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COLOMBIA: POVERTY ASSESSMENT

CHAPTER 5

MACROECONOMIC POLICY AND POVERTY ALLEVIATION IN COLOMBIA

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The Poverty Assessment Report is being written based on the findings of the mission which visited Colombia May 9-21, 1993. The mission was led by Ernesto May (LA3C1, macroeconomic analysis) and integrated by Ariel Fiszbein (LA3C1, poverty profile), Jacques Van der Gaag (LA3HR, health and education sectors), Eleanor Shreiber (LA3HR, health sector), Isabelle Girardot-Berg (LA3AG, agriculture sector), Anne Marie del Castillo (LA3AG, agriculture sector), Jayme Porto-Carreiro (LA3TF, energy sector), Thakoor Persaud (LA3IN, housing, water and sewerage sectors), William McGreevey (PHN, social safety net), Tim Campbell (LATAD, decentralization and provision of social services) and Guilherme Sedlacek (ESD, labor markets). The report is being produced jointly with the government of Colombia. The counterpart team is led by Carlos Eduardo Velez from the Misión Social in the Department of National Planning and has a group of consultants contracted by the government to produce background papers for each part of the study. The background paper for Chapter 5 was prepared by Eduardo Lora and Ana María Herrera from FEDESARROLLO. The content of this chapter is based largely on their excellent work.

Acronyms

CERT	Tax credit certificate (Certificado de Reembolso Tributario)
CONPES	National Counsel for Economic and Social Policies (Consejo Nacional de Política Económica y Social)
DNP	Department of National Planning (Departamento Nacional de Planeación)
DRI	Integrated Rural Development Program (Desarrollo Rural Integrado)
DTF	Colombian Interest Rate Index (Indice de Tasas de Interés Colombiano)
ECOPETROL	Colombian Oil Enterprise (Empresa Colombiana de Pétroleos)
EMP	Economic Modernization Program
FEDESARROLLO	Foundation for Higher Education and Development (Fundación Para la Educación Superior y Desarrollo)
FNC	National Coffee Fund (Fondo Nacional del Café)
HIMAT	Colombian Institute for Hidrology, Meterology and Land Preparation (Instituto Colombiano de Hidrología, Meteorología y Adecuación de Tierras)
ICA	Colombian Institute for Agriculture (Instituto Colombiano de Agricultura)
IDEMA	Agricultural Marketing Institute (Instituto de Mercadeo Agropecuario)
IMF	International Monetary Fund
INCORA	Colombian Institute for Agrarian Reform (Instituto Colombiano de Reforma Agraria)
INDERENA	National Institute of Renewable Resources and the Environment (Instituto Nacional de Recursos Renovables y del Medio Ambiente)
ISS	Social Security Institute (Instituto de Seguridad Social)
PNR	National Rehabilitation Plan (Plan Nacional de Rehabilitación)
SITC	Standard International Trade Classification

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Chapter 5

Macroeconomic Policy and Poverty Alleviation in Colombia

Colombia's excellent record in macroeconomic management has provided a solid basis for continuous gains in poverty alleviation. Recently, the crisis in the agriculture sector --related to both internal and external shocks-- has led to important reductions in rural income and a corresponding increase in poverty indicators. There is the need to adopt corrective measures to ensure Colombia regains its path to poverty alleviation. In the medium term, the recent oil discoveries of Cusiana provide an excellent opportunity to attain a higher growth path and devote resources to much needed infrastructure and social services that will directly benefit the poor. Good macroeconomic policy is essential if Colombia is to realize these potential benefits. The appropriate macroeconomic policy framework should be based on prudent fiscal policy that ensures continuous gains in the fight against inflation and investment in projects with high economic and social returns. Total factor productivity growth in the agriculture sector, on the other hand, needs to be attained if the rural sector is to benefit from Cusiana's oil bonanza and the poor are to share the windfall gains.

I. Background

1. Colombia's competent macroeconomic management, based on the government's continuous commitment to correcting internal and external imbalances, is best evidenced by its enviable growth record during the 1980s (see Figure 1 and related Table). During the so called "lost decade" in Latin America, Colombia was able to maintain an average growth rate of 3.4 percent p.a. while adjusting to a world-wide recession and to both coffee and oil price swings. Between 1980-85 Colombia's economy grew at an average 2.2 percent p.a., followed by a successful macroeconomic adjustment that raised the average growth rate to 4.5 percent p.a. between 1985-90. Positive economic growth was achieved every single year during the decade. While Colombia's economic growth during the 1980s was not as rapid as in the previous decade, maintaining stability and avoiding a recession provided the basis for continued success in reducing both poverty and inequality during this period.[1]

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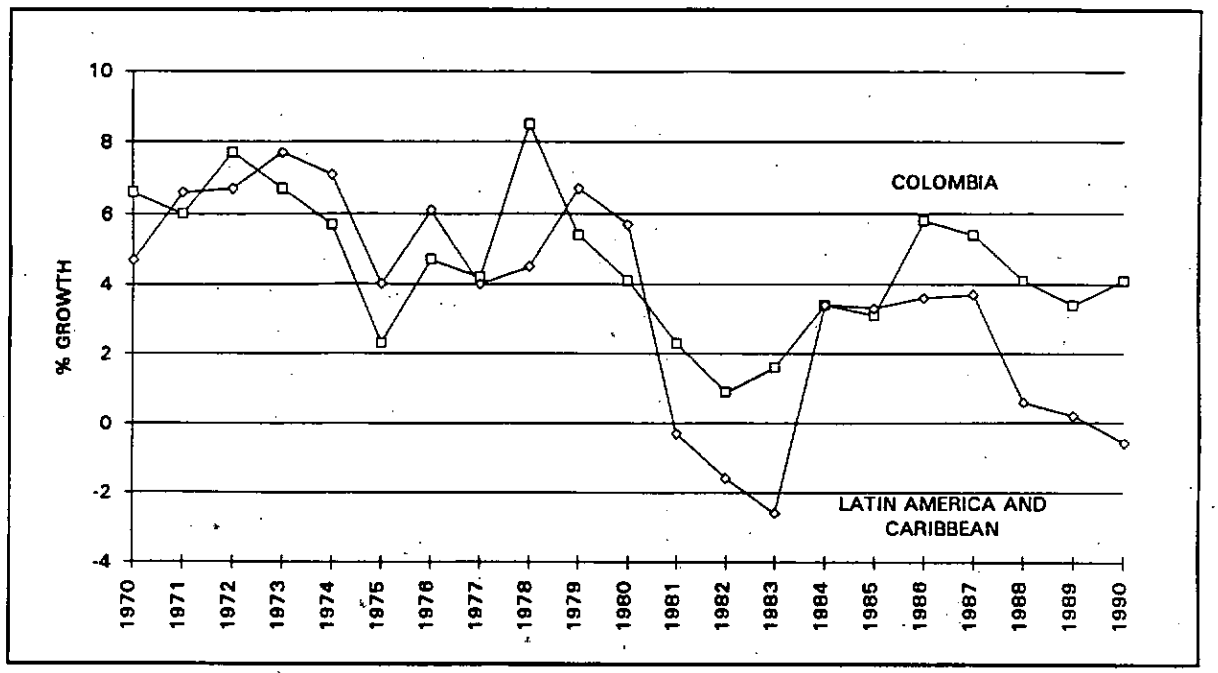
[1] As Morley (1992) indicates, Colombia's slowdown in economic growth during the first part of the 1980s --which led to idle capacity in the economy– provided the basis for an expansionary adjustment and stabilization effort in 1986-90. Combining a depreciation of the real exchange rate of over 50 percent and improvements in the fiscal position the authorities were successful in eliminating the balance of payments deficit, while both employment and real output growth accelerated. The sharp gains in real wages attained in 1980-84 were maintained and poverty reduction throughout the decade was achieved.

Figure 1: GDP GROWTH RATES AT CONSTANT PRICES, 1970 - 1990
(1985 = 100)



ANNUAL GROWTH RATES

1970 - 1990

	COLOMBIA	LATIN AMERICA AND CARIBBEAN
HIGH	8.5	7.7
LOW	0.9	-2.6
MEAN	4.6	3.5
VARIANCE	3.9	9.5

1980 - 1990

HIGH	5.8	5.7
LOW	0.9	-2.6
MEAN	3.5	1.4
VARIANCE	2.2	7.0

Source: IFS

2. The relatively smooth growth of the Colombian economy, however, masked some important structural deficiencies. A closer look at economic performance indicators suggests a lack of dynamism in the economy since the mid-1970s. The contribution of manufacturing to GDP remained relatively constant, growth in non-traditional exports was not diversified, and the manufacturing sector remained oriented towards the domestic market. The low and frequently negative productivity growth observed in most sectors suggests that economic growth had been dependent on increasing capital inputs rather than efficiency gains.[2] To further advance the gains in poverty alleviation, Colombia required to change its growth strategy.

3. Recognizing that macroeconomic measures alone would be insufficient to raise productivity and output growth, and to promote employment and earning opportunities in the long term, in February 1990 the Barco Administration announced its Economic Modernization Program (EMP) to improve efficiency of resource allocation and use. The EMP contained a set of structural reforms and accompanying macroeconomic policies designed to raise economic growth to 5 percent p.a., bring inflation below 20 percent, and reduce the incidence of poverty. The centerpiece of the EMP was a trade reform program, which envisaged the gradual elimination of quantitative restrictions (QRs) on manufactured imports and scheduled reductions in the levels and dispersion of tariffs to reach an average tariff rate of 15 percent in 1994. Taking advantage of a strong balance of payments in 1990-91, the Gaviria Administration advanced the timetable for implementation. The trade reform was put in place in 18 months, rather than the five years originally envisaged. The government also went beyond the original scope of the EMP by extending trade liberalization to agriculture. The state monopoly on imports of key agricultural products was eliminated and a variable tariff scheme was implemented for a selected number of commodities. Although progress in completing a regional trade agreement under the Andean Pact has been slow, Colombia and Venezuela freed their bilateral trade and adopted common external tariffs since February of 1992, and similar agreements were finalized later in August with Ecuador and Bolivia.

4. Besides trade liberalization, the Gaviria Administration actively pursued and broadened the scope of structural reform in Colombia. To improve resource mobility and facilitate the supply response to the new trade regime, reforms in the financial sector authorized ownership of financial institutions by foreign investors and free entry into all segments of the market subject only to prudential requirements. Access to foreign exchange was improved, and the government liberalized direct foreign investment. The labor regime was modified to reduce labor rigidities and facilitate industry restructuring. Reforms in the public sector were to improve the efficiency and focus of public expenditures. The government initiated the process of eliminating public monopolies in sectors critical to trade flows, including railways, ports, shipping, and agricultural marketing. Three of the five banks nationalized during the banking crisis of 1982-85 were privatized, and further

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[2] Since the mid-1970s, total factor productivity growth fell both in absolute terms and as a proportion of output growth. A major contributing factor was the declining productivity of capital, which was also reflected in the increase in the capital-output ratio of the economy. See World Bank (1991), pp. 16-21.

divestment of the government's non-oil industrial holdings is underway. The intention to reorient the role of the state in a liberalized economy was spelled out in the government's 1990-94 Development Plan, which emphasized social sectors, infrastructure, and environmental protection.

5. The process of structural reform during the last two years was accompanied by significant shocks to the economy. In reference to poverty alleviation, probably the most important ones are those that directly affected the agriculture sector: (i) severe drought experienced since the end of 1991; (ii) sharp reduction of the external price of coffee and other agriculture commodities; and (iii) intensification of guerrilla and drug related violence in the rural areas. These shocks were then exacerbated by the real appreciation of the exchange rate --the result of large external capital inflows-- and the restraint of credit to the agriculture sector --an outcome related to the financial crisis experienced by Caja Agraria.

Poverty Alleviation: Major Macroeconomic Challenges

6. The recent decline in rural incomes in Colombia has led, as shown in Chapter 1, to an increase in poverty indicators. Current policy debate, therefore, is focused on reversing the observed deterioration of the rural sector. The Minister of Agriculture has presented an emergency policy package[3] which proposes some backtracking on trade liberalization, and has advocated the use of rural work programs and the depreciation of the exchange rate as instruments to promote growth in the agriculture sector. The program has been received with skepticism by some other ministers in the economic cabinet but is currently under discussion. The debate has led some government officials to question the direction of structural reform in Colombia, arguing it has had a negative impact on employment and has caused hardship to low income groups both in the rural and urban areas. Importantly, even if the reforms are maintained and consolidated --the most likely and desirable case-- the government may need to take compensatory measures including reallocation of public expenditures toward the poor and the development of adequate safety nets.

7. To determine the appropriate instruments to deal with the current crisis in the rural sector in particular, and to promote income-earning opportunities for the poor in general, it is essential to identify the way in which both the structural reforms implemented in Colombia during the last two years and the major shocks in the economy have interacted to produce the recent deterioration in poverty. Only on this basis can one assess whether corrective measures are required, or if there is the need to redefine the current macroeconomic policy framework. Section II analyzes the effects of each of the major reforms and shocks in the income of the poor, and defines a strategy to regain the path for poverty alleviation in Colombia.

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[3] See section II, part D for the details of the proposal and the corresponding policy discussion.

8. In the medium term, the major macroeconomic policy challenge in Colombia is to adjust to the expected oil boom that will result from the exploitation of recent discoveries in Cusiana and Cupiagua, which have more than doubled Colombia's proven oil reserves. The expected oil revenues provide Colombia with an opportunity to attain a higher growth path and to devote resources to much needed infrastructure and social services that will directly benefit the poor. Good macroeconomic management, however, is essential if one is to realize these potential benefits. The experience of countries like Venezuela and Nigeria, which have lived through similar shocks, provides clear indications that caution is required. Section III explores Colombia's medium term macroeconomic perspectives as it adjusts to Cusiana's oil bonanza. In doing so, it incorporates the proposed changes in the social security reform currently being considered by Congress. It then recommends a macroeconomic policy framework aimed at steering Colombia to a course of higher sustainable growth with equity.

II. Structural Reforms, Shocks, Responses and the Poor: 1990-92

9. The purpose of this section is to assess, in terms of poverty alleviation, the effectiveness of macroeconomic management[4] in Colombia during the last two years. Based on a computable general equilibrium model[5], the analysis explores the role of each of the major reforms, shocks and corresponding policy responses, in explaining the observed changes in the income of the poor. By simulating the behavior of the economy between 1990 and 1992 with and without a specific reform (or shock as the case may be), and taking the results without reform as the counterfactual, the model is used to identify its particular effects on the different variables in the economy. All together, the purpose is to determine how the disadvantaged households (those in the lower part of the income distribution) fared from the macroeconomic changes observed in 1990-92. The section begins with an overview of macroeconomic performance of the economy during the last two years and its consequences for the poor. It then presents a brief description of the major reforms and shocks experienced by the economy, and analyzes the role they played in explaining changes in the income of the poor. The analysis is centered around the crisis in the agriculture sector and three main policy reforms which have important income distribution implications: (a) trade liberalization; (b) tax reform; and (c) reform of the labor regime. The section concludes with a summary assessment of the factors behind the income variations observed during the last two years, and a set of resulting policy recommendations.

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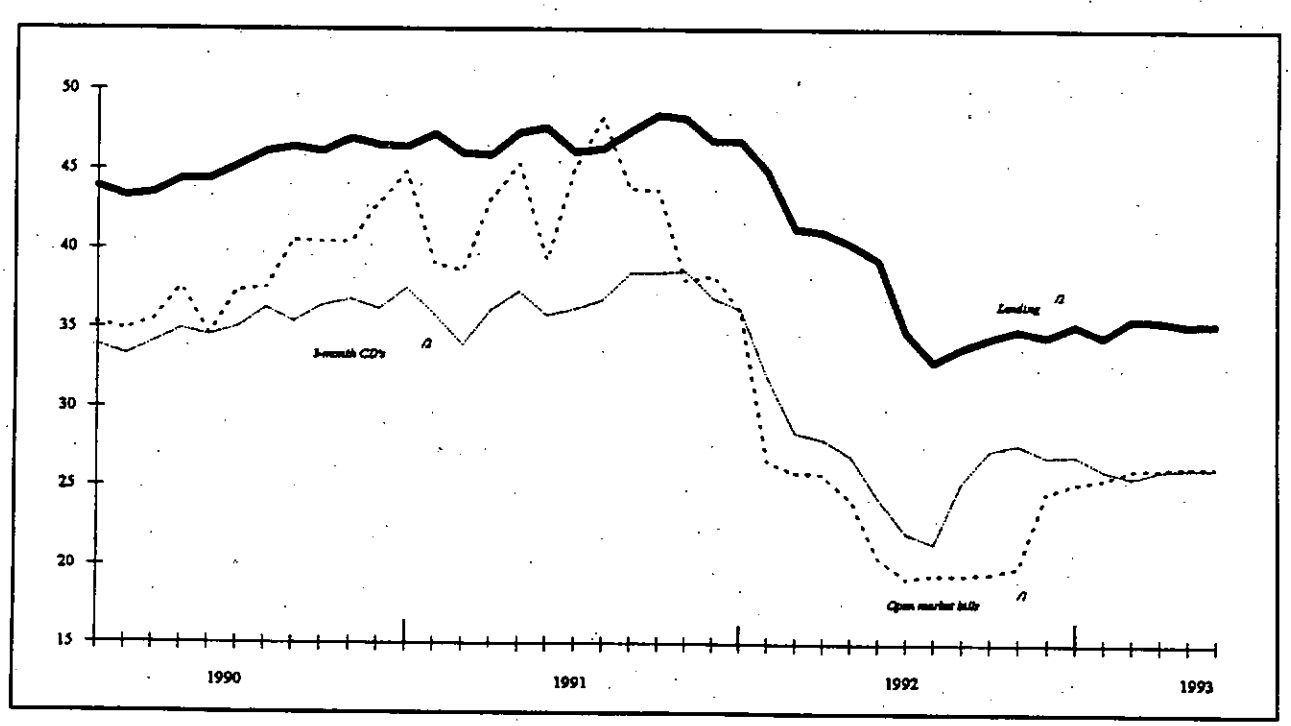
[4] Increased attention is now being given to the role of macroeconomic policy in poverty alleviation --the Bank's Poverty Report (1990) is a good example. Clearly, effective adjustment to negative external shocks is essential if one is to minimize their effects on the poor. Even structural reforms aimed at improving the efficiency of resource use and generating income-earning opportunities for the poor through increased labor demand can, in the short run, lead to deterioration in poverty. Imperfections in the labor market can, during the adjustment process, result in higher unemployment and corresponding declines in labor income. Accompanying demand-reducing measures may hurt the consumption of the poor and the non poor alike.

[5] The model has been developed by FEDESARROLLO. A complete description is presented in the Annex.

A. Macroeconomic Performance and the Poor: 1990-92.

10. During 1990-92 policy makers faced the difficult task of implementing the structural reforms of the EMP, while reducing inflation --which had reached a 15-year peak of 32 percent in December 1990. The government's macroeconomic program for 1991 called, therefore, for tight fiscal and credit policies. As envisaged, the deficit of the non-financial public sector was reduced from 0.6 percent of GDP in 1990 to 0.2 percent in 1991, and domestic interest rates rose sharply (see Figure 2). But this rise --combined with falling world interest rates and a slower depreciation of the exchange rate-- widened the differential between the returns on peso and dollar assets, encouraging strong capital inflows partly fed by drug money. The capital inflows undermined the tight monetary policy, strengthened the balance of payments and led to the appreciation of the real exchange rate. As a response, the government decided to advance the implementation timetable of the trade reform; by accelerating trade liberalization, the government aimed to reduce the growing external imbalance. But success was limited: the current account surplus in 1991 ended above 5 percent of GDP, with gross international reserves increasing to over 9 months of imports of goods and services. The uncertainties related to the stability of the exchange rate and the pace of implementation of the structural reforms caused private expenditures to stagnate. As shown in Table 1, private consumption grew only 0.9 percent during 1991 (-0.7 percent in per-capita terms), private investment fell 14.1 percent, and total imports dropped 3.9 percent. The resulting slow economic growth of 2.1 percent was generated mainly through the expansion of the agriculture sector (5.2 percent) and infrastructure (3.4 percent). Manufacturing grew just 1.1 percent and construction fell 0.7 percent. Even then, the 12-month inflation rate fell only to 27 percent by year-end.

Figure 2: COLOMBIA - NOMINAL INTEREST RATES, 1990 - 1993
(Percent per annum)



Source: Banco de la República and IMF staff estimates
1/Weighted average of weekly rates on the three-month bills.
2/Average monthly rates based on survey of financial intermediaries.

Table 1: ECONOMIC GROWTH AND ITS SOURCES, 1990-92

	(% Change, 1975 pesos)			(% of GDP, 1975 pesos)		
	1991	1992	1990-92	1990	1991	1992
Demand						
Private Consumption	0.9%	4.0%	2.4%	68.0%	67.2%	67.5%
Government Consumption	2.3%	12.4%	7.2%	11.1%	11.1%	12.1%
Private Investment	-14.1%	27.5%	4.7%	8.0%	6.7%	8.3%
Government Investment	-1.8%	7.4%	2.7%	6.1%	5.8%	6.0%
Inventory Accumulation	63.8%	3.2%	30.0%	1.7%	2.7%	2.7%
Exports	3.6%	6.7%	5.1%	20.7%	21.0%	21.7%
Imports	-3.9%	29.4%	11.5%	15.5%	14.6%	18.3%
GDP	2.1%	3.5%	2.8%	100.0%	100.0%	100.0%
Supply						
Agriculture, Fishing and Forestry	5.2%	-0.9%	2.1%	22.4%	23.1%	22.2%
- Coffee	15.0%	-0.4%	7.0%	2.8%	3.1%	3.0%
- Other Agriculture	4.2%	-2.6%	0.7%	9.2%	9.4%	8.9%
Mining	0.7%	0.7%	0.7%	4.8%	4.7%	4.6%
Manufacturing	1.1%	4.6%	2.8%	22.0%	21.8%	22.1%
- Coffee Processing	-7.6%	30.7%	9.9%	2.9%	2.7%	3.4%
- Other Manufacturing	2.4%	0.9%	1.7%	19.1%	19.1%	18.7%
Infrastructure 1/	3.4%	1.4%	2.4%	10.0%	10.2%	10.0%
Construction	-0.7%	13.6%	6.2%	3.1%	3.0%	3.3%
Services	1.3%	4.5%	2.9%	37.6%	37.3%	37.8%

Source: DANE

1/ Transportation, storage and communications, electricity, gas and water.

11. The macroeconomic policy program for 1992 was designed to consolidate trade liberalization, further tighten fiscal policy through tax reform and modify the monetary policy stance to bring about a decline in interest rates, capital inflows, and the real appreciation of the exchange rate. Early in 1992 a pronounced slowdown in the combined net placement of open-market instruments in local and foreign currency helped lower the rates on three-month open-market bills from 36 percent at end-1991 to 20 percent in May-September 1992. As a result, the surge in capital inflows observed in 1991 and the first half of 1992 subsided as well as the pace of reserve accumulation by the Central Bank. For the year as a whole the real appreciation of the peso was 2 percent. Imports grew sharply while exports remained stable, and the current account surplus fell to about 2 percent of GDP. By December 1992, interest rates stabilized around 27 percent and inflation fell to 25.1 percent. Greater confidence and stability spurred private expenditure: private consumption grew 4 percent, private investment 27.5 percent and imports 29.4 percent. Expenditure was further stimulated by the government, as public consumption increased 12.4 percent and public investment 7.4 percent. Growth picked up to 3.5 percent, and came mainly from the non-tradeable sectors -- construction expanded 13.6 percent and services 4.5 percent--, while agriculture (excluding coffee) suffered a contraction of 2.6 percent and the manufacturing sector (excluding coffee processing) grew just 0.9 percent. This resource allocation came as a response to sharp changes in relative prices due to trade liberalization, the drop of international commodity prices --the price of coffee, for example, fell from US$0.95/lb in 1990 to US$0.69/lb in 1992--, and the 11 percent real appreciation of the exchange rate during 1990-92. Prices in the agriculture sector were further affected by the dismantling of support prices and purchase agreements which, until 1990, were managed by IDEMA to reduce price uncertainty and sustain profitability of the main crops. Overall, in relation to the GDP deflator, agriculture prices dropped 13.3 percent between 1990 and 1992.

12. Despite the relatively slow economic growth during 1990-92, 2.8 percent p.a., employment in the economy expanded on average 5 percent p.a. and the unemployment rate fell from 8 percent in 1990 to 7 percent in 1992. As can be seen in Table 2, the expansion of employment in the urban areas took place in all segments of the labor market. Employment of skilled workers grew 9.3 percent p.a., while that for unskilled workers increased by 5 percent p.a. Although the construction and services sectors grew faster than manufacturing, formal employment expanded at a higher rate than informal occupations --6.3 percent p.a. vis-a-vis 3.7 percent p.a. In the rural areas, employment also increased significantly --4.7 percent p.a.--, with the unemployment rate falling from 5.5 percent in 1990 to 4.4 percent in 1992. Given the sectorial composition of economic growth during the period, however, the expansion of employment in the different segments of the labor market came as a result of substantial differences in the behavior of real wages. As shown in the last column of Table 2, while real wages in the formal sector remained basically stagnant and those in the informal sector increased by 3 percent between 1990 and 1992, real wages for skilled workers dropped 4 percent while those for the rural areas fell 22 percent.

Table 2: COLOMBIA - THE LABOR MARKET, 1990 - 1992

	Number of People (Thousands) 1/			Variations in Employment (%)			*Variation in Real Wages (%) 2/*
	1990	1991	1992	1991/90	1992/91	1992/90	
MAIN URBAN AREAS							
Labor force	4,816.30	5,112.20	5,327.80	6.14	4.22	10.62	
Employed	4,324.70	4,610.60	4,841.20	6.61	5.00	11.94	
-Unskilled formal	1,999.70	n.a	2,244.80			12.26	*0.34*
-Unskilled informal	1,515.80	n.a	1,629.50			7.50	*2.92*
-Skilled	809.10	n.a	966.80			19.48	*-3.88*
Unemployed	491.60	501.60	486.60	2.04	-2.99	-1.02	
Memo:Unemployment rate (%)	10.21	9.81	9.13				
OTHER URBAN AREAS							
Labor force	2,819.40	2,812.90	2,960.30	-0.23	5.24	5.00	
Employed	2,560.60	2,565.90	2,720.70	0.21	6.03	6.25	
Unemployed	258.80	247.00	239.60	-4.57	-2.99	-7.42	
Memo:Unemployment rate (%)	9.18	8.78	8.09				
RURAL AREAS							
Labor force	5,191.50	5,836.70	5,628.90	12.43	-3.56	8.43	
Employed	4,905.80	5,589.50	5,382.80	13.94	-3.70	9.72	*-22.39*
Unemployed	285.60	247.20	246.10	-13.47	-0.43	-13.84	
Memo:Unemployment rate (%)	5.50	4.23	4.37				
TOTAL							
Labor force	12,827.20	13,761.80	13,917.00	7.29	1.13	8.50	
Employed	11,791.10	12,766.00	12,944.70	8.27	1.40	9.78	
Unemployed	1,036.10	995.80	972.30	-3.89	-2.35	-6.15	
Memo:Unemployment rate (%)	8.08	7.24	6.99				

1/ Source: DANE Household Survey, September 1990,1991 and 1992

2/ Source: FEDESARROLLO. Results of the 1990-92 simulation.

13. With labor income representing the principal source of total income of poor households, the observed behavior of employment and real wages during 1990-92 led to a sharp redistribution of income between the urban and the rural areas. During this period, as estimated by the 1990-92 simulations, the average household income of the four lower deciles in the rural area dropped 14.7 percent in real terms, while those in the urban areas experienced a 10.6 percent increase. This result has led to the deterioration of poverty indicators in Colombia for 1992, as described in Chapter 1.

14. To address this recent deterioration in poverty, it is essential to understand its causes. Following is the analysis of the role played by each of the major structural reforms and shocks, experienced in Colombia during 1990-92, in producing the described behavior of the economy and the observed changes in income of the poor.

B. Structural Policy Reforms

Trade liberalization

15. **Brief Description of the Reform[6].** The trade liberalization program initiated in February 1990 was the result of more than a year of discussions within the government, and between the government and the private sector, on the need to modernize the economy by opening it to international competition. The decision to liberalize the trade regime was based on a growing agreement among analysts and policy makers that Colombia's inward-oriented trade regime, while perhaps useful during earlier stages of industrialization, had become counterproductive. By increasing import penetration and reducing the anti-export bias inherent in the trade regime, the government hoped to raise the medium-term rate of economic growth through productivity improvements, and to increase and diversify exports.

16. Implementation of the trade reform began in March 1990 with changes in the system of import licenses and tariffs. Subsequent modifications were made from May through the beginning of August 1990. Upon taking office on August 7, 1990, the Gaviria Administration announced its intention to accelerate the trade liberalization process initiated by the previous administration, and to extend its application to the agricultural sector. The new administration made further reforms in the prior license system and tariff structure in September 1990. QRs on industrial imports --which formerly covered 80 percent of domestic production-- were lifted ahead of schedule in November 1990. And in August 1991, in a CONPES decision, the government advanced the 1994 tariff targets for immediate implementation. The resulting tariff structure had four tariff rates --0 percent for raw materials, intermediate goods, and capital goods not produced in Colombia; 5 percent and 10 percent for these goods when domestic production exists; and 15 percent for final consumer goods-- and an 8 percent tariff surcharge. Early in 1992, the tariffs and the surcharge were

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[6] A complete description of the trade reform, as well as the analysis of its impact on effective rates of protection in Colombia, is presented in World Bank (1992), pp. 19-36.

unified --creating an additional tariff of 20 percent. Exceptions in the tariff structure were the agricultural products included in a variable tariff scheme[7] and automobiles (which carry tariffs of 35 percent to 40 percent). The resulting average nominal protection afforded by tariffs (excluding the exceptions) was 14.8 percent, with an import-weighted average of 12.6 percent, and effective protection fell from an average of 44 percent to 24.8 percent -- estimates which still exclude the elimination of tariffs resulting from trade agreements with Venezuela, Ecuador and Bolivia.

17. With respect to export policy, the international trade law enacted in January 1991 maintained the Tax Reimbursement Certificate (CERT) as an instrument of tax reimbursement and selective export promotion. In April 1991, Decree 956 modified the CERT regime by reducing the number of CERT rates from six (5 percent, 6 percent, 8 percent, 9 percent, 10 percent, and 12 percent) to three (5 percent, 8 percent, and 10 percent) and reclassifying products into three categories according to the nature of the product and market destination[8]. Traditional agricultural products and intermediate goods receive the lowest rates, while the majority of final industrial goods receive 10 percent. CERTS vary by market to achieve the government's objective of diversifying export destinations.

18. **Trade Liberalization and the Poor.** To assess the effect of trade liberalization in the economy, three changes are simulated in the model: (a) tariffs are reduced, thus causing the relative price of imported goods to decrease; (b) quantity restrictions affecting imports are lifted, allowing import supplies to grow, in turn enhancing competition with domestic production; and (c) new export markets are opened --as a result of trade agreements or conferred preferential treatment to selected Colombian exports-- enabling exports to grow faster. The simulation results seem to indicate, as expected, that trade liberalization has led to an increase in total exports and imports in the economy. In response to the trade reform, as shown in Table 3, exports are estimated to have grown by 6.3 percent, while imports increased 12.1 percent. Exports have been stimulated, apart from trade agreements or new preferential access, by the reduction of the anti-export bias of the old trade regime. Exports which have been identified to benefit the most from trade liberalization have been durable and intermediate manufactured goods, modern agriculture goods and agriculture food products. Although imports faltered in 1991, substantial increases were observed in 1992. With only minor exceptions (natural gas and refined oil products),

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[7] A system of price bands was developed for a group of agricultural products to reduce the impact on the economy of their highly unstable international prices. The system is managed by the Ministry of Agriculture and originally applied to six commodities (rice, maize, sorghum, soybeans, wheat, and barley) and their derivatives and substitutes. The price band for each commodity is adjusted every six months based on a formula which considers: (a) deflated monthly CIF prices over the past sixty months; (b) the basic tariff; and (c) port handling charges and internal transport costs. As long as the resulting CIF price of imports and the basic import tariff (the "spot price") is within the band, no corrections are made. When the spot price falls below the floor, an additional tariff is applied to raise the import price to the floor price. When the spot price exceeds the ceiling price, discounts on the basic tariff are made up to but not to exceed the full amount of the basic tariff.

[8] World Bank (1989) estimated that the CERT program over-compensated exporters for indirect taxes actually paid during 1981-86, and therefore subsidized exports. While estimates are not available for the new CERT regime, it appears that it fails to eliminate the subsidy element of CERTs.

imports of goods by sector have increased more than 20 percent in real terms, and some have expanded more than 40 percent. It is estimated that a large proportion of these changes have been due to trade liberalization measures, which seem to have generated substantial imports of processed food products, modern agriculture goods, agriculture food products and other non-durable manufactured goods.

Table 3: TRADE LIBERALIZATION - ESTIMATED IMPACT ON THE ECONOMY

	Compared with Counterfactual 1990-92 (% change)			
	Production	Prices	Exports	Imports
Agriculture food products	0.00	-9.44	29.34	57.84
Modern agriculture goods	0.00	10.19	37.77	59.33
Raw coffee	-0.03	0.00	-	-
Processed coffee	0.20	0.00	0.00	-
Oil	0.00	0.00	-0.09	-
Natural gas	3.32	0.00	-	3.32
Coal	0.55	0.00	0.00	1.33
Refined oil products	0.00	0.00	-27.76	-23.95
Rest of mining	-2.77	0.00	0.00	54.93
Other processed food products	-3.57	2.81	-23.64	66.97
Other non durable manufactured goods	-2.71	-1.09	-5.61	47.57
Intermediate manufactured goods	6.35	-3.29	62.43	8.10
Durable manufactured goods	-2.82	-4.44	124.13	12.28
Construction	0.02	-3.45	-	-
Commerce	-0.28	-1.64	0.30	31.23
Transportation	0.94	-1.96	0.34	-0.82
Rest of modern services	0.74	-1.63	0.31	-0.48
Personal services	0.64	-1.11	-	-0.47
Housing	0.31	-0.59	-	-
Domestic services	1.37	-1.59	-	-
Government services	0.00	0.00		
TOTAL	0.45	-0.62	6.25	12.13

Source: Fedesarrollo.

19. In the aggregate, the simulation shows that GDP has increased 0.5 percent as a result of the trade reform. With total imports expanding faster than exports, however, the activity levels in some sectors have fallen. In manufacturing, for example, processed food products has dropped 3.6 percent and other non-durables 2.7 percent, while the rest of mining has declined 2.8 percent. Production in other sectors like intermediate manufactured goods and services has nevertheless accelerated. The positive response of intermediate goods can be related to the sharp reaction of its exports, whereas the services sector has mainly benefited from lower inflationary pressures which have resulted from both lower tariffs and increased international competition: the CPI has fallen 1.7 percent. Consumer purchasing power has been enhanced and private consumption has increased 1.5 percent, thereby inducing greater demand for services. Price reductions due to trade liberalization have been important in agriculture food products, which fell 9.4 percent, but have taken place in most other sectors with only two exceptions: modern agriculture goods and processed food products.

20. Importantly, as presented in Table 4, trade liberalization seems to have improved both rural and urban incomes. Indeed, the rural poor have benefited the most from the reform, as it is estimated it has increased the real income of the lowest two rural quintiles by 3.4 percent. This result emerges from the induced changes in the incentive structure that have been precipitated by the trade reform. Even though prices in the economy have generally declined in response to liberalization, relative prices have moved strongly in favor of agriculture --with the jump in modern agriculture prices leading to an aggregate 2.7 percent increase in agriculture relative prices (with respect to the GDP deflator). In turn, as shown by the simulation results, this has generated demand for rural labor which has led to a 7.4 percent increase in rural wages. In the urban areas, the expansion of the intermediate manufactured goods sector (intensive in formal unskilled labor) has induced a movement of unskilled workers from the informal to the formal sector. The final outcome has been a reduction of 0.4 percent in employment in the informal sector, an increase of 1 percent in the number of formal jobs, and a slight drop of 0.4 percent in the unemployment rate. The reduction of the informal work force, combined with expanded labor demand, has led to a 0.7 percent increase in real wages in the informal sector. In all, due to the trade reform real incomes in the urban area are estimated to have experienced an even, though moderate, increase of 0.8 percent.

Table 4: TRADE LIBERALIZATION - ESTIMATED INCOME EFFECTS

	Compared with Contrafactual 1990-92 (% Change)
A. Real urban income	
Lower quintile	0.76
Upper quintile	0.84
Gini	0.03
B. Real rural income	
Lower two quintiles	3.39
Upper quintile	2.85
Gini	-0.38
C. Employment	
Rural	0.00
Unskilled informal	-0.35
Unskilled formal	1.05
Skilled	0.00
Unemployment Rate	-0.37
D. Real wages	
Rural	7.42
Unskilled informal	0.69
Unskilled formal	0.00
Skilled	0.64
E. Real capital income	
Rural	0.11
Urban	0.90

Source: Fedesarrollo

21. The results just presented clearly contradict the view of some policy makers in Colombia which have attributed the recent deterioration in rural incomes to the trade reform. Indeed, trade liberalization seems to have had a positive effect on both income levels and income distribution in the rural areas. Furthermore, given the estimated improvement of real incomes in the lowest deciles of both rural and urban areas, one could ascertain that poverty alleviation has been enhanced by the trade liberalization effort in Colombia.

Tax reforms

22. **Brief Description of the Reforms.** During the 1990-92 period, two major tax reforms were passed by Congress. The Tax Reform of 1991, approved during the 1990 legislative period, enacted the following measures: (a) granted amnesty to capital held abroad, subject to either the acquisition of public bonds or the payment of a 3 percent tax; (b) increased the VAT tax rate from 10 percent to 12 percent; (c) eliminated reduced VAT rates applied to services (which varied from 4 percent to 10 percent) and broadened the tax base to include personal and communication services; and (d) granted tax exemptions to capital gains resulting from the sale of shares in the stock market. The corresponding increase in tax revenues was expected to compensate for the reduction of the import surcharge from 18 percent in 1989 to 10 percent in 1991. During 1991, in addition, the government invoked its Constitutional powers under the *state of siege* --imposed as a result of increased guerrilla violence--, and by decree created a 5 percent "war surtax" to be levied on the income of large tax payers and a "special contribution" to be paid by oil companies as an excise tax on oil production (320 pesos per barrel).

23. Further developments during late 1991 and 1992 forced the government to contemplate another tax reform. The CONPES document of August 1991 that recommended the immediate implementation of the tariff targets previously programmed for 1994 noted that the accelerated trade liberalization would have a fiscal cost of 0.2 percent of GDP in 1991, 0.6 percent in 1992 and 0.4 percent in 1993. It suggested then to adopt fiscal revenue measures and expenditure cuts to maintain macroeconomic balances. In addition to this expected drop in tax revenues, early in 1992 public finances were being adversely affected by the sharp decline in international coffee prices, and the weakening of public electricity companies owing to projected shortfalls in revenues and unanticipated expenditures related to the crisis in the power sector. As a result, in March 1992, the Gaviria Administration presented the draft Tax Reform of 1992 to Congress. As stated by the government, the purpose of the reform was to offset the revenue loss from early implementation of the trade liberalization program in 1991, to create space for much needed social expenditures and public investment in infrastructure, and to compensate the central government for the increasing share of current revenues to be transferred to local governments as mandated by the Constitution. The Tax Reform sought to broaden the base and increase the tax rates of value-added and income taxes, increase the ad valorem tax on gasoline, and eliminate certain import tax exemptions. In all, the tax bill was intended to raise government revenues by an estimated 3 percent of GDP on an annual basis.

24. The Tax Reform encountered significant opposition in Congress and the administration was forced to use some of its political capital to lobby for the approval of the reform. Even then, the Congress made substantial modifications to the original proposal, including a reduction in the recommended VAT tax rate --from 18 percent to 14 percent-- and an increase in the proposed surcharge on income taxes --from 17 percent to 25 percent. The 1992 Tax Reform, as passed by Congress in July, is expected to yield only half the revenues of the original package and a significant number of its measures only became effective in

January 1993. Furthermore, the Tax Reform was only approved until 1997 and will require Congress to extend it. The main changes to the tax system incorporated in the reform are presented in Table 5.

Table 5: COLOMBIA - THE TAX REFORM OF 1992

Tax Measure	Estimated Tax Revenue (as % of GDP)
I. Value Added Tax	0.7
-Increase of general rate from 12% to 14%	0.6
-Unification of rates and broadening of base	0.1
II. Income Tax	0.5
-Surcharge of 7.5% points in income tax	0.5
III. Other Measures	0.2
-Special contributions including excise tax on oil which was increased to 600 pesos per barrel	0.2
Total Tax Reform	1.4

Source: Ministry of Finance

25. **Tax Reform and the Poor.** The simulation of the tax reforms[9] with the general equilibrium model allows to track down both their direct and indirect effects on the behavior of the economy. The modifications in the Colombian tax structure have: (a) subtracted incomes from both corporate and individual tax payers, and (b) increased the market prices of the goods taxed by the VAT, mainly manufactured goods and modern services. On both accounts, as can be seen by the simulation results presented in Table 6, these changes have led to a contraction of domestic demand and production. The latter, however, has been moderated by a positive response of exports of non-coffee agricultural and manufacturing goods, and a general reduction in imports. The sectors that have been most severely affected by the reduction of production are modern services, domestic services, intermediate manufactured goods, and other durable and non-durable goods. In total, the manufacturing and services sectors have experienced a contraction of 0.8 percent and 1.2 percent, respectively. These reductions account for most of the 0.9 percent drop in aggregate economic activity. Although VAT adjustments have been a source of pressure on prices, it is

[9] Given the focus on the behavior of the economy between 1990 and 1992, the simulation only incorporates the tax modifications implemented during this period. The changes in the value added tax rates which were only effective as of January 1993 have been excluded.

estimated that these have been overridden by the contractionary effects of the tax reforms. Thus, the CPI has dropped 1.5 percent in response to changes in the tax structure. As can be seen in Table 6, prices received by producers (i.e. net of the VAT) have declined across sectors on an average of 2.6 percent.

Table 6: TAX REFORM - ESTIMATED IMPACT ON THE ECONOMY

	Compared with Counterfactual 1990-92 (% change)			
	Production	Prices	Exports	Imports
Agriculture food products	0.00	-3.79	1.86	-6.85
Modern agriculture goods	0.07	-3.79	1.79	-7.61
Raw coffee	-0.50	0.00	-	-
Processed coffee	-0.49	0.00	0.00	-
Oil	0.00	0.00	0.12	-
Natural gas	-1.40	0.00	-	-1.40
Coal	-0.13	0.00	0.00	-4.53
Refined oil products	0.00	0.00	0.00	-5.86
Rest of mining	-0.16	0.00	0.00	-1.06
Other processed food products	-0.34	-3.89	1.91	-7.57
Other non durable manufactured goods	-0.85	-3.03	1.78	-7.37
Intermediate manufactured goods	-1.35	-2.06	1.92	-3.24
Durable manufactured goods	-0.85	-1.78	2.70	-2.52
Construction	-0.07	-3.12	-	-
Commerce	-0.45	-3.51	1.53	-6.03
Transportation	-0.93	-3.12	-1.23	-5.14
Rest of modern services	-2.05	-3.52	4.21	-6.92
Personal services	-0.80	-4.57	-	-6.41
Housing	0.36	-6.92	-	-
Domestic services	-2.35	-1.63	-	-
Government services	-0.06	0.00		
TOTAL	-0.88	-2.63	0.69	-3.76

Source: Fedesarrollo.

26. As presented in Table 7, the outcome of the simulation seems to indicate that tax reforms have been responsible for a contraction of both urban and rural real incomes. In the urban areas, given the short-run pricing practices of most firms where a fixed mark-up is added to costs, capital income has been affected both by the decline in production and the increase of direct taxation on corporate income. The reduction in urban capital income is estimated to have been 1.1 percent. Urban labor incomes, on the other hand, have been affected differently depending on the specific segments of the labor market. Unskilled formal

Table 7: TAX REFORM - ESTIMATED INCOME EFFECTS

	Compared with Contrafactual 1990-92 (% Change)
A. Real urban income	
Lower quintile	-2.40
Upper quintile	-3.10
Gini	-0.34
B. Real rural income	
Lower two quintiles	-0.86
Upper quintile	-0.82
Gini	0.02
C. Employment	
Rural	0.00
Unskilled informal	1.24
Unskilled formal	-3.66
Skilled	0.00
Unemployment Rate	1.28
D. Real wages	
Rural	-1.07
Unskilled informal	-2.93
Unskilled formal	0.00
Skilled	-1.99
E. Real capital income	
Rural	-0.64
Urban	-1.07

Source: Fedesarrollo

workers, which have been protected through the minimum wage policy, have experienced increased layoffs as firms have accommodated production cuts. Employment of unskilled workers in the formal sector has declined 3.7 percent, leading to a similar drop in real labor income. On the other side, unskilled workers in the informal segment have encountered increased competition from those displaced in the formal market, but have been able to expand employment through wage concessions. Thus, while real wages in the informal labor market have fallen 2.9 percent, employment has increased 1.2 percent and the resulting real labor income has declined only 1.8 percent. The unemployment rate is estimated to have increased 1.3 percent. Reduced labor demand, in turn, has led to a decline of 2.0 percent in real wages for skilled workers and to a corresponding drop of 2.4 percent in real labor income. In all, the induced reduction in different types of urban income seems to have been progressive. Total real income of the upper and lower quintiles in the urban population has declined 3.1 percent and 2.4 percent, respectively. The urban gini coefficient has been reduced by 0.3 percentage points. In the rural areas, the reduction of total incomes affected labor more severely than capital incomes (1.1 percent vs 0.6 percent), but without important effects on income distribution. All income groups experienced reductions of about 0.8 percent in their real incomes.

27. In conclusion, recent tax reform efforts in Colombia are estimated to have had a contractionary effect on real incomes, with a somewhat positive effect on income distribution. Not only has urban income distribution improved as a result of the modifications in the tax structure, but the rural sector has been somewhat protected from the accompanying income contraction.[10]

Reform of the Labor Regime

28. **Brief Description of the Reform.** Labor legislation in Colombia has been oriented toward job security through penalties and government controls. The Chenery Employment Mission of 1986 and other more recent studies[11] indicated that the labor regime acted as an important barrier to labor mobility and increased labor costs, thereby reducing the international competitiveness of Colombian industry. In September 1990, conscious of the potential impact of current labor regulations on the success of its trade reform, the government submitted to Congress proposals to revise the labor code so as to permit more flexibility in labor deployment.

29. Law 50, adopted in Congress in December 1990, included the following specific adjustments: (a) addition of competitiveness, restructuring, and modernization requirements to the criteria of just cause in cases of individual and collective dismissal, and as

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[10] This conclusion is maintained even if one simulates the tax reforms including the VAT changes of 1993.

[11] See Lopez Guerra (1991).

a basis for setting the duration of labor contracts; (b) reduction of the number of enterprises for which a review by the Ministry of Labor and Social Security is required prior to collective employee transfer or dismissal, or for reduction or closure of production capacity; (c) revision of procedures to permit separate labor contract negotiations with economically distinct units of the same enterprise; (d) provision for a flexible definition of work hours and contract arrangements in accordance with production requirements; (e) elimination of obligatory rehiring of dismissed employees with more than ten years of service and of the "*pensión-sanción*" severance payment; and (f) elimination of the partial retroactivity clause of the *cesantía* (severance payment) system. Overall, the new legislation has provided more flexible regulations to hire and fire workers, as well as to fix salaries and work journeys. It has been particularly successful in reducing the role of the state in collective bargaining.

30. Minimum wage policy, on the other hand, has remained unchanged. For some time now, the government has set the annual adjustment to the minimum wage by correcting it for past inflation. This has led to an important element of indexation in the economy. Wage settlements in January 1993, for example, featured a 25 percent increase in minimum wages and basic public sector salaries --the 12-month rate of consumer price inflation at end-1992. Importantly, the urban labor market in Colombia is characterized by a relatively high concentration of workers with labor earnings close to the minimum wage (see Figure 3)[12]. It is a striking feature of the personal labor income distribution and one which distinguishes Colombia from other Latin American labor markets. In Venezuela, for example, there is no evidence of concentration of labor contracts with total monetary payments around the minimum wage. In Colombia, approximately 30 percent of all urban workers are clustered in an interval of plus or minus 20 percent around the legal minimum wage. Only 22 percent of the workers earn less than a minimum wage, while 75 percent earn less than 2 minimum wages.

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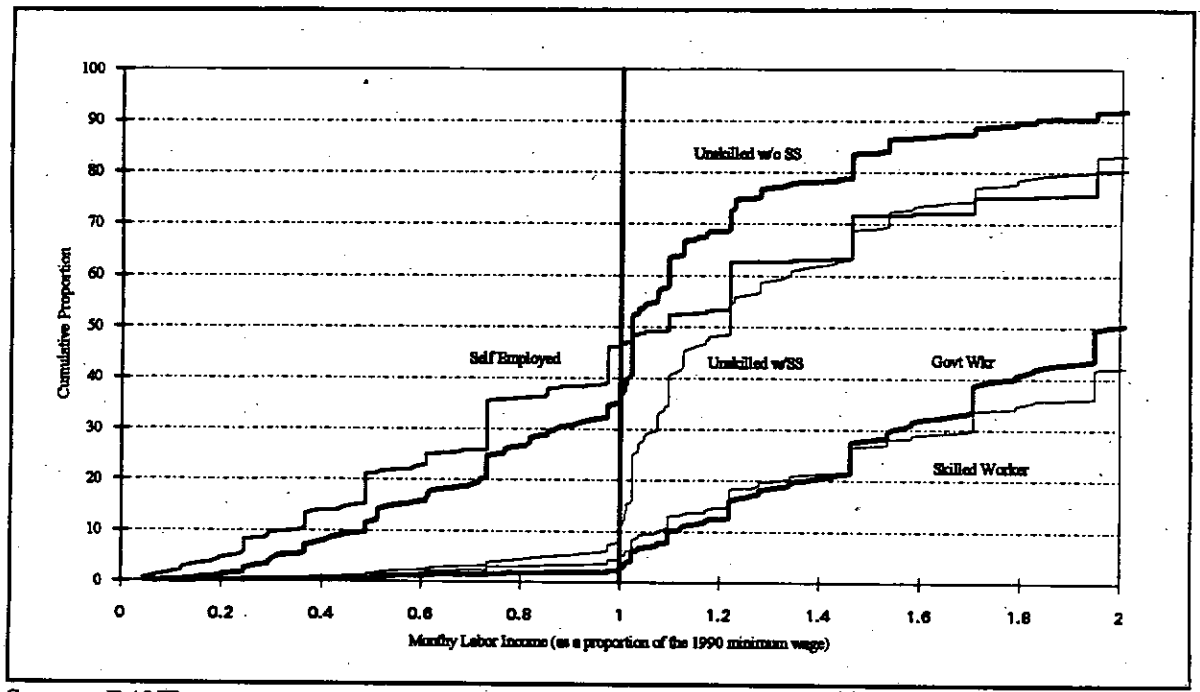
12 The information presented is the reported total labor income from the June 1990 Household Survey, which includes a special module for the labor informal sector. All income values are measured as fractions of the daily minimum wage rate effective in 1990, which was 1,367.50 pesos. Skilled labor is defined as workers with 12 or more years of education, the remaining workers are classified as unskilled labor. In turn, unskilled labor is disaggregated between formal and informal depending on whether the worker is associated with the social security system or not.

Figure 3: COLOMBIA - URBAN LABOR INCOME, 1990



Source: DANE

31. As one focuses on the clustering of *unskilled* urban workers around the legal minimum wage, as portrayed in Figure 3, one can only conclude that the minimum wage is relatively binding in Colombia. In the formal sector, fewer than 10 percent of workers earn less than the legal minimum wage, and 44 percent have monthly labor incomes within its 20 percent interval. Even in the informal sector labor income is closely related to the minimum wage. Although more than 30 percent of workers in this sector of the labor market earn less than the minimum wage, one can observe a substantial concentration of informal workers at the minimum wage. The pattern is similar to that observed around the minimum wage in the formal segment of the market. In all, approximately 40 percent of unskilled informal urban workers are concentrated around the legal minimum wage, and it is clear that wage determination in this sector of the market is also influenced by minimum wage policy.

32. **Labor Regime and the Poor.** The simulation related to the labor regime in Colombia is designed to better understand the role of minimum wage policy in poverty alleviation. It cannot be determined, *a priori*, whether the existence of a minimum wage above the equilibrium price in the labor market helps to reduce poverty or not. The mere existence of unemployment, beyond a minimum frictional level, may indicate that the wage rate prevents some workers from being employed, but does not prove by itself that the poor are actually worse off. This depends, among other factors, on the relative size of the informal sector, the existence of slack capacity in the economy, the degree of substitutability

of formal vis-a-vis informal workers and the possibility of migration between rural and urban segments of the labor market. To assess the effect of minimum wages in the income of the poor in Colombia, the model is used to simulate the behavior of the economy if one would allow wages in the formal sector adjust to the level that would be required to expand labor demand and reduce the unemployment rate of unskilled urban workers from the 8.8 percent estimated in 1992 to 7 percent. This level of unemployment has been identified as frictional in Colombia, among others, by the Chenery Employment Mission. It provides the necessary space for the normal entrance and transit of workers between occupations, and for structural incompatibilities between supply and demand for labor due to educational factors.

33. As simulated by the model, wages in the formal sector have been maintained 5.3 percent higher than would have been required to attain a 7 percent unemployment rate of unskilled urban workers. Accordingly, minimum wage policy in Colombia is believed to have had a contractionary effect on the economy. As shown in Table 8, on account of minimum wages GDP has fallen 0.9 percent. The sectors that have seen their production most sharply curtailed are estimated to be commerce, non-durable manufacturing goods, durable goods, and modern services. Importantly, minimum wages have also imposed pressures on prices in the economy. It is estimated that between 1990 and 1992 domestic prices have been 3.7 percent higher as a result of such pressures. Indeed, the urban sectors directly affected by these rigidities have seen their prices increase between 5 and 8 percent. Clearly, this has eroded competitiveness in the economy and led to more capital intensive modes of production. It is estimated that exports have been curtailed by 0.9 percent, with important constraints in exports from sectors like durable manufactured goods, intermediate manufactured goods, and other non-durables. Imports, on the other hand, have been stimulated --on average 1.5 percent-- with significant increases in all tradeable services and non-durable manufactured goods.

34. Table 9 summarizes the simulated effects of minimum wage policy in urban and rural incomes. Between 1990 and 1992, the minimum wage policy has increased real wages of unskilled formal workers by 5.3 percent, while curtailing employment in this segment of the market by 5.1 percent. With real wages for unskilled informal workers only increasing by 1.3 percent, jobs in this segment of the market have increased 1.8 percent, with an important number of workers remaining unemployed. The unemployment rate, as discussed before, has been 1.8 percent above the level of frictional unemployment. Even then, the urban poor seem somewhat better off as a result of the minimum wage policy: it is estimated that real urban income of the lower quintile has increased 0.2 percent. The contractionary effect of minimum wages has implied, on the other hand, a 2.9 percent reduction of real urban capital income. In turn, this explains the fall of 0.4 percent in real income of the upper quintile in the urban sector, and the corresponding improvement in urban income distribution (with the gini coefficient dropping 0.2 percentage points). Effects on the rural areas, however, are estimated to have been substantially different. The simulation results indicate price increases of agriculture goods have been very mild compared with those of urban goods and services. The contractionary effects of minimum wages have reduced the demand for rural products, ultimately leading to a decline of 1.8 percent in agriculture

Table 8: MINIMUM WAGES - ESTIMATED IMPACT ON THE ECONOMY

	Compared with Counterfactual 1990-92 (% change)			
	Production	Prices	Exports	Imports
Agriculture food products	0.00	1.43	-0.72	2.55
Modern agriculture goods	-0.02	0.00	-0.03	-0.04
Raw coffee	0.16	0.00	-	-
Processed coffee	0.19	0.00	0.00	-
Oil	0.00	0.00	0.28	-
Natural gas	-0.90	0.00	-	-0.90
Coal	-0.21	0.00	0.00	-5.22
Refined oil products	0.00	0.00	0.00	-1.89
Rest of mining	-0.19	0.00	0.00	-1.19
Other processed food products	-0.43	2.54	-1.29	3.75
Other non durable manufactured goods	-2.20	5.22	-3.24	6.37
Intermediate manufactured goods	-1.75	4.68	-4.55	1.23
Durable manufactured goods	-2.01	4.16	-6.60	0.82
Construction	-0.05	5.41	-	-
Commerce	-2.71	6.61	-1.24	5.29
Transportation	-1.33	5.67	-1.02	4.59
Rest of modern services	-1.85	8.12	-1.60	7.27
Personal services	-1.69	6.18	-	5.09
Housing	-1.62	6.49	-	-
Domestic services	-0.67	3.89	-	-
Government services	0.04	0.00		
TOTAL	-0.90	3.73	-0.94	1.46

Source: Fedesarrollo.

Table 9: MINIMUM WAGES - ESTIMATED INCOME EFFECTS

	Compared with Contrafactual 1990-92 (% Change)
A. Real urban income	
Lower quintile	0.18
Upper quintile	-0.36
Gini	-0.23
B. Real rural income	
Lower two quintiles	-2.08
Upper quintile	-2.06
Gini	0.02
C. Employment	
Rural	0.00
Unskilled informal	1.75
Unskilled formal	-5.14
Skilled	0.00
Unemployment Rate	1.79
D. Real wages	
Rural	-2.09
Unskilled informal	1.27
Unskilled formal	5.34
Skilled	2.76
E. Real capital income	
Rural	-1.94
Urban	-2.85

Source: Fedesarrollo

relative prices (with respect to the GDP deflator). This has resulted in a decline of real rural incomes of about 2 percent for all income groups, with the effect on both real wages and capital income being of the same order of magnitude.

35. In the final assessment, given the concentration of poor households in the rural areas, minimum wage policy seems to have been detrimental to poverty alleviation in Colombia. The protection awarded to unskilled workers in the formal sector has been maintained through a transfer of income from the countryside to this urban group. The deadweight loss of such policies appears to be substantial --almost 1 percent of GDP-- and, against some beliefs, not conducive to overall poverty alleviation. Given the crisis in the agriculture sector, discussed thoroughly in the next section, and the need to focus on rural incomes it may be an appropriate time for the government to revise its minimum wage policy and allow real minimum wages to start declining. At the very least, minimum wages should be set on the basis of expected inflation as opposed to past inflation. This in itself should prove useful in the government's fight to bring inflation under control. The pay-off of this policy change is to be gained by the rural poor.

C. The Crisis in the Agriculture Sector

36. **Brief Description of the Crisis.** The agriculture sector, representing more than 20 percent of GDP, grew by 5.2 percent in 1991 but contracted 0.9 percent during 1992. Its disappointing performance last year was largely the result of a stagnant coffee sector and sharp contractions in the production of semi-annual crops which, as shown in Table 10, fell by 11.9 percent in real terms. Among the semi-annual crops, importable crops such as corn, wheat, barley, and soybeans fell by more than 15 percent. Cotton, which is an exportable crop, fell by 26 percent. On the other hand, permanent crops performed well, growing by 9.5 percent, led by sugar cane, flowers, banana, and cassava.

37. The coffee sector, which accounts for 14 percent of agriculture value added and has been an important source of foreign exchange in the economy, encountered a sharp deterioration in its external environment during the last few years. As can be seen in Table 11, international coffee prices declined more than 40 percent between 1989 and 1992. Indeed, in real terms coffee prices reached their lowest level ever in 1992. The depression of prices was mainly due to the increased world production and exports that followed the suspension of the quota system under the International Coffee Agreement in July of 1989. As a major coffee producer, Colombia was harmed by these developments. They directly affected about 300,000 families and threatened the very existence of the coffee stabilization fund (Fondo Nacional de Café or FNC) --a decline of one cent in international coffee prices is estimated to increase the FNC deficit by 11,000 million pesos. To control the growing deficit of FNC, which with observed price trends could have increased to an equivalent of 1.1 percent of GDP, the government reduced domestic support prices by 15 percent in 1992, and launched an eradication program aimed at uprooting coffee trees in 100 thousand hectares during a period of three years. With this set of measures the government constrained

Table 10: AGRICULTURE: PRODUCTION AND VALUATION. NATIONAL TOTAL 1990 - 1992

	Tons			Valuation			Var %	
				$(mill of 1975)				
	1990	1991	1992	1990	1991	1992	1991/1990	1992/1991
TOTAL AGRICULTURE	19,768,167	20,022,772	20,344,958	96,406.7	100,787.0	100,887.9	4.54	0.10
(1) AGRICULTURE WITHOUT COFFEE	18,923,187	19,051,372	19,379,558	78,416.3	80,104.9	80,333.6	2.15	0.29
(A) Semestral Cultivations	8,764,795	8,330,521	7,637,860	35,812.4	34,506.8	30,416.3	-3.10	-11.86
Sesame	8,230	5,602	3,785	99.7	67.9	45.8	-31.90	-32.55
Cotton	314,170	414,539	306,589	3,360.4	4,433.9	3,278.3	31.95	-26.04
Rice	2,116,600	1,738,600	1,734,950	6,939.2	5,698.1	5,687.2	-17.86	-0.21
Barley	100,400	102,400	66,039	543.5	554.3	303.3	1.99	-45.28
Bean	132,150	108,016	119,756	1,925.4	1,573.8	1,744.8	-18.26	10.87
Corn	1,213,300	1,273,600	1,066,670	5,566.8	5,843.3	4,843.4	4.97	-17.11
Peanut	4,760	5,384	4,228	35.7	40.4	31.7	13.17	-21.53
Potatoe	2,464,400	2,371,948	2,281,400	6,303.9	6,067.4	5,835.8	-3.75	-3.82
Sorghum	777,400	738,300	751,785	2,787.9	2,657.1	2,705.7	-6.03	1.83
Soja	232,140	193,597	98,002	2,273.8	1,896.3	940.3	-16.60	-50.41
BlondTobacco	11,645	12,535	9,825	309.0	332.6	260.7	7.64	-21.62
Wheat	104,800	93,900	76,219	677.6	607.2	486.4	-10.39	-19.89
Vegetable	1,284,800	1,272,100	1,142,412	4,780.7	4,733.6	4,250.9	-0.99	-10.20
(B) Permanent Cultivations	10,158,392	10,720,851	11,741,698	42,803.6	45,598.2	49,918.1	6.53	9.47
Export Banana	1,243,614	1,521,332	1,673,469	2,341.7	2,864.7	3,151.1	22.33	10.00
Cocoa	56,163	58,141	59,168	1,649.3	1,707.7	1,737.9	3.54	1.77
Sugar Cane 1/	1,588,800	1,702,413	1,989,316	9,080.0	9,728.3	11,368.9	7.15	16.86
Brown Sugar	1,092,629	1,092,551	1,094,534	5,923.1	5,922.7	5,879.3	-0.01	-0.73
Coco	119,308	129,643	125,486	475.7	516.9	500.3	8.66	-3.21
Ñame	21,607	35,082	34,663	182.9	297.0	293.5	62.38	-1.18
Name	28,322	51,944	53,378	94.4	173.1	177.9	83.37	2.77
Africana Palm	261,861	290,856	304,496	3,935.6	4,543.2	4,756.2	15.44	4.69
Plantain	2,515,943	2,560,726	2,859,979	7,130.2	7,267.1	8,105.2	1.78	11.69
Black Tobacco	21,344	21,803	17,103	424.7	433.9	340.3	2.17	-21.57
Yuca	1,939,019	1,645,213	1,835,738	3,098.6	2,627.4	2,931.7	-15.15	11.58
Fruit Trees	1,172,500	1,498,960	1,573,908	2,851.5	3,645.5	3,827.7	27.84	5.00
Flowers 4/	107,192	112,187	130,664	5,817.9	5,879.7	6,848.1	4.66	16.47
(2) COFFEE 5/	844,980	971,400	965,400	17,990.5	20,682.1	20,554.3	14.86	-0.62

Source: DNP - UDA, URPAs, Ministry of Agriculture, SIAE.
Forestry: DNP, PAFC, INDERENA. Calculations-MAG.
Fishery: INPA, ACUANAL. Calculations-MAG.
1/ Production in terms of sugar
2/ Production in terms of brown sugar
3/ Production in terms of oil
4/ Source: For 1992, DANE until September. Proyections for Oct. to Dec.
5/ Source: DNP and Oficina Asesores Cafeteros
Note: Data for valuation of permanent cultivations in 1992 is preliminary. The figures therefore are not yet consistent with aggregate national accounts.

Table 11: INTERNATIONAL AGRICULTURAL COMMODITY PRICES (US$/TON)

YEARS	COFFEE 1/	RICE 2/	CORN 3/	SORGHUM 4/	SOYBEAN 5/	SUGAR 6/	WHEAT 7/	BARLEY 8/	PALM 9/	COTTON 10/	BANANA 11/	COCOA 12/
1989	116.2	310.5	111.4	105.9	261.0	378.7	171.1	122.4	350.3	1,674.1	488.7	1,242.2
1990	95.1	278.2	109.3	104.5	229.1	381.4	136.7	121.3	289.8	1,787.6	530.4	1,264.0
1991	90.8	300.1	108.7	104.5	220.8	295.6	127.8	118.6	339.0	1,691.0	532.1	1,210.7
1992	69.1	275.5	104.7	103.1	221.1	272.8	152.4	121.3	393.6	1,275.4	647.2	1,100.0
Variation												
Dec 92/90	-12.88	-0.75	-8.74	-7.84	-2.65	-18.70	36.73	-6.47	15.90	-37.09	64.81	-19.35
Dec 92/91	-1.41	-6.41	-13.76	-10.48	0.92	-9.82	-7.16	-10.24	6.65	-10.35	104.31	-23.32
Variation												
92/90	-27.34	-0.97	-4.21	-1.34	-3.49	-28.47	11.49	0.00	35.82	-28.65	22.02	-12.97
92/91	-23.90	-8.20	-3.68	-1.34	0.14	-7.71	19.25	2.28	16.11	-24.58	21.63	-9.14

SOURCE: : DNP

1/ Colombian Excelso New York, cts US$/pound

2/ FOB Bangkok, 10% broken rice

3/ Chicago, yellow corn No. 2

4/ FOB Gulf USA - USDA

5/ FOB Chicago

6/ Contract No. 5 London

7/ Kansas. H.R.W No.2

8/ Portland

9/ CIF Rotterdam

10/ Index A Liverpool

11/ East Coast USA

12/ ICCO Prices

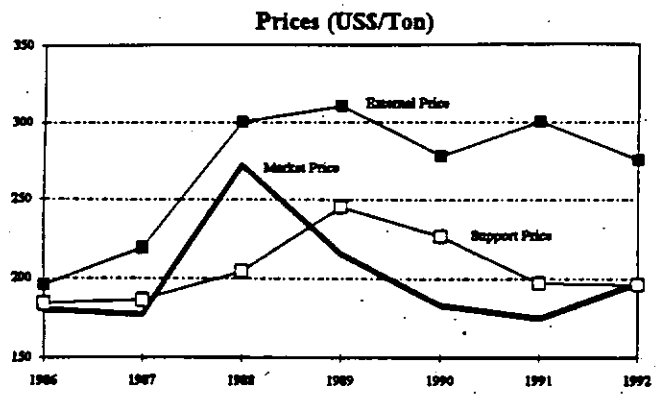
coffee production and was able to contain the deficit of the FNC to 0.7 percent of GDP in 1992. Nevertheless, low world coffee prices are expected to put continuing pressure on the public sector deficit and have a serious social impact in the coffee regions.

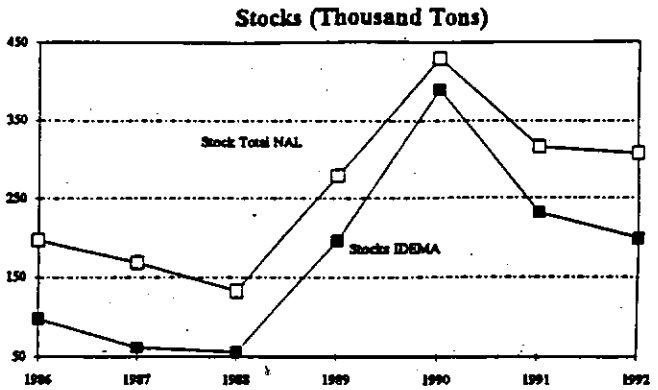
38. The poor performance of semi-annual crops was, to a large extent, due to exogenous shocks including lower world prices, a severe drought, and increase in violence in certain regions of the country. As shown in Table 11, weak world growth and excess supply of agriculture commodities led prices to drop to their lowest levels in the near past. As a group, cereals presented a clear downward trend which probably started between 1989 and 1990. During 1992 alone, corn prices fell by 13.8 percent, sorghum 10.5 percent, rice 6.4 percent, wheat 7.2 percent, and barley 10.2 percent. Exportable commodities also saw an important decline in prices: cotton by 10.4 percent, cocoa 23.3 percent and sugar 9.8 percent. In addition to lower international prices, the Colombian farmer faced one of the most intense and prolonged droughts recently experienced. The lack of adequate rainfall severely distressed farming of crops like corn, beans, and cotton, and was responsible for reductions in areas cultivated and deterioration of yields. Increased violence in rural areas also played an important role in the disruption of farming activities.

39. The reduction in areas cultivated, however, was also part of the adjustment process the economy has been going through as a result of structural reforms during the last two years and corresponding changes in relative prices of agriculture commodities. An important element of these reforms for the agriculture sector was the restructuring of IDEMA --the public enterprise responsible for buying, storing and distributing agriculture products. Until 1990, IDEMA was the only agent entitled to import most agriculture products. Its monopoly power was used to maintain market prices in line with established support prices, and to assure the acquisition of the domestic harvest by the manufacturing sector. Manufacturing firms were required to buy fixed quantities of the domestic harvest in order to have access to the goods imported by IDEMA. Prices were therefore controlled through purchasing agreements and the manipulation of imports and inventories. For exportable products, as cotton or tobacco, the government also arranged for purchasing agreements through which it tried to control the domestic price at which industry would buy these agriculture products. But in November 1991, the government eliminated IDEMA's import monopoly and replaced its policy of support prices with one of minimum prices. In dollar terms, between 1990 and 1992, official nominal prices were reduced 13 percent for rice, 17 percent for corn, 14 percent for sorghum, and 20 percent for soybeans. In real terms the reductions were larger, as the real exchange rate appreciated 11 percent during this period. The change in pricing policies was also accompanied by a substantial release of stocks (see Figure 4). Public stocks of agriculture products, which had been increasing until 1989 as a result of the policy of high support prices and strict import restrictions that granted a high degree of market control to IDEMA, started to be reduced sharply. Since 1990, average stocks held by IDEMA were reduced 49 percent in the case of rice, 57 percent in corn, 62 percent in sorghum, and 38 percent in soybeans. In all, the restructuring of IDEMA completely changed the nature of its operations and influence in the sector. The

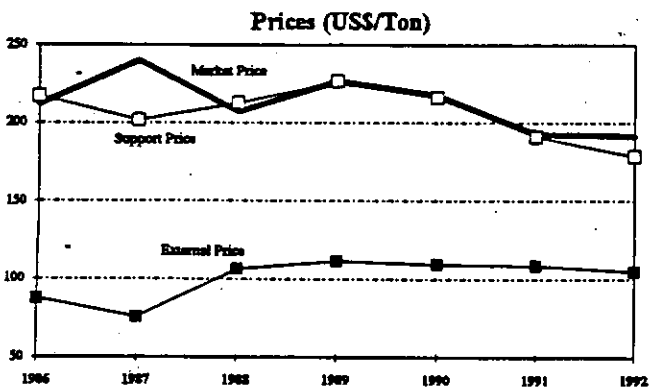
Figure 4: Price and Stock Variations for Selected Agriculture Products, 1986-92

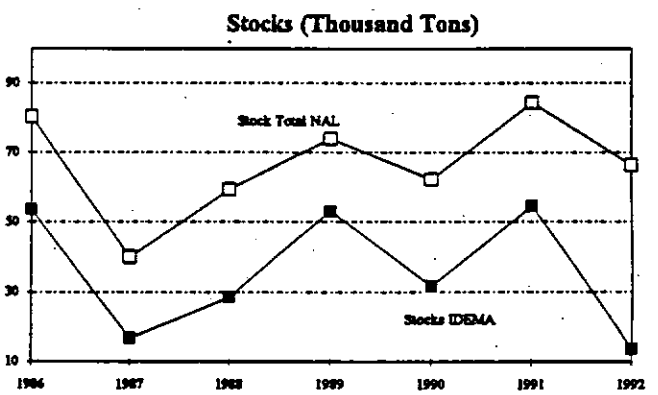
RICE



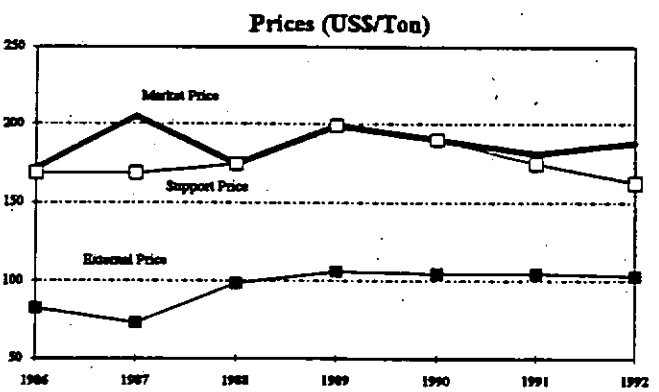


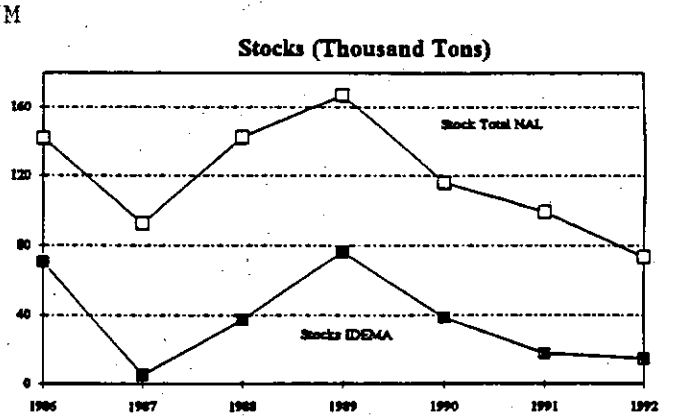
CORN



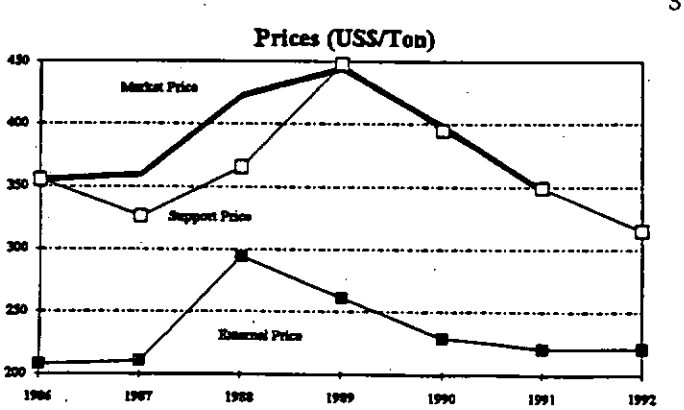


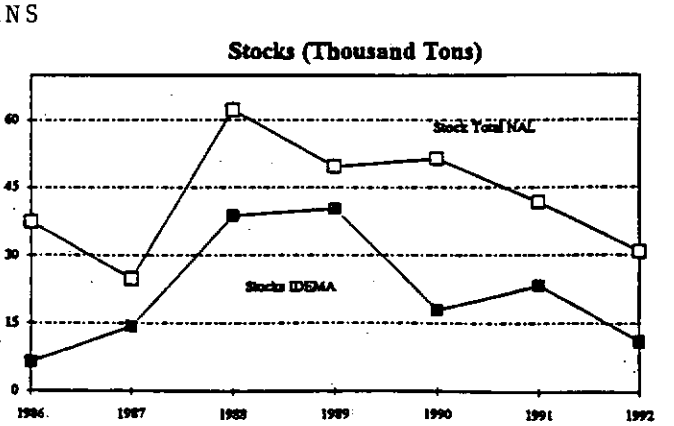
SORGHUM





SOYBEANS





institutional reforms removed an important element of protection for the agriculture sector, with significant consequences for relative prices of agriculture products.

40. **The Agriculture Crisis and the Poor.** The simulation of the agriculture crisis is designed to capture the effects of the two major shocks to which the sector has been exposed, in particular: (a) the sharp drop in international commodity prices; and (b) the reduced role of IDEMA and related changes in stock management and domestic pricing policies.

41. **Changes of External Agriculture Prices.** As expected, the international commodity-price shock experienced by Colombia between 1990 and 1992 seems to have led to a deterioration of agriculture sector relative prices. As can be seen from the simulation results presented in Table 12, the most important price changes have taken place in coffee -- in response to policy adjustments in domestic prices-- and modern agriculture. The external shock has in turn been translated into lower rural incomes and through it in contractionary pressures on the economy. Although these pressures have been partially offset by the induced 2 percent depreciation of the real exchange rate, it is estimated they have ultimately resulted in a slowdown of 0.2 percent in economic activity, an increase of 0.2 percent in exports and a 2.9 percent decline in imports. In the urban areas, real income gains resulting from reduced agriculture prices have been almost completely neutralized by the decline in demand from rural households. Thus, activity levels of most sectors have experienced but minor changes. Only coffee processing has accelerated by 1.9 percent, while the rest of the sectors have experienced changes between 0.4 percent and -0.9 percent. As a result of lower input costs, prices in urban activities have fallen between 1.4 percent and 4.9 percent depending on the sector.

42. The simulation results indicate, as shown in Table 13, that the drop in agriculture external prices has led to a reduction of both real wages and capital income in the rural areas, 3.6 percent and 6.6 percent respectively. The difference in behavior of wages and capital income in the rural areas is related to the particular effects of the drop in coffee prices and other agriculture commodities. Whereas the drop in international coffee prices directly affected the rents of the sector, accounting for a decline of 6.3 percent in rural capital income, the decline of prices in other agriculture commodities has been largely absorbed through the reduction of real wages. Ultimately, the change in factor remuneration has led to a decline of real rural income of the lower two quintiles of 5.5 percent. In the urban areas, since production has experienced only minor changes and real wages of the unskilled formal workers have been protected by the minimum wage policy, the variations of all types of labor and capital income have been insignificant. Total real urban income of the lower quintile improved 0.4 percent as a result of the drop in international agriculture commodity prices.

Table 12: AGRICULTURE INTERNATIONAL COMMODITY PRICES - ESTIMATED IMPACT ON THE ECONOMY

	Compared with Counterfactual 1990-92 (% change			
	Production	Prices	Exports	Imports
Agriculture food products	0.00	-1.37	11.62	-48.55
Modern agriculture goods	-0.26	-6.47	-3.80	-5.44
Raw coffee	1.81	-25.26	-	-
Processed coffee	1.85	-21.56	0.00	-
Oil	0.00	0.00	0.00	-
Natural gas	-0.45	0.00	-	-0.45
Coal	-0.04	0.00	0.00	-3.73
Refined oil products	0.00	0.00	0.00	-2.13
Rest of mining	-0.06	0.00	0.00	-0.36
Other processed food products	-0.30	-4.92	2.40	-9.37
Other non durable manufactured goods	0.07	-2.83	1.67	-5.36
Intermediate manufactured goods	-0.45	-1.81	1.69	-1.89
Durable manufactured goods	0.35	-1.37	2.08	-0.63
Construction	-0.02	-2.10	-	-
Commerce	0.20	-2.35	0.43	-3.15
Transportation	-0.54	-2.07	0.36	-3.27
Rest of modern services	0.00	-2.59	0.49	-3.07
Personal services	0.06	-3.27	-	-3.75
Housing	0.06	-3.44	-	-
Domestic services	-0.91	-2.79	-	-
Government services	-0.04	0.00		
TOTAL	-0.16	-3.40	0.21	-2.90

Source: Fedesarrollo.

Table 13: AGRICULTURE INTERNATIONAL COMMODITY PRICES - ESTIMATED INCOME EFFECTS

	Compared with Contrafactual 1990-92 (% Change)
A. Real urban income	
Lower quintile	0.36
Upper quintile	0.55
Gini	0.08
B. Real rural income	
Lower two quintiles	-5.51
Upper quintile	-5.69
Gini	-0.11
C. Employment	
Rural	0.00
Unskilled informal	0.06
Unskilled formal	-0.21
Skilled	0.00
Unemployment Rate	0.07
D. Real wages	
Rural	-3.59
Unskilled informal	-0.18
Unskilled formal	0.00
Skilled	-0.07
E. Real capital income	
Rural	-6.59
Urban	0.94

Source: Fedesarrollo

43. **Stock Management and Domestic Agriculture Pricing Policies.** Taken together, trade liberalization, tax reforms, minimum wages, and international price changes can only partially explain changes observed in agriculture relative prices and rural incomes. Relative prices of agriculture food products (with respect to the GDP deflator) fell 13.3 percent in the period 1990-1992, while those of modern agriculture goods fell 16.0 percent. The four factors mentioned above account for a reduction of 8.4 percent in the case of agriculture food products (leaving 4.9 percentage points to be explained) and for less than half a percentage point in the relative price of modern agriculture goods (leaving 15.6 percentage points unexplained). In the same way, those factors account for a reduction of real rural incomes of only 5 percent, out of a total calculated reduction of 14.7 percent. Hence, it is clear that other important elements have been at play. Although numerous other policy changes and exogenous shocks influenced these prices and incomes[13], the most important remaining factor is related to the restructuring of IDEMA and the corresponding changes in stock management and agriculture pricing policies[14].

44. Indeed, as presented in Table 14, the relaxation of support prices, the reduced importance of purchasing agreements, and the release of agriculture stocks are estimated to have caused a severe reduction in producer prices of agriculture food products, 15.7 percent, and of modern agriculture goods, 18.1 percent. The simulation indicates, in turn, that these changes have had significant repercussions for prices of processed food products, and milder but still noticeable ones for the remaining urban sectors. In all, domestic prices have fallen 6.5 percent. This fall in prices has made domestic products more competitive, inducing a 1.8 percent expansion of exports and a 3.8 percent reduction of imports. Although the most significant changes in exports and imports have taken place in the agriculture sector, the spillover effect has also resulted in changes of exports and imports in the manufacturing sector. Improved competitiveness has provided room for an acceleration of 1.6 percent in the activity level of the manufacturing sector and 0.6 percent in the service sectors, and a 4 percent appreciation of the real exchange rate. Economic growth has expanded 0.6 percent as a result of the restructuring of the agriculture sector.

45. Increased levels of production have generated demand for labor, leading unskilled workers to move from the informal to the formal sector. As a result, as shown by the outcome of the simulation presented in Table 15, formal employment of unskilled workers has increased 2.8 percent while informal employment has fallen 0.8 percent. Given the rigidity of formal real wages, incomes of unskilled workers in the formal segment of the market have grown in line with employment. The reduction of the informal working force has in turn been accompanied by an increase of 2.2 percent in real wages, with total real incomes of unskilled informal workers increasing 1.6 percent. Real wages of the skilled workers and

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13 See the Annex for a complete listing of all the exogenous changes introduced in the model to replicate the observed behavior of the economy between 1990 and 1992.

14 The model does not allow for a direct treatment of agriculture pricing policies. Inventory changes were then used as control variables in the model to reproduce the observed behavior of agriculture prices, once all other factors were considered.

Table 14: STOCK MANAGEMENT AND DOMESTIC AGRICULTURE PRICING POLICIES - ESTIMATED IMPACT ON THE ECONOMY

	Compared with Counterfactual 1990-92 (% change)			
	Production	Prices	Exports	Imports
Agriculture food products	0.00	-15.72	7.27	-29.40
Modern agriculture goods	0.11	-18.12	7.75	-38.29
Raw coffee	-0.79	0.00	-	-
Processed coffee	-1.02	0.00	0.00	-
Oil	0.00	0.00	-0.13	-
Natural gas	0.05	0.00	-	0.05
Coal	0.06	0.00	0.00	-2.88
Refined oil products	0.00	0.00	0.00	-1.04
Rest of mining	0.03	0.00	0.00	0.21
Other processed food products	3.51	-15.05	6.94	-20.58
Other non durable manufactured goods	1.84	-6.76	3.89	-9.86
Intermediate manufactured goods	0.40	-4.20	3.87	-2.52
Durable manufactured goods	1.15	-2.92	4.40	-0.82
Construction	0.04	-4.06	-	-
Commerce	1.27	-4.52	0.81	-4.47
Transportation	-0.23	-3.95	0.68	-5.00
Rest of modern services	0.98	-5.46	1.02	-5.18
Personal services	1.33	-7.02	-	-6.44
Housing	-0.13	-4.66	-	-
Domestic services	1.21	-7.76	-	-
Government services	-0.05	0.00		
TOTAL	0.55	-6.52	1.75	-3.76

Source: Fedesarrollo.

Table 15: STOCK MANAGEMENT AND DOMESTIC AGRICULTURE PRICING POLICIES - ESTIMATED INCOME EFFECTS

	Compared with Contrafactual 1990-92 (% Change)
A. Real urban income	
Lower quintile	2.86
Upper quintile	3.05
Gini	0.06
B. Real rural income	
Lower two quintiles	-4.27
Upper quintile	-4.08
Gini	0.12
C. Employment	
Rural	0.00
Unskilled informal	-0.78
Unskilled formal	2.75
Skilled	0.00
Unemployment Rate	-1.01
D. Real wages	
Rural	-5.42
Unskilled informal	2.24
Unskilled formal	0.00
Skilled	1.33
E. Real capital income	
Rural	-3.12
Urban	3.88

Source: Fedesarrollo

urban capital incomes have increased 1.3 percent and 3.9 percent, respectively, in response to the acceleration in activity levels and improvements in relative prices of industrial goods and services. Thus, all types of urban factors have benefitted from the reduction of agriculture prices. Total real urban incomes increased 3 percent, with very similar advances across all groups along the income spectrum. The counterpart of these improvements has been a substantial deterioration of rural incomes. Agriculture relative prices have fallen 4.5 percent (in relation to the GDP deflator), resulting in a 4.3 percent decline in real income of the lower quintile in the rural sector. The slight deterioration in income distribution results from the more significant decline in wages than in capital income: 5.4 percent vs. 3.1 percent.

46. The relaxation of support prices in the agriculture sector in conjunction with the release of agriculture stocks seems to have led to an important redistribution of income from the rural to the urban areas, increasing the levels of poverty in the countryside and the country as a whole. Indeed, these agriculture support mechanisms had been operating as a system of income transfers to rural households. Their costs, as estimated by the simulation model, were reflected in a less competitive economy, both in the rural and urban sectors, which constrained total exports in 1.8 percent, encouraged imports in 3.8 percent, and limited total private consumption in 1 percent. In terms of poverty alleviation, the support mechanisms were costly instruments given their inability to target the poor. Indeed, as can be seen from the outcome of the simulation, the top quintile of rural households got as much benefit from the support mechanisms than the lower quintiles. Leakages to the nonpoor were substantial. The results suggest that in implementing the referred policy change, even though appropriate on efficiency grounds, the government should have anticipated its negative effects on the rural poor and accompanied it with compensatory measures.

47. In all, between the drop in international agriculture commodity prices and the relaxation of the agriculture support system one seems to be able to explain a decline of 10 percent in real income of the two lower quintiles in the rural area --almost 70 percent of the observed deterioration. The extent and magnitude of this deterioration would clearly warrant government intervention.

D. Income of the Poor, 1990-92: A Summary Assessment of the Role of Policy Reforms and Shocks, and Recent Policy Response

48. Table 16 presents the summary results of the role different policy reforms and shocks seem to have in explaining the observed behavior of the income of the poor in Colombia between 1990 and 1992. As explained before, the simulation results indicate that trade liberalization has been beneficial to both the rural and urban populations. The tax reforms, on the other hand, have extracted income from them both. In these two cases, however, the rural population seems to have been relatively protected. But that is as far as the protection would go. The minimum wage policy has resulted in an income transfer from the rural sector to the urban poor. The change in agriculture international commodity prices have clearly benefited the urban sector while imposing an important reduction in the standards

of living of the rural population. Finally, the relaxation of agriculture support mechanisms has put an end to a continuous transfer of resources from the urban sector to the rural sector. Clearly, the rural poor have been negatively affected by developments between 1990 and 1992. The macroeconomic policy framework pursued by the government, however, did not include any corresponding compensatory measures. It is only recently that authorities have tried to define a policy response to the crisis in the rural sector.

Table 16: SUMMARY ASSESSMENT OF THE ROLE OF POLICY REFORMS AND SHOCKS ESTIMATED INCOME EFFECTS, 1990-92

	Counterfactual (% Change)	Compared with Counterfactual (% Change)				
	1990-92	Trade Reform	Tax Reform	Labor Regime	Agriculture International Prices	Agriculture Domestic Prices
A. Real urban income						
Lower quintile	10.58	0.76	-2.40	0.18	0.36	2.86
Upper quintile	11.71	0.84	-3.10	-0.36	0.55	3.05
Gini	0.57	0.03	-0.34	-0.23	0.08	0.06
B. Real rural income						
Lower two quintiles	-14.72	3.39	-0.86	-2.08	-5.51	-4.27
Upper quintile	-14.71	2.85	-0.82	-2.06	-5.69	-4.08
Gini	0.01	-0.38	0.02	0.02	-0.11	0.12

Recent Policy Response to the Crisis in the Rural Sector

49. As mentioned before, the Minister of Agriculture has proposed an emergency policy package. The main elements of the proposal can be presented as follows:

(a) **Trade policy.** Measures that have been formally adopted and for which regulations are being prepared and will: (i) impose minimum import prices on forty-seven agricultural products based on prices quoted in international commodity exchanges (the original proposal included sixty nine items); (ii) modify the system of agricultural price bands agreed to convert import tariffs under the variable duty scheme from a specific to an ad-valorem basis; (iii) establish, for price band products, a limit of 50 percent for the sum of the basic and resulting additional tariff; (iv) raise effective protection on some crops by temporarily eliminating or reducing import duties on certain agricultural raw materials and intermediate goods (e.g., pesticides, fertilizers); (v) establish prior import licenses for poultry and dairy products; (vi) harmonize with its

Andean Pact partners both the price band system as well as all other sectorial policies, like production subsidies, which are a source of distortion to trade flows; and (vii) postpone the scheduled elimination by end-1993 of tax credit certificates (CERTs) in the case of farm goods. Among the elements still under discussion the most important ones are to: (i) establish "absorption agreements" that will effectively ban certain imports of farm products so long as domestic supplies are deemed sufficient; and (ii) introduce safeguard mechanisms against injury to domestic producers from sectorial surges of imports.

(b) **Domestic Pricing Policies.** Policies being implemented are to: (i) reinitiate market interventions to support the purchase of the recent crops of rice, cotton, and beans (in the case of rice, for example, the intervention price was set 6 percent above the established minimum price); (ii) establish purchase agreements between the industrial sector and agriculture producers for barley and sorghum; and (iii) establish a stabilization fund for cotton.

(c) **Credit Policies.** Approved measures are to: (i) extend by one year, until the end of 1994, the date at which interest rates to small farmers would be increased from DTF + 2 percent to DTF + 6 percent, but make the subsidy explicit and finance it through budget allocations (7,500 million pesos have been budgeted for 1994); (ii) refinance on preferential terms outstanding loans of farmers producing cotton, rice, coffee, sorghum, corn, barley, tobacco, or cassava; and (iii) recapitalize Caja Agraria (90,000 million pesos in 1993), purchase part of its non-performing debt and transfer it to municipalities who would use any collections they receive for social investments.

(d) **Public Employment Scheme.** An Emergency Rural Employment Program has been proposed. Although its structure is yet to be defined, it is to be coordinated by the Ministry of Agriculture. The program would be managed by local governments, financed through cofinancing arrangements, and executed in connection with projects implemented by HIMAT, IDEMA, INDERENA, DRI, and PNR. It is estimated the cost of the program could reach 12,000 million pesos during 1993 and 1994.

(e) **Government Expenditure Programs.** An important expansion of rural expenditure programs is being presented for the following two years. If implemented, public investment in the rural sector would double between 1992 and 1994. Programs like DRI would expand 272 percent, HIMAT 215 percent, IDEMA 62 percent, and INCORA 33 percent. Although no specific measures have been proposed, the policy

package has urged authorities at the different levels of government to better target expenditures. Programs specifically mentioned in this regard include, among others: DRI, PNR, INCORA and ICA.

50. Based on the results presented in this report, one would conclude that the ongoing efforts to respond to the crisis in the agriculture sector have been misguided. Most of the policy measures currently under implementation represent a regression on trade liberalization and domestic agriculture pricing policies. As has been shown, trade liberalization is estimated to have had a positive effect on rural incomes, and domestic support mechanisms have been an inefficient instrument to protect the rural poor. In terms of credit policies, it has been proven, time after time, that it is the access and not the price of credit that is the main constraint to lending in the rural areas. In the context of poverty alleviation, therefore, the government is moving in the wrong direction. Unfortunately, the authorities have been unable to resist the pressure of interest groups which have used the recent deterioration of rural incomes to pursue their own objectives. By doing so, the government is not only sending the wrong signals but putting in question the success of its own efforts. In responding to the current crisis in the agriculture sector, the government should be focusing instead in developing the last two components of its package as presented above: putting in place a rural employment program and restructuring government expenditures. Both of these instruments are more suitable for targeting and should prove more cost effective. Government efforts in this direction would probably have a better pay-off.

51. In line with the above arguments, the government should consider reversing -- as soon as possible-- most of its recent policy changes as related to trade, domestic pricing and credit policies in the agriculture sector. Clearly, however, there are some measures in these areas which should be pursued. In terms of *trade policy*, probably the only area were the government's recent changes need to be maintained is in the area of harmonization of trade and sectorial policies with its Andean Pact partners. Of particular importance is the elimination of existing subsidies to production in other countries. As a result of these policies, earlier in the year Colombia experienced a huge inflow of imports of soybeans from Bolivia and rice from Venezuela which had an important effect on domestic prices. Given that one can expect these subsidies to be removed sometime in the future, sooner rather than later is better if one is to avoid distortions in relative prices which will influence resource allocation in the agriculture sector. As far as *domestic pricing policies* is concerned, instead of further promoting the development of commodity stabilization funds the government should encourage producers to consider the use of the futures commodity market to manage fluctuations in international prices. In turn, the authorities should devote resources to define the legal and institutional framework for the development of transparent and well functioning spot and futures commodity markets, linked to the international markets and subject to clear rules and regulations. With respect to *credit policies*, the government should be focusing its attention on ways to stimulate new financial intermediaries to lend to the rural sector and, if a subsidy is to be considered, it should subsidize the transaction costs of lending to small farmers --as in Mexico or Chile.

52. The proposed *public employment scheme* should now receive the government's full attention for its design and implementation. It is probably the program which could have the most rapid short-term effects, serve as a real transitory scheme for the structural reallocation of resources in the agriculture sector, and provide a bridge for the poor to fare the current crisis. As proposed, the program could be managed by local governments and be executed in the context of some of the implementing agencies' most labor intensive projects in the rural areas (e.g., rural roads, small scale irrigation schemes or land terracing). Importantly, the government should take care in putting in place the employment scheme in conjunction with efficient labor-intensive techniques in these infrastructure programs. The wages within the program should be at below market rates, both to ensure targeting through self-selection as well as to give the incentive to leave the program as soon as work opportunities develop. As presented in the Bank's Poverty Report (1990), such programs have proven effective in countries like Chile or Peru. In both cases, the programs successfully targeted the poor and provided a safety net for the unemployed during the recession.

53. The increased priority that would be given to rural expenditure programs could also prove effective. Given the progressive nature of existing rural expenditure programs, their simple expansion would most certainly benefit the rural poor. However, implementation of such expansions could be problematic. Chapter II has already made specific recommendations aimed at *restructuring existing government expenditure rural programs* to deal both with implementation and targeting issues. At this point one only needs to emphasize the urgency of implementing these recommendations, given their relevance to the ongoing crisis in the rural sector and the planned expansion of the programs.

54. Importantly, the government's reaction to the current crisis should be consistent with a longer term strategy for the rural sector. Expansion of government expenditure programs, for example, should be aimed at improving the sector's competitiveness and enhancing its productivity --through better infrastructure, training, technology and diversification. Policy adjustments which are deemed appropriate to put Colombia back on track for further poverty alleviation should be implemented in the context of an overall medium-term policy framework. The next section develops such a framework focusing on Colombia's upcoming macroeconomic policy challenges.

III. Macroeconomic Policy Challenges in the Medium Term: Adjusting to Cusiana's Oil Bonanza

55. The discovery of oil reserves in Cusiana and Cupiagua provides Colombia with new wealth which can be used to raise the standards of living of its population. Attaining this objective is probably the country's biggest challenge during the coming years. This section presents an overall perspective of this challenge. The first part describes the magnitude of the new oil discoveries and its relation to the Colombian economy. The second part describes the complex problems of macroeconomic management entailed and proposes a policy

framework that would allow (a) the potential benefits of the expected oil revenue to be realized; and (b) the poor segment of the population to benefit from the corresponding windfall gains.

A. Magnitude of the New Oil Discoveries: An Overall Perspective[15]

Cusiana and Cupiagua: Proven Oil Reserves, Production, Exports and Investment

56. In 1986, based on an association contract with ECOPETROL, British Petroleum (BP) initiated oil exploratory activities in the Department of Casanare. It was not until 1987, however, when the Cusiana oil field was first discovered by drillings in Cusiana-1, and until 1991 when those discoveries were confirmed by separate drillings in Cusiana-2A. Oil reserves of the field were estimated at 1,500 million barrels. Further exploratory activities in the area led then to the discovery of a separate oil field: Cupiagua, with estimated oil reserves of 500 million barrels. In all, the new oil discoveries more than doubled Colombia's previous proven reserves of 1,800 million barrels. Furthermore, oil exploration activities continue at a fast pace in the extensive area of Piedemonte Llanero --12 association contracts have been signed, expecting approximately US$800 million will be invested and 40 oil fields will be drilled, while ECOPETROL is planning to invest about US$120 million and separately drill 9 additional oil fields. It is anticipated that these exploratory activities could result in findings of 1,000 to 2,000 million barrels of new oil reserves.

57. Based on proven reserves of 2,000 to 2,200 million barrels in Cusiana and Cupiagua, on June 29, 1993, ECOPETROL and its associates (BP Exploration Colombia, Total Exploratie en Prodiktie MIJ, B.V., and Triton Colombia Inc.) signed an agreement by which these oil fields will be exploited. The Cusiana and Cupiagua Project is set to increase oil production from the current level of about 10,000 barrels per day (bpd) --which is considered part of the extensive production testing of the fields-- to around 600,000 bpd by 1997. As can be seen in Table 17, these production levels will allow Colombia not only to replace the expected decline in production of Caño Limon, but to increase its overall oil production from approximately 480,000 bpd in 1993 to 1,080,000 bpd in 1997[16]. As a result, oil exports would increase from about 220,000 bpd to 800,000 bpd during the same time period.

58. To attain these levels of production and exports will require significant investments, both in the oil fields and in transportation infrastructure. As presented in Table 18, these investments would amount to US$5,429.1 million between now and the year 2000.

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[15] This section summarizes a very complete description of the magnitude of the Cusiana and Cupiagua Project presented in DNP (1993). For a detailed description then, the reader is encouraged to refer to this document.

[16] These estimated levels of production would increase the participation of oil in total GDP from 1.8 percent in 1990 to probably 3.5 percent to 4 percent of GDP at the end of the 1990s.

Table 17: COLOMBIA: OIL PRODUCTION AND EXPORTS 1993-2000
(Thousands of barrels per day)

	SUPPLY			DEMAND		
	CUSIANA	OTHER	TOTAL	REFINING	EXPORTS	TOTAL
1993	9.0	470.8	479.8	259.1	220.7	479.8
1994	32.0	521.1	553.1	274.4	278.7	553.1
1995	135.0	534.5	669.5	278.5	391.0	669.5
1996	315.0	507.9	822.9	278.6	544.3	822.9
1997	600.0	476.1	1,076.1	279.3	796.8	1,076.1
1998	600.0	447.4	1,047.4	279.2	768.2	1,047.4
1999	600.0	423.1	1,023.1	279.6	743.5	1,023.1
2000	600.0	402.8	1,002.8	279.6	723.2	1,002.8

Source: DNP

Production infrastructure --which includes drilling platforms and equipment to extract oil and reinject gas-- would require approximately US$3,752.0 million. Transportation infrastructure --which includes revamping existing oil pipelines, constructing a new one, and enhancing port facilities-- would in turn require US$1,677.1 million.

59. After everything is said and done, official estimates indicate that the present value of the net income flows to be generated by the Cusiana and Cupiagua project between 1993 and 2005 amounts to US$15,300 million. This represents an oil windfall gain of approximately 28 percent of GDP. To put it in perspective, this windfall gain is larger than those experienced by Indonesia and Nigeria with the fourfold oil price increase in 1974, corresponding to 17 percent and 23 percent of GDP respectively. As shown in Table 19, Colombia's public sector is expected to capture 80 percent of the windfall, while its associates in the oil venture will receive the rest.

Fiscal Accounts: Expected Expenditures and Revenues

60. The fact that the participation of the public sector in Cusiana's income is greater than 50 percent, as specified in the association contracts, is due to the taxes and royalties to be paid by the foreign associates. In total, these companies are estimated to pay about US$4,600 million in taxes and royalties between now and the year 2005: US$500 million in oil excise taxes, US$2,000 million in income taxes, US$450 million in taxes on remittances, US$1,600 million in royalties and US$70 million in import duties.

TABLE 18: TOTAL INVESTMENTS IN CUSIANA
(Millions of US$)

	1993	1994	1995	1996	1997	1998	1999	2000	Accumulated Investments 1993-2000
Production	280.0	486.2	868.7	1,038.3	284.8	295.8	306.8	191.6	3,752.0
Transportation	200.0	665.3	526.5	285.3	0.0	0.0	0.0	0.0	1,677.1
Total	480.0	1,151.5	1,395.2	1,323.6	284.8	295.8	306.8	191.6	5,429.1

Source: DNP

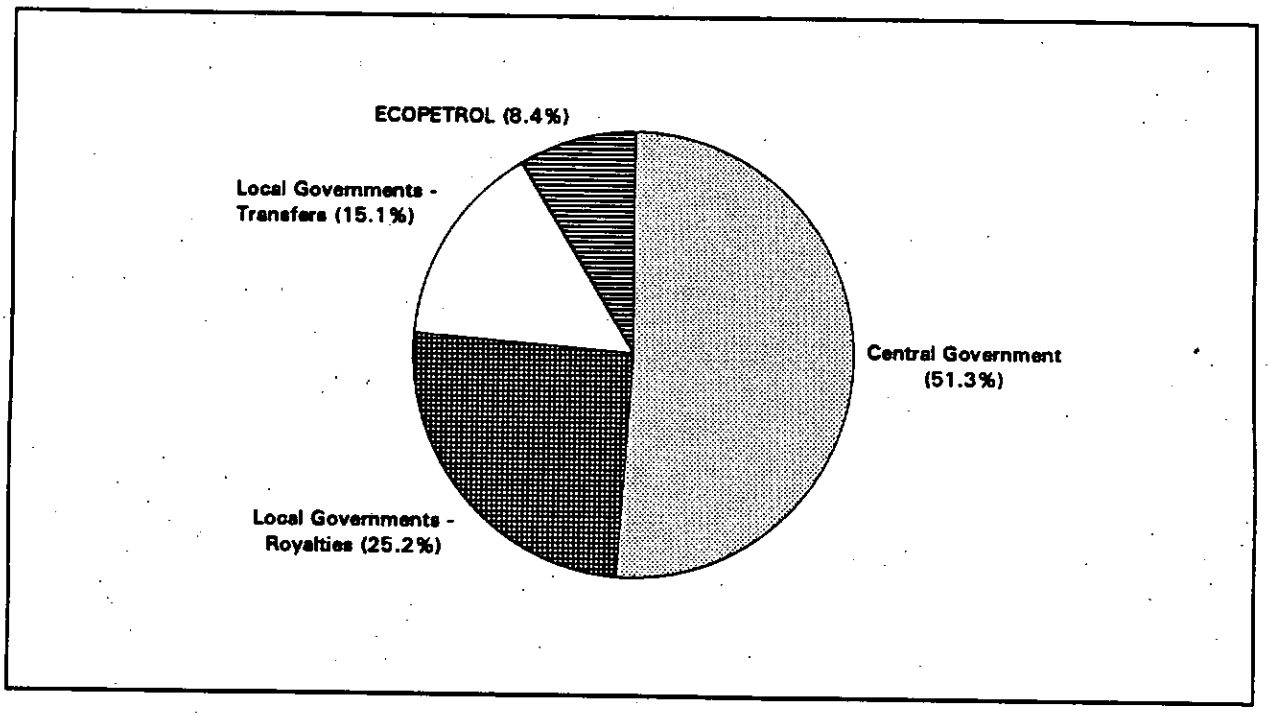
TABLE 19: NET PRESENT VALUE AND DISTRIBUTION OF CUSIANA'S EXPECTED INCOME FLOWS, 1993-2005
(Millions of 1993 US$)

	TOTAL	PUBLIC SECTOR	ASSOCIATES	PUBLIC/TOTAL (%)
Gross Income	21,062.5	15,232.8	5,829.6	72.3%
Costs 1/	5,757.6	2,878.8	2,878.8	50.0%
Net Profits 2/	15,304.8	12,354.0	2,950.8	80.7%

1/ Operational plus investment costs
2/ For associates these are net of taxes and royalties.
For the public sector, correspondingly, they include tax and royalty receipts.
Source: DNP

61. Importantly, however, not all of the public sector's net income will be received by ECOPETROL or the central government. Indeed, as can be seen in Figure 5, ECOPETROL will only retain 8 percent of total oil revenues --as it will transfer 50 percent to 75 percent of its net profits as dividends to the central government. Departments and municipalities, on the other hand, will receive 40 percent of the oil revenues: 25 percent as royalties to the departments where oil exploitation is taking place, and 15 percent as part of the required sharing arrangements established by law (Ley de Competencias y Recursos) -- these transfers are defined as an increasing percent of total central government revenues. Clearly, the substantial participation of local governments in the oil windfall makes it imperative for the central government to ensure, within the decentralization process, that local authorities have the institutional capacity to properly identify, prepare and implement projects. Furthermore, the limited control of oil revenues by the central government, 51 percent, sets definite constraints in its future fight for fiscal discipline.

Figure 5: CUSIANA - DISTRIBUTION OF PUBLIC SECTOR'S NET INCOME



Balance of Payments: Expected Foreign Exchange Flows

62. In addition to the fiscal accounts, the exploitation of the oil fields will have a direct impact on the balance of payments. As presented in Table 20, the potential accumulation of reserves as a result of the Cusiana and Cupiagua project will be increasing rapidly. By the year 2000, the accumulation could well exceed the total amount of existing international reserves --about US$8.5 billion, which account for more than 11 months of

Table 20: CUSIANA 'S BALANCE OF PAYMENTS
(Millions of US$)

	1993	1994	1995	1996	1997	1998	1999	2000
I. CURRENT ACCOUNT	-209.6	-507.9	-52.5	981.2	3,036.6	3,156.1	3,278.3	3,453.6
A. Exports	59.2	215.2	934.0	2,262.0	4,472.3	4,642.2	4,818.7	5,001.8
Ecopetrol	35.5	129.1	560.4	1,357.2	2,683.4	2,785.3	2,891.2	3,001.1
Associates	23.7	86.1	373.6	904.8	1,788.9	1,856.9	1,927.5	2,000.7
B. Imports	252.0	660.2	716.0	615.0	113.9	118.2	122.7	76.6
Production 1/	112.0	194.5	347.5	415.3	113.9	118.2	122.7	76.6
Transportation	140.0	465.7	368.5	199.7	0.0	0.0	0.0	0.0
C. Services	-16.8	-62.9	-270.5	-665.8	-1321.8	-1367.9	-1417.7	-1471.6
Income	0.8	3.0	13.3	15.4	16.0	16.7	17.3	18.0
1. Oil Pipeline - Transportatio	0.8	3.0	13.3	15.4	16.0	16.7	17.3	18.0
Expenditure	17.6	65.9	283.8	681.2	1,337.8	1,384.6	1,435.0	1,489.6
1. Technical Services	1.6	6.0	26.0	62.9	124.4	129.1	134.0	139.1
2. Capital Income 3/	16.0	58.1	252.2	610.7	1,207.5	1,253.4	1,301.0	1,350.5
3. Financial Services	0.0	1.8	5.6	7.6	5.9	2.1	0.0	0.0
II. CAPITAL ACCOUNT								
A. Net Foreign Investment	310.7	831.5	943.8	804.5	142.4	147.8	153.4	95.8
Production 4/	110.7	166.2	417.3	519.2	142.4	147.8	153.4	95.8
Transportation	200.0	665.3	526.5	285.3	0.0	0.0	0.0	0.0
B. Long Term Capital								
Official Debt	0.0	50.0	59.0	0.0	-50.0	-59.0	0.0	0.0
Disbursements	0.0	50.0	59.0	0.0	0.0	0.0	0.0	0.0
Amortizations					50.0	59.0	0.0	0.0
Reserve Changes due to Cusiana	101.0	373.7	950.3	1,785.5	3,129.0	3,244.9	3,431.6	3,549.4

1/ It is assumed that 40% of the investment for production capacity and the 70% of transportion are imports.
2/ It is assumed that the associates will transport up to 75 MBD in the existante oil pipelines.
From this, half will generate incomes for ECOPETROL and the country.
3/ It includes the leasing share to finance the transportation investment.
4/ Net amount of the precommercial expenditures that ECOPETROL must recognized to the associates.
Note: Present Value of Reserve Accumulation up to 2000 US$ 10,478 (*)
Present Value of Reserve Accumulation up to 2005 US$ 13,720 (*)
(*) The discount rate is 10%.

imports of goods and services. Oil exports are expected to increase from 0.5 percent of GDP in 1994 to 5 percent of GDP in 1997. The net present value of the projected contribution of Cusiana to the balance of payments between now and the year 2000 is estimated at US$10,478 million or 19 percent of GDP.

B. Colombia's Medium Term Macroeconomic Perspectives: Adjusting to the Oil Boom

63. There is extensive literature about adjustment to oil booms. The theoretical framework of the so called "Dutch Disease" clearly portrays the main elements of what would be an efficient adjustment to an oil boom of the kind currently facing Colombia[17]. There is also ample evidence of the experience of different countries in their efforts to adjust to similar external shocks. Colombia itself is not unfamiliar with this phenomenon. As recently as 1975-80, Colombia encountered a Coffee Bonanza that increased international coffee prices more than fourfold in a period of two years.

64. Many lessons can be drawn from the existing literature and the international experience. First, the natural and efficient adjustment to a permanent windfall gain, like the one now facing Colombia, is for the economy to move towards a higher growth path and to experience a significant restructuring of the composition of its output. Resources move away from the (non-booming) tradeable goods and services towards non-tradeable domestically produced goods and services. This transformation is desirable and ultimately necessary if the improvement in the standards of living of the society is to be an enduring one. Second, the cases in which windfall gains did not prove to be welfare improving are related to bad macroeconomic management in general, and relaxation of fiscal policy in particular. In the case of Mexico, for example, not only did the government use the oil revenues to embark in a very ambitious public expenditure program, but heavily borrowed against expected future income. The outcome was an excessive appreciation of the real exchange rate and a significant waste of resources as the economy encountered important allocative bottlenecks. And third, policy makers should be concerned, not in protecting its tradeable sector per se, but in enhancing resource mobility in the economy and in removing distortions that could lead to misallocation of resources. This will enable the economy to take advantage of the windfall gain and enhance its capacity to absorb the investment boom productively.

65. Based on these lessons and the particular circumstances facing Colombia, the long-run version of the general equilibrium model is now used to explore the country's medium-term macroeconomic perspectives. Special attention is given to better understand the way in which the poor would share in the benefits of the oil windfall gain. The analysis is carried out in two parts. The first one explores the adjustment process to the oil boom, while pursuing prudent fiscal policies and implementing the proposed reform of the social security

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[17] See W.M. Corden, and J.P. Neary (1982) and W.M. Corden (1984), for clear expositions of the analytics of the "Dutch Disease". The name of this phenomenon comes from the observed developments in the Netherlands following large natural gas discoveries during the 1960s.

system. The general findings suggest that the oil discovery will enable Colombia to attain a higher growth path. However, without specific policies to enhance productivity in the rural areas, rural incomes would fall below long-run trends even in a well managed adjustment to the oil bonanza. The second part of the analysis, then, is devoted to determine the extent to which productivity gains in the rural sector are necessary to avoid any deterioration of rural income as a result of the oil boom. Indeed, by adopting an appropriate set of policies to enhance rural productivity, the authorities could use the oil windfall gains not only to put Colombia on a higher growth path but one which would ensure a generalized improvement in the standards of living of its population.

Adjusting to the Oil Boom: Prudent Fiscal Policies and Social Security Reform

66. The oil boom simulated in the model represents the base case scenario being used by the government in relation to production from the new oil fields. As shown in Table 17, it is expected that production from the Cusiana and Cupiagua Project will increase from its current level of about 10,000 bpd to around 600,000 bpd by 1997, when it will reach its production plateau. This will more than double total oil production in Colombia from 479,800 bpd in 1993 to 1,076,100 bpd in 1997 --an increase of 124.3 percent. The simulation imposes this increase in oil production and assumes the economy reaches its new equilibrium position by 1998. The real exchange rate is endogenous in the model. With regard to fiscal policy, as mentioned before a key ingredient to the final outcome of the adjustment, two assumptions are made: (a) prudent fiscal policy is pursued; and (b) the proposed reform of the social security is implemented.

67. To operationalize the referred fiscal assumptions a two stage process is pursued. First, the model is run to simulate the effect of the increase in oil production while maintaining both the current account and the fiscal positions constant. This simulation estimates the space that the oil boom would create for total, private and government investment in the economy, while forcing authorities to maintain what is perceived as a prudent fiscal position and preserving the external balance. The results indicate that the oil bonanza in Colombia would provide room for total investment in the economy to increase 7.3 percent (1.4 percent p.a.) above its long-term trend --with private investment[18] growing 9.1 percent (1.8 percent p.a.) and government investment 6.5 percent (1.3 percent p.a.). The second stage of the process then brings in the simulation of the social security reform[19], considering that private and government investment grow by 9.1 percent and 6.5 percent respectively. Accordingly, the resources generated by the social security tax on the wage bill

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[18] Investments from public enterprises are considered private investment in the model. In that regard, all capital expenditures for the development of the oil fields are included as private investments.

[19] For a complete description of the proposed social security reform refer to Chapter 4. Its magnitude, however, can be put in perspective in relation to the model. The reform is recommending to augment the wage tax in the formal sector from 8 percent to 12.5 percent in relation to pensions, and from 7 percent to 12 percent as regards to health services. This represents an increase of 9.5 percent in labor costs over the wage bill for the formal sector. The model incorporates the inclusion of private pension funds and their partial replacement of ISS.

are assumed to be effectively channeled to both public and private savings ensuring the funding of future social security benefits.

68. The results of the simulation clearly portray the "Dutch Disease" adjustment process the economy is expected to go through, as indicated in the sectorial breakdown of price, production, trade and employment changes presented in Table 21. As can be seen, as a result of the oil boom relative prices in the economy are expected to move strongly in favor of non-tradeable goods and services. Besides the mining sector, commerce, domestic services and rest of modern services are the sectors which would experience the largest increases in relative prices. Parallel changes would occur in the structure of production, with the construction sector --being both non-traded and investment good-- expanding most significantly, while other non durable manufactured goods, processed food products, intermediate manufactured goods, and modern agriculture goods are all expected to grow below their long-term trends. The model is able to capture the different degrees of substitutability between domestic and foreign goods, as well as the relative importance of trade in the different sectors, thereby distinguishing the extent to which each sector is expected to behave as a tradeable or non-tradeable sector. In that regard, for example, it is interesting to point out that agriculture food products and durable manufactured goods would be expected to expand their production as a result of the oil boom --behaving, therefore, more like non-tradeables. Finally, the effect of the oil boom on foreign trade is as anticipated. Imports rise in all traded sectors and exports decline, both because productive resources are drawn into non-tradeable sectors and also because domestic tradeable goods prices, not perfectly tied to international prices, are allowed to rise. The resulting appreciation of the real exchange rate would be 9.2 percent (or 1.8 percent p.a.).

69. Turning to the impact of the oil bonanza on the labor market, two important results emerge from the simulation. First, as expected, labor would be leaving the tradeable for the non-tradeable sectors. Employment opportunities would most significantly expand in the sectors of oil extraction, construction, durable manufactured goods, and modern services. Second, the widening of the income gap between the rural and urban areas would encourage a new wave of labor migrations to the cities. In its absence, it is estimated the oil boom together with the social security reform would cause relative wages for unskilled workers to fall 13.2 percent in the rural vs the urban areas (on the basis of formal wages). It is foreseen then that rural-urban migration would result in a reduction of 2.3 percent in the number of rural workers, which would be absorbed by a corresponding increase of 1.8 percent and 2.2 percent in employment of the informal and formal segments of the market. The gap between rural and urban wages would then be reduced to 7.2 percent. Real rural wages, as can be seen in Table 22, would fall 6.4 percent, while wages for unskilled urban workers would increase 0.9 percent in the formal sector and 0.5 percent in the informal sector. Real wages for skilled workers, on the other hand, would increase 3.9 percent. The relatively small increase in wages for unskilled urban workers is due, in addition to rural-urban migration, to the wage tax imposed by the social security reform. It is estimated that without social security reform or migration, real wages for unskilled urban workers would increase 4.4 percent as a result of the oil boom. Once social security reform is considered, the increase is

Table 21: STRUCTURAL EFFECTS OF THE ADJUSTMENT TO THE OIL BOOM - PRUDENT FISCAL POLICIES AND SOCIAL SECURITY REFORM
(% Change)

	Production	Prices	Exports	Imports	Employment			
					Rural	Non-qualified		Qualified
						Informal	Formal	
Agriculture food products	1.49	-6.36	-6.09	8.87	-0.06			
Modern agriculture goods	-2.19	-5.96	-8.99	7.25	-3.34			
Raw coffee	-0.10	-6.58	-	-	-1.09			
Processed coffee	0.04	-3.99	-	-		2.73	2.02	-0.82
Oil	124.30	-12.45	312.98	-		131.89	130.29	123.60
Natural gas	-4.11	1.83	-	-4.16		-0.63	-1.31	-4.18
Coal	-1.10	3.52	-	-		2.39	1.68	-1.26
Refined oil products	-11.04	-7.43	-11.92	54.19		-8.51	-9.14	-11.78
Rest of mining	-12.13	36.78	-17.83	1.26		-9.61	-10.23	-12.59
Other processed food products	-2.76	-0.54	-7.22	16.54		0.91	0.22	-4.24
Other non durable manufactured goods	-5.19	3.06	-10.43	22.12		-3.12	-3.78	-6.64
Intermediate manufactured goods	-2.41	2.15	-7.83	7.87		1.67	0.97	-5.57
Durable manufactured goods	0.75	0.16	-3.94	9.70		3.65	2.94	-1.45
Construction	8.11	1.63	-	-		10.66	9.90	7.10
Commerce	-4.55	3.79	-10.65	10.52		-1.83	-2.51	-4.80
Transportation	-1.80	2.70	-7.25	12.92		0.64	-0.05	-2.84
Rest of modern services	0.04	3.35	-6.32	15.15		3.16	2.45	-0.56
Personal services	-1.50	1.86	-	11.40		0.44	-0.25	-2.08
Housing	-0.22	0.53	-	-				
Domestic services	-4.36	3.73	-	-		-0.22		
Government services	-0.03	2.17				2.67	1.96	-1.08
TOTAL	4.76	n.a. 1/	32.09	12.15	-2.30	1.78	2.23	0.00

1/ The consumer price index is used as the numeraire for the simulation.

Source: Fedesarrollo.

Table 22: INCOME EFFECTS OF THE ADJUSTMENT TO THE OIL BOOM

	Prudent Fiscal Policy and Social Security Reform (% Change)			
	No Increase Rural Productivity	In Per-Capita Terms	25% Increase Rural Productivity	In Per-Capita Terms
A. Real urban income				
Lower quintile	1.29	-0.50	7.09	5.03
Upper quintile	1.24	-0.55	6.94	4.88
Gini	0.12		0.11	
B. Real rural income				
Lower two quintiles	-8.34	-6.01	-2.54	0.17
Upper quintile	-8.32	-5.99	-2.55	0.16
Gini	0.01		0.00	
C. Employment				
Rural	-2.30		-2.50	
Unskilled informal	1.78		2.09	
Unskilled formal	2.23		2.33	
Skilled	0.00		0.00	
D. Real wages				
Rural	-6.37		0.03	
Unskilled informal	0.53		6.12	
Unskilled formal	0.88		6.32	
Skilled	3.92		9.30	
E. Real capital income				
Rural	-8.22		-2.58	
Urban	3.86		10.44	

Source: Fedesarrollo

only 2.7 percent in the informal sector and 3.4 percent in the formal sector. Migration accounts for the rest of the decline.

70. In the final analysis, the expansion of the oil sector in Colombia could be expected to increase the country's GDP by 4.8 percent (0.9 percent p.a.) above its long-term trend. The additional income would accrue to the urban areas, whose productive resources would be more intensively used and which would benefit from the 7.2 percent decline of the relative prices of agriculture goods vis-a-vis the prices of urban goods and services. Although urban incomes would only increase by 1.3 percent --indeed, given added migration to the cities, in per capita terms would remain stagnant--, urban welfare would have improved significantly. By being able to finance the social security reform, expected urban income would have increased as future social security benefits would now be viable. Rural income, on the other hand, would fall 8.3 percent (6 percent in per capita terms). The oil boom then, would provide the necessary room to expand investment in the economy, at a time when a major social security reform is implemented, and would allow Colombia to move to a faster growth path. However, the benefits of the windfall gain would not be equally distributed. If no corrective action is undertaken, the rural sector, and thereby most of the poor in Colombia, would not share the benefits of the bonanza. Indeed, the gap between the rural and the urban areas that has been opened since 1990 would widen further.

Adjusting to the Oil Boom: Proactive Policies to Enhance Productivity in the Rural Sector

71. Though labor migration would certainly reduce the widening income gap between the rural and the urban areas, it would hardly close it. Rural productivity will necessarily have to improve if further deterioration of the living conditions of the rural poor is to be prevented. To do so, authorities need to focus their attention on the competitiveness of the agriculture sector, not through exchange rate management --as has been sometimes suggested-- but through improvements in productivity. It should be clear that, given the magnitude of the oil revenues, the appreciation of the real exchange rate is both desirable and unavoidable. On the other hand, the windfall gain can certainly be used to improve rural infrastructure, enhance agricultural extension, access modern technology and market information services, and consolidate agricultural land, all of which would result in desired improvements in rural productivity.

72. It is estimated that a 25 percent increase (4.6 percent p.a.) in the productivity of the non-coffee agriculture activities would be required to avoid further falls of rural per-capita income in the medium term. This productivity increase would be consistent with present real wages in the rural areas and with a reduction of 2.5 percent in the number of rural workers, which is in line with the expected migration trends discussed above. Furthermore, agriculture productivity increases would enhance labor and income opportunities for the urban poor, including those migrating from the rural areas. This is because, as can be seen in Table 23, agriculture goods would become cheaper in relation to urban goods, thus creating incentives to expand urban production. By making the cost of food products more affordable, increased rural productivity would allow consumers to diversify and expand their

Table 23: MACROECONOMIC EFFECTS OF THE ADJUSTMENT TO THE OIL BOOM

	Prudent Fiscal Policy and Social Security Reform	
	No Increase Rural Productivity	25% Increase Rural Productivity
A. Aggregate Accounts (% Change)		
GDP	4.76	8.19
Private Consumption	-0.89	3.94
Government Consumption	0.00	0.00
Total Investment	7.29	7.29
Private Investment	9.13	9.13
Public Investment	6.46	6.46
Inventories Variation	0.00	0.00
Exports	32.09	38.83
Imports	12.15	18.31
B. Macroeconomic Balances (Change as % of GDP)		
Resource Gap	2.85	2.70
Government Savings-Investment Gap	1.02	0.48
Private Savings-Investment Gap	1.83	2.22
C. Relative prices (% Change)		
Agriculture	-5.80	-20.38
Mining	-8.02	-9.32
Manufacturing	0.18	0.39
Construction	2.45	6.36
Services	2.93	6.80
D. Real Exchange Rate (% Change)		
Based on GDP Deflator	-9.21	-12.24
Based on CPI	-9.93	-11.95
E. Production (% Change)		
Agriculture	-0.87	25.82
Mining	68.79	67.40
Manufacturing	-2.81	-1.38
Construction	8.11	7.95
Services	-1.07	-1.37

Source: Fedesarrollo

consumption basket and encourage other productive sectors to accelerate their activity levels. The additional supply of exportable agriculture goods would increase total exports of the economy, lead to further appreciation of the exchange rate and a related increase in total imports. Accelerated activity levels would mostly be observed in agriculture, but the manufacturing sector would also benefit from enhanced rural productivity, as its production would now only fall by 1.4 percent instead of 2.8 percent. Services and construction would not experience any important change. In aggregate terms, GDP would expand 3.4 percent over and above the estimated path for the oil boom, with private consumption increasing 3.9 percent. Indeed, the assumed productivity gains would allow the economy to expand 1.6 percent p.a. above its long-term trend, as compared with the 0.9 percent p.a. of the oil boom itself.

73. Furthermore, real income of the lowest urban quintile would improve 7.1 percent (5 percent per capita), as compared with 1.3 percent (-0.5 percent per capita) in the absence of productivity increases. Rural income of the lowest quintile, on the other hand, would fall 2.5 percent (with a 0.2 percent increase in per capita income) as compared with the previous decline of 8.3 percent (6 percent per capita). The results suggest a clear direction for policy: the government needs to put in place an expenditure and policy program aimed at increasing rural productivity. If successful, and rural productivity in the medium term increases by 25 percent or more, the authorities would have used the oil windfall gains in a way that would ensure a pareto optimal welfare solution: everyone would be better off as a result of the oil bonanza in Colombia.

C. Proposed Medium-Term Macroeconomic Policy Framework

74. Based on the analysis just presented, and the general lessons described by the "Dutch Disease" literature, one can propose a policy framework that would enable Colombia to attain the full benefits from its oil bonanza. The main elements of this policy framework are as follows:

(a) **Set targets for a continuous abatement of inflation.** A key to a smooth adjustment to the oil boom is to avoid the appreciation of the real exchange rate through a burst of inflation. It is important then to build consensus around a targeted path for further reductions in inflation. Given Colombia's gradual approach to macroeconomic management, one could think of targeting a 1 to 2 percentage points reduction in inflation each year. This could put Colombia's inflation in the single digits by the year 2000.

(b) **Define, on a yearly basis, a macroeconomic program which is consistent with the above inflationary targets.** Given the limited role of monetary policy in an open economy as Colombia, this will define

the fiscal position which would allow the government program to achieve its inflation target.

(c) **Given the appropriate fiscal position, excess oil revenues should be used to prepay debt or saved abroad.** There should be no predefined targets for reduction of external debt. The prepayment of debt should be done only when it is financially more attractive than saving abroad. For that purpose an analysis of existing debt and the costs involved in its prepayment needs to be carried out. In the final assessment, the objective to maintain a good standing for Colombia in the international capital markets should be incorporated.

(d) **Establish an oil fund[20] as an instrument to institutionalize the option to save abroad.** Given the political difficulties of maintaining fiscal discipline in the context of an oil bonanza, the establishment of the oil fund may provide an instrument by which to build consensus around the need to save part of the oil revenues abroad. Importantly, given the existing law for the transfer of central government revenues to the departments and municipalities, the fund needs to be placed in between ECOPETROL-Associates and the central government, so that the oil revenues that are saved abroad are not considered part of central government revenues. Local government authorities, however, need to be assured that their claim on those resources would still be effective, and implemented as those resources are brought back into the economy.

(e) **Identify a public investment program, focused on infrastructure and human capital development --e.g., projects in education, health--, with high economic and social rates of return.** Given supply and implementation constraints, the overall public investment program should be spread out in time so as to ensure the execution of the projects does not hamper their rates of return. In no case should projects be undertaken when their rate of return is equal or lower to what would be obtained by investing abroad. In contrast to the public investment program which faces rapid decreasing returns, saving abroad would present the option of constant returns (i.e., a larger transfer of funds abroad will have no discernable impact on international interest rates).

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20 Although the discussion in Colombia is referring to the fund as a stabilization fund, given the permanent nature of the income shock of the oil discoveries, and the observed non-stationary behavior of oil prices, it is difficult to think about it as a stabilization instrument. Indeed, the oil fund would be expected to simply accumulate deposits for a prolonged period of time.

(f) **Assign an increasing share of government resources to rural expenditure programs aimed at increasing rural productivity.** Programs to improve rural infrastructure (roads, water supply, and irrigation), services (agriculture extension, market information and access to modern technology), and land consolidation (through land reform) should receive funding commensurate with the required objective of a 5 percent p.a. improvement in rural productivity. Furthermore, they should be accompanied by policies which provide the necessary incentives for the private sector to seek such improvements.

(g) **Increase the institutional capacity of local governments for planning and budgeting, and for properly identifying, preparing and implementing projects.** These objectives, clearly set as part of the decentralization effort in Colombia, have now attained particular importance. Given the sharp increase in resources to be transferred to local governments as a result of the oil revenues, their proper use will prove essential if fiscal discipline is to be maintained.

(h) **Define the Royalties Fund (Fondo de Regalias) so as to ensure that the additional resources being received by local governments are used for the execution of regional infrastructure projects.** Oil revenues can, in this way, provide room for the central government to discharge some of its expenditure responsibilities --and thereby enhance the possibility of maintaining fiscal discipline.

(i) **Transfer any additional resources to the private sector.** Given the appropriate fiscal position, and an attainable and attractive public investment program for the year, any additional resources should be transferred to the private sector for it to invest, save or consume. By simply increasing public savings such resources would be available to the private sector through the financial system.

(j) **Increase factor mobility.** With the enormous shift of resources expected in the economy, factor mobility will be critical, both to ensure minimum costs of transition as well as efficient allocation of resources. In terms of the formal labor market, as has been mentioned before, real minimum wages should be allowed to fall slowly --at the very least they should only be adjusted for expected inflation. But the issue of labor mobility should be considered in its broadest sense. Colombia needs to reduce its frictional unemployment and facilitate rural-urban migration. Expenditures in education and health, particularly in the rural areas, are essential instruments for these objectives to be attained.

75. Importantly, given the results presented in this report, the deterioration of the rural sector that has been observed during the last two years is not going to subside but, on the contrary, may well accelerate. Corrective measures, then, should be consistent with the required policy adjustments in the longer term. In that context, the emergency employment program discussed before should serve not only as a safety net, but as a way to enhance labor mobility during the transition period. The expansion and restructuring of rural expenditure programs should not only improve targeting, but should directly address the urgent need to increase rural productivity. The government should understand that its stance on agriculture policy is not to be seen as a response to a temporary phenomenon, but a strategy to address a medium-term problem. It is in this context that the measures so far undertaken by the government seem even more counterproductive. On the trade front, any increase in protection would result in a further appreciation of the exchange rate during the adjustment process to the oil boom. The expected gains on one side would be lost on the other. The loss, however, would be accompanied by a misallocation of resources at a time when significant shifts are taking place. It is important to emphasize that trade liberalization has put the Colombian economy in a better position to smoothly adjust to the oil boom. The government should be careful not to loose this advantage. On domestic pricing policies, it would be unsustainable for the government to maintain support prices during a period of continued deterioration of agriculture relative prices. It would undermine the need for prudent fiscal policy.

76. The challenge for the government now is to look beyond the existing crisis in the rural sector, and start to implement a comprehensive medium-term policy strategy. Only in this way, will Colombia be able to regain its path for poverty alleviation, and steer its economy towards a course of higher sustainable growth with equity.

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COLOMBIA: POVERTY ASSESSMENT

CHAPTER 5

MACROECONOMIC POLICY AND POVERTY ALLEVIATION IN COLOMBIA
(Annex)

August 26, 1993

Annex

A Computable General Equilibrium Model of Colombia

1. The computable general equilibrium model used to analyze the effects of structural reforms and external shocks on income distribution in Colombia is a variant of an existing model developed by Lora and Ramírez (1990 and 1991) in FEDESARROLLO. To strengthen the model's capabilities for the analysis of poverty and income distribution issues, the existing model was modified and extended in several ways, including the (a) increase in the number of sectors, with oil being treated separately; (b) disaggregation to consider 10 rural income groups, matching the treatment of the urban sector; (c) distinction between skilled and unskilled (formal and informal) labor[1] by income group and by sector use; and (d) change in the corresponding specification of the labor market. Short and long-run versions of the model were constructed to study, on the one hand, the macroeconomic determinants of income distribution changes between 1990-1992 and, on the other, the prospects of future reductions of poverty and income concentration as a result of the adjustment to the expected oil revenues from the newly discovered fields in Colombia. Following is the presentation of the salient features of the model.

I. Structure of the Model

A. Short-Run Model

2. **Production and pricing.** The model is disaggregated into 21 sectors, based on a rearrangement of the two-digit level SITC from DANE as presented in Table A.1.

3. Production in each of the sectors is specified by nested production functions (see Graphic 1). Inputs and labor are combined in fixed coefficients (IO). Inputs used in each sector are, in turn, the result of combining energy and the rest of inputs in fixed coefficients, where energy use in each sector is determined by constant elasticity of substitution (CES) functions that combine the different sources of energy. Labor use in the urban sectors is modelled through two-stage CES functions: in a first stage the two types of unskilled labor are combined; in the second, skilled labor is combined with total unskilled labor (Table A.2 presents the employment patterns of each type of labor in the various sectors). In the rural sectors only rural labor is used. In the case of the modern agriculture sector capital is considered a market factor, which is combined with labor through a CES function (not shown in the graph). In the other sectors, both rural and urban capital are considered non-market factors, thus receiving an income not as a result of their marginal productivity but either as a rent that comes about as a residual between the price fetched for the final goods and the variable costs or as a mark-up on these costs. Rents occur when production and/or producer prices are assumed fixed (agriculture food products, raw coffee, oil, coal, natural gas, refined oil products and housing). Mark ups are assumed in the

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1 Skilled labor comprises workers with 12 or more years of education, the remaining workers are classified as unskilled labor. Unskilled labor, in turn, is disaggregated between formal and informal depending on whether the worker is associated with the social security system or not.

remaining industrial and service sectors, other than domestic and government services where prices are equalled to costs. A summary of the basic specification of the model is presented in Table A.3.

4. **Supply of goods.** Sectoral productions are split between exports and domestic uses. Constant elasticity of transformation (CET) functions are used for this purpose when quantities produced are either fixed (agriculture food products and refined oil products) or determined by the supply of factors of production (modern agriculture). Otherwise, fixed technical coefficients are applied. Goods supplied to the domestic market are a CES composite of domestic and imported goods according to the Armington specification. The supply of imported goods is infinitely elastic at given external prices. Goods supplied domestically are used for intermediate consumption, investment and final consumption.

5. **Factor markets.** As mentioned before, capital is a market factor only in the modern agriculture sector. The supply of this factor is assumed fixed and its return corresponds to its marginal productivity value. Three types of labor are considered: rural, unskilled urban and skilled urban, all in fixed supply in the short run. Clearing wages are assumed in the rural and the skilled urban segments of the labor market. The existence of a minimum wage for unskilled workers formally employed gives origin to unemployment and to an informal segment of unskilled workers. Unemployment occurs because some workers give up their informal jobs attracted by the probability to find a better paid job in the formal sector. Hence, the number of unskilled workers is split between the supply of labor to the formal market (either employed or not) and the self-employed in the informal segment, according with the following function:

$$A/B = c*(U)^{z}*(WA/WB)^{m}$$

where A and B are the supplies of labor in the formal and the informal segments of the labor market of the unskilled workers, U the rate of unemployment in the formal segment, WA and WB are the corresponding wages, c is a calibration parameter, z is a negative number representing the aversion to risk of being unemployed in the formal segment of the market and m is a positive number representing the elasticity of migration. The higher the costs of migrating between the informal and the formal market, the lower this elasticity. This formulation is consistent with a constant elasticity utility function where utility depends inversely on the risk of being unemployed and directly on the level of income.

6. **Income distribution and private consumption.** Each type of capital and labor income is assigned to household deciles in the rural or the urban areas in proportion to their original factor endowments (see Table A.4), after deducting corporate income taxes and social security taxes (in the cases of skilled and formal unskilled urban workers). In the oil sector, marginal rents are divided in equal parts between the government and the private associates --following standard practice in association contracts-- and this second half is assumed to be remitted abroad. Urban households receive transfers from abroad and from the government in fixed amounts. Income of each household

group is assigned to saving and consumption in fixed proportions, after deducting direct taxes (paid only by the two upper urban income deciles). Consumption in each of the household groups is modelled as a linear expenditure system (LES). Due to lack of information, the same consumption pattern is assumed for the 10 rural households (see following section for sources of data).

7. **External sector.** Imports are modelled under the small country assumption of infinite elasticity of supply. Perfectly elastic demand curves are also assumed for exports of all primary goods, though not for manufactured goods and services. In the short run, external demand of manufactured goods and services is somewhat inelastic due to product differentiation and restricted access to the international markets[2]. In spite of the small country assumption for imports and primary goods exports, the "law of one price" is ruled out by the referred treatment of export supplies and import demands. The current account is equivalent to net exports of goods and services plus net transfers to families and government, which are given in dollar terms. The exchange rate is assumed fixed in nominal terms and is chosen as the numeraire for the model.

8. **Government.** The government collects direct and indirect taxes, obtains earnings from its production of government services and receives transfers from abroad. The proceeds are used to consume, invest, pay transfers to the corporate sector and households, and save. All transfers are fixed in nominal terms. Government consumption and investment in goods and services are fixed in real terms.

9. Direct taxes are paid by the corporate sector and by the two upper urban deciles at fixed rates. Indirect taxes and subsidies comprise: VAT, import tariffs, export subsidies and rebates, and some minor indirect taxes by sector of production. Goods and services within the Colombian VAT system are classified in three groups: (a) excluded; (b) included with zero tax; and (c) included with other taxes. Goods excluded of the VAT comprise agriculture and mining goods, processed food products, construction, transportation, housing, and personal, domestic and government services. All exports are excluded of the VAT system, regardless of the type of good. Exclusion implies no refund of taxes levied on the inputs of the corresponding good. Inclusion at zero rate implies no tax paid either directly or indirectly. Goods taxed at zero rate comprise gasoline and other fuels, manufactured inputs, machinery and equipment for the agriculture sector, and a few trading activities and modern services. Investment in machinery and equipment is subject to a special regime, since the corresponding VAT is deductible from the corporate tax. In the model, this type of investment is included in the list of goods taxed at zero rate. The rest of goods and services included (other oil derivatives, industrial goods, commerce and the rest of modern services, used for private consumption or for intermediate consumption in the production of the goods) are taxed explicitly.

10. **Private investment and model closure.** Private investment comprises fixed investment and inventory accumulation, which are assumed fixed in real terms. Since government investment is also fixed in real terms, total savings must accommodate to close the model. The sources of savings comprise the current account, government, corporate sector and households. The two former are residual, the two latter are endogenous given the average propensities to save.

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2 This assumption is necessary to justify the existence of slack capacity in the urban sectors.

B. Long-Run Model

11. **Production and pricing.** The long-run version of the model assumes that only the production of oil, and the exports of coffee and coal are fixed. The remaining quantity rigidities are lifted as presented in Table A.5. All domestic prices are market determined. As a result, rents occur only in the production of oil, coffee and coal. In all other sectors, capital is paid according to its marginal productivity value, under the assumption of full capacity utilization. Capital may now be substituted for labor through CES sectoral production functions.

12. **Supply of goods.** Except in oil, coffee and coal, CET functions are used to assign domestic production to exports and domestic uses.

13. **Factor markets.** With the same exceptions as in production, capital is a market factor, perfectly mobile within the urban and the rural sectors, but not between the two. In the labor market, the previous segmentation is maintained but wages in the formal segment are free to change in order to clear the market. Migration between urban sectors within each segment of the labor market is assumed perfect. Consequently, unemployment is ruled out. Labor migration may take place (i) between the formal and the informal segments of the urban market of unskilled workers and (ii) between the rural and the urban market of unskilled workers. In both cases, migration is modelled with equations of the form used in the short-run model (disregarding the term for unemployment and calculating total urban wages as a weighted average of the two segments of unskilled labor).

14. **External sector.** Export demands are assumed to be infinitely elastic, except in the cases of coffee and coal. In this version of the model, the real exchange rate is endogenous.

15. **Government.** Public investment may be assumed fixed or not, depending on whether the fiscal deficit is endogenous or fixed in nominal terms.

16. **Private investment and model closure.** Being a long-run model, private investment must now be determined by the availability of savings.

II. Sources of Data and Parameters

17. Aggregate accounts are consistent with the official 1990 national accounts by DANE. Production accounts are taken from the 1990 Input-Output Matrix elaborated by DANE. Disaggregation of the agriculture sector is based on the cost structure and the supply-demand equilibriums by product, presented in Lora and Ramirez (1990) and Gómez (1990). Production accounts for the mining sectors are taken from Lora, Perry et.al. (1992). The major macroeconomic variables for the base case are presented in Table A.6

18. Value added by capital and labor within each sector comes from the 1990 Input-Output Matrix. The proportions in which the three types of urban labor are combined in each sector are taken from the September 1992 National Households Survey.

19. Distribution of factor incomes to households by deciles is also based on the 1992 Household Survey (see Table A.4). The differences observed between the income distribution used for the model and the one presented in Chapter 1, is related to the fact that household distributions and not individual ones are being used. For the model, deciles are related to the number of households.

18. Urban households consumption by deciles is calculated maintaining the same consumption pattern observed in the 1985 Incomes and Expenditures Survey (the last expenditure survey). Since this survey did not include rural areas, rural consumption is obtained residually, ensuring that overall household consumption matches private consumption of national accounts[3]. The rest of the data for final demand by type of good is taken from national accounts.

20. In terms of parameters, the elasticity of migration between skilled and unskilled labor is taken from the previous work of Lora and Ramirez (1990 and 1991), elasticities of substitution between labor and capital come from Whalley (1985), and between sources of energy from Lora, Perry, et. al. (1992). Substitution elasticities between imports and domestic production, and transformation elasticities between goods for domestic and external markets have been adopted from Botero and Lopez (1989). For manufactured goods exports, transformation elasticities are assumed to be equal to the price elasticities of supply estimated by Botero and Meisel (1988). The elasticity for rural-urban migration has been arbitrarily chosen to produce plausible results.

III. Calibration of the Model: 1990-1992

21. To simulate the behavior of the economy between 1990 and 1992, the observed values of the following variables were used as criteria for good fitness (all in percentual changes with respect to 1990): (i) GDP and its demand components according to DANE; (ii) value added by sector, for the 21 sectors of the model, using its correspondence with the official national accounts by DANE; (iii) imports and exports, by type of good, on the basis of customs information; (iv) price variations for imports and exports, by type of good, according to the Producer Price Index by Banco de la República; (v) Consumer Price Index by DANE (total and for each of the services considered in the model); (vi) Producer Price Index by type of good produced and consumed domestically; and (vii) rural and urban labor force, employed and unemployed, distinguishing in the urban areas between skilled and unskilled, and the latter between formal and informal (according to the household surveys by DANE).

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3 Due to the residual treatment of rural consumption, some adjustments were necessary in order to avoid some implausible results.

The observed variations of the referred variables were closely reproduced in the model by imposing the following changes on exogenous variables and parameters:

Exogenous Variables and Parameters	Absolute values	% Variation
Policy Variables (as observed)		
Tariffs by type of good:		
Agriculture food products		-56.7
Modern agriculture goods		-61.2
Processed food products		-61.2
Other non-durable goods		-60.5
Intermediate manufactured goods		-62.8
Durable manufactured goods		-64.5
Services		-79.7
VAT rates by type of good:		
Refined oil products		20.0
Other non-durable goods		25.6
Intermediate manufactured goods		20.0
Durable manufactured goods		23.0
Modern services		66.7
Personal services		75.0
Excises:		
Oil (pesos per barrel since July, 1992)	600	
Coal (pesos per ton)	100	
Direct taxes (corporate and personal)		7.0
Government expenditure:		
Consumption (real)		15.0
Investment (real)		5.5
Net transfers (nominal)		58.6
Nominal exchange rate		43.3
Nominal minimum wage		58.9

External Prices (as observed, in dollars)

Export prices:	
Agriculture food products	18.2
Modern agriculture goods	-10.0
Coffee	-28.6
Oil	-19.2
Coal	-2.9
Other mining products	-12.0
Refined oil products	-19.2
Processed food products	33.8
Other non-durable goods	14.3
Intermediate manufactured goods	3.4
Durable manufactured goods	-2.1
Import prices:	
Agriculture food products	17.4
Modern agriculture goods	-2.5
Coal	-2.9
Natural gas	-19.2
Other mining products	-20.0
Refined oil products	-19.2
Processed food products	19.3
Other non-durable goods	10.5
Intermediate manufactured goods	-9.6
Durable manufactured goods	-4.4

Net external transfers received by agent (millions US$, as observed)

Corporate sector	224.5
Government	300.9
Urban households (10th decile)	84.4

Exogenous Quantities (as observed)

Factors of production:	
Rural labor	9.7
Urban informal unskilled labor	7.5
Urban skilled labor	19.5
Rural capital (to reproduce observed production)	1.1
Production:	
Oil	0.1
Refined oil products	2.8

Agriculture food products	0.2
Raw coffee	14.3
Exports:	
Coffee	18.5
Coal	0.0
Other mining products	6.9
Private Investment:	
Durable manufactured goods	5.0
Construction	16.8

Domestic Prices (as observed, in pesos)

Raw coffee	18.1
Processed coffee	21.8
Fuels (oil, coal, natural gas, refined oil products)	70.0
Housing	57 9
Government services	96.9

Import coefficients (values of calibration parameters for CES functions)

Agriculture food products	70.0
Modern agriculture goods	40.0
Other mining products	36.0
Processed food products	30.0
Other non-durable goods	29.0
Intermediate manufactured goods	-2.0
Durable manufactured goods	8.0

Exogenous export demands (shift parameters)

Processed food products	-19.2
Other non-durable goods	-5.9
Intermediate manufactured goods	61.7
Durable manufactured goods	114.9

Export coefficients (values of calibration parameters for CET functions)

Agriculture food products	23.0
Modern agriculture products	40.0
Refined oil products	-27.0

Inventory accumulation (absolute change in billions of 1990 pesos)

Agriculture food products	-79.1
Modern agriculture goods	-102.0
Raw coffee	-67.0
Processed coffee	19.0
Oil	59.9
Coal	-2.8
Other mining products	50.3
Refined oil products	13.1
Processed food products	21.8
Other non-durable goods	-34.5
Intermediate manufactured goods	152.4
Durable manufactured goods	205.8

Mark-ups

Processed food products	20.0
Other non-durable goods	-1.0
Intermediate manufactured goods	-1.0
Durable manufactured goods	-11.0
Transportation services	9.0
Personal services	4.0

Other variables

Labor productivity in the service sectors	-8.0
Average propensities to save (all income groups)	-2.5

Graphic 1

PRODUCTION STRUCTURE

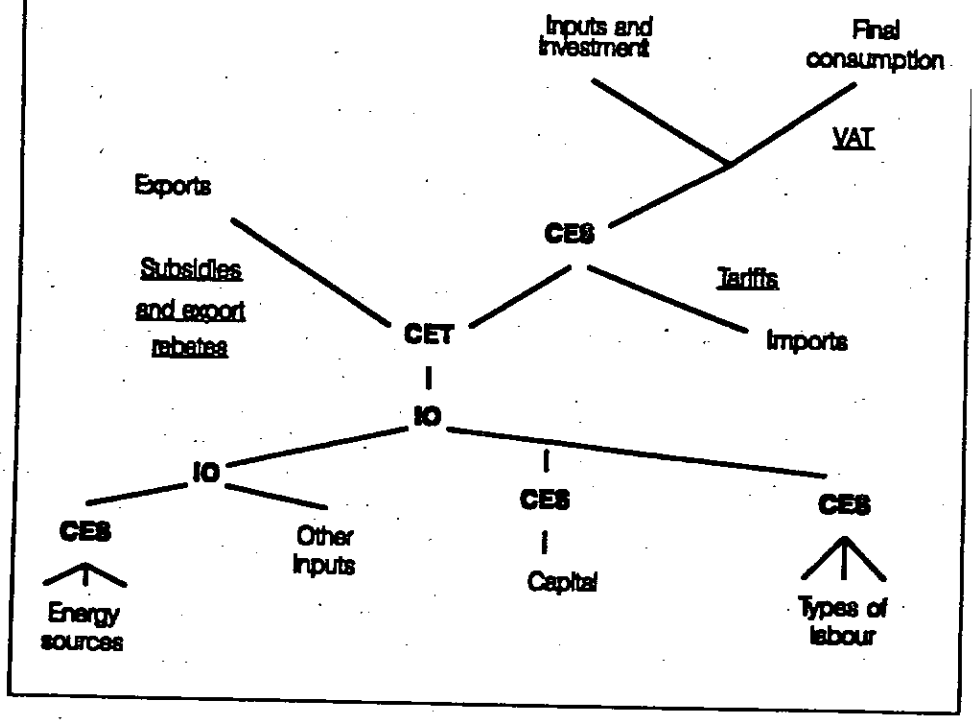

TABLE A.1: CLASSIFICATION OF THE SECTORS IN THE MODEL

Model Sectors	DANE Sectors
Agricultural food products	Non-commercial agriculture (02)
Modern agriculture	Commercial agriculture (02)
	Livestock (03)
	Forestry (04)
	Fishing and hunting (05)
Raw coffee	Raw coffee (01)
Processed coffee	Processed coffee (08)
Oil	Oil (06)
Natural gas	Natural gas (06)
Coal	Coal (06)
Refined oil products	Refined oil products (20)
Rest of mining	Mining (07)
Other processed food products	Other processed foods (09)
	Cereal products (10)
	Dairy products (11)
	Sugar and sugar products (12)
	Other agricultural food products (15)
Other non durable manufactured goods	Beverages (13)
	Processed tobacco (14)
	Textiles, garments and leather products (16)
	Lumber and furniture (17)
Intermediate manufactured goods	Paper and paper products (18)
	Chemicals and rubber (19)
	Non-metallic minerals (21)
Durable manufactured goods	Metallic goods (22)
	Machinery and equipment (23)
	Transportation goods (24)
	Miscellaneous industries (25)
Construction	Construction (27)
Commerce	Commerce (28)
Transportation	Transportation (29)
Rest of modern services	Banking, insurance and service industries (31)
	Water, power and gas (26)
	Communications (30)
Personal services	Personal services (33)
Housing	Housing (32)
Domestic services	Domestic services (35)
Government services	Government services (34)

Source: Fedesarrollo

Table A.2: STRUCTURE OF DEMAND AND FACTOR USE
(As percent of GDP)

	Consumption		Investment		Inventories Accumulation	Exports	Imports	Value Added	Labor Income				Capital Income	
	Households	Government	Private	Public					Rural	Qualified	Formal	Informal	Rural	Urban
Agriculture food products	3.80	-	0.00	-	0.09	0.01	0.35	4.61	1.05	-	-	-	3.41	-
Modern agriculture goods	2.64	-	0.23	0.02	1.31	1.57	0.24	10.08	4.06	-	-	-	5.97	-
Raw coffee	-	-	-	-	-	-	-	3.21	1.50	-	-	-	1.71	-
Oil	-	-	-	-	-0.14	3.66	-	5.40	-	0.17	0.09	0.01	-	4.66
Coal	-	-	-	-	-0.01	1.31	-	1.37	-	0.11	0.05	0.01	-	1.18
Natural gas	0.10	-	-	-	-	-	0.01	0.24	-	0.00	0.00	0.00	-	0.22
Refined oil products	0.94	-	-	-	0.03	1.21	1.16	1.62	-	0.20	0.11	0.01	-	0.24
Rest of mining	0.01	-	-	-	0.22	1.72	0.13	2.02	-	0.03	0.02	0.18	-	1.69
Processed coffee	0.64	-	-	-	0.04	3.76	-	0.20	-	0.24	0.10	0.07	-	-1.08
Other processed food products	11.27	-	-	-	-0.04	0.94	0.33	4.97	-	0.32	0.47	0.25	-	3.78
Other non durable manufactured goods	7.72	-	0.08	0.02	0.14	2.29	0.81	7.21	-	0.52	1.05	1.08	-	2.54
Intermediate manufactured goods	7.18	-	-	-	0.31	1.22	3.72	7.17	-	0.78	1.13	0.35	-	3.43
Durable manufactured goods	2.63	-	7.87	0.37	0.18	0.49	6.87	8.20	-	0.65	0.74	0.41	-	2.04
Construction	0.00	-	5.16	2.90	-	-	-	5.49	-	0.40	0.35	1.18	-	3.30
Commerce	0.00	-	-	-	-	0.02	0.03	0.18	-	0.01	0.01	0.01	-	0.11
Transportation	8.65	-	-	-	-	1.60	0.87	7.66	-	0.44	0.76	1.58	-	4.71
Rest of modern services	3.42	-	-	-	-	0.74	0.48	11.58	-	3.03	1.51	0.43	-	6.18
Personal services	11.40	-	-	-	-	-	0.03	8.50	-	0.18	0.67	2.85	-	4.69
Domestic services	0.22	-	-	-	-	-	-	0.22	-	-	-	0.22	-	-
Housing	4.70	-	-	-	-	-	-	4.31	-	-	-	-	-	3.99
Government services	0.22	10.27	-	-	-	-	-	7.80	-	4.61	2.95	0.30	-	-
Total	65.45	10.27	13.32	3.32	1.91	20.57	14.82	100.00	6.61	11.70	10.01	8.62	11.08	41.69

Source: Fedesarrollo

Table A.3: BASIC SPECIFICATION OF THE MODEL

	Production	Exports	Imports	Supply	Price
I. SECTORS					
Agriculture food products	Fixed	CET with domestic demand (elast. = INF)	CES with domestic production (elast. = 1.80)		Flexible
Modern agriculture	Flexible	CET with domestic demand (elast. = INF)	CES with domestic production (elast. = 1.80)		Flexible
Raw coffee	Flexible	-	-		Fixed
Oil	Fixed	Demand elasticity = 50	-		Fixed
Coal	Flexible	Demand elasticity = INF	CES with domestic production (elast. = 0.0)		Fixed
Natural gas	Flexible	-	CES with domestic production (elast. = 0.0)		Fixed
Refined oil products	Fixed	CET with domestic demand (elast. = 50.0)	CES with domestic production (elast. = INF)		Fixed
Rest of mining	Flexible	Demand elasticity = INF	CES with domestic production (elast. = 0.0)		Mark-up
Processed coffee	Flexible	Demand elasticity = INF	-		Mark-up
Other processed food products	Flexible	Demand elasticity = 0.9	CES with domestic production (elast. = 1.80)		Mark-up
Other non-durable manufactured goods	Flexible	Demand elasticity = 0.9	CES with domestic production (elast. = 1.80)		Mark-up
Intermediate manufactured goods	Flexible	Demand elasticity = 0.9	CES with domestic production (elast. = 0.75)		Mark-up
Durable manufactured goods	Flexible	Demand elasticity = 0.9	CES with domestic production (elast. = 0.75)		Mark-up
Construction	Flexible	-	-		Mark-up
Commerce	Flexible	Demand elasticity = 0.3	CES with domestic production (elast. = 1.50)		Mark-up
Transportation	Flexible	Demand elasticity = 0.3	CES with domestic production (elast. = 1.50)		Mark-up
Rest of modern services	Flexible	Demand elasticity = 0.3	CES with domestic production (elast. = 1.50)		Mark-up
Personal services	Flexible	-	CES with domestic production (elast. = 1.50)		Mark-up
Domestic services	Flexible	-	-		Flexible
Housing	Flexible	-	-		Fixed
Government services	Flexible	-	-		Flexible
II. FACTORS					
Rural labour	-	-	-	Fixed	Flexible
Unskilled informal labor	-	-	-	Depending on the	Depending on the
Unskilled formal labor	-	-	-	Depending on the	Depending on the
Skilled labor	-	-	-	Fixed	Flexible
Modern agriculture capital	-	-	-	Fixed	Flexible

Source: Fedesarrollo

Table A.4: INCOME DISTRIBUTION

Urban Deciles	Labor Income: Skilled	Labor Income: Formal unskilled	Labor Income: Informal unskilled	Non-labor Income	Percentual Distribution	Rural Deciles	Labor Income	Non-labor Income	Percentual Distribution
1	4.076	47.050	84.818	107.901	2.15	1	19.144	28.307	1.31
2	9.286	90.093	127.551	184.856	3.45	2	56.408	78.808	3.72
3	13.246	121.369	157.833	220.243	4.51	3	78.867	117.429	5.41
4	30.147	152.780	182.314	285.577	5.73	4	93.803	139.536	6.43
5	57.948	177.531	190.667	332.160	6.68	5	111.650	164.264	7.60
6	91.152	188.744	204.170	443.027	8.16	6	131.500	192.761	8.93
7	159.808	212.751	203.409	544.620	9.87	7	153.288	233.719	10.66
8	261.845	235.933	205.118	692.563	12.29	8	194.240	297.320	13.54
9	437.598	230.739	218.280	1020.822	16.80	9	192.857	332.349	14.47
10	952.300	267.831	229.797	1997.633	30.38	10	327.646	686.841	27.94
Gini coef. a/					0.462				0.464

a/ Calculation based on post-tax incomes.

Includes factor incomes and government and social security transfers.

Table A.5: DIFFERENCES BETWEEN THE SHORT AND THE MEDIUM-RUN MODELS

	Short run	Medium run
A. Fixed quantities		
Oil production	YES	YES
Oil refinery	YES	NO
Agricultural production	YES	NO
Coffee exports	YES	YES
Coal exports	YES	YES
Other mining exports	YES	NO
B. Fixed prices		
Coffee (producers')	YES	NO
Gasoline	YES	NO
Other sources of energy	YES	NO
Housing	YES	NO
C. Factor markets		
Fixed wages of formal workers	YES	NO
Unemployment of unskilled workers	YES	NO
Rural-urban labor migration	NO	YES
Capital mobility	NO	YES
D. Functional forms		
CES between factors	NO	YES
CET for exports	NO	YES
Export demands different from infinity	YES	NO

Source: Fedesarrollo

TABLE A.6: COLOMBIA: MAJOR MACROECONOMIC VARIABLES, 1990

	BILLIONS OF PESOS	% OF GDP
NATIONAL ACCOUNTS		
WAGES AND SALARIES	7,555.360	37.35%
RETURNS TO CAPITAL AND OTHER FACTORS	10,682.055	52.81%
INDIRECT TAXES	2,048.402	10.13%
LESS: SUBSIDIES	57.720	0.29%
GROSS DOMESTIC PRODUCT	20,228.097	100.00%
PRIVATE CONSUMPTION	13,238.466	65.45%
GOVERNMENT CONSUMPTION	2,076.459	10.27%
GOVERNMENT INVESTMENT	671.062	3.32%
PRIVATE INVESTMENT	2,693.439	13.32%
INVENTORY ACCUMULATION	387.156	1.91%
EXPORTS	4,159.955	20.57%
IMPORTS	2,998.373	14.82%
GROSS DOMESTIC PRODUCT	20,228.164	100.00%
GOVERNMENT ACCOUNTS		
GOVERNMENT CONSUMPTION	2,076.459	10.27%
GOVERNMENT INVESTMENT	671.062	3.32%
TOTAL GOVERNMENT EXPENDITURE	2,747.521	13.58%
INCOME TAXES	885.216	4.38%
INDIRECT TAXES	2,048.402	10.13%
CAPITAL INCOME	-33.418	-0.17%
TOTAL GOVERNMENT REVENUE	2,900.200	14.34%
LESS: SUBSIDIES	57.720	0.29%
TOTAL GOVERNMENT REVENUE (NET OF SUBSIDIES)	2,842.480	14.05%
GOVERNMENT DEFICIT	94.959	0.47%
INDIRECT TAXES	2,048.402	10.13%
INDIRECT TAXES ON PRODUCTION	1,042.490	5.15%
VALUE ADDED TAX	470.537	2.33%
IMPORT TAXES	468.419	2.32%
EXPORT TAXES	65.504	0.32%
- COFFEE	63.615	0.31%
- COAL	1.889	0.01%
OTHER TAXES	1.462	0.01%
SUBSIDIES	57.720	0.29%
SAVINGS-INVESTMENT GAPS		
RESOURCE GAP	1,161.582	5.74%
GOVERNMENT SAVINGS	766.021	3.79%
GOVERNMENT INVESTMENT	671.062	3.32%
GOVERNMENT SAVINGS-INVESTMENT GAP	94.959	0.47%
PRIVATE SAVINGS	4,147.218	20.50%
PRIVATE INVESTMENT	2,693.439	13.32%
INVENTORY ACCUMULATION	387.156	1.91%
PRIVATE SAVINGS-INVESTMENT GAP	1,066.623	5.27%
TOTAL SAVINGS-INVESTMENT GAP	1,161.582	5.74%

Source: DANE