# THE OIL BOOM AND AFTER: STRUCTURAL ADJUSTMENT IN CAMEROON

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# 1. INTRODUCTION

After almost a decade of rapid growth fueled by the discovery of petroleum in the 1970s, Cameroon's economy was hit hard in the mid-eighties by the steep fall in world prices for oil, coffee, and cocoa, its other principal exports. Cameroon had to scale back spending in 1987/88 and finally in 1989/90 to take recourse in a structural adjustment program. After growing at an annual rate of 11.5 percent from 1976 to 1981 and 5.9 percent from 1982 to 1985, GDP decreased at 2.6 percent annually between 1986 and 1990 (see Table 1).[1] By 1990, Cameroon's external debt was more than double that of a decade before. Despite the massive contraction between these years, per capita GNP in 1989/90 was $1010, one of the highest in sub-Saharan Africa. As Blandford, et al. (1994) note, given its high per capita income, its relatively steady growth, and the apparent prudence of the government in husbanding its oil revenues, the magnitude of Cameroon's economic crisis was unexpected.

This study uses a computable general equilibrium model of Cameroon to examine several key issues. First, what was the impact on income distribution of the different components of the price shocks and of the adjustment program? Second, what alternative adjustment policies could the government have followed and how would they have affected growth and distribution? Third, would the economy have been less vulnerable to the adverse shock in the terms of trade had the government adopted a different set of trade and investment policies during the oil boom?

Section 2 of this paper summarizes the major features of the process of growth in Cameroon over the past two decades. Section 3 is in two parts. The first part describes the structure of the Cameroon economy using the Gauthier-Kyle (1991) social accounting matrix, and the second part presents the CGE model. Section 4 describes the simulation experiments and the results and Section 5 concludes the study.

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[1] The Cameroon fiscal year runs from June 1 to July 31. Thus, 1984 refers to the year 1984-1985. It should be noted that data on GDP for the period after 1985 are not reliable. The data used here are from the 1992 World Tables, but it differs substantially from more recent data obtained from the World Bank. However, the latter is clearly in error because it shows a 50 percent decrease in real value added in the petroleum sector in 1986 even though there was no significant change in oil production.

**Table 1 — Cameroon: Macroeconomic Summary, 1975-1990**

| | 1975 | 1976-81 | 1982-85 | 1986-90 |
|---|---|---|---|---|
| Real GDP (billion 1987 CFA FRANCS, market prices) | | | | |
| End of Period | 1624.9 | 3118.9 | 3930.5 | 3451.4 |
| Real GDP/Capita ('000) 1987 CFA Francs/person) | | | | |
| End of Period | 218.4 | 347.2 | 386.6 | 294.0 |
| Annual Change in GDP (percent) | -0.75 | 11.48 | 5.95 | -2.57 |
| Annual Change in GDP Deflator (percent) | | | | |
| Average | 18.93 | 9.08 | 11.37 | -0.16 |
| End of Period | 18.93 | 11.80 | 9.04 | -1.92 |
| Budget Surplus/GDP (percent) | | | | |
| Average | -2.12 | -0.46 | 0.51 | -1.20 |
| End of Period | -2.12 | -2.95 | 0.79 | -3.15 |
| Trade Deficit (G&NFS)/GDP (percent) | | | | |
| Average | 7.81 | 5.87 | -7.09 | 0.60 |
| End of Period | 7.82 | 2.31 | 11.00 | -2.06 |
| Exchange Rate (CFA Francs/dollar) | | | | |
| Average | 222.4 | 228.8 | 383.0 | 322.6 |
| End of Period | 222.4 | 235.3 | 471.1 | 300.7 |
| Total External Debt (mn dollars) | | | | |
| Average | 420.1 | 1717.2 | 2779.3 | 4557.1 |
| End of Period | 420.1 | 2548.3 | 2939.9 | 6023.4 |

**Source:** World Tables (1993).

## 2. CAMEROON'S ECONOMIC GROWTH[2]

### THE OIL BOOM

Until the discovery of petroleum in the mid-1970s, Cameroon was a predominantly agricultural economy. Agriculture accounted for 36 percent of GDP, 84 percent of employment, and 87 percent of exports during the early 1970s. The share of industry in GDP was about 16 percent during this period.

Petroleum production grew swiftly after the mid-1970s, its share of GDP rising to 20 percent by 1984/85. Under the stimulus of the oil boom the economy grew rapidly. Gross domestic product growth was 14 percent per annum from 1977/78 to 1980/81, falling off to about 7.5 percent per annum for the period 1982/83 to 1985/86. Though population also increased rapidly at 3.2 percent annually, per capita GDP growth was high, about 6 percent annually from 1978/79 to 1984/85. This period was marked by massive expansion in investment funded by oil revenues. The share of gross domestic investment in GDP increased from 21 percent in 1979/80 to 33 percent in 1985/86.

Not unexpectedly, there was substantial variation in growth rates across sectors. Manufacturing, in particular, was aided by protectionist policies. The export agriculture sector, however, remained stagnant because the increase in world market prices was not passed on to producers and because the oil boom led to some real exchange rate appreciation. As petroleum exports surged, total exports expanded rapidly at an average rate of 17 percent annually from 1978/79 to 1984/85. Imports also increased, but at a slower rate, so that Cameroon ran a sizable current account surplus in 1984/85.

Government revenue increased substantially, both in absolute terms and as a share of GDP, rising from 16 percent of GDP during the late 1970s to 25 percent in 1982/83. From 1981/82 to 1985/86, oil revenues accounted for over 40 percent of total revenues. Government expenditures also increased rapidly, but rarely exceeded revenues (Table 1). However, towards the end of the oil boom, in 1985/86 and 1986/87, government expenditure surged by 13 percent and 30 percent, respectively, in real terms, the result of substantial increases in public investment. And, as government revenues fell sharply in 1986/87, the deficit mounted to 71 percent of revenue and 13 percent of GDP. A key aspect of the evolution of government expenditure during these years was the rapid increase of current transfers and subsidies to a level of 25 percent of current expenditure by 1985/86, much of it accounted for by subsidies to loss-making public enterprises.

Public investment was a major factor behind the economic boom, accounting for over 45 percent of gross fixed capital formation by 1984/85. In addition,

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[2] This section is based on Blandford, et al. (1994).

capital expenditures accounted for between 38 and 51 percent of total expenditure from 1980/81 to 1986/87. However, public investment was not as fruitful as it might have been for two reasons. First, actual investment in agriculture, rural development, and social infrastructure was far lower than planned investment in these areas. Second, much of the oil revenue was held abroad in an attempt to prevent the building up of popular pressure for greater government expenditures and transferred at the discretion of the president, largely to finance capital expenditures. These expenditures were poorly coordinated with capital expenditures funded through the budget and from foreign sources, resulting in wasteful investment.

Cameroon is a member of the Communauté Francophone Africaine (CFA), and its currency, the CFA franc, is tied to the French franc. In addition, membership carries with it the ceding of autonomy in setting monetary policy to the CFA central bank. Despite the CFA franc's progressive overvaluation, French policy has been to maintain the exchange rate at fifty CFA francs to the French franc. After much speculation about devaluation and in the face of opposition from many governments in Francophone Africa, the CFA franc was devalued to one hundred CFA francs to the French franc in early 1994.

Two other features of this period are worth noting: the performance of the financial sector and of agriculture. The boom years saw a large expansion in credit from the formal sector. A high proportion of bad loans, however, brought the banking system close to bankruptcy, which was to have grave consequences when the oil boom came to an end.

Agricultural growth during this period was uneven across commodities. While food crop output increased, production of export crops stagnated after 1982. One reason for the slow growth of agriculture was the low priority this sector received in the allocation of public investment and formal-sector credit. Another is that the smallholder sector, which produces 90 percent of output and 80 percent of marketed surplus, was neglected and much of the investment went to the estate sector. Moreover, in the case of export crops, price policies in effect insulated domestic producers from world market prices. The gains from the commodity price boom accrued largely to the parastatal marketing agencies, and producers had no incentive to invest and increase capacity.

## THE BOOM ENDS

Cameroon's export boom came to an end in 1985/86, when the dollar-denominated prices of its major exports — oil, coffee, and cocoa — began to fall steeply. The fall in prices was exacerbated by the 40 percent fall of the US dollar against the French (and CFA) franc between 1985 and 1988. Cameroon's terms of trade declined by 47 percent between 1985 and 1987, much of it the result of a 65 percent decrease in the oil export price index. Total exports fell by 30 percent for two years in a row. The balance of payments went from a surplus of 4.4 percent of GDP in 1984/85 to a deficit of 8.8 percent in 1986/87.

Though government revenues fell by 19 percent in real terms in 1986/87, the government was unable to halt the growth of expenditure, which increased by 30 percent in real terms that year. Government spending fell precipitously thereafter, in real terms by 34 percent in 1987/88 and 12 percent in 1988/89. Capital expenditures were scaled back even more sharply. As the economy contracted sharply, private investment also declined. Total investment fell by 44 percent in 1987/88, 25 percent in 1988/89, and 12 percent in 1989/90.

Already in precarious shape, the banking sector was a major casualty of the economic crisis. A liquidity crisis developed as major depositors, such as the government and parastatal agencies, began to make large withdrawals to cover current expenditures. Real GDP fell rapidly as the contraction continued, by 6.5 percent, 7.7 percent, 3.4 percent, and 2.5 percent in 1986/87, 1987/88, 1988/89 and 1989/90, respectively.[3] Confronted by a crisis of this magnitude, Cameroon was forced to undertake a structural adjustment program under the auspices of the World Bank and the International Monetary Fund. Key aspects of the program are fiscal, public enterprise, and agricultural reforms. The fiscal reforms have had little success in increasing non-oil tax revenues primarily because the economic contraction has reduced the number of tax-paying enterprises and employees and because of increased evasion and smuggling. Public enterprise and banking sector reform has been slow and has yet to yield results. Agricultural sector reform has gone the furthest. The monopsonist marketing boards have been replaced by quality control boards, which do not control trade, and producer prices are to be aligned with world market prices.

A number of factors have impaired the adjustment process. The government's reluctance to curb current expenditures and reform public enterprises is indicative of the political strength of those who stand to lose from these measures. The inability or unwillingness to reduce current expenditure has meant that capital expenditure has borne the brunt of adjustment, thus compromising future growth. Finally, because of Cameroon's inability to devalue its currency, the economic contraction resulting from the adjustment program has been harsher than would otherwise have been the case.

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[3] These are based on the 1992 *World Tables* data.

# 3. THE CAMEROON ECONOMY

## THE STRUCTURE OF THE ECONOMY

The base year data for the model come from a social accounting matrix (SAM) for 1984/85 by Gauthier and Kyle (1991), which was based on the 1984/85 input-output table for Cameroon and on data from a household survey. The SAM has four labor categories: agricultural and informal sector labor, formal sector unskilled labor, skilled labor, and highly skilled labor. Agricultural and non-agricultural capital are also separated. The households are disaggregated in five rural and two urban groups: a) poor farm households in the northern and southern regions, respectively, b) rich farm households, c) poor non-farm households, d) rich non-farm households, e) poor urban households, and f) rich urban households. Poor households are those in the lower 60 percent of the income distribution.

This SAM was modified in several ways for the purposes of this study. First, the oil sector was separated from the manufacturing sector and the public administration sector was separated from the public services sector. Second, oil exports were under-reported and private consumption over-reported in the input-output (I-O) table; these were corrected using unpublished World Bank estimates for exports and using the budget share for petroleum products from a household survey in Côte d'Ivoire.[4] Third, the original I-O table ignored the state marketing agencies' levy on agricultural exports. In the new SAM, this levy on exports is treated as a tax on the producer which is transferred to the public services and public administration sectors.[5] Fourth, the household consumption matrix, the matrix of payments by sectors to the different factors and the matrix of payments by factors to households in the original SAM, had to be corrected for various computation mistakes. Finally, the structure of taxes in the Cameroon national accounts was incorrect in that indirect taxes were too high and direct taxes and petroleum-related taxes were too low compared to the figures in the World Bank's *World Tables* (1992) and the IMF's *International Financial Statistics Yearbook* (1992). This was corrected to some extent by decreasing trade margins

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[4] The budget share in the original I-O table was 14 percent. This was lowered to 3.8 percent, the budget share observed in Côte d'Ivoire.

[5] This treatment is based on the understanding that the incomes of the marketing agencies were expended on their own operations and not transferred to the government. The implicit export taxes were computed using unpublished World Bank data on the marketing agencies' margins.

for the petroleum sector and increasing indirect taxes on this sector.[6] It should be noted, however, that the original I-O table is not consistent with the Cameroon national accounts (Cameroon 1989) or with the 1992 *World Tables*. Thus, GDP in the original I-O table is 4.421 billion CFA francs while GDP in the national accounts and the *World Tables* is 3.839 billion CFA francs. After correcting for the understatement of oil production, GDP in the modified SAM increases to 4.706 billion CFA francs.[7]

As Table 2 shows, the service sectors accounted for over 50 percent of value added in 1984/85. The petroleum sector's share in GDP was 17 percent, while that of agriculture was 21.3 percent and that of manufacturing 8.7 percent. Major exporting sectors were oil (62.7 percent) and export agriculture (15.8 percent).[8] The manufacturing sectors' (excluding food processing) share in exports was 9.1 percent. As is to be expected in an import-substituting economy, the manufacturing sector was the largest importer, with a share of 86.6 percent. Import tariffs on the manufacturing sectors were moderate, between 21 and 25 percent. Export taxes (representing the marketing boards' margins) applied only to the agricultural export sectors. These were high in 1984/85 at 61.4 percent.[9]

Turning to factor incomes (Table 3), all labor income in the non-estate agricultural sectors accrues to agricultural and informal sector labor. Informal sector labor is also employed in the private service sector, which accounts for over a third of labor income in this category. Formal unskilled labor is employed mostly in manufacturing, construction, public services, and public administration. Skilled labor income is concentrated in private services, manufacturing, and public administration. Highly skilled labor is also concentrated in public and private services and public administration. Agricultural capital income is evenly divided between traditional food crops and agricultural export crops. The private services and oil sectors are the major sources of non-agricultural capital income, with the oil sector accounting for over half of the total.

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[6] A more complete revision of the I-O table to make the direct and indirect taxes consistent with World Bank and IMF data was not performed because it would have required extensive changes in the I-O table and because no other data on sectoral indirect tax rates were available.

[7] In the case of imports and exports the figures in the national accounts do not agree with those in the *World Tables* or in the original I-O table. In addition, the sectoral shares in value added in the national accounts, I-O table, and the *World Tables* are also inconsistent.

[8] Export agriculture includes the estate sector.

[9] That is to say, producer price (including transport and trade margins) was 1/1.614 or 0.62 times world price.

Table 2 – Sectoral Shares in Value Added, Imports and Exports, 1984/85

| Sector | Share of Value Added | Export Tariff | Share of Exports | Share of Imports | Import Tariff |
|---|---|---|---|---|---|
| | | | (Percent) | | |
| Food Agriculture | 11.90 | - | 0.53 | 2.05 | 0.152 |
| Export Agriculture | 7.34 | 0.614 | 14.71 | 2.00 | 0.295 |
| Forestry | 1.66 | - | 2.74 | 0.00 | 0.000 |
| Estate Sector | 0.57 | 0.614 | 1.14 | 0.15 | 0.295 |
| Food Proc. (private) | 1.30 | - | 1.55 | 3.39 | 0.256 |
| Food Proc. (public) | 0.15 | - | 0.19 | 0.42 | 0.258 |
| Manufacture (private) | 7.04 | - | 8.31 | 82.20 | 0.253 |
| Manufacture (public) | 1.68 | - | 0.78 | 4.37 | 0.213 |
| Construction | 7.85 | - | - | - | - |
| Services (private) | 31.23 | - | 6.21 | 3.01 | 0.000 |
| Services (public) | 4.67 | - | 1.12 | 0.55 | 0.000 |
| Public Administration | 7.46 | - | - | - | - |
| Oil | 17.13 | - | 62.72 | 1.87 | 0.152 |

**Source:** Computed from 1984/85 Social Accounting Matrix. Export tariff computed form data on trading margins of marketing boards.

Table 3 – Share of Factor Income by Sector of Origin

| | Labor | | | | Capital | |
|---|---|---|---|---|---|---|
| | Agricultural & Informal Sector | Formal Unskilled | Skilled | Highly Skilled | Agricultural | Non-agricultural |
| Sector | (Percent) | | | | | |
| Food Agriculture | 36.96 | 0.00 | 0.00 | 0.00 | 50.10 | 0.00 |
| Export Agriculture | 21.57 | 0.00 | 0.00 | 0.00 | 41.42 | 0.00 |
| Forestry | 4.42 | 0.00 | 0.00 | 0.00 | 8.48 | 0.00 |
| Estate Sector | 0.00 | 2.64 | 0.13 | 0.29 | 0.00 | 0.80 |
| Food Proc. (private) | 0.00 | 1.83 | 3.41 | 0.00 | 0.00 | 1.25 |
| Food Proc. (public) | 0.00 | 0.64 | 0.07 | 0.12 | 0.00 | 0.14 |
| Manufacture (private) | 0.00 | 10.30 | 14.92 | 3.88 | 0.00 | 8.05 |
| Manufacture (public) | 0.00 | 4.60 | 1.55 | 1.86 | 0.00 | 1.83 |
| Construction | 0.00 | 31.90 | 7.66 | 3.63 | 0.00 | 9.12 |
| Services (private) | 37.06 | 0.00 | 52.20 | 54.12 | 0.00 | 21.83 |
| Services (public) | 0.00 | 13.31 | 4.51 | 10.50 | 0.00 | 4.94 |
| Public Administration | 0.00 | 30.23 | 10.24 | 23.86 | 0.00 | 0.00 |
| Oil | 0.00 | 4.55 | 5.31 | 1.75 | 0.00 | 52.04 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

**Source:** Computed from household survey data and Cameroon input-output table.

Table 4 shows per capita incomes and sources of income for the different household groups.[10] The rural farm and non-farm poor have the lowest annual incomes per capita, between 148 and 165 thousand CFAF (US $314 to $350 at 1984/85 exchange rates). Rich farm households are significantly less well off than rich non-farm rural households. The urban poor appear to have higher incomes than the rural poor. The highest incomes are those of the rural non-farm rich and urban rich households. Agricultural and informal sector labor is the major source of income for poor farm and non-farm households and also for the rich farm households. It is also an important source of income for the urban poor. While poor farm households are almost entirely dependent on agricultural labor income, however, the other household groups receive substantial parts of their incomes from skilled and highly skilled labor, and from capital income.[11] Non-agricultural capital incomes accrue by assumption only to the rural non-farm rich and the urban rich. These groups also receive a large part of their income from skilled and highly skilled labor. Transfers from government are assumed to flow only to rich farm and rich urban households and are only a small part of these groups' incomes.

## THE MODEL

The model is a standard neo-classical computable general equilibrium (CGE) model in the tradition of Dervis, de Melo, and Robinson (1982).[12] Each sector employs capital and a labor aggregate of the four kinds of labor. Output is given by a CES function of the factor inputs. Demand for intermediates is obtained using the input-output coefficients. Labor demand is determined by the usual marginal conditions. Sectoral capital stocks are fixed in the short run and sectoral rates of return will, in general, not be equal. The petroleum sector is treated differently in that output is specified exogenously and capacity

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[10] The savings rates shown in the table need some explanation. The factor income distribution was obtained using data on sector of employment and skill classification for household members in the survey. These data were not of good quality and it proved necessary to work out household income from household consumption using an assumed savings rate under the constraint that total household savings were consistent with the figure in the aggregate social accounting matrix.

[11] Agricultural capital income from food agriculture and export agriculture was allocated to the different farm household groups in a two-step process using data from Cameroon's agricultural census. In the first step, profits from food agriculture and export agriculture were divided between northern and southern regions in proportion to cultivated areas. In the second step, profits in the northern and southern regions were allocated to poor and rich farm households again in proportion to areas cultivated by them by assuming that small farms (as identified by the census) were operated by poor households.

[12] The model presented in this paper extensively draws upon a CGE model for Cameroon developed by Benjamin (1991).

Table 4 – Sources of Houeshold Income and Savings Rates

| | North farm poor | South farm poor | Farm rich | Non-farm rural poor | Non-farm rural rich | Urban poor | Urban rich |
|---|---|---|---|---|---|---|---|
| | | | | (Percent) | | | |
| **Labor** | | | | | | | |
| Agric. & Informal Sector | 77.07 | 84.53 | 48.22 | 42.05 | 6.51 | 20.08 | 2.17 |
| Formal Unskilled | 19.88 | 5.19 | 16.76 | 32.14 | 11.40 | 34.98 | 6.77 |
| Skilled | 0.0 | 5.43 | 19.89 | 16.37 | 33.58 | 28.35 | 25.11 |
| Highly Skilled | 0.0 | 1.81 | 3.22 | 9.44 | 25.10 | 16.59 | 14.39 |
| Agricultural Capital | 3.05 | 3.04 | 11.15 | 0.0 | 0.0 | 0.0 | 0.0 |
| Non-agricultural Capital | 0.0 | 0.0 | 0.0 | 0.0 | 23.42 | 0.0 | 47.04 |
| Transfers from Government | 0.0 | 0.0 | 0.75 | 0.0 | 0.0 | 0.0 | 4.51 |
| Savings Rate | 4.00 | 4.0 | 14.2 | 4.0 | 21.8 | 4.0 | 21.8 |
| Per Capita Income ('000 CFAF) | 164.8 | 148.0 | 480.2 | 160.3 | 749.3 | 310.2 | 852.8 |
| Number of Houesholds | 159,273 | 322,327 | 523,077 | 127,503 | 241,394 | 11,053 | 155,647 |

**Note:** The savings rates need some explanation. The factor income distribution was obtained using data on sector of employment and skill classification for household members in the survey. These data were not of good quality and it proved necessary to work out household income from household consumption using an assumed savings rate under the constraint that total household savings were consistent with the figure in the aggregate social accounting matrix.

**Source:** Computed from household survey data and Cameroon input-output table.

utilization adjusts. The reason for this is that petroleum production does not respond in the short run to prices (which are well above marginal cost) and is determined largely by past investment and production capacity. Payments to capital and the different kinds of labor are aggregated across sectors. Labor income accrues only to households, while capital income flows to both firms and households. Firms are only accounting entities; they receive capital income and transfers from government, and they pay taxes and save, transferring the residual to households.[13] Their marginal propensity to save is assumed to respond to the average rate of return to capital with a constant elasticity. Similarly, households' propensity to save is also sensitive to the average rate of return to capital. This specification attempts to capture the large increase in domestic savings experienced during the oil boom.

Households receive transfers from firms and government and labor and capital income. Household consumption is determined by subtracting personal taxes and savings from household incomes. Consumer demand is found by using a linear expenditure system of demand (LES) demand system for each household group.[14] Budget shares are reported in Appendix Table 2.

Trade flows are determined by making the assumption that domestic sales and exports are imperfect substitutes as are domestic production and imports. We also assume that firms and consumers operate as price-takers and respond to the prices of imports and exports relative to domestic prices. Import and export prices are determined by applying the exchange rate and the relevant tariff rates to world prices. Thus, firms operate on a transformation frontier between domestic sales and exports and allocate their production between the two markets in such a way as to maximize revenue. Similarly, what consumers buy is an aggregate of imports and domestic production.[15] The ratio of imports to the domestic product is determined by cost minimization on the part of consumers. The only exception to this is in the petroleum sector, in which imports and domestic production are assumed to be perfect substitutes. This was necessary to prevent unrealistically large swings in the domestic price of oil in response to the large increase in oil production and exports that occurred in the mid-1970s. Exports, imports, production, and the elasticities of transformation and substitution are shown in Appendix Table 1.

Government revenue is endogenous, consisting of domestic indirect taxes, tariff revenues, and corporate tax. However, the export tax on agriculture, which is really part of the marketing boards' margins, does not accrue to government but is treated as a subsidy to the public administration and public

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[13] All capital income is not taxed at the same rate. Profits from the oil sector are taxed at a higher rate than profits in other sectors.

[14] Each group's LES was estimated using estimates of the flexibility of money or the Frisch parameter. See Bieri and de Janvry (1972).

[15] CET and CES aggregation functions are used for exports and imports, respectively.

services sectors. Government expenditure is essentially exogenous, but in some of the simulations simple rules are used to endogenize some of its components. Government savings is a residual.

Total investment can be treated either as exogenous or endogenous. Total investment less changes in stocks is allocated across sectors according to an investment allocation rule. The vector of sectoral investment is translated into a vector of investment demand by sector, using a capital composition matrix. Total savings is the sum of domestic and foreign savings. Foreign savings or the current account deficit is the trade deficit plus net remittances abroad.[16]

In general, commodity and factor prices are determined by market clearing, except that rates of return to capital are determined residually and need not be equal across sectors because sectoral capital stocks are fixed in the short run.

Two kinds of simulations can be distinguished. In one, the model is used to track the historical performance of the economy. In this case, gross investment, changes in stocks, government consumption and transfers, and net remittances to the rest of the world are exogenous.[17] In addition, since Cameroon has been on a fixed exchange rate regime with respect to the French franc, the exchange rate is fixed at unity and the price index is allowed to adjust. The current account balance is then endogenous. The attempt in these simulations is to calibrate the model so as to track the behavior over time of the current account balance, the price index, and real GDP.[18]

In the second kind of simulation, one wishes to examine counterfactual scenarios. In these, many of the exogenous variables follow their actual time paths, but alternative trajectories will be specified for other exogenous variables, e.g., for oil export prices or total investment. In a different kind of counterfactual scenario one may endogenize investment by assuming that investment and savings are equal *ex ante* (what is known as the neo-classical closure) and by postulating simple rules for endogenizing other variables, such as government expenditure, remittances, and foreign savings. One such rule is to assume that these quantities grow at the same rate as GDP.

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[16] As noted above, the Cameroon government made extensive use of overseas accounts to conceal oil revenues. This form of financial investment is not examined here because the accumulation of debt and financial assets and interest payments on debt are not modeled here.

[17] Information on other quantities, such as transfers by firms, is not available over time. These variables are kept endogenous in these simulations by making the assumption that they are proportional to some other flow, such as firms' income in this example.

[18] Since GDP in the base year does not agree with that in the World Bank data, for purposes of calibration the World Bank series is multiplied by a constant to bring it into agreement with the GDP in the base year SAM.

In both kinds of simulations, investment is allocated to the different sectors according to some rule. Typically, one would expect sectoral investment allocation to respond to changes in sectoral rates of return. The different rules used in the simulations are described in the section on results below.

**Limitations of the Model**

In analyzing and interpreting the results from model simulations, it is necessary to bear in mind the limitations of the model and the data. On the data side, as noted above, there are conflicting estimates for the major macroeconomic aggregates, taxes, and data relating to the petroleum sector. As a result, the model's ability to track macroeconomic aggregates will be limited. Second, the commodity classification was imposed by the published results from the Cameroon budget survey and is highly aggregated. As a result, substitutability between imports and domestic production is likely to be overstated. In addition, the consumer demand system is not based on econometric estimates. Third, the income distribution sub-model is based on employment-related data from the budget survey, which are not of high quality. Several adjustments had to be made, as described in the section on the SAM above, to arrive at an internally consistent income distribution.

On the modeling side, there are two major limitations. First, because the base year for the model is 1984/85 and the key issues to be examined in the simulations pertain to the period after 1984/85 (which was also a period of economic crisis), the model could not be calibrated in the usual fashion using a dynamic simulation forward in time. Instead, a "calibration" using simulations backward in time was employed to validate the model. This must be viewed with some caution, however, because investment allocation decisions in dynamic models are typically made forward in time and cannot be run in reverse. A second limitation is that the neoclassical, Walrasian CGE model is ill-suited for examining situations of macroeconomic disequilibrium, as when the economy is not at full employment. Even large price shocks produce little change in real GDP in full-employment CGE models. A greater degree of realism can be injected by incorporating non-Walrasian features, such as mark-up pricing or unemployment. The Cameroon model implements this through the device of a highly elastic labor supply when the economy is not at full employment. Clearly, a more realistic model of the labor market, embodying institutional details such as wage formation mechanisms and indexation would be desirable.

# 4. RESULTS

## THE OIL BOOM, 1976-1984

This experiment seeks to simulate the growth of the Cameroon economy from 1976/77 (when oil production commenced) to 1984/85 (the height of the oil and commodity price boom). As noted previously, in this simulation oil production, gross investment, changes in stocks, government consumption and transfers, remittances to the rest of the world, and world prices (in CFA francs) for Cameroon's imports and exports take on their historical values and are exogenous. The exchange rate is fixed and the price index and balance of payments are endogenous.

Since the sectoral allocation of investment, labor supply growth by skill category, and sectoral productivity growth are not known over this period, some assumptions have to be made about these variables. Aggregate labor supply is assumed to grow at 4 percent annually, slightly in excess of the annual 3 percent rate of population growth. Labor supply in all categories, except that of agricultural and informal sector labor, is assumed to grow at 5 percent annually, a rate higher than the rate of growth of aggregate labor supply, reflecting both increased urbanization and skill upgrading. However, agricultural and informal sector labor supply grows at a rate of 3.8 percent, only slightly slower than aggregate labor supply growth. This is not unreasonable because this labor category includes both rural and urban informal sector workers and need not decrease with urbanization. Total factor productivity growth is assumed to be 4 percent annually in manufacturing and public-sector food processing and 2 percent per year in private-sector food processing.[19]

No attempt is made to incorporate in the model the phenomenon of urbanization and the movement of households across household groups associated with urbanization and economic growth because no data are available that would permit modeling these changes. As a result, the simulations do not directly address the issue of how the gains from growth were distributed, though some conclusions may be drawn from sectoral growth rates and growth rates of wage payments for the different labor categories.

Starting from the base year of 1984/85, the model is solved backward in time. Since sectoral investment shares are only known in the base year (1984/85) some assumptions are required to find previous years' sectoral investment shares. The equations describing these are shown below:

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[19] These total factor productivity growth rates were chosen by trial and error. That for the private food processing sector is smaller than that for the public sector, the reason being that unlike the public sector, the private sector includes household and small-scale enterprise, which are likely to be less dynamic and exhibit lower TFP growth than the large-scale public sector.

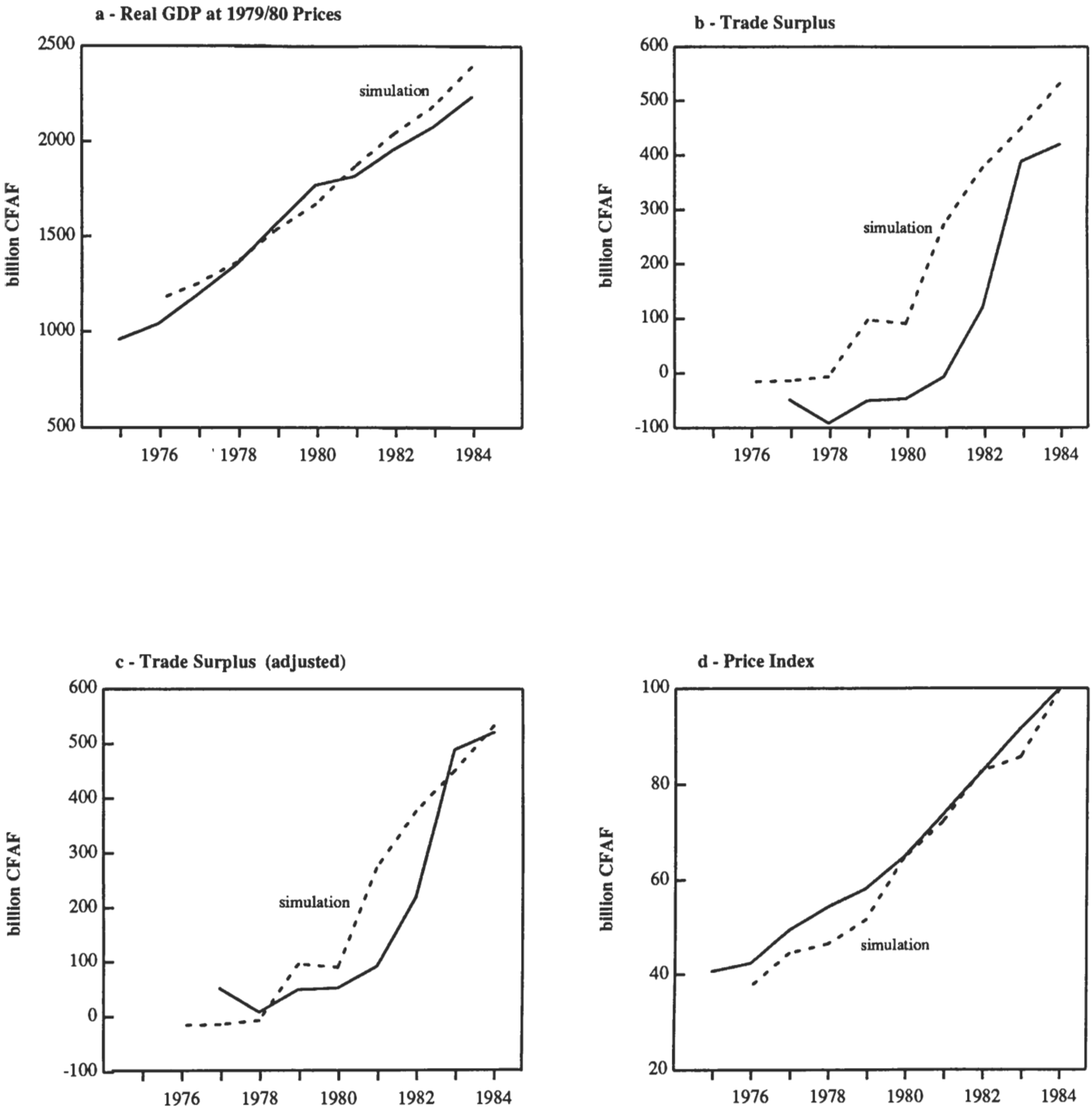
$$K_i(1-d_i)+DK_i=K_i^0$$
$$P_i^K DK_i=\rho_i I$$
$$\rho_i=\mu\hat{\rho}_i+(1-\mu)\rho_i^0$$
$$\hat{\rho}_i=\mu_i^1 P_i^K K_i(1-d_i)/\sum_j \mu_j^1 P_j^K K_j(1-d_j)$$

Here $d_i$ is the depreciation rate in sector $i$ and $P_i^K$ is the price of capital in sector $i$. The first equation above states that next year's sectoral capital stock, $K_i^0$, is this year's capital stock, $K_i$, less depreciation plus this year's sectoral investment $DK_i$. The value of investment in sector $i$, $P_i^K DK_i$, is the sectoral investment share $\rho_i$ times total investment $I$. The sectoral investment share $\rho_i$ is a weighted average of the current sectoral share, $\rho_i^0$, and a desired sectoral share, $\hat{\rho}_i$. The desired sectoral share is proportional to the value of the sectoral capital stock, so that the desired sectoral investment is one which would lead to an equal rate of growth of capital across sectors. This specification makes it possible to solve the model recursively backward in time by endogenizing the current year's sectoral capital stocks and sectoral investment, given the next year's sectoral capital stocks. Thus, after solving for the base year equilibrium, all exogenous quantities (including labor supply and total factor productivity) are "updated" to their values in 1983/84, the model re-solved for, among other things, sectoral capital stocks and investment in 1983/84, and so on, until the year 1976/77.

The model was calibrated by attempting to match trends (see Figure 1) in GDP, the current account balance and the price index over the period 1976/77 to 1984/85. Among the parameters, which were varied for this purpose, were the sectoral capital stocks in the base year and the total factor productivity growth rate. Real GDP increased at almost 14 percent annually from 1976/77 to 1980/81 before slowing down considerably. The simulation does not capture this break in the growth rate and merely matches the trend growth rate from 1976/77 to 1984/85, which was 9.7 percent a year. Broad features in the evolution of the current account balance are captured by the simulation. As noted above, even in the base year the current account balance from the World Bank's *World Tables* does not agree with that from the Cameroon SAM. Figure 1c shows the current account balance from the simulation less a 100 billion CFAF, which makes the current account balance match the World Bank data for the base year. Last, Figure 1d shows that the price index in the simulation tracks the actual price index well after 1980/81, when the era of high growth had come to an end. The model's failure to track GDP and the price index before 1980/81 is perhaps indicative of the difficulty of tracking growth in an economy growing at 14 percent a year with a simple model and limited data.

Over the period of the simulation (1976/77 to 1984/85) real GDP growth was 9.63 percent a year. Other growth rates (at constant domestic prices) were 15.3 percent for exports, 5.2 percent for imports, 15.7 percent for domestic savings, and 13.4 percent for government revenues. The rapid growth in exports, savings,

**Figure 1 — Cameroon: 1976-1984**



and government revenues was largely the result of the steep increase in petroleum production and export after 1976. The domestic savings rate rose from 20 percent in 1976/77 to 28.2 percent in 1984/85. At the sectoral level, growth was most rapid in the oil sector. The construction sector grew at 9.93 percent a year as investment expanded rapidly. Manufacturing and services (including construction) expanded at 8.85 percent and 8.25 percent annually, followed by agriculture at 6.05 percent. Within agriculture, growth rates were 5.24 percent for the traditional food agriculture sector, 6.25 percent for export agriculture, and 8.48 percent for the forestry sector. The sectoral growth rates based on data from the 1992 *World Tables* are agriculture (5.1 percent), manufacturing (14.9 percent), and services (7.0 percent). It is clear that the simulation underestimates the growth rate in manufacturing.

Real wage rates grew at 8.6 percent for agricultural and informal sector workers, 4 percent for unskilled formal sector workers, 6.3 percent for skilled workers, and 5.4 percent for highly skilled workers, reflecting differences in growth rates of labor demand and differences in labor supply growth rates. The rapid wage growth for agricultural and informal sector workers is thus partly the result of the comparatively low rate of labor supply growth for this labor category. Wage payments to agricultural and informal sector workers increased in real terms at 12.7 percent annually, to unskilled formal sector workers (9.4 percent), skilled workers (11.9 percent), and highly skilled workers (11 percent). Non-agricultural capital incomes to households increased at 21.4 percent in real terms while agricultural capital incomes to households decreased at 17.1 percent annually. Non-agricultural profits accruing to households grew rapidly because of increasing revenues from the petroleum sector and because of the oil boom's stimulus to the rest of the economy. The decline in agricultural profits may be associated with the increasing level of the implicit tax on export agriculture and the protection granted the non-agricultural sector during the boom years.

How were the gains from growth distributed? The rapid growth of manufacturing, services and petroleum production, the slow growth of agriculture and the growth of non-agricultural profit income and decline in agricultural profits would suggest that farm households gained less than did non-farm households. But to the extent that poor farm households migrated to cities and entered the informal sector work force, these households would have gained from the increasing wage payments to informal sector labor. Since Cameroon experienced a significant increase in urbanization from 27.9 percent in 1976 to 35.4 percent in 1984, this shift in population would have had a significant effect on the distribution of gains from growth.

## THE PRICE SHOCK AND ITS AFTERMATH

As noted above, Cameroon's export earnings were hit hard by the sharp decrease in world prices for its major exports after 1985/86. Coupled with a steep fall in government revenues and expenditures, the price shock resulted in a substantial contraction in economic activity after 1987/88. As is well known, a full employment model will fail to replicate such a contraction. One way to

obtain a contraction when aggregate demand declines is to have inflexible real wages. Real wage inflexibility is introduced by making labor supply highly responsive to the real wage after 1987/88.[20]

A second change is in the treatment of sectoral investment allocation. As before, the actual sectoral investment share is a weighted average of the previous year's sectoral investment share and a desired sectoral investment share. However, the desired sectoral investment share, $\hat{\rho}_i$, is now the previous year's sectoral investment share, $\rho_i^0$, multiplied by a factor which depends on the change in the sectoral profit rate, $r_i$, from its previous value, $r_i^0$. Thus, sectors with increasing profit rates will have larger desired and actual investment shares. The parameter $v_i$ determines how responsive the investment share in sector $i$ will be to a change in that sector's profit rate.

$$P_i^K DK_i = \rho_i I$$
$$\rho_i = \mu\hat{\rho}_i + (1-\mu)\rho_i^0$$
$$\hat{\rho}_i = (r_i/r_i^0)^{v_i}\rho_i^0 / \sum_j (r_j/r_j^0)^{v_j}\rho_j^0$$

This model is used to examine how these shocks affected output and distribution in Cameroon. Several simulations or runs are presented (see Tables 5 to 13). In these runs, total investment, government expenditure, oil production, and remittances are exogenous and take on their observed values (except for investment when alternative investment scenarios are considered).[21] Run 1 simulates the actual trajectory of the economy from 1984/85 to 1989/90. The simulations were not extended beyond 1989/90 primarily because data for many exogenous variables were not available beyond this date. The other runs are counterfactual. Runs 2 and 3 simulate the separate impacts of the oil and agricultural export price shocks. Since a major factor behind the crisis in 1986/87 was the large increase in investment in 1985/86 and 1986/87, run 4 simulates the outcome when there is no increase in nominal investment in these years. Run 5 simulates the outcome of a more restrained build-up of public investment, in which total investment is maintained at its level in 1983/84, instead of rising 44 percent in 1984/85 and 34 percent in 1985/86 before falling steeply in 1987/88 and 1988/89. Runs 6 and 7 combine the separate price shocks

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[20] A constant elasticity of labor supply with respect to the real wage was assumed. This elasticity was taken to be 1.4 except for agricultural and informal sector labor, for which it was specified as 0.6. The market for the latter labor category therefore exhibits greater wage flexibility than those for the other, more skilled, labor categories. It should be noted that the modeling here of labor market outcomes is rudimentary. There is no unemployment as such in the model and those who "leave" the labor market share incomes with those who continue to be employed.

[21] The (nominal) exchange rate is fixed. In addition, since remittances are exogenous, an increase in the current account deficit will imply an increase in absorption and in real incomes.

**Table 5 – The Base Run: 1984/85 to 1989/90**

| | 1984/85 | 1985/86 | 1986/87 | 1987/88 | 1988/89 | 1989/90 |
|---|---|---|---|---|---|---|
| | | | (Billion CFAF) | | | |
| Real GDP | 4706 | 5022 | 5104 | 4971 | 4944 | 4678 |
| Price Index | 100 | 110.1 | 109.3 | 91.5 | 83.3 | 80.4 |
| Govt. Revenue | 821 | 803 | 713 | 573 | 529 | 486 |
| Govt. Expenditure | 501.8 | 556.2 | 556.0 | 530.0 | 559.4 | 567.0 |
| Exports | 1262 | 1094 | 839 | 899 | 847 | 795 |
| Imports | 728 | 811 | 834 | 693 | 614 | 587 |
| Balance of Trade | 534 | 283 | 5.2 | 206 | 233 | 208 |
| Gross Domestic Saving | 1328 | 1327 | 1134 | 759 | 643 | 5213 |
| Savings Rate[1] | 0.282 | 0.249 | 0.223 | 0.197 | 0.178 | 0.169 |
| **Real per Capita Incomes** | | | (Thousand CFAF) | | | |
| North Farm Poor | 164.8 | 184.3 | 183.2 | 159.5 | 161.4 | 126.9 |
| South Farm Poor | 148.0 | 162.9 | 161.4 | 147.6 | 147.5 | 114.9 |
| North & South farm rich | 480.2 | 522.8 | 503.2 | 428.5 | 428.5 | 337.3 |
| Rural Nonfarm Poor | 160.3 | 176.7 | 179.4 | 155.8 | 158.4 | 135.3 |
| Rural Nonfarm Rich | 749.3 | 781.2 | 754.8 | 631.3 | 656.9 | 574.7 |
| Urban Poor | 310.2 | 329.8 | 325.7 | 268.3 | 268.1 | 231.0 |
| Urban Rich | 852.8 | 794.5 | 692.4 | 577.5 | 579.6 | 511.9 |

**Note:** [1] Savings Rate is gross domestic savings divided by nominal GDP at market price.

**Table 6** – Run 2: No Oil Price Shock

| | 1984/85 | 1985/86 | 1986/87 | 1987/88 | 1988/89 | 1989/90 |
|---|---|---|---|---|---|---|
| | | | (Changes in percent from base run) | | | |
| Real GDP | 0 | 0.54 | 0.69 | 0.28 | 0.13 | -0.14 |
| Price Index | 0 | 2.26 | 3.48 | 4.26 | 4.84 | 4.92 |
| Govt. Revenue | 0 | 22.11 | 38.99 | 45.47 | 51.41 | 50.97 |
| Exports | 0 | 32.70 | 65.74 | 55.34 | 60.90 | 58.10 |
| Imports | 0 | 2.43 | 3.61 | 3.95 | 4.34 | 4.22 |
| Balance of Trade | 0 | 119.59 | 10,038 | 228.38 | 210.27 | 209.89 |
| Balance of Trade (bn CFAF) | 534 | 620 | 527 | 676 | 722 | 645 |
| **Real Per Capita Incomes** | | | | | | |
| North Farm Poor | 0 | -1.83 | -3.60 | -5.52 | -6.51 | -7.55 |
| South Farm Poor | 0 | -1.16 | -2.50 | -4.23 | -5.04 | -6.10 |
| North & South Farm Rich | 0 | -2.05 | -3.98 | -6.21 | -7.29 | -8.30 |
| Rural Nonfarm Poor | 0 | -1.75 | -3.13 | -4.80 | -5.62 | -6.53 |
| Rural Nonfarm Rich | 0 | 3.98 | 5.80 | 6.60 | 6.46 | 6.29 |
| Urban Poor | 0 | -1.97 | -3.35 | -5.05 | -5.89 | -6.73 |
| Urban Rich | 0 | 11.68 | 19.96 | 24.41 | 25.97 | 25.77 |

**Table 7** – Run 3: No Agricultural Export Price Shock

| | 1984/85 | 1985/86 | 1986/87 | 1987/88 | 1988/89 | 1989/90 |
|---|---|---|---|---|---|---|
| | | | (Changes in percent from base run) | | | |
| Real GDP | 0 | -0.09 | 0.21 | 3.78 | 5.19 | 9.05 |
| Price Index | 0 | -0.92 | 1.84 | 9.06 | 10.16 | 13.04 |
| Govt. Revenue | 0 | -0.75 | 1.74 | 13.10 | 16.15 | 22.77 |
| Exports | 0 | -2.29 | 5.83 | 31.05 | 36.54 | 48.98 |
| Imports | 0 | -0.81 | 1.59 | 11.80 | 15.09 | 21.28 |
| Balance of Trade | 0 | -6.54 | 685.74 | 95.88 | 93.17 | 127.00 |
| Balance of Trade (bn CFAF) | 534 | 264 | 40.8 | 404 | 449 | 473 |
| **Real Per Capita Incomes** | | | | | | |
| North Farm Poor | 0 | -0.80 | 1.70 | 12.86 | 15.80 | 28.07 |
| South Farm Poor | 0 | -1.00 | 2.21 | 15.20 | 18.75 | 33.84 |
| North & South Farm Rich | 0 | -0.95 | 1.93 | 22.41 | 22.93 | 31.11 |
| Rural Nonfarm Poor | 0 | -0.33 | 0.56 | 3.92 | 6.70 | 14.74 |
| Rural Nonfarm Rich | 0 | -0.06 | 0.00 | 0.15 | 2.23 | 7.48 |
| Urban Poor | 0 | -0.12 | -0.03 | 0.34 | 2.48 | 7.92 |
| Urban Rich | 0 | 0.20 | -0.39 | -0.53 | 1.22 | 4.75 |

**Table 8** – Run 4: No Investment Build-up in 1985/86, 1986/87

| | 1984/85 | 1985/86 | 1986/87 | 1987/88 | 1988/89 | 1989/90 |
|---|---|---|---|---|---|---|
| | | (Changes in percent from base run) | | | | |
| Real GDP | 0 | -0.56 | -1.15 | -1.05 | -0.93 | -0.83 |
| Price Index | 0 | -8.54 | -9.33 | 0.43 | 0.43 | 0.40 |
| Govt. Revenue | 0 | -8.23 | -10.87 | -0.59 | -0.56 | -0.39 |
| Exports | 0 | 4.99 | 6.91 | -1.23 | -1.16 | -0.93 |
| Imports | 0 | -9.11 | -10.62 | -0.56 | -0.53 | -0.38 |
| Balance of Trade | 0 | 45.45 | 2820 | -3.50 | -2.85 | -2.47 |
| Balance of Trade (bn CFAF) | 534 | 411 | 152 | 199 | 226 | 203 |
| **Real Per Capita Incomes** | | | | | | |
| North Farm Poor | 0 | -2.48 | -3.50 | -1.60 | -1.32 | -1.12 |
| South Farm Poor | 0 | -0.99 | -1.88 | -1.72 | -1.42 | -1.20 |
| North & South Farm Rich | 0 | -2.29 | -2.94 | -0.98 | -0.86 | -0.84 |
| Rural Nonfarm Poor | 0 | -3.42 | -4.29 | -1.37 | -1.16 | -0.95 |
| Rural Nonfarm Rich | 0 | -3.23 | -4.42 | -0.99 | -0.89 | -0.73 |
| Urban Poor | 0 | -3.84 | -4.61 | -1.14 | -1.01 | -0.87 |
| Urban Rich | 0 | -1.75 | -3.52 | -0.77 | -0.74 | -0.57 |

**Table 9 –** Run 5: No Build-up or Reduction in Investment (Investment Kept at 1983/84 Level)

| | 1984/85 | 1985/86 | 1986/87 | 1987/88 | 1988/89 | 1989/90 |
|---|---|---|---|---|---|---|
| | | (Changes in percent from base run) | | | | |
| Real GDP | 0 | -1.27 | -2.43 | -2.93 | -0.12 | 1.98 |
| Price Index | 0 | -15.97 | -16.53 | -0.23 | 4.34 | 6.61 |
| Govt. Revenue | 0 | -15.29 | -19.19 | -3.46 | 4.79 | 9.63 |
| Exports | 0 | 9.85 | 12.59 | -2.00 | -4.19 | -3.60 |
| Imports | 0 | -17.45 | -19.28 | -3.47 | 5.34 | 10.67 |
| Balance of Trade | 0 | 88.22 | 5126.69 | 2.94 | -29.36 | -43.82 |
| Balance of Trade (bn CFAF) | 534 | 531 | 272 | 212 | 164 | 117 |
| **Real Per Capita Incomes** | | | | | | |
| North Farm Poor | 0 | -4.63 | -6.41 | -4.17 | -0.81 | 2.83 |
| South Farm Poor | 0 | -1.78 | -3.54 | -4.21 | -1.54 | 2.01 |
| North & South Farm Rich | 0 | -3.97 | -5.01 | -2.92 | 0.42 | 3.45 |
| Rural Nonfarm Poor | 0 | -6.55 | -7.96 | -3.88 | -0.10 | 2.84 |
| Rural Nonfarm Rich | 0 | -6.11 | -8.10 | -3.22 | 0.68 | 2.91 |
| Urban Poor | 0 | -7.35 | -8.51 | -3.53 | 0.47 | 2.89 |
| Urban Rich | 0 | -3.08 | -6.28 | -2.74 | 0.93 | 2.74 |

**Table 10** – Run 6: No Oil Price Shock and No Reduction in Investment

| | 1984/85 | 1985/86 | 1986/87 | 1987/88 | 1988/89 | 1989/90 |
|---|---|---|---|---|---|---|
| | | | (Changes in percent from base run) | | | |
| Real GDP | 0 | -0.62 | -1.53 | -2.41 | 0.19 | 1.96 |
| Price Index | 0 | -13.58 | -12.86 | 4.19 | 9.22 | 11.52 |
| Govt. Revenue | 0 | 6.93 | 20.08 | 42.27 | 56.40 | 60.76 |
| Exports | 0 | 42.29 | 78.02 | 54.05 | 57.45 | 55.08 |
| Imports | 0 | -14.92 | -15.55 | 0.68 | 9.81 | 14.94 |
| Balance of Trade | 0 | 206.51 | 15096 | 233.76 | 183.25 | 168.14 |
| Balance of Trade (bn CFAF) | 534 | 866 | 790 | 687 | 659 | 558 |
| **Real Per Capita Incomes** | | | | | | |
| North Farm Poor | 0 | -6.68 | -10.32 | -9.08 | -6.66 | -4.14 |
| South Farm Poor | 0 | -3.16 | -6.34 | -7.92 | -5.98 | -3.52 |
| North & South Farm Rich | 0 | -6.37 | -9.51 | -8.53 | -6.20 | -4.26 |
| Rural Nonfarm Poor | 0 | -8.52 | -11.46 | -8.19 | -5.20 | -3.20 |
| Rural Nonfarm Rich | 0 | -1.44 | -1.11 | 3.98 | 7.23 | 8.98 |
| Urban Poor | 0 | -9.60 | -12.33 | -8.09 | -4.91 | -3.34 |
| Urban Rich | 0 | 10.52 | 17.24 | 22.12 | 26.12 | 27.12 |

**Table 11** – Run 7: No Agricultural Exports Price Shock and No Reduction in Investment

| | 1984/85 | 1985/86 | 1986/87 | 1987/88 | 1988/89 | 1989/90 |
|---|---|---|---|---|---|---|
| | | | (Changes in percent from base run) | | | |
| Real GDP | 0 | -1.35 | -2.25 | 0.48 | 4.44 | 9.89 |
| Price Index | 0 | -17.00 | -14.50 | 8.55 | 13.79 | 18.37 |
| Govt. Revenue | 0 | -16.10 | -17.40 | 8.59 | 19.58 | 30.63 |
| Exports | 0 | 7.39 | 18.67 | 26.95 | 29.76 | 41.91 |
| Imports | 0 | -18.35 | -17.58 | 7.39 | 19.15 | 30.15 |
| Balance of Trade | 0 | 81.25 | 5838 | 92.80 | 57.77 | 75.06 |
| Balance of Trade (bn CFAF) | 534 | 512 | 309 | 397 | 367 | 365 |
| **Real Per Capita Incomes** | | | | | | |
| North Farm Poor | 0 | -5.61 | -4.43 | 7.40 | 12.97 | 27.28 |
| South Farm Poor | 0 | -2.93 | -1.12 | 9.46 | 14.93 | 31.74 |
| North & South Farm Rich | 0 | -5.25 | -2.36 | 18.70 | 21.46 | 31.28 |
| Rural Nonfarm Poor | 0 | -6.98 | -7.33 | -0.74 | 5.38 | 15.48 |
| Rural Nonfarm Rich | 0 | -6.19 | -8.12 | -3.42 | 2.34 | 9.44 |
| Urban Poor | 0 | -7.57 | -8.47 | -3.53 | 2.30 | 9.51 |
| Urban Rich | 0 | -2.80 | -6.78 | -3.53 | 1.71 | 6.94 |

Table 12 – Run 8: 25 Percent Devaluation in 1986/87

| | 1984/85 | 1985/86 | 1986/87 | 1987/88 | 1988/89 | 1989/90 |
|---|---|---|---|---|---|---|
| | | | (Changes in percent from base run) | | | |
| Real GDP | 0 | 0 | 0.60 | 2.36 | 3.06 | 2.50 |
| Price Index | 0 | 0 | 9.63 | 10.63 | 10.87 | 10.09 |
| Govt. Revenue | 0 | 0 | 11.75 | 16.69 | 18.49 | 17.91 |
| Exports | 0 | 0 | 11.22 | 11.00 | 12.19 | 10.44 |
| Imports | 0 | 0 | -10.17 | -7.43 | -6.43 | -7.26 |
| Balance of Trade | 0 | 0 | 4330.1 | 116.35 | 101.70 | 100.39 |
| Balance of Trade (bn CFAF) | 534 | 283 | 230 | 446 | 469 | 417 |
| **Real Per Capita Incomes** | | | | | | |
| North Farm Poor | 0 | 0 | -2.22 | -0.48 | 0.69 | -2.05 |
| South Farm Poor | 0 | 0 | -0.10 | 1.82 | 3.02 | 0.28 |
| North & South Farm Rich | 0 | 0 | -1.72 | 2.12 | 2.25 | -1.92 |
| Rural Nonfarm Poor | 0 | 0 | -3.31 | -2.54 | -0.97 | -2.04 |
| Rural Nonfarm Rich | 0 | 0 | -3.89 | -2.99 | -1.19 | -1.15 |
| Urban Poor | 0 | 0 | -3.99 | -3.56 | -1.93 | -2.46 |
| Urban Rich | 0 | 0 | -2.35 | -0.21 | 1.49 | 1.98 |

**Table 13** – Run 9: Reduction of Implicit Tax on Agricultural Exports

| | 1984/85 | 1985/86 | 1986/87 | 1987/88 | 1988/89 | 1989/90 |
|---|---|---|---|---|---|---|
| | | | (Changes in percent from base run) | | | |
| Real GDP | 0 | 0.12 | 0.14 | 0.38 | 0.75 | 0.66 |
| Price Index | 0 | 2.22 | 2.37 | 2.99 | 2.69 | 1.15 |
| Govt. Revenue | 0 | 1.43 | 1.70 | 2.20 | 2.61 | 1.50 |
| Exports | 0 | 4.15 | 5.31 | 4.96 | 5.52 | 2.96 |
| Imports | 0 | 1.49 | 1.49 | 1.90 | 2.35 | 1.35 |
| Balance of Trade | 0 | 11.77 | 618 | 15.28 | 13.91 | 7.50 |
| Balance of Trade (bn CFAF) | 534 | 316 | 37.3 | 237 | 265 | 224 |
| **Real Per Capita Incomes** | | | | | | |
| North Farm Poor | 0 | 1.86 | 2.09 | 3.26 | 3.77 | 2.61 |
| South Farm Poor | 0 | 2.65 | 3.12 | 4.40 | 5.05 | 3.58 |
| North & South Farm Rich | 0 | 2.52 | 2.48 | 5.27 | 4.53 | 2.14 |
| Rural Nonfarm Poor | 0 | -0.25 | -0.30 | -0.63 | 0.36 | 0.94 |
| Rural Nonfarm Rich | 0 | -1.33 | -1.53 | -2.69 | -1.65 | -0.13 |
| Urban Poor | 0 | -1.30 | -1.61 | -2.70 | -1.68 | -0.24 |
| Urban Rich | 0 | -1.66 | -1.83 | -2.82 | -1.83 | -0.33 |

and the restrained investment build-up scenarios. As was seen above, Cameroon's adjustment program had to depend entirely on expenditure-reducing policies because its membership in the CFA zone precluded the use of devaluation to encourage expenditure switching from non-traded to traded goods. Run 8 examines the outcome of instituting an expenditure-switching policy through a 25 percent devaluation in 1986/87. The last simulation (Run 9) reduces the implicit tax on agricultural exports in 1985/86. This reduction is expected in the short run to increase farm incomes and to raise incentives for investment and in the long run to increase sectoral productivity.

**Run 1: The Base Run**

This run seeks to replicate the growth of the economy from 1984/85 to 1989/90. All exogenous variables are at their observed values. In 1985/86 gross investment rose by 34 percent and the world price for Cameroon's petroleum exports fell by 36 percent. Gross domestic product (at 1984/85 prices) in the simulation rises by 6.7 percent, exports fall by 169 billion CFAF (13 percent), imports rise by 84 billion CFAF (15 percent) and the trade balance falls from 534 to 282 billion CFAF. Gross domestic product continues to increase in 1986/87, but by only 1.6 percent. Gross investment fell thereafter, reaching by 1989/90 a level (in nominal terms) almost two-thirds below its peak in 1986/87. In the simulation GDP falls by 1989/90 to a level close to its value in 1984/85 and 8.5 percent below its peak in 1986/87. Figure 2 compares the simulation with data from the 1992 *World Tables* and more recent unpublished World Bank data.[22] Unfortunately, the World Bank data appear to be incorrect: they show value added at constant prices in mining and quarrying fell by almost half between 1985/86 and 1986/87 despite the fact that oil output fell by only about 4 percent.[23] The impact at the sectoral level is mixed. In 1989/90 output in sectors other than manufacturing and public administration is 6 to 8 percent below the base year level. Output in the agricultural export crop sector and in construction falls even more steeply, by 13 percent and 34 percent, respectively. Output in manufacturing grows by 37 percent as exports double and imports fall by 43 percent.

Turning to the trade surplus, as Figure 2 shows, the simulation captures, reasonably well, broad changes in trade surplus over this period, especially the decrease in trade surplus between 1984/85 and 1986/87. In the simulation, however, the trade surplus recovers far too rapidly after 1986/87. The reason for this appears to be that the economy deflates quickly after this date,

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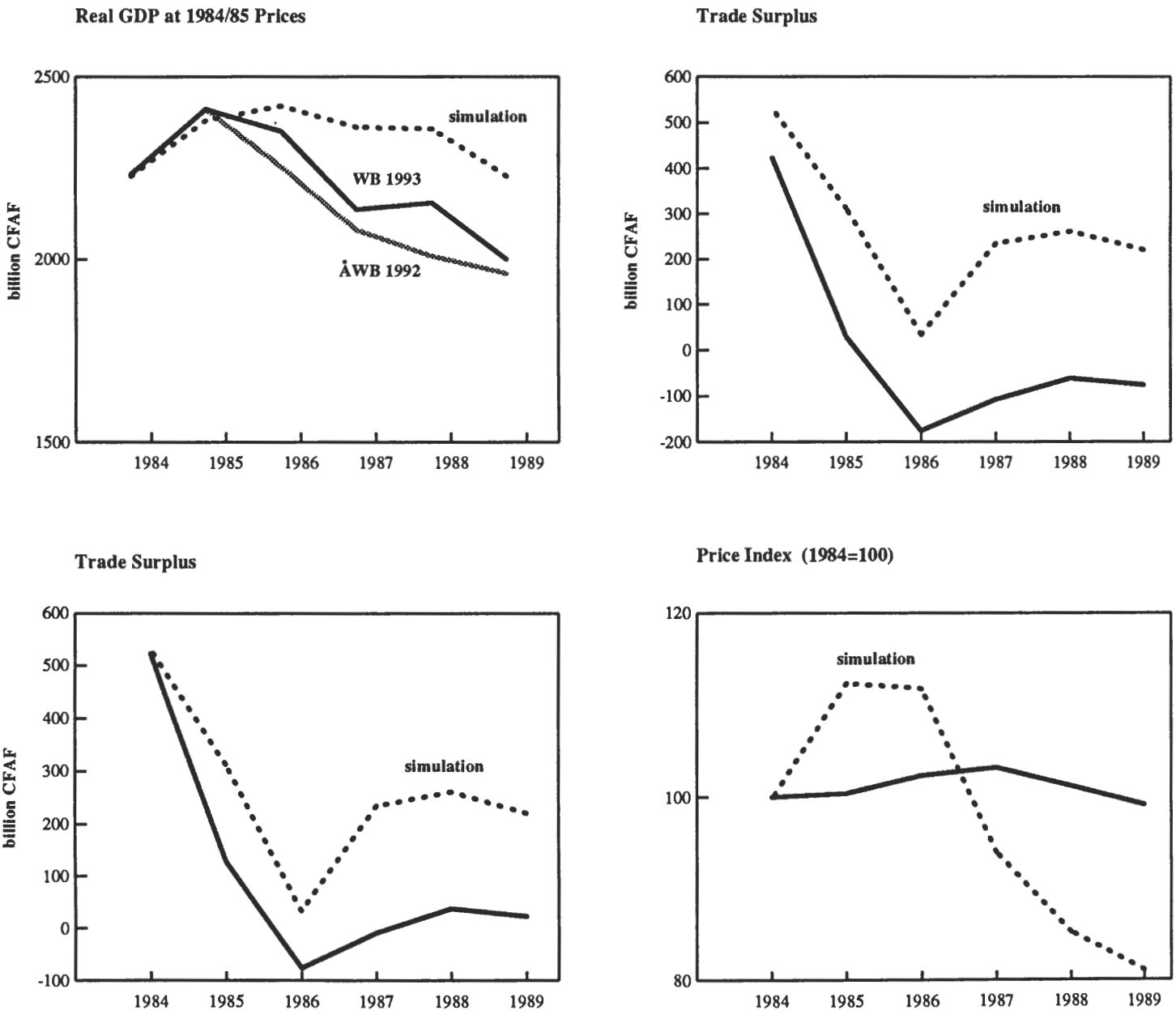
[22] The 1993 World Bank data are from the Cameroon country desk and the constant price series is at 1979/80 prices. To facilitate comparison with the simulation, the 1993 and 1992 World Bank data are converted to 1984/85 prices and the GDP series is scaled to match with the GDP in the 1984/85 SAM.

[23] The understatement in oil value added is approximately 270 billion CFAF at 1984/85 prices. If this is the only error in the World Bank data, the fall in real GDP in Figure 2 is seriously exaggerated.

**Figure 2 -- Base Run: 1984/85 to 1989/90**



stimulating net exports. The behavior of the price index in the simulation is clearly unrealistic.[24] The increase in the simulation of 10 percent in the price level between 1984/85 and 1985/86, when gross investment increased by 34 percent, does not appear unrealistic, however, when compared to the increase of 9 percent in the price level between 1983/84 and 1984/85, when gross investment went up 44 percent. Gross domestic savings also declines rapidly, from 1327 billion CFAF in 1984/85 to 521 billion CFAF in 1989/90. The savings-to-GDP ratio falls from 0.282 to 0.169 over this period. As a comparison with Table 14 shows, domestic savings fell much faster than is captured by the simulation.[25]

Real per capita incomes show much larger changes than does real GDP because of the large terms of trade effects. In 1985/86 real incomes are higher by 6 to 11 percent for all except the urban rich, whose incomes fall by 6.8 percent, largely because of the decline in profit income from oil revenues. The decrease in real incomes is especially pronounced starting in 1987/88, when gross investment begins to shrink rapidly, inducing a recession. Real incomes fall the most in 1989/90, when the decline in real GDP is largest. The decrease in real income between 1984/85 and 1989/90 ranges from 15 percent for the rural non-farm poor to 40 percent for the urban rich. The income of the urban rich decreases more than those of the other groups because oil revenues — which fall steeply — represent a significant part of this group's income. Incomes for farm households and for rural non-farm rich and urban poor households fall by 22 to 29 percent. Both urban and rural groups face similar declines in incomes because the decline in agricultural export prices and the reduction in aggregate demand affect almost all sectors equally.

**Run 2: No Oil Price Shock**

In this run, Cameroon's oil export price remains at its 1983/84 level while all other exogenous variables are as in the base run. Real GDP is not much higher than in the base run because petroleum production is exogenous and does not increase in response to the higher oil price. Exports increase in value substantially and in 1986/87 are 65 percent higher than in the base run, and the steep reduction in the trade surplus seen in the base run is averted. Total exports do not grow over time because oil production is stagnant and agricultural exports fall because of falling world prices. However, the trade surplus remains high throughout the period.

The gains from higher oil earnings accrue only to the rural non-farm rich and urban rich households. The other household groups' real incomes are lower

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[24] The steep fall in the price index is not the result of introducing an elastic supply of labor. If labor supply is kept fixed in the base run, the fall in the price index is even steeper.

[25] Gross domestic savings in the base year SAM does not equal that shown in Table 14 because the trade surplus in Table 14 differs from that in the SAM.

**Table 14 –** The Cameroon Economy: 1984/85 to 1989/90

| | 1984/85 | 1985/86 | 1986/87 | 1987/88 | 1988/89 | 1989/90 |
|---|---|---|---|---|---|---|
| | | | (Billion CFAF) | | | |
| Real GDP[1] | 4706 | 5083 | 4954 | 4505 | 4544 | 4216 |
| Real GDP[2] | 4706 | 5107 | 4865 | 4529 | 4284 | 4102 |
| Price Index | 100 | 100.4 | 102.3 | 103.3 | 101.1 | 99.2 |
| Govt. Revenue | 821 | 803 | 721 | 599 | 563 | 478 |
| Govt. Expenditure | 501.8 | 556.2 | 556.0 | 530.0 | 559.4 | 567.0 |
| Exports | 1318 | 985 | 667 | 599 | 672 | 674 |
| Imports | 896 | 956 | 843 | 707 | 743 | 751 |
| Balance of Trade | 422 | 28.6 | -176 | -108 | -62 | -73 |
| Remittances | 162 | 240 | 189 | 180 | 142 | 171 |
| Gross Dom. Investment | 955 | 1285 | 1318 | 733 | 552 | 484 |
| Gross Dom. Saving | 1215 | 1074 | 953 | 445 | 348 | 240 |

**Notes:** [1] The GDP series is mulitplied by a constant to make GDP in 1984/85 equal 4706 bn CFAF, the GDP in the SAM.

[2] This series is from the 1992 World Tables.

**Source:** World Bank (1993)

than in the base run in large part because consumer prices rise faster than these groups' nominal incomes. Compared to the base run, in 1989/90, real incomes are 25 percent and 6 percent higher for the urban and rural non-farm rich, respectively, and 6 to 8 percent lower for other groups, and real wages for all categories of labor are 6 percent lower.

Government revenues are tied closely to oil earnings and are 40 to 50 percent higher than in the base run. Had oil prices not fallen so drastically, both internal and external imbalances may have remained manageable for a period of time.[26] The economy may well have weathered the steep fall in agricultural export prices without massive reductions in public investment and a recession.

**Run 3: No Price Shock for Agricultural Exports**

The price index for Cameroon's agricultural exports peaked in 1984/85. By 1986/87 it was 10 percent below its 1983/84 level. In this simulation, prices for agricultural exports remain at their 1983/84 level in every year after 1984/85, the base year. It is assumed that export prices facing producers increase proportionately, i.e., that the marketing boards' margins (as a fraction of export price) remain at their observed levels. Real GDP in 1985/86 and 1986/87 is close to that in the base run because the agricultural export price index in these years is not far from its value in 1983/84. In later years, this price index is 60 to 120 percent higher than in the base run and real GDP is 4 to 9 percent higher than in the base run. Unlike the oil sector, output in the agricultural export sector is price-responsive, so higher prices lead to increased output and are expansionary. Agricultural export prices in 1989/90 are 125 percent higher than in the base run, stimulating an increase of 64 percent in output in the agricultural export sector and increases of 13 percent in the CPI and 19 percent in real wages for agricultural workers. The expansionary impact of higher agricultural production varies from sector to sector. Output in sectors with small trade shares is about 10 percent higher. Output in sectors with large trade shares, such as manufacturing, is only 1 or 2 percent higher. Compared to the base run, in 1989/90 real value added is higher in agriculture by 35 percent, in services by 6 percent, and in manufacturing by 3 percent. Real GDP increases until 1988/89, reversing the decline seen in the base run. The expansionary effect of higher agricultural production is thus larger than the contractionary effect of falling investment for much of the period. Government revenues also increase more or less in step with nominal GDP, but the increase is less than half of that seen in the no oil price shock scenario of Run 2.

Since the agricultural export price is higher than in the base run after 1986/87, exports are 30 to 49 percent higher in these years. However, the increase in total exports is not as large as in Run 2, when there is no oil price shock, so that agricultural export prices would have had to rise above their 1983/84 level in order to compensate for the loss of export earnings resulting

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[26] Adjustment could not have been put off indefinitely because Cameroon's oil reserves are limited in extent and are close to exhaustion.

from the oil price shock. Even if prices of agricultural exports had held firm, Cameroon would have faced a balance-of-payments crisis because of the oil price shock.

Since the difference in export prices between this run and the base run is small in 1985/86 and 1986/87, there is little difference in real per capita incomes between these runs in these years. The differences are pronounced in later years, when the difference in export prices is large. In 1987/88, all rural groups are better off, especially the rich farmers, while there is little difference in the real incomes of the urban groups. The reason for this is that the increase in urban groups' nominal incomes is of course much smaller than that for the rural groups and is more or less counterbalanced by the increase in their consumer price indices because of higher agricultural prices. In later years, the increase in real GDP is larger and real incomes are higher for all groups. The difference is especially pronounced in 1989/90, when GDP is 9 percent higher and real incomes are between four and 31 percent higher than in the base run. What is notable is that real income gains for poor farm household groups are comparable to the gains made by rich farm households. One reason for this is that real wages for agricultural workers increase, in part because the consumer price index does not rise as fast as agricultural export prices.[27]

Several important conclusions emerge from a comparison of the run with no oil price shock (Run 2) and this run (Run 3). First, higher prices for agricultural exports are more effective in maintaining real GDP than are higher prices for petroleum exports. This is because higher oil prices do not result in increased petroleum output, while output in the agricultural export sector is highly price-responsive. Second, it should be noted that government revenues are tied much more to oil prices than to agricultural export prices. If oil prices had remained stable, the government would have been able to make far smaller cuts in investment spending, which would also have been less contractionary.

**Run 4: No Investment Build-up in 1985/86 and 1986/87**

The unsustainable increase in investment after 1984/85 was cited as a major factor responsible for the economic crisis after the end of the oil boom. This scenario examines the outcome when there is no investment increase. Instead of increasing by almost a third from its 1984/85 level, investment in 1985/86 and 1986/87 is kept at this level (in nominal terms), returning to its observed trajectory thereafter. Real GDP in 1985/86 and 1986/87 is 0.6 percent and 1.1 percent lower, respectively, and real incomes are 1 percent to 4.6 percent lower than in the base run. In later years, when the economy is not at full employment, the differences between the two runs in the macro aggregates and in

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[27] In addition, income gains are comparable for poor farm households in the north and in the south despite the fact that the share of the northern region in agricultural export crops is small. The reason for this is that the agricultural labor market is not disaggregated by region so that gains in agricultural wage incomes will accrue proportionately to poor households in both regions.

real incomes remain small, about 1 or 2 percent. Thus, in these circumstances, the extra capacity created by the increased investment in the two years after 1984/85 has little effect on output during the recession.

With the decrease in investment in these two years, the trade surplus is markedly higher than in the base run because the demand for foreign savings is lower. The increase in the price level is lower than in the base run because a smaller increase in net imports is required to finance the lower level of investment. It is unclear what impact avoiding this build-up of investment would have had on the severity of the economic crisis. Certainly, the government would not have run a deficit amounting to 71 percent of revenue in 1986/87. Also, it would not have had to make such a large draft on the banking system for financing its deficit. In this case, the collapse of the financial system may well have been delayed, if not averted, the economic contraction would have been less severe and the government better able to reform its finances.

**Run 5: Investment Kept Constant at 1983/84 Level After 1984/85**

Average investment from 1985/86 to 1989/90 was more than 25 percent above investment in 1983/84, so that it would have been feasible to keep investment in these years at the 1983/84 value even after making allowances for inflation. In this scenario, investment after 1985/86 is kept at its 1983/84 level. Since investment in 1985/86 and 1986/87 is now almost 50 percent lower than in the base run and investment in 1987/88 is 7 percent lower than in the base run, GDP is between 1.3 and 2.9 percent lower than in the base run. But in the last two years of the simulation, 1988/89 and 1989/90, investment is 25 percent and 40 percent higher than in the base run, respectively. Gross domestic product is marginally lower in 1988/89 and is 2 percent higher in 1989/90. The changed investment profile results in lower capital stocks and GDP initially, but in higher GDP in later years.

As is to be expected, government revenue is below its base run trajectory until 1987/88. Household incomes exhibit similar behavior. Real incomes are lower for all groups until 1987/88, as much as 8 percent lower than in the base run. Real incomes fall more steeply than does GDP because with the decrease in investment the price level falls, stimulating net exports and decreasing absorption. Only in 1989/90 do all households have higher real incomes than in the base run. The lesson here is that the pay-off in terms of higher future growth appears only in the medium term. This strategy of restrained but steady investment would clearly be superior if the simulation were extended beyond 1989/90. Not modeled here are other factors favoring such a strategy. First, a slower build-up of investment after 1983/84 would have been more efficient in increasing productive capacity because investment projects would have been better coordinated and implemented. Second, had investment not risen so sharply, the financial system and public finances would have been more resilient and the economic crisis brought on by falling export revenues would have been less severe.

The sharp fall in the balance-of-trade surplus seen in the base run is absent because investment in 1985/86 and 1986/87 is much lower than in the base run. The trade surplus in later years is lower because real GDP is higher and the domestic price level is higher, resulting in higher imports and lower exports. Thus, the economy would still face the need to adjust to the growing external imbalance brought about by falling export prices, an imbalance which is now larger than in the base run because of higher growth.

This simulation demonstrates the trade-off between more sustainable investment and growth. The investment trajectory considered here produces what may be initially unacceptably large real income losses. A higher level of investment would be then be called for. In a second simulation, investment was kept constant at its average between 1985/86 to 1989/90, a level 28.8 percent above that in the simulation discussed above. At this level of investment, GDP and household incomes are above their base run values after 1987/88. In addition, the present value of real incomes is higher than in the base run for interest rates up to 5 percent. In hindsight, it is clear that a sustainable investment policy would have been superior.

**Run 6: No Oil Price Shock and Investment Maintained at 1983/84 Level**

This scenario is a combination of Run 2 (no oil price shock) and Run 5 (constant investment). The only shock affecting the economy is the fall in agricultural export prices after 1986/87. Real GDP differs only by −0.2 to 0.9 percent from its path in Run 5: because oil sector output is exogenous, the expansionary effect of higher oil prices is small. The major impact of higher oil prices is on exports, the balance of trade, government revenues, and the distribution of real income. Exports, the balance of trade, and government revenues are all substantially higher. And as in the comparison of Run 2 and the base run, the results of Run 6, compared to Run 5, show that higher oil prices result in higher real incomes for the rural non-farm rich and urban rich groups and lower real incomes for all other groups. Similarly, a comparison of Run 2 and this run shows that real incomes and GDP are lower in this run in 1985/86 and 1986/87, the years in which investment is almost half of that in Run 2, and that real incomes and GDP are generally higher in 1988/89 and 1989/90, the years in which investment is markedly higher than in Run 2.

This scenario also demonstrates that sustained investment and higher oil prices lead to a more favorable outcome, compared to the base run, for only the rural non-farm and urban rich households. The increase in oil prices works against farm incomes and the decrease in agricultural and informal sector labor demand also adversely affects the incomes of the non-farm poor households. It should of course be borne in mind that the outcome would be even more favorable for all households had the higher oil revenues been used to finance higher public investment.

**Run 7: No Price Shock for Agricultural Exports and Investment Maintained at 1983/84 Level**

This scenario is a combination of Run 3 (no change in agricultural export prices from 1983/84 level) and Run 5 (investment constant at 1983/84 level). Investment is now kept constant at its level in 1983/84 and the rapid increase in investment in 1985/86 and 1987/88 is avoided. As a result, real GDP and real incomes are in general lower than in Run 3 until 1989/90. Of course, since higher agricultural export prices result in an expansion of agricultural export production, real GDP is higher than in Run 5 except in 1985/86 when agricultural prices are below their level in Run 5. Although the increase in agricultural prices is expansionary, it also tends to redistribute income from the urban rich to farm households. Except in 1985/86, real incomes are higher than in Run 5 and farm households gain the most. The combination of higher agricultural prices and higher investment than in the base year is strongly expansionary. Real GDP grows throughout, except in 1989/90, when it is slightly below its value in 1988/89. Government revenues are in general higher than in Runs 3 and 5 (except in years when investment is lower or agricultural prices are lower). While they do not reach the levels seen in the no-oil-price-shock scenarios, revenue in 1989/90 is 77 percent of that in the base year. Because investment is lower in 1985/86 and 1986/87, the trade balance improves enough to produce a current account surplus.[28] Again, this suggests that if agricultural export prices had stayed high and an unsustainable increase in investment had not occurred, the oil price shock need not have triggered off a major economic crisis.

**Run 8: 25 Percent Devaluation in 1986/87**

This scenario is identical to the base run except for a 25 percent devaluation of the CFA franc in 1986/87, the year when the balance of payments was under greatest pressure. With a 25 percent devaluation, exports increase 11 percent and imports fall by 10 percent (both in dollars terms) in 1986/87. The trade surplus increases to 230 billion CFAF in 1986/87 and 445 billion CFAF in 1987/88 compared to 5.1 and 206 billion CFAF for these years in the base run. Devaluation is clearly expansionary. However, the increase in real GDP is not uniform over time. Real GDP in 1986/87 is only 0.6 percent above its value in the base run because in the simulation the economy is maintained at full employment until this year. Starting from 1987/88, the economy is not at full employment and so the expansionary effect of devaluation is larger and real GDP is 2.4 to 3.1 percent higher than in the base run. The price index after 1986/87 follows a trajectory about 10 percent higher than that in the base run. Government revenues are 12 to 18 percent higher than in the base run.

However, even though devaluation is expansionary, the impact on real incomes is ambiguous because real GDP does not increase uniformly over the period of the simulation. Compared to the base run, real wages are lower after 1986/87

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[28] Table 14 shows remittances (factor payments and other payments). The current account balance is the trade surplus less remittances.

by 1.7 to 3.4 percent for agricultural and informal sector workers and by 5.7 to 9.1 percent for other categories of labor. Initially, real incomes are lower for all groups because real GDP increases only 0.6 percent in the year of the devaluation. Later on, generally speaking, the farm and urban rich household groups stand to gain. Farm households gain because the devaluation increases export demand for agriculture. The urban rich gain because devaluation increases oil sector revenues. Other groups' real incomes tend to be somewhat below their levels in the base run. Poor farm households in the north stand to gain less than the other farm household groups because they produce predominantly for the domestic market and gain little from better export crop prices.

These results suggest that a devaluation would have been an effective means of addressing the external imbalance facing the Cameroon economy following the export price shock. In addition, any adverse effect on real incomes from such a devaluation would likely have been small.[29] The devaluation would have also resulted in improved government revenue, making a less drastic reduction in expenditure possible, and mitigating the harshness of the adjustment process.

**Run 9: Reduction of Tax on Agricultural Exports**

The implicit tariff on Cameroon's agricultural exports resulting from the marketing boards' price-setting policies was 32 percent in 1985/86; i.e., producer prices were 32 percent below world prices that year. This tax fell during the economic crisis, becoming negative in 1987/88 and 1988/89 before rising to 14 percent in 1989/90. In this scenario, this tax is reduced so that the producer price is 20 percent above its level in the base run. The implicit tax collected by the marketing boards is transferred to the public administration and services sectors as a subsidy. A reduction in this tax will therefore affect income distribution. In addition, it will also increase incentives for investment in agriculture, resulting in greater productivity in the medium to long run.

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[29] The recent devaluation of the CFA franc from 50 to 100 per French franc has provoked major protests throughout the CFA countries, triggered by the sharp increase in prices of imported consumer goods, such as drugs and other necessities. How can this be reconciled with the small changes in real income observed in the simulation discussed here? First, the devaluation discussed in the simulation is not as large, from 50 to 62.5 CFA francs per French franc. Second, the sectoral disaggregation in the model is broad, so that even if large price increases were to occur for certain "politically sensitive" commodities, these would be less noticeable at the level of aggregation employed here. Third, the simulation does not examine the process by which the economy makes the transition from one equilibrium to another. The predicted increases in exports, production, employment and wage incomes occur with a lag, while the prices of imports go up immediately after the devaluation. During the initial stage of the transition, the costs for many groups may well exceed the benefits, and future benefits would still be uncertain, providing cause for dissatisfaction and protests.

The reduction in tax results in a 7 to 12 percent increase in agricultural export crop production. However, the impact on sectoral capital stock of this reduction in tax is not large. Capital stock in 1989/90 in the agricultural export sector is only 1 percent higher than in the base run. One reason why the increase in capital stock is small is that investment is lower in real terms in this scenario because nominal investment is exogenous and the price level is two to 3 percent higher than in the base run.

The short-run impact of the tax reduction is therefore of greater significance here. Undoubtedly, a tax reduction undertaken five to ten years before the boom in commodity prices would have had a larger impact on agricultural investment and productivity because world prices for Cameroon's agricultural exports were higher and the implicit tax was large and positive during much of the economic boom after 1975.

As one might expect, real GDP, exports, and the trade surplus are all higher than in the base run. The increase in GDP is higher after 1986/87 — between 0.4 percent and 0.7 percent — when the economy is not at full employment. Changes in real incomes are larger — farm households gaining between 2 and 5 percent and non-farm households usually losing between 0.2 percent and 2.7 percent. The gains are smaller for the north farm poor household group because their share in export crop production is small, and so, they gain mostly as a result of increased employment.

While the impact of a 20 percent increase in producer price is not very large, it should be kept in mind that a similar decrease in taxation during the commodity boom would have resulted in a substantially larger increase in producer prices. In addition, the volume of agricultural investment is likely, in reality, to be sensitive to the producer price so that higher producer prices would have led to increased investment by farm households, which is not taken into account in this simulation. Thus, the high implicit taxation of export agriculture during the boom years would have had a major impact on income distribution, agricultural investment, and productivity.

# 5. CONCLUSION

After nearly a decade of rapid growth, the Cameroon economy plunged into an economic crisis triggered by the steep fall in its major exports' prices. Unable to devalue its currency because of its membership in the CFA zone, the government had to depend exclusively on expenditure-reducing policies to reduce aggregate demand and bring about a new equilibrium. In addition to these macroeconomic policy changes, the government also undertook other systemic and sectoral reforms. These included attempts to reform public sector enterprises, the financial system, and pricing reforms in agriculture aimed at aligning producer prices closer to world prices and eliminating the large implicit tax on agriculture.

What was the impact on growth and income distribution of the terms-of-trade shock and of the reductions in public expenditure and investment which followed? The base run simulation presented here suggests that by 1989/90, real GDP had fallen 8.5 percent from its peak in 1986/87. By 1989/90, real income for most household groups was at least 25 percent lower than in 1984/85, the simulation's base year, suggesting that the external shocks and the attempt to adjust to these shocks have had a drastic impact on the economy.

In addition to the base run, other simulations examined the impact of different components of the price shocks and the role of investment policy and agricultural price policy in the adjustment process. The implications for policy from these simulations are examined below.

## THE TERMS-OF-TRADE SHOCK

As the simulations demonstrate, the oil and agricultural export price shocks are transmitted to the economy by very different mechanisms. The sectoral and multisectoral impact of the oil price shock was small because of the unresponsiveness of output to price and the weak linkages between the petroleum sector and the rest of the economy. However, government revenues are tied closely to petroleum earnings and so the major impact of the oil price shock was macroeconomic, operating through the government budget and the balance of payments. Faced with falling oil revenues and no external source of finances, the government had no recourse but to reduce expenditures. In addition, the price shock affected income distribution because profits flowing to households from the petroleum sector accrue mostly to the urban rich.

On the other hand, the fall in world prices for Cameroon's agricultural exports directly led to a substantial reduction in the agricultural sector and a decline in real incomes for farm households. Reduced output also occurred in other sectors, as a result of production and consumption linkages with agriculture. While the price shock undoubtedly reduced the transfers from farmers effectuated by the marketing boards, the shock had little direct impact

on government revenues narrowly defined because these transfers were used to subsidize the operations of the boards and did not accrue to the state treasury.

Had the government been able to adjust gradually, the impact of the oil price shock would have been moderated. By all accounts, the government had built up considerable financial assets abroad during the oil boom. Presumably, these were depleted in financing the investment boom prior to the price shock. Had a more prudent investment policy been followed, these assets could have been used to finance a gradual reduction in government expenditure and in the current account deficit after the price shock.

In the case of the agricultural export sector, a similar argument can be made about the marketing boards. If the marketing boards and other parastatal agencies had not dissipated the large revenues accruing to them during the years of booming commodity prices, they would have been better placed to moderate falling producer prices and revenues when export prices fell. The agricultural export sector would have contracted as adjustment proceeded, but at a slower pace and with less drastic an impact on the rest of the economy.

Another factor impeding adjustment to the price shock was Cameroon's inability to devalue its currency. As the simulation shows, devaluation is expansionary and results in increased government revenues and an improvement in the current account balance. Since government revenues are higher and the trade deficit is lower after devaluation, the government could have relied less on expenditure reduction, which would have moderated the severity of the adjustment process.

## INVESTMENT POLICY

The simulations of alternative investment policies demonstrate that the investment build-up after 1983/84 was of little benefit because the increased production capacity added little to output in a situation of economic contraction and excess capacity. In addition, the simulations demonstrate that a more prudent investment policy, which avoided this rapid increase in investment, would have made it possible (as pointed out above) to sustain a substantially higher level of investment after the price shock, resulting in a smaller reduction in GDP and a less severe contraction of the economy. Moreover, a more prudent investment policy would have averted the large macroeconomic imbalances which appeared in the wake of the price shocks, making it easier to restore macroeconomic balance and stabilize the economy.

## AGRICULTURAL PRICE POLICY

The high degree of implicit taxation of the agricultural export sector during the commodity boom has been criticized extensively, both because it transfers income from agricultural households to mostly better-off urban government employees and other non-farm groups and because it reduces incentives for agricultural investment. However, there is little scope for increasing the

producer price in the period after the boom because the wedge has become small, and sometimes negative, and the government and parastatal agencies do not have the wherewithal to finance a producer subsidy. The lesson here is that the years of the commodity boom were the time for reducing the wedge between producer price and world price. At that time, the wedge was large, world prices were high, and its reduction would have had a large impact on rural incomes and, over time, on sectoral investment.

## STRUCTURAL ADJUSTMENT AND POVERTY

It is clear from an examination of macroeconomic data that the Cameroon economy experienced a marked contraction after the mid-eighties. For insight into the consequences for poverty and income distribution of the continuing economic crisis and the structural adjustment policies one has to turn to the model simulations discussed earlier.

Largely dependent on agriculture, the rural poor constitute the bulk of the poor in Cameroon. Their incomes are not directly tied to government expenditures through large-scale public employment or anti-poverty transfers. Consequently, structural adjustment — chiefly expenditure reduction — has affected these households indirectly through: the multiplier; reductions in the quality and supply of infrastructural and agricultural services and in public investment in agriculture; and its impact on investment and growth in the non-agricultural sector.[30] With the collapse of oil revenues the Cameroonian state has been unable to maintain the low pre-existing level of support for agriculture. The long-term consequences of reduced public spending on agriculture, though unknown, provide cause for worry.

On the other hand, the steep fall in world prices for Cameroon's major export crops had a direct and substantial effect on rural poverty, especially in the more export-oriented southern region. While this price shock was one of the factors precipitating the economic crisis, its effect must be distinguished from the effects of the structural adjustment policies *per se*. Indeed, as the simulation demonstrates, had export crop prices not fallen, the impact of structural adjustment and the associated expenditure reduction policies on rural incomes would have been comparatively small.

That the direct impact of the structural adjustment policies on poverty has been small (when compared to the reduction in GDP caused by the price shocks) and has been concentrated in the relatively better-off non-agricultural and urban sectors is cold comfort indeed. The inability of the state to restore public and private investment and revive economic growth, coupled with Cameroon's rapid population growth, can only lead to rapidly increasing poverty in the long run.

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[30] Of these, the reduction in the quality of infrastructural and agricultural services is not modeled here.

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## APPENDIX: EQUATIONS OF THE CAMEROON MODEL

**Prices:**

(1) $PM_i = ER \cdot PWM_i(1 + tm_i + mr_i^m)$ for $i \in I_M$

(2) $PE_i(1 + te_i) = ER \cdot PWE_i$ for $i \in I_E$

(3) $P_i X_i = PD_i XXD_i$ for $i \in \bar{I}_M$

(4) $P_i X_i = PD_i XXD_i + PM_i M_i$ for $i \in I_M$

(5) $PD_i = PM_i$, for $i \in I_{M2}$

(6) $s_b \sum_{i \in I_s} PX_i XD_i = \sum_i te_i PE_i E_i$, $I_b$ = set of public administration sectors

(7) $PX_i XD_i = PD_i XXD_i$ for $i \in \bar{I}_E$

(8) $PX_i XD_i = PD_i XXD_i + PE_i E_i$ for $i \in I_E$

(9) $PT = \sum_i tt_i^0 P_i$

(10) $PVA_i + \sum_j A_{ji} P_j = PX_i(1 - it_i + s_b \delta_{ib}) - mr_i^x PT$, $\delta_{ib} = \begin{cases} 1 & \text{if } i \in I_b \\ 0 & \text{otherwise} \end{cases}$

(11) $PK_i = \sum_j B_{ji} P_j$

(12) $\bar{P} = \sum_i w_i P_i$

**Production:**

(13) $XD_i = \kappa_i AD_i(\lambda_i LA_i^{\rho_i'} + (1 - \lambda_i) K_i^{\rho_i'})^{1/\rho_i'}$

$$(14)\ W_{1c}wd_{1,1c} = XD_1 PVA_1 \alpha_{1,1c} \lambda_1 LA_1^{\rho_1'} / (\lambda_1 LA_1^{\rho_1'} + (1-\lambda_1) K_1^{\rho_1'})$$

$$(15)\ (PVA_1 XD_1 - \bar{r}\ rd_1 K_1)(1-\lambda_1) K_1^{\rho_1'} = \bar{r}\ rd_1 K_1 \lambda_1 LA_1^{\rho_1'}$$

**Factor Markets:**

$$(16)\ LA_1 = \prod_{1c} L_{1,1c}^{\alpha_{1c}}$$

$$(17)\ \sum_1 L_{1,1c} = LS_{1c}$$

$$(18)\ LS_{1c} = LS_{1c}^0 (W_{1c}/W_{1c}^0)^{\delta_{1c}}$$

$$(19)\ \sum_1 K_1 = \bar{K}$$

**Trade:**

$$(20)\ XD_1 = AT_1 (\gamma_1 E_1^{\rho_i^T} + (1-\gamma_1) XXD_1^{\rho_i^T})^{1/\rho_i^T}, \quad i \in I_E$$

$$(21)\ \frac{E_1}{XXD_1} = \left[ \frac{PE_1}{PD_1} (1/\gamma_1 - 1) \right]^{1/(\rho_i^T - 1)}, \quad i \in I_E$$

$$(22)\ XXD_1 = XD_1, \text{ for } i \in \bar{I}_E$$

$$(23)\ X_1 = AC_1 (\delta_1 M_1^{-\rho_i^C} + (1-\delta_1) XXD_1^{-\rho_i^C})^{-1/\rho_i^C}, \text{ for } i \in I_M$$

$$(24)\ \frac{M_1}{XXD_1} = \left[ \frac{PD_1}{PM_1} \frac{\delta_1}{1-\delta_1} \right]^{1/(1+\rho_i^C)}, \text{ for } i \in I_M$$

$$(25)\ X_1 = M_1 + XXD_1, \text{ for } i \in I_{M2}$$

$$(26)\ XXD_1 = XD_1, \text{ for } i \in \bar{I}_E$$

$$(27) X_i = XXD_i, \text{ for } i \in \bar{I}_M$$

**Marketing Margins:**

$$(28) MM_i = mr_i^x XD_i + mr_i^m ER \cdot PWM_i M_i / PT$$

$$(29) TT_i = tt_i^0 \sum_j MM_j$$

**Income Distribution:**

$$(30) TW_{1c}^{ag} = W_{1c} \sum_{i \in I_{ag}} wd_{i,1c} L_{i,1c}$$

$$(31) TW_{1c}^{nag} = W_{1c} \sum_{i \in \bar{I}_{ag}} wd_{i,1c} L_{i,1c}$$

$$(32) TW_{1c} = TW_{1c}^{ag} + TW_{1c}^{nag}$$

$$(33) YH_{h,1c} = \sigma_{h,1c} TW_{1c}$$

$$(34) DEP_{ag} = \sum_{i \in I_{ag}} dr_i PK_i K_i$$

$$(35) DEP_{nag} = \sum_{i \in \bar{I}_{ag}} dr_i PK_i K_i$$

$$(36) YK_{agf} = PVA_{agf} XD_{agf} - \sum_{1c} W_{1c} wd_{agf,1c} L_{agf,1c} - PK_{agf} dr_{agf} K_{agf}$$

$$(37) YK_h^{ag} = \theta_h^{ag} \left( \sum_{i \in I_{ag}} PVA_i XD_i - \sum_{1c} TW_{1c}^{ag} - DEP_{ag} \right) + \theta_h^{agf} YK_{agf}$$

$$(38) YK_h^{nag} = \theta_h^{nag} (1 - \theta_f) \left( \sum_{i \in I_{nag}} PVA_i XD_i - \sum_{1c} TW_{1c}^{nag} - DEP_{nag} \right)$$

$$(39) YF = \theta_f \left( \sum_{i \in I_{nag}} PVA_i XD_i - \sum_{1c} TW_{1c}^{nag} - DEP_{nag} \right) + GFT - ER \cdot YFW$$

$$(40) FTAX = dt_f YF + (dt_{o11} - dt_f)\theta_f (PVA_{o11} XD_{o11} - \sum_{1c} W_{1c} wd_{o11,1c} L_{o11,1c} - dr_{o11} PK_{o11} K_{o11})$$

$$(41) Y_h = \sum_{1c} YH_{h,1c} + YK_h^{ag} + YK_h^{nag} + g_h GT + f_h FT$$

$$(42) GFT = (1 - a_h) GTT$$

$$(43) GT = a_h GTT$$

$$(44) FGT = a_{fg} (YF - FTAX)$$

$$(45) FT = a_{fh} (YF - FTAX)$$

**Savings:**

$$(46) mps_h = mps_h^0 (\bar{r}/\bar{r}_0)^{v_3}$$

$$(47) S_h = \sum_h mps_h (1 - dt_h) Y_h$$

$$(48) S_f = YF - FTAX - FT - FGT$$

$$(49) S_g = GR - GTT - \sum_i P_i GD_i$$

$$(50) S_T = S_f + S_h + S_g + DEP_{ag} + DEP_{nag} + ER \cdot FSAV$$

**Demand:**

$$(51) D_j^{int} = \sum_i A_{ji} XD_i$$

$$(52) \Delta S_i = ds_i XD_i$$

$$(53) P_i CD_{ih} = P_i CD_{ih}^0 + \beta_{ih} ((1 - mps_h)(1 - dt_h) Y_h - \sum_j P_j CD_{jh}^0$$

$$(54) P_i GD_i = \alpha_i^g GDTOT$$

**Government:**

$$(55)\ GR = ER\sum_{i} tm_i PWM_i M_i + \sum_{i} it_i PX_i XD_i + \sum_{h} dt_h Y_h + FTAX + FGT$$

**Investment:**

$$(56)\ \bar{r}\cdot\bar{K} = \sum_{i} PVA_i XD_i - \sum_{ic} TW_{ic}$$

$$(57)\ r_i = rd_i / \sum_{j} rd_j$$

$$(58)\ DST = \sum_{i} P_i \Delta S_i$$

$$(59)\ INVT = DST + DKTOT$$

$$(60)\ \tau_i = (r_i / r_i^0)^{v_i} \tau_i^0 / \sum_{j} (r_j / r_j^0)^{v_j}$$

$$(61)\ \tau_i^1 = (1-\mu)\tau_i + \mu\tau_i^0$$

$$(62)\ PK_i DK_i = \tau_i^1 DKTOT$$

$$(63)\ ID_i = \sum_{j} B_{ij} DK_j$$

**Current Account:**

$$(64)\ \sum_{i} PWM_i M_i = \sum_{i} PWE_i E_i + FSAV - YFW$$

**Commodity Market Equilibrium:**

$$(65)\ X_i = D_i^{int} + \sum_{h} CD_{ih} + GD_i + ID_i + \Delta S_i + TT_i$$

**Parameters:**

| | |
|---|---|
| $AC_i$ | Armington function shift parameter in sector *i* |
| $AD_i$ | Production function shift parameter in sector *i* |
| $AT_i$ | CET function shift parameter in sector *i* |
| $A_{ij}$ | Input-output coefficient for purchases from sector *i* by sector *j* |
| $a_{fg}$ | Share of government in transfers from firms |
| $a_h$ | Share of household group *h* in transfers from government |
| $a_{fh}$ | Share of household group *h* in transfers from firms |
| $\alpha_{i,lc}$ | Labor share parameter in production for labor category *lc* in sector *i* |
| $\alpha_i^g$ | Share of government consumption from sector *i* |
| $\beta_{ih}$ | Marginal propensity to consume for LES demand system |
| $CD_{ih}^0$ | Committed expenditure for LES demand system for sector *i* and hh group *h* |
| $\delta_{lc}$ | Labor supply elasticity for labor category *lc* |
| $\delta_i$ | Armington function share parameter in sector *i* |
| $dr_i$ | Depreciation rate in sector *i* |
| $ds_i$ | Ratio of inventory invt. to gross output in sector *i* |
| $dt_h$ | Direct tax rate for household group *h* |
| $dt_f$ | Direct tax rate for firms |
| $dt_{oil}$ | Direct tax rate on firms' oil income |
| $\gamma_i$ | CET function share parameter for sector *i* |
| $it_i$ | Indirect tax rate in sector *i* |
| $\lambda_i$ | CES production function parameter for sector *i* |
| $mr_i^m$ | Marketing margin on imports in sector *i* |
| $mr_i^x$ | Marketing margin on production in sector *i* |
| $\mu$ | Investment share responsiveness parameter |
| $v_i$ | Investment share elasticity in sector *i* |
| $v_3$ | Elasticity of marginal propensity to save w.r.t. average rate of return |
| $rd_i$ | Base year differential in rate of return to capital in sector *i* |
| $\rho_i^P$ | CES production function exponent in sector *i* |
| $\rho_i^T$ | CET function exponent in sector *i* |
| $\sigma_{h,lc}$ | Wage income share for household group *h* from labor category *lc* |
| $\theta_h^{ag}$ | Agricultural capital income share for household group *h* |
| $\theta_h^{agf}$ | Food sector capital income share for household group *h* |
| $\theta_h^{nag}$ | Non-agricultural capital income share for household group *h* |
| $\theta_f$ | Non-agricultural capital income share for firms |
| $te_i$ | Export duty rate in sector *i* |
| $tm_i$ | Tariff rate in sector *i* |
| $tt_i^0$ | Share of marketing margin expenditure flowing to sector *i* |
| $w_i$ | Weights for price index |
| $wd_{i,lc}$ | Base year wage proportionality factor in sector *i* for labor category *lc* |

**Exogenous variables**

| | |
|---|---|
| $GTT$ | Transfers from govt to firms and households |
| $LS^0_{lc}$ | Labor force in base year in labor category $lc$ |
| $mps^0_h$ | Marginal propensity to save in base year for household group $h$ |
| $PWM_i$ | World market price of imports in sector $i$ |
| $PWE_i$ | World market price of exports in sector $i$ |
| $r^0_i$ | Base year sectoral rate of return in sector $i$ |
| $\bar{r}_0$ | Base year average rate of return |
| $\tau^0_i$ | Previous year's investment shares |
| $W^0_{lc}$ | Base year wage rate for labor category $lc$ |
| $YFW$ | Net factor payments to rest of the world (in dollars) |

**Endogenous variables**

| | |
|---|---|
| $CD_{ih}$ | Private consumption demand by household group $h$ for sector $i$ |
| $DEP_{ag}$ | Depreciation of agricultural sectors |
| $DEP_{nag}$ | Depreciation of non-agricultural sectors |
| $D^{int}_i$ | Intermediate demand for sector $i$ |
| $DK_i$ | Investment in sector $i$ |
| $DKTOT$ | Total investment |
| $\Delta S_i$ | Inventory investment demand for sector $i$ |
| $DST$ | Total inventory investment |
| $E_i$ | Exports by sector $i$ |
| $ER$ | Exchange rate |
| $FSAV$ | Foreign savings |
| $FTAX$ | Direct tax on firms |
| $FGT$ | Firms to government transfer |
| $FT$ | Firms' transfers to households |
| $GFT$ | Government to firms transfer |
| $GT$ | Government transfers to households |
| $GD_i$ | Government consumption demand for sector $i$ |
| $GDTOT$ | Total government consumption |
| $GR$ | Government revenue |
| $ID_i$ | Final demand for productive investment from sector $i$ |
| $INVT$ | Total investment |
| $\bar{K}$ | Aggregate capital stock |
| $K_i$ | Capital stock in sector $i$ |
| $\kappa_i$ | Capacity utilization factor (for oil sector only) |
| $L_{i,lc}$ | Employment by sector and labor category |
| $LA_i$ | Labor aggregate in sector $i$ |
| $LS_{lc}$ | Labor supply by labor category $lc$ |
| $M_i$ | Imports in sector $i$ |
| $MM_i$ | Marketing margins in sector $i$ |
| $mps_h$ | Marginal propensity to save by household group $h$ |
| $P_i$ | Price of composite good in sector $i$ |
| $PD_i$ | Domestic consumption good price in sector $i$ |

| | |
|---|---|
| $PE_i$ | Domestic price of exports in sector *i* |
| $\bar{P}$ | Aggregate price index |
| $PK_i$ | Price of capital in sector *i* |
| $PM_i$ | Domestic price of imports in sector *i* |
| $PT$ | Price of trade margins |
| $PVA_i$ | Value added price in sector *i* |
| $PX_i$ | Domestic supply price in sector *i* |
| $r_i$ | Rate of return on capital in sector *i* |
| $\bar{r}$ | Average rate of return to capital |
| $S_h$ | Household savings |
| $S_f$ | Firms' savings |
| $S_g$ | Government savings |
| $S_T$ | Total savings |
| $s_b$ | Subsidy to public sector financed by export tax |
| $\tau_i$ | Desired share of investment in sector *i* |
| $\tau_i^1$ | Actual share of investment in sector *i* |
| $TW$ | Total wage bill |
| $TW_{lc}^{ag}$ | Total wages in agriculture by labor category |
| $TW_{lc}^{nag}$ | Total wage in nonagriculture by labor category |
| $W_{lc}$ | Average wage rate by labor category |
| $X_i$ | Composite goods supply in sector *i* |
| $XD_i$ | Production in sector *i* |
| $XXD_i$ | Domestic sales by sector *i* |
| $Y_h$ | Household income for household group *h* |
| $YF$ | Firms' income |
| $YH_{h,lc}$ | Labor income by household and labor category |
| $YK_{ag}$ | Non-food agricultural sector profits |
| $YK_{agf}$ | Food agricultural sector profits |

**Sets**

| | |
|---|---|
| $I_M$ | Sectors with imports (all except public administration) |
| $I_{M2}$ | Oil sector (imports and domestic sales are perfect substitutes) |
| $\bar{I}_M$ | Sectors with no imports (public administration) |
| $I_E$ | Sectors with exports (all except public administration) |
| $\bar{I}_E$ | Sectors with no exports |
| $I_b$ | Sectors subsidized by tax on agriculture (public administration, public services) |

**Sectors**

| | |
|---|---|
| Traditional food crops | Traditional export crops |
| Forestry | Agriculture, modern sector |
| Food industries, private sector | Food industries, public sector |
| Manufacturing, private sector | Manufacturing, public sector |

| | |
|---|---|
| Construction | Services private sector |
| Services public sector | Public administration |
| Petroleum | |

**Labor Categories**

| | |
|---|---|
| Agriculture and informal, unskilled | Formal sector, unskilled |
| Skilled | Highly skilled |

**Household Groups**

| | |
|---|---|
| Farm north poor | Farm south poor |
| Farm north and south rich | Non-farm poor |
| Non-farm rich | Urban poor |
| Urban rich | |

**Appendix Table 1** — The Cameroon Model: Output, Exports, Imports, and Trade Parameters (1984/85)

| | Production | Imports | Exports | Elasticity of Substitution | |
|---|---|---|---|---|---|
| | | | | Imports | Exports |
| | (billion CFA Francs) | | | | |
| Food Agriculture | 588.33 | 14.93 | 6.09 | 1.20 | 1.50 |
| Export Agriculture | 425.06 | 14.53 | 169.19 | 0.80 | 1.20 |
| Forestry | 167.05 | 0 | 31.52 | 0.40 | 1.20 |
| Estate Sector | 32.88 | 1.12 | 13.09 | 0.80 | 1.20 |
| Food Proc., pvt. | 288.54 | 24.65 | 17.82 | 0.90 | 0.90 |
| Food Proc., pub. | 34.15 | 3.05 | 2.21 | 0.90 | 0.90 |
| Manufacture, pvt. | 891.56 | 598.35 | 95.65 | 1.10 | 0.70 |
| Manufacture, pub. | 162.22 | 31.79 | 8.97 | 1.10 | 0.70 |
| Construction | 503.83 | 0 | 0 | 0.40 | 0.40 |
| Services, pvt. | 2009.35 | 21.92 | 71.41 | 0.40 | 0.50 |
| Services, pub. | 244.09 | 3.97 | 12.93 | 0.40 | 0.40 |
| Public Admin. | 372.68 | 0 | 0 | 0.40 | 0.40 |
| Oil | 915.70 | 13.60 | 721.43 | 3.00 | 2.00 |

**Appendix Table 2 — The Cameroon Model: Household Budget Shares (1984/85)**

| | North Farm Poor | South Farm Poor | Farm rich | Non-farm rural poor | Non-farm rural rich | Urban poor | Urban Rich |
|---|---|---|---|---|---|---|---|
| | | | | (percent) | | | |
| Food Agiculture | 37.83 | 27.53 | 23.02 | 21.66 | 15.24 | 13.38 | 12.07 |
| Export Agriculture | 1.43 | 8.01 | 4.59 | 6.55 | 4.07 | 3.25 | 2.33 |
| Forestry | 0.62 | 0.78 | 1.69 | 5.58 | 4.05 | 13.28 | 7.35 |
| Estate sector | 0.11 | 0.62 | 0.36 | 0.51 | 0.32 | 0.25 | 0.18 |
| Food Proc., pvt. | 9.05 | 13.00 | 8.93 | 14.46 | 11.32 | 11.29 | 11.85 |
| Food Proc., pub. | 1.07 | 1.53 | 1.05 | 1.70 | 1.33 | 1.33 | 1.40 |
| Manufacture, pvt. | 27.84 | 18.70 | 29.66 | 19.58 | 32.40 | 19.57 | 27.40 |
| Manufacture, pub. | 3.10 | 2.08 | 3.30 | 2.18 | 3.60 | 2.18 | 3.05 |
| Construction | 0.78 | 0.34 | 0.47 | 0.32 | 0.36 | 0.86 | 0.62 |
| Services, pvt. | 12.28 | 21.28 | 19.56 | 21.22 | 19.56 | 27.34 | 25.69 |
| Services, pub. | 2.05 | 3.55 | 3.26 | 3.54 | 3.26 | 4.56 | 4.29 |
| Oil | 3.85 | 2.59 | 4.10 | 2.71 | 4.48 | 2.71 | 3.79 |
| Total Consumption (billion CFAF) | 175.64 | 319.29 | 983.65 | 136.77 | 643.95 | 22.48 | 595.30 |