I. Introduction

Like most developing countries, Cameroon and Gabon put in place during the early years of their independence (early 1960s) a strategy of global economic development characterized essentially by protectionism. This economic policy was to be achieved by adequate trade policies, including important tariff barriers and quota restrictions on imports, reinforced by the subvention of local production and price controls. One of the first results of this strategy was the development of a relatively large industrial sector, which unfortunately satisfied mainly domestic demand.

Faced with the brutal fall in the macroeconomic and sectoral performances of their national economies in the early 1980s, the governments of Cameroon and Gabon adopted in the late 1980s a new strategy of global economic development in the framework of structural adjustment programs (SAPs). Economic liberalization comprising trade liberalization is the watchword of these programs, which intend to revamp the whole national economy through efficient resource allocation.

Despite the liberalization option of international trade regimes and the disengagement of states from production activities in accordance with the first SAPs in these countries, it was not until the beginning of 1994 that a substantial reform in trade policy within the regional fiscal reform program (RFRP) in the Central African Customs and Economic Union (UDEAC) was noticed.

Considering, on the one hand, that the budgets of developing countries depend largely on fiscal revenue and, on the other hand, that these budgets are important in the stimulation of the productive systems of these countries, one can rightly pose the following questions:

- Will this reform guarantee a reasonable level of fiscal revenue ?

- Can reform induce supply/demand effects in conformity with the macroeconomic objectives of member states ?

The answers to the questions suggest the need for an analysis of the macroeconomic and sectoral repercussions of the reform in Cameroon and Gabon as well as the coordination of economic policy within the UDEAC.[1] This analysis is all the more necessary as existing literature has not clearly established the global macroeconomic and sectoral impact of trade liberalization measures.[2]

The complexity of reallocations that follow such an intensive reform recommend an analysis of its repercussions within the micro, meso and macroeconomic contexts. The computable general equilibrium (CGE) model is the most appropriate for this purpose.

The objective of this research is thus to construct two independent and identical CGE models for a comparative analysis of the repercussions of the trade liberalization processes proposed through the UDEAC RFRP on (1) fiscal revenue and (2) the macroeconomic and sectoral performances of Cameroon and Gabon.

The rest of the text deals with the following six main points:

- The presentation of the conceptual framework of the study
- The description of Cameroon and Gabon's economic structures
- The construction of the social accounting matrixes of the two countries
- The description of the CGE model
- The analysis of the simulation results
- The conclusion and policy recommendations

II. Conceptual framework

A good analysis of the effects of trade liberalization must be preceded by a good definition of this notion. To this end, Krueger (1986) proposed a minimum number of trade liberalization criteria. She considers the process as the substitution of quota restrictions with instruments of economic policy directly affecting prices. Under these conditions, the replacement of quota restrictions by tariff is a trade liberalization measure. Jebuni et al. (1994) consider this definition as a second best liberalization.

Trade liberalization is also often considered as a step toward a neutrality of relative prices. In this case, the subvention of exports equal in proportion to custom revenue on imports is considered as trade liberalization (Reinikka, 1994). The wider definition, which is seen as a step toward free trade, requires both the elimination of quota restrictions and the reduction of tariffs on imports as well as exports.

In practice, "liberalization" could refer to import liberation and/or a movement toward neutrality in the structure of relative prices and/or the substitution of less distorting for more distorting forms of intervention. (Collier et al., 1997: 309)

The determination of a trade liberalization episode is thus subsequent to the definition adopted.

Papageorgiou et al. (1991) believe that trade liberalization should begin when a change in trade policy tending towards greater liberalization is instituted. Accordingly, the episode ends when the trend is reversed or when a new and more liberal trade policy is adopted. In developing this general concept, Ajakaiye and Soyibo (1995) added that the beginning of a trade liberalization episode coincides with the reduction or elimination of quota restrictions on trade and/or the reduction of custom duties on imports and/or exports.

This synthetic approach has itself been inspired by the concept of trade policy reform of Thomas and Nash (1991). It incorporates implicitly the descriptive and quantitative approaches based on the analysis of the evolution of trade policy determinants as well as the calculation and comparison of trade liberalization indexes.[3] The debate on the effects of this liberalization is still ongoing (Collier et al., 1997).

Theoretically, trade liberalization helps to eliminate distortions between international and local prices to create a favorable environment for better economic performance (World Bank, 1990). It therefore definitely influences gross domestic product (GDP) growth, trade balance (BC) and budgetary equilibrium through its impact on fiscal revenue. However, it is generally believed that the evolution of trade balance after trade liberalization depends on the relative reaction of import and export sectors to the variation in relative prices.

In this connection, Jebuni et al. (1994) claim that if the liberalization process is engaged when the trade balance is at a deficit it is almost certain that this deficit will worsen in the

short term because of the delay in the adjustment of supply in the export sector. If the process is durable and is accompanied by incentive export measures, it can result in a noticeable improvement in trade balance in the medium and long terms. This is made possible through an increase in exports due to the reallocation of resources from the non-export to the export sectors (Balassa, 1982).

On the other hand, Rodrik (1990) and Greenaway and Milner (1993) assert that budgetary implication is a determining factor in trade liberalization efforts of developing countries. Indeed, fiscal revenues, particularly those originating from customs duties, play an important role in the budgets of these countries, and Cameroon and Gabon are not excluded from this reality. The important role of fiscal revenue in these budgets implies a direct relationship between fiscal revenue and budgetary imbalance as well as an implicit connection between this imbalance and trade policy through its tariff aspect. In this context, for any trade reform to be credible its effects on the budget should be compatible with the macroeconomic objectives of the country. These effects are not obvious at first.

Theoretically, the effects of trade liberalization on a state's budget depend on its direct impact on custom revenue as well as the economy's reaction to variations in relative prices. Though these effects can be positive or negative,[4] Tanzi (1989) asserts that generally a reduction in quota restrictions accompanied by a devaluation should increase fiscal revenue and possibly improve budgetary balance. If the second measure (devaluation) was unavoidable in the two countries under study, the first (fiscal reform) prescribed within the framework of the UDEAC RFRP is not uniformly applied in the two countries. Cameroon fully applied it in January 1994, but Gabon still has to do so.

Misunderstanding about the effects of such a reform is certainly at the root of Gabon's hesitations. For this reason, it is necessary to carry out an empirical analysis of the impact of this fiscal reform on the Gabonese economy as well as the welfare of its population. The analysis is also worthwhile for Cameroon, which has already implemented the reform, since it will make it possible for us to compare the effects of the reform on the two economies for the purpose of economic policy coordination analysis within UDEAC. Such an analysis would only be pertinent if one is familiar with the macroeconomic structures of these countries.

III. Cameroon and Gabon's trade policies and economic structures

The brief description of the macroeconomic structure of Cameroon and Gabon presented here has to do with the evolution of their trade policies and economic performances. Special attention is given to the analysis of some of their macroeconomic performance indicators throughout their trade liberalization episodes.

Evolution of trade policies

The protectionism of Cameroon and Gabon's trade policies during the two decades following independence was manifested by important tariff barriers and quantitative restrictions (QRs) officially reinforced in Cameroon in 1972 by the adoption of the general trade program (GTP) and in Gabon in 1983 by the implementation of the law on the regulation of external trade. These laws instituted QRs and prescribed import and export authorizations and export price adjustments, as well as a twinning of local and import products and price controls.[5]

This protectionism is also reflected in the fiscal structure of the two countries. It comprises about 20 different taxes applicable selectively to import and export products at rates sometimes reaching 150% of the cost, insurance and freight (CIF) value (See table 1.).

Following the liberal option ushered in by the implementation of SAPs in Gabon (1986) and Cameroon (1988), a slight reduction in the protectionism tendencies could be observed. The QRs as well as price controls were gradually abandoned. QRs were lifted from a first wave of 105 products in Cameroon in 1989/90 and from the last 22 in 1990 (MINDIC, 1989). With decree No. 772/PR/MCIRS/MFBP of 1994, suppressing all import and export authorizations, these restrictions were finally and officially lifted in Gabon.

It was only in 1994 that a substantial reform of tariffs and indirect taxes was proposed within the framework of the UDEAC RFRP. This reform, which implies the reduction, not only of the tariff and indirect tax instruments, but also of the scope of fiscal exemptions and custom duty and tax rates, aims to (1) simplify the fiscal system to allow for easy and transparent administration, (2) increase fiscal yield through improved revenue collection and (3) improve the efficiency and competitiveness of enterprises within UDEAC through a wider tax base and reduced and uniform tax rates.

With the reform, internal indirect taxes are replaced by the turnover tax (TCA), and the import taxes are aggregated in two tariff positions : (1) the common external tariff (TEC) comprising customs duty (DD), excise tax (DA) and a progressive surtax (SP),

Table 1 : Elements of tariff structures of Cameroon and Gabon before January 1994

Tax/tariff	Cameroon	Gabon	Field	Base	Rate range[1]	
					Cameroon	Gabon
• Customs duty	X[2]	X	Import	Ad valorem	5 to 30%	5 to 30%
• Entry tax	X	X	Import	Ad valorem	15 to 70%	15 to 70%
• Turnover tax	X	X	Import	Ad valorem	10%	10%
• Complementary tax	X	X	Import	Ad valorem	0 to 90%	0 to 90%
• Unique tax	X	X	UDEAC imports	Ad valorem	10%	10%
• Exit tax	X	X	Export	Ad valorem	0 to 40%	0 to 40%
• Unloading tax	X		Import	Specific	595 to 6,200 CFAF/ton	
• Warehouse tax	X		Import	Specific	na[3]	na
• Alcohol tax		X	Import	Ad valorem		0 to 150%
• Petrol tax	x		Import	Specific	na	na
• Animal circulation tax	X	X	Import/Export	Specific	100[2]CFAF/100kgs	100 CFA francs/100kgs
• Sanitary and veterinary tax	x		Import/Export	Ad valorem	1 to 3%	
• Council tax	X		Import/Export	Specific	na	
• Solidarity tax		X	Export	Specific		na
• Tree felling tax		X	Export	Specific		na
• Reforestation tax		X	Export	Specific		na
• Packaging tax	X	X	Export	Specific	na	na
• Public works tax		X	Export	Specific		na
• Additional tax	X		Import	Ad valorem	na	
• Computer dues	X		Import	Ad valorem	1,5%	

Note : [1] : According to products ; [2] : Applied ; [3] : Not available.
Source : Compiled by the author using data from “Tarif Douanier UDEAC” (1988) and “Code Général des Impôté” for Cameroon and Gabon.

(2) the turnover tax (TCA), which is an aggregate of the import CIF value to which the other taxes have been added.

The TEC comprises the former custom (DD) and entry (DE) duties. The TEC rates defined according to four categories of products I, II, III and IV are 5%, 10%, 20% and 30% of the CIF value, respectively. The turnover tax (TCA) replaces the former import turnover tax (TCAI) and the complementary tax (TC). The turnover tax (TCA) on local products sold locally replaces the former internal production tax (TIP), the unique local tax (TUL), the internal consumption tax (TIC), the transaction tax (TT), the internal turnover tax (ICAI) and the proportional stamp duty (DTP). It is applied at a zero rate to exempt products and at reduced and normal rates of 8% and 17%, respectively, for the others. As with the value added tax (VAT), the TCA is deductible.[6]

A proportional surcharge (SP) as well as an excise tax (DA), respectively 25% and 30% of the CIF value, can also be levied on a limited number of products imported and produced and sold locally to reduce the harmful effects of instituting the reform. The list of these products is established by the UDEAC management committee. The application of these taxes, however, is left to the discretion of each member states.

The export taxes remain unchanged and their application is left to the discretion of each of the UDEAC member states. The unique tax (TU) applied to all inter-regional exchange of products satisfying the rule of origin[7] is replaced by a generalized preferential tariff (TPG) that is a proportion of the custom duty (DD) of the TEC applicable on similar products that do not conform to this particular tax system.[8] The scope of tax exemptions arrived at simply by applying the TCA tax is reduced to the barest minimum. Import tax rates are considerably reduced and the base is widened. These fiscal liberalization measures are reinforced by the devaluation of the CFA franc.[9]

In the light of these developments we can distinguish two episodes of trade liberalization in Cameroon and one in Gabon. The first begins in Cameroon in 1989/90 with the abolition of QRs and ends in 1994 when the second began with the fiscal reform, the elimination of QRs and the devaluation of CFA franc. This second episode coincides with the Gabonese first episode which was characterized by the elimination of QRs and the devaluation of CFA franc.

The ongoing debate on the importance of the effects of trade liberalization on the economic performance of developing countries, makes an analysis of these effects necessary. Collier et al. (1997: 349) state that :

> There are three ways of dealing with this : CGE modeling, cross-section analysis or times-series analysis.

The CGE approach is used in our analysis.

Macroeconomic performance analysis

It should be noted that the liberalization process described above came as a result of the severe economic crisis of the mid 1980s, which hit Cameroon and Gabon after a long period of sustained growth that lasted for almost 25 years.

From the early 1960s, Cameroon and Gabon went through a period of economic growth as a result of global stability of the terms of trade and rapid expansion in agricultural and oil exports, respectively. In Cameroon, the oil boom of 1982 accelerated this growth.

However, behind this good global economic performance, there were great sectoral disparities. Long before the oil boom in Cameroon, agriculture was the main economic activity, providing more than one-third of the GDP and representing more than 90% of total exports (FAO, 1996). From 1982, the Dutch Disease was seen in the economy. There was a stagnation in the industrial and agricultural sectors and a boom in the oil and services sectors that until 1985 provided more than two-thirds of the GDP (See Table 2). From 1985, there was a slight recovery in the primary and secondary non-oil sectors, thereby permitting to barely escape this syndrome, as shown by Benjamin and Devarajan (1985).

Because of a high proportion of cash crops in Cameroon's agriculture, this country's economy as well as that of Gabon remains dependent on the foreign market and consequently is highly vulnerable to external shocks. The first of these shocks in the mid 1980s signaled the end of the boom period and the start of the economic crisis in these two countries.

In Cameroon, beginning in 1985/86, the economy faced several simultaneous negative external shocks. The world prices of its main exports (oil, coffee and cocoa) were falling, and the U.S. dollar (main exports payment currency) depreciated by almost 40% between 1985 and 1988. Between 1985 and 1987, the export price indexes for oil, cocoa, coffee and rubber (almost 80% of total exports during this period) fell, respectively, by 65%, 24%, 11% and 20%, resulting in a 47% deterioration in the global terms of exchange. This gave rise to a drastic deterioration of the balance of payments, which went from a surplus of 4.4% of the GDP in 1984/85 to a deficit of 8.8% in 1986/87 (Blandford et al., 1995). During this period the GDP fell by 4.5%. For the first time, the government was faced with a budget deficit amounting to 6.0 billion CFA francs in 1988/89.

Gabon's economy has been in decline since 1986 as a result of the fall in the price of oil (almost 50%), which constitutes the country's main resource (85% of exports in 1984), as well as the fall in the exchange rate of the U.S dollar, which is the main currency in the payment of exports. Between 1985 and 1987, the Gabonese government's oil revenue, which is the main source of the government's revenue, fell by more than 80%. This reduction also brought about a decline in public investment. The labour sector was severely affected. Between 1985 and 1992, there was a 25% reduction in employment in the public sector and about 50% in the modern private sector (World Tables on diskette, 1996). On the other hand, the Dutch Disease was exacerbated.[10]

In this context of economic doldrums, the trade liberalization process that was implemented can be considered as an attempt to revamp the economy. It is therefore important to evaluate the consequences of the measures already implemented on the economic performances of the two countries. To achieve this, we make use of some of the indicators listed by Collier et al. (1997) (see Table 2.).

From the date given in this table, it can be said that in Cameroon there was a slowdown of the reduction in production activity (real GDP) during the first episode and a growth recovery in the second (3.2% increase of the real GDP). Contrary to the government

objective of making the industrial sector the mainspring of economic development, it was the agricultural (primary) sector that was responsible for the positive results observed. Thanks to sustained agricultural and oil exports, the trade balance showed a clear improvement during this episode, and remained positive at around 7% of the GDP. The stagnating fiscal revenue has still not lived up to expectations. The growth in trade balance surplus has, however, not prevented the continued deterioration of the balance of payments. This is mostly due to a sharp increase in capital transfers. Debt servicing, which constitutes its main component, absorbed more than two-thirds of export revenue by the end of the first episode.

In Gabon, despite the late implementation of trade liberalization measures and despite the persistent signs of economic crisis (budget imbalance, balance of payments deficit, increase in external debt and reduction in final consumption), some indicators show a relative economic recovery. The real GDP showed a 3% average annual growth rate between 1990 and 1994. The trade balance surplus showed a clear improvement. This surplus almost tripled with the 1994 trade liberalization process. There was also a global improvement in fiscal revenue, which, however, still did not reach the pre-crisis level (see Table 2.)

The results observed in Cameroon and Gabon appear to conform with the short-term theoretical effects expected from trade liberalization in the context of highly import-dependent economies.

Since other factors affect the macroeconomic aggregates used in our analysis, these results, obtained from a partial equilibrium analysis, cannot be entirely attributed to trade liberalization alone (Shafaeddin, 1994; Collier et al., 1997).[11] Moreover, it is early to ascribe the macro-economic performance of 1994 to the regional fiscal reform so soon after it has been implemented in Cameroon. Indeed, the program had not been introduced in Gabon. As the evaluation of the impacts of this reform is our main concern, the above limitations suggest recourse to the CGE modeling approach, which is capable of providing an evaluation of implemented trade liberalization measures as well as that of alternative ones.

Table 2 : Evolution of some macroeconomic performance indicators for Cameroon and Gabon between 1985 and 1994

	Cameroon							Gabon							
	84/85[1]	88/89	89/90	90/91	91/92	92/93	93/94	94/95	1985	1989	1990	1991	1992	1993	1994
	(in %)								(in %)						
• Real GDP growth[2]	8.86	-5.44	-6.14	-3.76	-3.05	-3.16	-3.27	3.24	-7.08	-12.45	5.18	6.12	-3.25	3.96	3.68
• Sectoral composition of GDP															
- Primary	21.57	26.78	28.24	28.24	31.11	32.66	34.74	34.89	10.47	12.80	11.85	9.67	10.21	10.03	9.94
- Non-oil secondary	18.77	19.73	19.91	20.09	19.11	19.67	18.92	18.99	23.31	15.87	13.84	11.03	13.26	13.28	12.73
- Oil	17.18	14.32	13.74	12.34	11.59	9.77	8.79	8.16	14.72	25.02	32.11	33.27	33.72	35.02	38.16
- Tertiary	42.48	39.17	38.11	39.33	38.19	37.90	37.55	37.96	51.50	53.69	42.20	43.03	42.81	41.67	39.17
• Trade balance/GDP	14.9	6.0	5.2	7.3	8.4	5.9	11.3	7.8	8.1	5.3	17.4	12.1	12.3	13.5	26.0
• Balance of payments/GDP	0.5	-4.5	-5.6	-8.3	-8.7	-9.2	-6.5	-4.4	-1.2	-9.0	-4.6	-3.8	-16.3	-11.1	-3.8
• Ext.debt ser./export earnings[3]	5.8	28.4	36.6	48.0	60.8	66.7	72.8	na[4]	11.5	2.3	1.8	10.7	14.1	1.7	9.0
• Composition of export earnings															
- Agriculture	45.2	31.6	23.9	19.3	22.3	31.4	32.1	27.7	10.2	16.6	12.9	13.8	14.4	14.4	17.2
- Non-oil industries	18.1	30.8	29.5	25.7	27.1	18.8	25.9	34.5	10.3	16.2	10.3	9.6	9.2	9.2	9.1
- Oil	36.7	37.6	46.6	55.0	50.6	49.8	42.0	37.8	79.5	67.2	76.1	76.6	76.4	76.4	73.7
	(in billions of current CFA francs)								(in billions of current CFA francs)						
• Total exports earnings	557.7	536.8	553.6	545.1	518.2	418.7	603.6	811.0	897.9	564.1	712.5	669.7	649.2	691.0	1,356.9
• Total imports	482.3	402.2	425.8	381.2	311.1	291.3	312.3	464.7	49.6	492.7	454.8	485.0	467.2	484.3	751.8
• Trade balance	95.4	134.6	127.8	163.9	207.1	127.4	291.3	346.3	148.3	71.3	257.7	184.7	182.0	206.7	605.1
• Balance of payments	20.0	-146.0	-172.0	-252.0	-240.0	-239.0	-172.0	-175.6	-22.1	-120.5	-67.8	-57.7	-241.0	-169.8	-89.3
• Final public consumption	345.3	378.4	427.5	443.4	409.4	372.2	340.3	343.5	289.0	233.1	228.7	238.5	241.9	236.9	297.8
• Total investment	955.3	600.6	597.2	556.5	429.8	522.4	570.1	729.9	757.8	424.9	347.0	393.1	324.8	340.5	297.9
• Fiscal revenue	542.6	339.5	313.2	285.6	390.7	312.8	302.8	389.6	601.5	241.3	298.8	354.1	358.7	330.2	540.9
• External public debt	742.3	1128.5	1237.3	1437.2	165.5	1806.5	3186.7	na	373.9	780.1	800.3	839.7	820.4	835.4	1907.4
• Budget deficit or surplus	2.7	-6.0	-21.3	-32.0	-24.4	-15.7	-42.6	10.8	-103.6	-92.6	-17.4	19.1	-44.9	-86.8	-59.6

Notes : 1. Period between 1st June of the first year and 31 May of the second year ; 2. Base 100 = 1984/85 for Cameroon and 1989 for Gabon ; 3. Ratio of the external debt service to total export earnings ; 4. Not available.

Sources : Complied by the author using data from the World Tables (1992), "Comptes Nationaux du Cameroun" (1996); "Caisse Francaise de Développement" (CFD); "Le Cameroun en Chiffres : 1997" and "Tendances de l'Economie" du Gabon (1997).

IV. Construction of the social accounting matrixes (SAM)

The CGE model is a mathematical representation of the functioning of an economy numerically described in a SAM. The construction of this SAM, in keeping with the author's stated problem, is therefore a prerequisite to any CGE modeling process. Since we are concerned with a comparative analysis of the trade liberalization impacts on Cameroon and Gabon's economic performances, two appropriate SAMs are constructed. The complete list of accounts of each SAM showing the numbering and abbreviations adopted is given in Appendix A. Appendix B contains the completed SAMs, for the two countries.

Each SAM comprises a total of 42 accounts divided as follows: 2 factor production accounts (labour and capital); 5 agent accounts; 3 production sector accounts; 29 product accounts (with 5 locals and 13 imported with 7 imported from UDEAC countries and 6 imported from the rest of the world); 3 composite products and 8 exported (with 4 exported to the other UDEAC member states and 4 exported to the rest of the world). An accumulation account registers the different savings and investments of the economies and 2 passage accounts allow us to register fiscal revenues in line. The total receipt of these accounts is reversed in column to the government account.

In the agent accounts, local agents (households,[12] government and firms) are distinguished from external agents (the rest of UDEAC member states (UDEAC) and the rest of the world (ROW). In the production block, the non-tradable services (BRNM) sector is separated from the agricultural (AGR) and industrial (IND) sectors.

In the non-tradable services sector the hypothesis of homogenous production is retained. This is not the case with the agricultural and industrial sectors. The first provides (1) subsistence agricultural products (PAGS), generally considered as raw agricultural products, that are tax exempt on the UDEAC market, and (2) perennial agricultural products (PAGP), which at present are a major focus for increasing Cameroon's fiscal revenue. The industrial sector, on its part, produces goods at reduced (PITR) and normal (PITN) TCA rates.

Industrial imports are differentiated according to their tariff systems. Thus, in addition to those subject to the reduced (PITR) and normal (PITN) TCA rates, we can distinguish between those likely to be subject to excise and surcharge taxes (PITD) and those exempt from TCA (PITE).[13] Imports subject to the unique tax (PITU) are also distinguished to take into account the specificity of the UDEAC market.[14]

A distinction of product origin and destination (local, imported or exported) is made, as well as a distinction of zone of origin or destination (UDEAC and ROW). Insofar as consumer demand is an Armington (1969) aggregate, a composite product (local and imported) is determined.

To fill the matrix described above, it is necessary to compile existing consolidated and coherent statistical data for each country. The following main sources of statistical data have been used: (1) the generic SAM of Njinkeu et al. (1997),[15] (2) the input-output table, (3) the balance of payments, (4) the structure of import duties, (5) the detail of government fiscal revenue and (6) the structure of export taxes registered by the customs services of Gabon in 1994, (7) the list of Cameroon's and Gabon's total imports and exports, (8) the list of products exchanged between these countries and other UDEAC member states, (9) the list of products of basic necessity and equipment goods exempt from TCA, (10) the list of products subject to a reduced TCA rate, and (11) the list of products likely to be subject to temporary surcharge and excise tax.

The last three lists have been taken from the UDEAC regional reform program. Details of products exchanged between our two countries and other UDEAC member states are obtained from the customs statistics department. Those details permitted us to regroup UDEAC imports and exports into PAGS, PAGP, PITR, PITN, PITE, PITU and PITD products. (Refer to Appendix A for these and other account abbreviations.) This procedure is facilitated by the identity of the customs nomenclature of UDEAC products.

Since there is no specific tariff policy for the exportation of industrial products as is the case with perennial agricultural products (specific taxes on cocoa, coffee, cotton, timber and banana in Cameroon), industrial products for export are simply separated according to the type of TCA rate governing them on the local market. The distinction of subsistence and perennial agricultural exports from the whole of agricultural exports has followed the principle of aggregation used in the production block. The SAMs resulting from these calculations are presented in tables B.1 (Cameroon) and B.2 (Gabon) of Appendix B. A CGE model, incorporating all the distinctive features of these two SAMs, is then constructed.

V. Model specification

Our model is particularly inspired by experiments developed by Martin et al. (1993) on the CGE model in developing countries. We incorporate into this available methodological framework the developments done by Harris (1985), Rutherford et al. (1994), Bamou (1996), and Njinkeu and Bamou (1996). Five main hypotheses are implicit in these models :

- There exists a competition market where price, quantity of goods and services, and factors are adjusted to determine supply and aggregate demand at equilibrium.

- The sectoral supply of capital is fixed. Consequently, one can have different sectoral remuneration rates of capital in the economy. Technological parameters characterize the heterogeneity of the sectors.

- The hypothesis of a "small country being a price-taker on the international scene" is admissible on the external markets. The share of Cameroon's and Gabon's markets in international trade is too small to have any influence on international prices.

- The hypothesis of underemployment of labour is admissible to take into consideration the phenomenon of unemployment raging nowadays in Cameroon and Gabon.

- The heterogeneity of agricultural and industrial production is admissible.

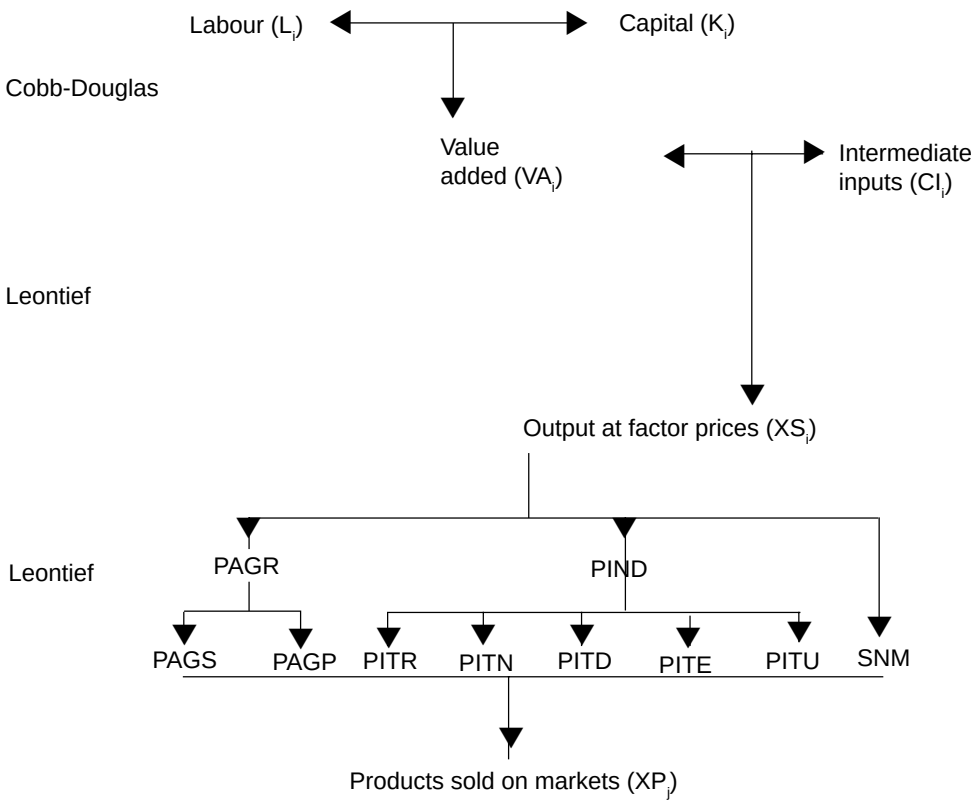
The specificity of our model resides in the treatment of the fiscal system as a consequence of amendments introduced by the 1994 fiscal reform. The treatment of the external markets and the specification of the production system also constitute the originalities of our model. The following sections present the global structure and specific features of the model.

The main structure of the model

Our CGE model is made up of five main blocks (production, income/savings, demand, price and equilibrium). This section will deal mainly with the functioning of the first three blocks.

As presented in figure 1, in the production block, the sectors produce by combining primary factors (labour and capital) and intermediate inputs (CI) in a two-level procedure. Products sold on markets are then distinguished from sectoral production.

Figure 1: Production structure of the model



In the demand block, the distinguishing feature of the UDEAC market as a second external market for local economic operators gives rise to a special modeling of demand of domestically produced and composite products. A two-level constant elasticity transformation (CET) function, following the Njinkeu and Bamou (1996) approach, permits us to distinguish the products produced and sold locally (DC) from those exported to the UDEAC zone (EXUC) and the rest of the world (EXRC).

In like manner, a two-level constant elasticity substitution (CES) function made it possible for us to obtain the Armington demand for composite products (Q). Figures 2 and 3 describe these processes.

In the income/savings block, households receive the larger part of salaries while a small part is paid to the UDEAC countries as salaries for border workers. The capital revenue is distributed among local agents (households, companies and government) who are owners of the capital invested in the production activities. The agents save after paying taxes, consuming and making transfers. The sum of savings is used to finance global investment. The complete specifications of the model are given in Appendix C. Appendix D gives the complete list of the parameters and the endogenous and exogenous variables of the model.

Figure 2: Demand structure of domestically produced products

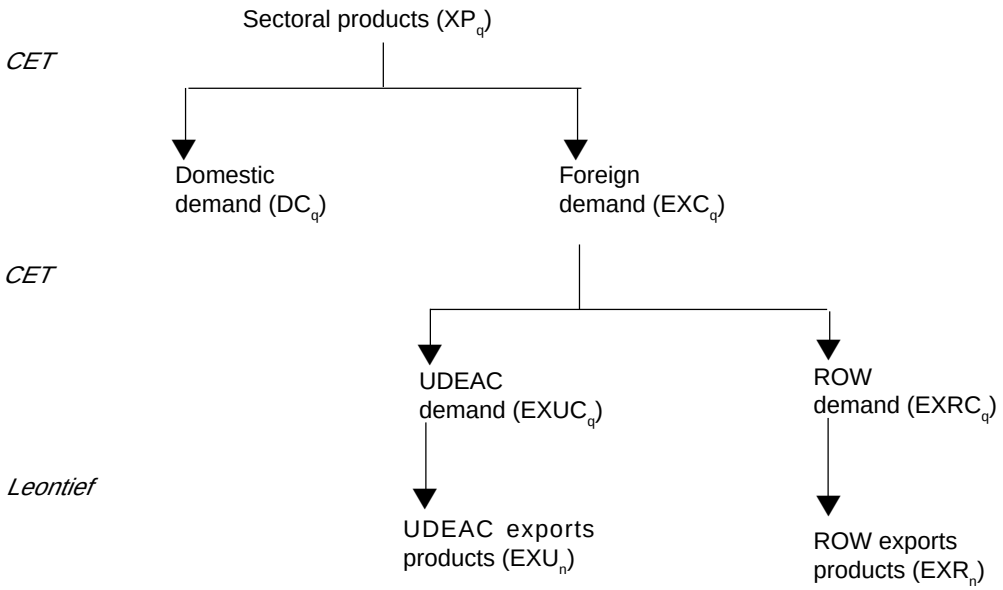
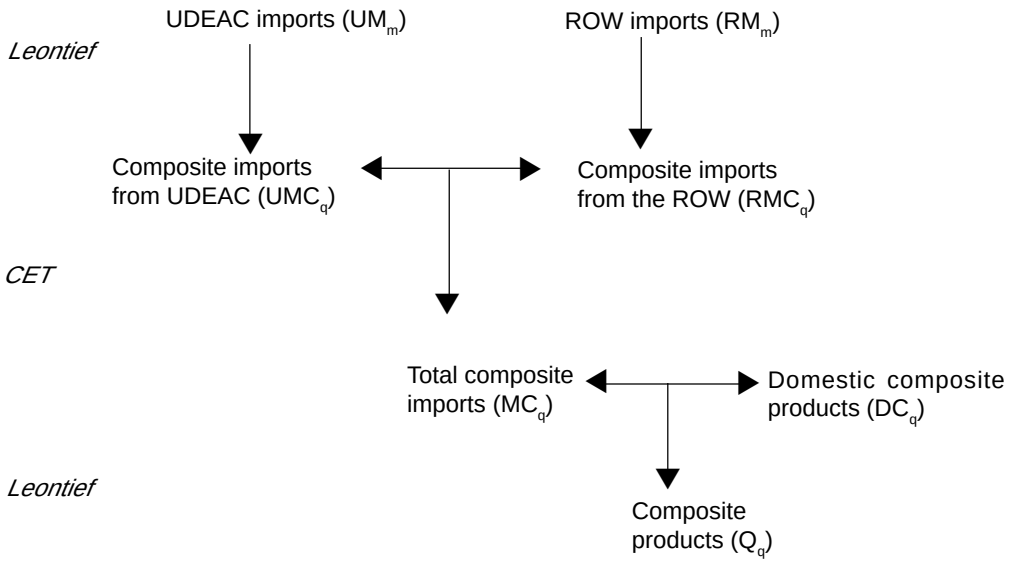


Figure 3: Demand structure of composite products



Specific features of the model

In the preceding CEG models constructed for UDEAC countries, the revenue from indirect taxes and custom duties is generally considered to be endogenous. The tariff rates are then exogenous and governments can manage their levels to attain their fiscal objectives. The implicit hypothesis is therefore made that government has the latitude to determine the levels of each of the multiple tax rates at its disposition. As a result of the 1994 fiscal reform, governments have only TCA rate (tca), the custom duty rate (tdd), the temporary surcharge rate (tsp), the excise tax rate (tda) and the preferential generalized tariff rate (tpg). The indirect and customs duty rates then become a composite of rates expressed as follows :

$$td_j = tda_j + tsp_j + (1 + tda_j + tsp_j).tca_j \quad (1)$$

$$tm_m = tdd_m + tda_m + tsp_m + (1 + tdd_m + tda_m + tsp_m).tca_m \quad (2)$$

$$tu_u = a.tdd_u = tpg_u \quad (3)$$

with,

td_j	=	indirect tax rate on local products ;
tca_j	=	TCA rate on local products ;
tca_m	=	TCA rate on imported products ;
tm_m	=	former custom duty rates on imports ;
tdd_m	=	custom duty rates on imports ;
tda_m	=	excise tax rate on imports ;
tsp_m	=	temporary surcharge on imports ;
tu_u	=	unique tax rate ;
tpg_u	=	preferential generalized tariff rate.

The preferential generalized tariff (TPG) rate is a regressive tax. Its rate is a percentage of the customs duty rate (tdd) of the TEC applicable to similar products imported from other countries.

This new formulation of the tariffs and indirect tax system significantly affects the prices of products sold within the UDEAC zone (see these implications in the price block of Appendix C.) In order to take into account the deduction of the turnover tax on intermediary consumption, an exempt TCA price of composite products (PCHT) has been considered to valorize intermediary consumption in the determination of the sectoral value added price (PVA). The value of this deducted turnover tax reduces government fiscal revenue, thereby reducing available resources. This can be formulated as follows:

$$PVA_i = \frac{P_i.XS_i - \sum_p PCHT_i.CIJ_{ip}}{VA_i} \quad (4)$$

$$PCHT_i = \frac{PDMHT_i.D_i + PMHT_i.M_i}{Q_i} \quad (5)$$

$$PDMHT_i = PD_i.(1 + tda_i + tpd_i) \quad (6)$$

$$PMHT_i = e.PWM_i.(1 + tdd_i + tda_i + tsp_i) \quad (7)$$

$$RTCACI_i = \sum_p CIJ_{ip}.(PC_i - PCHT_i \quad (8)$$

with,

CIJ_{ip}	=	sector's intermediate consumption ;
D_i	=	domestic sales ;
e	=	nominal exchange rate ;
M_i	=	total imports ;
P_i	=	sector's production cost ;
PC_i	=	price of composite product (all taxes included) ;
$PCHT_i$	=	exempt TCA price composite products ;
PD_i	=	domestic producer price ;
$PDMHT_i$	=	exempt TCA market price of local products ;
$PMHT_i$	=	exempt TCA market price of imports ;
PWM_i	=	international price of imports ;
Q_i	=	local demand of composite products ;
$RTCACI_i$	=	TCA revenue on intermediate consumption ;
VA_i	=	sector's value added ;
XS_i	=	sector's domestic output .

It is important to discuss the conditions of equilibrium of the model that refer to the macroeconomic closure conditions. These significantly affect the results obtained from simulations as shown by Decaluwé et al. (1988).

On the labour market, the practice of work contracts and guaranteed minimum wage would suggest that salaries are rigid in the short term. In practice, this rigidity is conveyed by a personnel reduction during periods of economic recession and massive recruitment in case of revival (example of the Cameroonian public service, the country's main employer). In this context, salary adjustment is used only in the medium or long term. This short-term rigidity of salaries is expressed in the model by an unemployment equilibrium where a variation in the labour demand is conveyed by a modification of the unemployment rate (tch). The total labour supply (LS) and the salary rates are thus fixed and the endogenous rate of unemployment plays the role of labour market equilibrium factor.[16]

$$(1 - tch).L^s = \sum_i L_i^D \quad (9)$$

with,

L^S = labour supply.

In the light of the fiscal objectives of governments and taking into account the new constraints introduced by the low flexibility of the new fiscal instruments (tca, tsp, tda and tpg), the new tax rates are, in the first instance, considered as parameters and fiscal revenue as endogenous variables. This allows us to simulate the ranges offered by the reform and to appreciate and compare the levels of fiscal revenue generated as well as their impact on the economic performance and welfare of the population of Cameroon and Gabon. In the second instance, fiscal revenue is considered to be exogenous and tariff rates are taken to be endogenous variables. This closure allows us to simulate alternative fiscal objectives for the two governments and to compare the tariff rates thus generated with those imposed by the reform. At this point, an analysis of coherence in the coordination of economic policies within the UDEAC zone is undertaken.

One of the major implications of the foreign market segmentation is its impact on the trade balance of each country, which becomes the sum of trade balances with the other UDEAC member states (BCU) and with the rest of the world (BCR). The governments of Cameroon and Gabon cannot borrow indefinitely to finance their development. To avoid the financing of investment through increased foreign indebtedness, we have chosen to set each country's global trade balance at its initial level. To this end, regional trade balances (with UDEAC and the ROW) adjust themselves to balance the foreign market. The general consumer price index is thus used as "numeraire". This approach is appropriate as welfare analysis is among our concerns.

With such a closure, the welfare depicted in our model is specific to the generation under analysis and not the one borrowed from the future generation through indebtedness. Public expenditure is exogenous and government savings are endogenous so as to allow for an adjustment in budget expenditure on government revenue as recommended by the restrictive policies prescribed in the SAPs in place in the two countries.

In order to be able to observe the effects of the reform on resource allocations, a welfare variation model is added to the CGE model.[17] It is inspired by the compensating variation (CV) and equivalent variation (EV) defined by Hicks (1956), associated with the development of purchasing power suggested by Hicks (1946) and Harberger (1971). The indirect utility function associated with the Cobb-Douglas demand function type deriving from the household consumption function in the CGE model is widely used in the specification of this welfare variation model.

The compensating variation uses the equilibrium level of consumer budget and product prices obtained by simulation and searches for the budget level at which the consumer can find initial utility. As for the equivalent variation (EV), it uses the initial equilibrium level of consumer budget and product prices to estimate the changes necessary for obtaining the utility associated with the equilibrium level of the simulation. These variations can de formulated as follows :[18]

$$CV = \frac{U - UO}{U}.YM \qquad (10)$$

$$EV = \frac{U - UO}{UO}.YMO \qquad (11)$$

with,

YM = household revenues obtained by simulation in the CGE model ;
UO = utility of the initial consumption ;
U = utility of the consumption obtained by simulation.

Any positive sign in the two measures corresponds to an improvement in welfare and a negative sign indicates a deterioration in welfare. Since in the conceptual plane these indicators measure two different things, we have used a third indicator to reconcile them. This indicator (H*) is derived from the index of change in the purchasing power suggested by Hicks (1946) and Harberger (1971).

$$H^* = \tfrac{1}{2}(q^1 + q^2).(p^1 + p^0) = -\tfrac{1}{2}(p^1 + p^0).(q^1 - q^0) \qquad (12)$$

In this formulation, q and p are, respectively, quantity and price vectors. The first part of the measure has been suggested by Hicks and the second by Harberger. The interest of this index is that it shows without ambiguity an improvement or a deterioration of the purchasing power when the consumer with a constant budget faces price changes.

Given the fact that any amelioration or deterioration of welfare is shown by a positive or a negative sign for both CV and EV, their sum can only have the same sign and thus indicates the same variation direction as each of them taken individually. The purchasing power index can therefore be assimilated to the CV and EV average (Deaton and Muellbauer, 1988). This average, which has the advantage of giving the general direction of welfare change, can be specified as follows :

$$H^* = \tfrac{1}{2}(CV + EV) \qquad (13)$$

The household budget, assimilated to their total revenue, is directly borrowed from the CGE model. All that remains is to specify the utility function that will be used in calculating CV and EV. Since the households' consumption function in the CGE model is derived from the Cobb-Douglass demand function type, the indirect utility function associated with this demand can be specified as follows :[19]

$$U = \sum_i \left(\frac{\beta_i.CM}{PC_i}\right)^{\beta i} \qquad (14)$$

The advantage of this utility is that it can be limited to the consumption of one or more products. The utility function thus formulated will be replaced in the formulation of the CV and EV to the point that the global variation can be expressed as follows :

$$H^* = \tfrac{1}{2}\left[\frac{\sum_i \left(\frac{\beta_i^c . CM}{PC_i}\right)^{\beta_i^c} - \sum_i \left(\frac{\beta_i^c . CMO}{PCO_i}\right)^{\beta_i^c}}{\sum_i \left(\frac{\beta_i^c . CM}{PC_i}\right)^{\beta_i^c}} . YM \right.$$

$$\left. + \frac{\sum_i \left(\frac{\beta_i^c . CM}{PC_i}\right)^{\beta_i^c} - \sum_i \left(\frac{\beta_i^c . CMO}{PCO_i}\right)^{\beta_i^c}}{\sum_i \left(\frac{\beta_i^c . CMO}{PCO_i}\right)^{\beta_i^c}} . YMO \right] \qquad (15)$$

The models thus constructed are used to simulate established fiscal measures and alternatives. The choice of simulations and the analysis of their results are dealt with in the next section.

VI. Research scenarios and results

This section first discusses the presentation and justification of the research scenarios, and then presents the analysis of the scenario results.

Presentation of research scenarios

Six scenarios have been simulated:

(1) The fiscal reform proposed in the UDEAC RFRP (Scenario 1). It involves the suppression of all former indirect taxes (td, tpd, tpeu, tper, tm et tu) and the application of the maximum value of the reduced rate (8%) and normal rate (17%) of TCA. The TCA on local products sold locally is increased by 10% to represent the additional tax ("centimes additionnels"). This increase brings the reduced and normal TCA rates on these products to 8.8% and 18.7%, respectively. A zero rate (0%) is applied to exempt products (PAGS, SNM and PITE). The general preferential tariff (TPG) rate is generated by the model. The minimum amount (25%) of excise tax (tda) is also applied to products subject to this tax (PITD). The progressive surtax, which is a temporary tax, is not applied. Its rate is thus zero (tsp = 0).

This simulation permits us to evaluate the impact of the reform as proposed in the UDEAC RFPR on economic aggregates as well as on the welfare of the population of Cameroon and Gabon. The comparison of these impacts on the two economies affords an opportunity to appreciate the relevance of coordination of economic policies within UDEAC countries.

(2) The neutrality of fiscal revenue (Scenario 2). It involves the reversing of the closure of Scenario 1. All the former indirect taxes are suppressed and the level of the sum of indirect fiscal revenue (RFI) derived from the SAMs built is imposed (exogenous) so that the TCA rates on products sold on the different markets are generated by the model (endogenous). Scenario 2 allows us to see if the levels of TCA rates generated are compatible with those offered by the proposed RFRP. At the same time, the impact of this new structure of indirect tax system, which favours taxes on local products sold locally over import and export taxes, on economic aggregates is simultaneously appreciated and compared for each of the countries.

(3) Scenario 2 with the cancellation of the general preferential tariff - TPG - (Scenario 3). This scenario permits us to analyze the impact on the economies of Cameroon and Gabon of the free circulation within the UDEAC zone of products fulfilling the conditions of origin.

(4) Scenario 3 with a 10% increase of the sum of indirect fiscal revenue (RFI) (Scenario 4). Here, the compatibility of TCA rates generated with those proposed by the UDEAC RFPR is analyzed, as well as their impacts on the economies and welfare of the populations of Cameroon and Gabon.

(5) Scenario 4 with the use of revenue generated from increased indirect taxes to augment government transfers to the rest of the world (TGR) (Scenario 5). This increase may result, for example, from increased debt servicing.

(6) Scenario 4 with the use of revenue generated from increased indirect taxes to augment public spending (government final consumption - CG) (Scenario 6).

Just as it is true that higher taxes are prejudicial to the welfare of those being taxed, so also it can be admitted that the indirect positive effects brought about by a judicious use of the revenue thus generated can attenuate the direct harmful effects. The last two scenarios will make it possible to analyze these effects.

The results of these scenarios are given in tables 3 and 4. The following section deals with the analysis of the results.

Research scenario results

Our analysis focuses on the macroeconomic aspects. Special attention is given to the fiscal aspect as well as the comparison of simulation results in Cameroon with those of Gabon.

From the tables 3 and 4, it may be concluded that in Cameroon the application of the reform (Scenario 1) yields increased indirect fiscal revenue (almost 46%). This increase is a result of the hike in tax revenue from local products sold locally : the increase (391%) has more than compensated for the reduction in import/export taxes (-8% and -16%, respectively). This shift of fiscal pressure from international trade to local products sold locally is in keeping with the theoretical results expected from the application of the TCA.

Increased fiscal pressure on local products results in a slight reduction in global production (-0.3%) following reduced global demand.[20] This slight reduction in production is the result of increased (1.1%) production in the services sector (reduced fiscal pressure has been registered here), which slightly compensates for reductions in the agricultural (0.6%) and industrial (0.5%) sectors. Increased supply of exports resulting from higher producer prices (suppression of production tax) is, however, not significant enough to compensate for the reduced production brought about by lower domestic demand. As

Table 3 : Scenario impact on some macroeconomic performance indicators of Cameroon and Gabon (in percentage changes from the base solution)

Indicators	Scenario 1		Scenario 2		Scenario 3		Scenario 4		Scenario 5		Scenario 6	
	Cam	Gab	Cam	Gab	Cam	Gab	Cam	Gab	Cam	Gab	Cam	Gab
Fiscal elements												
- Total direct fiscal revenue (RFD)	-2.40	11.20	-5.47	9.60	-5.92	9.71	-6.10	9.68	-7.52	8.25	0.32	11.55
- Total indirect fiscal revenue (RFI)	45.74	-38.76	0.00	0.00	0.00	0.00	10.00	10.00	10.00	10.00	10.00	10.00
- Total fiscal revenue (RFT)	14.38	-19.70	-3.56	3.67	-3.86	3.71	-0.49	9.88	-1.41	9.33	3.28	10.59
Production elements												
- GDP at factor prices (ΣVA_i)	-0.28	3.16	-1.12	2.75	-1.18	2.47	-1.20	2.74	-1.58	2.42	0.76	4.71
- Total taxes on local products sold locally	391.15	-12.01	251.41	91.42	261.76	90.99	299.33	108.95	303.90	116.76	266.15	115.48
- Total import taxes	-8.05	-12.42	-59.83	8.98	-65.41	91.81	-61.79	119.20	-62.38	117.69	-36.51	112.24
- Total export taxes	-16.48	1.60	-13.84	2.93	-13.29	2.80	-13.07	2.84	-11.53	4.38	-13.80	2.95
- GDP at current prices (ΣVA_i + RFI)	2.05	-3.51	-1.06	2.31	-1.13	2.33	-0.64	3.90	-1.00	3.63	1.22	5.55
Macroeconomic equilibrium elements												
- Budget deficit/surplus (SG)	-23.68	-129.34	3.46	14.43	3.77	14.67	-1.63	52.35	16.11	-16.30	-11.56	-8.37
- UDEAC balance account (BCU)	7.88	32.12	12.26	47.40	12.78	48.75	12.96	53.22	15.42	43.50	6.22	54.29
- ROW balance account (BCR)	1.00	0.69	1.55	1.02	1.61	1.05	1.64	1.15	1.95	0.94	-0.57	1.17
- Global balance account (BC)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
- Total exports to UDEAC countries (ΣEXU_n)	7.68	2.43	12.05	3.20	12.58	3.08	12.75	2.78	15.07	5.21	6.24	3.56
- Total exports to the ROW (ΣEXR_n)	8.37	2.05	11.32	3.07	12.11	2.96	12.47	2.81	14.29	4.83	9.25	3.28
- Total imports from UDEAC (ΣUM_m)	-0.23	22.91	3.74	35.09	4.60	36.03	4.31	39.25	1.23	33.41	6.94	39.02
- Total imports from the ROW (ΣRM_m)	7.80	3.77	10.63	5.65	11.35	5.39	11.68	5.02	5.59	0.12	8.82	5.99
- Total investment (IT)	11.16	-2.92	-8.05	23.35	-8.72	23.66	-5.78	31.40	-17.58	13.92	-5.72	18.82
- Unemployment rate (tch)	4.67	-49.83	18.34	-43.02	19.47	-43.40	19.79	-43.03	25.76	-37.61	-13.21	-72.62
- Households revenue (YM)	-1.95	10.38	-5.06	9.21	-5.46	9.30	-5.58	9.34	-6.94	8.12	0.40	12.57
- Firm savings (SS)	-2.96	14.53	-6.56	12.35	-7.11	12.52	-7.32	12.47	-8.99	10.49	0.76	12.16
- Average welfare variation of households (H*) (in billion of CFA francs)	-295.14	98.34	-15.17	-12.46	-17.09	-13.93	-33.83	-47.72	-39.32	-46.41	39.26	-14.91

Source : Complied by the author using data from the result files of the model.

Table 4 : Rate of turnover tax (TCA) generated by scenarios (in percentage)

Products	Scenario 1		Scenario 2		Scenario 3		Scenario 4		Scenario 5		Scenario 6	
	Cam	Gab	Cam	Gab	Cam	Gab	Cam	Gab	Cam	Gab	Cam	Gab
- Local products												
* PAGS	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
* PAGP	8,80	8,80	3,20	14,10	3,30	14,40	3,60	27,60	3,70	17,30	3,80	21,70
* PITR	8,80	8,80	3,20	14,10	3,30	14,40	3,60	27,60	3,70	17,30	3,80	21,70
* PITN	18,70	18,70	6,90	30,00	6,90	30,50	7,60	58,60	7,90	36,90	8,10	46,20
* SNM	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
- Import products from UDEAC												
* PAGS	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
* PAGP	8,00	8,00	2,90	12,80	3,00	13.10	3,20	25,10	3,40	15,80	3,50	19,80
* PITU	2,00	2,00	0,70	3,20	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
* PITR	8,00	8,00	2,90	12,80	3,00	13,10	3,20	25,10	3,40	15,80	3,50	19.80
* PITN	17,00	17,00	6,20	27,30	6,90	27,80	6,90	53,30	7,20	33,50	7,30	42,00
* PITD	17,00	17,00	6,20	27,30	6,90	27,80	6,90	53,30	7,20	33,50	7,30	42,00
* PITE	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
- Import products from the ROW												
* PAGS	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
* PAGP	8,00	8,00	2,90	12,80	3,00	13,10	3,20	25,10	3,40	15,80	3,50	19,80
* PITR	8,00	8,00	2,90	12,80	3,00	13,10	3,20	25,10	3,40	15,80	3,50	19,80
* PITN	17,00	17,00	6,20	27,30	6,90	27,80	6,90	53,30	7,20	33,50	7,30	42,00
* PITD	17,00	17,00	6,20	27,30	6,90	27,80	6,90	53,30	7,20	33,50	7,30	42,00
* PITE	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
- General TCA Rate	18,7	18,7	6,90	30,00	6,90	30,50	7,60	58,60	7,90	36,90	8,10	46,20

Notes :Cam : Cameroon
Gab : Gabon
PAGP : Perennial agriculture
PAGS : Subsistence agriculture
PITD : Industrial subject to excise tax
PITE : Industrial exempt form excise tax
UDEAC : Central African Customs and Economic Union
PITR : Industrial subject to reduced TAC rate
PITU : Industrial subject to unique tax
SNM : Non-tradeables services
ROW : Rest of the world
PITN : Industrial subject to normal TCA rate
Source : Complied by the author using data from the result files of the model.

salary rates are hypothetically fixed, producers react to reduced production by lowering their demand for labour. This reduction in labour demand worsens unemployment by 4.7%

Government consumption is also hypothetically fixed, thus the accumulated revenue generated by increased total fiscal revenue (13.4%) is translated by a significant reduction of the budget deficit (-23.7%). As a matter of fact, the more than proportionate increase in indirect fiscal revenue (45.7%) has more than compensated for the slight reduction in direct fiscal revenue (2.4%) and also given rise to increased total government revenue. Since public spending is hypothetically fixed, this increase in revenue translates into increased government savings or reduced budget deficit.

On the international scene, since global trade balance is fixed, trade balances between UDEAC (BCU) and ROW (BCR) compensate each other. The reform constitutes a significant reduction of fiscal pressure on imports from the two zones. However, the higher reduction of the ROW imports results in a shift in demand away from UDEAC imports (-0.2%) as well as local products to the ROW imports (+7.8). The 1% increase in the balance account deficit with the ROW is thus financed by the increased balance account surplus with UDEAC (8%). The phenomenon of reduced imports and increased exports from UDEAC reinforces the Hub-and-spoke character of trade between Cameroon and the other countries of the zone.

The reduction of labour demand leading to a reduction in salaries paid out (salary rates are fixed), and of capital remuneration in agriculture and industrial sectors that register reduced activity, also leads to a reduction in household revenue (-2%). The more than proportionate reduction in the demand for local products, as against the increase in demand for imports, results in reduced household final consumption. This reduction in revenue as well as in consumption results in a serious deterioration of the welfare of households (a decline of CFAF 295 billion).

The highly reduced budget deficit has more than compensated for the reduced household and firm savings, and given rise to increased global savings, which in turn has financed increased global investment (11%).

In Gabon, apart from the fact that a shift in fiscal pressure from international to domestic trade has not been registered, this simulation (Scenario 1) has different effects on the aggregates mentioned above.

Because of the reduced indirect fiscal revenue, the government moves from a surplus to a deficit budget (reduction of about 129% in government savings). In contrast with Cameroon, the application of the reform leads to a reduced rate of indirect tax pressure in Gabon. This high tax reduction on both the local and foreign markets fosters demand, the excess of which is compensated for by increased production (3.5%) sustained by a significant increase in labour demand that is translated by a significant reduction in the unemployment rate (almost 50%). The joint positive production and fiscal effects result in a significant increase in household welfare (CFAF 98 billion).

Despite the indirect fiscal neutrality constraint introduced in Scenario 2, the shift in fiscal pressure from the international to domestic markets has led to the negative effects already noted in the Cameroonian economy in Scenario 1. Four major remarks can be made:

- The TCA rates generated are inferior to the minimum rates required by the UDEAC RFPR. In addition, the general TCA rate is even lower than the reduced rate proposed.

- The negative effects observed on the economy are higher.

- The lower direct fiscal revenue due to reduced production activities leads to reduced global government revenue, which in turn results in increased budget deficit.

- Since the sum of indirect tax revenue is fixed, the reduction in production has resulted in a reduction in GDP at current prices.

In Gabon, however, the TCA rates generated are higher than the maximum proposed by the reform. The transfer of the pressure of indirect taxes from international to domestic trade has still not been established. There has been increased pressure on both imports and local products sold locally. However, both reductions and augmentations in fiscal pressure have been registered on different sectoral products.

Gabon's domestic fiscal system for the base year consists of high fiscal exoneration and subvention on the products of certain sectors (industrial products subject to reduced TCA rates and subsistence agriculture), and high pressure on others (perennial agricultural products and industrial products subject to normal TCA rates). The implementation of the reform coupled with an insistence on fiscal neutrality results in increased fiscal pressure on the first group of products and reduced pressure on those of the last group.

With higher taxes resulting in higher product prices, a lower demand is registered, thereby affecting production and import levels. The double reduction in the prices of local products subject to lower taxes as well as their imported substitutes results in an increased demand for both local products and imports. However, a deterioration in the relative prices within local and imported products is noted to the detriment of imported products, resulting in a more than proportionate increase in the demand for local products as compared with imported ones. The increased production of these products being higher than the reduction registered in the other sectors, we note an increase in the global production (2.8%). This increase is all the more significant as the sectors registering increased production constitute almost 80% of total production (including oil, which is mainly exported). The positive production effect is sustained by increased labour demand and therefore a significant reduction in unemployment.

Because of the higher percentage of products registering a price increase (higher taxes) in household final consumption, the positive revenue effect (increased production leading to increased salary paid) is not enough to offset the negative price effect. This results in a slight reduction in household welfare (CFAF 12.5 billion). The increase in direct fiscal revenue (9.6%), which has resulted from higher production, has led to increased government revenue and budget surplus (14.4%).

The results observed in Scenario 3 reveal a certain number of contradictions in relation to certain conclusions found in the literature on the analysis of the UDEAC regional integration process. It is generally admitted in the literature that inter-regional trade within sub-Saharan economic groups will always be low even if the constraints on it are

removed. The reason given for this is the low potential for trade among the countries of these zones, itself the result of their low internal demand (Foroutan and Pritchett, 1993).

Contrary to this idea, the suppression of the tax on inter-regional imports fulfilling the conditions of origin in conjunction with the constraints of the indirect fiscal neutrality of the reform has given rise to a significant increase in Cameroon's and Gabon's inter-regional trade. Exports and imports have increased, respectively, by 13% and 11% for Cameroon and by 3% and 36% for Gabon. In Cameroon, the increase in exports being higher than the increase in imports, it can be concluded that the new indirect fiscal structure accentuates the Hub-and-spoke character of this country's trade with other UDEAC member states.

Regarding Scenario 2, it may be noted that as theoretically expected, the positive effect resulting from the suppression of inter-regional import taxes has affected the productive system and, indirectly, the welfare of Cameroonian households.[21] This explains the relative reduction in production as well as a relative increase in unemployment in the two countries. The reduced prices of UDEAC products fulfilling the conditions of origin has given rise to a shift in demand from local substitutes to imported products. The positive price effect thus engendered has, however, not been strong enough to offset the negative revenue effects (decrease in production). The result has been a relative deterioration in the welfare of the two countries' households.

The main observation that can be made from these first three scenarios is that in Cameroon, contrary to Gabon, the effects registered have been realized within the constraints imposed by the UDEAC RFRP on indirect fiscal instruments. The TCA rates generated for Cameroon remain within the range and even below the minimum rates authorized, while in Gabon, they are much higher than the authorized maximum (See Table 4.).

In Cameroon, Scenario 4 produces the same production and fiscal effects as Scenario 1. In Gabon, these effects are similar to those of Scenario 2. They are amplified when it comes to welfare, however. The increase in the sum of indirect fiscal revenue leads to higher fiscal pressure on products sold on all the markets. This higher pressure translates into greater negative price effects, which are not compensated for by the positive revenue effects engendered by the production sector. The result is further deterioration in household welfare. With Scenario 4, Gabon departs even further from the TCA limits proposed by the reform.

Scenario 5 increases Cameroon's budget deficit and reduces Gabon surplus, whereas Scenario 6 reduces Cameroon's budget deficit and reduces Gabon's surplus to a lesser proportion than in Scenario 5. The positive production results brought about by Scenario 6 are so high that we observe a significant relative improvement in the welfare of the two countries' populations. In this scenario, the almost 13% and 73% reduction in unemployment rates in Cameroon and Gabon, respectively, reveal economic revival in both countries. Better still in Cameroon, this revival remains compatible with the indirect fiscal constraints imposed by the reform as shown in the TCA rates generated and reproduced in Appendix F. However, the increased deficit and reduced budget surplus pose the problem of a deficit level compatible with sustainable economic growth.

VII. Conclusion

With Cameroon and Gabon facing an economic crisis that has lasted since the mid 1980s, trade liberalization, consisting mainly of the proposed UDEAC Regional Fiscal Reform Program (RFRP), may be considered as a weapon in the fight for economic growth. The questions asked were whether this reform could guarantee a reasonable level of fiscal revenue and induce supply/demand effects in conformity with the macroeconomic objectives of the countries. To answer these questions, a CGE model was constructed.

The scenario results show that because of the high economic structural disparities of the two economies analyzed, the reform effects on these economies are contradictory. In Cameroon, we observed the realization of fiscal revenue objectives within the limits of the constraints imposed by the reform and in Gabon, a reduction in indirect fiscal revenue under the same constraints. However, the realization of Cameroon's fiscal revenue objective is obtained to the detriment of the production and the population welfare objectives. Nevertheless, the use of revenue generated to increase public final consumption compensates for the harmful effects on households' welfare. On the other hand, the reduction in indirect fiscal revenue in Gabon is compensated for by a positive reaction in the production sectors, thus leading to an improvement in population welfare.

In like manner, it is observed that while Cameroon can improve its level of indirect fiscal revenue by respecting the constraints on fiscal instruments imposed by the reform, Gabon can only apply much higher rates to conserve its initial level of the same revenue. Since this country is not faced with a budget deficit problem, there is no serious reason why it cannot apply the reform as Cameroon has done. This reform is all the more to be recommended for Gabon as it has positive welfare effects on the population.

The study thus shows that : (1) Gabonese government needs not to be afraid of the fiscal impact of the proposed UDEAC Regional Fiscal Reform Program, (2) an economic recovery through public spending financed by increased fiscal pressure is possible in Cameroon as well as in Gabon, (3) and the coordination of trade policy between Cameroon and Gabon is not possible without harmonization of their macroeconomic objectives.

The absence of an analysis of the effects of harmonizing the macroeconomic objectives on the welfare of social groups of both countries constitutes the main limit of our research. This can only be carried out after a restructuring of our model to take into account the different social groups and their savings and consumption behaviour. Such a model, involving all UDEAC countries and enriched by ingredients from regional models, can serve as an important working instrument to support decisions relating to trade policy coordination among UDEAC member states.

The SAMs for the two countries are constructed for two different years because of

lack of recent input-output table in Cameroon. The results of our model are not significantly affected by this difference because, for each country, the fiscal reform impacts are compared with the economic performances of one period without the reform. However, when the comparison of the reaction of the two economies is considered, this different period constitutes one of the main limitation of the study.

Notes

1. It is shown in the literature that the absence of regional economic policy coordination is one of the main causes of the failure of UDEAC (Langhammer and Hiemenz, 1991; Foroutan, 1992; Badiane, 1992; Foroutan and Pritchett, 1993; OECD, 1993; Diouf, 1994; Ouali, 1994; DÈcaluwÈ et al. 1995).
2. Loo and Tower (1990) assert that although the expected gains from trade liberalization are important in developing countries, they nevertheless depend on measures that the country experimenting with trade liberalization should take simultaneously with developed countries to avoid a deterioration of the terms of exchange, which could inhibit the positive effects of such a liberalization.
3. See Reinikka (1994) for a review of quantitative identification methods of trade liberalization episodes.
4. Tanzi (1989) has made an inventory of these effects. See Jebuni et al. (1994) for a summary of these effects.
5. Price adjustment consists of using import tax revenue from a particular product to subsidize local producers of the same product. The twinning of import and local products consists of authorizing the importation of a quantity of a specific product in proportion to the local purchase of the product.
6. The production units deduct from the TCA paid, the amount paid on their intermediary inputs and equipment purchase. The TCA can thus be defined as a final consumption tax.
7. For more developments on that notion, see the treaty on the creation of UDEAC in "LeJournal Officiel de la RÈpublique du Cameroun : Janvier 1965" or Mytelka (1975).
8. In conformity with the text of the UDEAC regional reform program, this proportion should stand at 10% in 1997 and at 0% in 1998. This should allow for a free circulation of products subjected to this tax.
9. The value of 1 French franc (FF) went from 50 to 100 CFA franc with the January 1994 devaluation of the CFAF.
10. The contribution of oil and tertiary sectors to Cameroon's real GDP went from 60% to 53% between 1985 and 1989, while that of Gabon went from 66% to 79% during the same period. This represents a reduction of about 10% of the contribution of these sectors to the Cameroonian economy as against an increase of almost 20% in their contribution to the Gabonese economy (see table 2).
11. Among other factors that could have contributed to the positive results observed during the trade liberalization episodes, we can cite : the restrictive budgetary policy put in place by the two countries within the framework of the stabilization programs

and the liberalization of all economic activities through restructuring, privatization and/or liquidation of state enterprises as required by the SAPs. In addition to these measures, the recycling of Gabon's external debt and the entry into production of new oil wells greatly contributed to the relative good performance of some the country's macroeconomic aggregates.

12. Considering our specific preoccupation with the security of fiscal revenue, we preferred a representative household just to observe the global impact of fiscal measures on the welfare of households.
13. Imports likely to be subject to the progressive surcharge would have been distinguished were it not for the similarity between these imports and those likely to be subject to the excise tax.
14. The distinction of these imports was made necessary by the fact that following the reform, they will be subject to the generalized preferential tariff, which is to disappear in 1998.
15. This matrix comprises 149 accounts divided into the following 8 main groups: (1) factor accounts (numbered form 1 to 2); (2) agents accounts (3 to 6); (3) production sector accounts (7 to 37); (4) local product accounts (38 to 68); (5) imported product accounts (69 to 92); (6) composite product accounts (93 to 123); (7) exported product accounts (124 to 148); and (8) accumulation account (149). Constructed within the framework of the PARADI research program on the social dimension of structural adjustment in Cameroon, this matrix is a framework for the reconciliation of the principal micro and macroeconomic data dealing with the 1989/90 period consigned in the country's most recent macroeconomic tables (Input-Output Table, integrated economic accounts [TEE and CEI] and balance of payments [BP]).
16. Devarajan and de Melo (1987) have already used this closure of the labour market. See Bamou (1996), Njinkeu and Bamou (1996), Dissou and Decaluwé (1994), and Collange (1993) for alternative closures of the labour market. The Devarajan and de Melo (1987) approach is preferred to take into account the importance of contractual salaries in the two economies.
17. It has been shown in the literature that gains in global welfare (relative to GDP), as shown in the CGE models, are relatively low and that their sectoral production, resource reallocation and trade repercussions are generally higher. Therefore, if we want to look at the effects of the reform on the population (households), it will be necessary to pay special attention to these repercussions rather than to global welfare. The method used for this consists of incorporating the CGE model as constrained equations in a non-linear model where the objective function, represented by the consumer utility function, is coherently defined in relation with the expenditure function incorporated in the CGE model (Robinson, 1990).
18. The symbol "O" characterizes the base-year value of the variables.
19. Fortin et al. (1994) have already used this functional form in their model.
20. Note that contrary to the sum of value added, which has decreased, the GDP at market prices, which is of interest to the policy makers, has increased by almost 1.5%.
21. See Drusilla and Stern (1989) for a description of the mechanisms.

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Appendix A : List of the 42 accounts of the social accounting Matrixes (SAM) of Cameroon and Gabon

		Account	Abbreviation	Numbering
		Labour	L	1
Factors		Capital	K	2
		Households	MEI	3
Local		Firms	SQS	4
agents		Government	G	5
External		UDEAC	UDEAC	6
agents		Rest of the World (ROW)	ROW	7
Passage		Production taxes	TAP	8
accounts		Former taxes	ANT	9
		Agriculture	AGR	10
Production		Industry	IND	11
sectors		Non-tradable services	BRNM	12
		Subsistence agriculture	PAGS	13
Local		Perennial agriculture	PAGP	14
products		Industrial subject to reduced TCA rate	PITR	15
		Industrial subject to normal TCA rate	PITN	16
		Non-tradable services	SNM	17
		Subsistence agriculture	PAGS	18
	From the	Perennial agriculture	PAGP	19
	other	Industrial subject to unique tax	PITU	20
	UDEAC	Industrial subject to reduced TCA rate	PITR	21
	member	Industrial subject to normal TCA rate	PITN	22
Imported	states	Industrial subject to excise tax	PITD	23
products		Industrial exempt from the TCA tax	PITE	24
	From the	Subsistence agriculture	PAGS	25
	rest of	Perennial agriculture	PAGP	26
	the	Industrial subject to reduced TCA rate	PITR	27
	world	Industrial subject to normal TCA rate	PITN	28
		Industrial subject to excise tax	PITD	29
		Industrial exempt from the TCA tax	PITE	30
		Agriculture	PAGR	31
Composite		Industry	PIND	32
products		Non-tradable services	SNM	33
	From the	Subsistence agriculture	PAGS	34
	other	Perennial agriculture	PAGP	35
	UDEAC	Industrial subject to reduced TCA rate	PITR	36
	member	Industrial subject to normal TCA rate	PITN	37
Exported	states			
products	From the	Subsistence agriculture	PAGS	38
	rest of	Perennial agriculture	PAGP	39
	the	Industrial subject to reduced TCA rate	PITR	40
	world	Industrial subject to normal TCA rate	PITN	41
Accumulation		Accumulation	ACC	42

Appendix B : Social accounting matrixes (SAMs) for trade liberalization impact analysis (in million of CFA francs)

B.1 : Cameroon's 1989/90 SAM

	L	K	MEI	SQS	G	UDEAC	RDM	TAP	ANT	AGR	IND	BRNM	PAGS	PAGP	PITR	PITN	SNM	PAGS	PAGP	PITU	PITR	PITN	PITD	PITE
Nos.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1										63,789	591,844	405,739												
2										533,854	1,871,772	140,876												
3	1,061,372	1,691,701		422,700	200,800																			
4		753,230	17,100																					
5		101,571	118,700	138,600			8,072	14,299	177,696															
6																		111	294	79	3	379	36	22
7				89,300	124,300																			
8													249	187	2,180	9,649	205							
9													128	1,785	3,388	54,260	204	12	4	13	0	62	6	3
10													560,031	123,494										
11															619,014	3,172,827								
12																	698,218							
13																								
14																								
15																								
16																								
17																								
18																								
19																								
20																								
21																								
22																								
23																								
24																								
25																								
26																								
27																								
28																								
29																								
30																								
31			451,841							27,867	317,730	1,321												
32			2,134,965							162,322	1,548,516	145,054												
33			121,504		563,488					24	8,551	5,228												
34						222																		
35						535																		
36						2,121																		
37						34,407																		
38							2,609																	
39							101,849																	
40							22,840																	
41							494,277																	
42			532,463	119,730	-329,650	-36,361	287,897																	
Total	1 061 372	2 546 502	3 376 573	770 330	558 938	924	917 544	14 299	177 696	787 856	4 338 413	698 218	560 408	125 466	624 582	3 236 736	698 627	123	298	92	3	441	42	25

Appendix B.1 : Continued

Nos.	PAGS 25	PAGP 26	PITR 27	PITN 28	PITD 29	PITE 30	PAGR 31	PIND 32	SNM 33	PAGS 34	PAGP 35	PITR 36	PITN 37	PAGS 38	PAGP 39	PITR 40	PITN 41	ACC 42	Total
1																			1,061,372
2																			2,546,502
3																			3,376,573
4																			770,330
5																			558,938
6																			924
7	5,605	1,013	19,781	519,901	11,209	146,435													917,544
8										0	1	7	103	1	154	78	1,485		14,299
9	605	13	2,887	85,009	1,833	21,356				15	17	67	300	196	500	718	4,315		177,696
10										207	517			2,412	101,195				787,856
11												2,047	34,004			22,044	488,477		4,338,413
12																			698,218
13							560,408												560,408
14							125,466												125,466
15								624,582											624,582
16								3,236,736											3,236,736
17									698,627										698,627
18							123												123
19							298												298
20								92											92
21								3											3
22								441											441
23								42											42
24								25											25
25							6,210												6,210
26							1,026												1,026
27								22,668											22,668
28								604,910											604,910
29								13,042											13,042
30								167,791											167,791
31																		-105,228	693,531
32																		679,475	4,670,332
33																		-168	698,627
34																			222
35																			535
36																			2,121
37																			34,407
38																			2,609
39																			101,849
40																			22,840
41																			494,277
42																			574,079
Total	6,210	1,026	22,668	604,910	13,042	167,791	693,531	4,670,332	698,627	222	535	2,121	34,407	2,609	101,849	22,840	494,277	574,079	

B.2 : Gabon's 1994 SAM

	L	K	MEI	SQS	G	UDEAC	RDM	TAP	ANT	AGR	IND	BRNM	PAGS	PAGP	PITR	PITN	SNM	PAGS	PAGP	PITU	PITR	PITN	PITD	PITE
Nos.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1										38,498	387,409	225,395												
2										181,974	1,141,866	462												
3	648,479	393,940		36,564	74,319		13,712																	
4		929,902	27,721		19,573		21,958																	
5		460	142,180	88,130			44,793	0	374.099															
6	2,823																	43	15	1,643	4,633	459	205	4,735
7			66,460	178,111	116,692																			
8																								
9													-1,015	3,564	12,377	252,840	35	6	3	405	519	76	20	863
10													109,575	11,620										
11															354,364	1,155,731								
12																	353,147							
13																								
14																								
15																								
16																								
17																								
18																								
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21																								
22																								
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24																								
25																								
26																								
27																								
28																								
29																								
30																								
31			192,216							11,633	14,448	427												
32			667,793							89,650	1,099,418	126,800												
33			7,723		345,084					12	300	63												
34						2																		
35						129																		
36						560																		
37						5,054																		
38							16,472																	
39							191,115																	
40							24,005																	
41							1,119,518																	
42			62,921	696,349	93,994	8,811	-408,953																	
Total	651,302	1,324,302	1,167,014	999,154	649,662	14,556	1,022,620	0	374,099	321,767	2,643,441	353,147	108,560	15,184	366,741	1,408,571	353,182	49	18	2,048	5,152	535	225	5,598

Appendix B.2 : Continued

Nos.	PAGS 25	PAGP 26	PITR 27	PITN 28	PITD 29	PITE 30	PAGR 31	PIND 32	SNM 33	PAGS 34	PAGP 35	PITR 36	PITN 37	PAGS 38	PAGP 39	PITR 40	PITN 41	ACC 42	Total
1																			651,302
2																			1,324,302
3																			1,167,014
4																			999,154
5																			649,662
6																			14,556
7	25,756	147	50,420	386,977	44,791	153,266													1,022,620
8																			0
9	4,032	29	12,533	43,290	7,405	14,180				0	5	8	69	46	7,095	330	15,384		374,099
10										2	124			16,426	184,020				321,767
11												552	4,985			23,675	1,104,134		2,643,441
12																			353,147
13							108,560												108,560
14							15,184												15,184
15								366,741											366,741
16								1,408,571											1,408,571
17									353,182										353,182
18							49												49
19							18												18
20								2,048											2,048
21								5,152											5,152
22								535											535
23								225											225
24								5,598											5,598
25							29,788												29,788
26							176												176
27								62,953											62,953
28								430,267											430,267
29								52,196											52,196
30								167,446											167,446
31																		-64,949	153,775
32																		518,071	2,501,732
33																		0	353,182
34																			2
35																			129
36																			560
37																			5,054
38																			16,472
39																			191,115
40																			24,005
41																			1,119,518
42																			453,122
Total	29,788	176	62,953	430,267	52,196	167,446	153,775	2,501,732	353,182	2	129	560	5,054	16,472	191,115	24,005	1,119,518	453,122	

Appendix C : The Complete specification of the model

Sets definition

i	∈	I = {AGR,IND,BRNM} production sectors ;
j	∈	J = {PAGS,PAGP,PITR,PITN,SNM} local goods and services ;
m	∈	M= {PAGS,PAGP,PITR,PITN,PITD,PITE} imported products ;
u	∈	U = {PITU} product subject to the unique tax ;
n	∈	N = {PAGS,PAGP,PITR,PITN} exported products ;
s	∈	S = {SNM} non-tradable product ;
a	∈	A = {PAGS,PAGP} agricultural products ;
b	∈	B = {PITR,PITN,PITD,PITE} industrial products ;
z	∈	Z = {UDEAC,RDM} the two external markets ;
k	∈	K = {PITR,PITN,PITD} Industrial import products from UDEAC subject to TCA ;
p	∈	P = {PAGR,PIND,SNM} sectoral goods and services ;
q	∈	Q = {PAGR,PIND} composite tradable products ;
il	∈	IL= {PITR,PITN}: Industrial products sold locally and exported ;
iu	∈	IU= {PITR,PITN,PITD,PITE,PITU} Industrial import products from UDEAC ;
PAGR	=	PAGS + PAGP agricultural product ;
PIND	=	PITR + PITN + PITD + PITE + PITU industrial product.

Production block

(1) $VA_i = A_i . L_i^{Dai} \cdot K_i^{(1-\alpha i)}$

(2) $CI_i = io_i . VA_i / v_i$

(3) $XS_i = CI_i / io_i$

(4) $CIJ_{ip} = a_{ip} . CI_i$

(5) $L_i^D = \alpha_i . PVA_i . VA_i / w$

(6) $XP_j = \sum_i \beta_{ij}^p . XS_i$

Revenue-savings block

(7) $$YM = w.\lambda_L^M.\sum_i L_i^D + \lambda_K^M.\sum_i RK_i + DIM + TGM.Pindex$$

(8) $$DIM = tdi.(YS - trk.\lambda_K^S.\sum_i RK_i)$$

(9) $$YDM = (1 - tym).YM - TMS - TMR$$

(10) $$TAXD_j = [td_j + tda_j + tpd_j + (1 + td_j + tda_j + tpd_j).tca_j].PD_j.D_j$$

(11) $$YG = tym.YM + [1 - (\lambda_K^M + \lambda_K^S)].\sum_i RK_i + TAXP$$
$$+trk_s.\lambda_K^S + \sum_i RK_i \sum_j TAXD_j + \sum_m \sum_z TAXMm,z$$

(12) $$ANT_{m,z} = tm_{m,z}.e.PWM_m.M_{m,z}$$

(13) $$DDD_{m,z} = tdd_{m,z}.e.PWM_m.M_{m,z}$$

(14) $$TDA_{m,z} = tda_{m,z}.e.PWM_m.M_{m,z}$$

(15) $$STP_{m,z} = tsp_{m,z}.e.PWM_m.M_{m,z}$$

(16) $$TAXEn,z = \frac{e.PWE_{n,z}.EX_{n,z}}{(1 + te_{n,z} + tpe_{n,z})}$$

(17) $$YS = \lambda_K^S.\sum_i KR_i + (TSM + TGS).Pindex + e.TRS$$

(18) $$RK_i = PVA_i.VA_i - w.L_i^D$$

(19) $$TAXP = \sum_j tpd_j.PP_j.\beta_j^D.XP_j + \sum_n \sum_z TAXE_{nz} + e.TRG - \sum_p RTCACI_p$$
$$+\sum_n \sum_z tpe_{n,z}.PP_n.\beta_{n,z}^E.XP_{n,z}$$

(20) $$TCA_{m,z} = (1 + tdd_{m,z} + tda_{m,z} + tsp_{m,z}).tca_{m,z}.e.PWM_m.M_{m,z}$$

(21) $TAXM_{m,z} = ANT_{m,z} + DDD_{m,z} + TDA_{m,z} + STP_{m,z} + TCA_{m,z}$

(22) $RTCACI_p = \sum_i CIJ_{ip}.(PC_p - PCHT_p)$

(23) $SS = YS - [DIM + trks.\lambda_K^S.\sum_i RK_i + (TSM + TSR).Pindex]$

(24) $SM = pms.YDM$

Demand block

(25) $CG = YG - (TG.Pindex + TGR + SG)$

(26) $CM = YDM - SM$

(27) $Q_q = B_q^M.[\delta_q.MC_q^{p_q} + (1-\delta_q).DC_q^{p_q}]^{(1/p_q)}$

(28) $Q_s = D_s$

(29) $\frac{MC_q}{DC_q} = [\frac{PDC_q}{PMC_q}.\frac{\delta_q}{1-\delta_q}]^{\sigma_q^M}; \sigma_q^M = \frac{1}{1-p_q}$

(30) $PC_i.C_i = \beta_i^c.CM + \beta_i^G.CG$

(31) $MC_q = B_q^{1M}.[\delta_q^1.UMC_q^{p_q^1} + (1-\delta_q^1).RMC_q^{p_q^1}]^{1/p_q^1}$

(32) $MC_{PIND} = \sum_{iu} UM_{iu} + \sum_b RM_b$

(33) $MCPAGR = \sum_a (UM_a + RM_a)$

(34) $PC_i.INV_i = \beta_i^1.IT$

(35) $$\frac{UMC_q}{RMC_q} = [\frac{PMUC_q}{PMRC_q} . \frac{\delta_q^1}{1-\delta_q^1}]^{\sigma_q^{1M}} ; \sigma_q^{1M} = \frac{1}{1-\rho_q^1}$$

(36) $$UM_a = \lambda_a^U UMC_{PAGR}$$

(37) $$UM_b = \lambda_b^U UMC_{PIND}$$

(38) $$UM_u = (1 - \sum_b \lambda_b^U) . UMC_{PIND}$$

(39) $$DINT_i = \sum_p a_{ip} . CI_i$$

(40) $$XS_q = B_q^X . [\gamma_q . EXC_q^{\psi q} + (1-\gamma_q) . DC_q^{\psi q}]^{(/ / \psi q)}$$

(41) $$XS_s = DC_s = D_s$$

(42) $$\frac{EXC_q}{DC_q} = [\frac{PEC_q}{PDC_q} . \frac{1-\gamma_q}{\gamma_q}]^{\sigma_q^E} ; \sigma_q^E = \frac{1}{(\gamma_q - 1)}$$

(43) $$EXC_q = B_q^{1X} . [\gamma_q^1 . EXUC_q^{\psi_q^1} + (1-\gamma_q^1) . EXRC_q^{\psi_q^1}]^{(1/\psi_q^1)}$$

(44) $$\frac{EXUC_q}{EXRC_q} = [\frac{PEUC_q}{PERC_q} . \frac{1-\gamma_q^1}{\gamma_q^1}]^{\sigma_q^{1E}} ; \sigma_q^{1E} = \frac{1}{(\gamma_q^1 - 1}$$

(45) $$EXU_n = \lambda_{n,q}^{XU} EXUC_q$$

(46) $$EXR_n = \lambda_{n,q}^{XU} EXRC_q$$

(48) $$RM_a = \lambda_a^R RMC_{PAGR}$$

(49) $$RM_b = \lambda_b^R RMC_{PIND}$$

(50) $$DC_{PAGR} = \sum_{a} D_a$$

(51) $$DC_{PIND} = \sum_{il} D_{il}$$

Prices block

(52) $$PVA_i = (P_i.XS_i - \sum_{p} PCHT_i.CIJ_{ip}) / VA_i$$

(53) $$PP_n = (PD_n.D_n + PE_n.EX_n) / XP_n$$

(53) $$P_i = \sum_{j} PP_j.XP_j / XS_i$$

(54) $$PP_s = PD_s$$

(55) $$PEU_n = \frac{PWE_n}{1 + teu_n + tpeu_n}$$

(56) $$PMC_q.MC_q = PMUC_q.UMC_q + PMRC_q.RMC_q$$

(57) $$PMUC_{PAGR}.UMC_{PAGR} = \sum_{a} PMU_a.UM_a$$

(58) $$PERn = \frac{e.PWE_n}{1 + ter_n + tper_n}$$

(59) $$PCHT_p = \frac{PDCHT_p.DC_p + PMCHT_p.MC_p}{Q_p}$$

(60) $$PEC_q.EXC_q = PEUC_q.EXUC_q + PERC_q.EXRC_q$$

(61) $$PC_q = (PDC_q.DC_q + PMC_q.MC_q) / Q_q$$

(62) $$PC_s = PDM_s.D_s./ Q_s$$

(63) $$PMRC_{PAGR}.RMC_{PAGR} = \sum_{a} PMR_a.RM_a$$

(64) $$PMRC_{PIND} = \frac{\sum_{b} PMR_b.RM_b}{RMC_{PIND}}$$

(65) $$PDM_j = PD_j.[td_j + tpd_j + tda_j + (1 + td_j + tpd_j + tda_j).tca_j]$$

(66) $$PDC_{PAGR} = \frac{\sum_{a} PDM_a.D_a}{DC_{PAGR}}$$

(67) $$PDC_{PIND} = \frac{\sum_{il} PDM_{il}.D_{il}}{DC_{PIND}}$$

(68) $$PMUC_{PIND} = \frac{\sum_{iu} PMU_{iu}.UD_{iu}}{UMC_{PIND}}$$

(69 $$PMUm = PWM_m.[(tm_m + tdd_m + tda_m + tsp_m) + (1 + tdd_m + tda_m + tsp_m).tca_m]$$

(70) $$PEUC_{PAGR} = \frac{\sum_{a} PEU_a.EXU_a}{EXUC_{PAGR}}$$

(71) $$PEUC_{PIND} = \frac{\sum_{il} PEU_{il}.EXU_{il}}{EXUC_{PIND}}$$

(72) $$PMR_m = e.PWM_m.[(tm_m + tdd_m + tda_m + tsp_m) + (1 + tdd_m + tda_m + tsp_m).tca_m]$$

(73) $$PMUHT_m = PMRHT_m = e.PWM_m.(1 + tdd_m + tda_m + tsp_m)$$

(74) $PDMHT_i = PD_i.(1 + tda_i + tpd_i)$

(75) $Pindex = \sum_i \beta_i^C . PC_i$

Equilibriums block

(76) $IT = SS + SM + SG + e.BC$

(77) $BCU = (1 - \lambda_L^M).w.\sum_i LD_i + PWM_u.UM_u$

$+\sum_m PWM_m.UM_m - \sum_n PWE_n.EXU_n$

(78) $BCR = (\sum_m PWM_m.RM_m) + 1/e.(TGR + TSR + TMR)$

$-(\sum_n (PWE_n.EXR_n) + TRG + TRM + TRS)$

(79) $L\ on\ = Q_s - C_s - DINT_s - INV_s$

(80) $Q_q = C_q + DINT_q + INV_q$

(81) $(1 - tch).L^s = \sum_i L_i^D$

(82) $BC = \frac{BCU}{e} + BCR$

Appendix D : List of variables and parameters of the model

Endogenous variables

$ANT_{m,z}$	Former taxes on imports
BCR	Current account with the ROW
BCU	Current account with other UDEAC countries
C_i	Final consumption of goods
CI_i	Total sector's intermediate consumption
CIJ_{ip}	Sector's intermediate consumption
CM	Household total consumption
D_j	Domestic sales
DC_q	Domestic sales of composite goods
$DDD_{m,z}$	Custom duty revenues
DIM	Dividends received by household
$DINT_i$	Intermediate demand of goods
EXC_q	Total composite exports
$EXUC_q$	Total composite exports to the UDEAC zone
$EXRC_q$	Total composite exports to the RDM zone
EXU_n	Exports to the other UDEAC member states
EXR_n	Exports to the rest of the world
INV_i	Investment in goods
IT	Total investment
L_i^D	Sector's employment
Leon	Equilibrium checking variable
MC_q	Total imports
P_i	Sector's production cost
PC_i	Composite goods price
$PCHT_i$	Composite goods price exempt from TCA
PD_j	Domestic producer price
PDC_q	Domestic producer price of composite local goods
PDM_j	Domestic market price (TTC)
$PDMHT_j$	Domestic market exempt from TCA price
PEC_q	Domestic price of total composite exports
$PEUC_q$	Domestic price of total composite exports to the UDEAC zone
$PERC_q$	Domestic price of total composite exports to the ROW zone
PEU_n	Domestic price of exports to UDEAC countries

PER_n	Domestic price of exports to the rest of the world
Pindex	General consumer price index
PMC_q	Domestic price of total imports
PMU_m	Domestic price of imports from UDEAC countries
$PMUHT_m$	Domestic exempt from TCA price of imports from UDEAC countries
PMR_m	Domestic price of imports from the rest of the world (ROW)
$PMRHT_m$	Domestic exempt from TCA price of imports from the ROW
$PMUC_q$	Domestic price of composite imports from UDEAC countries
$PMRC_q$	Domestic price of composite imports from the ROW
PP_j	Production cost of goods and services
PVA_i	Sector's value added price
Q_i	Composite good supply
RK_i	Sectoral capital remuneration
RM_m	Imports from the rest of the world (ROW)
RMC_q	Composite imports from the rest of the world
$RTCACI_p$	Intermediate consumption TCA revenue
SG	Government saving
SM	Household saving
SS	Firms saving
$STP_{m,z}$	Imports proportional surcharge revenue
$TAXD_j$	Indirect taxes on local products revenue
$TAXE_{n,z}$	Export taxes Revenue
$TAXM_{m,z}$	Imports custom duties revenue
TAXP	Production tax revenue
$TCA_{m,z}$	Imports TCA revenue
$TDA_{m,z}$	Imports excise taxes revenue
tch	Unemployment rate
TPG_u	Generalized preferential tax revenue
UM_m	Imports from UDEAC countries
UM_u	Imports of products subject to the unique tax
UMC_q	Composites imports from UDEAC countries
VA_i	Sector's value added
XP_j	Domestic goods supply
XS_i	Sector's domestic output
YDM	Household disposable revenue
YG	Government revenue
YM	Household total revenue
YS	Firms revenue

Exogenous variables

BC	Global current account
e	Nominal exchange rate with the ROW

K_i	Sector's stock of capital
L^S	Total labour supply
PWE_n	Exports world prices
PWM_m	Imports world prices
CG	Government consumption
TMS	Household transfers to firms
TGM	Government transfers to households
TGR	Government transfers to the ROW
TRG	The ROW transfers to the government
TSR	Firms transfers to the ROW
TMR	Household transfers to the ROW
TGS	Government transfers to firms
TRM	The ROW transfers to households
TRS	The ROW transfers to firms
w	Average wages rate.

Parameters

a_{ip}	Input-output coefficients
A_i	Cobb-Douglas shift parameter
αi	Labour share parameter in the value added production function
λ_K^M	Capital remuneration share owned by household
λ_K^S	Capital remuneration share owned by firms
λ_a^U	Share of imported agricultural in total agricultural imports from UDEAC
λ_b^U	Share of imported industrial products in total industrial imports from UDEAC
λ_a^R	Share of imported agricultural products in total agricultural imports from ROW
λ_b^R	Share of imported industrial products in total industrial imports from the ROW
pms	Household average rate of saving
tdi	Dividends share received by household
tym	Household direct tax rates
trk	Firms profits tax rate
td_j	Indirect tax rates on local products
tda_j	Excise tax rates on local products
$tdd_{m,z}$	Imports custom duty tax rates
$tda_{m,z}$	Imports excise tax rates
tca_j	TCA rates on local products
$tca_{m,z}$	Imports TCA rates
tu	Unique tax rate
$tsp_{m,z}$	Imports temporary surcharge rates

tpd_j	Production tax rates on local products sold locally
$tm_{m,z}$	Average former imports custom duty rates
teu_n	UDEAC exports tax rates
ter_n	ROW exports tax rates
$tpeu_n$	Production tax rates on local products exported to the UDEAC
$tper_n$	Production tax rates on local products exported to the ROW
β_i^C	Share of good in household consumption
β_j^D	Share of local products sold locally
β_n^E	Share of local products sold on each external market
β_i^G	Share of good in public expenditure
β_i^I	Share of good total investment
β_{ij}^P	Share of good in sectoral production
io_i, v_i	Technology coefficients
B_q^M, B_q^{1M}	Armington shift parameters
δ_q, $\delta 1_q$	Armington exponents
ρ_q, $\rho 1_q$	Substitution parameters in the CES functions
σ_q^M, σ_q^{1M}	Substitution elasticity of imports
σ_n^E, σ_n^{1E}	Transformation elasticity of exports
B_n^X, B_n^{1X}	CET shift parameters
γ_n,$\gamma 1_n$,φ_n,$\varphi 1_n$	CET functions exponents