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# **TRADE AND EXCHANGE RATE POLICY OPTIONS FOR THE CFA COUNTRIES: SIMULATIONS WITH A CGE MODEL FOR CAMEROON**

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AND  
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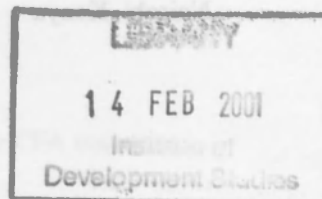
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# Trade and exchange rate policy options for the CFA countries: Simulations with a CGE model for Cameroon

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## List of abbreviations and acronyms

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AFZ	African Franc Zone
BEAC	Central Bank of Central African States (Banque Centrale des Etats de l'Afrique Centrale)
BCEAO	Central Bank of West African States (Banque Centrale des Etats de l'Afrique de l'Ouest)
CBN	Central Bank of Nigeria
CET	Common external tariff
CFAF	African Financial Community Franc (Franc de la Communauté Financière en Afrique) in West Africa, or African Financial Cooperation Franc (Franc de la Coopération Financière en Afrique Centrale) in Central Africa
CFAZ	CFA zone
CGE	Computable general equilibrium
ECOWAS	Economic Community of West African States
GDP	Gross domestic product
NTBs	Non-tariff barriers
QRs	Quantitative restrictions
RFRP	Regional fiscal reform programme
SAM	Social accounting matrix
SAP	Structural adjustment programme
SSA	Sub-Saharan Africa
TCA	Turnover tax (taxe sur le Chiffre d'Affaires)
UDEAC	Customs and Economic Union of Central African States (Union Douanière et Economique des Etats de l'Afrique Centrale)
UTCS	Uniform tariff-cum-subsidy
WTO	World Trade Organization

## Abstract

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This paper uses a computable general equilibrium model consistent with stylized facts about Cameroon to assess the impact of the 1994 regional fiscal reform. Two main elements characterize this model: it accounts for the asymmetric impact with trading partners and the dualism on product and factor markets through due consideration of both formal and informal sector's activities. Price formation in the model is standard, except that import prices are adjusted to take into account tax evasion and smuggling. Our analysis focuses on the macroeconomic impact and the welfare implications of the simulations. Overall, the various simulations lead to higher economic growth and expansion in employment. However, depending on the combination of taxes used, the sectoral effects are different. As a member of the CFA zone Cameroon can achieve a real depreciation on an individual basis through stringent fiscal and monetary policies or through a uniform tariff-cum-subsidy (UTCS) scheme, which is obtained via subsidies to selected export crops and high import tariffs. The simulation of this policy scenario leads to an increase in GDP at factor cost, while employment increases at a higher rate than in other scenarios; hence the unemployment rate falls and households' welfare increases. All households are better off in this simulation, although in the formal household category, welfare increased by a lesser amount.

# 1. Introduction

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All countries of the Communauté Financière en Afrique (CFA) have experienced negative external shocks (terms of trade, interest rates, effect of worldwide recession) since the 1970s. A deficient national policy environment and a weak industrial base increased the negative effects of these shocks and this in turn led to a loss of competitiveness of the domestic economy, manifested by deteriorating balance of payments, slow growth and unemployment. In such conditions, appropriate combinations of micro, meso and macroeconomic policies are needed to return to competitive equilibrium. The required policy packages were formulated in the structural adjustment programmes (SAPs). SAPs aimed to restore macroeconomic balance, to integrate the economy into the global economy, to greatly increase the role of (relatively undistorted) markets in allocating resources and to create the institutions needed for those purposes (Corbo and Fisher, 1993).

The structural adjustment policy mix includes stabilization (demand) and adjustment (supply) components. The objective of the stabilization component is to reduce aggregate demand to levels compatible with those of output and sustainable debt. This is achieved by adequate fiscal and monetary policies. The supply side of the SAP aims at reducing distortions to efficient production, which is obtained by liberalizing trade regimes, keeping the exchange rate close to equilibrium, moving away from price controls, reforming the public sector, restructuring the financial sector and reducing the rigidities in prices including wages. At the end of the process, it is expected that the economy's production and consumption would change in favour of fewer imports and more exports and domestic production.

Because of the specific characteristics of the monetary setup of CFA countries, SAP recommendations on the supply side included all but exchange rate policy. Results were not spectacular and pressure increased for including exchange rate policy in the package. On 12 January 1994, and after a long period of speculation, the CFA franc was devalued for the first time since 1948. The devaluation was reinforced by the adoption of a new fiscal code by the Central African Customs and Economic Union (UDEAC) within a Regional Fiscal Reform Programme (RFRP). The new fiscal code was expected to create a neutral and flexible trade and fiscal incentive system.

The principal objective of this research was to assess the impact of this reform package. A major focus is on the fiscal reform, which is assessed using a computable general equilibrium (CGE) model. The use of CGE modelling for assessing trade policy options is motivated by three considerations. First is the realization that prices matter, as they adjust with quantities to clear product and factor markets, with the speed of the adjustment

depending on prevailing constraints. The second consideration is that interaction between markets and sectors also matters. Finally, the economic structures are important; the relative shares of sectors as well as the power of social groups are useful in understanding policy on both efficiency and sustainability grounds. CGE is particularly useful here as partial equilibrium analysis can take into account neither direct and indirect policy effects nor specific structural features of the economy under investigation.

Our principal objective is reached via three specific objectives. The first objective is to provide a synthesis of trade and exchange rate policy options under fixed and flexible exchange rates with reference to CFA member states. The second specific objective is to construct a social accounting matrix (SAM) and a CGE for Cameroon that are conducive to the analysis of trade policy based on data portraying the prevailing structure of the Cameroon economy. The final objective is to simulate alternative trade policy options in order to investigate their impact on growth performance.

The rest of the paper unfolds as follows. In section two we present the trade and exchange rate policy options in Cameroon and other CFA countries; section three provides a description of the SAM used for the calibration of the model, which is specified in section four. Section five presents the simulation experiments and section six concludes with the ensuing policy recommendations.



## **2. Trade policy options in Cameroon and other CFA countries**

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In Cameroon and other countries in the CFA Zone (CFAZ) the trade regime in the pre-reform period (middle to late 1980s) included a restrictive tariff, a non-tariff protection scheme and widespread price controls on most manufactured products. On top of these there was a marketing board for the main agricultural export crops (coffee, cocoa). These measures were, as well, part of an overall discretionary scheme for tax exemptions on most products within the investment or tax codes. This trade regime in general led to an important bias against exports. The implicit tax on Cameroonian export sectors resulting from tariff protection has been estimated at 27% in the short run and a loss in output evaluated at 3.3% of the 1988 GDP (Njinkeu, 1996).

In such a distorted environment trade policy can be appropriately evaluated only when it includes commercial policy, exchange rate policy and marketing issues. Trade policy is viewed as including all measures whose impact can change the incentives for producing or consuming either tradeable goods versus non-tradeable or some tradeable goods relative to others. We concentrate on exchange rate and trade policies.

### **Exchange rate policy options**

Despite the now accepted need for appropriate exchange rates for international competitiveness, devaluation leads to hot controversies. Devaluation has a contractionary effect on the overall economy, and the reliance on real exchange rate targeting to protect external competitiveness leads to inflation, which is costly. Furthermore, maintaining a fixed exchange rate can lead to a policy credibility issue. We address each of these issues with specific reference to CFAZ and particularly to Cameroon. We use data on recent developments in the zone to illustrate.

### ***Impact of currency devaluation***

The theoretical impacts of devaluation in an economy with a fixed exchange rate regime are well known. In the short run a devaluation of the currency will lower the real exchange rate and can have an expansionary effect on the demand for non-tradeable goods and the production of tradeable goods. This result, however, depends on whether there is full capacity utilization or not, and on the relative importance of the tradeable relative to the non-tradeable. In the presence of underutilized capacity, currency devaluation is

expansionary. When we allow for tradeables and non-tradeables, devaluation has no effect on output as there will be resource shifts from the production of non-tradeables to that of tradeables without a change in the aggregate level of output or employment.

When the level of the exchange rate is determined by its fundamentals, devaluation is not necessarily contractionary in the long run. However, in the short run, there are effects arising from demand and/or supply sides, and the relative sizes of traded versus non-traded goods sectors. For traded goods, a currency devaluation stimulates production, unless production costs rise in the same proportions. The situation is less clear on the non-traded goods sectors as the effect depends on the relative weights of private consumption, private investment and government expenditure. Overall, exportable sectors expand, while importable sectors shrink. The net effect on the non-tradeables and the overall output is ambiguous.

The effect on investment is ambiguous as well. A devaluation as a component of a liberalization programme renders capital goods expensive in some sectors and relatively cheaper (or at least available) for others. This change in the relative price of capital to firms causes shifts within and between sectors without prior knowledge of the net effect. Private consumption and investment will most likely rise due to reduced household income, an income redistribution in favour of households with low marginal propensities to spend, high interest rates induced by currency devaluation, and the rise in the price of imported capital and intermediate goods. The effect on government expenditure is contractionary when the government is a net external debtor. Moreover, these effects may be weakened or reversed depending on whether the private sector is a net international creditor and whether the private sector's domestic assets are indexed to the price level; or it could depend on private agents' anticipation of devaluation and its likely effect on interest rates. The substitution effect of devaluation or the induced shift in domestic demand from traded to non-traded goods is also important.

On the supply side, domestic production cost usually increases in both sectors as a result of currency devaluation. If wage increases are not substantial, production of traded goods is stimulated. The impact on the non-traded goods sectors is uncertain. Specific conditions may also weaken or reverse these conclusions. If overall the traded goods sectors experience an expansion, the short-run impact on the non-traded goods sectors depends on specific conditions. Nothing is clear for either subgroup of these sectors (tradeable and non-tradeable) and a disaggregation of these categories is necessary to trace the welfare impacts on the socioeconomic categories.

A related issue is that of real exchange rate targeting. Exchange rate policy concerns the real exchange rate, which reflects the relative competitiveness of the domestic vis-à-vis the foreign economy. It defines the ratio of foreign prices in domestic currency units relative to the domestic price. Under a fixed exchange rate regime, if the real exchange rate is low, domestic goods are too expensive compared with foreign produced goods and sales of domestically produced goods shrink, leading to unemployment. To return to competitive levels, the exchange rate must be devalued via a nominal devaluation, or by allowing some flexibility in domestic prices, of which wages play a key role. If there are rigidities in domestic prices, and devaluation is excluded, adjustment becomes very difficult.

In the case of currency over-valuation in CFA countries, a country can achieve a real depreciation on individual basis through stringent fiscal and monetary policy and in so doing, achieve a nominal deflation in the domestic price level or less deflation relative to its trading partners. A real devaluation can also be achieved through a uniform tariff-cum-subsidy (UTCS) scheme, also called mock devaluation, which is obtained via subsidies to selected export crops and high import tariffs. A third option is the reduction of domestic costs by lowering prices of selected non-tradeable inputs such as water or electricity, or lowering wages or allowing a more flexible labour market. The wage structure, despite a recent reform of the labour code, is quite rigid in Cameroon. Trade liberalization alone in such circumstances will not lead to the required adjustment.

To decide the needed rate of devaluation, it is necessary to determine the extent to which the currency is over-valued. One option is the purchasing power parity (PPP) based exchange rate, using as the base a year during which the level of imbalance in the trade or fiscal deficit was at a sustainable level. The recommended rate of devaluation is given by the inflation differential between the country and its trading partners. PPP calculations raise theoretical and empirical problems analysed by Devarajan et al. (1993). An alternative to the PPP approach is to rely on the Salter–Swan dependent economy model modified by allowing imperfect substitution via the Armington (1969) assumption and using the price indexes of tradeables and non-tradeables. The CGE framework presented in section three meets that requirement.

### *Exchange rate options*

Maintaining a fixed exchange rate can lead to policy credibility issues, unless accompanying instruments are available. Strict financial discipline is required for maintaining a fixed exchange rate regime. Otherwise, several devaluations of the currency will be required and this could increase the uncertainty on the flow of goods and factors of production. Constraints imposed by a fixed exchange rate include: (1) equality of domestic and world inflation appropriately adjusted for currency depreciation; (2) equality of the rate of real output and the rate of growth of money net of the rate of world inflation; (3) maintenance of growth of credit below or near the rate of growth of nominal income.

Fixed exchange rate regime is a credible policy under specific conditions; that is, it depends upon the consolidated account of the financial and nonfinancial public sectors. Solvency of this consolidated account is obtained and financial discipline guaranteed when the present value of anticipated future primary surplus is at least equal to the face value of the public sector's debt net of seignorage revenue. A fixed exchange rate limits seignorage revenue and consequently the resources available to the public sector. Substantial reserves are hence required. Financial discipline can be maintained with a fixed exchange rate regime if the monetary authorities can use currency devaluation to reduce or eliminate debts that are denominated in domestic currency. Seignorage revenues and inflation have been negligible in the CFAZ as compared to other countries, but real interest rates are higher for the CFA countries.

Whether the exchange rate should be permanently fixed or changed frequently also depends on the issue of time consistency. For the policy to be time consistent, periodic adjustments are preferable, as the authorities can use the exchange rate to orient the inflation rate to socially desirable objectives. This requires that private agents either do not anticipate currency devaluation or that they are convinced the government is committed to price stability and will not devalue several times.

Whether a permanent peg, such as the CFA arrangement, is sustainable therefore depends on the cost to a country of abiding by the rule. If the cost to a country that opts to leave the agreements and manage its own exchange rate policy is too high, partners will never take this option—the consequence being, sometimes, heavy social costs in case of external shocks. One alternative is to adopt rigid exchange rate rules for devaluation. These rules consist of either linking the decision with specific external shocks, or giving more autonomy in the management of the central bank to central bankers committed to price stability (see Aghevli and Montiel, 1991), which is comparable to a crawling peg regime (Neary 1991).

Several authors have studied the choice of exchange rate regime and of the adjustment tools.<sup>1</sup> Devarajan and de Melo (1987) and Devarajan et al. (1990) looked into this issue for the CFAZ. For the 1970s, the member countries could use tariff protection, domestic taxes and government expenditures to obtain the necessary depreciation in the real exchange rate. This was not possible for the 1980s and the early 1990s, however, when the same institutional arrangement could not provide the necessary depreciation of the real exchange rate.

A permanent peg is sustainable in the long run if wage policy is consistent with continued profitability in the traded goods sector, which in turn depends on the inflation profile. To ensure inflation discipline, the monetary and fiscal policy frameworks must be considered jointly. When correctly implemented, the equilibrium discretionary solution for inflation will be the same in an adjustable peg regime as in the flexible rate case. Insulation is another desirable characteristic of the exchange rate regime. It measures the capacity of the policy regime to adequately react to shocks, external or domestic. The extent of factor price flexibility (especially wage) is important in this case. When wages are perfectly flexible, the two regimes are equivalent irrespective of the origin of the disturbance. In case of imperfect wage flexibility the origin (domestic or foreign) is important and a fixed exchange rate is more stabilizing than an adjustable peg. The contrary is true for the adjustable peg and in the case of supply shocks. Concerning shocks originating on the international market, if wages are not flexible, no definite conclusion can be drawn.

A natural question then concerns the relative cost and benefit of fixed and flexible regimes. The evaluation of the pros and cons of the flexible versus fixed exchange rate regime is related to the trade-off between inflation and growth.<sup>2</sup> Exchange rate can be looked at from either the real target or the nominal anchor. In the real target approach, the exchange rate is an indispensable tool for achieving domestic and external balance. Exchange rate policy is therefore used very often, sometimes on a discretionary basis, to fine-tune the economy. An appropriate combination of expenditure-switching policies (trade and exchange rate policies) and expenditure-reducing policies (fiscal and monetary

policies) is called for. In the nominal anchor approach, frequent use of exchange rate policy is not stabilizing. The inflationary cost of modifying the exchange rate is far greater than the benefits. Especially when we take price expectations into account, a fixed compared with a flexible exchange rate regime is more beneficial.

The adoption of a fixed exchange rate is acceptable under four conditions. First, the economy is small enough that its membership in the currency union is compatible with optimum currency area requirements. Second, the currency is pegged to a currency or basket of currencies covering at least 50% of foreign trade. Third, the economy can sustain an inflation rate consistent with the currency to which the peg is made. Fourth, the country is willing to accept the constraints imposed by the arrangement. An analysis of trade orientation and other selected economic indicators for the CFAZ suggests that these four conditions are not met. Analysis of foreign trade data revealed that France is the principal partner, followed by Holland or the USA depending on the level of bilateral exchange rates. Performances differ on the import and export sides. The share of imports from France has always been greater than 40%, but substantial variations exist for exports. Overall, total trade with France has fluctuated with a downward trend. Management of trade and exchange rate policies should pay special and differentiated attention to the export and import sides. The differentiated trend of exchange rate on the import and export sides suggests that commodity composition is important.

## Trade policy options

Like most developing countries, members of the CFAZ put in place during the early years of their independence a strategy of global economic development characterized by protectionism including important tariff barriers and quantitative restrictions (QRs) on imports. Since January 1994, the tariff protection is legislated in Cameroon by a more liberalized fiscal code—the UDEAC's regional fiscal reform programme (RFRP).<sup>3</sup> On the import and export side, the programme distinguishes goods according to their origin and destination within or outside the region. Unlike the former tax system with its four main taxes, the new system has only two main groups of taxes. The first element is the common external tariff (CET), comprising customs duty and temporary surcharge taxes (excise and progressive taxes). The second is the turnover tax (TCA) whose base is the sum of the cost, insurance and freight (cif) value, the customs duty, and the temporary surcharge tax value where applicable.

In the customs duties, code products are classified in either of four groups, representing successive levels of product transformation. Group I products include necessary goods and have the lowest rate. Group II includes primary and equipment products. Group III products include semi-finished goods and group IV comprises consumption goods. The tax rates per category are 5%, 10%, 20% and 30%, respectively. A temporary surcharge tax was put in place to substitute for the protection formerly provided to firms via non-tariff barriers (NTBs). It is thus temporary and its rate varies according to products but may not exceed 30%. All QRs were mandated by the reform to be abolished in all UDEAC member states by 30 June 1996 and the rate for the temporary tax was to reach zero by 1999.

Sales on local markets are subjected to indirect taxes made of two components: (1) an excise tax and (2) a turnover tax. Each of these taxes has budgetary considerations. For locally produced goods and services the tax base is either the ex factory price or the market price, net of other taxes. The turnover tax has two rates; a normal rate and a reduced rate, with the latter being applicable for essential products. The turnover tax is comparable to a value added tax. Medicines, books, medical and surgical equipment, and manufacturing equipment are exempted from the TCA, and the tax paid on raw materials is deductible when the finished products is sold. The rates are freely fixed by each member state within the range of 3% to 6% for the reduced rate, and 7% to 18% for the normal rate. In July 1994, the rates fixed in Cameroon were 5% and 15%. In July 1996, these rates went, respectively, to 7% and 18%; the excise as well as temporary taxes on imports and exports are still not applicable.

The impact of the change of the turnover tax rates, which now constitute the main tax base in Cameroon, is analysed with the CGE model presented in the next section. Our major concerns are the impact on growth. We are also interested in the specific effects on sectoral output, employment, trade and fiscal balance, and the distributional costs of the fiscal policy adjustment. The construction of an appropriate SAM is a prerequisite to the modelling process.

### 3. Description of the SAM

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The quality of the results deriving from the CGE model depends on the data used as summarized in the social accounting matrix (SAM). A SAM gives a snapshot of the economy at one point in time (base year). In our case, the base year is 1989/90, chosen because it precedes the 1990 liberalization in Cameroon and is more representative of economic conditions at the time of the reform. It was also the most recent year for which such work could be done. The input-output was completed in 1993 by the Ministry of Planning, and was used to construct the generic SAM reported in Njinkeu et al. (1994).

Our SAM has a total of 73 accounts divided into 9 blocks (factors, institutions, sectors, products, local market, import market, composite good, export market and investment-savings). There are two factors of production (capital and labour) subdivided into formal and informal sectors. There are four groups of market participants or institutions (households, firms, the government and foreign partners). Households are distinguished according to the place of residence and the sector of occupation. This classification is made so as to consider a poverty profile that allows welfare assessment and is consistent with stylized facts about Cameroon, including the distinction between urban and rural, formal and informal, and employed and unemployed.<sup>4</sup> We therefore obtain four household categories (informal rural households [IRH], informal urban households [IUH], formal households [FH], and unemployed households [UH]). Because of lack of social security, unemployed households' revenues are made up of transfers from other household categories. Foreign partners are distinguished according to the exchange rate regime: CFAF zone (CFAZ), Nigeria (NIG) and the rest of the world (ROW).

Imported goods are imperfect substitutes for similar tradeable goods produced domestically. Such composite goods are used for intermediate consumption, final consumption or both. Domestic sales of an exportable and sales on each of the three markets are also Armington aggregates. A step-by-step aggregation is made, as described above. A household consumes an aggregate bundle of goods originating from either of four sources (Cameroon, the CFAZ, Nigeria or ROW). We consider one representative firm and one government.

Eleven sectors are considered, of which four are in agriculture: formal food agriculture (FFA), informal food agriculture (IFA), formal rent agriculture (FRA), and informal rent agriculture (IRA). Three are in industry: export-oriented industry (EIND), other industries in the formal sector (FAIN) and the informal industrial sector (IAIN)). We have one oil sector (OILS) and three service sectors: public service (NTSS), formal service sector (FTS), and informal service sector (ITS). These 11 sectors supply the market with 7 products, which are sold on either domestic or foreign markets. Domestic consumers

choose from a basket made of non-tradeables or a composite of imports and domestic substitutes of each tradeable. Savings–investment balance is given in an "accumulation account".

Households' incomes are obtained from factor (labour, capital) remuneration, dividends and transfers from the government. Total dividend is distributed among households and is paid by firms only on formal sector capital. Firms' revenues are made of capital remuneration and transfer received from the government. Because of the deficient social security system, the unemployed get their revenues from households. We assume formal households pay an income tax while informal households and the unemployed pay a lump-sum tax.

Adjustment policies with poverty concerns are designed in such a way that poorer segments of the population stand a higher probability of resisting external shocks. This is obtained by either direct transfer or putting in place institutions that are conducive to their greater participation in market transactions. Targeting aims at making transfers to the poor so that their income level after the transfer is above the stated poverty line. Our approach is to assess whether the immediate impact on the household category that includes a higher share of the poor has its welfare improved.

Policy with poverty alleviation concerns can focus on perfect targeting of the poor when this is possible, not only subsidizing the poor for the losses that ensue from the policy but compensating them in such a manner that their total income rises above the poverty line. An alternative to this is a universalistic targeting by which all households are subsidized to the extent that none remains below the poverty line. It is evident that such an approach requires a larger budget and the amount may be prohibitive, in addition to the possibility of increasing an inequitable income distribution. An appealing approach is to associate each policy option with its likely impact on economic welfare differentiated by socioeconomic categories. We follow such an approach, and we do so by considering the implied social safety net of our model. This relies on exogenous transfers among the institutions considered in our SAM: the four household categories, the unemployed, the representative firm, the government and the foreign agent.<sup>5</sup>



## 4. CGE model specification

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Modelling Cameroonian trade options integrates the following elements: (1) asymmetric impact with trading partners; (2) a particular attention devoted to cross-border trade with Nigeria, with possible impact on the economic structures; and (3) the dualism of product and factor markets through due consideration of both formal and informal sector activities. These elements are important to capture the salient characteristics of the Cameroon economy: first it is a small open economy in which firms produce for sale on local and foreign markets, and households choose between locally produced and imported goods. Moreover, Cameroon has a dualistic production structure wherein a traditional (informal) sector with rather weak infrastructure and a modern (formal) sector coexist. This carries over to the labour market, which is segmented, with high unemployment and a shortage of skilled workers. Social welfare standards are also low, and the wealth distribution is highly skewed. Finally, pricing practices differ according to the sector of production or the foreign markets.<sup>6</sup>

### Analytical framework of the modelling approach

The analysis of trade policy options is done with a standard Salter–Swan dependent economy model in which the tradeable sector is divided into importables and exportables, with associated welfare indicators appearing to be minimal requirements. Adjustment policies aim to reduce the level of aggregate demand, switch consumption away from foreign produced goods and production toward tradeable goods, and expand supply. The Salter–Swan dependent economy framework is a good benchmark, since it distinguishes the tradeable and non-tradeable sectors of the economy. If the analytical framework is limited to the tradeable sectors, such as the Balassa–Corden effective protection analytical framework, the effects of currency devaluation cannot be considered. Likewise, a model based on non-tradeables only is not useful since in such an economy terms of trade shocks are not an issue.

For that matter, standard international trade theory suffers from a major deficiency. The small open economy assumption requires that the country be a price taker on the international market, leading to perfect substitution between an importable and a domestically produced tradeable good; the price of non-tradeable goods is also assumed to be determined entirely by conditions prevailing in domestic markets. The framework also assumes constant returns to scale that lead to complete specialization and that rule out two-way trade. Likewise, the assumption of no substitution between domestic goods

and imports—as in a two-gap model—makes foreign trade policy useless. Tradeable and non-tradeable sectors have to be taken into account and importable and exportable sectors distinguished, so that import tariffs, export subsidy and taxation schemes can be considered. This is accomplished via the Armington assumption, which introduces a composite good at the production and consumption levels.

The Armington assumption is an improvement over two alternatives in the literature. The first is the trade theory framework in which distinction is made between traded goods that are perfectly substitutable for imports and non-traded goods whose prices are entirely determined by local conditions. The additional constant returns to scale assumption leads to extreme specialization in production; this pattern of specialization is rarely (if ever) observed.

The second alternative framework, arising from structuralist analysis, assumes zero substitution between domestic and imported goods. This framework leads to the conclusion that trade policy can be useful in closing the foreign exchange gap, as suggested by a two-gap type model. The Armington assumption allows us to make up a composite good and to allow for two-way trade at sectoral levels, as well as price differentiation between domestic and foreign produced goods.

Policy directed toward one sector affects others, and under the prevalent constraints (economic, institutional) of developing economies, the adjustment process may be slow. The role of the key players and the adjustment process may be handled by either the choice of adequate functional forms used to model consumers' and producers' optimizing behaviour, or the closure rule adopted,<sup>7,8</sup> or both.

## The basic structure of the model

The model is presented in five blocks (production, income and savings, demand, price, and equilibrium). In the production block, the production process is a two-step nested structure. At the top level, primary inputs (labour and capital) are combined with a Cobb–Douglas technology to make up value added; this is combined within a fixed coefficient Leontief technology with intermediate inputs at the second level to give the output.

Households receive the larger part of salaries, while a small part is paid to the CFAZ countries as salaries for foreign workers.<sup>9</sup> The capital remuneration is distributed among local agents (households, companies and government) who are owners of the capital invested in the production activities. These agents save after paying taxes, consuming and making transfers. The sum of savings is used to finance global investment. Because of the lack of institutions, the unemployed are considered only as consumers and supported by local workers.

In the demand block, quantity of imports, exports, supply and local demand are Armington aggregates. These quantities may be considered from either a technological or a behavioural point of view. An Armington aggregation of sales on domestic and foreign markets makes up the total supply of each good. A similar relationship for the constant elasticity of substitution (CES) aggregation of domestically and foreign produced

goods holds on the demand side. We assume consumers do not distinguish goods according to the sector (formal or informal) in which they are produced.

Households and the government demand consumer goods and firms demand intermediate and capital goods. We assume that prior to making their consumption decisions, each household category and the government decide on the proportions of their income to save. The ensuing net income together with prices determines the amount of consumer goods demanded by each category.

Consumption goods are Armington aggregates of imported and domestically produced tradeable goods. A consumer chooses the combination of goods so as to minimize total expenditure necessary to achieve a stated level of utility. A composite of each tradeable commodity is made as a CES function of domestic and foreign produced goods so that demand for either imports or domestically produced goods is a derived demand arising from a cost minimization. In this case, the optimal point is characterized by the equality of the ratio of imports to domestically produced goods and the price ratios. The magnitude of substitution elasticity determines the responsiveness of domestic demand to changes in the relative prices of imported goods brought about by trade and exchange rate policy.

The structure of an imported good depends on its origin. At each level, a CES Armington aggregation scheme is used. Total imports are a two-step process. At the first level, the importer chooses between a first group comprising goods from either the CFAZ or Nigeria and a second group of goods imported from the rest of the world. The second level assumes the imported good is made up of a basket either from Nigeria or other CFAZ countries or from the rest of the world.

Finally, the basket of Nigerian or CFAZ countries' products is also a CES aggregate. Exports are also considered at two levels. Initially, total export is the sum of export to the CFAZ countries versus the rest of the world, with this last component considered at the second level as the combination of exports to Nigeria and the rest of the world. At each step, a constant elasticity of transformation function is postulated with its associated transformation elasticity. These processes allow the choice of a commodity used by the consumer or produced by the producer to depend upon the substitution elasticity that varies with the origin and destination in the case of exports.

Price formation in the model is standard, except that import prices are adjusted to take into account tax evasion and smuggling. In the equilibrium block, the model is closed by appropriate normalization. We fixed the exchange rate and allowed the external imbalance to adjust to equilibrium. The equilibrium on the product market is such that the supply of composite commodities equals their demand. Equilibrium in the factor markets is obtained by the equality of the labour supply with the sum of the demand for labour by both informal and formal sectors and unemployment. Equilibrium on the foreign market establishes a relationship between the exchange rate and the current account.

Summaries of these blocks (Table A1), as well as the complete specification of the model—which comprises 394 equations with 394 endogenous variables (Table A2)—are given in the Appendix. The Appendix also includes the complete list of variables and parameters of the model (Table A3).

## Specific features of the model

Our model is not the first CGE model of Cameroon,<sup>10</sup> but it has three particular features. First, we use a SAM based on an input-output matrix that is more representative of actual economic conditions. Second, we introduce distributional considerations based on a household classification that takes into account preference variations. Finally, we explicitly introduce market segmentation into formal and informal sectors.

There is substantial unrecorded or under-recorded trading across the Nigeria–Cameroon border. Reasons for such trading include CFA franc (CFAF) convertibility, a diversified production structure in Nigeria and the CFAF/naira exchange rate. Even though goods from Nigeria are not of better quality, their prices are usually low enough to make them attractive to Cameroonian households, especially since the onset of the current depression.

Prices of imports from Nigeria are determined by several factors: sales prices in Nigeria, transport costs, Nigerian export taxes, Cameroonian import duties, enforcement of legislation on irregularly imported goods into Cameroon and demand pressure. Although no quantitative assessment is available, most goods are believed to be imported duty free or at a token rate, with the difference between the regular rate and that paid being a rent that is shared by the customs and law enforcement officials. To allow for illegal trade or border penetration, a smuggling rate is used on the import side of each of the foreign trade zones; this is obtained by allowing different foreign trade tax rates.

To take into account the dualism of formal and informal sector activity, the primary factors (labour and capital) are distinguished in the model into formal and informal. We assume that these factors are sector specific<sup>11</sup> and sectoral production ( $XS$ ) is differentiated between formal and informal. However, at the distribution stage, formal and informal sector production is combined to give a composite good.

Labour is mobile in the model; the wage rate in the formal sector is fixed while it is market determined in the informal subsectors. In the formal sector, there is minimum wage legislation that constrains firms to pay higher wages than desired. Some firms avoid this legislation by operating in the informal sector, where—in addition to not paying the minimum wage—they do not pay taxes. Operation in the informal sector is costly, however. Whether firms operate in the formal or the informal sector is a reflection of technology and other characteristics. Although lower wages and zero tax are paid by firms in the informal sector, there are additional costs that they bear to avoid being caught by the tax administration.<sup>12</sup>

Workers in the formal sector earn an exogenously determined wage,  $w$ , while those in the informal sector earn a smaller rate,  $w_i$ , determined by market and technological conditions. The workers who get a job in the formal sector get a rent. Accordingly, a worker has options for informal or formal sector. But the latter option requires waiting until a job is available. The model thus contains two types of labour, formal and informal. Formal and informal labour is used exclusively in either the formal or the informal sectors. We assume that firms in the formal sector are constrained by wage determination as stipulated by the government. We allow for unemployment with an unemployment rate

determined by the wedge between labour supply and total sectoral demand relative to total labour supply.<sup>13</sup>

Incorporation of informal sector activities also relies on its treatment in the input-output matrix. The sample of firms on which the aggregates were determined was made in 1977/78, but only those operating in the formal sectors had been followed. For 1989/90, an estimation of the contribution of the informal sector was made for each sectoral classification based on data from the ministries of agriculture and livestock, and the 1983/84 household survey; they were also supplemented by sporadic field data. Overall, the informal sector represents 43.11% of total GDP, a contribution that varies across sectors.<sup>14</sup> 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; it is based on compensating variation (CV) and equivalent variation (EV).

## 5. Simulations and results

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An economy always experiences a complex combination of phenomena, so that it is hard to single out the impact of a given policy from the impact that can be attributed to these phenomena. Simulation of policy initiative in CGE gives an ideal way of analysing the effect of a policy that other analytical tools do not permit. A trade liberalization policy can alter the real exchange rate and the incentive structure in favour of tradeables. The resource allocation leads to gains and losses that may require some accompanying measures to deter opposition by losers or to minimize the negative impacts. The process by which the impact is transmitted to the relative price and the effect on the income of various social groups is uncertain and should be thoroughly assessed. The result of the simulations indicates those sectors that contract and those that expand under different policy scenarios and the net effect on the overall economy. Endogenous trade policy is another available substitution for currency devaluation via the structure of protection.

Our analysis of tariff reform in Cameroon is based on two groups of simulations at two levels of disaggregation, of which one considers a single foreign market and the other distinguishes among three market destinations: CFAZ, Nigeria (NIG) and the rest of the world (ROW). The first group of simulations is based on a model without specific consideration of the trade zone, while the second is made of those where producers or consumers consider that the export market comprises the CFA zone, Nigeria and the rest of the world. Within each group we consider the application of a uniform export subsidy and a uniform import tariff together and a policy by which import tariff is increased and export tax is reduced at the same rate.

According to the 1994 reform, import tariffs on all exports are harmonized around an average of 18.7% and agricultural and other raw material exports are taxed to satisfy the government deficit constraint. In each case we focus on the variation of key endogenous variables with respect to the base year; this is characterized by four facts:

1. We normalize all prices net of taxes to unity; this includes the wage rate in the formal sector. The wage rate in the informal sector is 40% lower than that in the formal sector but is endogenous in all simulations.
2. Informal sector activities demand 72% of labour, but yield only 43.48% of total value added and 39.87% of production at factor cost.
3. The informal and formal households share approximately 50% of total consumption.

4. There are both trade and current account deficits representing, respectively, 4.6% and 10.5% of total GDP.

## Presentation of simulations

Five simulations are realized under two alternative foreign market considerations (one and three). The first two simulations focus on direct fiscal measures that have been undertaken by the government. Simulation 1 (Sim 1) reproduces the proposed UDEAC regional fiscal reform, which consisted of the harmonization of import tariff at the level of 18.7%. This implies an increase by 23% of the average rate used in the SAM.<sup>15</sup> Simulation 2 (Sim 2) extends the tax harmonization to the export sector. This combines simulation 1 with uniform taxation of agricultural exports at 5%, which is the average tax rate on those exports at the base year. Taxation of agricultural and other raw material exports was required to meet the budgetary constraint in the 1995/96 financial law. The other policy simulations consider alternative fiscal measures that were not undertaken in the 1995/96 fiscal year. Simulation 3 (Sim 3) is the same as simulation 1 with subsidy of all exports at 5%; simulation 4 (Sim 4) is a unilateral import liberalization, which involves cancellation of all taxes on imports.

Another alternative to devaluation is a uniform tariff-cum-subsidy (UTCS), by which a constant ad valorem tariff is applied to all imports and an equal subsidy to all export. A UTCS can lead to undesirable results such as the under-invoicing of imports and over-invoicing of exports. Although the over-invoicing is less likely than under-invoicing, the government needs to have sufficient resources to pay the export subsidy. Such an asymmetry has welfare as well as resource allocation impact. In a competitive environment UTCS is equivalent to a devaluation of the commercial rate in a dual exchange rate system. However, by inducing a differential between the domestic and foreign prices of traded goods, a UTCS may facilitate the emergence of illegal trading activities and hence lead to asymmetric policy effects on imports and exports (O'Connell, 1992). By this asymmetry the import price is less than the full tariff-inclusive price and the export price is higher than the subsidy-inclusive price. Accordingly, the domestic price of exports in terms of imports rises as a result of an increase in the UTCS rate and invoicing fraud therefore leads to a real equilibrium different from what is expected from the policy. Illegal trade thus significantly weakens the case for uniform trade taxes as proxies for devaluation, but the net effect is uncertain. Our CGE is therefore useful to that effect. Simulation 5 (Sim 5) considers a uniform tariff-cum-subsidy (UTCS) at 5%.

## *Analysis of simulation results*

Our analysis focuses on the macroeconomic impact and the welfare implications of three simulations (see Table A4). To differentiate the trade regime two versions of the model are considered: the case of one foreign market and the case in which we distinguish among trade with Nigeria, the CFAZ and the rest of the world.

Assuming one foreign market, the GDP at factor cost increases by 0.89% when the uniform 18.7% rate (Sim 1) is used. Such an increase is due to the large increase in formal sector activities (2.03%), which outweighs the 0.6% fall in informal sector production. The overall economic activity leads to an increase in employment that in turn leads to a fall of 6.10% in the unemployment rate. The budget deficit also falls (by 5.9%) as a result of an increase in customs receipts, but the trade balance deteriorates by 2.69%. The combined effect is positive on informal rural and formal households' welfare, which increases by, respectively, CFAF 0.18 billion and 14.83 billion; informal urban households lose CFAF 1.28 billion.

Import prices increase as a result of a shift away from imports in favour of locally produced goods. The increase in the demand for locally produced goods leads to an increase in their prices with beneficial impacts on producer prices and factor rewards. Labour therefore becomes relatively more scarce and hence more expensive in the formal compared with the informal sector. This leads to increased employment in the informal sector. The increase in formal sector activities is higher than the fall in the informal sector, however, which explains the fall in unemployment. On the foreign market, the informal sector contributes more to total exports; this explains why the fall in value added combined with the deterioration in the relative price of local production leads to a more than proportional fall of exports relative to imports and hence the deterioration of the trade balance.

These effects on production are reinforced in the second simulation experiment (Sim 2). GDP at factor costs increases more (2.42%, compared with 0.89%) and employment increases even more as the unemployment rate falls by 25.65%. These positive effects on production lead to an increase in household welfare of CFAF 9.27, 2.07 and 15.49 billion for informal rural households, informal urban households and formal households, respectively. In this simulation, informal household welfare increases relatively more. At the macroeconomic level the budget deficit falls by 11.33%. Because of the combined price effects due to increases in exports and the income effect arising from the import side, the deterioration in the trade balance is higher (10.91%).

According to simulation 3 (Sim 3), most of the effects on the production side remain. The distinction is on the macroeconomic scene, where the impacts on the deficits are different. The budget deficit deteriorates by 7.51% and the trade balance improves by 9.28%.

The overall impact of simulation 4 (Sim 4) on the budget deficit and the trade balance is negative. They deteriorate by 27.72% and 20.15%, respectively. The effect on the formal sector is positive (1.04%), unlike the impact on the informal sector (-0.72%), but the net effect on production is an increase of 0.28; as a result, the impact on employment is smaller than in the previous simulation. The impact is positive on households, especially the rural informal ones, as a result of the positive price effect.

The last simulation (Sim 5) based on a single foreign market assesses the impact of a uniform tariff-cum-subsidy scheme. Overall GDP at factor cost increases by 1.67% as in the third simulation and employment increases but at a higher rate than in the third simulation. As a result, the unemployment rate falls by 16.12% and household welfare increases. Except for the formal household category, for which welfare increases by 16.56 rather than 21.39 as in Sim 3, all households are better off in this simulation.



A central issue in this research is whether the policy impact changes when we consider alternative trade regimes. The simulations are therefore reproduced in a model where three, rather than one, foreign markets are considered. As expected, some of the results are significantly modified.

When we incorporate these alternatives into Sim 1, there is almost no change in either sectoral production or total GDP at factor cost; as a result, the level of employment and welfare do not change. Instead, other macroeconomic aggregates change substantially. The budget deficit falls by 36.16%, while the fall was only 5.91% in the original Sim 1. The trade balance deteriorates by 4.14% rather than 2.69%. The impact differs according to the region. The initial surplus with the CFAZ deteriorates by 48.56%; the deficit with Nigeria deteriorates by 30.38%, but improves by 18.27% with the rest of the world.

Unlike the direct substitution of imports by locally produced goods that was observed with one foreign market, when three market destinations and origin are distinguished, there is a first substitution between goods imported from each of the three foreign markets. Such an effect, due to relative price changes, is more pronounced for food and rent agricultural products that are cheaper in the CFAZ, causing an increase in imports from CFAZ compared with the other two foreign markets. For the other tradeable goods category (TS), they become cheaper when imported from the CFAZ or Nigeria compared with the ROW. As a result of these shifts in relative profitability, the trade balance with the three zones differs. Only a limited substitution is observed between imports and domestic production. However, such a limited demand can induce a producer price increase, leading to a boost of factor rewards that cause a higher demand for capital in formal sector activities and a lower labour demand in the informal sector.

Different patterns are obtained for the second simulation with differentiated trade regimes. The formal sector's production falls by 0.01% and there is an increase of 0.72% in the informal sector's. In this case also the budget deficit improves while the trade balance deteriorates.

With respect to unilateral liberalization, there is substantial increase in economic activity: GDP increases by 7.33% compared with the 0.28% obtained with one foreign market. This result can be attributed to a large increase in informal sectors (16.32%). While trade liberalization had almost no impact on the labour market with one foreign market, allowing different market destination leads to a 93.17% fall in the unemployment rate and an increase in household welfare. At the macroeconomic level, the budget deficit deteriorates less and the trade balance improves.

Such impacts can be traced to the relative price effects. Import prices of food and agricultural and industrial goods fall in the ROW relative to the two African regions. As a result, imports from the ROW increase. The overall decline in import price leads to an increase in consumer surplus of locally produced goods—but the increase in their demand does not lead to an increase in their prices, partly because of substitution with imports. The increase in supply to satisfy this additional demand comes at the disadvantage of factor remuneration. The higher pressure on the labour market leads to higher demand for labour. For the last simulation, paired comparisons show that in the scenario of one foreign market, GDP grows less (1.67 and 5.24%), the unemployment rate falls more (-6.9 and -16.1) and welfare improves relative to the base year for all household categories when we account for trade regime differentiation.

## 6. Conclusion and policy implications

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The overall objective of this study was to assess trade and exchange rate policy options for Cameroon, in light of recent economic developments. Possible options include a status quo situation with adjustment entirely depending on use of internal adjustment mechanisms. A second option is the allowance for more flexibility in some policy arenas such as fiscal policy rules and currency convertibility, while a third possibility is to allow for differentiation in the exchange regime.

Our assessment based on field data and simulations from the CGE suggests that the following elements are important in policy discussions in both UDEAC and the CFAZ: There is asymmetric impact on export and import sides as well as differentiated impacts on trade tax and exchange rate variation with trade partners. Particular attention should be devoted to cross-border trade with Nigeria. The higher impact is obtained on macroeconomic aggregates and employment when we differentiate the foreign market by market destination of exports and origin of imports.

As a result of these facts, trade and exchange rate policies should be coordinated with both Nigeria and other ECOWAS members. Trade liberalization yields the highest increase in GDP and employment when we take explicit account of market destination and origin. This result suggests that abolition of illegal trade will lead to more economic growth and higher welfare. Another policy recommendation, also supplemented with field data on cross-border trade, highlights the fact that the CFAF is demanded because of its convertibility. The evolution of bilateral exchange rates with neighbouring non-CFA countries not only reflects relative competitiveness; the lack of policy coordination penalizes Cameroon and there is no indication that Nigeria gains from it.

## Notes

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1. Also see Collier and Joshi (1990), Aghevli and Montiel (1991), and Williamson (1991).
2. Dordunoo and Njinkeu (1996) analyse the contribution of exchange rate regimes to growth and inflation in SSA.
3. See Decaluwé et al. (1999) for the analysis of the regional tax reform and its relationship with regional integration.
4. In his poverty profile study, Njinkeu (1994) took into consideration differences in preferences, suggesting that stratification of regional and household characteristics is necessary if the policy aim is to secure economic growth and protect the poor. The regional characterization follows agro-ecological zones and is related to both economic activity and consumption preferences.
5. Most of the transfer programme of our economy is exogenous to the model, except the assistance of working households to the unemployed.
6. We have differentiated among three trade regimes: the African Franc Zone (AFZ), Nigeria and the rest of the world. AFZ comprises countries with production structures comparable to that of Cameroon who are members of the currency union; the rest of the world is made up of developed countries with exchange rates exogenously given to Cameroon. Trade with these two regions is standard; trade with Nigeria is analysed using cross-border trade data.
7. See Decaluwé et al. (1987) for more developments on the closure rules.
8. Adelman and Robinson (1988), analysing the impact of the closure rule, concluded that while the functional distribution of income depends on the closure, the size of the distribution of income is not affected. They also found that the treatment of balance of payments is important for distributional impact of adjustment to shocks.
9. All formal labour salary is received by formal households only and informal labour salary is distributed only among informal households.
10. Models based on the pre-1989 input-output tables include Benjamin and Devarajan (1985), Benjamin et al. (1989), Dahl et al. (1986), Benjamin and Yoon (1991), Devarajan and de Melo (1987).
11. No policy can lead formal labour to becoming informal and nobody operates in both formal and informal sectors. Labour mobility is limited to the sector (informal sector labour cannot move to the formal sector).
12. Fortin et al. (1994) show that it is possible to find a firm that would demand the same amount of labour regardless of the sector where it operates. Such a firm earns higher profits in the informal sector. If the profit tax rate falls, there is a

level at which the profit in the formal sector increases at a faster rate than that in the informal sector.

13. The labour market is closed by keeping nominal wage in the formal sector and real wage in the informal sectors fixed at their base year level.
14. We have, for example, 20.4% in the primary sector, 1.045% in extractive industries, 2.75% in manufacturing, 3.54% in transport and telecommunication, and 4.2% in banking and insurance. See Tchuinou and Nguenevit (1993) for a complete description of the process by which the informal sector is taken care of in each sector of the input-output matrix.
15. Such an increase does not contradict current trends suggested by the World Trade Organization (WTO), as the pre-reform legal rate is an average 35% (see Njinkeu and Nana, 1994, for more developments).

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## Appendix - Model specifications

**Table A1: Main blocks of the 1989/90 Cameroon SAM for trade policy option for the CFA countries analysis (in billion CFA francs)**

### A1a: Supply block

	FFA	IFA	FRA	IRA	OILS	EIND	FAIN	IAIN	FTS	ITS	NTSS	Total
FL	2.7		14.1		18.5	37.4	113.9		227.5		362.6	776.7
IL		532.8		148.7				121.0		395.8		1198.3
FK	2.3		33.1		261.7	60.2	263.2		461.0		132.1	1213.6
IK		43.8		12.5				14.2		262.1		332.6
VA	5.0	576.6	47.2	161.2	280.2	97.6	377.1	135.2	688.5	657.9	494.7	3521.2
AFO	2.2	16.3	0.0	0.0	0.0	0.6	3.8	3.9	4.4	13.6	8.0	52.8
TAG	0.0	0.2	0.5	0.0	0.0	14.8	19.7	13.8	0.0	32.6	0.1	81.7
OIL	0.0	0.0	0.0	0.0	0.0	0.0	62.5	0.0	0.0	0.0	0.0	62.5
EIP	0.0	0.0	0.2	0.0	0.5	32.5	17.4	29.9	5.9	13.7	2.2	102.3
AIP	2.7	19.5	14.1	24.6	8.4	67.8	161.0	33.5	113.3	185.6	43.6	674.1
TS	1.3	4.8	31.5	2.0	43.9	33.2	73.0	8.5	215.1	70.9	48.4	532.6
NTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IC	6.2	40.8	46.3	26.6	52.8	148.9	337.4	89.6	338.7	316.4	102.3	1506.0
XS	11.2	617.4	93.5	187.8	333.0	246.5	714.5	224.8	1027.2	974.3	597.0	5027.2

#### Notes:

FFA: formal food agriculture; IFA: informal food agriculture; OILS: oil sector; FL: formal labour; IL: informal labour; FRA: formal rent agriculture; IRA: informal rent agriculture; IK: informal capital; EIND: export-oriented industry; FAIN: other formal industries sector; VA: value added; FK: formal capital; IAIN: other informal industries sector; FTS: formal service sector; NTSS: public service sector; ITS: informal service sector; AFO: agricultural food product; TAG: perennial agriculture product; OIL: oil; EIP: export-oriented industrial product; AIP: other industrial product; TS: tradeable services; NTS: non-tradeable services; IC: total sector's intermediate consumption; XS: sectoral production.

**A1b: Demand block**

	AFO	TAG	OIL	EIP	AIP	TS	NTS	Total
FFA	11.2							11.2
IFA	617.4							617.4
FRA		93.5						93.5
IRA		187.8						187.8
OILS			333.0					333.0
EIND				246.5				246.5
FAIN					714.5			714.5
IAIN					224.8			224.8
FTS						1027.2		1027.2
ITS						974.3		974.3
NTSS							597.0	597.0
<b>XP</b>	<b>628.6</b>	<b>281.3</b>	<b>333.0</b>	<b>246.5</b>	<b>939.3</b>	<b>2001.5</b>	<b>597.0</b>	<b>5027.2</b>
D	607.3	177.1	75.0	117.7	896.0	1880.6	597.0	4350.7
EXC	2.1			109.5	36.2	36.3		184.1
EXN	17.1			19.3	7.1	12.1		55.6
EXR	2.1	104.2	258.0			72.5		436.8

## Notes:

D: domestic sales; EXC: total exports to the CFAF zone; EXN: total exports to Nigeria; EXR: total exports to the rest of the world (ROW); XP: supply of domestic goods

**A1c: Absorption block**

	AFO	TAG	OIL	EIP	AIP	TS	NTS	Total
D	607.3	177.1	75.0	117.7	896.0	1880.6	597.0	4350.7
IDT	0.5	3.8	-3.2	7.5	63.5	71.2	0.4	143.7
MC	10.0	4.1				74.4	3.3	91.8
TCM	1.6	0.7				0.0	0.0	2.3
MN	8.0	2.1		62.9	63.0	37.2		173.2
TNM	1.2	0.3		7.4	11.6	0.0		20.5
MR	2.0	0.7		146.7	188.9	260.5	7.8	606.6
TRM	0.3	0.1		17.4	34.7	0.0	0.0	52.5
<b>Q</b>	<b>630.9</b>	<b>188.9</b>	<b>71.8</b>	<b>359.6</b>	<b>1257.7</b>	<b>2323.9</b>	<b>608.5</b>	<b>5441.3</b>
C	726.3	149.6	0.0	111.5	804.4	983.0		2774.8
GC							608.5	608.5
INTD	52.8	81.7	62.5	102.3	674.1	532.6	0.0	1506.0
INV	-148.2	-42.4	9.3	145.8	-220.8	808.3	0.0	552.0

## Notes:

IDT: indirect taxes; MC total imports from the CFAF zone; MN: total imports from Nigeria; MR: total imports from the ROW; TCM: taxes on imports from the CFAF zone; TNM: taxes on imports from Nigeria; TRM: taxes on imports from the ROW; C: final consumption; GC: public expenditures; Q: composite goods and services; INTD: intermediate demand for goods; INV: investment goods (volume).



**A1d: Income distribution block**

	IRH	IUH	FH	UH	F	G	CFAZ	NIG	ROW	Total
FL			776.7							776.7
IL	869.6	326.5					2.2			1198.3
FK	94.3	60.8	583.8		474.7					1213.6
IK	42.5	27.4	262.7							332.6
IRH				98.5		21.2	2.0	5.9	2.0	129.6
IUH				20.3		9.0				29.3
FH				243.5		54.7	4.0	4.2	31.3	337.7
UH										0.0
F		5.9	23.6			234.0			76.6	340.1
G	35.3	20.1	23.6		12.5				96.1	187.6
CFAZ										0.0
NIG										0.0
ROW						4.9				4.9
M						221.0	91.8	173.2	606.6	871.6
TITR										221.0
Rev	1041.7	440.7	1670.4	362.3	487.2	544.8	100.0	183.3	812.6	5643.0
C	828.4	373.7	1210.4	362.3		608.5				3383.3
EX							184.6	55.7	438.2	678.5
TRF	129.6	29.3	337.7	0.0	340.1	187.6			4.9	1029.2
SAV	83.7	37.7	122.3	0.0	147.1	-251.3	-84.6	127.6	369.5	552.0

## Notes:

IRH: informal rural households; IUH: informal urban households; FH: formal households;  
 UH: unemployed household; CFAZ: CFAF zone; NIG: Nigeria; ROW: Rest of the world;  
 F: firms; G: government; M: imports; Rev: total revenue ; EX: total exports; TRF: transfers;  
 SAV: savings; TITR: total indirect tax revenue.

Source: Authors' construction.

**Table A2: Specification of the CGE model**

A2a: Sets definition

i	∈	I = {IFA, IRA, IAIN, ITS} informal sectors
f	∈	F = {FFA, FRA, FAIN, FTS, OILS, EIND, NTSS} formal sectors
j	∈	J = {AFO, TAG, OIL, EIP, AIP, TS, NTS} goods and services
With		AFO = IRA production + FFA production
		TAG = ITRA production + FRA production
		OIL = OILS production
		AIP = IAIN production + FAIN production
		EIP = EIND production
		TS = ITS production + FTS production
		NTS = NTSS production
m	∈	M = {AFO, TAG, EIP, AIP, TS, NTS} importable goods
a	∈	A = {AFO, TAG, TS, NTS} goods imported from the CFAF zone
b	∈	B = {AFO, TAG, EIP, AIP, TS} goods imported from Nigeria
n	∈	N = {AFO, TAG, OIL, EIP, AIP, TS} exportable goods
c	∈	C = {AFO, EIP, AIP, TS} goods exported to CFAF zone and Nigeria
d	∈	D = {AFO, TAG, OIL, TS} goods exported to the ROW
k	∈	K = {TAG, OIL} goods exported only to the ROW
l	∈	L = {AFO, TS} goods exported to all destinations
o	∈	O = {OIL}
p	∈	P = {EIP, AIP} industrial goods
r	∈	R = {AFO, TAG, TS} goods imported from all destinations
s	∈	S = {NTS} unexportable goods
h	∈	H = {IRH, IUH, FH} household set

**A2b: List of equations**

Production block	Number
(1) $VA_i = A_i \cdot L_i^{D_i} \cdot K_i^{(1-\alpha_i)}$	4
(2) $VA_f = A_f \cdot L_f^{D_f} \cdot K_f^{(1-\alpha_f)}$	7
(3) $L_i^D = \alpha_i \cdot PVA_i \cdot VA_i / w_i$	4
(4) $L_f^D = \alpha_f \cdot PVA_f \cdot VA_f / w$	7
(5) $IC_i = i_o_i \cdot VA_i / v_i$	4
(6) $IC_f = i_o_f \cdot VA_f / v_f$	7
(7) $XS_i = IC_i / i_o_i$	4
(8) $XS_f = IC_f / i_o_f$	7
(9) $XP_j = XS_i + XS_f$	7
(10) $ICJ_{ij} = a_{ij} \cdot IC_i$	28
(11) $ICJ_{ff} = a_{ff} \cdot IC_f$	49
<hr/>	
Revenues and savings block	
(12) $HR_h = \lambda_h^I \cdot w_i \cdot \sum_i L_i^D + \lambda_h^F \cdot w \cdot \sum_f L_f^D + \lambda_h^{IK} \cdot \sum_i KR_i + \lambda_h^{FK} \cdot \sum_f KR_f$ $HDIV_h + Pindex \cdot GTH_h$	3

With  $HDIV = 0$  for informal rural household,  $\lambda^{IK} = 0$  for formal household  
and  $\lambda^{FK} = 0$  for informal households

- (13)  $HDIV_h = dr_h \cdot (FR - TAXFPI - FTR)$  3
- (14)  $FR = (1 - \sum_h \lambda_h^H) \cdot TKR + Pindex \cdot GTF$  1
- (15)  $TKR = \sum_i (PVA_i \cdot VA_i - w_i \cdot L_i^D) + \sum_f (PVA_f \cdot VA_f - w \cdot L_f^D)$  1
- (16)  $RK_i = PVA_i \cdot VA_i - w \cdot L_i^D$  4
- (17)  $RK_f = PVA_f \cdot VA_f - w \cdot L_f^D$  7
- (18)  $UR = \sum_h \lambda_h^U \cdot HDR_h$  1
- (19)  $HDR_h = HR_h \cdot (1 - ht_h) - (HTR_h + HTC_h + HTN_h + LST_h)$  3
- (20)  $GR = \sum_h ht_h \cdot HR_h + TAXFPI + \sum_j IDT_j + TAXM + TAXE + e \cdot RTG$  1
- (21)  $IDT_j = td_j \cdot PD_j \cdot D_j$  7
- (22)  $TAXM = \sum_a TCM_a + \sum_b TNM_b + \sum_m TRM_m$  1
- (23)  $TCM_a = itc_a \cdot P_a^{WM} \cdot MC_a$  4
- (24)  $TNM_b = itn_b \cdot e \cdot P_b^{WM} \cdot MN_b$  5
- (25)  $TRM_m = itr_m \cdot e \cdot P_m^{WM} \cdot MR_m$  6
- (26)  $TAXE = \sum_c TCE_c + \sum_c TNE_c + \sum_d TRE_d$  1
- (27)  $TCE_c = (etc_c \cdot P_c^{WE} \cdot EXC_c) / (1 + etc_c)$  4
- (28)  $TNE_c = (etn_c \cdot e \cdot P_c^{WE} \cdot EXN_c) / (1 + etn_c)$  4
- (29)  $TRE_d = (etr_d \cdot e \cdot P_d^{WE} \cdot EXR_d) / (1 + etr_d)$  4
- (30)  $TAXFPI = tpif \cdot (1 - \sum_h \lambda_h^x) \cdot TKR$  1

- (31)  $HS_h = pms_h \cdot (HDR_h - HTU_h)$  3
- (32)  $HTU_h = \lambda_h^U \cdot HDR_h$  3
- (33)  $FS = FR - (TAXFPI + \sum_h HDIV_h + FTR)$  1
- (34)  $GS = GR - (\sum_h GTH_h + GTF) \cdot Pindex - GTR - GC$  1
- (35)  $HC_h = HDR_h - HTU_h - HS_h$  3

## Demand block

- (36)  $PC_j C_j = \sum_h \beta_{jh}^H \cdot HC_h + \beta_j^U \cdot UR + \beta_j^G \cdot GC$  7
- (37)  $PC_j \cdot INV_j = \beta_j^I \cdot TI$  7
- (38)  $INTD_j = \sum_i a_{ij} \cdot IC_i + \sum_f a_{jf} \cdot IC_f$  7
- (39)  $XP_n = B_n^X \cdot [\gamma_n \cdot EX_n^{\psi_n} + (1 - \gamma_n) \cdot D_n^{\psi_n}]^{\frac{1}{\psi_n}}$  6
- (40)  $XP_s = D_s$  1
- (41)  $\frac{EX_n}{D_n} = \left[ \frac{PE_n}{PD_n} \cdot \frac{1 - \gamma_n}{\gamma_n} \right]^{\sigma_n^E}$  6
- (42)  $EX_c = B1_c^X \cdot [\gamma_n^1 \cdot EXE_c^{\psi_c^1} + (1 - \gamma_c^1) \cdot EXC_c^{\psi_c^1}]^{\frac{1}{\psi_c^1}}$  4
- (43)  $EX_k = EXE_k$  2
- (44)  $\frac{EXC_c}{EXE_c} = \frac{PEC_c}{PEE_c} \cdot \frac{1 - \gamma_c^1}{\gamma_c^1} \right]^{\sigma_c^1 E}$  4
- (45)  $EXE_i = B2_i^X \cdot [\gamma_i^2 \cdot EXR_i^{\psi_i^2} + (1 - \gamma_i^2) \cdot EXN_i^{\psi_i^2}]^{\frac{1}{\psi_i^2}}$  2
- (46)  $EXE_k = EXR_k$  2

- (13)  $HDIV_h = dr_h \cdot (FR - TAXFPI - FTR)$  3
- (14)  $FR = (1 - \sum_h \lambda_h^H) \cdot TKR + Pindex \cdot GTF$  1
- (15)  $TKR = \sum_i (PVA_i \cdot VA_i - w_i \cdot L_i^D) + \sum_f (PVA_f \cdot VA_f - w \cdot L_f^D)$  1
- (16)  $RK_i = PVA_i \cdot VA_i - w \cdot L_i^D$  4
- (17)  $RK_f = PVA_f \cdot UA_f - w \cdot L_f^D$  7
- (18)  $UR = \sum_h \lambda_h^U \cdot HDR_h$  1
- (19)  $HDR_h = HR_h \cdot (1 - ht_h) - (HTR_h + HTC_h + HTN_h + LST_h)$  3
- (20)  $GR = \sum_h ht_h \cdot HR_h + TAXFPI + \sum_j IDT_j + TAXM + TAXE + e \cdot RTG$  1
- (21)  $IDT_j = td_j \cdot PD_j \cdot D_j$  7
- (22)  $TAXM = \sum_a TCM_a + \sum_b TNM_b + \sum_m TRM_m$  1
- (23)  $TCM_a = itc_a \cdot P_a^{WM} \cdot MC_a$  4
- (24)  $TNM_b = itn_b \cdot e \cdot P_b^{WM} \cdot MN_b$  5
- (25)  $TRM_m = itr_m \cdot e \cdot P_m^{WM} \cdot MR_m$  6
- (26)  $TAXE = \sum_c TCE_c + \sum_c TNE_c + \sum_d TRE_d$  1
- (27)  $TCE_c = (etc_c \cdot P_c^{WE} \cdot EXC_c) / (1 + etc_c)$  4
- (28)  $TNE_c = (etn_c \cdot e \cdot P_c^{WE} \cdot EXN_c) / (1 + etn_c)$  4
- (29)  $TRE_d = (etr_d \cdot e \cdot P_d^{WE} \cdot EXR_d) / (1 + etr_d)$  4
- (30)  $TAXFPI = tpif \cdot (1 - \sum_h \lambda_h^H) \cdot TKR$  1

- (31)  $HS_h = pms_h \cdot (HDR_h - HTU_h)$  3
- (32)  $HTU_h = \lambda_h^U \cdot HDR_h$  3
- (33)  $FS = FR - (TAXFPI + \sum_h HDIV_h + FTR)$  1
- (34)  $GS = GR - (\sum_h GTH_h + GTF) \cdot Pindex - GTR - GC$  1
- (35)  $HC_h = HDR_h - HTU_h - HS_h$  3
- 
- Demand block
- 
- (36)  $PC_j C_j = \sum_h \beta_{jh}^H \cdot HC_h + \beta_j^U \cdot UR + \beta_j^G \cdot GC$  7
- (37)  $PC_j \cdot INV_j = \beta_j^I \cdot TI$  7
- (38)  $INTD_j = \sum_i a_{ij} \cdot IC_i + \sum_f a_{jf} \cdot IC_f$  7
- (39)  $XP_n = B_n^X \cdot [\gamma_n \cdot EX_n^{\psi_n} + (1 - \gamma_n) \cdot D_n^{\psi_n}]^{\frac{1}{\psi_n}}$  6
- (40)  $XP_s = D_s$  1
- (41)  $\frac{EX_n}{D_n} = \left[ \frac{PE_n}{PD_n} \cdot \frac{1 - \gamma_n}{\gamma_n} \right]^{\sigma_n^E}$  6
- (42)  $EX_c = B_c^X \cdot [\gamma_c^1 \cdot EXE_c^{\psi_c^1} + (1 - \gamma_c^1) \cdot EXC_c^{\psi_c^1}]^{\frac{1}{\psi_c^1}}$  4
- 
- (43)  $EX_k = EXE_k$  2
- 
- (44)  $\frac{EXC_c}{EXE_c} = \frac{PEC_c}{PEE_c} \cdot \frac{1 - \gamma_c^1}{\gamma_c^1} \sigma_c^E$  4
- (45)  $EXE_i = B_i^X \cdot [\gamma_i^2 \cdot EXR_i^{\psi_i^2} + (1 - \gamma_i^2) \cdot EXN_i^{\psi_i^2}]^{\frac{1}{\psi_i^2}}$  2
- (46)  $EXE_k = EXR_k$  2

$$(47) \quad EXE_p = EXN_p \quad 2$$

$$(48) \quad \frac{EXR_i}{EXN} = \left[ \frac{PER_i}{PEN_i} \cdot \frac{1 - \gamma_i^2}{\gamma_i^2} \right]^{\sigma_i^2 E} \quad 2$$

$$(49) \quad Q_m = B_m^M \cdot [\delta_m \cdot M_m^{-\rho_m} + (1 - \delta_m) \cdot D_m^{-\rho_m}]^{\frac{-1}{\rho_m}} \quad 6$$

$$(50) \quad Q_o = D_o \quad 1$$

$$(51) \quad M_m = \left( \frac{\delta_m}{1 - \delta_m} \right)^{\sigma_m^M} \cdot \left( \frac{PDM_m}{PM_m} \right)^{\sigma_m^M} \cdot D_m \quad 6$$

$$(52) \quad M_m = B1_m^M \cdot [\delta_m^1 \cdot MR_m^{-\rho_m^1} + (1 - \delta_m^1) \cdot ME_m^{-\rho_m^1}]^{(-1/\rho_m^1)} \quad 6$$

$$(53) \quad MR_m = \left( \frac{\delta_m^1}{1 - \delta_m^1} \right)^{\sigma_m^{1M}} \cdot \left( \frac{PME_m}{PMR_m} \right)^{\sigma_m^{1M}} \cdot ME_m \quad 6$$

$$(54) \quad ME_r = B2_r^m \cdot [\delta_r^2 \cdot MC_r^{-\rho_m^2} + (1 - \delta_r^2) \cdot MN_r^{-\rho_m^2}]^{-1/\rho_m^2} \quad 3$$

$$(55) \quad ME_p = MN_p \quad 2$$

$$(56) \quad ME_s = MC_s \quad 1$$

$$(57) \quad MC_r = \left( \frac{\delta_r^2}{1 - \delta_r^2} \right)^{\sigma_r^{2M}} \cdot \left( \frac{PMN_r}{PMC_r} \right)^{\sigma_r^{2M}} \cdot MN_r \quad 3$$

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Prices block

$$(58) \quad PVA_i = (P_i - XS_i - \sum_j PC_j \cdot ICJ_{ij}) / VA_i \quad 4$$

$$(59) \quad PVA_f = (P_f - XS_f - \sum_j PC_j \cdot ICJ_{fj}) / VA_f \quad 7$$

$$(60) \quad PD_j = PP_j (P_i XS_i + P_f XS_f) / XP_j \quad 7$$

$$(61) \quad PM_m \cdot M_m = PMC_m \cdot MC_m + PMN_m \cdot MN_m + PMR_m \cdot MR_m \quad 6$$



- (62)  $PMC_a = (1 + itc_c).PM_a^{WM}$  4
- (63)  $PMN_b = e.PM_b^{WM}.(1 + itn_b)$  5
- (64)  $PMR_m = e.PM_m^{WM}.(1 + itr_m)$  6
- (65)  $PME_r.ME_r = (PMC_r.MC_r + PMN_r.MN_r)$  3
- (66)  $PME_p = PMN_p$  2
- (67)  $PME_s = PMC_s$  1
- (68)  $PE_n.EX_n = PEC_n.EXC_n + PEN_n.EXN_n + PER_n.EXR_n$  6
- (69)  $PEC_c = PE_c^{WE} / (1 + etc_c)$  4
- (70)  $PEN_c = e.PE_c^{WE} / (1 + etn_c)$  4
- (71)  $PER_d = e.PE_d^{WE} / (1 + etr_d)$  4
- (72)  $PEE_l.EXE_l = (PEN_l.EXN_l + PER_l.EXR_l)$  2
- (73)  $PEE_k = PER_k$  2
- (74)  $PEE_p = PEN_p$  2
- (75)  $PC_m = (PD_m.D_m + PM_m.M_m) / Q_m$  6
- (76)  $PC_o = PDM_o.D_o / Q_o$  1

$$(77) \quad PDM_j = PD_j \cdot (1 + td_j) \quad 7$$

$$(78) \quad Pindex = \sum_j \beta_j^u \cdot PC_j \quad 1$$

$$(79) \quad PD_j \cdot D_j + PE_j \cdot EX_j = P_i \cdot XS_i + P_f \cdot XS_f \quad 7$$

$$(80) \quad P_i = PP_j \quad 4$$

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Equilibrium block

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$$(81) \quad Q_j = C_j + INTD_j + INV_j \quad 7$$

$$(82) \quad TI = \sum_h HS_h + FS + GS + CA \quad 1$$

$$(83) \quad CA = CAC + CAN + CAR \quad 1$$

$$(84) \quad CAC = \sum_a PM_a^{WM} \cdot MC_a + (1 - \sum_h \lambda_h^1) \cdot wi \cdot \sum_i L_i^D + \sum_h HTC_h - \sum_c P_c^{WE} \cdot EXC_c \quad 1$$

$$(85) \quad CAN = \sum_b PM_b^{WM} \cdot MN_b + (1/e) - \sum_h HTN_h - \sum_c P_c^{WE} \cdot EXN_c \quad 1$$

$$(86) \quad CAR = \sum_m PM_m^{WM} \cdot MR_m + (1/e) \cdot (\sum_h HTR_h + FTR + GTR) - \sum_d P_d^{WE} \cdot EXR_d - RTG \quad 1$$

$$(87) \quad (1 - u) \cdot L^s = \sum_i L_i^D + \sum_f L_f^D \quad 1$$

**Total**

**394**

Welfare variation model

$$(w1) CV_h = [(U_h - UO_h) / U_h] \cdot HR_h$$

$$(w2) EV_h = [(U_h - UO_h) / UO_h] \cdot HRO_h$$

$$(w5) U_h = \sum_j \left( \frac{\beta_{jh}^H \cdot HC_h}{PC_j} \right)^{\beta_{jh}^H}$$

$$(w3) Z_h = 1/2 \cdot (CV_h + EV_h)$$

Symbol 'O' characterizes the base year value of the variables.

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**A3: List of variables and parameters**


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Endogenous variables		number
CA	Current account (in foreign currency units)	1
CAC	Current account on transactions with the CFAF zone (in CFAF)	1
CAN	Current account on transactions with Nigeria (in naira)	1
CAR	Current account on transactions with the ROW (in US\$)	1
$C_j$	Final consumption of good (in volume)	7
$HC_h$	Household total consumption (value)	3
$HR_h$	Household total revenue (value)	3
$HS_h$	Household savings (value)	3
$HDR_h$	Household disposable revenue (value)	3
$HDIV_h$	Dividends received by household (value)	3
$D_j$	Domestic sales (volume)	7
$EX_n$	Total exports (volume)	6
$EXC_a$	Total exports to the CFAF zone (volume)	4
$EXN_c$	Total exports to Nigeria (volume)	4
$EXR_d$	Total exports to the ROW (volume)	4
$EXE_n$	Total exports out of the CFAF zone (volume)	6
$FR_n$	Firms' revenue (value)	1
FS	Firms' saving (value)	1
GR	Government revenue (value)	1
GS	Government saving (value)	1
$HTU_n$	Household transfers to unempoyed	3
IC	Total sector's intermediate consumption (volume)	11
ICJ	Sector's intermediate consumption (volume)	77
$IDT_j$	Indirect taxes (volume)	7
INV	Investment goods (volume)	7
$INTD_i$	Intermediate demand for goods (volume)	7
KR	Sector's capital remuneration (value)	11
$L^D$	Sector's employment (volume)	11
$M_m$	Total imports (volume)	6
$MC_a$	Total imports from the CFAF zone (volume)	4
$MN_b$	Total imports from Nigeria (volume)	5
$MR_m$	Total imports from the ROW (volume)	6
$ME_m$	Total imports from CFAF zone and Nigeria (volume)	6
P	Sector's production cost	11
$PC_j$	Composite goods price	7
$PD_j$	Domestic producer price	7
$PDM_j$	Domestic market price (TTC)	7
$PE_n$	Domestic price of exports	6
$PEC_c$	Domestic price of exports to the CFAF zone	4
$PEN_c$	Domestic price of exports to Nigeria	4
$PER_d$	Domestic price of exports to the ROW	4
$PEE_n$	Domestic price of exports out of the CFAF zone	6
$PM_m$	Domestic price of imports	6
$PMC_a$	Domestic price of imports from the CFAF zone	4
$PMN_b$	Domestic price of imports from Nigeria	5

PMR <sub>m</sub>	Domestic price of ROW imports	6
PME <sub>m</sub>	Domestic price of imports from Nigeria and the CFAF zone	6
PP <sub>j</sub>	Production cost good j	7
PVA	Sector's value added price	11
Q <sub>j</sub>	Composite good supply (volume)	7
TAXM	Total import tax revenue	1
TAXE	Total export tax revenue	1
TAXFPI	Profit tax paid by firms	1
TCE <sub>c</sub>	Taxes on exports to the CFAF zone (value)	4
TCM <sub>a</sub>	Taxes on imports from the CFAF zone (value)	4
TI	Total investment	1
TNE <sub>c</sub>	Taxes on exports to Nigeria (value)	4
TNM <sub>b</sub>	Taxes on imports from Nigeria (value)	5
TRE <sub>d</sub>	Taxes on exports to the ROW (value)	4
TKR	Total capital remuneration (value)	1
TRM <sub>m</sub>	Taxes on imports from the ROW (value)	6
u	Unemployment rate	1
UR	Unemployed revenue	1
VA	Sector's value added (volume)	11
wi	Average informal wages rate	1
XS	Sector's domestic output (volume)	11
XP <sub>j</sub>	Volume of domestic goods supply	7
<b>Total</b>		<b>394</b>

Exogenous variables		number
CG	Government consumption (value)	1
e	Nominal exchange rate with the ROW (\$US)	1
FTR	Firms transfers to the ROW (value)	1
GTH <sub>h</sub>	Government transfers to households (volume)	3
GTF	Government transfers to firms (volume)	1
GTR	Government transfers to the ROW (value)	1
HTC <sub>h</sub>	Household transfers to the CFAF zone (value)	3
HTN <sub>h</sub>	Household transfers to Nigeria (value)	3
HTR <sub>h</sub>	Household transfers to the ROW (value)	3
K	Sector's stock of capital	11
L <sup>s</sup>	Total labour supply	1
LST <sub>h</sub>	Lump sum tax paid by informal (value)	3
Pindex	Consumer price index	1
PWE <sub>n</sub>	World price of exports	6
PWM <sub>m</sub>	World price of imports	6
RTG	The ROW transfers to the government	1
w	Average formal wage rate	1
<b>Total</b>		<b>47</b>

## Parameters

$a_{ij}, a_{ij}$	Input-output coefficients in the informal and formal sectors
$A_i, A_f$	Informal and formal Cobb-Douglas shift parameters
$\alpha_i, \alpha_f$	Labour share parameter in the informal and formal value added function
$io_i, io_f$	Informal and formal technical coefficients
$v_i, v_f$	Informal and formal technical coefficients
$\lambda_n^i$	Informal labour remuneration share
$\lambda_n^f$	Formal labour remuneration share
$\lambda_n^\pi$	Profit share
$\lambda_n^u$	Household share of revenue transferred to unemployed
$dr_h$	Dividends share received by household
$pms_h$	Household average rate of saving
$ht_h$	Household direct tax rates
$td_i$	Indirect tax rates
$itc_a$	CFAF zone tariff rates
$itn_b$	Nigeria tariff rates
$itr_c$	Rest of the world (ROW) tariff rates
$etc_c$	CFAF zone export duty rates
$etn_c$	Nigeria export duty rates
$etr_d$	ROW export duty rates
$tpif$	Profit tax rate
$\beta_n^H$	Share of good in household consumption
$\beta_n^U$	Share of good in unemployed consumption
$\beta_n^G$	Share of good in government consumption
$\beta_n^I$	Share of good in total investment
$B^M, B1^M, B2^M$	Armington shift parameters
$B^X, B1^X, B2^X$	CET shift parameters
$\delta_m^1, \delta_m^2, \delta_r^2$	Armington parameters
$\rho_m^1, \rho_m^2, \rho_r^2$	Substitution parameters in CES
$\sigma_n^E, \sigma_c^{1E}, \sigma_1^{2E}$	Substitution elasticities of imports Transformation elasticities of exports
$\gamma_n^1, \gamma_c^1, \gamma_1^2$	CET functions coefficients
$\Psi_n^1, \Psi_c^1, \Psi_c^2$	CET exponents

**TableA4: Simulation impact on some macroeconomic indicators of Cameroon (in % of base year values)**

	One foreign market					Three foreign markets				
	Sim. 1	Sim. 2	Sim. 3	Sim. 4	Sim. 5	Sim. 1	Sim. 2	Sim. 3	Sim. 4	Sim. 5
- Total GDP	0.89	2.42	1.67	0.28	1.67	0.00	0.31	0.83	7.33	5.24
- Informal GDP	-0.60	3.11	0.67	-0.72	1.48	-0.01	0.72	1.92	16.32	11.68
- Formal GDP	2.03	1.88	2.44	1.04	1.81	0.01	-0.01	-0.01	0.40	0.29
- Unemployment rate (u)	-6.10	-25.65	-14.73	-1.01	-16.12	0.03	-3.84	-10.30	-93.17	-65.94
- Budget deficit (GS)	-5.91	-11.33	7.51	27.72	1.01	-36.16	-41.45	-21.98	13.98	14.71
- Total investment (TI)	7.30	16.71	-6.17	4.30	-5.76	20.16	22.90	13.48	31.04	8.18
- Total current account (CA)	2.69	10.91	-9.28	20.15	-0.23	4.14	4.21	3.5	44.45	15.97
- CFAZ current account (CAC)	na	na	na	na	na	-48.56	-49.03	-27.50	8.26	17.23
- Nigeria current account (CAN)	na	na	na	na	na	30.38	30.06	42.26	-46.29	-17.53
- Current account with the ROW (CAR)	na	na	na	na	na	-18.27	-18.19	-18.21	68.89	28.54
- Average welfare variation of household groups (Z) - in billion CFA francs										
IRH	0.18	9.27	6.79	15.12	15.30	-0.02	2.24	6.00	41.69	29.33
IUH	-1.28	2.07	1.07	1.51	2.97	-0.01	0.76	2.02	17.89	12.62
FH	14.83	15.49	21.39	6.51	16.56	0.01	0.04	0.14	11.68	7.72

Note: Base year = 1989/90

Sim: Simulation; na: Not available

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