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How Integration into the Central African Economic and Monetary Community Affects Cameroon's Economy

General Equilibrium Estimates

Ferdinand Bakoup

David Tarr

Cameroon stands to gain economically from the new regional trade agreement among countries of the Central African Economic and Monetary Community. Better access to partner markets and reduction of the external tariff explain virtually all of Cameroon's welfare gain.

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Summary findings

Bakoup and Tarr quantify the impact on Cameroon of three aspects of its new regional trade agreement with the Central African Economic and Monetary Community (the CEMAC agreement):

- Improved access to markets in CEMAC.
- Preferential tariff reduction.
- Reduction of its external tariff through implementation of the common external tariff of CEMAC.

They estimate that Cameroon will gain from the agreement but show how Cameroon's regional market power greatly affects the magnitude of its gains. They assume that Cameroon has regional market power in both imports and exports despite being small in world markets.

They find that better access to partner markets and reduction of the external tariff explain virtually all of Cameroon's welfare gain.

In their preferred scenario (Cameroon having regional market power), reduction of the external tariff explains three-quarters of the welfare gain.

If Cameroon further reduces tariffs to its regional partners, the effect on its economy is a loss of real income but the impact is negligible.

Should Cameroon's partners fail to provide tariff-free access to their markets, Bakoup and Tarr estimate that, given Cameroon's regional market power, Cameroon would gain even more from free trade than it would from implementing the CEMAC arrangements.

This paper — a product of the Development Research Group — is part of a larger effort in the group to investigate the implications of regional trade arrangements. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Lili Tabada, room MC3-333, telephone 202-473-6896, fax 202-522-1159, Internet address ltabada@worldbank.org. January 1998. (46 pages)

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and Monetary Community Affects Cameroon's Economy**

General Equilibrium Estimates

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I. Introduction

Africa has joined the world-wide rush of the 1990s to implement or strengthen preferential trading arrangements. This includes the Cross-Border Initiative among 19 African countries¹, the eleven country South African Development Community (SADC)², the Maghreb customs union in North Africa³ and reciprocal free trade agreements between Morocco and Tunisia with the European Union. In central Africa, Cameroon, Congo, Gabon, Equatorial Guinea, Central African Republic and Chad have strengthened the relationships of UDEAC with the formation in 1994 of the Central

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¹Participating countries are Angola, Burundi, Comoros, Djibouti, Ethiopia, Kenya, Madagascar, Mauritius, Mozambique, Malawi, Namibia, Rwanda, Seychelles, South Africa, Swaziland, Tanzania, Uganda, Zambia and Zimbabwe. Countries agree to eliminate regional tariff and non-tariff barriers, and to harmonize external tariffs with no tariff above 20-25 percent.

²Participating countries are: Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, Swaziland, South Africa, Tanzania, Zambia and Zimbabwe. These countries intend to establish a free trade area.

³This includes Algeria, Libya, Mauritania, Morocco and Tunisia.

African Economic and Monetary Community (known by its French acronym "CEMAC" for *Communaute Economique et Monetaire d'Afrique Centrale*).

Many would assess the past arrangements in Africa as having encouraged harmful import-substitution (see, for example, Foroutan, 1993); moreover they did not led to a significant increase in intra-regional trade⁴. In view of the rather pessimistic assessment of Africa's experience with regional preferential trading arrangements, one must pause to consider whether the new rush toward regionalism arrangements is well advised. Those who defend the present trend would argue that the arrangements of the 1990s constitute "new regionalism." By this it is meant that there are aspects of "deep integration" to many of these agreements in that some contemplate elements such as free movement of factors, standards harmonization, and monetary integration. Most importantly, these agreements intend to abandon the harmful import-substitution policies of the past and accompany regional tariff preferences with a reduction of external protection as well.

Despite the existence of many quantitative evaluations of regional trading arrangements in other parts of the world,⁵ we are not aware of any such evaluations in sub-Saharan Africa. In this paper we focus on the CEMAC arrangements and, in particular, we quantitatively assess its impact on its largest member: Cameroon. In order to ascertain the source of the gains and losses from CEMAC, however, we quantitatively decompose the impacts of its three most clear elements on Cameroon: (1) Cameroon's elimination of tariffs on imports from its regional partners; (2) the

⁴See Robson (1987) for data that show that intra-regional trade has been very small.

⁵For example, see Francois and Shiells (1993) for numerous evaluations of NAFTA; Harrison, Rutherford and Tarr (1997a) and Rutherford, Rutstrom and Tarr (1997) for evaluations of European Union agreements with Turkey and Morocco; Harrison, Rutherford and Tarr (1997b) for an evaluation of Chile's options with MERCOSUR and NAFTA; and Harrison, Rutherford and Tarr (1996) and Smith and Venables (1988) for an evaluation of the European Union's single market program.

elimination of tariffs on Cameroon's exports by its regional partners; and (3) the reduction of Cameroon's tariff on its imports from the rest of the world. We also estimate the effects on Cameroon of unilateral trade liberalization and compare this to joining CEMAC.

Even though Cameroon is small on world markets, Cameroon constitutes about 50 percent of the size of the combined CEMAC market--thus is likely possesses market power on regional markets under the CEMAC tariff umbrella. A methodological innovation of this paper is that our results incorporate, in an otherwise small open economy model, the fact that Cameroon may possess regional market power, and we assess the difference in results with models with no regional market power.

Our results for the central elasticity case are summarized in table 5. We find that Cameroon will gain between 0.41 and 0.62 percent of its GDP by implementing the CEMAC arrangements. Our decomposition of results shows that the part of the agreement that calls for further preferential reduction of tariffs is immiserizing, although given the low level of intra-regional imports, the quantitative impact is quite small. We verify the Wonnocott and Wonnocott (1981) result that improved access to partner country markets is important in assessing the impact of these arrangements: in our preferred market power case, about one-quarter of the gains to Cameroon derive from improved access to partner country markets. We find, however, that about three-quarters of the gains come from reduction of Cameroon's tariff against the rest of the world, i.e., the new regionalism aspect of CEMAC is its most important element. Moreover, our estimates for Cameroon's unilateral trade liberalization show that it can gain marginally even more from full unilateral trade liberalization than it can from implementation of the CEMAC arrangements, even though with unilateral trade liberalization it must forego the benefits of improved access to regional

markets.⁶

In section II we graphically analyze the welfare economics of preferential trade agreements, as a function of whether or not the home country has market power in regional markets for either its imports or exports. We show that the impact having regional market power on imports on the welfare effects of regional integration is ambiguous. On the other hand, we show that regional market power on exports unambiguously reduces the gains from a given tariff reduction by partners in a regional arrangement. These theoretical results are crucial to understanding our numerical estimates.

In section III we discuss the institutional background which led up to the reforms of CEMAC. We briefly characterize the model, data and elasticities in section IV. (A full characterization of the model equations is available in an appendix.) We focus on interpretation of results in section V and provide a brief conclusion in section VI.

II. The Welfare Economics of Preferential Trade Agreements:

with and without regional market power

In this section we derive, through graphical techniques, some new theoretical results which are important in interpreting our numerical results. Apart from the partial equilibrium nature of the diagrams, they represent the type of model structure we employ. We assume that the home country is small on world markets. In regional markets, we consider both the case where the home country has market power in the region and the case where it does not, and we compare results. In order to

⁶Our estimates are done with a comparative static model. Regarding the estimates of the gains from free trade, these are likely to be much larger in a dynamic model that incorporates the endogenous growth effect of trade liberalization. See Rutherford and Tarr (1997) for an example.

facilitate comparison, we depict both cases on one diagram.⁷

We show that when considering the impact on welfare of a regional trade agreement, there is an asymmetry in the impact on having regional market power on either exports or imports: possessing regional market power on exports lowers the gains from the preferential trade arrangement; but possessing regional market power on imports has an ambiguous effect.

Impact of the Home Country's Tariff Preferences

The Model. To be consistent with the data that shows both imports and exports of the same product group at a fairly disaggregated level, we assume that goods are differentiated by country of origin (the Armington assumption). In Figure 1, the home country's demand for a representative good from the partner country is measured to the right of the origin and its demand for the similar, but not identical, good from the rest of the world is measured to the left of the origin. Without loss of generality, we choose units so that the world price of both the large partner country good and the good from the rest of the world is unity in the initial equilibrium. We assume that the preferential trade area is not yet implemented in the initial equilibrium, so that the *ad valorem* tariff rate t applies to imports from both sources.

When there is no regional market power on imports, the partner country's tariff-ridden supply curve is perfectly elastic, shown by the dotted line at $P = 1+t$. When there is regional market power on imports, the partner country's supply curve is upward sloping, depicted by the solid line $S[P/(1+t)]$. Since both models must represent the initial data point as an equilibrium, the tariff ridden

⁷See Bhagwati and Panagariya [1996] for a treatment of several other cases.

supply curve of the partner country in the presence of market power, intersects the demand curve for partner country imports where the initial market price, $P = 1+t$, and the initial quantity, Q_0 , are the same as with perfectly elastic supply curves. Then in both cases, the initial tariff revenue from partner imports is the area $T_3 + D$ and tariff revenue from non-partner imports is $T_1 + T_2 + T_0$.

Consider a preferential reduction in the tariff on partner country imports from t to 0 . In the case on no market power, this results in an increase in the quantity demanded for partner country imports from Q_0 to Q_1 . Since imports from the rest of the world are gross substitutes with partner country imports, there is a downward shift in demand for imports from the rest of the world to dotted line M'_R . In the new equilibrium the quantity demanded of imports from the rest of the world declines from R_0 to R_1 .

Welfare Results: No Market Power on Import Demand. Although we employ Hicksian equivalent variation in our model, following Willig [1976] we approximate the welfare impact in Figure 1 using consumer's surplus analysis. First consider the case of no market power. In the market for partner country imports, consumer surplus increases by the area $A + B + C + D + T_3$. There is a loss in tariff revenue equal to the area $D + T_3$, yielding a "trade creation" triangle $A+B+C$. In the market for imports from the rest of the world, there is a loss of "surplus" equal to the lost tariff revenue (the "trade diversion" effect), which is the area $T_1 + T_2$. All tariff loss is a loss in welfare to the home country since either the government will have to generate this revenue or cut transfers to compensate.⁸ Thus, the net change in welfare is equal to $A+B+C-T_1 - T_2$. It is well known that the

⁸Our quantitative analysis, which is general equilibrium, incorporates the welfare changes from *all* goods. For our graphical analysis, following Harberger [1971], we ignore the market for the home country's goods and other products, presuming there is no difference between price and marginal cost.

sign is ambiguous in general. Figure 1, however, highlights how the parameters affect the results.

First, if the tariff on imports from the rest of the world is lowered, the rectangle of trade diversion will be smaller. In the limit, the home country can eliminate trade diversion completely by going to free trade on imports from the rest of the world. Thus, one disadvantage of a customs union over a free trade area is that the home country gives up its autonomous ability to reduce its tariffs and trade diversion on imports from the rest of the world. Second, if products from the partner country and the rest of the world are very good substitutes, the trade diversion rectangle will be relatively large.⁹ It is for this reason that our estimates of the gains from regional trade arrangements decrease as we increase the assumed trade elasticities. Finally, if home country products and imports are good substitutes (σ_{DM} in our model), it is more likely that preferential trade arrangements will be beneficial, since then the demand curves in Figure 1 will be relatively flat and the area $A + B + C$ will be larger.

Welfare Results: Market Power on Imports. After a free trade agreement is implemented with the market power with respect to regional imports, the price of partner country imports falls to P^1 , which exceeds $P = 1$ in the no market power case due to the upward sloping supply curve. The quantity of partner country imports increases by less than in the large partner country case, increasing to Q^1 . Since the price of partner country imports falls less, the inward shift in the demand for imports from the rest of the world is less as well, shifting down to the solid line M'_R rather than M_R .

Regarding the welfare effects, consumers gain the area $A + D$ in the market for partner

⁹In our model this is measured by the cross elasticity of demand between partner country imports and rest of the world imports, σ_{MM} .

country imports, but there is a loss of tariff revenue equal to $D + T_3$. In the market for imports from the rest of the world, there is a loss of tariff revenue equal to the area T_1 . Thus, the net welfare impact is equal to the area $A - T_3 - T_1$. The sign of this sum is also ambiguous in general, but the impact of the parameters on the results is comparable to the large partner country case.

Comparing the Cases: With or Without Market Power on Regional Imports. There is an adverse terms-of-trade shift in the regional market power case, since the supply price from partner country suppliers is $P^1 > 1$. As a result, there is a reduction in consumers' surplus compared to the no market power case equal to the sum of three areas in Figure 1: $T_3 + B + C$. On the other hand, the loss of tariff revenue in the market for imports from the rest of the world is less in the regional market power case by the area of rectangle T_2 . Thus, ignoring export markets, the home country will gain more from a preferential trade arrangement with a large country if and only if the adverse terms-of-trade loss exceeds the extra costs of trade diversion, i.e., $T_3 + B + C > T_2$. Thus, it is ambiguous whether possession of regional market power is preferable.

Note also that the area $T_3 + B$ represents a gain of producers' surplus to exporters from the partner country, so it is not dead-weight loss to the region. Then, (ignoring home country export access) the net welfare difference to the combined producers and consumers of the preferential trade area is $C - T_2$, where, for the region, partnership with no regional market power is better than with regional market power if this difference is positive. The rectangle T_2 measures the reduced trade diversion in the small country case. The triangle C is analogous to a dead-weight loss triangle which arises from importing from an alternate inefficient supplier. In this case, the dead-weight loss triangle arises from a hypothetical comparison to a supplier with a perfectly elastic supply curve at price $P = 1$.

Impact of Preferred Access to Partner Country Markets

One important element that is missing from figure 1 is the value to the home country of improved access to the markets of the partner country. In figure 2 we analyze the impact of tariff preferences in regional markets. SS is the supply curve of the home country to partner country markets.

The demand for partner country exports depends on whether the home country faces perfectly elastic or downward sloping demand curves for its exports in partner markets. In the case where the partner countries are large, the home country is a price taker, and initial demand is depicted by the dotted line $P/(1+t)$. The initial equilibrium quantity and price are E_0 and $P/(1+t)$, and initial tariff revenue, which is collected by partner countries, is the area $ABGF$. Removal of the tariff preferentially increases the demand for home country exports to the dotted line P . The new equilibrium is at E_1 , P . Producers' surplus for the home country increases by the area $ABEF$, which is decomposed as the rectangle $ABGF$, which is a transfer of initial tariff revenue of partner countries to home country exporters and a triangle BGE .¹⁰

If the home country is not a price taker in regional markets, initial demand for home country exports in partner countries is the tariff ridden demand curve, represented by the solid line $D_{REG}/(1+t)$, where D_{REG} is the corresponding demand curve without a tariff applied to home country exports. To assure a fair comparison between the price taker and market power cases, the demand curves are drawn such that both cases are consistent with the initial equilibrium quantity and price of E_0 and $P/(1+t)$, respectively and initial tariff revenue of $ABGF$.

¹⁰ This is not a typical triangle of efficiency gains due to the possibility of trade diversion.

When partner countries eliminate the tariff against home country exports, the new equilibrium quantity and price are E^1 and D . Producers' surplus of the home country expands to $ABCD$. Thus the gain in producers surplus for the home country is less when partner countries have downward sloping demand curves and the difference in welfare between the price taking and market power cases is $DCEF$. With market power, the price does not rise as much since with a downward sloping demand curve, the home country must accept a lower price to increase the quantity supplied. Thus, it is unambiguous that the value to the home country of a given level of preferential tariff reduction will be greater with no market power on its exports in regional markets.

III. The Institutional Background to the CEMAC Reform

A brief review of the events that led up to the formation of CEMAC will help explain the choice of some of the parameter values in the modelling and place the quantitative work in context.

The pre-reform trade regime: the UDEAC Experience

The data for our model comes from 1989 to 1993, during which time Cameroon, Congo, Gabon, Central African Republic, Chad, and Equatorial Guinea participated in the *Union Douanière et Economique de l'Afrique Centrale (UDEAC)*. UDEAC was formed in 1964 with the objective of promoting economic integration among the members. Although per capita income is relatively low in all six countries, as table 1 indicates Cameroon accounts for more than 54% of the GDP of the entire Union, and its population is 50% of the Union. Under the treaty establishing the union, the member countries were to progressively liberalize their trade with other members, encourage freedom of movement for factors of production and coordinate their economic policies. Indeed, the

treaty reads like that of a common market, even if in reality the major, if not the sole, vehicle of integration was liberalization of intra-regional trade.

External Trade. As regard trade with outside countries, the treaty establishing UDEAC called for implementation of a common external tariff. UDEAC countries had in common three different levies on imports: an *import duty*, an *entry duty*, a *duty on import turnover*. But in addition there was a fourth levy, the *complementary tax*, whose rate was determined independently by each country. Although Samen (1988) has shown that actual MFN duties did not differ greatly across countries, as a result of the complementary tax there never was a common external tariff. Most importantly, the UDEAC countries including Cameroon had a highly protective MFN trade regime. In the case of Cameroon, its tariff rates ranged from 2.5 percent to 150 percent.

Regional Trade. In 1965 the Union introduced a scheme to liberalize intra-regional trade based on what was called the single tax *regime*, and Cameroon's regional trade was governed by this system. Under this scheme, goods that had the potential of entering intra-regional trade were classified into two broad categories: The first category consisted of primary products (*produits du cru*) whose movement within the union was free of any duty. The second category consisted of all manufactured goods produced in one member country for regional export¹¹. The scheme required that these goods be subject to the single tax. Manufactured goods that had not won the single tax status were prohibited from trade within the union. In other words, there was no instance where a good manufactured in a union member could be exported to other union members unless it were

¹¹ Strict UDEAC policy on this matter considered as goods produced in one member country those goods that had a minimum of 40% of their value accounted for by the domestic production process. This rule was not, however, rigorously followed and granting the single tax regime to goods that had only 20% of domestic value was not uncommon practice.

classified as a single tax good. The single tax replaced all other import duties and domestic taxes on inputs used in the production of single tax goods, and was levied on a destination basis. The rate of the single tax applied on a product was determined on a case by case basis and would normally vary with the good, the producing country, the importing country and even the producing firm. The single tax was generally lower than the rate that would have resulted from the application of MFN treatment, and was collected by the customs of the importing country¹². But no discernible and stable relationship between these two rates was found.

In practice the *single tax* proved a very inefficient instrument for liberalizing intra-union trade. First of all, firms had to apply individually for the *single tax* status which was granted on a case by case basis, and its rate varied greatly across firms, across products and also across member countries. The unpredictable character and the cumbersome administrative process through which firms had to go to apply and obtain the *single tax* status may well have hindered rather than promoted intra-regional trade.

The Formation of CEMAC

CEMAC was formed following the events that led to the devaluation of the CFA Franc.¹³

¹² At the time of its introduction, the single tax was collected on origin basis by the exporting union member. In 1973 the system was replaced by the destination principle whereby the tax was collected by the importing union member.

¹³ The six CEMAC countries also participate in a monetary union through their membership in the *Banque des Etats de l'Afrique Centrale (BEAC)*. BEAC is one of two central banks responsible for the administration of monetary policy in the CFA zone, the other being the *Banque Centrale des Etats de l'Afrique de l'Ouest (BCEAO)*. The CFA zone brings together France and fourteen African countries (the six members of CEMAC, seven in west Africa, which are Benin, Burkina Faso, Ivory Coast, Mali, Niger, Senegal and Togo, as well as Comoros) into a monetary arrangement whereby these countries' currency the CFA Franc is pegged to the French Franc and two *compte d'opérations* opened at the French treasury to help sustain the exchange rate between the French Franc and the CFA Franc. For a comprehensive description of the Franc zone see Guillaumont and Guillaumont (1984).

The CFA Franc had been pegged to the French Franc (FF) at the rate of 1FF for 50 CFA Franc for almost forty-six years. In comparison to other African countries, economic performance of the CFA zone countries was generally favorable, until the mid-1980s. However, several factors,¹⁴ most notably the appreciation of the French Franc vis-à-vis the U.S dollar and other major currencies led to real appreciation of the CFA Franc, poor external performance of the member countries compared with other African countries and increasingly placed unsustainable pressures on the above mentioned parity. After a decade of real economic decline, the CFA Franc was therefore devalued effective on January 12, 1994. (See Devarajan and de Melo, 1987; 1991 and Eldabawi and Majd, 1996 for empirical analyses of the impact of CFA zone participation.)

Following the devaluation, the CEMAC countries rapidly implemented policies aimed at the total elimination of barriers to regional trade and a reduction in the common external tariff.¹⁵ In particular, the CEMAC agreement calls for: the abolition of the *taxe unique*; the implementation of a common external tariff with four rates on member's imports from nonmember countries which will substitute for all imports duties; CEMAC members were required to eliminate all unjustified exemptions in order to strengthen their fiscal position; and the implementation of a *Tarif Préférentiel Généralisé* (TPG), equal to 20% of the corresponding common external tariff on member's imports from other members, which is to be progressively phased out within five years. The goal therefore was complete free trade within the zone.

¹⁴Other relevant factors included changes in oil exports and the terms of trade. On the impact of oil exports in Cameroon on the real exchange rate and sectoral output, see Benjamin, Devarajan and Weiner (1989).

¹⁵ Cameroon introduced the reform in February 1994, Congo in April 1994, Gabon in February 1994, Chad in June 1994, Equatorial Guinea in August 1994 and Central African Republic in April 1994. The reforms were originally agreed in June 1993 in Libreville.

IV. Model, Data and Elasticities

Summary of the Model

A full listing of the equations and variables of the model are in an appendix. With a couple of exceptions our model follows closely the “small open economy” model described in detail in de Melo and Tarr (1992).¹⁶ We assume that Cameroon is small in relation to the rest of the world and therefore faces fixed terms-of-trade with respect to the rest of the world. The only distortion in the model is the existence of tariffs on imported goods imposed by the government, the proceeds of which are redistributed to consumers in a lump sum. Trade flows are distinguished by origin for imports and destination for exports. The economy is decomposed into three sectors: agriculture, industry and services, with both intermediate and final use of all goods. Factors of production are intersectorally mobile, but the total supply of each factor is fixed. Production functions are subject to constant returns to scale. All agents, consumers, firms and factor owners, maximize welfare, profits or their returns, under perfectly competitive conditions.

The key departure from the de Melo and Tarr model is that, in order to analyze regional trade preferences, we decompose Cameroon’s trade into trade with CEMAC and trade with the rest of the world. Imports tariffs on goods from regional partners may be, and typically are, different from those on imports from the rest of the world. When there is no regional market power, improved access to the markets of regional partners is handled by exogenously increasing the price that

¹⁶The model also closely resembles the structure of a previous CGE model of Cameroon: the one employed in Benjamin, Devarajan and Weiner (1989). Our model is an updated version of the Benjamin et al. model, although it contains fewer sectors.

Cameroonian exporters obtain in the markets of partners countries (see below for the regional market power case). In this respect the model follows more closely the models of Rutherford, Rutstrom and Tarr (1997) and Harrison, Rutherford and Tarr (1997a).

The key modelling innovation in this paper is that we allow Cameroon to have market power on its regional trade even though it has none with respect to the rest of the world.¹⁷ The supply of imports from CEMAC to Cameroon may be upward sloping; therefore the tariff ridden supply curve from CEMAC is a function of Cameroon's tariff. Similarly, the quantity of Cameroon's exports demanded by CEMAC may depend on the price charged by Cameroon. Formally, when Cameroon possesses market power in its import demand from the region, the supply of imports from the region is expressed as:

Regional Import Supply with Market Power: $S_i = C_i [P_i/(1+t_i)]^{\psi_i}$

where S_i is the quantity of sector i imports supplied by regional partners, P_i is the tariff inclusive market price paid by Cameroonian consumers for regional imports in sector i , t_i is the ad valorem tariff rate imposed on sector i imports from the region by Cameroon (therefore $P_i/(1+t_i)$ is the price received by regional exporters in Cameroon), ψ_i is the elasticity of supply for sector i imports by regional partners, and C_i is a constant that varies by sector. Elimination of the regional tariff by Cameroon, shifts the tariff ridden regional supply curves in each sector out and to the right.

Similarly, when Cameroon is assumed to possess market power on its regional exports, demand for its exports in the region in sector i is represented as:

¹⁷See de Melo and Tarr (1992) for an example of a small open economy model with market power; but it has not been applied in small open economy models of regional trading arrangements.

Regional Export Demand with Market Power: $E_i = K_i/[P_i(1+t_i)]^{\pi_i}$

where E_i is the quantity of Cameroonian exports demanded in the regional market, P_i is the price received by exporters from Cameroon, t_i is the ad valorem tariff rate imposed on sector i exports from Cameroon in the region, π_i the elasticity of demand for sector i exports from Cameroon in CEMAC, and K_i is a constant that varies by sector. Implementation of the CEMAC arrangements implies that the tariff rate applied against Cameroonian exports will be reduced (see below for the data details), thereby shifting demand for Cameroonian exports in CEMAC out and to the right.

Tariff Rates Chosen in the Model

In table 3 we present the tariff rates that we employ in the benchmark equilibrium and the policy counterfactuals. The structure of the import tariff rates was obtained from legal tariff rates, but we adjusted the legal tariff rates to reflect the actual collected rates as follows.

For the benchmark equilibrium, we employed the estimates of Semen (1988) to obtain the structure of legal tariffs rates that Cameroon applied on intermediate and consumption goods imported from the rest of the world; Semen shows that both for both Cameroon and its partners in UDEAC these rates followed closely the common external tariff of UDEAC. For legal tariff rates on intermediates and consumption goods imported from the region, we employed results from both Bela (1992) and unpublished IMF estimates. These studies combined gave us the structure of tariffs, intermediate versus consumption goods and regional versus rest of world.

Due to a large number of exemptions, however, the actual collected duties were considerably less than what is implied by the legal rates. Based on data we received from the Ministry of Finance

of Cameroon, we have that the actual aggregate collected duties were equal to 20.9 percent of the value of imports in fiscal year 1992-1993; and collected duties were equal to 10.7 percent of imports in fiscal year 1996-1997. This shows that the CEMAC reforms have led to a reduction in collected duties. In our view, the collected rates present a more accurate view of the protection provided to industries and the costs to consumers and firms of import protection. Thus, it is important to adjust the legal rates to reflect the collections. Since we do not have data on collected rates by intermediates versus consumption goods, in order to obtain our pre-reform (or benchmark) tariff rates of table 3, we scaled down the structure of the legal tariff rates proportionately such that the weighted average tariff rates equal to the collected rate of 20.9 percent. For the CEMAC compliance scenarios, we set all regional tariffs equal to zero and then scaled down the legal rates on rest of world imports such that the weighted average tariff rate was equal to 10.7 percent, the post-reform collected rate.

For the pre-reform tariff rates that applied on exports of Cameroon to its regional partners, we employed the estimates of a World Bank study of UDEAC; it indicates that on average, Cameroon's exports faced a tariff of 22 percent in the region. If Cameroon's regional partners conform to the arrangements of CEMAC, Cameroon will obtain tariff free access to the CEMAC markets, i.e., there will be a reduction of tariffs facing Cameroonian exporters by 22 percent. Cameroonian exporters cannot expect, however, to receive a price increase of the full 22 percent on their regional exports, since the common external tariff of CEMAC is also being reduced. The reduction in the external tariff by Cameroon's partners in CEMAC implies that the increase in demand that Cameroon will obtain from the elimination of the 22 percent tariff against its exports, will be eroded due to increased competition in the regional markets from rest of world imports, i.e., there will be a partially offsetting shift down in the demand curve for the regional exports of

Cameroon due to the tariff reduction on rest of world imports. Given that Cameroon and its partners start from the common external tariff of UDEAC and move to the common external tariff of CEMAC, we assume that all partners are cutting their external tariffs by about the same percent as Cameroon (Cameroon is cutting its overall tariff from 20.9 to 10.7 percent). On balance, we assume that Cameroon will realize a net increase in its demand by 11 percent, i.e, the preferential reduction of partner country tariffs by 22 percent is eroded by about 50 percent due to partner country tariff reduction against imports from the rest of the world. The actual extent of the erosion of the 22 percent tariff reduction against Cameroon's region is dependent on elasticity of substitution possibilities in the CEMAC markets.

Choice of elasticities

Table 4 presents the values chosen for the elasticities in the model. Elasticities of substitution between capital and labor are based on estimates from Caddy (1976). For composite final demand, we employ the "Linear Expenditure System" demand functions. The own price elasticities may be derived from estimates of the "minimum consumption requirements," which were obtained from the poverty assessment report of the World Bank (1995). For industry and services, these values are consistent with the estimates of Lluch, Powell and Williams (1977). The elasticities of substitution between imported and domestic goods in final consumption were based on estimates in Shiells, Stern and Deardorff (1986) and adjusted to reflect the limited possibilities for substitution between imports and domestic goods that are usually characteristic of a developing economy like Cameroon. Elasticities of substitution between imports from the region and imports from the rest of the world were interpolated from Faini (1994). The same values were chosen for intermediate goods. Elasticities of transformation between domestic supply and exports were also based on

Faini (1994).

Regarding the elasticities that reflect regional market power on imports and exports, in our central elasticity case we chose the value of four, which was the value taken by de Melo and Tarr (1992) for the selected products for which market power was present in their model. These values were halved and doubled in the low and high elasticity scenarios.

Trade shares

The share of Cameroon's total exports which go to CEMAC and its share of total imports from CEMAC are shown in table 2, by sector. As shown in figure 2, these values are rather important to the results. They were calculated from unpublished data provided by the Department of Statistics and National Accounts of the Cameroonian Ministry of Economy and Finance. The original data, which was slightly more disaggregated than the sectors in our model, provided the shares of each product category in total trade, intra-regional trade and trade with the rest of the world, along with the absolute totals for each. We aggregated these data to obtain the shares relevant to our model. In table 1, the aggregate shares of exports to and imports from the region were calculated as a weighted average of the shares in table 2.

V. Results

In table 5 we present the results of our policy simulations with our central elasticities. This involves selection of the policy instruments shown in columns 1-3, the specifics of which are explained in table 3. The results are dependent on the extent of market power by Cameroon in its regional markets. As discussed above, however, given the size of Cameroon in its regional markets, it is likely most appropriate to assume that Cameroon has market power on both its imports and

exports within the region, despite the fact that it is small in world markets. For the purpose of decomposing the results, we present in column 4 results assuming the Cameroon does not possess any regional market power. We present in column 5 the estimates for when Cameroon's demand for regional imports is large in relation to the capacity of its regional partners (but it is not large in its regional exports markets). In column 6 we reverse the assumption and assume that Cameroon is large in its regional export markets (but not large in its regional import markets). In column 7, Cameroon is large in both its regional export and regional import markets.

Implementation of CEMAC. In row 1 we assume that Cameroon and its CEMAC partners fully implement the CEMAC arrangements. As shown in column 4, if Cameroon is assumed to possess no regional market power, we estimate that it would gain 0.62 percent of its GDP. The results in column 5 (a gain of 0.61 percent of GDP) show that there is very little difference between having market power on regional import markets only and not having any regional market power. In general the existence of market power on imports implies that the country suffers a terms of trade loss from lowering tariffs, so the gains from trade liberalization will be smaller with market power. Our results, however, are explained by figure 1, where we showed that in the context of lowering tariffs preferentially, with market power in the regional market only, there is a tradeoff between the terms of trade loss from higher prices paid to partners for imports, and reduced trade diversion costs from less diversion away from rest of world imports. Then whether market power on regional imports reduces the gains from regional integration, compared to no regional market power, is elasticity dependent.

With market power on regional exports only, the gains from regional integration decline substantially to 0.41 percent of GDP. This is explained by figure 2, where we showed that there is

a terms of trade loss from facing a downward sloping demand curve for regional exports. Then compared with being a price taker on regional markets, there is an unambiguous loss of welfare. When Cameroon possesses market power on both its regional exports and imports, the gain from implementing CEMAC is 0.41 percent of its GDP. Thus, virtually all of the reduced gains from terms of trade losses derive from market power on exports.

Decomposition of the Results. Since the implementation of the CEMAC arrangements involve several elements, we separately evaluate the impact of the three most important changes in the simulations presented in rows 2-4. In row 3 we show that the isolated impact of Cameroon lowering its external tariffs is between 0.34 and 0.30 percent of GDP. Thus, as would be expected, Cameroons' market power on its regional markets does not have a significant impact on the estimated gains from tariff reduction with respect to the rest of the world.

In row 2, we evaluate the consequences of Cameroon obtaining improved preferential access to the CEMAC markets, i.e., we assume that the tariff against Cameroon's exports is preferentially reduced by 11 percent. With no market power, the value to Cameroon from improved access is 0.29 percent of GDP, which is almost 50 percent of full implementation of CEMAC (compare to row 1, column 4). As shown in figure 2, Cameroonian exporters gain in two ways: a triangle of additional producers' surplus on their additional sales to the regional market as a result of their improved terms of trade on exports; and a rectangle of terms of trade gain on their existing sales, as tariff revenue of the partner countries is converted into producers' surplus. Given that the gains are dependent on a rectangle of existing sales, the larger are initial sales to the region, the larger will be the gains to Cameroon from improved preferential access. When Cameroon possesses market power on its regional exports, the gains from improved access to regional markets are reduced to 0.11 percent of

GDP. The triangle and rectangle of additional producers' surplus for Cameroonian exporters are of reduced height due to adverse terms of trade effect. Then the gains from improved regional access are about 25% of the gains from full implementation of CEMAC with similar market power assumptions (row 1, column 6). That is, since the value of external liberalization is largely unaffected by Cameroon's regional market power, compared to improved regional access, external liberalization constitutes a larger share of the gains from CEMAC when we assume that Cameroon possesses market power on its regional export markets.

In row 4, assume that Cameroon eliminates tariffs against its regional partners without changing its external tariff and without obtaining improved access to regional markets. Cameroon is estimated to lose from this impact due to the dominance of trade diversion over trade creation in this case. It is a well known result (originally due to Lipsey, 1958) that, if one holds tariffs against the rest of the world constant and incrementally reduce tariffs preferentially, regional tariff preferences become immiserizing at the margin before regional tariffs go to zero.¹⁸ Since, as we showed in table 3, Cameroon already provides significant tariff preferences to its regional partners, it is not surprising that further preferential reduction, while holding external tariffs constant would be immiserizing. This further emphasizes the importance of tariff reduction to the rest of world accompanying the regional preferences.

To examine whether Cameroon's regional tariff preferences are immiserizing, in rows 5a and 5b we vary the regional tariff of Cameroon while we hold the tariff against the rest of world constant at the CET and unrealistically assume that Cameroon still obtains improved access to regional

¹⁸The result has also been independently established by Ethier and Horn (1984) and was shown by Meade (1956) in the framework of global, rather than national, welfare.

markets. Comparing the results of rows 5a, 5b and row 1, we can assess the optimal regional tariff, rest of world tariffs and regional access held constant. We estimate that the differences are rather small, but that Cameroon would be marginally better off if it held its regional tariffs constant at the level of the benchmark equilibrium. The welfare differences are rather small, because regional imports by Cameroon are only about two percent of its total imports. The results from rows 4 and 5 are reconciled by again appealing to the theoretical result that incremental preferential tariff reduction may be beneficial initially, but eventually becomes immiserizing. In the case of Cameroon, row 4 shows that preferential reduction below the benchmark tariff level is immiserizing if the tariff against the rest of the world is not reduced to the CET level; but row 5 shows that preferential reduction from the CET to the benchmark level is welfare neutral.

Other Policy Possibilities. In rows 6 and 7, we estimate the impact of unilateral non-preferential trade liberalization by Cameroon. Lowering tariffs to zero provide greater gains than lowering tariffs to the level of the common external tariff of CEMAC, which is to be expected since the bulk of Cameroon's trade is with the rest of the world and Cameroon is a price taker with respect to the rest of the world.

What is most interesting from a policy perspective is that in the most realistic case of regional market power on exports by Cameroon, Cameroon will gain more from lowering tariffs to zero than from full implementation of CEMAC, i.e., row 7 column 7 exceeds row 1 column 7. An effort by Cameroon to unilaterally lower its tariffs to zero may be impeded by a conflict with the common external tariff of CEMAC. If Cameroon chose to drop out of CEMAC, it would have to suffer from reduced access to the markets of CEMAC. These estimates indicate that the losses that Cameroon would suffer from reduced preferential access to CEMAC are more than compensated by the

additional gains from trade liberalization with the rest of the world.¹⁹

Given the history of incompletely fulfilled trading agreements among developing countries, it is possible that Cameroon would implement CEMAC arrangements, but that its partners would not provide preferential access to their markets. The results for this scenario are presented in row 8, and are little different from row 3, which is the value of external liberalization only. Thus, compared with full CEMAC implementation by its partners as well, Cameroon would lose from the lack of improved access to CEMAC markets; but the difference with respect to its regional tariffs are of second order of importance due to the small quantity of regional imports. Of course, if its regional partners fail to adhere to the CEMAC agreements, then Cameroon could further lower its external tariff to obtain further gains.

Finally, in row 9 we consider the impact of old style regional arrangements, where the common external tariff is not lowered, but Cameroon and its CEMAC partners eliminate tariff preferences against each other. The gains to Cameroon are comparable to the results in row 2 deriving from improved access.

Sensitivity Analysis. In table 6 we present the results for high and low elasticities. Included in the elasticities that we change are the elasticities that reflect the extent of market power. These are doubled and halved in the high and low elasticity scenarios. Higher elasticities generally result in larger gains since firms and consumers are more responsive to the new incentives, i.e., "Harberger

¹⁹Moreover, part of the gains to Cameroon from participating in CEMAC are losses to the rest of CEMAC, and these gains are likely to be larger, the larger is the regional trade surplus. That is, given Cameroon's regional trade surplus, it suffers relatively little trade diversion and benefits from improved access on its exports. Suppose we were to attempt to extrapolate these results to other CEMAC countries without estimation. Unilateral trade liberalization for other CEMAC countries who do not run a regional trade surplus is likely to be relatively better compared to participation in CEMAC than it is for Cameroon.

triangles" are larger. The pattern across scenarios, however, is similar to the central elasticity scenarios.

VI. Conclusion

We have quantified the impact on Cameroon of three aspects of the CEMAC agreements: improved access to CEMAC markets, preferential tariff reduction and reduction of external tariffs through implementation of the common external tariff of CEMAC. We estimate that Cameroon will gain between 0.41 and 0.62 percent of GDP, depending on market power assumptions. We find that improved access to partner markets and reduction of the external tariff explain virtually all of the welfare gain. In our preferred case of regional market power, external reduction explains about three-quarters of the welfare gain. Although we find that further preferential tariff reduction by Cameroon to its regional partners is immiserizing, the quantitative impact is negligible.

We have also estimated some unilateral trade policy options of Cameroon. In the event that Cameroon's partners fail to provide tariff free access to their markets, we estimate that ,taking Cameroon's regional market power into account, Cameroon would gain even more from free trade than it would from implementing the CEMAC arrangements.

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**The Economic Effects of Integration in the Central African
Economic and Monetary Community:
Some General Equilibrium Estimates**

Appendix: Equations of the Model

Model Equations

$$X_i = \alpha_i [\beta_i Kd_i^{\theta_i} + (1 - \beta_i) Ld_i^{\theta_i}]^{\frac{1}{\theta_i}} \quad (1)$$

$$X_j = \frac{INT(i, j)}{a(i, j)} \quad (2)$$

$$INT(i, j) = \gamma(i, j) [\delta(i, j) IM_{i,j}^{\rho} + (1 - \delta(i, j)) IDD_{i,j}^{\rho}]^{\frac{1}{\rho}} \quad (3)$$

$$IM(i, j) = \psi(i, j) [\zeta(i, j) IMREG_{i,j}^{\tau} + IMREG_{i,j}^{\tau}]^{\frac{1}{\tau}} \quad (4)$$

$$IM(i, j) = \left[\frac{\delta(i, j)}{1 - \delta(i, j)} \right]^{\rho(i, j)} \left[\frac{PID(i, j)}{PIM(i, j)} \right]^{\rho(i, j)} IDD(i, j) \quad (5)$$

$$IMREG(i, j) = \left[\frac{\zeta(i, j)}{1 - \zeta(i, j)} \right]^{\tau(i, j)} \left[\frac{PIMROW(i, j)}{PIMREG(i, j)} \right]^{\tau(i, j)} IMROW(i, j) \quad (6)$$

$$Kd(i) = X_i \left[\frac{PVA_i \beta_i \alpha_i^{\theta}}{R} \right]^{\frac{1}{1 - \theta}} \quad (7)$$

$$Ld(i) = X_i \left[\frac{PVA_i \beta_i \alpha_i^{\theta}}{W} \right]^{\frac{1}{1 - \theta}} \quad (8)$$

$$X_i = \tau_i [\vartheta_i EX_i^{\phi_i} + (1 - \vartheta_i) DS_i^{\phi_i}]^{\frac{1}{\phi_i}} \quad (9)$$

$$EX_i = \mu_i \left[\lambda_i EXREG_i^{\pi_i} + (1 - \lambda_i) EXROW_i^{\pi_i} \right]^{\frac{1}{\pi_i}} \quad (10)$$

$$DS_i = \chi_i \left[\xi_i CS_i^{w_i} + (1 - \xi_i) IDS_i^{w_i} \right]^{\frac{1}{w_i}} \quad (11)$$

$$EX_i = \left[\frac{1 - \vartheta_i}{\vartheta_i} \right]^{\phi_i} \left[\frac{PE_i}{PD_i} \right]^{\phi_i} DS_i \quad (12)$$

$$EXREG_i = \left[\frac{1 - \lambda_i}{\lambda_i} \right]^{\pi_i} \left[\frac{PEREG_i}{PEROW_i} \right]^{\pi_i} EXROW_i \quad (13)$$

$$CS_i = \left[\frac{1 - \xi_i}{\xi_i} \right]^{w_i} \left[\frac{PCD_i}{PIDD_i} \right]^{w_i} IDS_i \quad (14)$$

$$U_i = \sum_i \Omega_i \text{Ln}[QD_i - H(i)] \quad (15)$$

$$QD_i = H(i) + \left[\frac{\Omega_i}{PQ_i} \right] (Y - \Theta) \quad (16)$$

$$\Theta = \sum_i PQ_i H_i \quad (17)$$

$$QD_i = \lambda \left[\nu_i CM_i^{\phi_i} + (1 - \nu_i) CD_i^{\phi_i} \right]^{\frac{1}{\phi_i}} \quad (18)$$

$$CM_i = Z_i \left[\partial_i CMREG_i^{\Gamma_i} + (1 - \partial_i) CMROW_i^{\Gamma_i} \right]^{\frac{1}{\Gamma_i}} \quad (19)$$

$$CM_i = \left[\frac{v_i}{1-v_i} \right]^{\phi_i} \left[\frac{PCD_i}{PCM_i} \right]^{\phi_i} \quad (20)$$

$$CMREG_i = \left[\frac{\partial_i}{1-\partial_i} \right]^{\Gamma_i} \left[\frac{PCMROW_i}{PCMREG_i} \right]^{\Gamma_i} \quad (21)$$

$$Y_i = \sum_i R \times Kd_i + \sum_i W \times Ld_i + Tariff + TB \times e \quad (22)$$

$$\begin{aligned} Tariff = & \sum tmirow_i \times PHIMIREG_i \times IMREG(i,j) \times e + \sum tmcrow_i \times PHIMCROW_i \times CMREG_i \times e \\ & + \sum tmirow_{i,j} \times PHIMIROW_i \times IMROW(i,j) \times e \\ & + \sum tmcrow_i \times PHIMCROW_i \times CMROW_i \times e \end{aligned} \quad (23)$$

$$PX_i = PVA_i + \sum_j a_{i,j} PI_j \quad (24)$$

$$PVA_i = \frac{W \times Ld_i + R \times Kd_i}{X_i} \quad (25)$$

$$PHIEROW_i = \overline{PHIEROW_i} \quad (26)$$

$$PHIMIROW_i = \overline{PHIMIROW_i}$$

$$PHIMCROW_i = \overline{PHIMCROW_i}$$

$$EXREG_i = \left[\frac{1}{phiereg_i + tereg_i} \right]^{\eta_i} red_i \quad (27)$$

$$IMREG_i = [phimireg_i]^{E_i} rim_i \quad (28)$$

$$CMREG_i = [phimcreg_i]^{p_i} rcm_i \quad (29)$$

$$PHIEREG_i = \overline{PHIEREG_i} \quad (30)$$

$$PHIMCREG_i = \overline{PHIMCREG_i}$$

$$PHIMIREG_i = \overline{PHIMIREG_i}$$

$$PIM_{i,j} = \frac{PIMREG_i \times IMREG_{i,j} + PIMROW_i \times IMROW_{i,j}}{IM_{i,j}}$$

$$PIMREG_{i,j} = PHIMIREG_i [1 + tmireg_i] e$$

$$PIMROW_i = PHIMIROW_i [1 + tmirow_i] e$$

$$PEREG_i = PHIEREG_i \times e$$

$$PEROW_i = PHIEROW_i \times e$$

$$PE_i = \frac{PEREG_i \times EXREG_i + PEROW_i \times EXROW_i}{EX_i}$$

$$PCMREG_i = PHIMCREG_i [1 + tmcrow_i] e$$

$$PCMROW_i = PHIMCROW_i [1 + tmcrow_i] \times e$$

$$PCM_i = \frac{PCMREG_i \times CMREG_i + PCMROW_i \times CMROW_i}{CM_i}$$

$$PX_i = \frac{PE_i \times EX_i + PD_i \times DS_i}{X_i}$$

$$PQ_i = \frac{PCM_i \times CM_i + PCD_i \times CD_i}{QD_i}$$

$$PD_i = \frac{PIDD_i \times IDS_i + PCD_i \times CS_i}{DS_i}$$

$$PI_{i,j} = \frac{PIM_{i,j} \times IM_{i,j} + PID_{i,j} \times IDD_{i,j}}{IDD_{i,j}}$$

$$PIDD_i = \frac{\sum PID_{i,j} IDD_{i,j}}{IDS_i}$$

$$TB = \sum_i PHIEREG_i \times EXREG_i + \sum_i PHIEROW_i \times EXROW_i - \sum_{i,j} PHIMIREG_i \times IMREG_i - \sum_i PHIMC$$

$$\sum_{i,j} PHIMIROW_i \times IMROW_i - \sum_i PHIMCROW_i \times CMROW_i$$

$$\sum_i Kd_i = \bar{K}$$

$$\sum_i Ld_i = \bar{L}$$

$$\sum_i IDD_i = IDS_i$$

$$CS_i = CD_i$$

$$\frac{\sum PD_i DS_i^o}{\sum PD_i^o DS_i^o} = 1$$

Parameters

α_i	Scale parameter in the production function
β_i	Share parameter in the production function
θ_i	Capital-Labor elasticity of substitution
$a_{i,j}$	Input-Output coefficient
$\psi_{i,j}$	Scale parameter in the composite intermediate demand
ι_i	Composite intermediate imports elasticity of substitution
$\rho_{i,j}$	Composite intermediate demand elasticity of substitution
ω_i	Composite domestic supply elasticity of substitution
γ_i	Scale parameter in the composite intermediate demand
$\delta_{i,j}$	Share parameter in the composite intermediate demand
$\tau_{i,j}$	Scale parameter in the composite output
μ_i	Scale parameter in the composite exports
ϑ_i	Share parameter in the composite output function
ϕ_i	Composite output elasticity of substitution
π_i	Composite exports elasticity of substitution
χ_i	Scale parameter in the composite domestic supply function
ξ_i	Share parameter in the composite domestic supply
λ_i	Share parameter in the composite exports function
H_i	Minimum quantity of good i
Ω_i	Marginal budget share of good i
ν_i	Share parameter in the the composite final demand function
Φ_i	Composite final demand elasticity of substitution
Γ_i	Composite final imports elasticity of substitution

∂_i	Share parameter in the composite final imports
$tmireg_i$	Tariff rate on intermediate imports from the regional market
$tmcreg_i$	Tariff rate on final imports from the regional market
$tmirow_i$	Tariff rate on intermediate imports from the rest of the world market
$tmcrow_i$	Tariff rate on final imports from the rest of the world market
$tereg_i$	Tariff rate facing exports to the regional market
$phierow$	Price in the regional market
$phimirow$	Price of intermediates in the rest of the world market
$phimcrow$	Price of final goods in the rest of the world market
red_i	Export to the regional market demand parameter derived from calibration
rim	Intermediates imports from the regional market parameter derived from calibration
rcm	Final goods imports from the regional market parameter derived from calibration
η_i	Regional export demand elasticity
E_i	Regional demand for intermediates elasticity
ϕ_i	Regional demand for final goods elasticity
\bar{K}	Capital stock
\bar{L}	Total labor supply in the economy
TB	Trade balance---balance of trade in goods and services

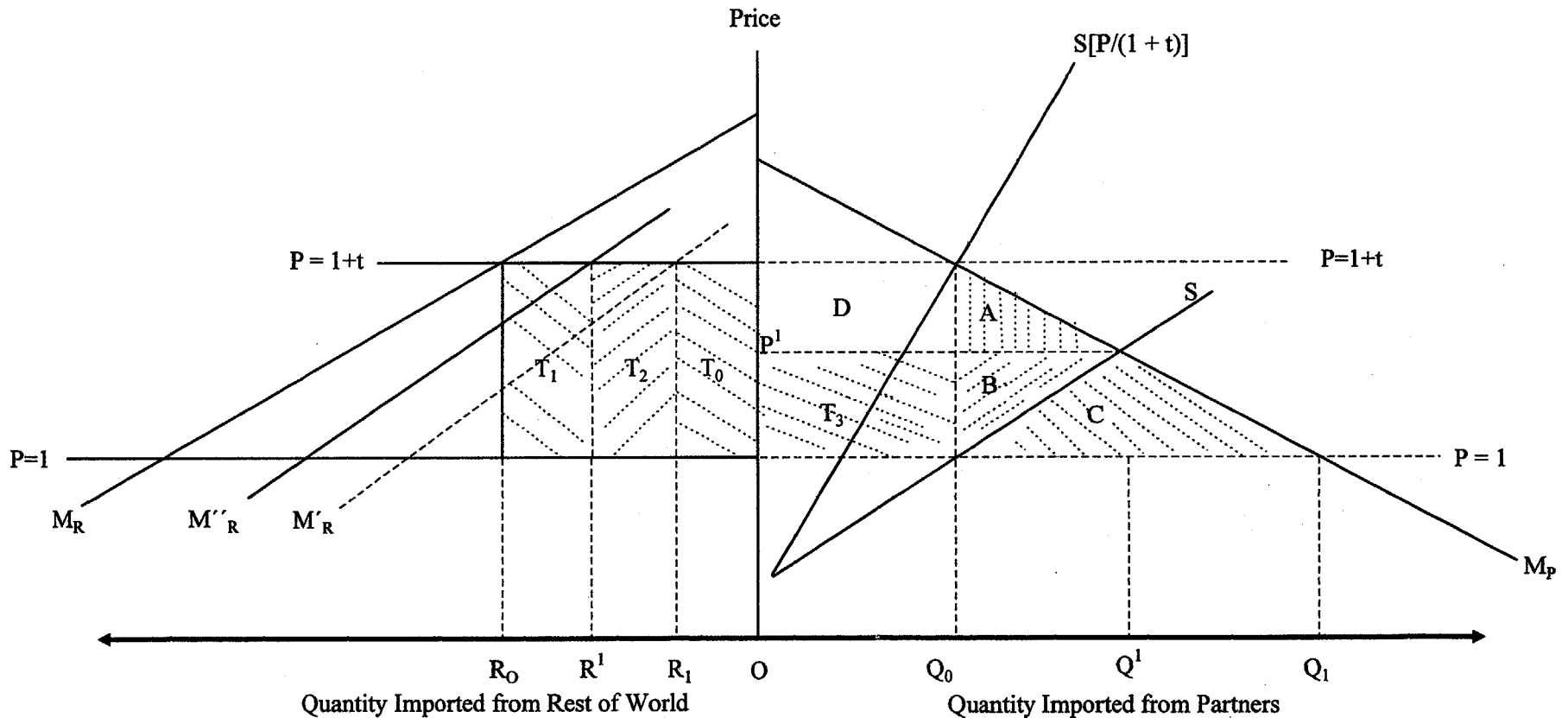
Variables

X_i	Output of sector i
Kd_i	Demand for capital by sector i
Ld_i	Demand for labor by sector i
$INT(i, j)$	Composite intermediate demand
$IM(i, j)$	Imported intermediate of goods I used by sector j
$IMREG(i, j)$	Imported intermediates from the regional market

$IMROW(i, j)$	Imported intermediates from the rest of the world market
$IDD(i, j)$	Domestically supplied intermediates
$PID(i, j)$	Domestic price of intermediates
$PIM(i, j)$	Domestic price of imported intermediates
$PIMROW(i, j)$	Domestic price of intermediates from the rest of the world
$PIMREG(i, j)$	Domestic price of imported intermediates from the regional market
$PCM(i)$	Domestic price of imported final goods
$PCMROW(i)$	Domestic price of imported final goods from the rest of the world market
$PCMREG(i)$	Domestic price of imported final goods from the regional market
PVA_i	Value-added price
W	wage rate
R	Capital rental rate
EX_i	Composite exports
$EXROW_i$	Exports to the rest of the world market
$EXREG_i$	Exports to the regional market
DS_i	Composite domestic supply
IDS_i	Domestic supply of intermediates by sector i
CD_i	Domestically supplied final consumption
PX_i	Price of composite output
PE_i	Domestic price of composite exports
$PEREG_i$	Domestic price of exports to the rest of the world market
$PEROW_i$	Domestic price of exports to the rest of the world market
PCD_i	Domestic price domestically supplied final consumption
$PIDD_i$	Domestic price of good i used as intermediate
QD_i	Composite final demand
PQ_i	Domestic price of the composite final demand
CM_i	Composite final imports

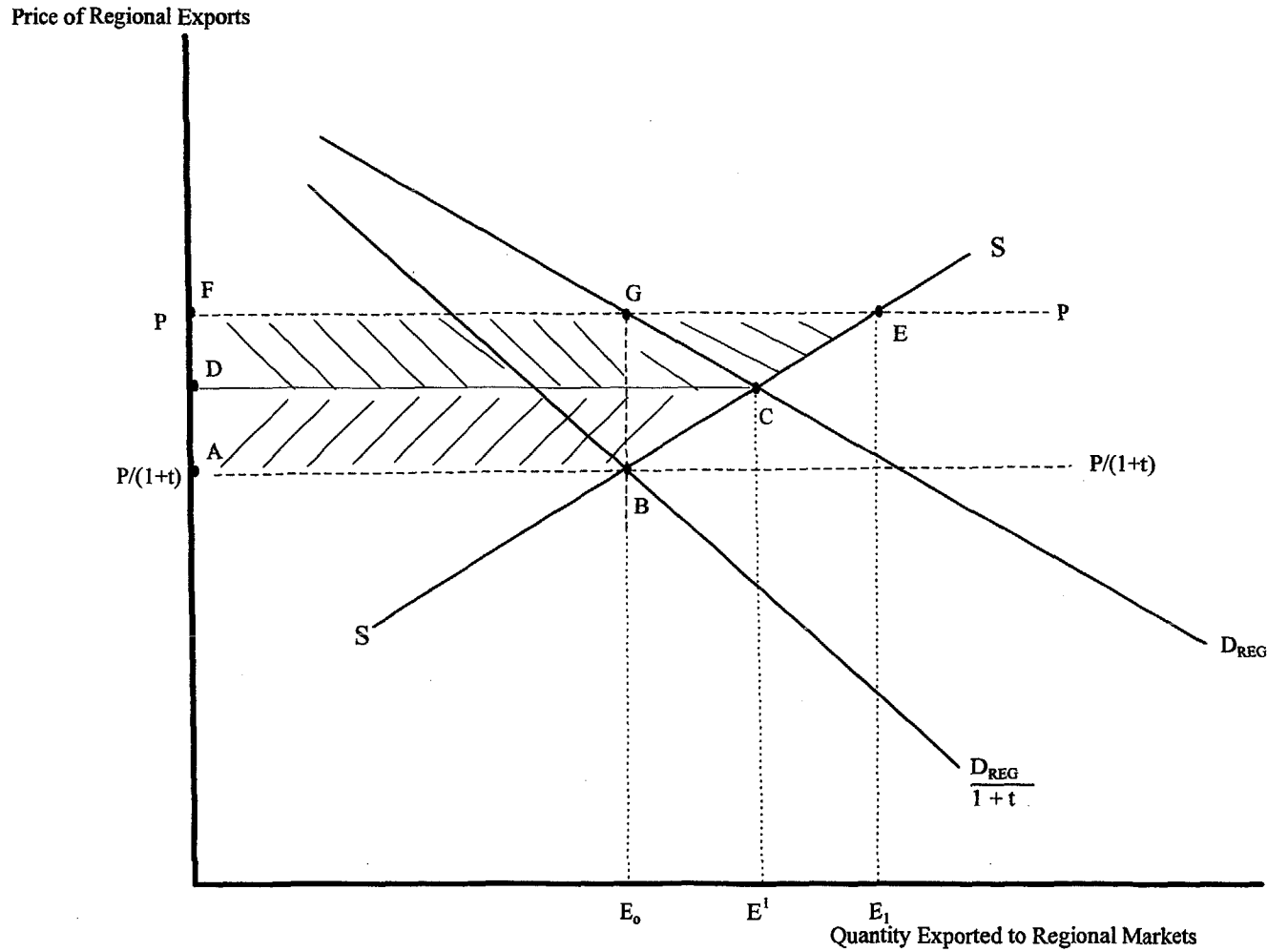
$CMREG_i$	Final imports from the regional market
$CMROW_i$	Final imports from the rest of the world market
Y	Income of the representative consumer
Θ	Committed expenditures in the LES function
$PHIEREG_i$	Export price in the regional market
$PHIMIREG_i$	Intermediate imports price in the regional market
$PHIMCREG_i$	Final consumption imports price in the regional market
<i>Tariff</i>	Tariff revenues collection by the Government
e	Exchange rate (index of the price of traded to non-traded goods)

**Figure 1: Trade Creation and Trade Diversion with Differentiated Products:
with and without regional market power.**



Supply and demand in the no regional market power (market power) case are drawn with dotted (solid) lines. If tariffs are reduced preferentially against partner country imports from t to 0 , the welfare change is equal to $A+B+C-T_1-T_2$ (in the no market power case) or $A+B+C-T_1-T_2-(A-T_3-T_1)$ (in the market power case). Ignoring improved access to export markets, the home country will gain more in the no market power case if the terms-of-trade loss exceeds the extra trade diversion costs, i.e. if and only if $T_3+B+C > T_2$. Since $B+T_3$ is producers' surplus for partner country suppliers, it is not a loss to the region.

Figure 2: The Value of Preferential Access to Partner Country Markets: with and without regional market power.



Regional demand for home country exports is depicted by solid lines with regional market power, but dotted lines with no regional market power. If tariffs are reduced preferentially by partners, the home country's producers surplus will increase by the area ABCD with market power, and by the area ABEF with no market power. There is an unambiguous additional gain, equal to DCEF, with no regional market power.

Table 1. Regional Economic Indicators of CEMAC Countries, 1994

	Cameroon	Congo	Gabon	Equatorial Guinea**	C. African Republic	Chad
GDP ¹	7.5	1.6	3.9	0.1	0.9	0.9
GDP per capita ²	576.9	615.4	3000.0	250.0	281.3	142.9
Share in regional GDP	50.3	10.7	26.2	0.7	6.0	6.0
Population (millions)	13	2.6	1.3	0.4	3.2	6.3
Area ³	475	342	268	28	623	1284
Sectoral distribution of GDP (In percent)						
Agriculture	19***	10	8	47	44	44
Industry	45***	44	52	26	13	22
Services	41***	46	49	27	43	35
Exports to CEMAC ⁴	8.6***	0.1	0.0	n.a	0.5	n.a
Imports from CEMAC ⁴	2.0***	3.1	5.2	36.9	9.1	25.9

¹ In billions of US dollars

² In US dollars

³ Thousands of square kilometers

⁴ Exports and imports as a percentage of the country's total exports and imports respectively.

Source: World Development Report (1996) except for the trade indicators which are from the IMF Direction of Trade (1996).

** Data for Equatorial Guinea are from UNCTAD, Handbook of International Trade and Development Statistics except for population and GDP which are from the IMF's International Financial Statistics.

*** For Cameroon, authors' estimates based on data provided by the Department of Statistics and National Accounts, Ministry of Economy and Finance, Cameroon.

Table 2. Cameroon: basic data for model calibration, 1989

Sectors	Output ¹	Value-added ¹	Export/Output ²	Consumption ¹	Imports/Consumption	Share of regional imports ²	Share of regional exports ²
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
AGR	896	708	12.1	451	2.3	2.0	5.0
IND	2624	1665.7	18.1	1838.4	49.4	2.0	10.0
SER	2439.7	1369.4	3.3	1832	6.4	2.0	5.0

¹ In billions of CFA Francs

² Cameroon's imports and exports as a percent of its imports and exports of the product.

Source: Column (1)-(5): 1989 Input-Output Table for Cameroon provided by the Department of Statistics and National Accounts, Ministry of Economy and Finance, Cameroon.
Columns (6)-(7): Authors' estimates based on data provided by the Department of Statistics and National Accounts, Ministry of Economy and Finance, Cameroon.

Table 3: Values of the Tariff Rates in the Policy Simulations (in percent)

	Import Tariffs Imposed by Cameroon				Export Tariffs faced by Cameroon in the Region
	Intermediate Products from: Region	Rest of World	Final Products from: Region	Rest of World	
Pre-Reform	2.9	19.7	5.7	22.6	22
CEMAC compliance	0	10.3	0	11.8	11*

* The actual export tariff faced by Cameroon with compliance is zero. Since CEMAC's tariffs to the rest of the world are also decreasing, on balance Cameroon will only obtain an improvement in regional demand of about 11 percent. See text for details.

Source: Authors calculations based on sources explained in the text.

Table 4. Assumed elasticities in the model
Central elasticity case

	<i>Sector</i>		
	<i>Agriculture</i>	<i>Industry</i>	<i>Services</i>
Capital-Labor substitution ^a	0.61	0.70	0.80
Composite final demand ^b	1.00	1.00	1.00
Elasticity of substitution ^c import-domestic in final and intermediates	1.40	2.10	2.10
Elasticity of substitution ^d imports from the region vs. imports from rest of world in final and intermediate goods	1.40	2.50	2.10
Elasticity of transformation ^e domestic supply vs. exports	4.00	3.00	3.00
Elasticity of transformation ^e exports to region vs. exports to rest of world	6.00	4.50	4.50
Elasticity of transformation ^f domestic intermediates vs domestic final	4.50	2.10	4.50
Regional export demand ^g	4.00	4.00	4.00
Regional import supply of ^g intermediate and final goods	4.00	4.00	4.00

Sources:

- ^a Caddy (1976).
- ^b World Bank (1995) and Lluch, Powell and Williams (1977).
- ^c Shiells, Stern, Deardorff (1986).
- ^d Faini (1994).
- ^e Interpolated from Faini (1994).
- ^f Authors' estimates.
- ^g de Melo and Tarr (1992). These are the values assumed with regional market power.

Table 5: Welfare Results for Cameroon of Regional and Unilateral Trade Liberalization
(Welfare is in Hicksian Equivalent Variation as a Percent of Base GDP)

POLICY	POLICY VARIABLES			WELFARE RESULTS			
	Regional	3rd Country	Tariff Free	Market Power:			
	Tariffs of Cameroon	Tariffs of Cameroon	Access to Regional Markets	Nowhere	On Regional Imports Only	On Regional Exports Only	On Regional Imports and Exports
	1	2	3	4	5	6	7
1. CAEMC (Full implementation)	0	CET	YES	0.62	0.61	0.41	0.41
<u>Decomposing the Effects</u>							
2. Value of Access	No change	No change	YES	0.29	0.28	0.11	0.11
3. External Liberalization Only	No change	CET	No	0.33	0.34	0.3	0.3
4. Value of Regional Tariff Reductio	0	No change	No	-0.01	-0.02	-0.01	-0.02
5a. Assessing Trade Diversion (compare to model 1)	CET	CET	YES	0.62	0.62	0.41	0.41
5b. Assessing Trade Diversion	No change	CET	YES	0.62	0.62	0.41	0.43
<u>Other Policy Possibilities</u>							
6. Partial Unilateral Trade Liberalization	CET	CET	NO	0.33	0.33	0.3	0.3
7. Complete Unilateral Trade Liberalization	0	0	NO	0.5	0.51	0.45	0.45
8. Cameroon Implements the CU but its Partners do Not	0	CET	NO	0.33	0.33	0.3	0.29
9. Old Regionalism	0	No change	YES	0.28	0.26	0.11	0.09

Source: Authors' estimates.

Table 6: Sensitivity of Welfare Results to Low and High Elasticities
(Welfare is in Hicksian Equivalent Variation as a Percent of Base GDP)

WELFARE RESULTS									
POLICY¹	ELASTICITIES	Market Power:							
		Nowhere		On Regional		On Regional		On Regional	
		Low	High	Imports Only		Exports Only		Imports and Exports	
		Low	High	Low	High	Low	High	Low	High
1. CEMAC (Full implementation)		0.42	1.09	0.41	1.08	0.24	0.76	0.24	0.75
<u>Decomposition of the Effects</u>									
2. Value of Access		0.23	0.42	0.23	0.42	0.10	0.15	0.09	0.14
3. External Liberalization Only		0.18	0.65	0.19	0.66	0.15	0.62	0.16	0.62
4. Value of Regional Tariff Reduction		0.00	-0.02	-0.02	-0.02	0.00	-0.02	-0.02	-0.02
5a. Assessing Trade Diversion (compare to model 1)		0.42	1.09	0.41	1.09	0.24	0.76	0.25	0.76
5b. Assessing Trade Diversion		0.42	1.09	0.42	1.10	0.24	0.76	0.26	0.80
<u>Other Policy Possibilities</u>									
6. Partial Unilateral Trade Liberalization		0.18	0.65	0.18	0.65	0.15	0.62	0.15	0.62
7. Complete Unilateral Trade Liberalization		0.28	0.99	0.28	1.00	0.21	0.93	0.22	0.93
8. Cameroon Implements the CU but its Partners do Not		0.18	0.65	0.18	0.65	0.15	0.62	0.15	0.61
9. Old Regionalism		0.23	0.41	0.21	0.40	0.10	0.13	0.08	0.12

¹ Policy instruments for the scenarios are the same as in table 4.
Source: Model Estimates

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