Poverty and Economic Policy Research Network

Research Proposal

Growth, Distribution, and Poverty in Cameroon: A Poverty Analysis
Macroeconomic Simulator’s Approach

By

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1. Research Question and Core Research Objective

After enjoying an extended period of prosperity from the independence to the mid 80s, Cameroon faced a severe crisis that lasted nearly a decade. The crisis had serious consequences for the country’s socio-economic trends. It led notably to a drastic decline in public and private revenues; a decline in agricultural production for export revenues; the closing of many enterprises leading to high unemployment; the reduction of private and public salaries… The combined effect of all these events led to the deterioration of living conditions. Poverty became widespread and deeper. The percentage of people living under poverty line increased from 40 per cent in 1984 to 50.5 per cent in 1996. Even if the triennial program supported by the World Bank and International Monetary Fund – IMF (1997-2000) and the IMF Poverty Reduction and Growth Facility (PRGF) have had slightly positive effects on poverty reduction between 1996 and 2001, more needs to be done in Cameroon in the context of poverty reduction. In fact, looking at poverty long trend evolution, average per capita consumption at constant prices reached the peak in 1983 and compared to its 1964 level, one realises that the average Cameroonian was in 2001 poorer than he was in 1964. The importance of Cameroon poverty varies from rural (very high) to urban (relatively high) areas.

Since the end of the 80s, supported by international institutions (notably the World Bank and IMF), Cameroon began to implement adjustment policies that aim at reducing poverty among its populations. With a deepening poverty and unsustainable debt service burden, Cameroon satisfied a three-year track record of implementations under the supervision of the World Bank and the IMF from 1997 to 2000. Success in this three-year program took Cameroon to the Decision Point meaning qualification as a Heavily Indebted Poor Country (HIPC country). The Government of the Republic of Cameroon prepared an Interim Reduction Strategy Paper (I-PRSP) during the first half of 2000. The I-PRSP was prepared in accordance with a participatory process that gave the poorest inhabitants an opportunity to freely explain their perception of poverty, to list the major determinants of poverty and to recommend measures to alleviate it. The full PRSP is awaited in January 2003.
The central question of the study is to know what has been the impact of such shocks and policies on Cameroonian living standard and which messages can we foresee in the future.

The obvious objective of the study is to evaluate the impact of shocks and policies on the living standard of Cameroonians and project over a chosen time period the poverty and distributional effects of macroeconomic and structural policies on Cameroon populations. This central objective can be divided into three specific objectives:

- update poverty profile in Cameroon
- project Cameroon’s poverty indicators over a time period (2003-2015)
- compare projected indicators with the millennium development goals

2. Scientific Contribution of the Research

Poverty is a situation in which people lack food, shelter and clothing, healthcare, education … Those falling in such a difficult situation always fear for their future, thinking and worrying about how will be the next day or even the next hour of their life. As pointed out by the World Bank (2001), poverty is even more than that because poor people are often treated badly by the State’s institutions and excluded from power by these institutions. Poor persons are characterised by low (and even no) income, explaining their low level of consumption. At this level, a poor person is a person whose income or consumption level is below a minimum necessary to meet basic needs. The concept of “Poverty Line” is used to indicate this minimum level. Living conditions and habits vary over time and from one place to another. For international comparisons, the World Bank uses reference lines set at one US dollar and two US dollars per day in 1993 purchasing power parity.

Studies that had been done in Cameroon in the context of evaluating the country’s level of poverty are based on the following national surveys: EBC83/84, ECM93, ECAM I (1996) and ECAM II (2001). These surveys emphasised the importance of income
poverty. Income poverty is measured by a consumption-based poverty line that can be defined as the amount of expenditure required for the acquisition of minimum food for an adult-equivalent (2400 calories and 2900 calories per capita per day were considered respectively in 1996 and 2001 estimations) and the basic necessities. People living under this estimated line are considered to be poor.

In 1996, according to ECAM I, Cameroon poverty line was estimated at CFA Francs 148 000 per capita and per year. People living with less than this amount were estimated at 50.5 per cent of total population. In 2001, according to ECAM II, people living with less than CFA Francs 232 547 are considered to be poor and represent 40.2 per cent of total population, slightly the same percentage than in 1984 (40 per cent).

Despite the recent positive evolution in the fight against poverty, one can observe that in a long run, Cameroon impoverished. This impoverishment can be observed by the long-term trend of per capita consumption in Yaounde, which shows that in 2001, Yaounde inhabitants became poorer than in 1964.

Table 1: Yaounde, per capita consumption in 1983 CFA Francs

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<tr>
<td>Per capita consumption</td>
<td>196 000</td>
<td>454 000</td>
<td>209 000</td>
<td>104 000</td>
<td>109 000</td>
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Sources: computed from EBC 83/84, ECM 93, ECAM I (1996) and ECAM II (2001)

The above-mentioned national surveys led to a multitude of poverty profile and poverty assessment studies in Cameroon. In fact these studies are based above-mentioned national surveys. Among these studies are the World Bank (1995), UNDP (1998) and several other reports on the topic. The last poverty profile and poverty assessment were done using ECAM I data. Since then, ECAM II was produced. The final PRSP will be officially ready in January 2003. The two documents provide additional important information about Cameroon poverty level as well as its strategies of alleviating it. It is now worth to produce a new synthesis of existing information concerning the poor, poverty and inequality to update the former poverty profiles. A second and more
important point is that, presently, no study considers all these surveys together with government macroeconomic policies to project poverty evolution in Cameroon over time. Such activity would lead to more efficiency in poverty reduction policies and policies recommendations for tackling poverty in Cameroon. It is therefore very worth producing information set on this area. This is an advantage for the present study to consider these two aspects of poverty in Cameroon.

3. Policy Relevance

Cameroon is actually struggling against widespread poverty among its populations. It will be with great interest to inform government and international donors about the outcomes of this battle and question about the possibility of winning this battle that can be materialised by reaching the millennium development goals. This activity would help adjust policy instruments in the case those goals are not likely to be achieved.

4. The Methodology

Apart from updating Cameroon poverty profile, the main point of the methodology will focus on the projection of the country’s poverty indicators.

To project poverty over time, I will consider the Poverty Analysis Macroeconomic Simulator (PAMS) developed by the World Bank in 2002 and applied to Burkina Faso. For any change in output growth desegregated by sector, PAMS simulates changes in income of various Representative Households (RHs). The technique is based on the idea that changes in poverty can be decomposed into changes due to the uniform growth of income and changes due to changes in relative incomes. PAMS predicts the consequences of any policy affecting aggregate output growth on poverty under the assumption that the examined policy will be distribution neutral or assuming that the distributional change can be specified using a quantifiable form.
The technique consists in extending the relationship between macroeconomic outcomes such as GDP growth, consumer price, inflation and employment and the income of various groups in the economy. This income is broken down into various socio-economic groups and economic sectors. The solution that is a distributional dynamic process between several typical socio-economic groups used the RH hypothesis. Each RH being employed in a different economic sector, it is possible to desegregate the production side of the economy. The labour market reflecting the skill composition of the labour force, the dichotomy between the rural and the urban sectors, the effect of sectoral output growth and real wages on the demand for labour is another important point of PAMS. General features of PAMS are: 1) a macro model; 2) a base year household survey; 3) a labour market model and 4) a household survey simulator.

The macro model provides PAMS’ macro consistency. This can be a general equilibrium model or sophisticated macro-econometric model. The direction of Forecast of the Ministry of Economy and Finance, with the help of the World Bank and UNDP has developed such model for Cameroon. The coefficients and relationships of the model are estimated using the country’s time series data. The macro model gives national account consistency in both real and nominal terms. It ensures that at an aggregate level, the budget constraints of economic agents are respected.

The base year household survey (HHS) provides information about initial levels of income and expenditure by economic sector of employment, by skill levels, by rural or urban location, and by formal and informal activities. The average wage and non-wage income of workers in each RH comes from the latest available household survey. In Cameroon, ECAM II (2001) will be the base year HHS.

The labour market model simulates the labour market linked to the consistency of the macro-model. In fact, one can model labour demand and supply and estimate elasticities with country time series. PAMS breaks down the economy into two basic components: the rural and the urban areas. Within each component, the formal and informal sectors are distinguished. Each sector is broken down into two sub-sectors, the production of
tradable and the production of non-tradable, allowing linking each sub-sector of the
production side of PAMS to each component of the labour market. Demographic
elements as well as labour and skill categories and exogenous migrations affect Labour
supply. The demand of labour is broken down by economic sector, skill level and
urban/rural location and is dependent upon relevant sectoral demand and real wages.
Hence the modules determines wage income broken by socio-economic categories, skill
levels and location. A feature on taxes, transfers and social expenditures help making
average transfers or average taxation of the specific representative household. It also
provides simulation about the cost of attaining certain socio-economic goals.

4.1 PAMS specifications

4.1.1 Production

In PAMS, production is broken down as following. Gross Domestic Product (GDP)
hereby refereed by Y is taken from the macro model. It is therefore exogenous. Y is
broken down between rural (Y\textsubscript{RUR }) and urban (Y\textsubscript{URB }). Rural GDP is made up of two
sectors: the production of cash crops (X\textsubscript{RUR}) - tradable goods for exports - and
subsistence agriculture (D\textsubscript{RUR}). Urban GDP is divided between a formal sector and an
informal sector (D\textsubscript{URB }). Private sector and public sector (Y\textsubscript{URB,PUB}) are the main
components of the formal sector. The urban formal private sector is divided into a
tradable sector (X\textsubscript{URB,PRIV}) and non-tradable sector (Y\textsubscript{URB,PRIV}). The informal urban
sector is viewed as a private-non-tradable goods sector. So in total, there are 6 sectors
from which one gets 6 representative households. These representative households are:
- rural workers of tradable goods sector;
- rural workers in the non-tradable goods sector;
- urban workers in the non-tradable formal private sector;
- urban workers in the non-tradable formal private sector;
- urban workers in the tradable sector;
- urban civil servants.

Assuming all prices are normalised to one, one can write:

\[ Y = Y\textsubscript{RUR} + Y\textsubscript{URB} = (X\textsubscript{RUR} + D\textsubscript{RUR}) + [(X\textsubscript{URB,PRIV} + Y\textsubscript{URB,PRIV}) + Y\textsubscript{URB,PUB} + D\textsubscript{URB}] \]
The export sector is broken down into agricultural exports and non-agricultural (urban) exports. At this level, production is exogenous, dependent upon foreign demand \((Y^*)\) and the respective real exchange rates for each sector (domestic and foreign prices ratio).

\[
X = (X_{RUR} + X_{URB,PRIV})
\]

\[
X_{RUR} = X \left( Y^* \frac{Ep^*_{RUR}}{P_{RUR,D}} \right)
\]

\[
X_{URB,PRIV} = X \left( Y^* \frac{Ep^*_{URB}}{P_{URB,Y}} \right)
\]

There are many options to determine output of the rural economy. The first one is to take agricultural production as given by the macro model, what will be done in the present study. Another consists in modelling rural production separately. At this level, the simplest way is to calculate \(Y_{RUR}\) using a constant elasticity of output to the rural labour \((\delta_{RUR})\). Some more complicated specifications can also be adopted. For the two simplest specifications, one can write:

\[
Y_{RUR} = \bar{Y}_{RUR} \quad \text{and} \quad Y_{RUR} = \kappa_{RUR} Y_{RUR} L_{RUR}^\delta
\]

When cash crops for exports and rural output are known, non-tradable rural output can be calculated as a residual.

Urban output is obtained with the production of tradable exports goods \(X_{URB,PRIV}\) and the public sector product \(Y_{URB,PUB}\) that is exogenous and fixed.

\[
Y - Y_{RUR} - X_{URB,PRIV} - Y_{URB,PUB} = (Y_{URB,PRIV} + D_{URB})
\]

In the urban area, for simplification needs, a fixed coefficient relation to the ratio of investment \(I = I_{URB,PRIV}\) to output can give the output’s growth rate.
Once determined the five sectors, it is possible to determine the output of the informal non-tradable goods as a residual.

4.1.2 Labour Market, Employment and Migration

With the additional dimension of the two types of labour (skilled and unskilled), employment determination in the labour market model follows the same breakdown of the economy. In the model, the total labour force represents a fraction of total population. Each sector of production is assumed to hire only one type of labour (skilled labour or unskilled labour). Unskilled labour is employed in the rural sector in both subsistence and exports sectors and in the non-tradable sector of the urban economy. Unskilled labour employed in the informal sector and public sector are assumed to be skilled. Skilled labour is employed in the urban formal exports sector.

Labour demand is decomposed as follows:

\[
\Delta Y_{\text{URB,PRIV}} - I_{\text{URB,PRIV},-1} = \sigma_{\text{URB}} \cdot Y_{\text{URB,PRIV},-1}
\]

\[
\Delta Y_{\text{URB,PRIV}} - I_{\text{URB,PRIV},-1} = \sigma_{\text{URB}} \cdot Y_{\text{URB,PRIV},-1}
\]

where subscripts RUR and URB stand for rural and urban respectively, UNSK and SK for unskilled and skilled labour respectively, X for tradable, D for domestic informal non-tradable, Y for domestic formal non-tradable, and G for public sector.

i) Employment, Migration in the Rural Economy

Rural economy employs only unskilled workers. Employment is assumed to follow the Lewis tradition of unlimited supply of unskilled workers that grows with the population growth rate \( \eta(POP) \). One should also consider the rural-to-urban migration.
Labour demand in the rural sector is a positive function of both components of the rural output with an elasticity $\omega_{\text{RUR}}$. It is a negative function of real wage with an elasticity $\alpha_{\text{RUR}}$. Real wages in cash crop sector ($w_{\text{RUR},X}^{\text{UNSK}}$) are higher than real wages in subsistence agricultural sector ($w_{\text{RUR}}^{\text{UNSK}}$) so that workers will opt to join first the sector offering a higher real wage. A fixed minimum sectoral subsistence wage $w_{\text{RUR},X}^{\text{UNSK}}$ constitutes the basis for real wage setting. It can adjust if wages are assumed flexible. The nominal wage is the product of the real wage by the sectoral producer price.

Unskilled labour supply in the informal subsistence is the residual of labour supply minus labour employed in the cash crop sector. The same wage determination principle is adopted in the subsistence agricultural sector.

Rural-to-urban migration at the rate MIGR is assumed without any cost. It is a function of the wage differential between rural sector and urban sector, which depends greatly on the probability of finding an unskilled job in the urban economy.
ii) Employment, Upgrading Skills in the Urban Economy

In the public sector, labour demand is exogenous. Workers are assumed opting first to be hired in the public sector because of some benefits associated with public sector employment.

\[ L^D_{URB,G} = \overline{L^D_{URB,G}} \]

In the private sector (the rest of the urban sector), unskilled labour are assigned to formal non-tradable goods sub-sector and skilled labour to the tradable goods sector. Labour demand for unskilled workers depends positively on urban private output while labour demand for skilled labour depends positively on urban tradable output with their respective elasticities (\( \sigma^{UNSK}_{URB,Y} \) and \( \sigma^{SK}_{URB} \)). The former depends negatively on the real wage rate with an elasticity \( \alpha^{UNSK}_{URB} \) while the latter depends negatively on the real wage with an elasticity \( \alpha^{SK}_{URB} \).

\[
L^D_{URB,Y}^{UNSK} = \kappa_{URB,PRIV}^{UNSK} Y^{UNSK}_{URB,Y} \bar{W}^{UNSK}_{URB,Y} - \alpha^{UNSK}_{URB} W^{UNSK}_{URB,Y} \\
L^D_{URB,Y}^{SK} = \kappa_{URB,PRIV}^{SK} Y^{SK}_{URB,Y} \bar{W}^{SK}_{URB,Y} - \alpha^{SK}_{URB} W^{SK}_{URB,Y}
\]

The \( \kappa \) are the shares of each sector to total GDP.

The supply of skilled and unskilled labour in the urban economy grows with the rate population growth.

The nominal wage rate in the public sector is exogenous \( W_G = \bar{W}_G \)

iii) Wage determination for unskilled workers
There is a minimum subsistence wage level set by the institutions. The informal sector is a residual in both production and employment. The wage rate of unskilled workers in the urban economy can be specified using information of the HHS.

4.1.3 Prices

The GPD price level of the macro model applies to the aggregate production. Exports prices are exogenous (small country hypothesis). If \( E \) stands for the nominal exchange rate and \( p^* \) the foreign currency price of exports, \( p_x = E \cdot p^* \). In rural areas, the weighted average (contribution to agricultural GDP) of cash crop prices and subsistence agriculture prices help calculate the price index. An increase over the cost elements which include a weighted average of the minimum subsistence wage for the informal rural sector and the formal rural wage cost recaps the change in the price index in the subsistence agriculture.

\[
p_{RUR} = E \cdot p^*_R \cdot \frac{X_{RUR}}{Y_{RUR}} + p_{RUR,D} \cdot \frac{D_{RUR}}{Y_{RUR}}
\]

\[
p_{RUR,D} = (p_{RUR,D-1}) \left[1 + \left( \theta_1 \Delta w_{RUR,D} + \theta_2 \Delta w_{RUR,Y} \right) \right] \quad \theta_1 + \theta_2 = 1
\]

The same procedure is adopted for the urban areas where

\[
p_{URB} = E \cdot p^*_U \cdot \frac{X_{URB}}{Y - Y_{URB}} + p_{URB,Y} \cdot \frac{(Y - Y_{RUR} - X_{URB})}{(Y - Y_{RUR})}
\]

\[
p_{URB,D} = (p_{URB,D-1}) \left[1 + \left( \mu_1 w_{URB,D} + \mu_2 w_{URB,Y} \right) \right] \quad \mu_1 + \mu_2 = 1
\]

In nominal terms, GDP (\( p_y Y_y \)) can be decomposed into nominal agricultural production (\( p_{RUR} Y_{RUR} \)), nominal exports expressed in local currency (\( p_x Y_x \)) and the nominal value of non-tradable goods (\( p_D Y_D \)).

\[
p_y Y = p_{RUR} Y_{RUR} + p_x Y_x + p_D Y_D
\]
\[ p_X^X = p_{RUR,X}^X X_{RUR} + p_{URB,X}^X X_{URB} \]
\[ p_D^D = p_{RUR,D}^D D_{RUR} + p_{URB,D}^D D_{URB} \]

Rural and urban price levels will help projecting the poverty lines in rural and urban areas respectively.

4.1.4 Income and expenditures of representative households

i) Wages and income of representative households

Wages and income of each representative household can be calculated as follows:

Rural unskilled workers of tradable goods sector: \( W_{RUR,X}^{UNSK} L_{RUR}^{X,UNSK} \), \( i = 1 \)

Rural unskilled workers in the non-tradable goods sector: \( W_{RUR,D}^{UNSK} L_{RUR,D}^{X,UNSK} \), \( i = 2 \)

Urban unskilled workers in the non-tradable formal private sector: \( W_{URB,Y}^{UNSK} L_{URB,Y}^{UNSK} \), \( i = 3 \)

Urban skilled workers in the non-tradable formal private sector: \( W_{URB,D}^{SK} L_{URB,D}^{SK} \), \( i = 4 \)

Urban skilled workers in the tradable sector: \( W_{URB,X}^{SK} L_{URB,X}^{SK} \), \( i = 5 \)

Urban civil servants (skilled): \( W_{URB,G} G \), \( i = 6 \)

Finally, non-wage income of capitalists and renters (profits) is approached by the difference between total income and wage income. \( PROF = p_Y Y - \sum_i W_i L_i \)

In such economy where the distribution of income by group is known, it is possible to outline indicators of inter-group income inequality.

ii) Disposable income, taxes and transfers
An income tax applies on each RH at a category-specific average $\tau$ while each RH receives lump sum budgetary transfers $T$ (on per capita basis) from Government’s budget.

\[
DINC_i (1 - \tau_i) \left( W_i L_i + PROF \right) + \left( \frac{T_i}{L_i} \right)
\]

\[
DINC = \sum_{i=1}^{J} DINC_i
\]

iii) Public and private expenditures

For each specific item, the sums of both private and public expenditures should respect private and public budget constraints.

\[
DINC_i \leq \sum_{j=1}^{J} \kappa_i^j \cdot DINC \quad \text{and} \quad G \leq \sum_{j=1}^{J} \kappa_j^G \cdot G
\]

where the $\kappa$ stand for the shares of each specific item in private and public budgets.

4.2 The household survey simulator of the PAMS

The basic principle of the simulator is an extension of Bourguignon 2002 decomposition rule to several RHs. (confer World Bank 2002).

\[
DINC_{t,k,RH} = \left( 1 + g_t^{RH} \right) DINC_{t-1,k,RH}
\]

The programme projects the DINC of each household according to its growth rate given by the labour market simulation for the group to which belongs the individual household. In fact, the result is the shift in the distribution of DINC$s$. This shift may be to the right or to the left, depending on the result of the policy or shock. The result can also lead to the change in the distribution of income (more flattened or more stretched curve). Gini coefficient measuring disposable income inequality is an important tool. The Gini measures the distance between the perfect equality curve (Gini=0) where each group

13
receives a share of income exactly proportional to its population size and the Lorenz curve obtained by the actual cumulative incomes of each group.

Figure 1: Changing in the DINC of each RH

After defining poverty lines for the rural and urban sectors, the labour market generates growth rates of disposal income for each group of 6 representative households and the capitalist renters group. For more details in the techniques and hypothesis, see the World Bank (2002).

5. Data Requirements and Sources

It is clear that households’ participation in the economic activity determines the impact of shocks and policies on their living standard. So the status of employment, the level of earnings and the level of expenditure stand to be the key determinants. Demographical information is also an important element on which the analysis should be based. This information can be found in the household survey. ECAM I (1996) and ECAM II (2001) provide such information in the context of Cameroon. The forthcoming Cameroon’s Final Poverty Reduction Strategy Paper will be another source of information. The macro-model is available at the Direction of Forecast of the Ministry of Economy and Finance.
6. Dissemination Strategy

I will work with the Direction of Forecast of the Ministry of Finance and Budget where I use to work as consultant. It is therefore clear that not only the Direction will provide me information (macro-model for example) and additional competency, but will also use the results of the study for its forecasting activities. This can also be seen as the proof of the likelihood that government will use the results of the study. A publication in an international review is another objective.

7. Key References


8. Prior Training and Experience of Researcher in the Issues and Techniques Involved

- June-August 2002: Consultant, the World Bank, Cameroon Country Office. I worked with a senior economist who is a poverty analyst expert. It is from him that I got the methodology. I also helped him supervising two students from Ivory Cost High Scholl of Statistics and Applied Economics. Based on PAMS, the two students were writing their final year dissertation on poverty.

- March-June 2002: I worked as consultant in a particular aspect of Cameroon’s Poverty Reduction Strategy Paper. My contribution was about industrial competitiveness and sustainable economic growth.


9. Expected Capacity Building for Researchers and their Institutions

As the leading researcher, I will familiarise with poverty concept as well as its methodological approaches. In this way, I will gain experience that would help me train and teach students in my university. A publication in an international review will be an important asset for my career, as it will help me being promoted in the future. Two research assistants, one from the university and one from the Ministry of Finance and Budget (a male and a female) will be involved in the study so that both the university and the ministry will befit in terms of capacity building.

10. Any Ethical, Social and Gender or Environmental Issues or Risks Which Should Be Noted

By the moment, I do not foresee any social, gender or environmental issue that we can mention.