Impact of Public Policies on Poverty, Income Distribution and Growth[*]

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(Preliminary Draft; March, 2004)

Abstract[*]

Paramount to the recent UN Millennium Development Goals initiative is the issue of whether public policies are at all efficient in alleviating poverty. From this premise, the paper proposes to analyze the impact on poverty of several components of public policies by avoiding the flaws in the scattered literature on the subject. It departs from available literature by directly focusing on the link between public social policies and poverty rather than indirectly through the impact of these policies on specific social outcomes. It also uses a framework that accounts for the endogeneity of and interactions between growth, income inequality, and poverty using different definitions of poverty and alternative estimation methods applied to a larger sample size and more recent data compiled from various sources. The results show that: (i) public policies affect poverty only indirectly through their impact on income distribution and mean expenditure; (ii) unlike what is generally believed, policies aimed at improving income distribution are more effective in affecting poverty than policies targeted to improving mean consumption and growth; (iii) overall Government expenditures, transfers and monetary policy aimed at reducing inflation, have all a positive impact on the extent of poverty. Openness, on the other hand, although a pro-growth policy, was found to have negative impact on income distribution and poverty. Given the conflicting impact of public policies on growth, poverty and income distribution, care has to be taken to choose the right mix of policies achieving positive results on these three variables; (iv) among the social spending chapters in Government budget, transfers seem to be more effective in affecting income distribution and poverty; (v) policies aimed at sustaining basic necessity production such as that of cereals, have a larger impact on poverty and income distribution than aggregate public policies; (vi) public policies and other variables affecting poverty are found to have a more significant impact on the degree of severity of poverty than on the number of the poor.

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1. Introduction

Given the still daunting issue of the worldwide spread of poverty with almost 50% of the population of the globe living with less than $2 a day and the lively debate over the possibility of reaching the Millennium Development Goals (MDG) emanating from the 2000 United Nations Millennium declaration and aiming at, among other things, reducing poverty levels by 2015 at half the levels of the base year 1990, it is very legitimate to address the issue of whether public policies are at all efficient in alleviating poverty and improving social outcomes.

Public policies have the dual role of achieving efficiency by correcting numerous market failures, and equity by improving the distributional and poverty outcomes that would result from a market-based allocation of resources. While the redistributive role is played by direct taxation in developed economies, this role is usually assumed by public policies mainly through targeted government expenditures in the form of direct provision of certain public services such as education, health and housing.

The assessment of the role of public policies in affecting income distribution and poverty requires the knowledge of the functional relationship between the targets (poverty and income distribution) and the instruments (public policies). This relationship is, however, far from being completely understood. Part of the problem resides in the fact that public policies are not only exclusively directed toward poverty alleviation, and affect poverty mainly indirectly through a web of complex interactions between public policies and growth on the one hand, and public policies and income distribution, on the other.

Public policies are generally intended to affect the mean income of the entire population and subsequently to improve poverty. However, it may also affect the income inequality that has a direct bearing on poverty as well. The final impact on the poor would depend on the magnitude as well as the direction of these two impacts.

Analysis of the impact of policies aimed at increasing the mean income of the population on the poor, for a given state of the income distribution, has been treated thoroughly in the literature. Kakwani (1993), for instance, has shown that for different classes of poverty measures, any policy aimed at increasing the mean income of the population would reduce poverty for a given level of income distribution. On the other hand, he has also shown that, under mild conditions and for a wide class of poverty measures, greater inequality leads to greater poverty.[1]

Since any given public policy intended to increase the mean income of the population may also change income distribution in either direction, the final impact on poverty cannot be known a priori. This impact can only be known based on empirical assessment.

Many of the relevant studies available in the literature on the link between public policies and poverty have relied on estimation procedures that have not accounted for the complex interactions between poverty and other variables such as growth and income distribution, and the endogeneity of the latter variables. In addition, sample sizes in these studies were generally small and estimation was problematic by the unavailability of relevant data. Finally, rarely any sensitivity or robustness tests were conducted in the literature.

This paper proposes to analyze the impact on poverty of several components of public policies by avoiding the flaws in the scattered literature on the subject. It departs from available literature in the sense that it directly focuses on the link between public social policies and poverty rather than indirectly through the impact of these policies on specific social outcomes. It also uses a framework that accounts for the endogeneity of and interactions between growth, income inequality, and poverty using a relatively larger sample size and more recent data compiled from various sources. Last but not least and unlike many of the previous studies, our results are more robust in the sense that they purport to different definitions of poverty and estimation methods.

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[1] The requirement that greater inequality leads to greater poverty is that poverty line income be less than the mean income. This condition is almost always satisfied. In our sample, the average ratio of poverty line income to mean income is 0.33 and hence verifies the stated condition.

The rest of the paper is composed as follows: Section 2 conducts a selective review of the literature on the impact of public policies on poverty; section 3 explains the methodology used in the paper; section 4 describes the data used; section 5 analyzes the results and section 6 concludes.

2. Public Policies and Poverty

Many studies, old and new, have taken up the issue of the impact of public policies on social outcomes such as poverty. However, the empirical evidence on the impact of public policies on poverty can best be characterized as mixed. Although from a principle point of view public policy is expected to affect income distribution and poverty, the empirical evidence is not overwhelmingly in support of this claim.

One element of solution to this puzzle is provided by the World Development Report of the World Bank (2004) which remarked that despite the fact that Governments devote about a third of their budgets to health and education, very little of it goes to the poor. Even if funds are dedicated to the poor people, the weak systems of incentives and delivery largely explain the lack of a consistent relationship between changes in the structure of public spending and poverty.

Along the same lines, Squire (1993) had previously expressed the dilemma facing policy makers in their efforts to fight poverty. He argues that universal programs to reduce poverty have tended to incur costly leakages to the nonpoor whereas highly targeted programs have tended to result in the incomplete coverage of the poor. In both cases, the impact on the poor of public policy would not be expected to be a significant one.

 Various incidence studies, that differ in nature from studies using cross-country evidence, reveal, on the other hand, that spending on basic services such as primary and secondary education and basic health care, tend to reach the poor, while spending on

tertiary services such as university education, hospital services, tend to be pro-rich (Van De Walle, 1996).

In general, there is an agreement that the lack of structural relationship between social policy and social outcomes is due to the lack of efficiency of Government expenditure in LDCs. Some researchers, such as Sanjeev et al. (1997), have even tried to measure the extent of inefficiency in public service delivery.

Another explanation of the often reported weak link between public policy and poverty resides in differences in coverage and sample sizes across studies focusing on this link. In some of these studies only a limited number of countries were used. Difference in results reflects to a great extent the paucity of relevant data especially the limited number of expenditure surveys (Gootaert et al., 1995).

Not less important is the difference in estimation methods and treatment of poverty across studies. In all likelihood, poverty is simultaneously determined with other variables in the process such as growth and income distribution. However, in most of the studies related to the impact of public policy on poverty, the latter is treated within single-equation models that do not take into account the endogeneity or the omission of many relevant variables.

In a recent work that is very close to the spirit of the actual paper, Dollar and Kray (2001), have attempted to address the impact of public policies such as macroeconomic stability and fiscal discipline, and certain components of public spending on health and education, on poverty. They find that many supposedly "pro-poor" policies such as public expenditure on health and education do not have any significant impact on the income of the poor. In contrast, income of the poor seems to respond systematically to pro-growth policies such as fiscal discipline, macroeconomic stability, good rule of law and openness to international trade.

They conclude that these pro-growth policies should be at the center stage of any program aiming at eradicating poverty. They argue, however, that social spending in developing countries often benefits the rich and middle classes more than the poor. Therefore a higher share of social spending on items such as health and education will not be reflected in higher incomes for the poor.

Similarly, Filmer and Pritchett (1997) have not found any significant impact of public expenditures on health and infant mortality that mainly touch the poor fringe of any society. In contrast, Bidani and Ravallion (1997) have found a statistically significant relationship between public spending on health and poverty.

In two separate studies, Fan et al. (1999) and Fan et al. (2002), have tried to analyze the role of different types of Government expenditures in contributing to poverty alleviation in rural areas in India and China, respectively. One of the merits of these two studies is their taking into account the endogeneity of many relevant variables in their model. This framework is extremely useful in delineating the direct as well as the indirect channels through which public expenditures affect poverty. Another merit of these studies is their focus on rural areas where the poor are the more likely to be located.

Their results indicate that Government's production-enhancing investments in agriculture, investment in rural infrastructure, and expenditures on health and education have a visible impact on poverty, with expenditures on education having the largest impact in reducing poverty in the case of China, and expenditures on roads to have the largest impact in the case of India.

The evidence on the impact of public policies on the main determinants of the degree of poverty namely, the poverty line, the average level of income and inequality in income

distribution, is not very conclusive either and is frequently flawed with serious issues of causality between the dependent variables and their respective determinants.[2]

With regard to income distribution, Li, Squire and Zou (1998) have found, for instance, that policies aimed at boosting education level, improving the work of institutions, developing the financial market and ensuring a better distribution of land tend to reduce inequality in income distribution and hence to lower poverty levels.

As for growth, although the recent cross-country literature did not look at the impact of detailed government spending on growth, it almost consistently reported compelling evidence on the distortionary impact of aggregate Government expenditure on growth. Barro (1991), for instance, found that an increase in non-productive spending tends to lower growth. However, it remains to be established through further studies which of the components of Government spending are more pro-growth than others.

The only regular evidence pertaining to the determinants of poverty lines is that it tends to respond to variation in mean consumption and growth (Ravallion et al., 1991). Subsequently any policy that affects these two variables should affect the poverty line and hence poverty.

3. Methodology

In order to analyze the impact of public policy on poverty, we use a modeling framework that accounts for the simultaneity in the determination of poverty, inequality and growth. As pointed out by Lundberg and Squire (1999), accounting for the simultaneity of the above variables allows first to avoid the shortcomings of previous studies that deal with each variable separately. Second, the simultaneous treatment of growth, inequality and poverty is useful from a policy perspective in the sense that it enables decision makers to

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[2] For instance the issue of causality and reverse causality between growth and income distribution is well documented in the literature. Abdelgadir (1998), for instance, has presented a good survey and reflected on this issue.

choose the combination of mutually beneficial and mutually exclusive policies that have positive impact on all three variables. Third, public policies tend to affect poverty mainly indirectly through their impact on growth and income distribution. The simultaneous treatment of growth, income distribution and poverty that model explicitly the interaction between all the variables involved is, therefore, the most appropriate tool to assess the direct as well as the indirect channels through which public policies affect poverty.

More specifically, we use a simultaneous equation model with three endogenous variables namely, growth, inequality and poverty. We draw heavily on pertinent standard theoretical and empirical models available in the literature. In the specification of each equation, care has been taken to adopt as parsimonious and robust specifications as possible to avoid any risk of spurious results. The generic specification of the system of equations is given as follows:

$$Growth = f_1(INV, OPEN, POLICY, INST, INITIAL) + \varepsilon \qquad (1)$$

$$Gini = f_2(Growth, POLICY, OTHER) + \xi \qquad (2)$$

$$Poverty = f_3(Poverty\,Line, Gini, Mean\,Consumption) + \zeta \qquad (3)$$

In the growth equation, our selection is guided by variables that proved more "robust" than others in recent empirical growth literature through the work of Barro (1991) and others. Among the variables that are incorporated in most of this literature is the investment ratio (INV) that is generally found to be associated with higher growth rates. Another important source of growth highlighted in the recent empirical growth literature is institutions (INST) defined as the regular and patterned forms of social behavior and interaction among human beings established by formal and informal rules (North, 1990). Institutions matter for growth because they affect incentives of actors.

Macroeconomic policy, POLICY, plays an important role for growth sustainability. Fisher (1993) has shown that growth is negatively associated with inflation, large

Government size and distorted foreign exchange markets. Among the three measures, we favor Government size as proxied by the share of its expenditure in GDP.

Openness has been used extensively in the literature as a major determinant of growth performance. Openness affects growth positively in as much it magnifies the benefits of international knowledge spillover and technological diffusion. It also enforces cost discipline through import competition. Openness measured by the ratio of trade to GDP is simply not appropriate for the case of many developing countries. Very frequently, the high trade ratios reflect partly the nature of factor endowment and not openness per se. For this reason, an alternative index of trade restrictiveness, OPEN, is used instead.

The last variable that is used in the growth equation is the initial level of income, INITIAL, measured in the year 1975 (i.e. prior to the earliest survey year in the sample). Recent empirical growth literature provides ample evidence of the existence of conditional income convergence across countries. Under the assumption of diminishing marginal returns to capital, the lower the initial level of income the greater the opportunity of catching up through higher rates of capital accumulation and diffusion of technology. This convergence is evidenced by the negative relationship between the growth rate of per capita GDP and the initial level of GDP per capita after controlling for other relevant variables.[3]

With respect to income inequality, less guidance is provided by the recent empirical literature. The very few empirical regularities in this literature points to the positive role played by Government expenditure, education, land distribution (Li et al., 1998 and Lundberg and Squire, 1999); the negative role played by inflation (Bulír, 2001) and to the existence of a U or inverted U-shaped relationship between growth and income inequality (Dollar and Kraay, 2001 and Lundberg and Squire, 1999). Some recent evidence also points to a positive relationship between income inequality and growth (Forbes, 2000).

The income inequality equation of the model has the Gini coefficient as dependent variable and an index for cereal production, transfers, inflation, public expenditure as share of GDP, growth of real per capita GDP and its square as explanatory variables.

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[3] Makdisi et al. (2003).

As argued by Kakwani (1993), the degree of poverty depends on the poverty line, the average level of income and the extent of inequality in income distribution. The specification of the poverty equation in the model is directly derived from this conjecture. Attempts at incorporating aggregate policy measures in the poverty equation did not produce any significant improvement over the core specification suggested by Kakwani and the theoretical literature on poverty.

In order to analyze the potential impact of public policy on poverty, three measures of poverty have been used namely, the poverty headcount (H), the poverty gap ratio (PG) and a composite measure of the severity of poverty (PG2) that belongs to a parametric class, branded Pa class, proposed by Foster, Greer and Thorbecke (1984), referred to as FGT hereafter, and where a=2. The headcount measures the proportion of population living under the poverty line, the income gap ratio measures the extent of immiseration measured by the relative shortfall of their income or consumption with respect to the poverty line. The general expression of the FGT poverty measures used in this paper can be written as follows:

$$Pa = (1/n)[\sum_{i=1}^{q}(g_i/z)^a] \quad , \quad for\ a \geq 0 \qquad (4)$$

where:

n = total number of households
g_i = poverty gap of the ith household
q = number of households below the poverty line
z = poverty line.

For a=0, Pa is equal to the headcount ratio H, for a=1, Pa is equal to the PG product of the headcount ratio and the average income or consumption shortfall, and for a=2, Pa is equal to PG2. It is important to note at this stage that these poverty measures have

different focus from a normative perspective. The headcount ratio would be more relevant if the purpose of policy makers is to reduce the number of people living below the poverty line. However, if the focus is not only on the absolute number of the poor but also on the degree of their immiseration, the poverty gap ratio would be more relevant. In the case where a=2, the distribution of income or consumption among the poor becomes more important since income or consumption shortfalls of the poorest fringe of the poor have heavier weights than the less poor. Therefore, the last index would be more relevant if the purpose of the policy maker is to help the poorest first and to help the less poor last.

Paramount to the three adopted measures of poverty is the concept of poverty line. There are several definitions that are available in the literature.[4] Among these, we have chosen a consumption-based concept of poverty line. It has been argued that a consumption-based concept of poverty is more appropriate when trying to analyze the standard of living in a society since current income may fluctuate and hence tend not to reflect consumption smoothing that is a good indicator of life-time material wealth or resources. In addition, we have chosen not to use a universal absolute poverty line as it may differ from national poverty lines that tend to better reflect the context in which needs arise.

We follow here the approach of Chen and Ravallion (2000), by regressing national poverty lines on a quadratic function of the difference between consumption per capita and the lowest consumption per capita in the sample, expressed in Purchasing Power Parity (PPP). The estimated value of the poverty line is then taken as the actual value of the poverty line for each country in the sample including the countries where no official national poverty line was reported.

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[4] See for instance, Hagenaars and van Praag (1985), Kanbur (1987) and Ravallion (1998) for the wide spectrum of measurement issues related to poverty line definitions.

4. The Data

The data used in this paper relate to 77 different countries representing 129 expenditure distribution surveys with 25 countries having one survey and 52 countries two different surveys. All relevant variables used in the analysis as well as their respective sources are reported in table (a) in the appendix.

Initial data on national poverty lines measured in 1985 PPP for a sample of 48 countries were taken from Ali and El Badawi (2002). The estimated quadratic equation used in the extrapolation of poverty line is given by :

$$\text{LOG}(Z) = \underset{(107.66)}{3.226} + \underset{(13.32)}{0.000500*[\mu-\min(\mu)]} - \underset{(-3.86)}{2.93\text{E-}08*[\mu-\min(\mu)]^2}$$

$$R^2 = 0.95 ; \quad F(45,42)=447.72.$$

where Z is the poverty line, μ is the mean consumption expenditure in the sample, $\min(\mu)$ is the lowest mean consumption expenditure in the sample.

The estimated equation presents a very good fit for the data at hand as shown in figure 1 and by the high coefficient of determination and t-ratios reported in parentheses. The fitted values of poverty lines from the latter equation were used in conjunction with expenditure distribution for the 129 surveys in the sample to compute the Gini indices, and the three FGT indicators namely, head count, poverty gap, and poverty severity using the computer program POVCAL developed by Chen et al. (1998).

Data on mean expenditure and expenditure distribution are expressed in constant international prices (PPP 1985) and compiled from World Bank (2003), Wider (2004) database, Deininger and Squire (1996) and Dollar and Kraay (2001).

Figure 1. Relationship between Poverty Line and Mean Expenditure
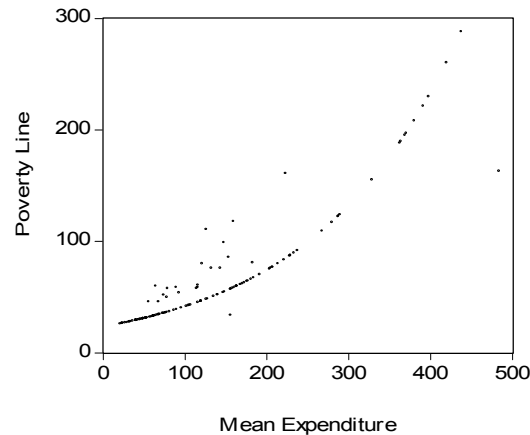
Before using the computed poverty indicators and to ensure consistency with data used in other sources, our own estimates of these indicators were compared with the estimates reported respectively in the World Bank (2003), Chen and Ravallion (2002) and Ali and El Badawi (2002).

Overall, our estimates are broadly in line with the estimates reported in the previous sources. For instance, table 6.2 in the World Bank Development Indicators (2003) gives an average head count ratio of 35.4% that is only slightly higher than our own estimates of 34.7 %, both of which are lower than the estimates of Ali and El Badawi (2002, table 1 p.6) of 37.96%. Given sample differences in terms of number of countries covered and years of surveys, these minor discrepancies in the estimates of poverty head counts are only natural.

Public policy stance is measured in this paper by the ratio of public expenditure to GDP and by the distribution of public spending on education, health, transfers and subsidies, social security and welfare, agriculture, and housing. Data on these items were taken

from the Government Financial Statistics of the IMF also published in the Web site of the Global Development Network (GDN).[5] Since public social expenditures and other control variables included in the model impact poverty and income distribution with a considerable time lag, these variables were included in the model as five-year backward moving averages from the date of the survey.

In order to reflect some stylized facts and possible correlations between public policies, poverty, income distribution, and growth as well as other aspects of the countries included in the sample, different data and indices are summarized according to the income classification of the countries adopted by the World Bank. This classification distinguishes developing countries according to low, lower and upper middle income.

The data were also geographically grouped into the following areas: Sub-Saharan Africa (SSA), Arab Countries (AC), East and Central Europe (ECA), East/South Asia and the Pacific (SEA), and Latin America (LA).

Figure 2 depicts the structure of poverty by income level and by region. The distribution of poverty measures according to income levels shows that low income countries have the highest headcount poverty with a median ratio of 43%, while lower upper middle income countries have almost half the level of low income countries. Poverty in upper middle income countries increases to 32% probably affected by countries with high income and high poverty such as Botswana.

 It should be noted that despite their poor growth record, Arab countries included in the sample have the lowest poverty incidence with a median headcount ratio of 16% only a third that of Sub-Saharan Africa and half that of Latin America.

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[5] The web site of GDN is http://www.gdnnet.org.

Figure 2. Income and Geographical Structure of Poverty
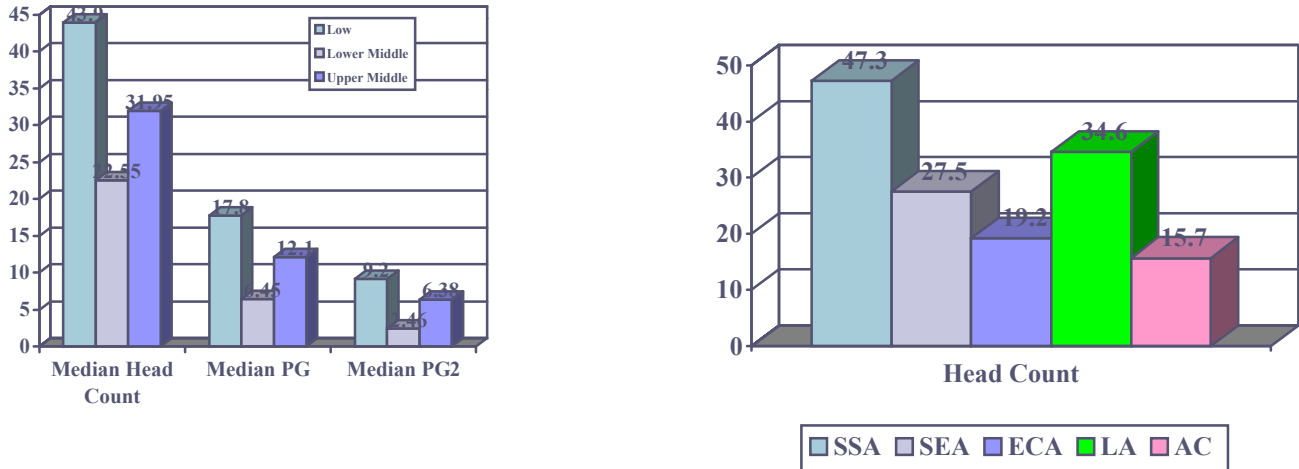
As shown in figure 3, the computed Gini index of income distribution shows a sample average value of 45.4 and a U-shaped like pattern with inequality more pronounced for high and low income groups. Sub-Saharan Africa and Latin American countries have the highest Gini index and Arab countries have a relatively favorable income distribution although less favorable than that of East and Central European countries.

On average, Government expenditure represents about a quarter of GDP. Arab and East European countries have the highest Public expenditure to GDP ratio and also the lowest poverty levels. However, this should not be taken as a well established relationship between the two variables since the number of countries in these two groups represents only a small fraction of the sample. In fact, the overall sample correlations between, on the one hand, the share of expenditure and the head count ratio, and the share of expenditure and Gini coefficient, on the other, are only –0.24 and -0.15, respectively.

Figure 3. Gini Coefficient by Income Level
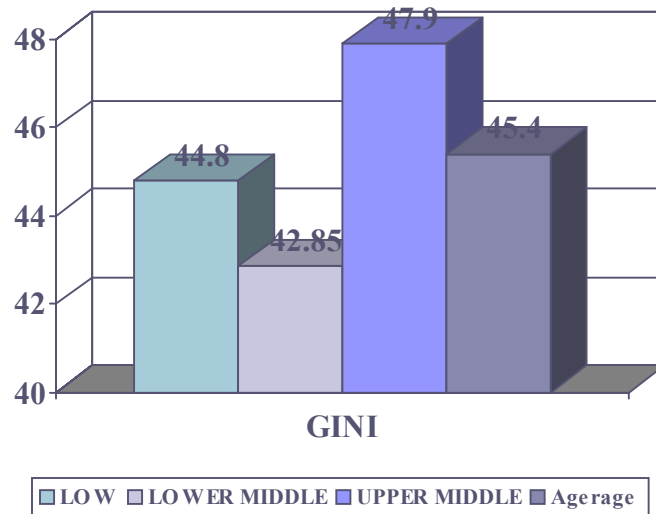
Figure 4 shows the share of Government expenditure in GDP and the sectoral allocation of budgets for the countries in the sample computed as five-year backward moving averages from the year of each survey. The figures show that, on average, Governments allocate 14% and 15% of their total expenditure on education and transfers, respectively; whereas health receives only 6% and housing 3%. Overall, the expenditure items that make up governments social policy constitutes 59% of total Government expenditure.

Figure 4. Share in GDP and Composition of Government Expenditures
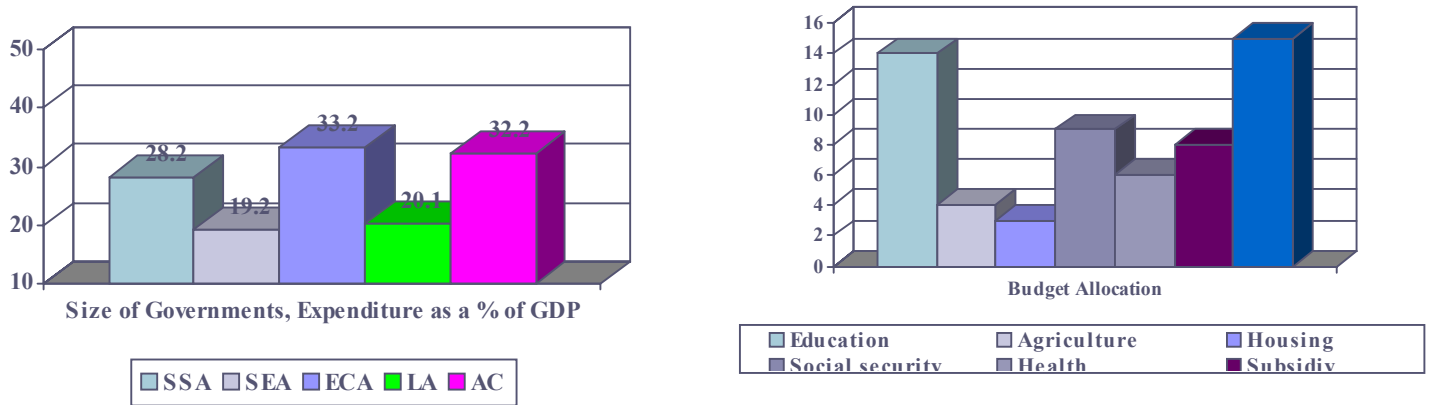
When countries are classified according to the degree of severity of poverty, there does not appear a clear cut correlation between shares of social spending and poverty. However, despite the insignificant differences in social policy stance between the low-level and high-level poverty countries, the data on other structural and economic data reveal wide differences between these groups of countries. For instance, countries with high poverty levels are in general characterized by lower growth of per capita GDP (-0.054%) compared with low-poverty countries (1.63%), and by higher median inflation of 99%, lower openness and higher inequality in income distribution.

Table 1 provides mean-difference tests for three groups of poverty levels: low poverty (headcount ratio less than 20%), medium (headcount ratio between 20 and 45%) and high (more than 45%). As the table shows, countries classified according to poverty levels allocate expenditure similarly except in the case of aggregate expenditure, transfers and social security whose shares are significantly low in countries with high poverty levels.

Table 1: Tests of Mean Difference according to Poverty Levels

Social Policy	Test of Mean Difference
Total Expenditure	8.530 (0.004)**
Housing	1.363 (0.261)
Health	0.426 (0.564)
Social Security	3.861 (0.025)*
Subsidies	1.127 (0.329)
Transfers	5.524 (0.006)**
Education	0.574 (0.566)

N.B. The expenditure items are calculated as percentage of GDP. P-values are in parentheses where (**) and (*) indicate statistical significance at the 1 and 5% levels, respectively.

5. The Results

Estimation results of the simultaneous equations model are presented in tables (b), (c) and (d) in the appendix. It should be noted that all variables have been converted to the logarithmic form so that estimates can directly be interpreted as elasticities. The model was estimated using three estimation procedures namely, Ordinary Least Squares (OLS), Two-Stage Least Squares (TSLS) and Three-Stage Least Squares (3SLS). The system was also estimated for the three poverty measures: headcount ratio, H, poverty gap ratio, PG, and the squared poverty gap ratio, PG2.

In general, the model presents a very good fit for the data and all the variables are statistically significant at conventional levels. The results are pretty similar across estimation methods despite the fact that the model was estimated in the case of TSLS and 3SLS using smaller numbers of observations given the incomplete data on several instrumental variables. It should be noted that given the recursiveness of the model, OLS estimates are in principle consistent.

The estimation of the growth equation, provided in table (b) in the appendix, reveals that many of the variables suggested by the recent empirical growth literature are rightly signed although statistically not very significant. The results pertaining to the income distribution equation, provided in table (c) in the appendix, also confirm some the regularities observed in recent literature pertaining to income distribution. For instance, it was found that the public expenditure ratio and share of transfers in public expenditures affect positively income distribution. Cereal production was also found to affect income distribution positively. Inflation was found to have a negative impact on income distribution and growth can positively impact the latter only at high rates.

As reported in table (d) in the appendix, poverty depends significantly on the poverty line, income distribution and mean consumption expenditure. Attempts at including other variables in the poverty equation notably those pertaining to public expenditures have yielded statistically insignificant results. The estimation of the poverty equation confirms the previous findings notably by Ali (1998) and those of Bruno et al. (1995) as reported in Ali, that poverty, no matter how measured, is more sensitive to changes in income distribution than to changes in mean consumption.

Our estimates of the elasticities of poverty with respect to mean consumption and the Gini coefficient show that the former is significantly above unity ranging across the three estimation methods between 1.2 and 2.0. The elasticity of poverty with respect to the Gini coefficient ranges between 1.8 and 4.8. It is also found that PG2 tends to be more responsive to changes in poverty line, income distribution and mean consumption expenditure than the other two measures of poverty.

Similarly, by deriving the reduced form parameters, it is possible to obtain the elasticity of any of the endogenous variables with respect to any of the exogenous variables. Table (e) in the appendix gives the multiplier (elasticity) matrix with respect to some of the variables of interest.

Based on the estimation of the structural parameters and the derived matrix of multipliers, we present here below some of the conclusions that can be drawn from the overall analysis of the results.

First and foremost, the results show that poverty respond to public policies only indirectly through the impact of the latter on growth and income distribution since none of the policy variables enter significantly into the estimated poverty equation.

Second, poverty is more responsive to public policies than income distribution and growth. The magnitude of the elasticities of poverty with respect to public policy and other control variables is higher than those of income distribution and growth. This is mainly due to the high elasticity of poverty with respect to income distribution, estimated between 1.8 and 4.0, that magnifies the impact of any policy or control variable on poverty.

Among the three measures of poverty adopted, PG2 and to a lesser extent PG seem to be more sensitive to public policy. This suggests that the impact of aggregate public policy tends to be more pronounced on the way income is distributed among the poor and the intensity of poverty than on the number of people living below the poverty line.

Third, the size of the Government proxied by the share of public expenditures in GDP is among the variables that have conflicting impact on growth and poverty. However, despite its distortionary impact on growth, the size of public expenditure seems to have a positive impact on income distribution and poverty. The elasticity of poverty with respect to aggregate Government expenditures was found to vary, across poverty definitions and estimation methods, between 0.35 and 1.31; and with respect to income distribution between 0.20 and 0.27.

Fourth, among the social public spending chapters in Government budget under study, transfers seem to be the more effective in affecting income distribution and poverty. However, transfers were found to have a small poverty elasticity ranging between 0.04

and 0.22. This result adds credence to previous findings on the statistical insignificance of the impact of aggregate public social policies on poverty (Dollar and Kraay, 2001).

Fifth, many indicators that are directly related to public policies and targeted toward the poor such as cereal production, are found to be important determinants of poverty and income distribution. The elasticity of poverty with respect to cereal production was systematically found to be larger than the elasticity of poverty with respect to transfers. This strengthens the validity of the argument calling for focusing public policies on basic needs and services at the expense of universal services such as higher education and hospital services, in order to improve the effectiveness of programs to fight poverty. This also confirms the results of Fan et al. (1999, 2002) on the role of production-enhancing investments in agriculture such as Research and Development in reducing poverty.

Sixth, the results pertaining to the poverty impact of growth seem to suggest an inverted–U relationship between the two. This means that only at high rates that economic growth can start affecting positively both income distribution and poverty.

Seventh, consistent with theory, it is found that macroeconomic imbalances such as high rates of inflation are detrimental to growth, income distribution and especially to poverty. A disciplined monetary policy is therefore a first line of defense against poverty.

Eighth, the results obtained from the growth equation fairly confirm established facts from the recent empirical growth literature. However and unlike what is reported in previous studies such as in Dollar and Kraay (2001), many of the factors impacting positively growth such as openness, institutional performance do not seem to have any significant impact on poverty or income distribution. On the contrary, openness is found to affect negatively poverty.

Ninth, many factors are mutually exclusive when it comes to their respective impact on growth, on the one hand, and income distribution and poverty, on the other. This, as argued by Lundberg and Squire (1999), calls for the adoption of a combination of both

mutually exclusive and mutually beneficial policies in order to achieve positive results with respect to the three variables at hand namely growth, income distribution and poverty.

Tenth, table (f) in the appendix, shows the partial elasticities of poverty with respect to mean consumption and income distribution classified by poverty and income levels as well as geographical location. A cursory analysis of these elasticities, computed using the POVCAL program, reveals that poverty tends to be more responsive for medium-income countries since the respective elasticities were found to be higher for this group than those of low and high income groups. This pattern may be interpreted as the mirror image of Kuznet's inverted U for income distribution since at low level of development attempts at poverty reduction are not very effective, become more successful as income level increases and less successful for higher levels of income.

The partial elasticities by geographical location show that East and South Asian countries have the higher elasticities followed by the group of Arab countries. This finding may reflect the fact that many of the countries in East and South Asia are among the medium-level income group in the World, while those of the Arab countries are in the lower fringe of this group.

Eleventh, the elasticities of poverty , whether partial or structural , with respect to mean consumption and income distribution tend to be higher for PG2 than for PG and H. This shows again that it is easier to impact the way income is distributed among the poor and the intensity of poverty than reducing the number of people living below the poverty line.

Finally, the results pertaining to the Arab countries confirm the previously reached conclusions for the whole sample. Table (h), reveals that higher-income Arab countries should in principle be more successful in reducing poverty than lower-income countries. In addition, the results show that policies aimed at improving income distribution are more effective in affecting poverty than policies directed to increase mean consumption (i.e. growth).

6. Conclusion

One of the most important results of the paper is that policies aimed at improving income distribution are more effective in affecting poverty than policies directed to increase mean consumption and growth. Although public policies were found to affect poverty only indirectly through their impact on growth and income distribution, the high elasticity of poverty with respect to income distribution is such that any policy that is favorable to income distribution has a more positive and immediate impact on the poor. This has important implications as far as the conventional prescription stating that the only viable anti-poverty measures are those aiming at promoting growth. In fact, our results firms up previously reached conclusions notably by Ali (1998) that growth-promoting policies need to be accompanied by equity and poverty enhancing policies in order to be effective and realistic.

Our results also show that Government expenditures, transfers and monetary policy aimed at reducing inflation, have all a positive impact on the extent of poverty. Openness, on the other hand, although a pro-growth policy, was found to have negative impact on income distribution and poverty. Given the conflicting impact of public policies on growth, poverty and income distribution, care has to be taken to choose the right of mix of policies achieving positive results on the three targets. Among the social spending chapters in Government budget, transfers seem to be more effective in affecting income distribution and poverty

The results also suggest that policies aimed at sustaining basic necessity production such as that of cereals, have a larger impact on poverty and income distribution than aggregate public policies. This suggests that policies targeted toward the basic necessities of the poor are more effective in reaching the poor than policies aiming at improving universal and non-basic services.

Finally, public policies and other variables affecting poverty are found to have a more significant impact on the degree of severity of poverty than on the number of the poor.

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Appendix

Table a. Variable Definitions and Data Sources

Variable	Sources
GINI	World Bank(2003), UN-Wider (2003) databases, Deininger and Squire (1996), Dollar and Kraay (2002)
Mean Expenditure	Summers and Heston Penn World Tables, World Bank database.
Poverty Line	Ali and El Badawi (2002) , Chen and Ravallion (2002)
Growth Rate	World Bank Indicators (2003)
Investment Ratio	World Bank Indicators (2003)
Trade Restrictions Index	Economic Freedom in the World (2004)
Cereal Production Index	World Bank Indicators (2003)
Inflation Rate	World Bank Indicators (2003)
Expenditure to GDP	World Bank Indicators (2003)
Government expenditure on: Education, Health, Social Security, Agriculture, Transfers, Subsidies	GDN and World Bank Indicators

Table b. Growth Equation

	OLS	2SLS	3SLS
Constant	-0.106 (-1.643)	-0.230 (-2.043)**	-0.284 (-2.877)***
Investment Ratio	0.038 (3.981)**	0.034 (2.358)**	0.033 (2.698)***
Trade Restriction Index	0.010 (1.001)	0.003 (0.103)	0.006 (0.301)
Expenditure Ratio	-0.025 (-3.369)***	-0.027 (-2.088)**	-0.021 (-1.835)*
Quality of Institutions	0.028 (1.728)*	0.033 (1.310)	0.048 (2.201)**
Initial Income	-0.006 (-1.116)	0.012 (0.927)	0.007 (0.716)
Obs	70	37	37
R^2	0.426	0.343	0.330

- Significant at the 10 % Level, ** Significant at the 5% Level, **** Significant at the 1 % Level

Table c. Income Distribution (GINI) Equation

	OLS	2SLS	3SLS
Constant	5.577 (12.424)***	5.316 (8.575)***	5.224 (9.800)***
Cereal Production Index	-0.156 (-3.473)***	-0.133 (-2.305)**	-0.129 (-2.634)***
Transfers	-0.055 (-2.713)***	-0.025 (-1.048)	-0.022 (-1.045)
Inflation Rate	0.104 (2.543)***	0.160 (3.191)***	0.157 (3.609)***
Expenditure to GDP	-0.165 (-2.122)**	-0.156 (-1.526)	-0.143 (-1.579)
Growth Rate	2.445 (2.750)***	4.266 (1.932)**	4.615 (2.364)***
Squared Growth Rate	-29.457 (-1.817)*	-40.280 (-1.229)	-29.836 (-1.059)
Obs	64	37	37
R^2	0.395	0.241	0.214

Table d. Poverty Indicators Regressions

	Head Count			Poverty GAP			Poverty Severity (PG2)		
	OLS	2SLS	3SLS	OLS	2SLS	3SLS	OLS	2SLS	3SLS
Constant	-0.579	0.119	0.389	-4.935	-6.421	-6.176	-7.625	-12.049	-11.697
	(0.880)	(0.848)	(0.667)	(6.698)***	(5.116)***	(5.308)***	(-8.656)***	(-6.226) ***	(-6.532)***
GINI	2.227	1.824	1.756	3.359	3.438	3.382	3.999	4.824	4.746
	(15.914)***	(12.483)***	(13.045)***	(20.484)***	(11.720)***	(12.577)***	(20.396)***	(10.664)***	(11.477)***
Mean Expenditure	-1.464	-1.164	-1.152	-1.847	-1.478	-1.452	-2.055	-1.718	-1.676
	(-12.862)***	(-14.120)***	(-15.272)***	(-14.507)	(-8.930)***	(-9.550)***	(-13.497)***	(-6.731)***	(-7.163)***
Poverty Line	1.511	1.183	1.160	1.949	1.565	1.511	2.203	1.877	1.788
	(10.756)***	(11.769)***	(12.703)***	(12.401) ***	(7.750) ***	(8.205)***	(11.724)***	(6.029)***	(6.315)***
Observations	129	37	37	129	37	37	129	37	37
R^2	0.740	0.926	0.924	0.818	0.900	0.899	0.815	0.886	0.885

Table e.   Model Derived Structural Elasticities

Estimation Method		Investment Ratio	Trade Restriction	Expenditure Ratio	Quality of Institutions	Initial Income level	Cereal Output	Transfers Share	Inflation Rate	Poverty Line	Mean Expenditure
OLS	**Growth Rate**	0.04	0.01	-0.03	0.03	-0.01	0.00	0.00	0.00	0.00	0.00
	Income Distribution	0.10	0.02	-0.23	0.07	-0.02	-0.16	-0.06	0.10	0.00	0.00
	Poverty Severity	0.39	0.10	-0.93	0.29	-0.10	-0.64	-0.24	0.40	2.20	-2.05
2SLS	**Growth Rate**	0.03	0.00	-0.03	0.03	0.01	0.00	0.00	0.00	0.00	0.00
	Income Distribution	0.13	0.01	-0.29	0.13	0.04	-0.13	-0.03	0.16	0.00	0.00
	Poverty Severity	0.62	0.06	-1.39	0.62	0.21	-0.63	-0.14	0.77	1.88	-1.72
3SLS	**Growth Rate**	0.03	0.01	-0.02	0.05	0.01	0.00	0.00	0.00	0.00	0.00
	Income Distribution	0.14	0.03	-0.24	0.23	0.05	-0.13	-0.02	0.16	0.00	0.00
	Poverty Severity	0.66	0.13	-1.13	1.10	0.22	-0.62	-0.10	0.76	1.79	-1.68

Table f. Poverty Partial Elasticities

Poverty Indicator	Expenditure			Gini		
	H	**PG**	**PG2**	**H**	**PG**	**PG2**
Poverty incidence						
Low Incidence	-2.80	-3.34	-3.73	4.54	8.03	11.29
Medium Incidence	-1.87	-2.40	-2.78	2.59	5.63	8.47
High Incidence	-1.01	-1.45	-1.78	0.81	2.85	4.82
Income Level						
Low	-1.61	-2.09	-2.39	1.63	3.80	5.80
medium	-2.17	-2.95	-3.62	3.58	7.57	11.38
Upper	-1.81	-2.00	-2.08	2.69	5.22	7.61
Region						
Sub Saharan Africa	-1.06	-1.49	-1.80	0.92	3.07	5.12
East and South Asia	-3.48	-4.52	-5.30	5.22	9.29	12.99
East and Central Europe	-2.76	-2.57	-2.23	4.38	6.58	8.54
Latin America	-1.32	-1.79	-2.19	1.92	5.01	8.02
Arab Countries	-2.72	-3.60	-4.27	4.24	8.10	11.65
Sample Average	**-1.85**	**-2.36**	**-2.73**	**2.56**	**5.44**	**8.15**

Table g. Model Derived Elasticities of Poverty

	Expenditure			Gini			Poverty Line		
	H	**PG**	**PG2**	**H**	**PG**	**PG2**	**H**	**PG**	**PG2**
OLS	-1.46	-1.85	-2.05	2.23	3.36	4.00	1.51	1.94	2.20
TSLS	-1.16	-1.48	-1.72	1.82	3.44	4.82	1.18	1.56	1.83
3SLS	-1.15	-1.45	-1.68	1.76	3.38	4.75	1.16	1.51	1.78
Average	**-1.26**	**-1.59**	**-1.82**	**1.94**	**3.39**	**4.52**	**1.29**	**1.68**	**1.94**

Table h. Partial Poverty Elasticities for Arab Countries

COUNTRY	SURVEY	ELASTICITIES					
		MEAN CONSUMPTION			GINI INDEX		
		H	PG	PG2	H	PG	PG2
ALGERIA	1995	-2.841	-3.501	-3.818	4.546	8.202	11.309
ALGERIA	1988	-2.981	-3.121	-2.827	4.86	7.719	9.87
EGYPT	1999	-5.53	-5.3	-4.55	9.049	11.31	12.718
JORDAN	1997	-2.784	-4.483	-6.184	4.982	10.812	16.646
JORDAN	1991	-4.357	-7.43	-10.532	7.79	16.072	24.406
MORROCO	1998	-2.643	-4.271	-5.892	4.385	9.745	15.095
MORROCO	1990	-2.726	-3.477	-3.9	4.444	8.3	11.619
MAURITANIA	1995	-1.668	-2.159	-2.637	1.399	3.649	5.889
MAURITANIA	1993	-1.275	-1.875	-2.261	0.987	3.225	5.299
TUNISIA	1995	-2.222	-2.748	-3.027	3.921	7.614	10.871
TUNISIA	1990	-2.117	-2.909	-3.534	3.804	8.023	11.942
YEMEN	1992	-1.465	-1.875	-2.044	0.758	2.487	4.091