IMPACT OF PRODUCTIVITY AND REAL EFFECTIVE EXCHANGE RATE ON THE COMPETITIVENESS OF MANUFACTURING EXPORTS: THE CASE OF CAMEROON

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The manufacturing industry in Cameroon is analyzed in this paper. The study, using data from the National Institute of Statistics of Cameroon, covering the period 1993-2008, focuses on the impact of productivity and real effective exchange rate on the competitiveness of manufacturing exports. A production function and an export function are estimated in order to determine the total factor productivity in each industry and manufacturing to measure the effect of productivity and real effective exchange rate on manufacturing exports. The results indicate that the arms *meat industry and fish*, *textile and clothing* are the branches where the total factor productivity is important. The export function was estimated for the branches of manufacturing industry; it appears that the total factor productivity has a positive and significant effect at 5%. The real effective exchange rate is significant at 10% after a robust estimate. The manufacturing export performance therefore depends on the one hand appropriate exchange rate and also productivity.

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Introduction

Primary products are an increasingly significant export in Cameroon. Indeed, according to research from the center of the OECD Development published August 14, 2001 on the promotion of manufacturing competitiveness in sub-Saharan Africa in general and Cameroon in particular, commodities represent about 60% of exports Cameroon. Unfortunately these products are subject to external pressures such as international prices, demand fluctuations and climate variations. Thus, to take advantage of its openness to the global economy, manufacturing Cameroon can play an important role given that Cameroon has a rich endowment in natural resources. According to data from the National Institute of Statistics (INS) for the year 2008, the manufacturing sector in Cameroon has contributed about 17%[1] of real GDP this year. The manufacturing exports represent about 27%[2] of total exports for that year. In addition, the REER can be considered as an indicator of price competitiveness in the short term exports. The concepts of competitiveness and productivity are the leading concepts of our study. These concepts which are somewhat different understandings will be illuminated in our study. The article aims to answer two questions:

❶ What is the impact of productivity on the competitiveness of manufacturing exports in Cameroon?

❷ What is the impact of real exchange rate on the competitiveness of manufacturing exports in Cameroon?

Review of the literature

Competitiveness is a complex concept. In the present context, it is a means of survival for firms and capacity for growth for nations. It also represents a challenge for countries like Cameroon, which ensures their integration into the global economy. The notion of competitiveness of a country is relatively large and not static as it changes with the aggregation level of analysis we want to lead. Many economists and researchers have paid great attention to the definition of the

[1]Source: Author's calculations based on INS data Cameroon.
[2]Source: Author's calculations based on INS data Cameroon.

concept. According to Landau (1992) "Competitiveness is the ability of a country to maintain, in a global economy, a growth rate acceptable standard of living of the population with equal distribution, while providing employment to all those wishing to work without reducing the potential for growth in living standards of future generations." Some economists believe that competitiveness can not be explained only at the national level. It is probably for this reason that Porter (1990) said that "Trying to explain the competitiveness at the national level is incorrect. What we must understand is what are the determinants of productivity and the rate of productivity growth. To find solutions, we should focus not on the overall economy, but rather on specific industries or industry segments. Two years later, Porter (1992) adds by saying that the fundamental actors in international competition are primarily businesses. They are the ones that face the international markets and to gain competitive advantages, either by cost or by differentiated products. In the following, we adopt the definition of Porter that it is insufficient to attempt to explain the competitiveness at the national level only. Indeed, an important variable in our study is the real effective exchange rate which does not depend only on the national level but also from outside.

Productivity is output per unit of factor. It can be calculated for a factor or all factors (TFP). This indicator is calculated from a production function by subtracting the growth contributions of labor and capital. Productivity is often considered as an indicator of economic performance, which may be affected by several factors, including competition. Improved performance in productivity allows a country to sell more products at lower prices and increase its relative competitiveness. On the international level, competitiveness depends on a multitude of factors. Among the most important, we quote the exchange rate. The real exchange rate is defined as the relative price of nontradables in terms of tradables (Paul Krugman and Maurice Obstfeld, 1995; Sadoulet and De Janvry, 1995). The real exchange rate measures the external purchasing power of money, that is to say, its purchasing power over foreign goods. The studies of Edwards (1997), de Melo and Robinson (1990), Biggs, Shah and Srivasta (1995), Tybout (1992), Bigsten et al. (1997) and Lucas (1993) show empirically and theoretically, that exports of manufactured products have a beneficial impact on total factor productivity. The exchange rate and productivity seem to decisive in explaining the differential market shares for exports. The importance of the real effective exchange rate for exports of manufactured goods in Africa

has been demonstrated by Ndulu and Semboja (1995), who found that the real effective exchange rate has a significant influence on manufacturing exports. Among the factors thought to influence export competitiveness, is the real effective exchange rate. Balassa (1990) established a link between the real effective exchange rate and exports of manufactured goods.

Methodology and results

The theoretical framework revolves mainly around the model which serves to support the analysis. First we specify the theoretical model. Then we will develop an appropriate method for its estimation. The concept of total factor productivity based on that of the production function. The production function used is the Cobb-Douglas. The value added can be expressed as:

$$Y = AK^{\alpha}L^{\beta}$$

where K is the approximate value of capital, L compensation of employees and A is the level of TFP.

Presentation of econometric models

For the estimation of productivity, we have the following logarithmic specification: We obtain the equation with the logarithm: $\ln Y_{it} = \alpha \ln K_{it} + \beta \ln L_{it} + \ln A + \varepsilon_{it}$ where t represents time (year) and i represents the manufacturing sectors. All variables in this model have the same number of observations. This means that there are no missing values for this model. Thus, no variable may weaken the estimates. For each branch of manufacturing, we have two variables. As these two variables are not proportional to each branch, so it is more interesting to study correlations between variables.

The impact of productivity and real effective exchange rate on manufacturing exports is estimated using the model defined by the following equation:

$$\ln \text{Export}_{it} = \alpha_1 \ln \text{Productivité}_{it} + \alpha_2 \ln TCER_{it} + \alpha_3 \text{Employés}_{it} + \alpha_4 t + Const + u_{it}$$

This model is based on empirical studies of the impact of productivity and exchange rates on exports, particularly those of the Development Centre of the OECD in their working paper

number 146. The empirical analysis and, on a panel cylinder (all observations for all individuals) of 21 branches of manufacturing. When we consider panel data, the first thing he should check the specification is homogeneous or heterogeneous data-generating process. Econometrically, this amounts to testing the equality of coefficients of the model studied in the individual dimension.

Results and interpretations

After productivity estimate by the method of OLS, we obtain the following table. By performing the calculation of productivity over time (from 1993 to 2008) for each branch, we notice that it hardly varies over time for each branch. This shows indeed that the total factor productivity is constant in each branch. The sum of the estimated elasticities with respect to capital and labor is not significantly different from 1. This result allows the assumption of constant returns to scale. Thus, the value increases in a similar proportion to inputs. The capital and labor inputs have a significant effect on overall production.

Table 1 : *The estimation results productivity by industry.*

Industry	productivity
Ind_Viande_et_poisson	0.745
Travaux_de_Grains	0.448
Ind_CacaoCaféThéSucr	0.482
Ind_Oléagin_Alim_Ani.	0.46
Fab_Prod_baseCéréale	0.529
Ind_LaitFruitLégu_autr	0.375
Industrie_de_Boissons	0.579
Industrie_du_Tabac	0.344
Ind_Textile_etConfecti.	1.332
Ind_Cuir_et_Fab_Chauss	0.4
Ind_Bois_sauf_fab_meub	0.572
Fab_Papieret_art_en_pap	0.488
Raffinage_Pétrole	0.41
Ind_Chimique_et	0.546
Prod_Caoutchouc_et	0.482
Fab_Autr_Produits_Min	0.494
Fab_Prod_Métallur	0.412
Fab_Machin_App_Elec	0.214
Fab_Equip_Appa_audio	0.375
Fab_MatérielTransport	0.322
Fab_Meubles	0.464

Source: *The author's calculations based on data from the INS*

The manufacturing sector which has the highest level of productivity is *the textile and garment* and one that has the lowest productivity level is *the branch Manufacturing Machines, appliances*. This can be explained by the fact that this branch is very poorly developed in Cameroon, which leads to low value added and hence a low level of productivity.

After a robust estimate of the model export, we obtain the following table:

Table 2 : *Robust Estimation Model Export.*

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. xtreg log_exports log_productivité log_tcer temps employes, re ro

Random-effects GLS regression                   Number of obs      =       336
Group variable: branche                         Number of groups   =        21

R-sq:  within  = 0.1005                         Obs per group: min =        16
       between = 0.3591                                        avg =      16.0
       overall = 0.3015                                        max =        16

Random effects u_i ~ Gaussian                   Wald chi2(5)       =     50.89
corr(u_i, X)       = 0 (assumed)                Prob > chi2        =    0.0000

                                               (Std. Err. adjusted for clustering on branche)
------------------------------------------------------------------------------
             |               Robust
 log_exports |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
log_produc~é |    3.507626   1.217973     2.88   0.004     1.120444    5.894809
     log_tcer |   -.7574273   .4454655    -1.70   0.089    -1.630524     .115669
       temps |    .0278486   .0125582     2.22   0.027      .003235    .0524623
    employes |   -.0000229   7.36e-06    -3.12   0.002    -.0000374   -8.52e-06
       _cons |    3.465128   2.257049     1.54   0.125    -.9586065    7.888863
-------------+----------------------------------------------------------------
     sigma_u |   1.5838944
     sigma_e |    .91417576
         rho |    .75011733   (fraction of variance due to u_i)
------------------------------------------------------------------------------
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Source: *Our calculations by using the Stata*

This robust estimation corrects for heteroskedasticity. According to estimates, total factor productivity has a positive and highly significant impact on manufacturing exports. Thus, an increase of one percent of the total factor productivity all things being equal results in an increase in manufacturing exports by 3.5%. After using a robust estimate, we corrected the fact that the REER is not significant. It is therefore significant at 10%. The negative sign of the exchange rate can be explained by the fact that most of the inputs used in manufacturing is imported. Thus, an increase in the REER can only have negative effects on exports. The Breusch-Pagan statistic shows that the random effects are globally significant at 5% level.

Conclusion

More generally, the manufacturing sector remains a key driver of economic activity in terms of value added and employment. It has a powerful ripple effect on all activities, particularly by its inputs. Cameroon has a small manufacturing sector and its contribution in terms of export is also low. The experts understand that industrial policies are an ideal gateway to the diversification of the economy. Well-considered industrial policy has important multiplier effects throughout the productive economy. It promotes both the agricultural sector than in services. Improving the competitiveness of exports must therefore be sought in the niche dynamics of global demand, focusing on manufactured goods. On the export side, the manufacturing sector is experiencing a slowdown. Modeling of exports has enabled us to have a good policy for

export. Better productivity performance is likely to improve exports through better allocation of production factors.

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