidy [(1a*2b)-(1a*2a)]*A	Mil. pesos	
3. CONASUPO price policy--		
a. Purchase price	Pesos/ton	Source: (3).
b. Sales price	Pesos/ton	Source: (3).
c. Volume of sales	Thou. ton	Source: (3).
d. CONASUPO subsidy [(3a-3b)*3c]/1,000	Mil. pesos	
4. Direct CONASUPO subsidy to wheat and corn millers	Mil. pesos	Only for 1983-86; Source: (9).
5. Low-income subsidy for corn	Mil. pesos	Only for 1986-87; Source: (9).
E. Total policy transfers to consumers:		
1. Total (1c+2c+3d+4+5)	Mil. pesos	
2. Consumer subsidy equivalents (E1/C)*100	Pct.	

Appendix table 10--Wheat: Calculation of Mexican consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Consumption	Mil. ton	4.5	4.0	5.0	5.3	5.2	5.2
B. Wholesale price	Pesos/ton	8,762.0	17,830.0	32,008.0	47,192.0	78,904.0	177,176
C. Consumer value (A*B)	Mil. pesos	39,533	71,782	159,943	250,400	412,904	915,468
D. Policy transfers to consumers:							
1. Price wedge--							
a. Border price	\$/ton	171.9	170.0	165.2	147.0	126.2	123.3
b. Reference price	Pesos/ton	10,726	22,186	30,103	41,036	83,794	182,966
c. Price wedge transfer (1b-B)*A	Mil. pesos	8,861.0	17,538.0	-9,519.0	-32,666.0	25,591.0	29,917
2. Exchange rate adjustment--							
a. Official exchange rate	Pesos/\$	57.4	120.2	167.8	257.0	611.4	1,366.7
b. Equilibrium exchange rate	Pesos/\$	46.9	95.8	159.8	243.1	461.9	1,058.6
c. Exchange rate subsidy [(1a*2b)-(1a*2a)]*A	Mil. pesos	-8,154.0	-16,700.0	-6,564.0	-10,830.0	-98,692.0	-196,055.0
3. CONASUPO price policy--							
a. Purchase price	Pesos/ton	8,620.0	17,932.6	30,942.0	45,007.9	74,968.4	152,557.0
b. Sales price	Pesos/ton	6,047.0	12,058.5	21,024.7	37,102.5	67,102.3	129,510.0
c. Volume of sales	Thou. ton	3,334.0	2,866.0	2,035.0	1,095.0	2,291.0	1,298.0
d. CONASUPO subsidy [(3a-3b)*3c]/1,000	Mil. pesos	8,576.0	16,725.0	21,009.0	7,519.0	48,836.0	29,915.0
4. Direct CONASUPO subsidy to millers	Mil. pesos	--	44,321.0	75,391.0	56,530.0	17,754.0	--
5. Low-income subsidy for corn	Mil. pesos	--	--	--	--	--	--
E. Total policy transfers to consumers:							
1. Total (1c+2c+3d+4+5)	Mil. pesos	9,283.0	61,884.0	80,317.0	20,553.0	-6,511.0	-136,223
2. Consumer subsidy equivalents (E1/C)*100	Pct.	23.5	86.2	50.2	8.2	-1.6	-14.9

-- = Not available.

Appendix table 11--Corn: Calculation of Mexican consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Consumption	Mil. ton	10.3	10.6	9.7	10.5	10.7	10.7
B. Wholesale price	Pesos/ton	11,153	23,128	39,913	60,054	103,979	266,705
C. Consumer value (A*B)	Mil. pesos	114,661	244,156	387,229	629,361	1,111,227	2,847,609
D. Policy transfers to consumers:							
1. Price wedge--							
a. Border price	\$/ton	121.2	149.4	149.8	123.8	98.4	85.8
b. Reference price	Pesos/ton	8,050	20,754	29,051	36,765	69,520	135,511
c. Price wedge transfer (1b-B)*A	Mil. pesos	-31,902	-25,058	-105,384	-244,065	-368,264	-1,400,758
2. Exchange rate adjustment--							
a. Official exchange rate	Pesos/\$	57.4	120.2	167.8	257	611.4	1,366.7
b. Equilibrium exchange rate	Pesos/\$	46.9	95.8	159.8	243.1	461.9	1,058.6
c. Exchange rate subsidy [(1a*2b)-(1a*2a)]*A	Mil. pesos	-13,099	-38,483	-11,553	-18,004	-157,093	-281,869
3. CONASUPO price policy--							
a. Purchase price	Pesos/ton	8,076	19,354	28,067	43,891	75,866	137,064
b. Sales price	Pesos/ton	5,389	8,738	12,745	24,802	46,870	131,650
c. Volume of sales	Thou. ton	4,899	4,769	4,442	4,473	3,791	3,223
d. CONASUPO subsidy [(3a-3b)*3c]/1,000	Mil. pesos	13,163.6	50,627.7	68,060.3	85,385.1	109,923.8	17,449.3
4. Direct CONASUPO subsidy to millers	Mil. pesos	--	8,571	12,887	47,761	53,500	--
5. Low-income subsidy	Mil. pesos	--	--	--	--	6,500	29,500
E. Total policy transfers to consumers:							
1. Total (1c+2c+3d+4+5)	Mil. pesos	-31,837.4	-4,342.3	-35,989.7	-128,922.	-355,433.	-1,635,678
2. Consumer subsidy equivalents (E1/C)*100	Pct.	-27.8	-1.8	-9.3	-20.5	-32	-57.4

-- = Not available.

Appendix table 12--Sorghum: Calculation of Mexican consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Consumption	Mil. ton	7.9	8.2	7.5	7.2	5.7	7.3
B. Wholesale price	Pesos/ton	7,991.0	15,241.0	30,286.0	42,630.0	102,074.0	191,246
C. Consumer value (A*B)	Mil. pesos	63,480	124,592	225,786	307,962	581,107	1,395,331
D. Policy transfers to consumers:							
1. Price wedge--							
a. Border price	\$/ton	121.6	143.5	130.1	113.9	94.0	83.0
b. Reference price	Pesos/ton	7,887	19,468	24,643	33,052	64,908	128,088
c. Price wedge transfer (1b-B)*A	Mil. pesos	-826.0	34,556.0	-42,075.0	-69,195.0	-211,587.0	-459,648
2. Exchange rate adjustment--							
a. Official exchange rate	Pesos/\$	57.4	120.2	167.8	257.0	611.4	1,366.7
b. Equilibrium exchange rate	Pesos/\$	46.9	95.8	159.8	243.1	461.9	1,058.6
c. Exchange rate subsidy [(1a*2b)-(1a*2a)]*A	Mil. pesos	-10,154.0	-28,622.0	-7,711.0	-11,424.0	-80,000.0	-186,422.0
3. CONASUPO price policy--							
a. Purchase price	Pesos/ton	6,894.0	17,536.0	25,539.0	32,828.0	83,726.0	130,303.0
b. Sales price	Pesos/ton	4,990.0	8,870.0	17,945.0	32,676.0	51,242.0	119,684.0
c. Volume of sales	Thou. ton	4,381.0	4,162.0	4,084.0	3,687.0	937.0	1,230.0
d. CONASUPO subsidy [(3a-3b)*3c]/1,000	Mil. pesos	8,341.4	36,067.9	31,013.9	560.4	30,437.5	13,061.4
4. Direct CONASUPO subsidy to millers	Mil. pesos	--	--	--	--	--	--
5. Low-income subsidy	Mil. pesos	--	--	--	--	--	--
E. Total policy transfers to consumers:							
1. Total (1c+2c+3d+4+5)	Mil. pesos	-2,638.6	42,001.9	-18,772.1	-80,058.6	-261,149.5	-633,009
2. Consumer subsidy equivalents (E1/C)*100	Pct.	-4.2	33.7	-8.3	-26.0	-44.9	-45.4

-- = Not available.

Appendix table 13--Dry beans: Calculation of Mexican consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Consumption	Mil. ton	0.7	1.1	0.9	0.9	0.9	0.8
B. Wholesale price	Pesos/ton	21,182	34,024	54,523	170,342	294,997	534,041
C. Consumer value (A*B)	Mil. pesos	15,002	36,763	47,735	147,006	251,559	426,832
D. Policy transfers to consumers:							
1. Price wedge--							
a. Border price	\$/ton	566.3	488.5	522.8	483.1	523.8	527.5
b. Reference price	Pesos/ton	37,342	67,394	100,699	142,513	367,590	827,682
c. Price wedge transfer (1b-B)*A	Mil. pesos	11,445	36,057	40,427	-24,017	61,904	234,693
2. Exchange rate adjustment--							
a. Official exchange rate	Pesos/\$	57.4	120.2	167.8	257	611.4	1,366.7
b. Equilibrium exchange rate	Pesos/\$	46.9	95.8	159.8	243.1	461.9	1,058.6
c. Exchange rate subsidy [(1a*2b)-(1a*2a)]*A	Mil. pesos	-4,215	-12,879	-3,639	-5,787	-66,741	-129,779
3. CONASUPO price policy--							
a. Purchase price	Pesos/ton	21,512	29,591	44,132	153,599	308,730	1,008,042
b. Sales price	Pesos/ton	16,161	21,850	29,110	65,279	194,224	360,361
c. Volume of sales	Thou. ton	546	596	578	345	250	418
d. CONASUPO subsidy [(3a-3b)*3c]/1,000	Mil. pesos	2,921.6	4,613.6	8,682.7	30,437	28,626.5	270,730.7
4. Direct CONASUPO subsidy to millers	Mil. pesos	--	--	--	--	--	--
5. Low-income subsidy	Mil. pesos	--	--	--	--	--	--
E. Total policy transfers to consumers:							
1. Total (1c+2c+3d+4+5)	Mil. pesos	10,151.6	27,791.6	45,447	633	23,789.5	375,392
2. Consumer subsidy equivalents (E1/C)*100	Pct.	67.7	75.6	95.3	0.4	9.5	87.9

-- = Not available.

Appendix table 14--Soybeans: Calculation of Mexican consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Consumption	Mil. ton	1.7	2.1	2.1	1.9	1.8	1.8
B. Wholesale price	Pesos/ton	17,566	37,483	68,065	98,285	186,807	529,888
C. Consumer value (A*B)	Mil. pesos	30,179	79,763	143,958	189,592	335,693	970,755
D. Policy transfers to consumers:							
1. Price wedge--							
a. Border price	\$/ton	248.7	284.6	287.2	228.2	213.2	216.9
b. Reference price	Pesos/ton	16,513	39,536	55,694	67,792	150,708	342,736
c. Price wedge transfer (1b-B)*A	Mil. pesos	-1,809	4,369	-26,165	-58,822	-64,870	-342,862
2. Exchange rate adjustment--							
a. Official exchange rate	Pesos/\$	57.4	120.2	167.8	257	611.4	1,366.7
b. Equilibrium exchange rate	Pesos/\$	46.9	95.8	159.8	243.1	461.9	1,058.6
c. Exchange rate subsidy [(1a*2b)-(1a*2a)]*A	Mil. pesos	-4,490	-14,777	-4,829	-6,110	-57,263	-122,329
3. CONASUPO price policy--							
a. Purchase price	Pesos/ton	16,067	35,354	58,498	65,721	209,759	385,027
b. Sales price	Pesos/ton	13,609	23,370	32,544	57,463	120,555	420,012
c. Volume of sales	Thou. ton	822	1,095	1,940	523	65	186
d. CONASUPO subsidy [(3a-3b)*3c]/1,000	Mil. pesos	2,020.5	13,122.5	50,350.8	4,318.9	5,798.3	-6,507.2
4. Direct CONASUPO subsidy to millers	Mil. pesos	--	--	--	--	--	--
5. Low-income subsidy	Mil. pesos	--	--	--	--	--	--
E. Total policy transfers to consumers:							
1. Total (1c+2c+3d+4+5)	Mil. pesos	-4,278.5	2,714.5	19,356.8	-60,613.1	-116,334	-471,706
2. Consumer subsidy equivalents (E1/C)*100	Pct.	-14.2	3.4	13.4	-32	-34.7	-48.6

-- = Not available.

VENEZUELA

Donna Roberts, Cecilia Gorriz, and Christine Bolling

Introduction

Venezuela's oil earnings multiplied dramatically during the oil boom years of the 1970's, providing the government with the revenue to pursue a development plan that aimed to rapidly transform Venezuela into a modern industrial state. One of the most notable disappointments of this development plan was the subsequent performance of Venezuela's agricultural sector. For years, the Government of Venezuela (GOV) invested petrodollars in its agricultural sector to counter the effects of its overvalued exchange rate, but its policies insulated farmers from international markets and made them dependent on the subsidies and protection that the GOV provided. At the same time, the GOV's consumption and macroeconomic policies fueled Venezuela's exploding demand for food. By 1982, Venezuela had to import almost 50 percent of its food supply.

During the 1980's, the GOV redoubled its efforts to create a strong agricultural sector. But after several years of declining oil revenues and dwindling foreign loans, the Government has found that it can no longer maintain its complex network of policies. This report presents PSE's that quantify the GOV's intervention in agricultural markets during 1982-87 and provides an estimate of the effects of dismantling this network on Venezuela's producers and consumers.

Economic and Agricultural Developments, 1982-87

Declining oil prices in 1982, in conjunction with the onset of the Latin American debt crisis, severely crippled the Venezuelan economy. Venezuela's export revenues fell by nearly 20 percent in 1982; by 1987, they had fallen nearly 50 percent from 1981 levels. Emergency measures were needed in order to prevent a serious imbalance in Venezuela's external account. In February 1983, the GOV increased import restrictions and introduced a multitiered exchange rate that effectively devalued the bolivar to control imports. Shortly thereafter, the newly elected government decided to increase its support to agricultural producers to reduce Venezuela's food import bill.

The agricultural development program seemed to work initially. The agricultural sector registered a high average annual rate of growth over the next four years, growing faster than the gross domestic product (GDP). Coarse grain production, the primary target of the GOV's import substitution policies, expanded significantly.

The increase in the ratio of domestic production to total consumption in some of the principal food categories was accomplished by the GOV's reducing or eliminating imports. The GOV's border policies raised the relative prices of these items so sharply that demand and supply were equated at a lower consumption level. Retail

food prices rose significantly faster than both the consumer price index (CPI) and average household incomes despite the GOV's efforts to control food prices.

The GOV's agricultural development plan of 1984-88 had been predicated on the eventual strengthening of world oil prices. Oil prices did improve somewhat during some years in the 6-year period, but not enough to relieve Venezuela's economic dilemma. By the end of the 1980's, Venezuela was no longer able to sustain a high level of agricultural growth built on subsidies and administrative fiat rather than underlying economic fundamentals. The GOV's policies had encouraged "farmers of opportunity" to plant unsuitable crops on marginal lands, using intensive chemical fertilization. The result was a weak agricultural sector rather than a strong one (11).¹

By 1989, Venezuela was unable to meet its debt repayment obligations and began to restructure its economy by opening it up to the world market. In 1989, for example, the new government began to implement a number of macroeconomic and trade policy reforms. The GOV has also signaled its intention to rationalize its agricultural policies in the near future.

Policies in the 1980's

Throughout the 1980's, the GOV continued to pursue policies that were designed to encourage development through import substitution, during periods of both fiscal austerity (1982-84) and fiscal expansion (1985-88). Troubling economic indicators signaled the need to enact structural economic reforms during 1982-87, but Venezuelan policymakers postponed difficult political choices hoping that rising oil prices would make these choices unnecessary.

Macroeconomic and Trade Policy Developments

The two policy measures that had the most pervasive influence on resource allocation throughout Venezuela's general economy during the 1980's were its multi-tiered exchange rate and its system of import licensing. The import licensing regime protected Venezuelan producers from foreign competition; the multi-tiered exchange rate subsidized consumers and processors of designated products. Both policies were cornerstones around which the GOV constructed its import substitution development agenda.

The multiple exchange rate system consisted of a preferred, a fixed, and a floating rate. Essential items were admitted at the preferential rate, exports and non-essential imports qualified for a fixed exchange rate, and luxury imports and most services entered at a free rate. Importers purchased more dollars with their bolivares with the preferential and fixed exchange rates than when they purchased dollars on the open currency market. These rates, therefore, effectively reduced the price of the qualifying imports.

¹ Underscored numbers in parentheses are listed in References at the end of this section.

The preferential exchange rate was used for the importation of raw materials (including wheat, sorghum, and soybeans) for the production of foodstuffs by domestic agroindustries. It was also used for certain agricultural inputs and powdered milk. The domestic processing industry was forced by means of retail price controls to pass along its foreign exchange savings to the consumers of the final products.

The import licensing system consisted of nine customs classifications or notas defining imports that were permitted, prohibited, or restricted to a government agency. The GOV did not import commodities in its own name when imports were restricted to a government agency, but rather issued import delegations to private importers (11).

The Ministry of Agriculture (MAC) managed these delegations under its contingentamiento or contingency program for agricultural and agroindustrial products. Under this program, the MAC projected what was necessary to balance the supply and demand of basic commodities, particularly for wheat, feed grains, and oilseeds. Import licenses were issued to domestic agroindustries only after they had purchased domestically produced agricultural products at "fair" minimum prices set by the government.

In exchange for purchasing the domestic crop at above world-level prices, processors could then import raw materials duty free at the preferential exchange rate. The final products of the Venezuelan food and feed processing industries were protected by this same import licensing program. Only 9 percent of agroindustrial tariff items were freely importable during this period.

Agricultural Policy Developments

In 1982-83, the GOV withdrew or reduced many of the subsidies that its producers had depended on since the early 1960's. In 1984, the new government reinstated a wide variety of policies designed to stimulate growth in the agricultural sector, maintain low and stable consumer prices, and stimulate exports. These policies ranged from direct input subsidies for producers to price controls for consumers. In addition, the GOV used the intricate system of trade and exchange rate policies to support its internal price policies.

Production Policies

Coarse grains, primarily corn and sorghum, were the focal point of the GOV's 1984 production policies. The GOV hoped to achieve self-sufficiency in coarse grains by stimulating large increases in corn production and moderate increases in sorghum production. Rice was also subsidized during 1984, but to a lesser degree than the coarse grains. In the late 1970's the GOV had directed large subsidies toward rice producers in order to reduce wheat imports. These subsidies had produced a surplus in rice by the early 1980's, which the GOV was not eager to maintain.

Production is affected by policies that determine both output and input prices. In Venezuela, output prices are regulated by the manipulation of border policies; prices

of many inputs (particularly fertilizer and credit) have been determined by administrative fiat.

Price policies. The Government manipulated the allocation of import licenses and foreign currency to reduce imports and to ensure that producers of import substitute commodities received a "fair" price for their crops. In view of Venezuela's goal to increase agricultural self-sufficiency, the GOV maintained farm-level prices at levels that were typically more than double the world price during the 1980's. Imports of commodities for which import substitution was possible, (including corn, sorghum, sugar, and powdered milk) declined dramatically during the latter half of the 1980's. Those for which substitution was less possible, such as wheat, declined less.

Fertilizer subsidies. The government has a monopoly on the production, distribution, and importation of fertilizer in Venezuela. When the GOV eliminated fertilizer subsidies in 1981, prices increased dramatically. Fertilizer sales decreased as farmers lowered their application rates and even stopped using fertilizer on some crops, such as sorghum. In 1984, the government reinstated a 50-percent subsidy for fertilizers through two petrochemical subsidiaries of the state-owned petroleum company. The GOV absorbed 80-percent of the cost of mixed fertilizers by 1987. As a result, fertilizer sales quadrupled between 1982 and 1987.

Credit subsidies. Two sources of public sector financing, the Institute of Agricultural Credit (ICAP) and the Agricultural Development Bank (BANDAGRO), provided about 10 percent of the value of agricultural sector loans in Venezuela during 1982-87. Private commercial banks provided the balance, principally because the banks were required to channel 22.5 percent of their loan portfolio to agricultural and agroindustrial activities. Beginning in 1984, both private and public sector lending institutions provided short-term production loans at an annual interest rate of 8.5 percent. In contrast, the average commercial lending rate during 1982-87 varied from a high of 17.3 percent in 1982 to a low of 12.6 percent in 1987.

Consumption Policies

The GOV tried to maintain low and stable consumer prices through both indirect and direct means. Several of Venezuela's trade and exchange rate policies were designed to indirectly lower food prices. Imports of certain basic products, such as wheat flour and vegetable oil, that did not compete with domestic production, entered the country at the preferred (overvalued) exchange rate. Exports of many food items were prohibited, so that supplies of both subsidized and nonsubsidized goods would be maximized, reducing the prices of items in the basic consumption basket. Food consumption was also subsidized indirectly through the GOV's input subsidies; subsidized feed and fertilizer prices were passed along the marketing chain so that consumers paid lower prices for the final food products.

The GOV directly controlled prices of important items in the Venezuelan diet at both the wholesale and retail levels. The maximum prices were set by the government by adding a "normal" marketing margin to the cost-of-production estimates provided by manufacturing firms. These prices were enforced through government inspections. In

addition to controlling prices of basic foods (such as bread, rice, pasta, vegetable oils, and milk), the GOV also paid subsidies directly to manufacturers of cornmeal and whole dry milk to enable them to maintain low retail prices.

Estimation of Policy Intervention in Agriculture

In order to quantify GOV intervention in domestic agricultural production, producer subsidy equivalents were estimated for three commodities: corn, sorghum, and rice. The PSE's are calculated by comparing the net value of subsidies and taxes to the value of production for each commodity.

Commodity Coverage

The three commodities covered in this report include two of Venezuela's principal food grains (corn and rice) and its primary feed input (sorghum). These three commodities accounted for approximately 50 percent of the harvested area and about 12 percent of the value added in agricultural production during 1982-87. Approximately 85 percent of the corn produced is white, destined for direct human consumption in the form of "arepas," a staple in the diet. Rice, too, is an important component in the Venezuelan diet, although per capita consumption has declined as more consumers switched to products made from imported wheat. Grain sorghum is the principal input in mixed feed rations for the Venezuelan poultry and swine industries.

Corn and sorghum figure prominently in Venezuela's agricultural trade balance. On average, these two commodities accounted for nearly 20 percent of the value of agricultural imports during 1982-87. In 1982, the GOV imported two-thirds of Venezuela's corn and sorghum requirements; in 1987, Venezuela imported no corn and only 50 percent of its sorghum requirements. Venezuela did not import any rice until 1987.

PSE Policy Coverage

The Venezuelan PSE estimates were based on estimates of the value of producer price supports, fertilizer subsidies, credit subsidies, and exchange rate effects. The GOV also provided significant support to its agricultural sector through large public sector investment in rural infrastructure, especially irrigation. However, insufficient data on these projects prevented their inclusion in the PSE estimates.

PSE Results by Commodity and Policy

The Venezuelan PSE's confirm the GOV's commitment to support its agricultural sector by stimulating the production of import substitution crops. The highest PSE during 1982-87 was registered for corn (table 1). As a result of the government's extensive subsidies, Venezuela was self-sufficient in corn by 1987, in contrast to 1982 when it imported more than one million tons. Sorghum producers also received a great deal of support as measured by the PSE's. Venezuela sorghum production doubled between 1982 and 1987; nonetheless, Venezuela was still importing 50 percent of its domestic sorghum supplies in 1987 as the demand for feed grains

Table 1--Summary of Venezuelan PSE's

Item	1982	1983	1984	1985	1986	1987
	<u>Percent</u>					
Corn	65.5	50.4	71.9	76.6	79.9	77.6
Sorghum	53.7	42.0	61.2	66.1	67.4	59.5
Rice	47.7	42.3	53.4	62.8	65.9	39.5
Three-commodity aggregate	55.5	45.4	64.0	70.8	74.4	66.5

continued to exceed domestic output. Although the measured PSE for rice was high, it was lower than the coarse grain PSE's in Venezuela (fig. 1). Despite the level of support that the GOV provided rice producers during 1982-87, rice production declined every year (except for 1985) and by 1987 Venezuela was forced to import a small amount of rice.

The producer price wedge, reflecting the GOV's internal pricing policies, was by far the largest component of the Venezuelan PSE's (fig. 2). The price wedge is measured by multiplying the difference between an average domestic producer price and a world market clearing price by the level of domestic production. This wedge measures the effects of the GOV's import licensing regime as well as domestic transportation and marketing costs.² The fact that the numbers are large and positive for all three commodities indicates that Venezuela's prices were substantially above world market prices during 1982-87.

Venezuela's overvalued exchange rate had the second largest effect on the level of support provided to corn, sorghum, and rice producers (table 2). The multitier exchange rate, established to subsidize the consumption of basic commodities that the GOV considered to be important in the Venezuelan diet, implicitly taxed domestic producers. This tax was the largest in 1987 when the price of imports that competed with domestically produced commodities was reduced by approximately 50 percent because of the GOV's policy of admitting these products at the preferred rather than the free market exchange rate.

The fertilizer subsidy was the third most important form of intervention for all three commodities as measured by the PSE's. The size of the subsidy changed significantly for corn, sorghum, and rice during 1982-87. In 1982, domestic producers were forced to purchase their fertilizer from Venezuela's inefficient state-controlled monopoly at prices that were slightly above world prices. In 1984, the GOV began absorbing 50 percent of the cost of fertilizer, and, by 1987, farmers had to pay only 20 percent of their fertilizer costs.

² Unfortunately, Venezuelan marketing margins for the commodities in this study could not be estimated because of the lack of data. This omission has the effect of magnifying the difference between domestic prices and border prices and, therefore, increasing the magnitude of the measured PSE's.

Figure 1
Venezuelan PSE's by commodity

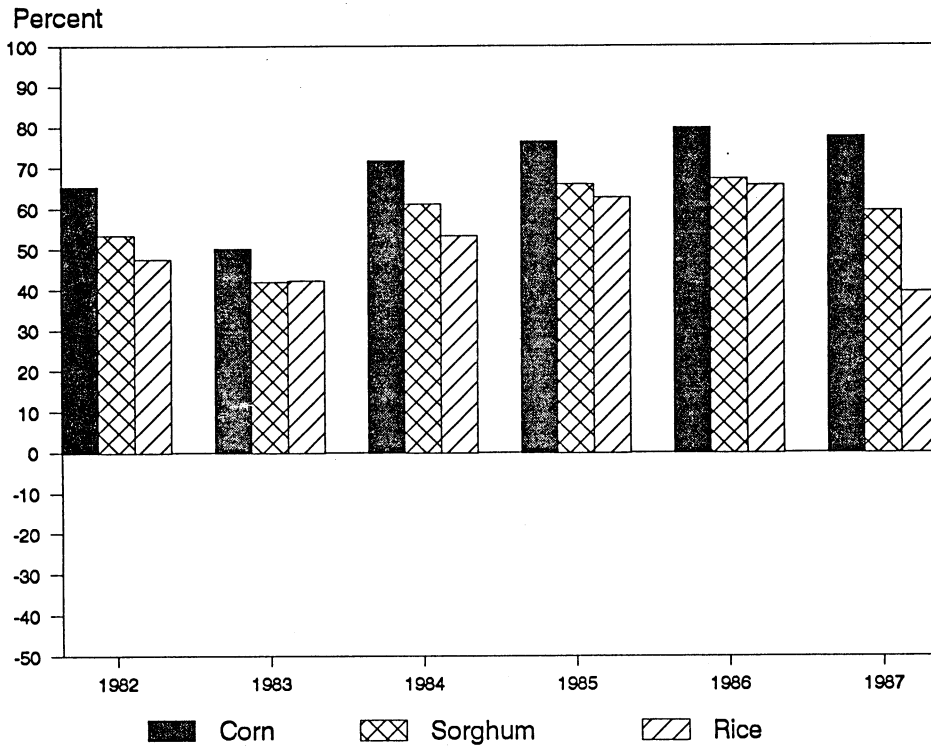


Figure 2
Venezuelan PSE's by policy, 1982-87 average

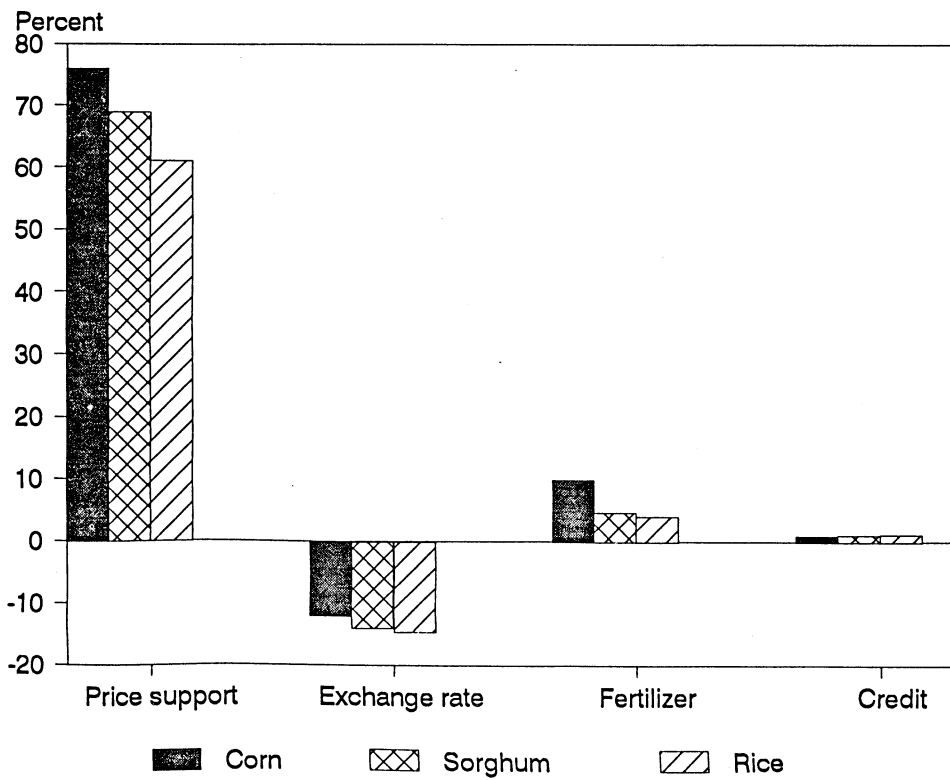


Table 2--Venezuelan PSE's by policy component

Item	1982	1983	1984	1985	1986	1987
	<u>Percent</u>					
Corn:						
Price wedge	69.9	60.8	74.3	81.2	74.0	78.4
Exchange rate adjustment	0	-6.3	-13.8	-14.1	-4.9	-19.4
Fertilizer	-4.5	-4.1	9.6	8.6	9.7	17.6
Credit	0	0	1.8	.9	1.1	1.0
Total	65.5	50.4	71.9	76.6	79.9	77.6
Sorghum:						
Price wedge	63.0	56.9	67.8	77.3	67.8	72.1
Exchange rate adjustment	0	-6.9	-17.3	-17.0	-6.1	-25.1
Fertilizer	-9.4	-8.0	7.8	5.2	4.3	11.3
Credit	0	0	2.9	5	1.4	1.1
Total	53.7	42.0	61.2	66.1	67.4	59.5
Rice:						
Price wedge	50.5	52.3	62.2	74.2	64.3	62.9
Exchange rate adjustment	0	-7.7	-20.3	-19.3	-6.8	-33.3
Fertilizer	-2.8	-2.3	7.6	6.6	7.0	8.8
Credit	0	0	3.9	1.3	1.3	1.2
Total	47.7	42.3	53.4	62.8	65.9	39.5
Three-commodity aggregate:						
Foreign Exchange	0	-6.9	-16.5	-16.0	-5.5	-23.2
Price support	60.4	56.8	69.3	78.6	70.9	74.2
Credit	0	0	2.7	0.9	1.2	1.1
Fertilizer	-4.9	-4.4	8.6	7.4	7.8	14.5
Total	55.5	45.4	64.0	70.8	74.4	66.5

The GOV began to subsidize credit in 1984 by offering short-term production loans at interest rates substantially below commercial rates. The effect of this intervention appears to be negligible compared with other components of the PSE's for all three commodities. However, it is likely that the present methodology significantly understates the magnitude of the GOV's credit subsidies (see Methodology Appendix).

Conclusion

Even though government intervention in the Venezuelan agricultural sector was extensive during the mid-1980's, the government was only partially successful in meeting its policy goals. Trade policies and input subsidies aimed at increasing farm profits and inducing farmers to increase production for the domestic market achieved their objectives. However, policies that were designed to forestall or at least moderate possible increases in the real price of foodstuffs for consumers, which resulted from the GOV's producer policies, fell short of their goals. The unpopularity of unprecedented food price inflation together with the enormous costs of this policy agenda---estimated at US \$1 billion in 1987 alone--prompted the administration that took office in 1989 to abandon many of these policies.

The new administration has adopted a number of macroeconomic and trade reforms aimed at making the economy more competitive by reducing regulations and by allowing the market to have a greater influence on the economy. The exchange rate was unified and floated in early 1989. The GOV also began to eliminate most of its quantitative trade restrictions and to progressively reduce and simplify the tariffs on its imported manufactured products.

Some agricultural policies have been reformed as well. Fertilizer subsidies have been reduced and are scheduled to be eliminated by 1993. Domestic prices of some commodities, including rice, will no longer be supported by the contingentamiento policy. Agricultural loans are made at interest rates that are still below standard commercial bank rates but farmers now pay interest rates that are tied to market rates so that their credit costs do reflect, to some extent, the opportunity cost of capital in Venezuela. Direct consumer subsidies, such as the corn meal subsidy, have also been eliminated. Only the powdered milk subsidy remains intact.

Despite this progress in dismantling the policies that have insulated Venezuela from the world economy, the GOV still maintains tight control over the importing of primary agricultural products and of important agroindustrial commodities. These import restrictions continue to be used to underpin the GOV's domestic producer price regime. Reportedly, the Government will begin to rationalize its agricultural trade policies in 1991, after it completes an in-depth study of the effects of reform on producers, consumers, and public sector expenditures.

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Methodology Appendix

The calculation of PSE's for Venezuelan corn, sorghum and rice includes: (1) an estimate of a price support component that accounts for the effects of farm price supports and import controls; (2) the effects of a multitier exchange rate; (3) credit subsidies; and (4) subsidized fertilizer prices.

Price Wedge

The first step in calculating a price wedge was to subtract a border price, converted from dollars to bolivars using the preferential exchange rate, from an average domestic producer price.³ This difference was then multiplied by total domestic production of that commodity to obtain the total value of producer transfers attributable to the price wedge component of the PSE. This was done for all three commodities and for each year covered in the study.

Exchange Rate Adjustment

According to the International Monetary Fund (IMF), Venezuela's average exchange rate (a trade-weighted average of the preferred, fixed, and floating exchange rates) approximated an equilibrium exchange rate in Venezuela during 1982-87 (2). The reasoning is as follows: if the government would have withdrawn the right of some importers to purchase a dollar for less than the free market rate, they would have been forced to enter the market to purchase dollars for their international transactions. The bolivar, therefore, would have appreciated in value vis-a-vis the dollar. Ultimately, the equilibrium exchange rate (in terms of bolivars per dollar) would have been greater than the previous preferred and fixed rates and less than the previous floating rate. This scenario assumes that the government would not have increased the money supply and that importers would not have altered the quantity of goods that they purchased abroad.

If the average exchange rate represented an equilibrium exchange rate, this implies that the preferred exchange rate was overvalued. Consequently, using the preferred exchange rate to calculate the price-support component of the PSE's overstates the difference between domestic and international prices measured in bolivares. To account for this overestimation, an exchange rate adjustment was calculated by subtracting the average exchange rate multiplied by the border price from the preferred exchange rate multiplied by the border price, and multiplying the difference by the domestic production of each crop.

³ The border price was estimated by adding an ocean freight charge to f.o.b. (U.S. gulf) prices for corn and sorghum and to f.o.b. (Thailand) prices for rice.

Fertilizer Subsidy

The fertilizer PSE was calculated for each of the three commodities by first subtracting the domestic prices of urea and 15-15-15 NPK from their border prices (which were multiplied by the average exchange rate to convert the dollar price into bolivars). Because of insufficient data to calculate a 6-year average of border prices for 12-24-12 NPK, the GOV subsidy for a kilo of 15-15-15 NPK was used as a proxy for the subsidy on a kilo of 12-24-12 NPK. These differences were multiplied by recommended per hectare fertilizer use for each commodity, and then multiplied again by the total number of hectares harvested for each of the three commodities (5).

Credit Subsidy

The credit subsidy component of the PSE's was calculated by first subtracting the subsidized interest rate from the average commercial lending rate offered by private banks, as estimated by the Central Bank of Venezuela (2). This difference was then multiplied by the amount of short-term production loans made to small farmers through ICAP and to medium and large producers through BANDAGRO for each individual crop in each year (3). No data were available on the loans made through Venezuela's private banks.

There is evidence that the default rates on the public sector loans are quite high. Repayment rates for BANDAGRO funds ranged from 57.3 percent to 75.9 percent during 1982-87 (3). These "default subsidies," however, could not be included in estimates of Venezuela's credit PSE's because of insufficient data. Because private sector interest rate subsidies and public sector default subsidies were omitted from this analysis, the current estimate of the credit component of Venezuela's PSE's vastly understates the magnitude of the credit subsidy to Venezuelan producers.

Appendix table 1--Calculation of Venezuelan producer subsidy equivalents

Item	Unit	Definition and sources
A. Area harvested	1,000 ha.	Source: (4).
B. Production	1,000 tons	Source: (4).
C. Average producer price	Bs./ton	Source: (8).
D. Producer value (B*C)/1,000	Mil. Bs.	
E. Policy transfers to producers:		
1. Price wedge--		
a. Border price	\$/ton	F.o.b. (gulf) price plus ocean freight for corn and sorghum. F.o.b. (Thailand) plus ocean freight for rice. Source: (prices): (1). Source: (ocean freight charges): (8).
b. Price wedge transfers $[C-(1a*2a)]*B/1,000$	Mil. Bs.	
2. Exchange rate adjustment--		
a. Preferred exchange rate	Bs./\$	An exchange rate established by the GOV for specified essential goods and qualifying debt service. Source: (8).
b. Average exchange rate	Bs./\$	A trade-weighted average of the preferred, fixed, and floating exchange rates. Approximates an equilibrium exchange rate. Source: (2).
c. Exchange rate transfers $[(1a*2a)-(1a*2b)]*B/1,000$	Mil. Bs.	
3. Fertilizer--		
a. Border price (urea)	Bs./ton	International price plus 10% estimated transport cost. Converted into bolivars using average exchange rate. Source: (1).
b. Domestic price (urea)	Bs./ton	Source: (8).
c. Urea requirements (kg./ha.*A)	1,000 tons	Source: (5).
d. Border price (15-15-15 NPK)	Bs./ton	U.S. domestic price plus 20% estimated transport cost. Converted into bolivars using average exchange rate. Source: (7).
e. Domestic price (15-15-15 NPK)	Bs./ton	Source: (8).
f. NPK requirements (Kg.ha.*A)	1,000 tons	Source: (5).
g. Fertilizer transfers $[(3a-3b)*3c+(3d-3e)*3f]/1,000$	Mil. Bs.	
4. Credit--		
a. Average commercial interest rate	Pct.	Calculated by the Central Bank of Venezuela. Source: (2).
b. Agricultural interest rate	Pct.	Source: (8).
c. Principal loaned	Mil. Bs.	Loans provided by ICAP and BANDAGRO. Source: (4).
d. Credit transfers $4c*(4a-4b)/100$	Mil. Bs.	
F. Total policy transfers to producers:		
1. Total (1b+2c+3g+4d)	Mil. Bs.	
2. Producer subsidy equivalents $(F1/D)*100$	Pct.	

Appendix table 2--Corn: Calculation of Venezuelan producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Area harvested	1,000 ha.	305.0	310.2	312.8	466.7	650.1	685.0
B. Production	1,000 tons	501.0	487.8	547.1	868.4	1,172.8	1,267.3
C. Average producer price	Bs./ton	1,720.0	1,620.0	2,470.0	2,840.0	2,880.0	3,040.0
D. Producer value (B*C)/1,000	Mil. Bs.	861.7	790.2	1,351.3	2,466.3	3,377.7	3,852.6
E. Policy transfers to producers:							
1. Price wedge--							
a. Border price	\$/ton	120.3	147.8	147.8	124.2	99.8	87.6
b. Price wedge transfers [C-(1a*2a)]*B/1,000	Mil. Bs.	602.6	480.2	1,003.6	2,002.5	2,499.9	3,020.1
2. Exchange rate adjustment--							
a. Preferred exchange rate	Bs./\$	4.3	4.3	4.3	4.3	7.5	7.5
b. Average exchange rate	Bs./\$	4.3	5.0	6.6	7.5	8.9	14.2
c. Exchange rate transfers [(1a*2a)-(1a*2b)]*B/1,000	Mil. Bs.	--	-49.8	-186.8	-347.3	-166.2	-748.1
3. Fertilizer--							
a. Border price (urea)	Bs./ton	823.2	745.3	1,358.7	1,230.2	1,145.3	2,001.5
b. Domestic price (urea)	Bs./ton	1,288.0	1,288.0	650.0	650.0	650.0	650.0
c. Urea requirements (kg./ha.*A)	1,000 tons	30.5	31.0	31.3	46.7	65.0	68.5
d. Border price (15-15-15 NPK)	Bs./ton	1,095.2	1,179.6	1,618.1	1,766.5	1,921.4	3,041.7
e. Domestic price (15-15-15 NPK)	Bs./ton	1,318.0	1,318.0	660.0	660.0	660.0	660.0
f. NPK requirements (Kg.ha.*A)	1,000 tons	109.8	111.7	112.6	168.0	234.0	246.6
g. Fertilizer transfers [(3a-3b)*3c+(3d-3e)*3f]/1,000	Mil. Bs.	-38.6	-32.3	130.1	213.0	327.4	679.9
4. Credit--							
a. Average commercial interest rate	Pct.	17.3	16.3	15.3	12.7	12.7	12.6
b. Agricultural interest rate	Pct.	17.3	16.3	8.5	8.5	8.5	8.5
c. Principal loaned	Mil. Bs.	481.1	327.0	360.9	511.7	889.7	960.1
d. Credit transfers 4c*(4a-4b)/100	Mil. Bs.	--	--	24.5	21.5	37.4	39.4
F. Total policy transfers to producers:							
1. Total (1b+2c+3g+4d)	Mil. Bs.	564.0	398.2	971.3	1,889.7	2,698.4	2,991.3
2. Producer subsidy equivalents (F1/D)*100	Pct.	65.5	50.4	71.9	76.6	79.9	77.6

-- = Not applicable

Appendix table 3--Sorghum: Calculation of Venezuelan producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986	1987
A. Area harvested	1,000 ha.	222.2	196.8	238.6	249.6	380.8	390.0
B. Production	1,000 tons	377.3	364.0	472.5	481.4	755.9	777.2
C. Average producer price	Bs./ton	1,400.0	1,400.0	1,740.0	2,180.0	2,200.0	2,280.0
D. Producer value (B*C)/1,000	Mil. Bs.	528.2	509.6	822.2	1,049.5	1,663.0	1,772.0
E. Policy transfers to producers:							
1. Price wedge--							
a. Border price	\$/ton	120.4	140.4	130.2	115.0	94.4	84.8
b. Price wedge transfers $[C-(1a*2a)]*B/1,000$	Mil. Bs.	333.0	289.8	557.6	811.5	1,127.7	1,127.6
2. Exchange rate adjustment--							
a. Preferred exchange rate	Bs./\$	4.3	4.3	4.3	4.3	7.5	7.5
b. Average exchange rate	Bs./\$	4.3	5.0	6.6	7.5	8.9	14.2
c. Exchange rate transfers $[(1a*2a)-(1a*2b)]*B/1,000$	Mil. Bs.	--	-35.3	-142.1	-178.2	-101.3	-444.3
3. Fertilizer--							
a. Border price (urea)	Bs./ton	823.2	745.3	1,358.7	1,230.2	1,145.3	2,001.5
b. Domestic price (urea)	Bs./ton	1,288.0	1,288.0	650.0	650.0	650.0	650.0
c. Urea requirements (kg./ha.*A)	1,000 tons	22.2	19.7	23.9	25.0	38.1	39.0
d. Border price (15-15-15 NPK)	Bs./ton	1,095.2	1,179.6	1,681.1	1,766.5	1,921.4	3,041.7
e. Domestic price (15-15-15 NPK)	Bs./ton	1,318.0	1,318.0	660.0	660.0	660.0	660.0
f. NPK requirements (Kg.ha.*A)	1,000 tons	84.4	74.8	90.7	94.8	144.7	148.2
g. Fertilizer transfers $[(3a-3b)*3c+(3d-3e)*3f]/1,000$	Mil. Bs.	-49.6	-40.6	64.3	55.0	71.7	200.3
4. Credit--							
a. Average commercial interest rate	Pct.	17.3	16.3	15.3	12.7	12.7	12.6
b. Agricultural interest rate	Pct.	17.3	16.3	8.5	8.5	8.5	8.5
c. Principal loaned	Mil. Bs.	325.5	335.5	348.1	127.8	541.6	487.5
d. Credit transfers $4c*(4a-4b)/100$	Mil. Bs.	--	--	23.7	5.4	22.7	20.0
F. Total policy transfers to producers:							
1. Total $(1b+2c+3g+4d)$	Mil. Bs.	283.4	214.0	503.4	693.7	1,120.8	1,053.7
2. Producer subsidy equivalents $(F1/D)*100$	Pct.	53.7	42.0	61.2	66.1	67.4	59.5

-- = Not applicable.

Appendix table 4--Milled rice: Calculation of Venezuelan producer subsidy equivalents

Item Unit	1982	1983	1984	1985	1986	1987	
A. Area harvested ¹	1,000 ha.	227.4	164.4	151.1	180.8	124.1	106.0
B. Production ²	1,000 tons	395.5	292.2	265.1	306.6	209.0	242.6
C. Average producer price ³	Bs./ton	2,461.5	2,446.2	2,938.5	3,800.0	4,000.0	4,630.8
D. Producer value (B*C)/1,000	Mil. Bs.	973.6	714.7	778.9	1,165.0	836.0	1,123.6
E. Policy transfers to producers:							
1. Price wedge--							
a. Border price	\$/ton	283.3	271.5	258.0	227.6	190.3	229.0
b. Price wedge transfers [C-(1a*2a)]*B/1,000	Mil. Bs.	491.7	373.7	484.8	865.1	537.6	707.0
2. Exchange rate adjustment--							
a. Preferred exchange rate	Bs./\$	4.3	4.3	4.3	4.3	7.5	7.5
b. Average exchange rate	Bs./\$	4.3	5.0	6.6	7.5	8.9	14.2
c. Exchange rate transfers [(1a*2a)-(1a*2b)]*B/1,000	Mil. Bs.	--	-54.7	-158.0	-224.7	-56.5	-374.4
3. Fertilizer--							
a. Border price (urea)	Bs./ton	823.2	745.3	1,358.7	1,230.2	1,145.3	2,001.5
b. Domestic price (urea)	Bs./ton	1,288.0	1,288.0	650.0	650.0	650.0	650.0
c. Urea requirements (kg./ha.*A)	1,000 tons	22.7	16.4	15.1	18.1	12.4	10.6
d. Border price (15-15-15 NPK)	Bs./ton	1,095.2	1,179.6	1,618.1	1,766.5	1,921.4	3,041.7
e. Domestic price (15-15-15 NPK)	Bs./ton	1,318.0	1,318.0	660.0	660.0	660.0	660.0
f. NPK requirements (Kg.ha.*A)	1,000 tons	75.7	54.7	50.3	60.2	41.3	35.3
g. Fertilizer transfers [(3a-3b)*3c+(3d-3e)*3f]/1,000	Mil. Bs.	-27.4	-16.5	58.9	77.1	58.3	98.4
4. Credit--							
a. Average commercial interest rate	Pct.	17.3	16.3	15.3	12.7	12.7	12.6
b. Agricultural interest rate	Pct.	17.3	16.3	8.5	8.5	8.5	8.5
c. Principal loaned	Mil. Bs.	549.2	446.2	442.7	348.2	263.4	317.4
d. Credit transfers 4c*(4a-4b)/100	Mil. Bs.	--	--	30.1	14.6	11.1	13.0
F. Total policy transfers to producers:							
1. Total (1b+2c+3g+4d)	Mil. Bs.	464.3	302.4	415.9	732.2	550.5	443.9
2. Producer subsidy equivalents (F1/D)*100	Pct.	47.7	42.3	53.4	62.8	65.9	39.5

-- = Not applicable.

¹ Harvested area of paddy rice.² Paddy rice production multiplied by .65.³ Paddy rice price divided by .65

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