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STRUCTURAL POLICIES FOR INTERNATIONAL COMPETITIVENESS IN MANUFACTURING: THE CASE OF CAMEROON

by

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Research programme on:
Economic Policy and Growth: Factors of Manufacturing Competitiveness

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ACKNOWLEDGEMENTS

RÉSUMÉ

L'industrie manufacturière au Cameroun est analysée dans ce document. L'étude, fondée sur des données d'enquête couvrant la période 1980-95, porte sur les facteurs structurels de la compétitivité. Une fonction de production et une fonction d'exportation sont estimées dans le but d'étudier les déterminants de la productivité globale des facteurs et de la performance à l'exportation. Les résultats indiquent que l'ouverture commerciale, le développement de la main-d'œuvre qualifiée ainsi qu'une bonne gestion du taux de change réel sont des facteurs importants pour la croissance de la productivité et des exportations. Une relation dynamique entre les exportations et la productivité est également mise en évidence. La performance de l'industrie manufacturière au Cameroun s'est dégradée depuis le milieu des années 80. Ce déclin est en partie expliqué par des effets de syndrome hollandais ainsi que par des régimes commerciaux relativement fermés, ce qui a entraîné une importante surévaluation du taux de change réel. Un modèle fondé sur les fonctions de production et d'exportation a été élaboré. Ce modèle cherche à quantifier les pertes de productivité et d'exportations dues à la surévaluation du taux de change réel.

SUMMARY

This study presents the main developments in the manufacturing industry in Cameroon, based on firm-level data covering the 1980-95 period. The emphasis is on structural factors of competitiveness. A production function and an export function are estimated in order to study the determinants of total factor productivity (TFP) and export performance. The results provide evidence indicating that openness to trade, development of skilled labour and adequate management of the real exchange rate are crucial factors for the enhancement of productivity and exports. Moreover, a mutually reinforcing relationship between productivity and export performance is demonstrated. The performance of the manufacturing sector in Cameroon has deteriorated considerably since the mid-1980s. This decline is to a degree explained by Dutch disease and inward-looking policies in the manufacturing sector, resulting in a highly overvalued real effective exchange rate (REER). Based on the estimated export and production functions, a model is constructed to assess the cost of this REER evaluation, both in terms of productivity and exports.

PREFACE

The recent economic recovery in several countries in sub-Saharan Africa has given new hope for industrial development in the region. In particular, improved macroeconomic and political stability in conjunction with market liberalisation has enhanced the opportunities for private sector-led economic development.

The experience of successful industrialising countries points to the importance of manufacturing exports for sustained growth. One main reason is that manufacturing exports can reduce vulnerability to terms-of-trade volatility. This is especially relevant for many sub-Saharan African countries in view of their heavy reliance on primary product exports. However, integrating African firms into the global economy remains conditional on their ability to compete internationally in a context of increasing competitive pressure for labour intensive goods.

The analysis of the case of Cameroon shows that export performance depends on productivity, appropriate exchange rate management and, indirectly, the availability of skilled labour. The simple model used to quantify these impacts reveals that the devaluation of the CFA franc in 1994 had some appreciably beneficial effects on manufacturing productivity and exports.

This study was carried out as a part of the Development Centre's 1996-1998 research programme on Economic Policy and Growth: Factors of Manufacturing Competitiveness. The analysis will help policy makers identify policies likely to enhance international competitiveness and export performance in the manufacturing sector in Africa.

Jean Bonvin
President
OECD Development Centre
March 1999

I. INTRODUCTION

There is reason to believe that the development of a manufacturing sector producing exports is crucial for creating the foundations of sustainable growth and therefore it may warrant being given some priority in developing countries. Manufacturing shows greater signs of external benefits than the rest of the economy. Economies of scale are most likely to be possible in the manufacturing sector. Lucas (1993) shows that in Southeast Asia productivity was increased through learning by doing and by the production of increasingly sophisticated manufactured goods. However, the economies in developing countries are rarely, if ever, large enough to support full-fledged industrialisation. Hence, in order to take advantage of the positive effects linked to the development of a manufacturing sector, developing countries need to gain access to export markets. Moreover, participation in trade has positive externalities in itself which may further increase productivity. These are spillover effects such as competitive pressures, economies of scale and technology transfers. Several studies provide empirical and theoretical indications that manufacturing exports have a beneficial impact on total factor productivity: Edwards (1997), de Melo and Robinson (1990), Biggs, Shah and Srivastava (1995), Tybout (1992) and Bigsten *et al.* (1997), just to mention a few.

There are additional reasons for focusing on manufacturing, in particular for export. Income elasticity of demand is higher for manufactured goods than for primary products. In other words, if foreign income increases, growth is expected to be higher in countries specialising in manufacturing than in countries mainly dependent on exports of primary products. Moreover, price elasticity of both demand and supply is higher for manufactured goods than for primary products, which has a stabilising effect on variation in terms of trade. This is of particular importance to many sub-Saharan African countries which are highly dependent on exports of primary products.

Success as an exporter of manufactures is largely dependent on competitiveness. Among the factors assumed to influence competitiveness are productivity, availability of skilled labour, and satisfactory management of the real effective exchange rate (REER). The significance of the REER for manufacturing exports in Africa has been demonstrated by Ndulu and Semboja (1995), who found that a depreciation of the REER had a positive and significant influence on manufacturing exports, and Sekkat and Varoudakis (1998), who showed that REER misalignment has a negative influence on exports.

Cameroon provides an interesting case for the study of productivity and manufacturing export performance, in particular the relation of the latter to the REER. Devarajan (1997) claims that the large oil producers (Gabon and Cameroon) had the most overvalued currency in the CFA zone around the time of the devaluation of the CFA franc in 1994. Tybout, Gauthier, Navaretti and de Melo (1997) show that this devaluation brought some productivity and export gains to Cameroon. However, the devaluation was primarily beneficial for firms already exporting. This study will show that there is a significant relationship between the REER on one hand and productivity and exports on the other. The mutually reinforcing relationship between exports and productivity will also be emphasised. For this purpose, we will use firm-level data from 38 Cameroonian companies for the 15-year period from 1980/81 to 1994/95. It will be shown that exports increase as the REER depreciates and that exports, in turn, have a significant positive impact on

productivity. The importance of availability of skilled labour for productivity gains will also be pointed out. Furthermore, a dynamic model will point to substantial losses in terms of exports and productivity during the second half of the 1980s and the first half of the 1990s. The model will also show important gains related to the devaluation of the CFA franc in 1994.

The paper is organised as follows: the following section gives some background information on the recent economic performance in Cameroon. The third section is a presentation of the database used for the regressions, and also gives some more information about the manufacturing industry on a sectoral level. The fourth and fifth sections present regressions for the determinants of productivity and export performance respectively. These results are used in the sixth section for a model quantifying the losses in terms of exports and productivity using two different measures of overvaluation of the REER. The conclusions are given in the last section.

II. OVERVIEW OF RECENT ECONOMIC PERFORMANCE

In the early post-independence period, Cameroon pursued an inward-looking industrialisation oriented towards import substitution. In the 1960s, agriculture accounted for almost 40 per cent of the GDP, while industry contributed a little more than 15 per cent. Initially, economic growth was largely derived from a mixture of cash and subsistence crops. In the 1970s, Cameroon began to focus on cash crops such as cocoa, coffee and cotton.

The discovery of oil in 1978 led to a major transformation of the Cameroonian economy, As Figure 1 shows, investment as a share of the GDP increased from 17 per cent to 30 per cent in the 1977-85 period, while the per capita GNP almost doubled. In 1985, oil production contributed 20 per cent to the GDP and nearly 50 per cent to exports. Since independence, the government has played a pivotal role in the Cameroonian economy, a role that was enhanced by the exploitation of oil. Oil became the main contributor to government revenue, peaking at 44 per cent in 1985. The internal and external surpluses that followed the surge in export revenues induced a boom in government investments. The short-term result was beneficial for the economy as a whole, including the private sector. Private investment increased, encouraged by government investments and even agricultural exports benefited.

Figure 1. **Investment and Per Capita GNP**

Source: World Bank, *African Development Indicators 1997.*

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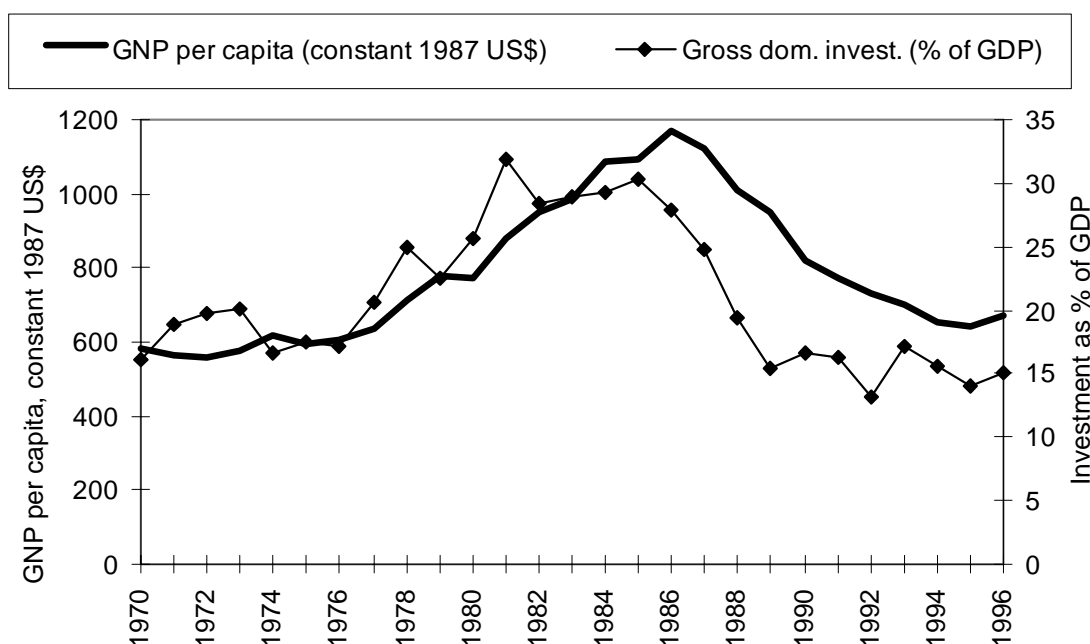
The impact of oil production has not been entirely positive over the long term, however. Signs of the Dutch disease appeared early. Soaring domestic demand resulted in increasing inflation, amounting to about 12 per cent per year during the 1977-85 period. The REER appreciated substantially, peaking in 1987, and corresponded to a 30 per cent real appreciation in local currency terms in just five years. The impact on other exporting sectors was highly detrimental. Higher production costs, labour costs in particular, combined with the appreciated REER, greatly diminished the competitiveness of the exporting sectors, as well as of domestic industries competing with imports.

Figure 2. **Real Effective Exchange Rate and Manufacturing Exports**
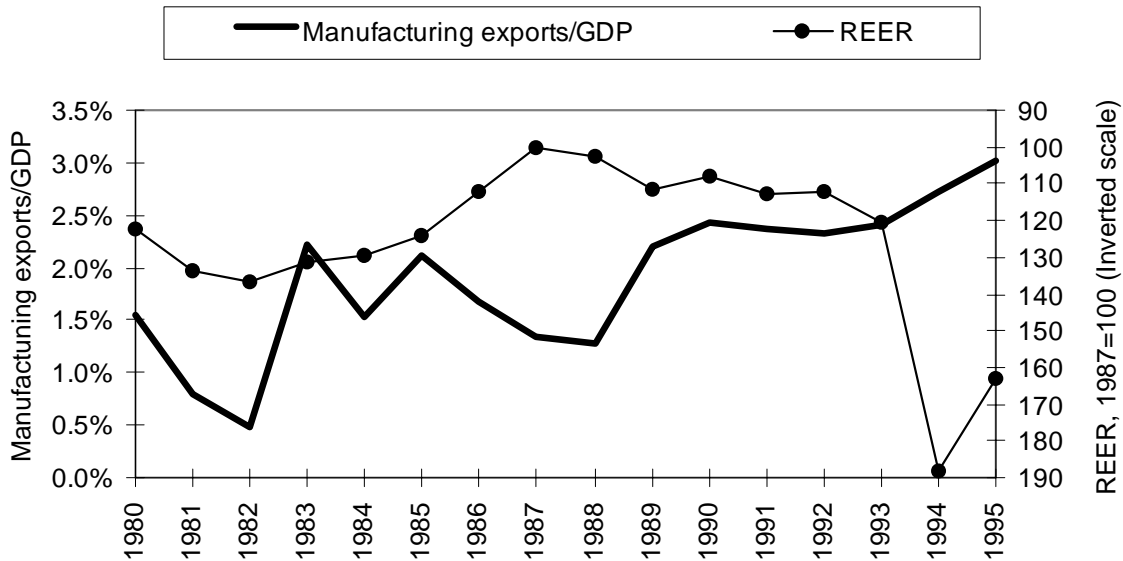
Source: World Bank, *African Development Indicators 1997.*

In the 1986-89 period, Cameroon experienced severe external shocks. In particular, the price of oil plummeted, as did the prices of other commodities it produced, such as coffee and cocoa. This situation was aggravated by a substantial weakening of the US dollar. As oil prices are typically set in US dollars this added to the effect of the low prices. Moreover, the depreciated dollar obviously hurt the competitiveness of all exports. Between 1985 and 1988, manufacturing exports fell by more than 40 per cent. With no possibility of adjusting to these external shocks through a nominal devaluation of the CFA franc, the Cameroonian government tried to adjust by deflationary policies, which resulted in a sharply declining GNP per capita without improving competitiveness. Moreover, no oil revenue had been set aside to finance possible future structural adjustment. Investment fell rapidly and the already inward-oriented and poorly competitive manufacturing industry was put in an extremely difficult position, with an unfavourable cost structure, in particular in relation to real wages. Even though investment fell, current expenditure was maintained through extraordinary outlays for earlier infrastructure projects or subsidies to public sector enterprises. Furthermore, the public sector was not reduced and wages were also maintained. As a result, the overall budget went from a surplus of one per cent of GDP in 1985 to a deficit of nearly 10 per cent in 1994.

In 1988, the Cameroonian government undertook a structural adjustment programme supported by a stand-by agreement with the IMF and a World Bank structural adjustment credit. The adjustment programme provided for, among other things, reduced public expenditures, trade liberalisation, privatisation of public enterprises and a restructuring of the banking sector. With the exception of trade liberalisation, the reforms were slow to be implemented.

A major step towards macroeconomic adjustment and competitiveness for the exporting sector was made with the 100 per cent devaluation of the CFA franc in January 1994. In 1995, another stand-by agreement was signed with the IMF and the World Bank agreed to provide a new structural adjustment credit in February 1996.

III. THE MANUFACTURING SECTOR IN CAMEROON

This study is based on a survey of 55 manufacturing companies covering the 15-year period between 1980/81 and 1994/95. Of the 55 firms, 38 have been selected to serve as database for the study. The other 17 companies were eliminated due to incomplete or unreliable data. The firms have been divided into five sectors, namely chemicals (6 firms), food (7 firms), metallurgy (9 firms), wood (12 firms) and other (4 firms). The "other" sector consists of firms from the construction and textile sectors. Where applicable, the data has been deflated by sectoral deflators. In the case of the capital stock, a common deflator has been used. This section will show some of the developments in the different manufacturing sectors during the period studied. It may be useful to keep in mind that manufacturing value added contributed an average of only about 10 per cent to the GDP during the 1980s. During the same period, manufacturing exports accounted for approximately 8 per cent of total exports.
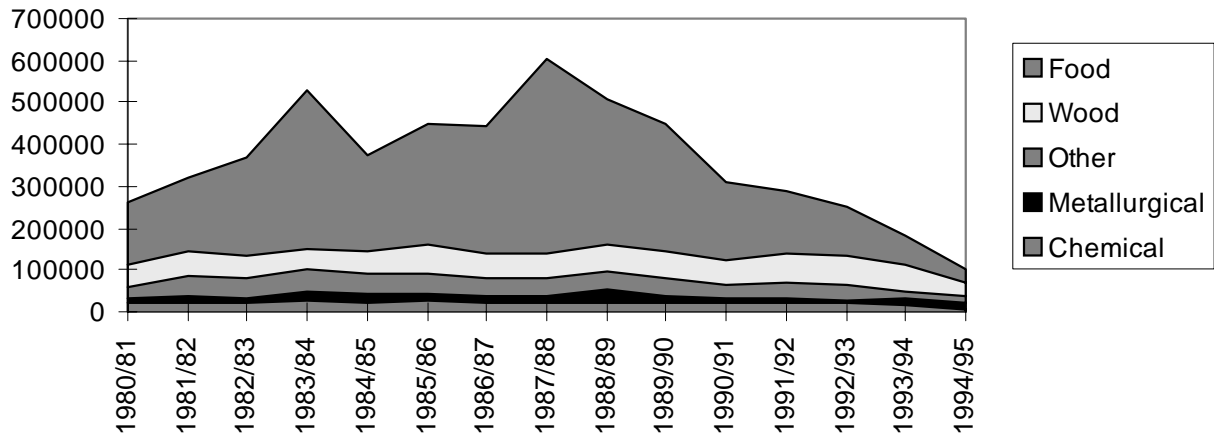
Table 1. **Representativity of Survey Sample: Reference Year 1990**
(percentages)

Sector	Survey Sample		
	Exports	Value Added	Employment
Chemical	8.8	6.3	4.0
Food	19.8	59.3	44.6
Metallurgical	19.0	3.3	11.3
Wood	48.1	19.4	25.7
Other	4.3	11.7	14.3
Total	100.0	100.0	100.0
Sector	Entire Manufacturing Sector		
	Exports	Value Added	Employment
Chemical	8.9	3.3	4.6
Food	15.0	45.1	60.8
Metallurgical	44.9	6.3	13.6
Wood	19.2	17.3	12.6
Other	12.1	27.9	8.4
Total	100.0	100.0	100.0

Sources: International Trade Statistics Yearbook 1995, UNCTAD, *Industrial Statistics 1996*, UNIDO and author's calculations.

In order to determine whether the survey sample was representative of Cameroon's manufacturing industry as a whole, some comparative data is shown in Table 1. It appears that the sample represents the industry fairly well, although the wood sector is somewhat overrepresented in terms of exports at the expense of the metallurgical sector. According to the *Industrial Statistics 1996* of UNIDO, in 1990 there were 174 manufacturing enterprises in Cameroon employing about 50 000 people. Hence, approximately one-fourth of these companies are covered by the sample. The sample covered just over 14 000 employees in 1990, which corresponds to almost one-third of the total number given by UNIDO. One can assume that the sample covers companies that, on average, are somewhat larger than for the manufacturing industry as a whole.

Figure 3. **Value Added by Sector**
(constant CFA francs, millions)

Figure 4. **Employment by Sector**
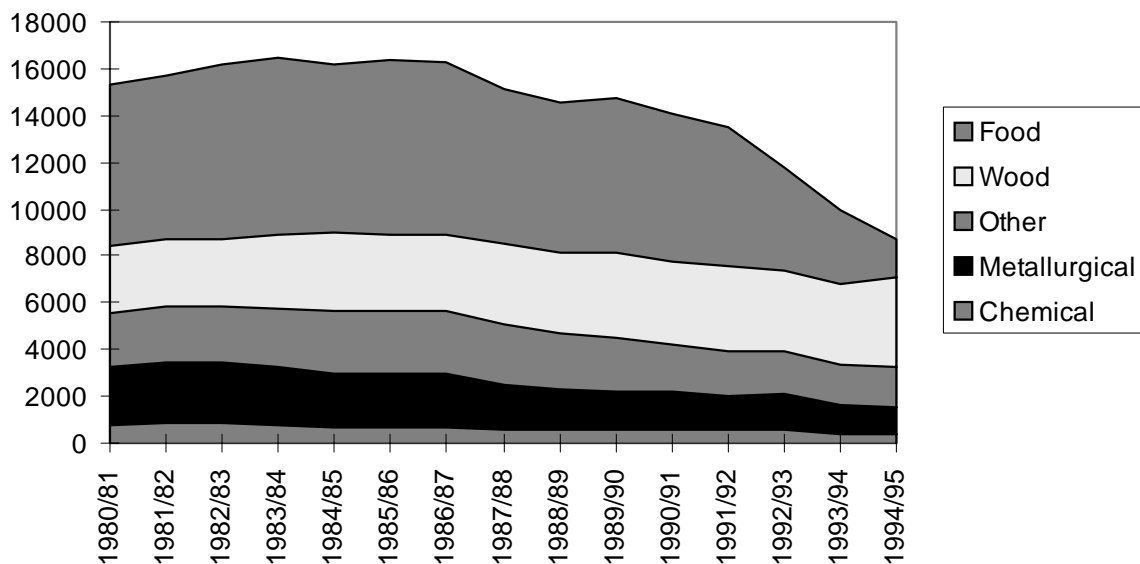
The food sector dominates Cameroonian industry, both in terms of value added and employment. The most prominent subsectors within the Cameroonian food-processing industry are cocoa products, coffee and breweries. Generally speaking, the sample studied consists of larger companies than may be representative of the Cameroonian economy as a whole, and economic crisis affects large firms more than smaller ones. Employment in the formal sector has declined sharply since the mid-1980s due to the economic recession. This is true not only for the food industry but the entire Cameroonian manufacturing sector. As will be demonstrated below, Cameroonian industry has suffered severely from overvaluation of the REER, induced in large part by the petroleum boom in the first part of the 1980s.

The wood sector in our sample consists of mostly medium-sized and large wood and paper companies (100 to 500 employees). Wood processing accounts for only a moderate part of the manufacturing industry despite the country's rich endowment in tropical rain forests. About 10 per cent of the area licensed for exploitation is actually being used and only a minor part of the wood is processed locally. Cameroonian wood companies are predominantly foreign- or government-owned.

The sample's firms in the chemical industry are mostly small or medium-sized firms (around 100 employees with a couple of exceptions). The sector is primarily made up from companies producing pharmaceuticals and cosmetics (including perfume and soap). The chemical industry's importance in Cameroon's manufacturing sector is limited.

The dominate subsector in the metallurgical industry is metal processing, especially aluminium. The companies in our sample are mostly medium-sized companies (100-500 employees). It is the smallest sector in the survey in terms of value added.
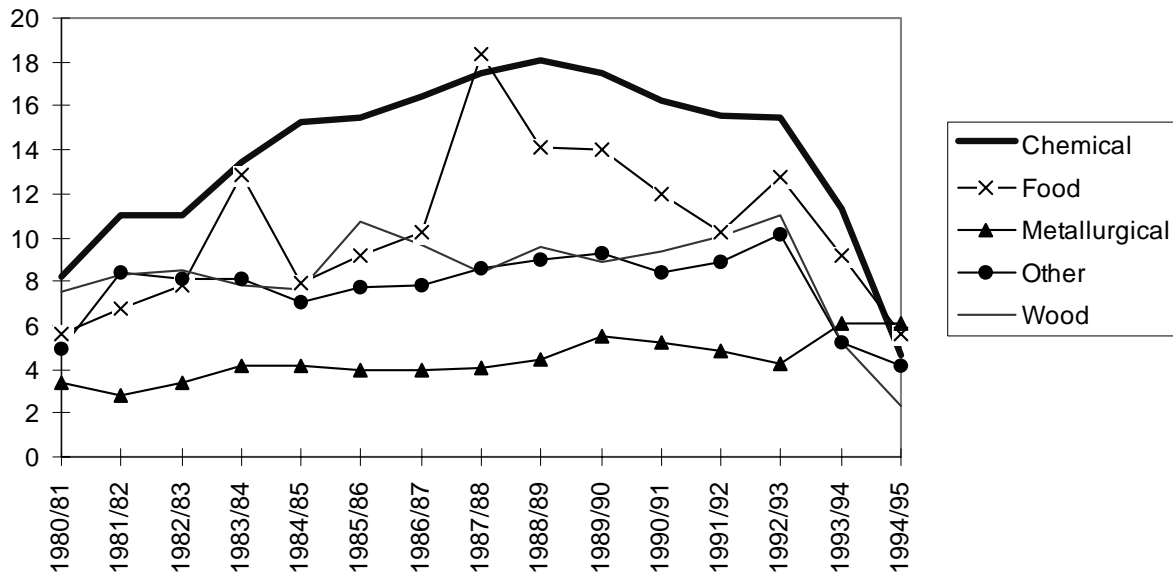
The "other" sector essentially consists of textile and construction companies, and includes Cimencam, a large cement manufacturer which has been hit by decreasing demand for public construction.

Figure 5. **Labour Productivity by Sector**
(millions of constant CFA francs, value added per employee)
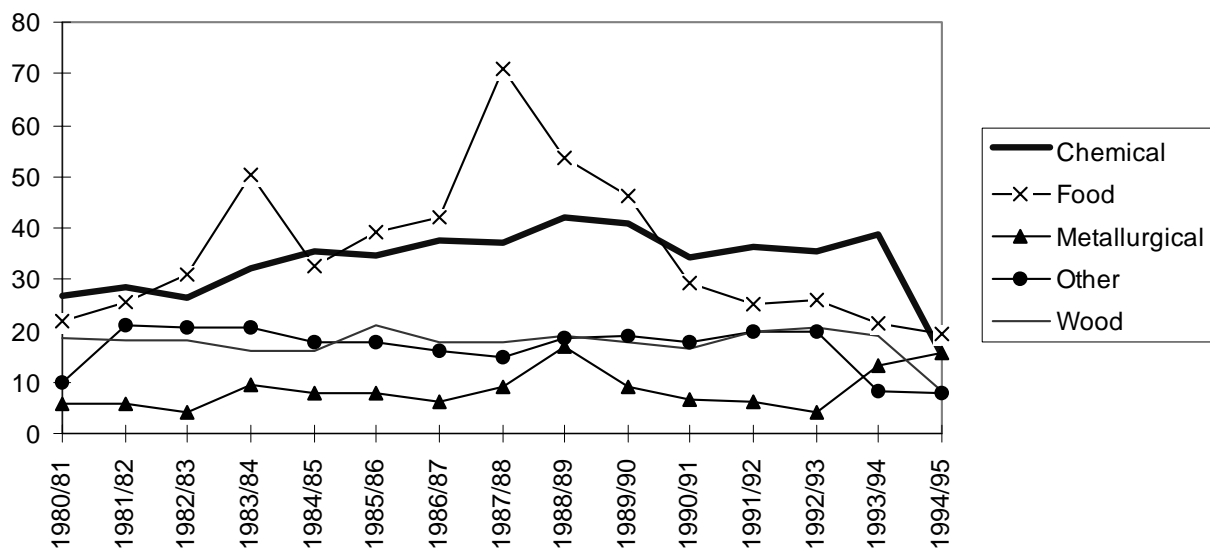
Source: Author's calculations.

Figure 6. **Average Real Wages by Sector**

(millions of constant CFA francs)

Figures 5 and 6 provide an idea of the evolution of Cameroon's competitiveness since 1980. Three phases can be distinguished: the oil-boom period, 1980-87; the crisis period, 1988-93; and the post-devaluation period. In order to see the impact of wages and productivity on competitiveness more precisely during these periods, the analysis is complemented by calculating the unit labour cost. The unit labour cost (ULC) is simply the average wage rate divided by labour productivity. Table 2 shows the development of the ULC during the three subperiods.

Table 2. **Unit Labour Cost**

(% average annual growth)

Sector	Unit Labour Cost			
	1980-87	1988-93	1994-95	1980-95
Food	0.2	12.6	-26.0	0.9
Metallurgical	-4.0	16.5	-49.0	-3.1
Wood	2.2	2.5	-30.8	-2.4
Chemical	6.2	-1.5	-19.1	-0.2
Other	2.3	-2.4	1.2	0.5
Total	-0.7	10.3	-21.7	0.2

Real wages on average increased at roughly the same pace as productivity during the oil boom, which is clear from the negligible average change in the ULC. The economic crisis starting in the mid-1980s is reflected in the evolution of productivity and real wages. Average labour productivity fell during the 1988-93 period while real wages remained rather flat or decreased only slightly. The average ULC increased by over 10 per cent annually during this period. As we can see from Figure 6, there was a considerable fall in real wages for all sectors except the metallurgical industry after the devaluation of the

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CFA franc. It is clear from Table 2 that the ULC decreased substantially in all sectors except in the "other" sector after the devaluation. In other words, the devaluation appears to have had the desired effect of decreasing production costs. However, this effect is likely to be somewhat exaggerated, seeing that wages are fixed by contract and do not change instantly. Moreover, it should be kept in mind that our data ends in 1994/95 (the fiscal year ends in June). In other words, post-devaluation developments should be interpreted with caution, given that the data only covers 18 months after the devaluation.

Table 3. **Export Performance 1980-95**
(% average annual growth)

Sector	Average annual growth of exports			1980-95
	1980-87	1988-93	1994-95	
Food	7.8	-1.1	-40.1	-2.2
Metallurgical	-1.4	-1.6	29.6	3.0
Wood	4.3	3.8	-23.8	0.1
Chemical	-2.4	10.3	-74.3	-8.1
Other	5.6	8.3	-17.7	3.2
Total	3.5	2.9	-18.6	0.1

Source: Author's calculations.
Note: Logarithmic growth rates.

The sectors that did the worst in terms of unit labour cost during the crisis period were the food and metallurgical sectors. Average ULC increased by 12.6 per cent and 16.5 per cent annually in the food and metallurgical sectors respectively. These two sectors also performed the worst in terms of export growth during the same period (see Table 3).

Navaretti, Gauthier, Tybout and de Melo (1997) showed that the devaluation had major consequences, in particular for firms already involved in trade. Exporting firms increased their exports while non-exporting firms were reluctant to incur the substantial costs needed to enter the international market. Quite naturally, costs increased, especially for importing firms. Moreover, one could observe productivity gains and moderate increases in production. The metallurgical sector in the sample provides a good illustration of this. The sector is one of the smallest in the sample in terms of value added and employment but the second largest in terms of exports after the wood sector (in competition with the food sector which contains fewer sampled firms). In our study, the metallurgical sector is the most dependent on imports after the chemical industry. In particular, raw materials for aluminium production are imported. Alucam, the large aluminium producer, imports bauxite from Guinea for smelting. According to the Economist Intelligence Unit (1997), Alucam exported over 60 000 tons of aluminium in 1994. Several firms in the sample use the aluminium from Alucam, among others, Socatral, the large aluminium sheet producer. The devaluation of the CFA franc led to increased input costs. However, they appear to have been more than offset by an increase in labour productivity (see Figure 5) and exports increased after the devaluation. Production increased significantly, although employment dropped.

The chemical sector shows quite a different pattern. The real wages for the chemical industry in the sample increased at a significantly higher pace than labour productivity prior to 1988/89. The substantial drop in real wages that followed the devaluation was clearly not enough to save the chemical industry from a severe decline in production and

exports. Although the sector managed to maintain a healthy export growth even during the crisis years of 1988-93, exports were cut by two-thirds in the two years following the devaluation. One plausible explanation for this is that Cameroon does not have a comparative advantage in the chemicals industry and thus its exports were unable to benefit from the devaluation. An important reason for this is the fact that the chemical industry is the most highly import-dependent sector in our sample. Hence, the devaluation of the CFA franc had a devastating impact on costs of inputs.

The wood-processing industry is another example where the productivity-wage ratio developed unfavourably prior to the devaluation. Productivity remained rather flat while real wages increased. Despite the relatively good export performance of the wood sector up until 1993, the sector did not manage to benefit from the devaluation. Exports actually decreased after the devaluation, however the extent of the decline could be somewhat overstated here due to the influence of a few powerful outliers. The World Bank (1996) expressed concern for the forestry industry even though timber exports have been increasing steadily during the 1990s. One reason for concern is the industry's impact on the environment. Moreover, the industry could be particularly unstable since it is controlled by a small number of large foreign enterprises with the technical and financial capacity to overcome problems with inadequate infrastructure. Weakness in the forestry industry is likely to be detrimental to the wood processing industry.

IV. DETERMINANTS OF MANUFACTURING PRODUCTIVITY

We have seen from the preceding analysis that the manufacturing industry in Cameroon has suffered from an unfavourable development of labour productivity in relation to real wages. This can be observed in particular for the crisis period from 1987 until the devaluation of the CFA franc. This decline in productivity can be attributed both to falling investment rates, as Figure 1 clearly indicates, and to a decline in total factor productivity (TFP). The first step of the empirical part of this study will be to estimate a production function and in particular to examine the determinants of TFP. In order to limit the number of equations, the determinants of the TFP are only shown implicitly through an augmented production function. The results are displayed in Table 4.

Table 4. **Estimation of a Production Function**

	Dependent variable - Log (Value Added)					
	Equation 1		Equation 2		Equation 3	
Variable	Coeff.	t-Stat	Coeff.	t-Stat	Coeff.	t-Stat
Constant	0.86	3.24	1.71	5.23	0.71	2.56
Log (Capital stock)	0.31	11.54	0.27	9.24	0.24	8.50
Log (Labour)	0.67	15.52	0.68	14.48	0.81	17.58
Trend Food	-0.06	-4.17	-0.07	-4.85	-0.06	-4.11
Trend Chemical	-0.02	-1.12	-0.02	-1.21	0.01	0.69
Trend Metallurgical	-0.03	-2.42	-0.07	-4.00	-0.03	-1.97
Trend Wood	-0.01	-0.50	-0.01	-0.46	-0.01	-1.03
Trend Other	-0.06	-2.62	-0.08	-3.40	-0.05	-2.36
Dummy Food	1.45	5.60	1.20	4.54	1.49	5.97
Dummy Chemical	1.80	6.51	0.95	2.71	1.42	5.33
Dummy Metallurgical	0.33	1.31	0.15	0.59	0.35	1.45
Dummy Wood	1.12	4.54	0.43	1.39	1.28	5.44
Log (Exports per empl., instrumented			0.18	3.78		
Log (Share of high skilled personnel)			0.17	3.10	0.07	1.41
Imports per employee					0.002	7.45
Adjusted R-squared	0.85		0.85		0.86	
Number of observations	527		521		521	
Estimation method	Pooled (OLS)		Pooled (OLS)		Pooled (OLS)	

Source: Author's calculations.

Results are robust with regards to the variables included[1]. The capital stock has been calculated from annual investments according to the Harberger method. This method states that, at constant returns to scale, the capital stock in year t-1 can be approximated by the investment in year t divided by the sum of the long-term growth rate of value added and the rate of depreciation of fixed capital[2]. Here the initial capital stock was calculated using the average investments and average production growth over the 1980-94 period

and a depreciation rate of 5 per cent. The capital coefficient does not change radically when a 3 per cent depreciation rate is used in the calculation as opposed to the 5 per cent used here. Constant returns to scale have been tested and accepted.

Applying the pooling technique is justified by the inclusion of sector dummies, which are assumed to capture the existing fixed effects common to the firms of each individual sector. The F-test for fixed effects shows that pooling without sector dummies is rejected.

The capital coefficients, estimated to be about 0.3 (somewhat lower in equation 3), correspond roughly to the results of Latreille and Varoudakis (1996) who found a capital coefficient of about 0.35 in the manufacturing industry in Senegal. When estimating different capital coefficients by sector, significant results were obtained for all sectors. However, these coefficients did not vary significantly from the common coefficient, nor between sectors. Therefore, one common coefficient will be used.

Significant negative trends in productivity can be observed for the food, metallurgical and "other" sectors in equations 1 through 3. According to equation 1, productivity was decreasing approximately by an average of 6 per cent per year for the food and "other" sectors. The corresponding figure was a decrease of 3 per cent for the metallurgical sector. It is interesting to compare these results with the evolution of labour productivity, as shown in Figure 5. The significant negative trend of TFP in the food sector is consistent with the unimpressive development of the sector's labour productivity. Similarly, although less evident, labour productivity in the metallurgical sector declined during most of the 1980s and until the devaluation of the CFA franc in 1994. With the exception of the post-devaluation period, labour productivity remained rather flat for the wood sector, which helps explain its insignificant trend.

In accordance with the assumption that openness improves technical efficiency, exports have a significant positive affect on productivity, as seen from equation 2[3]. Exports were highly significant, whether measured by exports per employee, a dummy variable for exports for each year separately, or by a dummy variable for firms exporting during all years of the period studied. As will be shown below, when studying the determinants of export performance, the TFP-export causality is directed two ways. Productivity enhances exports while exports enhance productivity. This endogeneity problem was dealt with by an instrumental variable from regressing the export variable on all exogenous variables (see Tables 4 and 5) and using the fitted values. The results from the regression were used to calculate fitted values for all firms and all years, including when exports were zero. This was done to avoid excluding non-exporting firms from the production function when taking the logarithm of the values[4]. Equation 2 shows that a 10 per cent increase of exports per employee would increase productivity by approximately 1.8 per cent.

Imports also turned out to be positive and significant (equation 3), implying that firms can improve their productivity by importing higher quality intermediate goods. There is probably also an effect of technology transfer induced by imports. Equation 3 is a semi-logarithmic equation. To avoid loss of information from firms with zero imports, the import variable is not a logarithm[5]. It was impossible to introduce both the import and export variables at the same time.

The proportion of highly skilled personnel has a significant positive influence on productivity. Human capital and technical capability have been proven crucial to productivity and technical efficiency: see e.g. Edwards (1997), Lucas (1993), Biggs, Shah and Srivastava (1995) and Latreille and Söderling (1997). According to equation 2, a 10 per cent increase in the proportion of highly skilled workers would improve productivity by 1.7 per cent.

V. EXPORT PERFORMANCE

In the previous section, the beneficial impact of exports on TFP growth was demonstrated. Moreover, it could be argued that good manufacturing export performance is, to some extent, the ultimate test of international competitiveness. In this section, the study will be taken one step further by examining the determinants of export performance. The starting point is an export function of the following type:

$$X=\lambda Y \qquad (1)$$

where X is exports, λ is a function defining the ratio of exports to value added and Y is value added.

Value added can be expressed as:

$$Y=AK^{\alpha}L^{(1-\alpha)} \qquad (2)$$

where K is the capital stock, L is labour and A is the level of TFP.

Hence, from (1) and (2), one obtains the following relation:

$$X/L=\lambda A(K/L)^{\alpha} \qquad (3)$$

or, expressed in logarithms:

$$\log(X/L)=\log(\lambda)+\log(A)+\alpha\log(K/L) \qquad (4)$$

Export performance depends on several different factors. As already mentioned, it appears plausible that export performance and productivity are mutually reinforcing. The productivity of the firm (measured as the level of TFP) is an important determinant for the ability to set prices at a competitive level. Furthermore, the REER affects incentives to produce for exports. A REER depreciation (appreciation) makes the production of tradables relatively more (less) profitable compared to the production of nontradables.

It has been argued that the size of the firm plays an important role in export performance. This argument is based on the high initial fixed costs of exporting. Setting up a distribution network, gathering market information, or retooling equipment for export production, for example, would entail such costs,. Moreover, larger companies are more likely to invest in firm-based training in Africa [see Biggs, Shah and Srivastava (1995)]. The importance of a company's size for exports has also been confirmed by Bigsten *et al*. (1997), Aitken, Hanson and Harrison (1994) and Latreille and Söderling (1997).

Furthermore, it can be assumed that the export ratio depends on the sector.

Hence, the resulting function for the ratio of exports to value added looks as follows:

$$\lambda=C*TFP^{b_1}*REER^{b_2}*e^{\,b_3 Size}*e^{\,b_4 Sector}*e^{\,b_5 t} \qquad (5)$$

The impact of the firm's size is measured by a dummy for small firms (less than 100 employees) and medium-sized firms (100-500 employees). The sector is represented by a dummy variable, t is a sector-specific time trend, and C is a constant.

Combining (4) and (5), while noting that A from (2) is equal to TFP from (5), gives the following expression:

$$\log(X/L)=c+(1+b_1)\log(\text{TFP})+b_2\log(\text{REER})+b_3\text{Size}+b_4\text{Sector}+b_5t+\alpha\log(K/L) \qquad (6)$$

or by using $\alpha = 0.3$ from equation 2 (6) can be written:

$$\log(\text{ExpEmpl})=c+b_1\log(\text{TFP})+b_2\log(\text{REER})+b_3\text{Size}+b_4\text{Sector}+b_5t \qquad (7)$$

where $\log(\text{ExpEmpl})=\log(X/L)-\log(\text{TFP, fitted values})-0.3*\log(K/L)$

Table 5 shows the results of the estimations of (7).

Table 5. **Determinants of Export Performance**

| | Dependent variable - Log(ExpEmpl) | |
| | Equation 4 | |
Variable	Coeff.	t-Stat
Constant	-11.88	-3.49
Log (TFP level, instrumented)	0.73	1.95
Small companies	-0.94	-3.23
Medium sized companies	0.51	2.05
Dummy Food	-1.53	-1.73
Dummy Wood	1.45	1.93
Dummy Chemical	1.12	1.17
Dummy Metallurgical	-0.47	-0.64
Log (REER)	1.90	2.82
Trend Food	0.13	2.54
Trend Chemical	-0.02	-0.54
Trend Metallurgical	0.23	4.29
Trend Wood	0.00	-0.02
Trend Other	0.24	3.60
Adjusted R-squared	0.28	
Number of observations	381	
Estimation method	Pooled (OLS)	

Source: Author's calculations.
Note: log(ExpEmpl)=log(Exports/Labour)-log(TFP, instrumented)-0.3*log(Capital stock/Labour).

The TFP level is defined as the exponential of $\text{Log (VA)}-\alpha\text{Log(K)}-(1-\alpha)\text{Log(L)}$, where α is the coefficient for capital in the production function, VA is value added, K capital and L labour. An instrumental variable was used to deal with problems arising from endogeneity of exports and TFP. From equations 1 and 2, the value of the capital coefficient is set to 0.3 for all sectors. The TFP level is subsequently regressed on all exogenous variables from Tables 4 and 5 and the fitted values are used in equation 4. The results are robust for the value of the capital coefficient. This instrumental TFP is also used to calculate the dependent variable according to the definition above. The significant positive value of the TFP level shows that productivity has a direct effect on exports, besides the indirect effect it has on production volume.

Smaller companies export less per employee than bigger companies, while medium-sized companies export the most per employee. A logit estimation (not reported here) with a dummy for exporting firms as dependent variable also showed that large and medium-sized firms are more likely to export than smaller ones.

The sector dummies indicate that the wood and chemical industries are the most important export sectors in terms of exports per employee (although not statistically significant in the case of the chemical industry). This is confirmed by comparing the average exports per employee by sector, which shows that the chemical and wood sectors export roughly ten times more per employee than the food and "other" sectors and about two or three times more than the metallurgical sector. This is probably an effect of higher capital intensity in these sectors

All sectors except the wood and the chemical sectors show significant positive trends after having controlled for REER and productivity. This is not only a reflection of a general drastic decrease in employees. The trends remain positive (but lower) if the number of employees is included in the regression.

Not surprisingly, the REER had a significant positive impact on exports. The elasticity is higher than one (although the difference is not statistically significant), indicating that a REER depreciation (appreciation) would induce a more than proportional increase (decrease) in exports, *ceteris paribus*. According to equation 4, a 10 per cent REER depreciation would boost exports by about 19 per cent, keeping the number of employees constant. This is more or less in line with the results of Sekkat and Varoudakis (1998), who found the corresponding coefficient to be between 1 and 2. It is also related to the findings of Ndulu and Semboya (1995). In their study, the elasticity of the REER to the ratio of production exported was 1.64. Moreover, there is a secondary effect through the impact of exports on productivity, which would further affect exports.

Note that the regression above only tells us about how exporting firms respond to certain incentives like a depreciation of the REER, or to competitive improvements like productivity gains. The non-exporting firms were automatically eliminated when taking the logarithm of exports per employee. This was done in order to obtain elasticities which could easily be used in a model. It is not necessarily a serious flaw in the equation for two reasons. First, this could only understate the effect of an overvalued REER, or of low productivity. Secondly, other studies have shown that new entrants normally contribute very little to total exports. Ndulu and Semboya (1995) found that although new export-friendly policies in Tanzania helped increase exports significantly in the second part of the 1980s, new exporters accounted for only slightly more than 7 per cent of total exports after five years. Tybout, Gauthier, Navaretti and de Melo (1997) found that nearly all export growth in Cameroon after the devaluation came from firms that already exported before the devaluation. Bigsten *et al.* (1997) came to similar conclusions.

VI. EVALUATING THE COST OF REAL EFFECTIVE EXCHANGE RATE MISALIGNMENT

In this section, an attempt will be made to quantify the impact of REER misalignment on exports and productivity. Of particular interest are the losses related to the substantial overvaluation of the Cameroonian REER prior to the devaluation as well as the gains of the devaluation of the CFA franc. We will use the previous results to construct a simple dynamic model.

For our calculations, we will use equation 2 in combination with equation 4. Simplified, we have a system of two equations:

$$\log (TFP) = Z_1 + \eta \log (X/L) \tag{8}$$

$$\log(X/L) = Z_2 + \kappa \log(TFP) + \varphi \log (REER) \tag{9}$$

where Z_1 and Z_2 are exogenous variables and their corresponding coefficients, X/L exports per employee, η is the coefficient for log (X/L) from equation 2, φ is the coefficient of the REER from equation 4 and κ is the coefficient of the TFP from equation 4, plus one, since the dependent variable is defined as log (X/L)-log (TFP, fitted values)-0.3*log(K/L).

Solving the system of equation gives:

$$\log (TFP) = Z' + \eta\varphi/(1-\eta\kappa)*\log(REER) \tag{10}$$

$$\log (X/L) = Z'' + \varphi/(1-\eta\kappa)*\log(REER) \tag{11}$$

where Z´ and Z´´ are linear combinations of Z_1 and Z_2.

In our case, this means that a 10 per cent REER depreciation improves manufacturing productivity by nearly 5 per cent and increases exports per employee by approximately 30 per cent.

We can now apply these formulas to make approximate calculations of the effect of overvaluation of the REER in Cameroon prior to the devaluation of the CFA franc in 1994 and of the gains induced by the devaluation. For this purpose we use two different measures of REER misalignment or overvaluation. The first is taken from Sekkat and Varoudakis (1998) and the second from Devarajan (1997). Sekkat and Varoudakis calculated a model-based measure of REER misalignment. The portion of REER misalignment which can be considered as policy induced are derived from three sources: *a)* excessive trade protection; *b)* excessive foreign borrowing; and *c)* excessive domestic credit expansion. Note that this measure only takes into account variables controllable by the government and not such sources of misalignment as terms-of-trade shocks, etc.

The misalignment is defined as the policy-induced variation of the REER, expressed in domestic currency, as a percentage of the REER that would exist in the absence of misconceived economic policies. In other words, using this misalignment in the model described above provides a measure of the percentage loss in terms of manufacturing productivity and exports per employee due to mismanagement of trade policies, foreign borrowing and domestic credit expansion.

Figure 7. **Policy-Induced REER Misalignment, Loss of Exports and Productivity**
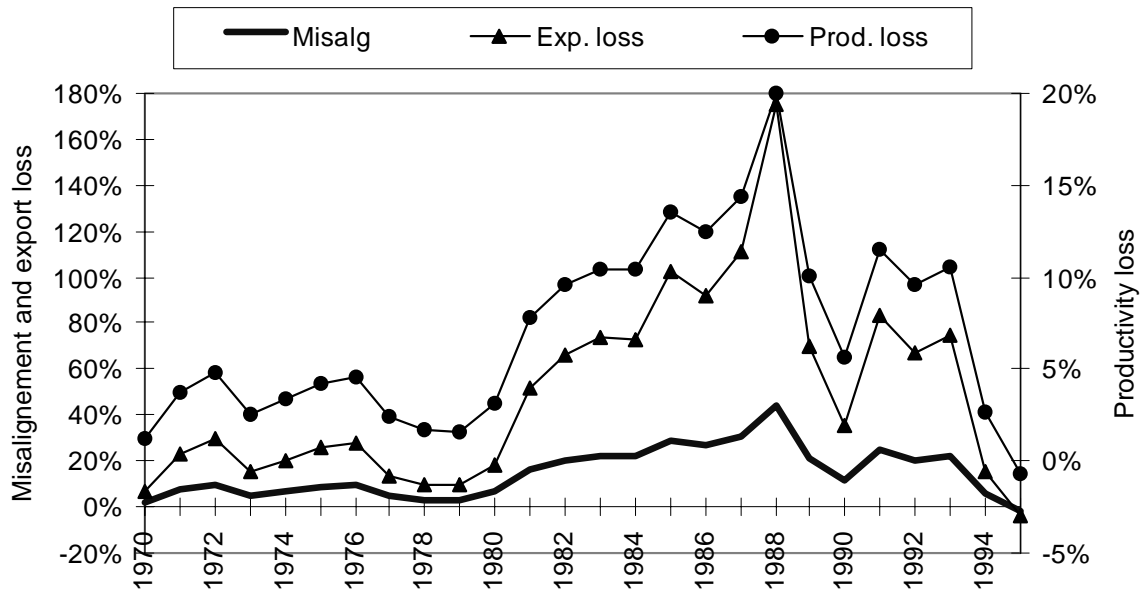

Source: Sekkat and Varoudakis (1998) and author's calculations.

As can be seen in Figure 7, Cameroon appears to have suffered substantially from an overvalued REER, in particular during the 1980s. According to the model of Sekkat and Varoudakis, the policy-induced REER misalignment in Cameroon was fairly low up to 1980, after which it started to increase significantly. The misalignment peaked in 1988, which can be primarily attributed to trade restrictions. Excessive credit expansion also played an important role during most of the 1980s and the beginning of the 1990s. According to our model, the impact on productivity is not significant until 1980. In the first part of the 1980s, the productivity loss lies between 5 per cent and 10 per cent, which approximately corresponds to the average annual negative TFP trends calculated in Table 4. The productivity loss peaks at around 20 per cent in 1988.

Exports, however, are more sensitive to REER changes. Manufacturing export losses hover around 80 per cent throughout the 1980s and at the beginning of the 1990s until the devaluation of the CFA franc in 1994, with exception of a peak at nearly 200 per cent in 1988. The devaluation and the accompanying economic restructuring measures appear to have almost entirely eliminated the policy-induced REER related losses of exports and productivity. Although the model is probably less accurate for values far from the average, it is probably safe to say that inappropriate economic policies caused severe damage to manufacturing exports after 1980 and that the situation was substantially ameliorated by the devaluation of the CFA franc.

Figure 8. **REER Overvaluation, Loss of Exports and Productivity**
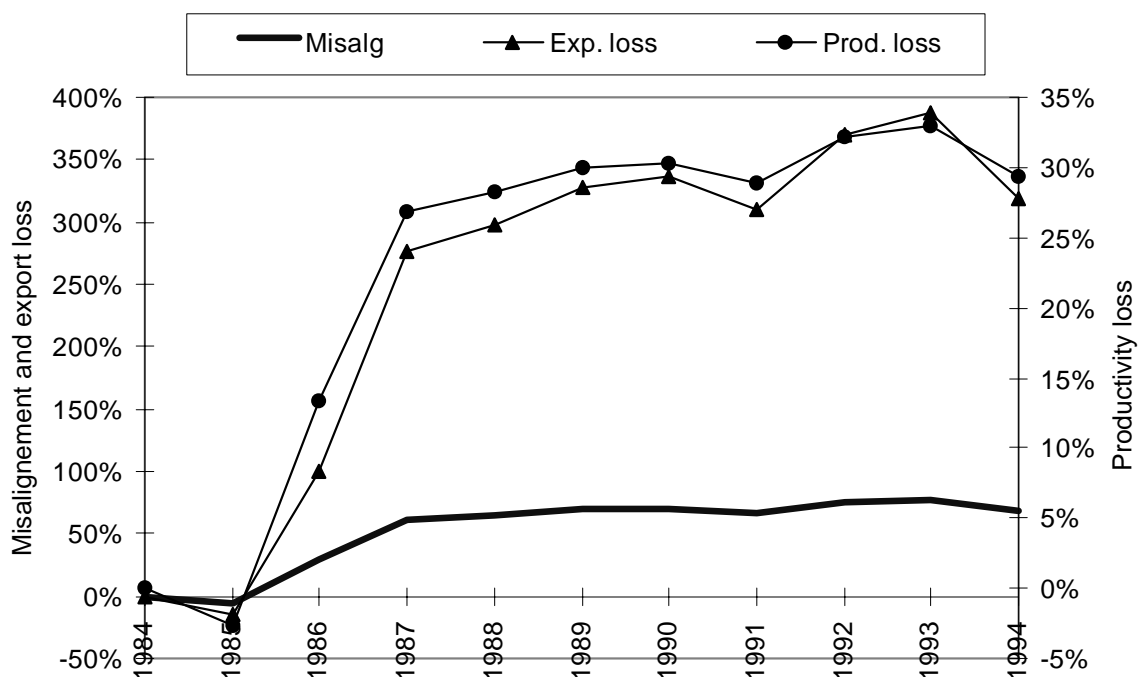
Devarajan uses a model based on the Salter-Swan model, in which the REER is determined as the ratio of prices of tradables to nontradables. Devarajan has extended this model to include domestic goods which are imperfectly substitutable for imported or exported goods, depending on the elasticities of transformation and substitution. The REER is then compared to a reference year to determine the overvaluation or undervaluation. In other words, Devarajan's model does not distinguish between policy-induced misalignment and other sources of misalignment. In particular, it includes the effects of the terms of trade. Hence it is not surprising to see that his measure of overvaluation is substantially higher than that of Sekkat and Varoudakis.

According to Devarajan, the REER was essentially in line with its equilibrium prior to 1986 when a severe terms-of-trade shock due to the plummeting oil prices induced a substantial overvaluation which has more or less prevailed ever since. This effect was aggravated by a weakening dollar, since the prices of petroleum are largely fixed in dollars. Using the overvaluation calculated from Devarajan's model, one finds much higher productivity and exports losses than for the previous measure of misalignment. The productivity loss lies around 25 per cent from 1987 onward and the corresponding loss for exports per employee is over 300 per cent. Interestingly, the devaluation does not bring about an amelioration to anywhere near the same degree as we found in the previous model. Using Devarajan's model, we find an overvaluation of 78 per cent in 1993 and 68 per cent in 1994. Hence, while the devaluation eliminated the policy-induced misalignment it did little to correct the terms-of-trade-related REER overvaluation and its accompanying losses in productivity and exports[6].

VII. CONCLUSIONS

This study shows that the Cameroon's lacklustre performance in manufacturing exports from the latter part of the 1980s onwards could be in large measure explained by the highly overvalued REER. In turn, the REER overvaluation was a result of poor economic management compounded by exogenous shocks. The loss of manufacturing exports due to policy-induced REER misalignment may have ranged as high as 80 per cent during the 1980s and until the devaluation of the CFA franc in January 1994, reaching nearly 200 per cent at its peak in 1988. This means that manufacturing exports might have been roughly 80 per cent higher during this period if the Cameroonian government had held back its excessive expansion of credit and trade restrictions. Productivity losses during the same period do not appear to have exceeded 15 per cent. The controllable, policy-induced misalignment and its resulting export losses gradually decreased after the 1988 structural adjustment programme, and were all but eliminated by the devaluation and its accompanying policy reforms. Including such uncontrollable events as terms-of-trade shocks in the calculations shows that the overall REER overvaluation may have cut the manufacturing exports by as much as three-fourths from 1987 onwards. This should be seen in perspective by noting that manufacturing exports represent less than 10 of total exports. Inasmuch as the overvaluation of the REER was largely due to the economic importance of oil and the related Dutch disease, it would seem that more emphasis should be put on developing the country's manufacturing industry. It also appears clear that appropriate REER management can play an important role in promoting exports, in particular in the manufacturing sector, and economic growth.

Low productivity in Cameroon was an equally important factor limiting manufacturing exports. Furthermore, the low productivity has been aggravated by high real wages, partly resulting from short-sighted inflationary policies brought about by the increasing importance of oil. Secondarily, this paper also alludes to the importance of the availability of skilled labour for productivity and, hence, for exports and economic development.

NOTES

1. The results also proved robust with regards to the method used. A mid-point estimation gave a capital coefficient of 0.34.

2. For more information on the Harberger method, see Harberger (1978).

3. For more theoretical and empirical evidence for the positive impact of trade on productivity, see, for example, Edwards (1997), de Melo and Robinson (1990), Biggs, Shah and Srivastava (1995), Tybout (1992), Bigsten *et al* (1997) and Lucas (1993).

4. The inclusion or exclusion of the non-exporting firms did not affect the results significantly. Moreover, the elasticities (other than for exports) were not significantly altered by including non-exporting firms in the instrumental variable regression and applying the fitted values without taking the logarithm.

5. Excluding firms or years with zero imports did not change the results significantly. The logarithm of imports per employee turned out to be significant with a coefficient of 0.23.

6. This is not a general case in the franc zone. According to Devarajan, the large oil producing countries, Cameroon, Gabon and Congo, were helped the least by the devaluation. Mali and Côte d'Ivoire were brought close to equilibrium and there was undervaluation in about half of the countries after the devaluation.

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