THE DISTRIBUTIVE IMPACT OF FISCAL POLICY IN CAMEROON:
TAX AND BENEFIT INCIDENCE

Revised Version of a Paper Presented in the PEP General Meeting, 13-17 June 2005

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Key words: Fiscal policy, taxes, public expenditures, incidence, inequality, poverty, Cameroon
JEL Classification: F15; H2; H51; H52; H22; I32; I31

August 2005
ACKNOWLEDGEMENTS

This research was carried out thanks to funding from the International Research Centre in Ottawa under the Poverty and Economic Policy Research (PEP) Network.

In particular, we wish to express our deepest gratitude to the PMMA sub-network leader, resource persons and researchers for guidance and technical advice all throughout the conduct of this study.

We benefited greatly from their detailed comments and suggestions and would not want to end this fact without mentioning Professor Jean Yves Duclos, the project supervisor and Doctor Abdelkrim ARAAR who drilled Tabi Atemnkeng (project leader) during the study visit at Universite Laval from January 22 to February 12, 2005.

Many thanks also to the PEP secretariat team, Sonia Moreau; Jane O’Brien and Gaetane for the part played which are very indispensable for the PEP network.

Lastly, the authorities of National Statistics Office and the University of Dschang in Cameroon are not left out for the administrative assistance they offered.
ABSTRACT

Most fiscal incidence studies neither analyze simultaneously the tax and benefit incidence, simply known as net fiscal incidence nor actually relate poverty indices to fiscal impact. This paper jointly and separately examines the redistributive and poverty effects of the tax and transfer (education and health) systems in Cameroon. Broadly speaking, the tax system is generally progressive but less so than the benefits of education and health. The latter are more effective to combat poverty as they are both inequality and poverty reducing whereas the tax system though inequality reducing, increases poverty. We also find that net fiscal incidence appears to be most progressive and poverty reducing in the rural areas than in the urban areas. Policy makers should rest assured that shifting the tax structure towards business taxes, excises, VAT and gasoline taxes rather than import duties would be both efficient and equitable. Effectively, poverty can be alleviated only if the revenue raised from taxes could be used to provide more health and education facilities to the population especially in the rural areas.
CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACKNOWLEDGEMENT

ABSTRACT

1. INTRODUCTION

2. INCOME POVERTY PROFILE IN CAMEROON

3. THE BUDGET AND FISCAL ADJUSTMENTS IN CAMEROON

4. AN OVERVIEW OF FISCAL INCIDENCE STUDIES
   4.1 Tax Incidence
   4.2 Expenditure Incidence

5. DATA AND METHODOLOGY
   5.1 Models of Tax Incidence
   5.2 Estimating the value of Public Spending: Standard Benefit Incidence
   5.3 Dominance Testing

6. RESULTS
   6.1 Tax incidence
   6.2 Benefit from social spending
   6.3 Net fiscal incidence

7. CONCLUSIONS AND RECOMMENDATIONS

REFERENCES

LIST OF TABLES

Table 1: Evolution of indicators of monetary poverty between 1996 and 2001
Table 2: Evolution of the Gini Index between 1996 and 2001
Table 3: Central Government Domestic Revenue
Table 4: Shares of Public Spending on key social sectors
Table B-1: Assumed Taxes on Expenditure Items in Cameroon, 2001
Table B-2: Redistributive effect of the combined tax and transfer system: Reynolds-Smolensky Indices
Table B-3: Poverty impact of Fiscal Mechanisms: Variations in Poverty Indices
Table B-4: Kakwani Indices of Tax-Redistribution Progressivity for Taxes
Table B-5: Kakwani Indices of Tax-Redistribution Progressivity for...
Public Subsidies

Table B- 6: Concentration indices of public spending on education and health with allowance on total schooling population and all patients

LIST OF FIGURES

Figure 1a: Concentration curves of direct and indirect taxes
Figure 1b: Concentration curves of main consumption taxes
Figure 2: Benefit from public spending on education
Figure 3: Benefit from public health care by health units
Figure 4: Overall benefit from education and health
Figure 5a: Concentration curves of post-transfer and post-tax incomes
Figure 5b: Concentration curves of aggregate taxes and benefits
Figure 6: Non-parametric regression of average rate of taxation and transfers
Figure 7: Non-parametric derivate regression of taxes and benefits
Figure 8: Conditional standard deviation curves for taxes and benefits
1. INTRODUCTION

Cameroon and other African countries achieved remarkable gains in living standards, as reflected in social indicators and income as far back from independence. Pertaining to the Cameroon economy, the nominal GDP grew at an average rate of 18.2%, rising from CFAF 300.4 billion in 1970 to CFAF 4135.1 billion in 1986. However, commencing from 1987, there was severe economic crisis resulting in a sharp decline in the per capita income. This economic decline took its toll on the social sectors manifested by consumption inequalities and structural poverty in the 1990s.

Recently, poverty alleviation has received much attention in Cameroon especially at the time when the government is still expected to finalise its poverty reduction strategy programme (PRSP) or reach the completion point under the HIPC initiative at the World Bank as a step towards being admitted effectively to the heavily indebted poor countries initiative. This is an important novelty in the post-1999 approach to poverty alleviation that involves preparation of the PRSPs by recipient countries as a prerequisite for reduction of the debt and for concessionary loans and grants.

Several measures had been defined and are being undertaken to fight poverty and include: diversifying and reinforcing on going actions in priority sectors such as education, health and infrastructure; initiate policies that raise the purchasing power of the population. In spite of this policy makers and even policy executors are facing the problem of making and executing policies that effectively target the poor groups. The answers to questions such as who benefits from public spending in education and health and who finances most of these spending are indispensable inputs to effective policies and pro-poor programmes. This is important especially with the economic upturn marking the period from 1995 to 2001 expected to trigger off changes on the environment under which families make decisions about children’s schooling.
and the health situation of the entire family. Furthermore, with the strive to reach the completion point of the heavily indebted poor countries initiatives (HIPC), feeding policy makers with useful information would be helpful to run the HIPC programme if finally granted and thus, avoiding to peter away any efforts at poverty alleviation. A major priority therefore for policy makers is to have an insight into how best domestic budget revenue should be mobilized in ways which minimized the tax burden on the poor, and maximize equity among income groups.

Tabi Atemnkeng (2003) aver that the indirect tax system could be a useful tool to promote equity in Cameroon. Neither the direct tax system nor the expenditure side of the budget are considered. The current analysis finds a complete fiscal incidence study to be more important. In an ideal world the distributional effects of public expenditures should not be analysed in isolation with the taxes used to finance those expenditures. A tax system may be highly regressive, so that raising taxes in order to finance increased public spending on education and health may lead to regressive changes in the overall distribution of income.

It is therefore important to crosscheck whether the services of public education and health as well as the entire taxation system are beneficial to the poor. A study on benefit incidence in the health sector exists in Cameroon (Kamgnia 2003). The distributive impact of spending on education, another vital input for poverty alleviation is lacking. Furthermore, a majority of the studies reviewed in the literature including Tabi Atemnkeng (2003) and Kamgnia (2003) which are both studies in Cameroon focused separately either on the distribution of tax burdens or the incidence of public spending. This study further examines the overall redistributive impact of fiscal policy on inequality and poverty in Cameroon. Nonetheless, we are aware of the fact that our component of public spending is limited to the health and education sectors. Numerous simplifying assumptions are also made and diverse data sources in the area of tax incidence are used. However, we are able to give a fair picture of
separate and combined fiscal incidence of Cameroon. Specifically, the study has examined the following:
  a) the progressivity of direct and indirect taxes and social spending on health and education;
  b) the extent to which taxes and social spending constitute targeted means for poverty reduction;
  c) the overall and separate redistributive and poverty impacts of the tax and transfer (education and health) systems.
  d) provide simulations on the impact of reforms on the tax and transfer system;
  e) propose policy measures for poverty alleviation.

2. INCOME POVERTY PROFILE IN CAMEROON

Cameroon’s welfare indicators have been moving closely to the level of income and economic growth. For over three decades since independence dating from 1960, the per capita income was at the highest level in 1984/85 and was as low as 249,000 CFA francs with the onset of the economic crisis and worsening fiscal situation in 1986. However, the situation seemed to have ameliorated between 1996 and 2001. In all, the per capita income estimated through per adult equivalent expenditure witnessed an increase of 14.8% for the past five years as from 1996. This gives an annual increase of 3%. Economic growth remained fragile since it could only support part of the increase in per capita spending. Generally speaking, households benefited from the economic growth experienced during the last five years from 1996. During this same period, urban households witnessed an annual increase in their average per adult equivalent spending of 4.1% as compared to 1.7% for rural households. Economic growth has therefore not benefited the entire population equally (DSCN 2002).

Cameroon’s poverty study as indicated by DSCN (1997, 2002) based on the 1996 and 2001 household surveys reveals that poverty affected an estimated
53.3% and 40.2% of Cameroonians respectively. The modification of the incidence of poverty, intensity of poverty and severity of poverty can be used to better appreciate the evolution of the monetary aspects of poverty. As observed in Table 1 below, overall, the incidence of poverty felt by about 13.1% while its depth reduced only by 5% with the greatest reduction occurring in the urban area. The general amelioration of the poverty situation by 13.1 points is more manifested in urban areas than in rural areas, that is, 19.3 points as against 9.7 respectively.

<table>
<thead>
<tr>
<th>Indicateurs</th>
<th>Milieu</th>
<th>1996</th>
<th>2001</th>
<th>Variations</th>
</tr>
</thead>
<tbody>
<tr>
<td>P0=incidence</td>
<td>Urban</td>
<td>41.4</td>
<td>22.1</td>
<td>-19.3</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>59.6</td>
<td>49.9</td>
<td>-9.7</td>
</tr>
<tr>
<td></td>
<td>Cameroon</td>
<td>53.3</td>
<td>40.2</td>
<td>-13.1</td>
</tr>
<tr>
<td>P1=intensity</td>
<td>Urban</td>
<td>14.7</td>
<td>6.3</td>
<td>-8.4</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>21.5</td>
<td>18.3</td>
<td>-3.2</td>
</tr>
<tr>
<td></td>
<td>Cameroon</td>
<td>19.1</td>
<td>14.1</td>
<td>-5.0</td>
</tr>
<tr>
<td>P2=severity</td>
<td>Urban</td>
<td>6.9</td>
<td>2.7</td>
<td>-4.2</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>10.1</td>
<td>9.3</td>
<td>-0.8</td>
</tr>
<tr>
<td></td>
<td>Cameroon</td>
<td>9.0</td>
<td>7.0</td>
<td>-2.0</td>
</tr>
</tbody>
</table>


The intensity or gravity of poverty that shows the gap between the average income of the poor and the poverty line witnessed a drop from 19.1% to 14.1%. In general, the monetary deficit of the poor reduced by 26.2% in five years and it is in urban areas that this reduction in gap is wider or more significant. Within the poor, the poverty phenomenon is less severe in 2001 than in 1996 due to the amelioration of the inequality between the poor. The incomes of the poor are less dispersed with respect to the poverty line in 2001 than in 1996. Severity or gravity of poverty as it is called; p2 was 9% in 1996 as compared to 7.0% in 2001. However, the amelioration of the gap between the poor was most felt in rural than in urban areas.

Inequality in the distribution of income remained high. There are more income disparities between individuals in 2001 than in 1996. This situation is confirmed by the Gini index that shows that in 2001, the distribution of the incomes was more unequal than in 1996. In 1996, the overall index was 0.406 as against 0.408 in 2001 revealing that inequalities persist instead of wiping out
getting severe for the rural areas and the male population (see Table 2 below). Thus, despite several measures undertaken within the auspices of the structural adjustment programme initiated in the 1987/88 Budget, more effort is needed to further reduce poverty and inequality especially in the rural areas.

Table 2: Evolution of the Gini Index between 1996 and 2001 according to some variables

<table>
<thead>
<tr>
<th>Variable in question</th>
<th>Modalities of the variable in question</th>
<th>1996</th>
<th>2001</th>
<th>Variations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milieu of residence</td>
<td>Urban</td>
<td>0.449</td>
<td>0.406</td>
<td>-0.043</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>0.345</td>
<td>0.369</td>
<td>0.024</td>
</tr>
<tr>
<td>Sex</td>
<td>Male</td>
<td>0.402</td>
<td>0.407</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>0.424</td>
<td>0.412</td>
<td>-0.012</td>
</tr>
<tr>
<td>Stratum</td>
<td>Yaoundé</td>
<td>0.487</td>
<td>0.433</td>
<td>-0.054</td>
</tr>
<tr>
<td></td>
<td>Douala</td>
<td>0.485</td>
<td>0.410</td>
<td>-0.075</td>
</tr>
<tr>
<td></td>
<td>Other cities</td>
<td>0.397</td>
<td>0.378</td>
<td>-0.019</td>
</tr>
<tr>
<td></td>
<td>Rural (Forest)</td>
<td>0.287</td>
<td>0.377</td>
<td>0.090</td>
</tr>
<tr>
<td></td>
<td>Rural (High lands)</td>
<td>0.346</td>
<td>0.398</td>
<td>0.052</td>
</tr>
<tr>
<td></td>
<td>Rural (Savannah)</td>
<td>0.354</td>
<td>0.330</td>
<td>-0.024</td>
</tr>
<tr>
<td>Employment status</td>
<td>Employed</td>
<td>0.403</td>
<td>0.410</td>
<td>0.007</td>
</tr>
<tr>
<td></td>
<td>Unemployed</td>
<td>0.424</td>
<td>0.376</td>
<td>-0.048</td>
</tr>
<tr>
<td></td>
<td>Inactive</td>
<td>0.423</td>
<td>0.395</td>
<td>-0.028</td>
</tr>
<tr>
<td>CAMEROON</td>
<td></td>
<td>0.406</td>
<td>0.408</td>
<td>0.002</td>
</tr>
</tbody>
</table>

Sources: DSCN (2002)

3. THE BUDGET AND FISCAL ADJUSTMENTS IN CAMEROON

The budget, in terms of taxation and public spending is a vital instrument in the provision of public goods and services and poverty alleviation. In Cameroon, from the 1960s extending to 1986, the government was able to meet its revenue needs as well as the objective of providing social services to the population in a less predatory manner. However, with the onset of the economics crises in the mid-80s, severe budgetary cuts was enforced which affected the allocation of total expenditure on the different sectors with differing trends. Between the mid-80s and the early 90s, the social sector-education and health (particularly education) gradually increased its share of expenditure in the total budget reaching a peak of 17% in 1991, with a serious decline in 1992. The health sector maintained a constant share of 4% whereas
the other components witnessed negative growth. Over the same periods, total tax revenue increased gradually averaging 80% as a share of total revenue with a peak in 1986 declining sharply and averaging 60% (Amin, 1998).

The main types of taxes that account for the bulk of tax receipts are taxes on income and profits and indirect taxes such as taxes on goods and services and international trade. With respect to revenue contribution of each tax, taxes from trade constitute the most important source of tax revenue topped by import duties. While export tax ranged from 5% in the late 1960s to 0.3% in the early 1990s, import taxes were as high as 30% in the early 1960s and as low as 1.5% in the early 1990s (Amin, 1998). In fiscal years 1990 to 2000 international trade taxes accounted for about 25% of total revenue. Ranking second are taxes on goods and services such as turnover tax, value added tax (VAT), excise taxes and tax on sales of petroleum products that entirely represented about 20% of total revenue. Income tax that ranks third in terms of revenue contributed less than 15% of total revenue over the same period. A series of adjustment programmes alongside fiscal reforms were put in place as from the 1987/88 budget aimed at reshaping the economy. Major tax reforms were initiated between 1994 and 2003\(^1\). Budgetary cuts became more severe in 1993 with drastic salary cut. Despite the reforms, total tax revenue maintained a constant trend of an average of 60% in the late 90s as further shown by the evolution of key tax indicators presented in Table 3 below.

\(^1\) The indirect tax structure experienced some modification with the institution of a Common External Tariff for the Central African Monetary and Economic Community sub-region. Sales tax was gradually replaced by a value added tax as from January 1999. Export taxes on several basic cash crops were abolished as from July 1998. This effect could be observed in table 3 by the declining trend in foreign trade taxes. Finally, a recent reform was on the personal income tax which formally consisted of a proportional tax and a graduated surtax, merge into a unique personal income tax with progressive rates as from January 2004 (See Tabi Atemnkeng et al., 2004 for details on tax reforms).
Table 3: Central Government Domestic Revenue (percentage share of total domestic revenue)

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Income tax</td>
<td>10.5</td>
<td>12.8</td>
<td>15.3</td>
<td>11.7</td>
<td>13.9</td>
</tr>
<tr>
<td>Excise taxes</td>
<td>2.4</td>
<td>2.6</td>
<td>2.6</td>
<td>2</td>
<td>2.2</td>
</tr>
<tr>
<td>Petroleum revenue</td>
<td>26.6</td>
<td>24.1</td>
<td>15.2</td>
<td>26.1</td>
<td>33.6</td>
</tr>
<tr>
<td>Sales/Value added tax</td>
<td>10.7</td>
<td>11.4</td>
<td>14.6</td>
<td>13.6</td>
<td>15</td>
</tr>
<tr>
<td>Taxes on sales of petroleum products</td>
<td>7.6</td>
<td>6.9</td>
<td>7.3</td>
<td>4.8</td>
<td>4.9</td>
</tr>
<tr>
<td>Other</td>
<td>6</td>
<td>5.4</td>
<td>8.8</td>
<td>7.2</td>
<td>7.3</td>
</tr>
<tr>
<td>Foreign trade taxes</td>
<td>26.2</td>
<td>29.1</td>
<td>27</td>
<td>19.6</td>
<td>20.1</td>
</tr>
<tr>
<td>Total tax revenue</td>
<td>63.4</td>
<td>68.2</td>
<td>75.6</td>
<td>66.3</td>
<td>63.4</td>
</tr>
<tr>
<td>Total non-tax revenue</td>
<td>12.1</td>
<td>9.4</td>
<td>9.3</td>
<td>17.4</td>
<td>4.6</td>
</tr>
<tr>
<td>Total revenue</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Nominal GDP at market prices</td>
<td>5017.4</td>
<td>5435</td>
<td>5709</td>
<td>6312.3</td>
<td>6587</td>
</tr>
<tr>
<td>Total tax revenue as share of GDP at market prices</td>
<td>10.4</td>
<td>11.1</td>
<td>11.6</td>
<td>11.8</td>
<td>12.2</td>
</tr>
<tr>
<td>Total revenue as share of nominal GDP</td>
<td>15.3</td>
<td>15.6</td>
<td>15.4</td>
<td>19.7</td>
<td>19.8</td>
</tr>
</tbody>
</table>

Source: Adopted and arranged from Reports of the National Council of Credit (BEAC) Cameroon and from www.impots.gov.cm

Furthermore, spending on the social sectors and on infrastructure indicated positive trends as observed in Table 4.

Table 4: Shares of Public Spending on Key Social Sectors

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>18.1</td>
<td>16.4</td>
<td>17.9</td>
<td>18.1</td>
<td>18</td>
<td>23.1</td>
</tr>
<tr>
<td>Health</td>
<td>4.7</td>
<td>4.7</td>
<td>5.6</td>
<td>5.6</td>
<td>5.3</td>
<td>6.6</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>7.6</td>
<td>11.4</td>
<td>12.2</td>
<td>10.9</td>
<td>9.9</td>
<td>11</td>
</tr>
<tr>
<td>Social Development and employment</td>
<td>1.1</td>
<td>1.0</td>
<td>0.7</td>
<td>0.9</td>
<td>0.9</td>
<td>1.0</td>
</tr>
<tr>
<td>Rural sector</td>
<td>4.3</td>
<td>4.2</td>
<td>4.5</td>
<td>4.5</td>
<td>3.9</td>
<td>4.3</td>
</tr>
</tbody>
</table>

Source: The Cameroon PRSP Draft, 2002

However, these positive trends were not substantial relative to those obtained between the mid-80s and the early 90s, particularly for education and health. Nevertheless, as a whole budgetary achievements were remarkable at the close of the 90s with increasing tax revenue that moved to 12.2% of GDP in 2001 as shown in Table 3. An overall performance was obtained thanks to the enhancement of the efficiency of financial services (customs, tax and treasury
departments) and to the smooth introduction of VAT in 1999 that projected the Sales/VAT taxes from 11.6% to 14.6% of total revenue in 2001.

4. AN OVERVIEW OF FISCAL INCIDENCE STUDIES

There is a continuous interest in economics in measuring the distributional impact of the public sector’s budget. This concerns studies of tax and benefit incidence that both compute and allocate tax burdens to different income groups or impute subsidies to individuals or households identified as users of a public service. Most tax incidence studies compute tax burden on the bases of annual data for income sources and expenditure patterns and also on the basis of several assumptions concerning how the different taxes are shifted to households either because they are consumers (for indirect taxes) or owners of factors of production for direct taxes.

Others have use the input-output table (Rajemison and Younger, 2000) to take into account the nature of production in the economy in order to understand the incidence of consumption taxes while some use a computable general equilibrium model pioneered by Harberger (1962) with the consequent increase in complexity and cost. For the later, tax incidence is established by comparing the vector of equilibrium prices before and after the tax change. This may be done in the context of ‘differential’ tax incidence where one tax is substituted for another while keeping government expenditures constant or in the context of ‘absolute’ tax incidence where a tax is introduced holding government expenditures constant. In this case, the additional revenue collected by the government may be rebated to taxpayers in a lump sum fashion.² On the other hand, two broad approaches have been widely used in the estimation of public expenditure incidence³. The first, based on the Aaron and McGuire (1970) methodology emphasizes the individual's own valuation of the good (i.e., the demand, or virtual price). There are difficulties inherent in estimating these valuations (as reviewed by Cornes, 1995) and this has called for less

² See McLure (1975) and Bovenberg (1987) for application and expansion of Harberger’s model
³ See Van de Walle (1998) and Demery (2000) for two excellent and complete reviews of the issues.
demanding approaches, in which publicly-provided goods and services are valued at their marginal cost (Brennan, 1976). This second approach is called benefit incidence analysis. It combines the cost of providing public services with information on their use to show how the benefits of government spending are distributed across the population.

However, in all the existing studies reviewed below, little or none has simultaneously analysed tax and benefit incidence, simply known as net fiscal incidence nor actually relate poverty indices to fiscal impact. This development is considered in this study. Net fiscal incidence is the difference between the benefits an individual receives from consuming government goods and services and the loss in consumption arising from bearing a certain tax burden. In other words, net fiscal incidence is the appropriate measure of the distributional impact of a government’s tax and expenditure policy. The only study on net fiscal incidence in a developing country is by Deverajan and Hossain (1998) for Philippines. They use a multi-sector, computable general equilibrium model to estimate the incidence of taxes and benefit incidence to determine the redistribution of spending on education, health and infrastructure. This study differs as it uses progressivity measures instead of comparing the share of each income docile with its share of taxes net of transfer. This is useful in indicating the degree of progressivity for comparison over time and space. Secondly, we initiate a measure for the fiscal-poverty link. However, the data demanding nature of net fiscal incidence analysis could explain why the literature remains scarce. Despite the non-availability of income data in our survey, we make use of the household income generated by the National Statistics Office to compute household income tax.

4.1 Tax Incidence

There is a considerable list of studies in the literature of tax incidence analyses with empirical estimates extending far back for over half a century. In
this paper, we present a review of the incidence results obtained in some recent studies and provide a summary of the general trends in their findings.

Four recent studies that describe the extent to which the tax system succeeds in transferring resources to the poor in African countries are: Uganda (Chen et al., 2001), Madagascar (Younger et al., 1999), Ghana (Younger 1996). Sahn and younger (1998) carried out some analysis in seven African countries; South Africa, Tanzania, Cote d’Ivoire, Guinea including the other countries mentioned above. In a more recent case in Cameroon, preliminary results indicate quite similar results (Tabi Atemnkeng, 2004) to those above. The tax system of the countries is found to be progressive or mildly progressive except taxes on kerosene and export duties, which are regressive. However, in Cameroon the progressivity of consumption taxes that were the centre of preoccupation in the study was reinforced following the tax and custom reforms in 1994.

Other studies on tax incidence recently undertaken in Latin America also produce the same over all conclusion of progressivity or mild progressivity of the tax systems, as in the case of Guatemala (Bahl et al., 1996) and Mexico (Martinez-Vazquez, 2001). Several others reviewed in Shah and Whaley (1991) also find a broadly progressive overall incidence pattern with an exception of Wasylenko (1986) who found an inverted U-shape incidence pattern (where income is redistributed from the middle income groups to the poor and the rich) in Jamaica.

In developed countries especially between the 1950s and 80s, Atkinson and Stiglitz (1980) review results of similar studies with the incidence of taxation being roughly proportional over a wide range of incomes. In OECD countries, Messere (1997) recently find generally proportional or mildly progressive patterns where governments had always taken steps to main proportionality or mild progressivity of the entire tax system. However, as reported in Bird and De Wulf (1973), the findings on overall progressive tax incidence over the last two decades contrast with those found in earlier studies.
Of the 24 tax incidence studies these authors reviewed for Latin America, only four were to have found some degree of progressivity in the tax systems. Thus, it may be that the move toward progressivity in more recent times has been due to changes in tax policies or reforms (Tabi Atemnkeng, 2003).

4.2 Expenditure Incidence

A number of studies have employed the unit cost approach to determine the benefit of either education or health spending (see for example, Selden and Wasylenko 1992; Meerman 1979; Selowsky 1979; Demery, Dayton and Mehra, 1996, Castro-Leal et al., 2000; Demery 2000, Chu et al., 2000). However, some others use the behavioural to study the benefit of education (Gertler and Glewwe, 1990) whereas Younger (1999) uses a combination of benefit and behavioural approaches, to examine the incidence impact of education and health expenditures.

From this brief review of the empirical literature on the incidence of public expenditures in developing countries, Martinez-Vazquez (2001) and Chu et al., (2000) noted some identical patterns. Incidence studies of public expenditures only cover a share of government total expenditures mostly focusing on education, health and basic utilities. In the majority of cases, overall public spending in each of the areas of education, health and transfer payments was found to be progressive, but it was often poorly targeted, most often in sub-Saharan Africa. Health spending was found to be progressive in all cases, but well targeted in only over a half. Targeting was poorest in transition countries and sub-Saharan Africa, the latter fact consistent with the findings reported by Castro-Leal et al. (2000), who survey several African countries. This does not distinguish levels of health care, because many of the studies reviewed do not. It may be that targeting is reasonably good for basic health care, but poorer for higher level health care facilities, however, a study in Ghana in 1991–92 somewhat surprisingly found that spending on health centres
and clinics is not any better targeted on the poor than spending on hospitals (Demery et al. 1996).

5.0 DATA AND METHODOLOGY

This study is based on data from the Cameroon’s Household survey (ECAM2) of 2001 compiled by the Department of Statistics and National Accounts and other relevant government information. The main data source, ECAM2 covers 11500 households and draws inspiration from the 1983/84 and 1996 household surveys which did not provide adequate information deemed necessary for poverty reduction (DSCN 2002). Information exists on household characteristics and expenditure sources and on their use of public goods such as education and health. On the expenditure items, the survey contains information on monetary and non-monetary expenditures on essential needs categorised under the following headings: foodstuff, drinks and tobacco; clothing and footwear; housing, water, electricity and other fuels; health and personal care; transport and communications; education, leisure spectacles and cultures. The ECAM 2 or 2001 survey does not contain complete information on income sources needed for direct tax incidence analysis. Household income tax generated by the National Statistics Office was used to determine the incidence of the tax. Nevertheless, taxes on non-agricultural family enterprises reported in the survey enabled us to examine the incidence of family business tax.

In examining the welfare impact of fiscal policy, we have used household expenditures (per capita or per equivalent adult) as a proxy for permanent income. The raison d’être is that households tend to report their expenditures more accurately than they report their incomes. They are more inclined to hide incomes than expenditure (from the enumerator and from family members). Likewise, it enables us to easily compare the progressivity of taxes and public expenditures using a common money-metric of utility, and as a welfare indicator, households could be ranked and inequality level measured. The benefits of public spending are valued using the monetary welfare metric
method and various indirect taxes have been computed following the tax laws and system in the country.

5.1 Models of Tax Incidence

The basic methodology behind conventional models of tax incidence is to allocate tax burdens to different income groups, ordered from rich to poor by deciles or quintiles of the population. Tax incidence is the analysis of who ultimately bears the burden of government taxes in the economy. A tax normally transfers real purchasing power from households to the government. Generally, there can be large differences between who the law says is obligated to pay taxes and who ultimately in the economy bears the burdens of taxes or whose real purchasing power falls in the course of government imposition. For instance, governments in developing countries collect most taxes from firms, but the firms do not suffer reductions in their purchasing power. Either the households that own them do, or the firm shifts the tax to its customers through changes in its prices especially in cases where the firm is highly competitive or have an inelastic demand for its products. On the other hand, a tax on firms’ profits probably falls mostly on firms’ owners.

Thus, tax incidence studies determine economic rather than statutory incidence (which refers to those taxpayers that are by law required to pay the tax. In this light, tax incidence studies often adopt a number of assumptions, which permit the shifting process of tax burdens from the legal payer to the person whose real purchasing power is finally affected. To arrive at an estimate of the incidence for the entire tax system, effective calculation of average tax rates by level of expenditure or income is done separately for each income group. In the simplest of cases, where taxes are collected according to the letter of the law, this calculation is straightforward for advalorem taxes. The tax paid is just the tax rate times the pre-tax value of expenditures given as:

\[ T_{ij} = t_j p_{ij} x_{ij} = \left( \frac{t_j}{1 + t_j} \right) \text{ex} \ p_{ij} \]  

(5.1)
where $T_{ij}$ is household $i$’s total loss in purchasing power for a tax on good $j$; $p_j x_{ij}$ is household $i$’s pre-tax amount of expenditure on good $j$; $t_j$ is the advalorem tax rate; and $exp_{ij}$ is the post-tax amount of expenditure on good $j$. The fact that $T_{ij}$ is proportional to $exp_{ij}$, the expenditure that is reported in a household survey, is a convenient assumption. Almost uniformly, markets are assumed to be competitive so that buyers bear the burden of all consumption taxes (see Sahn and Younger, 2004 for a review of other studies). Appendix A provides the procedures and application peculiar to Cameroon where in the various equations $C_{exp}$ (CIF or Dv) represent the post-tax (pre-tax) amounts of expenditure. For direct taxes, the factors that produce the incomes pay the associated taxes$^4$. For indirect taxes the general assumption underlying the estimates is that consumers bear the entire burden according to the share of consumption of the taxed goods and services. Thus, smokers pay taxes on tobacco and households that use kerosene as fuel or for lamps pay the taxes on kerosene. For gasoline (petrol and diesel) taxes, no one doubts that the direct consumption of gasoline is highly concentrated among rich households, yet critics of this tax argue that the secondary impact of such a tax is regressive because an increase in the price of gasoline cause increases in other prices such as public transport, on which poor households depend more than rich homes. Therefore, a tax on gasoline falls on direct consumers of gasoline and on users of public transportation services$^5$. Import duties are more difficult to capture from a household survey, given that there is no differentiation between imported and domestically produced consumer goods. In this line, the prices of all goods for which imports are a large share of the markets are assumed to go

$^4$The direct or income tax in Cameroon has two essential components, the personal income tax and the company tax. The former include taxes on salary and wages, income from non-agricultural enterprises and earnings from securities or financial assets. We adopted the household income tax data on generated by National Statistics Office. Taxes on income from business or non-agricultural family enterprises are reported in the survey (question 22, section 11) and are assumed to be very reliable as households tend to report their expenses more accurately than they do for income declaration.

$^5$ This effect is only partial, because it does not include the effects through transport as an intermediate product. Rather than use only households’ demand in an indirect tax analysis in Madagascar Rajemison and Younger (2000) employ an input-output table to final consumers but found similar results with Younger et al., (1999) using the same data.
up by the amount of the tariff when it is levied. Finally, most of the analysis relies on statutory tax rates rather than any estimates of taxes actually paid. Thus, we are aware of the fact that assumptions and measurement differences in tax incidence may occur depending on the environment as well as particular institutional issues such as purchases from the informal sector, smuggling and corruption etc.

5.2 Estimating the value of public Spending: Standard Benefit Incidence

In order to examine whether public services target the poor in the redistribution, benefit incidence is used to quantify the incidence on households. Standard benefit incidence will be used to determine the average rate of participation (and as well the probability of access) in health services or attendance in schools. On the other hand, the value for a service is got using the unit cost subsidy approach. Standard benefit incidence informs us who is benefiting from public services, and describes the welfare impact on different groups of people or individual households of government spending. The unit cost method usually uses the government’s cost of provision (obtained usually from government or service-provider data) with information on the use of these services (usually obtained from the households themselves through a sample survey) to impute or estimate a service’s value to users. This imputation is the amount by which household income would have to decrease if it had to pay for the service used. Usually, the total budget spent on the public service is divided by the estimated number of people in the country who use that service. However, the cost measures may not be a good enough approximation of true benefits. Further, unit costs may reflect inefficiencies in public service provision and may not capture possible differences in the quality of services in rich urban areas and in poor rural areas nor take into consideration long-term benefits (for example, basic education or immunization services).
Taking the example of government spending on education (the analysis of spending on health follows the same approach), this can be formally written as:

\[
B_j = \sum_{i=1}^{3} E_{ij} \frac{S_i}{E_i} = \sum_{i=1}^{3} \frac{E_{ij}}{E_i} S_i
\]

(5.2)

where \( B_j \) is the amount of the education subsidy that benefits group \( j \), \( S \) and \( E \) refer respectively to the government education subsidy and the number of public school enrolments, and the subscript \( i \) denotes the level of education (three levels are specified in (5.1) –primary, secondary and tertiary). The benefit incidence of total spending on education imputed to group \( j \) is given by the number of primary enrolments from group \( (E_{pj}) \) times the average cost of primary school place, plus the number of secondary enrolments times the secondary average cost, plus the number of tertiary enrolments times the average or unit cost of the tertiary education\(^6\). Note that \( S_i/E_i \) is the mean unit subsidy of an enrolment at education level \( i \). Moreover, the share of total spending on education imputed to group \( j \) \((b_j)\) is:

\[
b_j = \sum_{i=1}^{3} \frac{E_{ij}}{E_i} \left( \frac{S_i}{S} \right) = \sum_{i=1}^{3} e_{ij} S_i
\]

(5.3)

with \( e_{ij} \) defining the share of the group in total enrolments (or service use, i.e. health consultations in the case of health care) at each level of education. The \( s_i \) is the shares of public spending across the different types of service, which reflects government behaviour. In some cases, regional and other (ethnic) variations in subsidies are also taken into account calling for an additional subscript to denote the region specified in the unit cost estimate.

But there are both theoretical and practical reasons to doubt this practice (van de Walle 1998; Sahn and Younger 1998, 2000). Given the poor quality of most public expenditure data as well as drawing on budgets at highly aggregated level, the binary approach proposed by Sahn and Younger (1998,

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\(^6\) For health care facilities, we identify five levels including clinics and dispensaries or health centres, medical centres, district hospitals, provincial hospitals and reference and specialty hospitals.
2000) is used to further and support the analysis\textsuperscript{7}. This bypass the need for estimating the unit subsidy, and focus only on whether a service is used or not with users of public services counted and given the benefit of one, while non-users get zero. In equation (5.3) then, the $s_i$'s are set to unity. Once this is done according to group sample based on per capita expenditure or per adult equivalent, divide each individual’s or household’s benefits by the total to get his or her share of benefit (i.e. $e_{ij}$). In our study, we consider the total as the entire schooling population at various levels or all patients who either attended public or private health units. Dividing the number of users of public services by these numbers gives the distribution of benefit or the average participation rate in either health or education. The results obtained provide a completely different interpretation (see Table B-6).

Standard benefit incidence therefore uses group average to estimate the distribution of benefits. Despite its popularity, recent research has pointed out many other limitations (Van de Walle 1998; Lanjouw and Ravallion 1999). Among the most common criticisms of standard benefit incidence is that the measure does not yield the distributional consequences of a marginal policy change that distributes benefits to existing users in proportion to their benefit. In response to the preceding observation, several recent studies (reviewed by Younger, 2003) have proposed alternative methodology known as the “behavioural” approach used in benefit incidence which consists of a variety of methods for analysing the marginal benefit incidence of policy changes. This method further allows the estimation of incidence for public spending for which specific users cannot be identified and incorporates individual behavioural responses thereby providing concrete guidance for policy reform. Another advantage that this method provides is the possibility to estimate, econometrically, compensating and equivalent variations or the willingness to pay for price and other policy change. Similarly, demand functions for health

\textsuperscript{7} Though results are not reported the two approaches show insignificant differences in terms of progressivity of social services
care and education have been determined by a host of other studies. Younger (2003) noted that despite the fact that all the methods claim to measure “marginal” incidence, they do not measure the same thing nor are they intended to do so. Further arguing, he says there are many possible policy changes and thus many margins of interest and each method captures one of these and so is of interest for some analyses and inappropriate for others.

The problems with these approaches are that the comparability of results is quite limited since the prices (i.e. fees and other private expenses incurred) used, generally imputed from costs of travel, queuing, etc., are high and may seldom be met in reality, or that either the services are free or money prices are difficult to measure accurately. Furthermore the willingness to pay for services as expressed by the head of the household may have little to do with the private benefits children receive from education or health care and lastly the model also suffers a series of econometric problems in the case where the non exogeneity of policy measures renders the coefficients of the model biased etc. Finally, though standard benefit incidence has loopholes, the behavioural approach also has its own demerits. According to Younger (1999), for policymakers who are primarily interested in ranking the progressivity of benefits associated with various categories of public expenditure, or whether a service is progressive, available evidence indicates that little value is added in going beyond the simplest approach that assesses who makes use of what service. “In that sense the standard method is supported as long as it is interpreted correctly. In particular, expanded access to services, rather than changes in fees, is often what policymakers have in mind when considering increased spending on a public service”.

5.3 Dominance Testing

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8 Paul Gertler and his associates considered as pioneers in this area have applied these techniques to the demand for health and education in developing countries (Gertler at al., 1987, Gertler and Glewwe 1990).
After assessing the tax and benefit incidences, the next step are to check the progressivity against two benchmarks: whether they are progressive, i.e., inequality reducing relative to our welfare benchmark. This is to assure whether they are per capita progressive implying that those at the lower (upper) end of the income distribution receive (pay) at least an equal level of benefits (taxes) as upper (lower) income individuals. One of the most widely used methods in doing so is known as “Welfare dominance”.

The methodology, developed by Yitzhaki and Slemrod (1991) uses concentration curves. Yitzhaki and Slemrod then proved that, in this model, for any social welfare function favouring equitable distribution of income, a marginal (reduction) increase in one transfer (tax), $y$, followed by a marginal (increase) reduction in another transfer (tax), $z$, which keep the tax revenue constant, will improve social welfare if the $y$’s concentration curve is everywhere above (below) $z$’s curve. Explicitly, if poorer households tend to receive (pay) more of the benefits (taxes) associated with a particular type of social sector expenditure (revenue measure), say primary education (kerosene taxes), and less of another, say, secondary education (gasoline taxes), then reducing (increasing) expenditures (taxes) on the later to pay for the former will improve the distribution of welfare. They refer to this as welfare dominance because of the analogy with the concept of second order stochastic dominance in the finance literature.

In as much as the concentration curves for different types of social services and categories of taxes are compared, each of the curves is also compared to two benchmarks: the Lorenz curve for per capita expenditures, $L_X(p)$ and the 45-degree line (see figures 1 to 3). Expenditure (tax) is progressive if it benefits (taxes) poorer households more (less) than wealthy ones, relative to their income, and regressive if it does not. Following tax redistribution (TR) approach (Duclos and Araar, 2004), a tax $T$ is said to be

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9 These are curves similar to the Lorenz curve, which is a graphical representation of inequality. In this analysis, households are ranked from poorest to wealthiest along the horizontal axis and the cumulative share of taxes (benefits) paid (received) along the vertical axis.
TR-progressive if its concentration curve, $C_T(p)$ lies everywhere below the Lorenz curve, $L_X(p)$. Of two taxation schemes, the more TR-progressive one is that whose concentration curve is the lowest. Whereas, a benefit $B$ is TR-progressive if its concentration curve, $C_B(p)$ lies everywhere above the Lorenz curve, $L_X(p)$\(^\text{10}\). Of two benefits the more TR-progressive one is that whose concentration curve is the highest and is per capita progressive if it is above the 45-degree line (i.e. benefits go disproportionately to the poor in absolute terms). However, the conditions for welfare dominance are satisfied only when concentration curves do not intersect.

The dominance test may often be inconclusive in terms of providing information on the relative progressivity of different types of public expenditure (taxes) because of the requirement that each of the concentration curve for public expenditure (taxes) must be above (below) the other everywhere along the income distribution. In this case, we make use of a second approach to draw conclusions about welfare evaluation and incidence analysis- the cardinal measure of welfare. We summarize progressivity as well as the redistributive effect of taxes and transfers into inequality indices. Though several options of inequality indexes exist and can be used, the most common is the Gini coefficient. Yitzhaki (1983), for example provides a framework for analysing welfare dominance by using extended Gini coefficients. These allow for adjustments in the social weights given to various households, and provide a clearer notion of how alternative social welfare functions differ with expenditure or tax regimes. The formula for the coefficient is given as:

$$G(v) = -v \text{COV}[e \left(1 - F(e) \right)^{v-1}]$$  \hspace{1cm} (5.4)

\(^{10}\)An alternative way to check for progressivity of taxes, $T$ or benefits, $B$ is the Income-Redistributive (IR) approach. For instance, a tax $T_1$ or benefit, $B_1$ is more IR-progressive than $T_2$ or $B_2$ respectively, if $C_{X-T_1}(p) > C_{X-T_2}(p)$ and $C_{X+B_1}(p) > C_{X+B_2}(p)$. Generally, $X-T$ or $X+B$ are post-tax or transfer incomes or net incomes for short and thus the expressions above represent the concentration curves of net income.
Where \( v \) is a parameter that affects the weighting of the points on the concentration curve, \( F(e) \) is cumulative receipt (payment) of the social service (tax), and \( e \) measures the household’s receipt (payment) of the particular social service (tax)\(^{11}\). When \( v=2 \), \( G(2) \) yields the traditional Gini coefficient, while higher values of \( v \) would give more weights to poorer households. Statistically, one benefit is deemed more progressive than another if its concentration coefficient is significantly lower than the former at each of these values. A negative concentration coefficient or extended Gini implies the particular benefit from government spending on the service is propoor, an indication that the benefit disproportionately go to the bottom quintile in absolute terms and relative to their share of population, i.e. it is per capita progressive (see Table B-6). On the other hand, when the Gini coefficient for a given tax is greater than the Gini coefficient of per capita expenditure, then the particular tax is considered to be progressive.

However, with the DAD software, one can easily compute progressivity indices as differences between S-Gini indices of inequality, \( G_X(\rho) \) and concentration, \( IC_{T/B}(\rho) \) for the tax and or transfer system respectively. With \( \rho=2 \), the indices correspond to the traditional Gini as earlier mentioned. Kakwani (1977) provides a progressivity measure defined in terms the elasticity of the tax function \( T(X) \) with respect to income \( X \). Using the Lorenz, \( L_X(p) \) and concentration, \( C_{T/B}(p) \) curves, a proportional tax or transfer will mean a merging of the two curves while progressivity is measured by the distance between the them. The Kakwani indexes for the tax/transfer or net tax system are given as:

\[
KK_{(r)} = IC_{r} - G_{X} ; \quad KK_{(b)} = G_{X} - IC_{X} ; \quad KK_{(r-b)} = IC_{r-b} - G_{X} \quad (5.5)
\]

We suppose that \( T^*=T-B \) is tax net of transfers. The expressions in equation (5.5) coincide with the TR approach and the Kakwani index will be positive if both the tax and benefit are progressive (see Tables B-4 and B-5).

\(^{11}\) With the binary approach, a receipt of benefits is the unit value or proportion of household members who make use of a particular public service in relation to entire users of both the public and private service.
The redistributive impact of the combined tax and transfer system may be judged by the degree to which it reduces the Gini measure of inequality when moving from pre-tax and or pre-transfer to post-tax/transfer total household expenditure. In the case of the distribution of pre-tax/transfer expenditure, \( X \), the Gini measure, \( G_x \), is expressed in terms of the following covariance\(^{12}\):

\[
G_x = 2 \cdot \text{cov}(x, F(x))
\]  

(5.6)

where \( F(x) \) is the distribution function of household expenditure, so that \( F(x) \) represents the proportion of individuals with expenditure less than or equal to \( x \), and \( \bar{x} \) is the arithmetic mean of pre-tax /transfer expenditure. Suppose that net or post-tax/transfer expenditure, \( n \) is given by

\[ n = x - T^*(x) \]  

(5.7)

where \( T^*(x) \) is tax net of transfer or net tax for short\(^{13}\). The redistributive effect of the combined tax and transfer system is the difference between the two Gini measures, \( L \), so that:

\[ L = G_x - G_n \]  

(5.8)

This is referred to as the Reynolds-Smolensky measure of income redistribution progressivity. A (negative) positive value of \( L \) indicates that the combined tax and transfer system is inequality (increasing) reducing (see Table B-2)\(^{14}\).

We compare also the progressivity of the education and health subsidies as well as the overall subsidy and taxes respectively. For the former, health is more TR-progressive than education if its concentration curve is above that of education (see figure 4). Using Income-redistribution (IR) approach, aggregate benefit, \( B \) (i.e. education plus health subsidies), is more IR-progressive than aggregate indirect taxes if the concentration curve of post-transfer income,

\(^{12}\) For more on such covariance expression, see Jenkins (1988)

\(^{13}\) Letting \( X \) and \( N \) be gross and net incomes respectively, with \( T \) as taxes and \( B \) as transfers, then net tax is \( T^* = T - B \). Gross income is pre-tax and /or pre-transfer income, and net income is post-tax/transfer income. From sample data, algebraically \( N = \text{total expenditure} (X) - T \) or \( X - T + B \).

\(^{14}\) We also compute the redistributive effect of the direct and indirect tax systems respectively with net income given as \( N_1 = X - T \) and for the benefit system for \( N_2 = X + B \) separately.
Another objective of this paper has been to make simulations on the impact of reforms on the tax and transfer system. This involves an estimation of the expected relationship between variables representing the second most important sphere of recent applications of kernel estimation techniques (Duclos and Araar 2004). In this case, we estimate the relationship between the average and marginal rates of taxation and transfer on gross income. We expect a part of tax to be a function of the value of gross income \( X \), otherwise taxes would be lump sum and orthogonal to gross income. Thus, one can think of a tax \( T \) or a benefit, \( B \) as being a stochastic function of \( X \), with

\[
T = T(x) + u \quad \text{or} \quad B = B(x) + w
\]

(5.9)

where \( u \) and \( w \) are stochastic determinants. Non-parametric regressions like these ones enable one to predict expected level of taxes and benefits or their ratios at various gross income levels. Denoting the average rate of taxation or benefit at gross income \( X \) by \( t(X) \) or \( t(B) \), then \( t(X) = T(X)/X \) and \( t(B) = B(X)/X \). A tax (transfer) is progressive if the average rate of taxation (benefit) increases (decreases) with income (see figure 6). This result should coincide also with the marginal taxation/benefit rates (see figure 7).

Thus, we estimate the marginal taxation/benefit rates for final tax rates. For instance, recalling that \( T^* \) and \( X \) are tax net of transfers and income or expenditure respectively, then for the combined tax and transfer system, the marginal taxation rate is given as \( dT^*/dX \). A net tax (possibly including a transfer or subsidy) is said to be progressive if \( dT^*/dX \) increases with \( X \). This is the case with the marginal tax/benefit rate (see figures 7). Such simulation exercises are also made using the conditional standard deviation of taxes and benefits (see figure 8).

Lastly, one of the objectives of this study is to introduce the direct link between poverty indices and fiscal impact. We assess poverty using adult
equivalent pre and post incomes (expenditures) to get a clear image of the welfare impact of fiscal mechanism. This analysis is done for the net income given as $N = X - T$ or $N = X + B$ for the tax and transfer systems respectively and with the final net income of $N = X - T + B$ for the combined tax and benefit system. In all cases, fiscal intervention at the level of taxes, education plus health or the entire effect will (reduce) increase poverty if the FGT indexes\(^{15}\) (decrease) increase following the transition from pre-tax/transfer to post tax/transfer expenditures (see Table 3). However, like in benefit incidence the associated decline in poverty and even inequality or the reverse are immediate consequences that do not take into account related long-term benefits and externalities. These could occur in the form of life-long enhanced labour productivity or possible employment opportunities generated from spending on education and health, which are variants of human capital.

6. RESULTS

The fiscal system has now become one of the few and most important instruments available to the government of a poor country in fighting poverty. This concerns taxation and public spending on social services such as education and health. Like indirect taxation, which ranks over direct taxes, the relative share of government spending on education and health is significant (about 30 percent of total spending of the Central government in 2001). It is therefore essential to determine whether the poor pays much of the taxes or how well targeted the social services are towards the poor and how far they go in alleviating their plight. In this section, we present the results of the separate and

\(^{15}\) The Foster, Greer, and Thorbecke (1984) class of poverty indices takes the form:

$$P_\alpha = \frac{1}{n^*} \sum_{i=1}^{q} \left( \frac{z - y_i}{z} \right)^\alpha$$

where $y_i$ is adult equivalent consumption expenditures for those individuals below the poverty line, and zero for those above, $Z$ is the poverty line, $n^*$ the total population, and $q$ the number of poor people. The parameter $\alpha$, takes the value of zero for the headcount index ($P_0$), 1 for the poverty gap ($P_1$) and 2 for the squared poverty gap ($P_2$). We used an annual expenditure per adult equivalent of 232547 FCFA determined by DSCN (2002) as the poverty line.
combined incidence of tax and expenditure computed with the aid of DAD, software for distributive analysis developed by researchers in CREFA, Université Laval\textsuperscript{16}. We incorporate policy instruments as concerns tax and benefit system by linking each and both of the systems to poverty and inequality measures.

\section*{6.1 Tax incidence}

In this section, we present the impact of the taxation side of the budget on inequality. The survey as earlier mentioned does not contain information on income sources. The computation of a lump sum household personal income tax (e.g. on wages and salary and others) had been determined with the aid of an input-output table by the National Statistics Office whereas tax on non-agricultural family enterprises is reported in the survey.

Using the Kakwani measure, personal income taxes can be said to be generally progressive in Cameroon. However, while the lump sum household income tax indicates a slight regressivity, taxes from family businesses are more progressive (see Table B-4). The reason for the slight regressivity of the former could be linked to the old system. Until January 2004, the taxation of personal incomes in Cameroon included a proportional tax rate and a graduated surtax imposed on taxpayer’s annual net income consisting of about 11 income brackets and progressive rated ranging from 0\% to 60\%. The new personal income tax comprises solely, a unique progressive tax (rates) and one of the reasons for the reforms is government’s aim of rendering these taxes more progressive\textsuperscript{17}.

\begin{footnotesize}
\footnotesize
\begin{itemize}
\item \textsuperscript{16} Duclos, J.Y., Arrar, A. and Fortin, C. (2003), “DAD: Software for Distributive Analysis/Analyse Distributive”.
\item \textsuperscript{17} The new income tax regime places an upper bound to taxpayers at 52000 CFAF minimum wages. One of the components of the former tax- the graduated surtax adjusts payment in terms of the number of dependents and whereas family allowances are exempted from taxation. The new tax considers it as part of the gross taxable income. Lastly, for the taxation of financial asset, the new personal income tax places an upper limit to 10 million CFAF instead of the former 5 million CFAF on savings, an indication that poor households are exempted from such taxes.
\end{itemize}
\end{footnotesize}
For indirect tax incidence, based on Tables B-4 that provides the Kakawani indices on various kinds of indirect taxes and on the concentration curves presented in figure 1b, the current study to some extent provides strong optimistic results suggesting a strong and progressive indirect taxation. Most indirect taxes in Cameroon, including broad-based taxes such as VAT, commodity specific excises and import duties are progressive.

Other individual taxes such as taxes on the direct consumption of gasoline, special tax on petroleum products (TSSP) and excises are more progressive than import taxes and the VAT. Furthermore, since most gasoline is consumed as an intermediate input to other services, more especially transport, this indirect effect is captured by assuming that fuel accounts for about 18.5% of the cost of intercity and intracity transport (i.e. the average input-output coefficient for petroleum in the transport sector for three years having survey data). By assuming that part of the gasoline tax falls on users of public transport, progressivity measures for this tax as well as for the combined impact of direct purchase of gasoline and the indirect purchase through public transport were also computed. The results indicate that even the tax on public transport is progressive though not as progressive as the direct consumption of gasoline. Nevertheless, it should be noted that these services are concentrated among urban households.

The foregoing analysis does not lend support and contradict the view that higher gasoline taxation, an unpopular though increasingly common target for raising revenues in African countries, is regressive. Comparing various indirect taxes, whereas the VAT dominates import taxation, excises and taxes on gasoline and diesel consumption are highly progressive especially with the introduction of a special tax on petroleum products. The latter are judged preferable on efficiency grounds because of the negative externalities associated with them. Contrarily, tobacco excise is regressive in Cameroon as found in other studies e.g. Sahn and Younger (1998) and Tabi Atemnkeng (2003). Thus, our results indicate that both the direct and indirect tax structures
are mildly progressive. We also use expenditure per adult equivalent to rank households with results (not reported) indicating an improvement in progressivity.

Lastly, for the taxation system it was found that direct taxes (indirect taxes) generate for households an increase (a reduction) in inequality when moving from the distribution of expenditure net of indirect taxes (see Tables B-2). The increase in inequality is minimal when using expenditure per equivalent adult (results not reported)\(^{18}\). However, the entire system reduces inequality mostly in the semi-urban regions followed by the rural and urban areas respectively. Furthermore, the taxation structure causes a rise in poverty mostly in the urban areas followed by the semi-urban and rural areas (see Table B-3). Nevertheless, taxation results to a loss of household income and obviously is expected to take them below the poverty line. It could only reduce income gap or inequality. The expected poverty reducing impact of taxation comes via increased public spending and this put to question the efficiency of the budget.

**6.2 Benefit from social spending**

The concentration curves for social sector benefits (figures 2 to 4) can be helpful in showing how targeted and progressive subsidies are. However, where a curve crosses the Lorenz curve for expenditure, it is often difficult to judge its progressivity. The Kakwani and concentration indices are presented in Tables B-5 and B-6. A positive Kakwani index or a negative or lower concentration coefficient reveals that the subsidy is more propoor. Concentration curves lying above the expenditure line indicate that the subsidy is more equally distributed than income or expenditure. As a proportion of total income, poorer groups or lower quintiles gain more than the better off. By comparing the concentration curves with the 45° diagonal, targeting to poorer groups can be judged. Thus, if the curve lies above the diagonal, it means the poorest (say) quintile gains more

\(^{18}\) Creedy (2002) found that there is a possibility for a small decrease in inequality for some household types when the sample is divided according to demographic and socio-economic characteristics. This could be also possible with the poverty effects. Secondly, there is need to further the analyses by undertaken a decomposition of the redistributive effects into vertical, horizontal and reranking effects.
than 20% of the total subsidy (and the richest quintile, less than 20 percent). Such social services are said to be per capita progressive.

In Cameroon, the analyses indicate that primary education and some components of primary health facilities are well targeted and per capita progressive. Whereas secondary and tertiary education are poorly targeted, being below the diagonal, it is however difficult to judge the progressivity of the latter as it crosses the Lorenz curve. Nevertheless the Kakwani indices indicate that secondary schooling is more progressive than tertiary education, which is more regressive. Thus, at higher levels of education, progressivity declines. Lastly hospital care is poorly targeted as its curve lies between the diagonal and the Lorenz curve. On the whole, public health services are relatively evenly distributed than public education spending (see figure 4). The results on public health services are similar to those of Kamgnia (2003), where she concludes that as expected, the benefit from public spending in Cameroon is per capita progressive. She further noted that, although Reference hospitals receive the highest budget average share, the large number of peripheral health centres is such that the category gets the largest budget allocation. Consequently their common use by poor individuals leads to an equal distribution of the net transfer (Kamgnia 2003). Therefore, public health care is globally progressive in Cameroon, as found in other African countries by Castro-Leal et al (1999).

The distribution of benefits of social services over the milieu residence does not provide a balance pattern. The benefits in the rural areas are less progressive. As observed from the indices in Table B-5, in terms of progressivity, total spending on education is more progressive in the urban areas, followed by rural areas and lastly semi-urban. A surprising result is the case of tertiary education where, the rural population benefits relatively more from this subsidy. However, parents in the urban areas send absolutely more

19 Reference hospitals and provincial hospital represent hospital care whereas peripheral centres which include integrated health centres, (integr), medical centres of wards (MCW) and district hospitals are proxy to primary health facility.
children to the university than those living in the rural areas. Equally in the case of public health, there is a slight regional balance in terms of progressivity. However, hospital care appears more progressive in the urban regions since they are based in the cities, followed by the semi-urban and later by the rural areas respectively. Globally, spending is unevenly distributed geographically with the urban areas benefiting most. However, in the case of higher education which is not found in all the urban areas or towns, it progressivity depends on the income position of households and the desire to have their children obtain higher education and not their milieu of residence. Thus, this study shed light on the fact that, the geographical distribution of social services or their location does not matter in benefit incidence, rather it depends on how important households perceive a service.

We found that using either unit cost subsidy or binary approach has the tendency of producing biased results. This biasedness has not been identified in benefit incidence studies as in discrete choice models that determine demand functions for services. Most studies in benefit incidence conclude that poor households benefit from primary schooling and the relatively more children in poor households explain this\textsuperscript{20}. In this study, we propose another aspect and extend it to the health sector using the binary method. Thus, while valuing or counting only those who went to public schools or hospitals, the rest who seek alternative sources must be considered. We obtained the actual probability or participation rate for each household in a public unit by dividing the number of users of public units by the total number of users in both the public and private sector. Primary education and health subsidy became less progressive while higher levels of education were increasing being made use of by the poor (see Table B-6).

Finally, the overall benefit system generates a small decrease in inequality as well as a remarkable fall in poverty for households. The rural households

\textsuperscript{20} Household per capita equivalent rather than per capita has been used to take care of such demographic characteristics and results obtained indicate a slight reduction in progressivity. We applied this case in our study (results not reported) and obtained similarly results as in Demery (2000).
followed by the semi-urban and urban households mostly benefit these redistributive and poverty effects. The results support the view that improved health and education facilities are the most effective means to escape poverty.

6.3 Net fiscal incidence

This section provides the results on the combined tax and expenditure incidence. From a policy viewpoint, net fiscal incidence and not a separate analysis is the relevant measure that government authorities need to use in judging particular policies. For example, no matter whether an increase in excise taxes generates regressive or progressive tendencies, the policy would be desirable from an equity stand only if the revenues raised are used to finance school or hospital construction in a poor neighbourhood. However, this study is limited by the fact that in the computation of net income, corporate taxes and other components of public spending are not considered. Nevertheless, from Tables 3 and 4 the components considered remain important and so should occupy a place in policy debates.

The redistributive and poverty effects of the tax and transfer system is assessed by a simple examination of the change in inequality or poverty as measured by the difference in the Gini coefficients and FGT indices of pre-tax/transfer measure of total expenditure. Using the Reynolds-Smolensky measure, the fourth column in Table B-2 shows the inequality impact over milieu of residence that result from the tax and transfer system. The positive values for the system indicate that it is inequality reducing and vice versa. In Table B-3, the positive values of the FGT indices indicate an increase in poverty and vice versa. The positive poverty effect of the combined tax and transfer system is minimal as opposed to the tax system alone. This minimal impact is driven by the benefit system. The rural regions mostly benefit followed by the semi-urban and the urban areas respectively in terms of poverty and inequality reductions. These results provide a solution to the problem presented in Tables 1 and 2 where in 2001 inequality increased in the rural area
but reduces in the urban areas and the relatively widespread poverty in the rural areas. Thus, the tax and transfer system be used as a measure to ameliorate the situation in the rural areas.

The last part of this section concerns the links between household gross incomes and taxes paid or subsidies received. The results obtained here shed light on the possibility of making inference on the marginal impact of the tax and transfer systems respectively. As observed on figures 6 and 7, both the average and marginal rates of taxes and subsidies increase with income, thus, are progressive. Furthermore, the marginal taxation rate net of benefits is also an increasing function of income, i.e. progressive (see figures 7). This is an indication that on average the rate of taxes is low (high) for low (high) income earners while subsidy rates are high (low) for low (high) income levels. Finally, both taxes and benefits vary strongly with income as shown in figure 8. The government could effectively target the poor by raising taxes for the financing of education and health.

7. CONCLUSIONS AND RECOMMENDATIONS

The objectives of this study were to examine the progressivity of taxes and social services (i.e. education and health), and to assess the overall system. The results are presented in Tables B-2 to B-6 and on figures 1 to 8.

On the tax side, results suggest strong and progressive indirect taxes including the VAT, excises, import duties, petroleum and its related taxes. Policy makers should rest assured that shifting the tax structure towards excises VAT and gasoline taxes rather than import duties would be both efficient and equitable. It is important to remember that progressivity is not the only quality of a good tax. Other qualities such as a tax’s impact an economic efficiency (distortions in the allocation of resources), its cost of collection and administration do matter. Nevertheless, progressivity or equity matters for a country that considers the poor at heart. For direct taxes, personal income tax shows slight regressivity based on estimations from the old system whereas
family business tax is progressive. However, with the 2004-tax reform on personal income taxes, the structure could become progressive following the unique progressive rates now applicable.

For the social services, analysis of health services indicate that most are progressive in the sense that they are distributed more equally than income though hospital care appears less progressive than primary health facilities which slightly meets the criterion of per capita progressivity. For education, the poorest quintile benefits most from the primary schooling subsidy which is per capita progressive and least from secondary and tertiary spending. The opposite pattern applies to the richest quintile. The analysis of overall benefit incidence of spending on education and health revealed slight balance in terms of progressivity of social services over milieu of residence to the advantage of the urban areas as opposed to the rural areas.

However, the entire tax and transfer system is not globally progressive. An interesting story to tell here is that, the results of the net fiscal incidence reverses that of benefit incidence. While both education and health spending are most progressive in the urban areas, followed by semi-urban and rural areas, the opposite occurs with net fiscal incidence. The combined tax and benefit system is more progressive and poverty reducing in the rural areas, followed by the semi-urban and urban areas respectively. This is an indication that net fiscal incidence is more informative and reliable as far as policy prescriptions or intervention is concerned. This lends support to the fact that governments could raise much revenue from taxes to finance the construction of schools and hospitals in poor neighbourhood without any regressive tendencies. This is accepted especially as both the tax and transfer structures are marginally progressive. Nevertheless, it is the slight regressive of the income tax that drives down the progressivity of net fiscal incidence. Summarily, the interpretation of such results should always be done with caution following the numerous assumptions made and diverse data sources used in reaching the results.
Appendix A. Calculation of Household Tax Payments

This appendix describes the calculation of indirect and direct taxes in greater details.

Indirect taxes on expenditure items

In Table A-1 below are the expenditure items included in the survey data with corresponding taxes that are assumed incurred in purchasing the goods and services. To estimate the tax base for each tax, the following assumptions as provided in the general tax code are made.

- Value added tax (VAT) is levied on the cost in full (c.i.f)\(^{21}\) value of imports plus import duties paid.
- Import duties and tariffs (IMD) are levied on the c.i.f value of imports.
- Commodity specific excises (EXT) on (alcoholic beverages, cigarettes, bottled or mineral water, and jewelleries) are levied on the c.i.f value plus import duty for imported products.

Other Indirect taxes

The other indirect tax examined is the special tax on petroleum products (TSSP) such as petrol and diesel (gasoline). The rates are 120 CFA franc for petrol and 65CFA franc for diesel per litre respectively averaging about 22 percent. This rate is applied to each household’s consumption of the products. However, the massive removal of implicit taxation on exports of agricultural cash crops has rendered the tax progressive thus favouring the low-income farmers.

Effective Calculation and Applications

From the assumptions above, we have the following equations:

\[(i) \quad \text{VAT} = (\text{C.i.f + IMD})t_{\text{VAT}}\]

\(^{21}\) C.i.f is the pretax value for imported goods. It is used synonymously with pre-tax value for all commodities.
(ii) \( \text{IMD} = C.i.f \text{ value} \times t_{\text{IMD}} \)

(iii) \( \text{EXT} = (C.i.f + \text{IMD}) \times t_{\text{EXT}} \)

Where \( t_{\text{VAT}} \), \( t_{\text{IMD}} \), and \( t_{\text{EXT}} \) are the respective tax rates. We extend this tax base to consumption expenditure (\( C_{\text{exp}} \)) for the calculation of taxes on assumption that prices rise by the full amount of taxes. Thus, \( C_{\text{exp}} \) is given as,

\[
C_{\text{exp}} = C.i.f + \text{IMD} + \text{VAT} + \text{EXT} \quad \text{(iv)}
\]

Substituting (i), (ii) and (iii) in (iv) we have,

\[
C_{\text{exp}} = C.i.f + C.i.f \times t_{\text{IMD}} + (C.i.f + \text{IMD}) \times t_{\text{VAT}} + (C.i.f + \text{IMD}) \times t_{\text{EXT}}
\]

\[
= C.i.f \times (1 + t_{\text{IMD}} + t_{\text{VAT}} + t_{\text{EXT}})
\]

\[
C.i.f = \frac{C_{\text{exp}}}{(1 + t_{\text{IMD}} + t_{\text{VAT}} + t_{\text{EXT}})}
\]

Thus,

\[
\text{IMD} = C.i.f \times t_{\text{IMD}}
\]

\[
\text{EXT} = (C.i.f + \text{IMD}) \times t_{\text{EXT}}
\]

\[
= (C.i.f + C.i.f \times t_{\text{IMD}}) \times t_{\text{EXT}}
\]

\[
= C.i.f \times (t_{\text{EXT}} + t_{\text{IMD}} \times t_{\text{EXT}})
\]

\[
\text{VAT} = (C.i.f + \text{IMD}) \times t_{\text{VAT}}
\]

\[
= C.i.f \times (1 + t_{\text{IMD}}) \times t_{\text{VAT}}
\]

Gasoline (petrol and diesel) via transport tax (GT) is given as,

Pre-tax value (\( D_v \)) x gasoline on transport tax rate (\( t_g \))

\[
C_{\text{exp}} = D_v + \text{VAT} + \text{GT}
\]

\[
= D_v + D_v \times t_{\text{VAT}} + D_v \times t_g
\]

\[
D_v = \frac{C_{\text{exp}}}{(1 + t_{\text{VAT}} + t_g)}
\]

\[
\text{GT} = \frac{C_{\text{exp}}}{(1 + t_{\text{VAT}} + t_g)} \times t_g
\]

For the special tax on petroleum products (TSSP),

\[
C_{\text{exp}} = C.i.f + \text{IMD} + \text{VAT} + \text{TSSP}
\]

\[
= C.i.f + C.i.f \times t_{\text{IMD}} \times (C.i.f + C.i.f \times t_{\text{IMD}}) \times t_{\text{VAT}} + C.i.f \times t_{\text{TSSP}}
\]

\[
C.i.f = \frac{C_{\text{exp}}}{(1 + t_{\text{IMD}} + t_{\text{VAT}} + t_{\text{TSSP}} + t_{\text{IMD}} \times t_{\text{VAT}})}
\]
TSSP = Cexp/(1 + t_{IMD} + t_{VAT} + t_{TSSP} + t_{IMD} \cdot t_{VAT} \cdot t_{TSSP})

Table B-1: Assumed taxes on Expenditure items in Cameroon, 2001

<table>
<thead>
<tr>
<th>Expenditure items</th>
<th>Import taxes</th>
<th>VAT</th>
<th>Excise</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>All food except those listed</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rice</td>
<td>36</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Macaroni, spaghetti and related</td>
<td>58</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Wheat</td>
<td>58</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Wheat flours and others(^a)</td>
<td>58</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Canned vegetables tomato</td>
<td>58</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Baby food</td>
<td>12.5</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Canned food</td>
<td>58</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Milk (liquid)</td>
<td>39</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Milk (powdered)</td>
<td>29</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Cheese</td>
<td>60</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Butter and margarine</td>
<td>60</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Refined cooking oil and other oils</td>
<td>58</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Frozen chicken</td>
<td>40</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Canned fish</td>
<td>60</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Refined sugar</td>
<td>56</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Salt</td>
<td>48</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Hotels, cafe and restaurants</td>
<td>0</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Fruit juice and other non alcoholic drinks</td>
<td>0</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other non alcoholic beverages</td>
<td>58</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bottled or mineral water</td>
<td>0</td>
<td>18.7</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>Beer</td>
<td>83</td>
<td>18.7</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>Wine, liquor and other imported alcoholic drinks</td>
<td>83</td>
<td>18.7</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>Cigarettes (Cameroon)</td>
<td>0</td>
<td>18.7</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>Cigarettes (Imported)</td>
<td>83</td>
<td>18.7</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>Clothing and footwear articles</td>
<td>55</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Water charges</td>
<td>0</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Electricity</td>
<td>0</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Kerosene</td>
<td>35</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Domestic cooking gas</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Batteries</td>
<td>55</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Matches</td>
<td>58</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Candles</td>
<td>0</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Household furniture</td>
<td>0</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Household linen</td>
<td>55</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Musical and other instruments</td>
<td>55</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Computer materials</td>
<td>55</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Household appliances</td>
<td>55</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Household and kitchen utensils</td>
<td>45</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Gardening and home tools</td>
<td>55</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Home maintenance products</td>
<td>55</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>House construction and repairs materials</td>
<td>55</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pharmaceutical products</td>
<td>65</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Readaptation and medical apparatus</td>
<td>11.5</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Personal care articles</td>
<td>55</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Automobiles, motor cycles, bicycles and tricycles</td>
<td>55</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Gasoline (petrol and diesel)</td>
<td>35</td>
<td>18.7</td>
<td>0</td>
<td>120/65CFAF/litre</td>
</tr>
<tr>
<td>Lubricants (oil and greases)</td>
<td>55</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Spares and other tools for transport</td>
<td>55</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Transportation in cities and intercity</td>
<td>0</td>
<td>18.7</td>
<td>0</td>
<td>10(^b)</td>
</tr>
<tr>
<td>Mail and telecommunication</td>
<td>0</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Education and training</td>
<td>0</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Camera, sports and leisure accessories</td>
<td>55</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sport, leisure and spectacles</td>
<td>0</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bags and leather objects</td>
<td>35</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Watches and other</td>
<td>55</td>
<td>18.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Jewelleries</td>
<td>83</td>
<td>18.7</td>
<td>25</td>
<td>0</td>
</tr>
</tbody>
</table>

\(^a\) Includes wheat in bread and other flour-composed products.
\(^b\) For transport cost we assume that on average 18.5% of the cost is due to taxes on petroleum products.

**Source:** Adopted from Government of Cameroon’s General tax and Customs codes and the 2001/2002 survey data
Table B-2: Redistributive effect of the combined tax and transfer system: Reynolds-Smolensky Indices

<table>
<thead>
<tr>
<th>Milieu</th>
<th>Indirect tax</th>
<th>Direct tax</th>
<th>All tax</th>
<th>Transfer</th>
<th>Tax and transfer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>0.008</td>
<td>-0.042</td>
<td>-0.052</td>
<td>0.003</td>
<td>-0.048</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.018)</td>
<td>(0.020)</td>
<td>(0.00008)</td>
<td>(0.0008)</td>
</tr>
<tr>
<td>Semi-urban</td>
<td>0.012</td>
<td>-0.002</td>
<td>0.003</td>
<td>0.004</td>
<td>0.007</td>
</tr>
<tr>
<td></td>
<td>(0.0013)</td>
<td>(0.0011)</td>
<td>(0.002)</td>
<td>(0.0019)</td>
<td>(0.0028)</td>
</tr>
<tr>
<td>Rural</td>
<td>0.007</td>
<td>-0.007</td>
<td>0.0001</td>
<td>0.005</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.002)</td>
<td>(0.003)</td>
<td>(0.002)</td>
<td>(0.0032)</td>
</tr>
<tr>
<td>Cameroon</td>
<td>0.011</td>
<td>-0.022</td>
<td>-0.02</td>
<td>0.004</td>
<td>-0.015</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.009)</td>
<td>(0.010)</td>
<td>(0.0001)</td>
<td>(0.0099)</td>
</tr>
</tbody>
</table>

Note: Values in parentheses are standard deviation

Source: Author’s calculation based on household survey data and data provided by the Ministry of Economy and Finance.

Table B-3: Poverty impact of fiscal mechanisms: Variations in Poverty Indices

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Milieu</th>
<th>Taxes</th>
<th>Benefits</th>
<th>Net Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>P0=incidence</td>
<td>Urban</td>
<td>0.049 (0.004)</td>
<td>-0.005 (0.0015)</td>
<td>0.042 (0.0045)</td>
</tr>
<tr>
<td></td>
<td>Semi-urban</td>
<td>0.058 (0.007)</td>
<td>-0.013 (0.0032)</td>
<td>0.048 (0.007)</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>0.040 (0.005)</td>
<td>-0.019 (0.0036)</td>
<td>0.023 (0.0055)</td>
</tr>
<tr>
<td></td>
<td>Cameroon</td>
<td>0.045 (0.003)</td>
<td>-0.013 (0.002)</td>
<td>0.031 (0.00005)</td>
</tr>
<tr>
<td></td>
<td>Urban</td>
<td>0.029 (0.032)</td>
<td>-0.0019 (0.0001)</td>
<td>0.094 (0.0032)</td>
</tr>
<tr>
<td></td>
<td>Semi-urban</td>
<td>0.021 (0.006)</td>
<td>-0.004 (0.0003)</td>
<td>0.016 (0.0035)</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>0.072 (0.004)</td>
<td>-0.009 (0.0003)</td>
<td>0.013 (0.0034)</td>
</tr>
<tr>
<td></td>
<td>Cameroon</td>
<td>0.049 (0.011)</td>
<td>-0.006 (0.002)</td>
<td>0.042 (0.0116)</td>
</tr>
<tr>
<td>P1=intensity</td>
<td>Urban</td>
<td>0.097 (0.0031)</td>
<td>-0.0009 (0.00008)</td>
<td>0.088 (0.0023)</td>
</tr>
<tr>
<td></td>
<td>Semi-urban</td>
<td>0.069 (0.060)</td>
<td>-0.002 (0.0001)</td>
<td>0.066 (0.0065)</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>0.083 (0.069)</td>
<td>-0.005 (0.0002)</td>
<td>0.076 (0.0069)</td>
</tr>
<tr>
<td></td>
<td>Cameroon</td>
<td>0.082 (0.012)</td>
<td>-0.003 (0.0001)</td>
<td>0.065 (0.0117)</td>
</tr>
<tr>
<td>P2=severity</td>
<td>Urban</td>
<td>0.097 (0.0031)</td>
<td>-0.0009 (0.00008)</td>
<td>0.088 (0.0023)</td>
</tr>
<tr>
<td></td>
<td>Semi-urban</td>
<td>0.069 (0.060)</td>
<td>-0.002 (0.0001)</td>
<td>0.066 (0.0065)</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>0.083 (0.069)</td>
<td>-0.005 (0.0002)</td>
<td>0.076 (0.0069)</td>
</tr>
<tr>
<td></td>
<td>Cameroon</td>
<td>0.082 (0.012)</td>
<td>-0.003 (0.0001)</td>
<td>0.065 (0.0117)</td>
</tr>
</tbody>
</table>
Note: Values in parentheses are standard deviation

Source: Author’s calculation based on household survey data and data provided by the Ministry of Economy and Finance.
Table B-4: Kakwani Indices of Tax-Redistribution Progressivity for Taxes

<table>
<thead>
<tr>
<th>Import duties</th>
<th>VAT</th>
<th>Total excise</th>
<th>Alcoholic excise</th>
<th>Tobacco excise</th>
<th>Jewellery excise</th>
<th>TSSP</th>
<th>Gasoline via transport(^a)</th>
<th>Transport and gasoline(^b)</th>
<th>Gasoline(^c)</th>
<th>Aggregate indirect taxes</th>
<th>Family business taxes</th>
<th>Other income taxes</th>
<th>Total personal income tax</th>
<th>Total taxes</th>
<th>Taxes net of transfer</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.054</td>
<td>0.092</td>
<td>0.11</td>
<td>0.137</td>
<td>-0.205</td>
<td>0.228</td>
<td>0.376</td>
<td>0.074</td>
<td>0.201</td>
<td>0.376</td>
<td>0.071</td>
<td>0.18</td>
<td>-0.054</td>
<td>0.135</td>
<td>0.137</td>
<td>0.252</td>
</tr>
<tr>
<td>(0.034)</td>
<td>(0.04)</td>
<td>(0.039)</td>
<td>(0.041)</td>
<td>(0.047)</td>
<td>(0.027)</td>
<td>(0.01)</td>
<td>(0.012)</td>
<td>(0.014)</td>
<td>(0.011)</td>
<td>(0.013)</td>
<td>(0.107)</td>
<td>(0.019)</td>
<td>(0.067)</td>
<td>(0.022)</td>
<td>(0.031)</td>
</tr>
</tbody>
</table>

\(^a\) Gasoline via transport refers to the part of the direct tax on gasoline that falls on users of public transport.  
\(^b\) Transport and gasoline refers to the combined impact of the direct tax on gasoline and the indirect tax on users of public transport.  
\(^c\) Gasoline refers to the direct tax on gasoline.  

**Note:** Values in parentheses are standard deviation  

**Source:** Author’s calculation based on household survey data and data provided by the Ministry of Economy and Finance.
### Table B-5: Kakwani Indices of Tax-Redistribution Progressivity for Public Subsidies

<table>
<thead>
<tr>
<th>Milieu</th>
<th>Primary education</th>
<th>Secondary education</th>
<th>Tertiary education</th>
<th>All education</th>
<th>Primary health Facilities&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Hospital Care&lt;sup&gt;b&lt;/sup&gt;</th>
<th>All health</th>
<th>Total subsidy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>0.219</td>
<td>0.026</td>
<td>0.11</td>
<td>0.076</td>
<td>0.235</td>
<td>0.116</td>
<td>0.181</td>
<td>0.091</td>
</tr>
<tr>
<td></td>
<td>(0.021)</td>
<td>(0.019)</td>
<td>(0.037)</td>
<td>(0.012)</td>
<td>(0.018)</td>
<td>(0.016)</td>
<td>(0.008)</td>
<td>(0.010)</td>
</tr>
<tr>
<td>Semi-urban</td>
<td>0.079</td>
<td>-0.004</td>
<td>-0.232</td>
<td>0.013</td>
<td>0.104</td>
<td>0.113</td>
<td>0.104</td>
<td>0.025</td>
</tr>
<tr>
<td></td>
<td>(0.011)</td>
<td>(0.011)</td>
<td>(0.095)</td>
<td>(0.011)</td>
<td>(0.011)</td>
<td>(0.078)</td>
<td>(0.005)</td>
<td>(0.012)</td>
</tr>
<tr>
<td>Rural</td>
<td>0.105</td>
<td>-0.08</td>
<td>0.258</td>
<td>0.017</td>
<td>0.06</td>
<td>-0.013</td>
<td>0.056</td>
<td>0.025</td>
</tr>
<tr>
<td></td>
<td>(0.020)</td>
<td>(0.051)</td>
<td>(0.261)</td>
<td>(0.023)</td>
<td>(0.006)</td>
<td>(0.062)</td>
<td>(0.002)</td>
<td>(0.016)</td>
</tr>
<tr>
<td>Cameroon</td>
<td>0.21</td>
<td>-0.064</td>
<td>-0.179</td>
<td>0.038</td>
<td>0.182</td>
<td>-0.129</td>
<td>0.139</td>
<td>0.056</td>
</tr>
<tr>
<td></td>
<td>(0.018)</td>
<td>(0.029)</td>
<td>(0.050)</td>
<td>(0.014)</td>
<td>(0.009)</td>
<td>(0.017)</td>
<td>(0.003)</td>
<td>(0.010)</td>
</tr>
</tbody>
</table>

Note:  
<sup>a</sup> Includes integrated health centre without a medical doctor, district and sub-divisional hospitals with doctors but without specialized equipments or medical specialists.  
<sup>b</sup> Includes first class or referral and provincial hospitals with medical specialists and specialised equipments.

Values in parentheses are standard deviation

Source: Authors’ Calculation based on Cameroon’s 2001 household survey

### Table B-6: Concentration indices of public spending on education and health with allowance on total schooling population and all patients

<table>
<thead>
<tr>
<th>Milieu</th>
<th>Primary education</th>
<th>Secondary education</th>
<th>University eduction</th>
<th>Health care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>-0.19</td>
<td>0.006</td>
<td>0.27</td>
<td>0.016</td>
</tr>
<tr>
<td>Sem-urban</td>
<td>-0.08</td>
<td>0.02</td>
<td>0.29</td>
<td>0.026</td>
</tr>
<tr>
<td>Rural</td>
<td>-0.11</td>
<td>-0.02</td>
<td>-0.03</td>
<td>0.022</td>
</tr>
<tr>
<td>Cameroon</td>
<td>-0.14</td>
<td>0.058</td>
<td>0.50</td>
<td>0.006</td>
</tr>
</tbody>
</table>

Source: Authors’ Calculation based on Cameroon’s 2001 household survey
Figure 4: Overall benefit from education and health

Proportion of services

Proportion of households, poorest to richest

Expenditure  Education  Health

Figure 5a: Concentration curves of post-transfer and post-tax incomes

Cumulative share of real income

Cumulative proportion of households, poorest to richest

Expenditure  Post-tax income  Post-transfer income
REFERENCES


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