MACROECONOMIC GROWTH, SECTORAL QUALITY OF GROWTH AND POVERTY: MEASURE AND APPLICATION TO BURKINA FASO[1]

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Abstract

Macro-economic growth generally refers to GDP growth. The studies on the link between growth and poverty usually measure growth by mean household *per capita* expenditures. Furthermore, countries sometimes experience at the same time economic growth and growing poverty. It would seem important to establish a link between these types of growth.

The purpose of this paper is thus to discuss the link between macroeconomic growth and *per capita* expenditure growth with evidence drawn from Burkina Faso data. The paper also analyzes the impact of sectoral growth on poverty using Shapley-value-based decomposition approaches. National Accounts consumption - which is smaller - gives greater poverty incidence for 1994 and 1998 compared to the incidence estimated from consumption from household surveys. An annual 4% increase in real *per capita* consumption based on the survey gives a 13.4% decrease in poverty incidence, while a 6.6% annual growth in GDP yields only a 6.6% decrease in poverty incidence. Agricultural sector growth accounts for at least 80% of the decline in poverty incidence, gap and severity.

Key words: Growth, Poverty decomposition, Shapley Value, Burkina Faso

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INTRODUCTION

The Government of Burkina Faso's efforts to promote the country's development have been dominated over the past fifteen years by the structural adjustment programs (SAP) adopted in 1991. The impact of this policy package, combined with that of the devaluation of the CFA Franc (January 1994) resulted in a 5% annual increase in real GDP over the 1995-1998[4] period, compared to an average 1.5% increase over the 1993-1995 period. According to the statistics institute (INSD, 2000), increases of consumption (8.8%), investments (18.4%) and exports (12%) are largely responsible for this growth.

Despite these positive macroeconomic achievements, poverty remains an important social phenomenon, which has officially tended to increase during the same period. The poverty headcount ratio rose officially from 44.5% in 1994 to 45.3% in 1998 and to 46.4% in 2003. These variations in poverty levels contradict the growth effect, and when combined with stable inequality indices, the results appear to be inconsistent with expectations. Inconsistency might be linked to the use of inappropriate methods to evaluate poverty (Tesliuc, 2003). These previous poverty measures have been evaluated using nominal *per capita* expenditures, as in official reports. Computing the same measures with real *per capita* expenditures can mitigate conclusions on poverty trends. Boccanfuso and Kaboré (2003) illustrated the sensitivity of results of decomposition with respect to the deflator choice. They compared the consumption price index (CPI) and the ratio of poverty lines for 1994 and 1998 as price deflators. The CPI deflator generates a negative contribution of growth on poverty reduction as expected. However, this deflator leads to poverty incidence which is much lower than the *official* poverty rate (21.5% with the CPI versus 45.3% for the official rate). The ratio of poverty line deflator correct this problem, however, the real mean expenditure for the second year drops with respect to the first year leading to a perverse growth component.

Understanding the links between growth and poverty has become a major challenge both in research and policy debates. Recent literature came to the conclusion that the link between growth and poverty reduction is not a systematic one, suggesting that growth is not a sufficient condition to reduce poverty (Bigsten and Levin, 2000 ; de Janvry and Sadoulet, 2000 ; Ravallion and Datt, 2002 ; Bigsten et *al.*, 2002). Bourguignon (2003) has tried to clarify the debate on development strategies focusing on growth and income distribution by providing a rigorous framework for the analysis of the relationship existing between three "vertices" of the Poverty Growth Inequality (PGI) triangle.

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[4] This growth trend was maintained until 2002 despite a marginal decrease in 2000 (2.14%) (WAEMU Commission, December 2002)

Debate is ongoing in three areas. One of these areas questions the pro-poor nature of growth (Dollar and Kraay, 2000; Ravallion and Chen, 2003) and the role of sectoral growth (Fan et *al.*, 2000; Ravallion and Datt, 2002). The second subject of debate revolves around data (Ravallion, 2001a; Deaton, 2004). National Accounts (NAM) data and Household Survey (HS) data do not give an identical picture of the same phenomenon due to conceptual and methodological differences. These inconsistencies may have misleading implications for policy reforms as well as for poverty decompositions. The relevant literature has raised this problem but since household surveys are generally assumed to be more accurate and independent than national accounts, household data seems to be the most appropriate source. The third subject of debate centers on the relevance of the methods used to capture poverty trends (Tesliuc, 2003). Some methodological issues like "comparison of non-equivalent welfare measures", "benchmark period", and "quality of regional price statistics" can change consumption-based poverty measures and subsequently poverty dynamics. This paper focuses on the first two points, namely data issues and sectoral growth issues with an empirical application to Burkina Faso.

Ravallion (2001a) and Deaton (2004) underlined that recent applied work showed growing interest in the link between NAM and HS data sources. Understanding the relationship between household surveys and national accounts data and its implications for poverty analysis is a major challenge. Economic growth generally refers to GDP growth. Since poverty is usually measured by household survey data, survey *per capita* expenditure (PCE) growth is used to calculate the impact of growth on poverty dynamics instead of GDP growth. This paper attempts to shed some light on the effect of this distinction (Ravallion, 2003; Deaton, 2004) and formalizes the link between these two types of growth while also discussing its implications for poverty analysis using data for Burkina Faso.

As indicated earlier herein, the need to investigate the pro-poor nature of growth raises the issues of sectoral growth and its impact on poverty. This link can be analyzed through three major approaches. The first approach uses econometric methods to calculate poverty elasticities to some sectoral growth parameters (Ravallion and Datt, 2002; Fan et *al.* 2000; Heltberg and Tarp, 2002) or sectoral multipliers (Block, 1999). The second one uses Social Accounting Matrix (SAM) and Computable General Equilibrium Models (Khan, 1999) to evaluate the impact of sectoral growth on poverty. The third approach is based on techniques of decomposing poverty change over time into growth and redistribution effects (Kaboré, 2003). This paper adopts the third approach, which gives an exact decomposition of global poverty change into GDP growth and the redistribution components of targeted economic sectors.

Thus, the first contribution of this paper is to provide empirical evidence of the diverging poverty measures that can be obtained when using National Accounts versus Household Survey data. This empirical comparison becomes interesting since economic growth is always based on National Accounts data (GDP), while the variations on poverty measures are computed with Household Survey consumption data. The second contribution is to analyze the impact of several sector growths on poverty dynamics. The literature on conceptual and methodological issues is reviewed in section 2. The concepts and methods developed in the paper are discussed in section 3. Section 4 describes data sources and sector characteristics. The main findings are presented and discussed in section 5, which is followed by concluding remarks and some potential policy implications of our results

2. LITERATURE REVIEW

As stated in the introduction, this paper focuses on decomposition procedures and not on econometric or CGE models to evaluate the impact of sectoral growth on poverty. The variation over two periods of a national additive poverty measure (ΔFGT[5]) can be linked to sectoral poverty measures (ΔFGT_k) through two major approaches. The first well-known approach was proposed by Ravallion and Huppi (1991). Under this approach, global poverty change is decomposed into three effects viz.: (1) intra-sectoral poverty change effect, (2) population change effect, and (3) an interaction effect. This last term often seems to be problematic. The second and more recent approach (Shorrocks, 1999) is based on the "*Shapley value*"[6]. It is an exact decomposition procedure in the sense that the "interaction effect" is eliminated. It is also useful to look into intra-sectoral poverty dynamics. One way to do so is to look at growth and redistribution effects. For a given sector, the contribution of growth and redistribution to poverty dynamics over a period can be determined through several approaches: Datt and Ravallion (1992), Kakwani (1997) or Shorrocks (1999). The Datt and Ravallion approach produces a residual term to the growth and redistribution effects. This approach also uses the "*benchmark period*" concept, which leads to an asymmetrical consideration of initial and final periods. To overcome these two limitations, Kakwani (1997) develops an axiomatic approach, which eliminates the residual term and gives a symmetrical evaluation of initial and final periods. Reacting to the absence of a common framework for decomposition procedures, Shorrocks (1999) proposed a "*Shapley value*"-based cooperative game theory framework. Applied to a "*growth-redistribution*" decomposition of poverty change, a "*Shapley value*"-based approach gives results similar to those of Kakwani (1997). Combining sectoral decomposition with "*growth-redistribution*" decomposition allows to establish a useful link between a variation in national poverty measures and sectoral growths and redistributions (Kaboré, 2003). The approach adopted in this paper is based on that link, using a Shapley decomposition which will be further described in the next section.

[5] FGT refers to the Foster, Greer and Thorbeck (1984) poverty measures.

[6] The "*Shapley value*" is a solution formalized in 1953 by Lloyd Shapley, which allocates a surplus or cost to *n* players in a cooperative game. For details on the Shapley value, see Moulin (1988) and Owen (1977). Shorrocks (1999) uses this framework to decompose a poverty or inequality measure *I* into *K* contributions of *K* factors.

As hinted above, many countries have experienced paradoxical economic growth and poverty growth, which emphasizes the importance to gain a better understanding of the link between these two types of growth. It is crucial, however, to reconcile household survey and national accounts data before carrying out this decomposition. If survey data are not consistent with national account ones, this would lead to misleading policy implications, especially in the case of poverty decompositions. This problematic is often dealt with in the literature but it is generally assumed that household surveys are more accurate when they are independent of national accounts[7]. A computable general equilibrium (CGE) setting seems to be most exposed to this inconsistency, particularly in the context of micro-simulation models. Constructing a micro-simulation model in a CGE framework requires the use of a social accounting matrix (SAM) and household income and expenditure vectors, which raises the likelihood of mismatches. There are many reasons to explain these differences. On the household survey side, there may be some sampling and non-sampling errors, due *inter alia* to inadequate survey design and /or measurement errors, which makes it difficult to obtain accurate household responses on certain economic variables. On the national accounts side, while supply-side information on output and income for some sectors is based on high quality survey or census data, information on subsistence farming and informal sector producers is not only harder to obtain but it is usually of poor quality.

There are three major approaches[8] in the literature to reconcile these two types of data sets. The first one is called the entropy estimation approach and is based on an entropy measure of information applied by Robilliard and Robinson (2001). They process the additional information originated from the national accounts data to re-estimate the household weights used in the survey. However, it may not be easy to estimate a set of sampling probabilities (household survey weights) close to the ones drawn from HS and to overcome various known temporary constraints such as external shock suffered by the household during the survey. The second approach is based on a squared-errors minimization method used by Decaluwé and *al.* (1999) or Cockburn (2001). Cockburn (2001) chooses to minimize the sum of squared errors of the nominal variation between the original and new social accounting matrix values. The last approach is a "*pragmatic*" one used by Boccanfuso and *al.* (2003a, 2003b). This third method assumes that the levels of macro data are accurate; so are the shares in the

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[7] Stuttard (1996) describes an exercise of reconciling a household income distribution series with national accounts aggregates. Through this exercise, he highlights a number of potential conflict areas when attempting to reconcile micro- and macro- income data. Then he tries to figure out what the product of a reconciliation exercise should be. A technique is then being developed to reconcile the outcome of the European Community Household Panel with the countries' income surveys considering several characteristics of income distribution.

[8] Another approach consists in using survey data to determine shares and then applying RAS techniques (or similar methods). However, this procedure is often considered to be inefficient due to the large number of observations and to the likely very low level of some of the initial values.

structure of household survey data, and the household survey shares are thus applied to national account levels. We use here this last method for reconciling micro- and macro-data.

In the context of poverty decompositions, micro- and macro-data are also compared though from an aggregate standpoint, which also implies some inconsistencies and implications for poverty analysis. Using statistical tests to establish systematic differences, Ravallion (2001a) revealed from the data gathered on 88 developing countries that under the National Accounts, *per capita* private consumption deviated on average from mean household expenditures based on national sample surveys. The corresponding growths also differed systematically. Deaton (2004) explained this deviation by assuming that richer households are less likely to participate in surveys. Consequently, National Accounts may contain large and rapidly growing numbers of items not consumed by the poor and not included in the surveys, which results in a downward bias in consumption surveys. The controversial question is about the inability of current sampling methods to overcome the bias-generating behavior of rich households. In this paper, we compare poverty measures using both Household Surveys and National Accounts consumption. We try to capture more efficiently the differences in the corresponding "*growth*" and "*redistribution*" effects derived from appropriate poverty decompositions.

3. CONCEPTS AND METHODS

A review of the methods by which a link can be established between micro level consumption growth, macroeconomic growth and poverty is carried out in the following section. The growth observed in survey *per capita* expenditure (PCE) tends to reflect growth on the household side while GDP growth describes economic growth. The link between GDP and PCE growths is formalized through macroeconomic principles. The implications for poverty measures (FGT[9]) are then discussed. Finally, the impact of sectoral growth and redistribution on FGT measures is formalized.

3.1. Economic Growth and Growth of Mean Expenditure

Gross Domestic Product (GDP) is a macroeconomic indicator often used to measure economic growth. An expenditure-based Keynesian definition of GDP is given hereunder (Baumol and *al.*, 1985):

$$\text{GDP} = \text{C} + \text{I} + \text{G} + \text{X} - \text{IM} \qquad \textit{Eq. 3-1}$$

in which C is household final consumption, I, total investment, G, government expenditure on goods and services, X, total exports and IM, total importations. GDP can also be defined from the income and production sides. From the income side, GDP is the sum of factor earnings (wages, interests,

[9] Cf. equation 3-7.

profits, and other capital remunerations). From the production side, GDP is the sum of value-added over each production sector.

The absolute variation in GDP is formalized from equation Eq. 3-1 as follows:

$$\Delta \text{GDP} = \Delta \text{C} + \Delta \text{I} + \Delta \text{G} + \Delta \text{X} - \Delta \text{IM} \qquad \textit{Eq. 3-2}$$

Dividing the two members of equation Eq. 3-2 by GDP gives

$$\frac{\Delta GDP}{GDP} = \frac{\Delta C}{C} \cdot \frac{C}{GDP} + \frac{\Delta I}{I} \cdot \frac{I}{GDP} + \frac{\Delta G}{G} \cdot \frac{G}{GDP} + \frac{\Delta X}{X} \cdot \frac{X}{GDP} - \frac{\Delta IM}{IM} \cdot \frac{IM}{GDP} \qquad \textit{Eq. 3-3}$$

Eq. 3-3 expresses economic growth as a function of the growth of each component and their shares in initial GDP. This relation can also be re-written as follows:

$$\frac{\Delta GDP}{GDP} = \alpha_c \frac{\Delta C}{C} + \alpha_I \frac{\Delta I}{I} + \alpha_G \frac{\Delta G}{G} + \alpha_X \frac{\Delta X}{X} - \alpha_{IM} \frac{\Delta IM}{IM} \qquad \textit{Eq. 3-4}$$

where α_C, α_I , α_G , α_X, α_{IM} represent the proportions of *C*, *I*, *G*, *X* et *IM* respectively in the GDP of the initial period while $\Delta C/C$, $\Delta I/I$, $\Delta G/G$, $\Delta X/X$, $\Delta IM/IM$ represent the growth rates of consumption, investment, government expenditure, exports and imports respectively.

Total household consumption (*C*) represents the product of *per capita* mean expenditure (μ) by the population (*N*). From $C = \mu.N$, ΔC becomes $\Delta C = \Delta\mu.N + \Delta N.\mu$. Household consumption growth $\Delta C/C$, can be formalized as:

$$\frac{\Delta C}{C} = \frac{\Delta N}{N} + \frac{\Delta \mu}{\mu} \qquad \textit{Eq. 3-5}$$

Substituting Eq. 3-5 into Eq. 3-4, we obtain the following relation:

$$\frac{\Delta GDP}{GDP} = \alpha_c \left(\frac{\Delta N}{N} + \frac{\Delta \mu}{\mu} \right) + \alpha_I \frac{\Delta I}{I} + \alpha_G \frac{\Delta G}{G} + \alpha_X \frac{\Delta X}{X} - \alpha_{IM} \frac{\Delta IM}{IM} \qquad \textit{Eq. 3-6}$$

Eq. 3-6 reveals, *ceteris paribus*, that the economic growth between two periods t_1 and t_2 is the growth of *per capita* mean expenditure weighted by the share of global consumption in the GDP of initial period t_1.

Between the two periods t_1 and t_2, the typical economic process entails a simultaneous change in all the macroeconomic variables of equation Eq. 3-6. Then, economic growth can be driven by variables other than *per capita* mean expenditure (μ) as is usually assumed. A decrease in *per capita* mean expenditure ($\Delta\mu/\mu<0$) likely to increase poverty is therefore compatible with positive economic growth ($\Delta GDP/GDP>0$). In the standard methods of evaluating growth and redistribution effects on poverty (Datt et Ravallion, 1992; Kakwani, 1997) and in more recent "*Shapley value*"-based approaches

(Shorrocks, 1999), growth is measured by household PCE growth computed on the basis of survey data.

In a short run relation between growth and poverty reduction, a distinction should be made between two growth features. First, one must acknowledge that economic or macroeconomic growth may be driven by variables other than household consumption and that it may not be directly beneficial to the poor. Secondly, the micro side refers to growth of *per capita* mean expenditure ($\Delta\mu/\mu<0$), which is closely related to poverty reduction. To obtain rapid pro-poor effects, economic growth needs to be driven by *per capita* mean expenditure ($\Delta\mu/\mu$) growth.

With the distinction that needs to be made between macroeconomic growth of GDP (GDP_{nam}[10]) and *per capita* mean expenditure (GDP_{hs}[11]) growth, it is necessary to match micro and macro data regarding GDP growth. There are two possibilities to do this. The first one is to assume that total expenditure as reported in the household survey (noted C_{hs}) is the "*true*" total value. In this case, the associated GDP (GDP_{hs}) will also be the "*true*" figure to be reflected in the Input-Output (I-O) table. However, if GDP_{nam} is substituted by GDP_{hs} in I-O table, this entails a change in the whole macroeconomic structure leaving the social accounting matrix unbalanced in which case it will require balancing it anew. While it is relatively easy to make this choice, it is not simple to apply and validate the method, for the value of the national accounting matrix will change even if the structure of the economy remains unaltered.

The second possibility, which corresponds to our choice, is to assume that GDP_{nam} is the "*true*" value along with the total consumption (C_{nam}) reflected in I-O table. In order to match C_{nam} and C_{hs}, we use an approach similar to that in the recent fully integrated household models (Decaluwé et *al.*, 1999; Boccanfuso et *al.*, 2003a, 2003b, Savard, 2005). Assuming that GDP_{nam} and C_{nam} are the "*true*" values, we substituted C_{hs} by C_{nam} in the household survey. This assumption allows to obtain a consumption vector and poverty indices which are consistent with the well accepted economic growth indicator namely the GDP rather than to assume that the National Accounts-based consumption is a true and more accurate evaluation of the households' total consumption. On the other hand, we changed total expenditure for each household *i* (C_{hsi}). However, for consistency purposes in relation to the initial household survey, we inferred expenditure structure from initial household data[12]. A new vector of total expenditure is thus obtained in which the sum is equivalent to the one establishing a link between I-O table and household survey.

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[10] NAM: data extracted from the National Accounting Matrix.

[11] HS: data extracted from household survey

[12] To obtain the household expenditure structure of the survey we calculated C_{hsi} / C_{hs}.

This data extrapolation introduces a degree of consistency between the two information sources needed for the poverty decomposition exercise described in the following section.

3-2 Sectoral Growth and Poverty Reduction

In this paper, the Shapley-based approach of both sectoral and "*growth-redistribution*" decompositions are analyzed along Shorrocks' lines (1999) and their computation with the DAD software, version 4.3[13]. An alternative approach combining a Ravallion and Huppi (1991) sectoral decomposition with a Datt and Ravallion (1992) "*growth-redistribution*" decomposition is used in Kaboré (2003).

The Shapley-based decomposition approach consists of two major steps. First, a sectoral decomposition is performed in order to establish the national poverty measure as a function of the poverty measures of individual sectors. Next, the poverty measure of each sector is decomposed into growth and redistribution components. Lastly, introducing results of step *2* into step *1* is equivalent to measuring the impact of sectoral growths and redistributions on national poverty. The mathematical details of this approach are given hereunder:

Step 1: The additivity property of FGT class poverty measures is used to obtain a sectoral decomposition of poverty change over time. Assume that K is a set of sectors and P_t the poverty measure of the entire population at period t. The FGT P_ω class of additively decomposable poverty measures can be used to measure the proportion of poor people among the population (headcount ratio) as well as poverty depth and severity. The normalized Foster-Greer-Thorbecke poverty index FGT $P(z;\omega)$ is

$$P(z,\omega)=\frac{1}{\sum_{i=1}^{n} sw_i}\sum_{i=1}^{n} sw_i\left(\frac{z-y_i}{z}\right)_+^{\omega} \qquad \text{Eq. 3-7}$$

where ω is a poverty-aversion parameter, z is the poverty line, $x_+ = Max(x,0)$, w_i is the sampling weight for observation i and s is the size of observation (e.g. the household) i[14]. When the poverty aversion rate $\omega = 0$, P_ω is called poverty incidence and indicates the percentage of poor in the total population; with $\omega = 1$ poverty depth is measured while $\omega = 2$ allows to compute poverty severity. α_{kt} and P_{kt} are population share and FGT poverty measure

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[13] The DAD software (Distributional Analysis – Analyse Distributive) is software developed by Duclos, Araar and Fortin (2005) which is freely available on http://www.pep-net.org.

[14] For further discussion of this measure, see Ravallion, (1994)

of sector $k \in K$ at period t ($t = 1,2$) respectively. Based on the additivity property of FGT indexes, $P_t = \sum_k \alpha_{kt} P_{kt}$. The global poverty change over the two periods is $\Delta P = \sum_k (\alpha_{k2} P_{k2} - \alpha_{k1} P_{k1})$. ΔP is also determined by the contributions of population shares ($\Delta\alpha_k$) and those of poverty measures (ΔP_k) for each K groups or sectors.

Shorrocks (1999) indicated that a Shapley decomposition of ΔP into contributions of sectoral changes in population shares and poverty is given by the following relation:

$$\Delta P = \sum_{k \in K} \frac{\alpha_{k1} + \alpha_{k2}}{2} \Delta P_k + \sum_{k \in K} \frac{P_{k1} + P_{k2}}{2} \Delta \alpha_k \qquad \textit{Eq. 3-8}$$

The first sum is the contribution of poverty changes in sectors or groups. The second term is the contribution of variation in population shares.

Step 2: Given a fixed poverty line z, the level of poverty at time t (t = 1, 2) may be expressed by a function $P(\mu_t, L_t)$ with μ of mean income, and the Lorenz curve, L. The poverty change over periods *1* and *2* in sector k ($\Delta P_k = P_{k2} - P_{k1}$) can be decomposed into a "*growth effect*" (G_k) and a "*redistribution effect*" (D_k). This decomposition as formulated by Shorrocks (1999) is exact, i.e., it has no residual. We therefore have $\Delta P_k = G_k + D_k$, with:

$$G_k = \frac{1}{2}\left[\left(P(\mu_2, L_2) - P(\mu_1, L_2)\right) + \left(P(\mu_2, L_1) - P(\mu_1, L_1)\right)\right] \qquad \textit{Eq. 3-9}$$

and

$$D_k = \frac{1}{2}\left[\left(P(\mu_2, L_2) - P(\mu_2, L_1)\right) + \left(P(\mu_1, L_2) - P(\mu_1, L_1)\right)\right] \qquad \textit{Eq. 3-10}$$

Equation 3-8 then becomes:

$$\Delta P = \sum_{k \in K} \frac{\alpha_{k1} + \alpha_{k2}}{2} (G_k + D_k) + \sum_{k \in K} \frac{P_{k1} + P_{k2}}{2} \Delta \alpha_k \qquad \textit{Eq. 3-11}$$

Then, the absolute impact of the growth component G_k on ΔP is obtained by weighting G_k by the mean population shares of sector k over the two periods. The absolute impact of redistribution is computed similarly. Dividing absolute contributions by ΔP provides the relative contributions, which are indicative of the percentage of ΔP explained by G_k, D_k or $\Delta\alpha_k$. It is worth noting that the contributions of sectoral growth and redistribution to the global change in poverty level are sensitive to the population shares of these sectors. This sensitivity can be explained by the fact that the change in poverty level within the population of sector k (G_k and D_k) must be weighted by the size of that sector (α_{k1} and α_{k2}) within the global population. If G_k and D_k are zero in sector k, the contributions of growth and redistribution will also be equal to zero regardless of the population share of sector k. On the other hand, if the population share of sector j is very small, its growth contribution to the overall change in poverty level will be small, regardless of the change in poverty level (G_j, D_j) in this sector.

4. DATA AND SECTOR CHARACTERISTICS

The two major data sources that we used are: (1) National Accounts (referred to as NAM) for macroeconomic data and, (2) the two national household surveys (*Enquêtes Prioritaires*, referred to as EP) on household living conditions. EP *I* for the year 1994 consists of a sample of 8,642 households and EP *II* for 1998 has a sample of 8,478 households. In both surveys, a 2-step stratified sampling procedure is used with several strata. This sample design will be taken into account for the computation of standard deviations.

Furthermore, we chose to disaggregate into four types of sectoral decomposition that we will refer to as *E1* to *E4*. Set *E1* is the usual economic sectors such as primary, secondary, service sectors including other sectors used for unspecified social economic group. *E2* characterizes regional decomposition into seven regions or cities including West, South-Southwest, Central North, Central South, North, other cities and Ouagadougou-Bobo. Set *E2* can be seen as referring to a geographical decomposition and in Burkina this decomposition is important as the poverty reduction strategy paper is implemented in part on a regional basis. It was not possible to use the actual thirteen (13) official regional divisions that existed in 1998 since these were created in 1996 after the 1994 survey. Our decomposition is meant to differentiate between five large rural and two urban areas (*E2*) to capture agro-climatic and infrastructural differences, which two important aspects of growth. *E3* subdivides the primary sector of the *E1* classification into agricultural and other primary sectors (fishing and livestock). The other *E1* groups are maintained to complete this decomposition. Lastly, set *E4* decomposes the agricultural sector into food crop sector and cotton sector while aggregating all others sectors (non-agricultural sector). Thus, sets *E1*, *E3*, *E4* have been defined by taking into account standard macroeconomic sectors in which the household work and information found in the HS.

5. FINDINGS

5.1. Relation between Consumption, GDP and Poverty

Poverty measures and *per capita* average consumption in these four types of decomposition in Burkina Faso are presented in Table 1 while Table 2 presents macroeconomic indicators.

Table 1: FGT poverty measures and per capita average consumption in sectors in Burkina Faso (1994 and 1998).

Sets	Sectors	Year	% population	Poverty measures from surveys (%)			*Per capita* mean expenditure (cfaf 1000) from *Household-Surveys*	*Per capita* mean expenditure (cfaf 1000) from *National Accounts*
				FGT_0	FGT_1	FGT_2		
E1	Primary	1994	79.00	51.03	15.95	6.87	48.61	44.66
		1998	82.89	35.26	9.57	3.89	58.43	49.35
	Secondary	1994	3.39	13.55	3.11	1.09	139.88	128.52
		1998	1.98	6.99	1.93	0.77	150.77	127.35
	Service	1994	10.01	5.52	1.48	0.60	180.29	165.64
		1998	10.46	4.91	0.98	0.29	215.22	181.78
	Other unspecified	1994	7.61	41.72	14.81	7.12	75.19	69.08
		1998	4.67	26.59	7.37	2.91	92.22	77.89
E2	West	1994	18.14	40.14	11.91	4.89	61.08	56.12
		1998	17.24	28.92	7.40	2.65	76.33	64.47
	South. Southwest	1994	13.25	48.23	15.60	6.57	59.16	54.35
		1998	15.19	25.30	6.80	2.82	65.86	55.63
	Central North	1994	22.97	61.17	20.88	9.54	40.45	37.16
		1998	22.06	43.32	11.78	4.65	47.16	39.83
	Central South	1994	24.05	51.50	14.70	6.00	49.39	45.37
		1998	23.82	39.40	11.58	5.14	60.34	50.96
	North	1994	5.40	50.21	18.77	9.64	50.34	46.25
		1998	6.21	29.69	6.74	2.38	63.90	53.97
	Other cities	1994	4.81	18.11	4.90	1.89	115.40	106.02
		1998	5.37	14.02	3.14	1.23	129.62	109.48
	Ouagadougou Bobo	1994	11.38	7.11	1.53	0.54	162.97	149.73
		1998	10.12	7.50	1.60	0.53	191.48	161.73
E3	Primary-Agriculture	1994	83.27	51.47	16.22	7.03	48.44	45.50
		1998	82.77	35.31	9.58	3.89	58.30	49.20
	Other sectors	1994	16.73	9.81	2.87	1.28	158.85	145.94
		1998	17.23	11.00	2.81	1.05	174.03	146.99
E4	Food Crop	1994	68.08	51.52	16.33	7.06	47.50	43.64
		1998	65.35	37.11	10.15	4.13	54.65	46.16
	Cotton	1994	10.43	50.07	13.75	5.59	51.26	47.09
		1998	16.78	28.48	7.54	3.05	70.14	59.24
	Non-agricultural	1994	21.49	19.54	6.66	3.15	135.98	124.93
		1998	17.86	11.70	2.89	1.06	172.11	145.37
Burkina Faso		1994	100	44.50	13.98	6.07	66.91	61.47
		1998	100	31.13	8.41	3.40	78.23	66.08

Note : Consumptions have been deflated using the Private Consumption Deflator (Constant CFAF of 1985) provided by NAM.

Source: These figures have been computed from data extracted from *"Enquêtes Prioritaires"* I (1994) and II (1998) and National Accounts (NAM) of the corresponding years.

When comparing poverty indices between 1994 and 1998 and using 1985 CFA francs, poverty incidence falls by about 30% (from 44.5% in 1994 to 31.13% in 1998), poverty gap falls by 40% (13.98% to 8.41%) and poverty severity falls by 44% (6.07% to 3.40%) between 1994 and 1998. These results are not independent of the 17% increase (66,910 Fcfa to 78,230 Fcfa) in the *per capita* real expenditure calculated from the HS.

Looking at poverty dynamics by sector, we note that poverty incidence dropped by 11% in the service sector (5.52% to 4.91%), by 31% in the primary sector (51.03% to 35.26%) and by 48% in the secondary sector (13.55% to 6.99%) and in the South and South-West regions by 48.23% and 25.30% respectively. Only two sectors witness worsening poverty incidence: (1) large cities: 5% increase in Ouagadougou and Bobo Dioulasso (from 7.11% to 7.50%), and (2) non-agricultural sector of set *E3*: with a 12% increase (going from 9,81% to 11%). From this we see that poverty changes are very different from one sector to another.

The results presented in Table 1 also reveal that the *per capita* average expenditure is higher in HS versus National Accounts (NAM) and this holds for all decompositions. National survey average is 8.85% higher than NAM's average for 1994 and 18.39% for 1998. This result suggests that using NAM consumption to evaluate poverty would result in higher poverty measures if the same nominal poverty levels are used.

Table 2 : Evolution of macroeconomic data in Burkina Faso (94-98)

	1994	**1998**
Population (million)	9, 938, 100.00	10, 809, 300.00
	National account	
Consumption (cfaf 1,000)	627.60	1,105.05
Investment (cfaf 1,000)	286.80	401.34
Public expenditure (cfaf 1,000)	162.00	248.21
Imports (cfaf 1,000)	263.40	470.49
Exports (cfaf 1,000)	149.40	213.16
GDP (1,000 Fcfa)	962.40	1.497.27
Consumption deflator (1985 price)	108.70	157.80
GDP deflator (1985 price)	111.50	134.40
National mean expenditure (cfaf)	63,150.90	102,231.60
GDP % growth	6.59%	
National mean expenditure % growth	2.76%	
	Survey	
Survey mean expenditure (cfaf)	72,727.8	123,456
Survey mean expenditure % growth	3.99%	
Survey GDP % growth	8.50%	

Sources: Data and economic and financial indicators based on "*Instrument Automatisé de Prévisions*" (IAP), developed by the "Ministère de l'Economie et des Finances" (MEF), in collaboration with GTZ, March 2003.

The upper part of Table 2 summarizes the main macroeconomic indicators of Burkina Faso for 1994 and 1998[15]. The lower part shows the results obtained by combining national accounting data with those calculated from HS. One can observe that all macroeconomic aggregates and the population have grown between 94 and 98. Consumption and imports exhibit higher nominal increases at 76.1% (627,600 Fcfa to 1,105,050 Fcfa) and 78.6% (263,400 Fcfa to 470,490 Fcfa) respectively. Public expenditure follows with an increase of 53.2% and finally, investment and exports recorded the

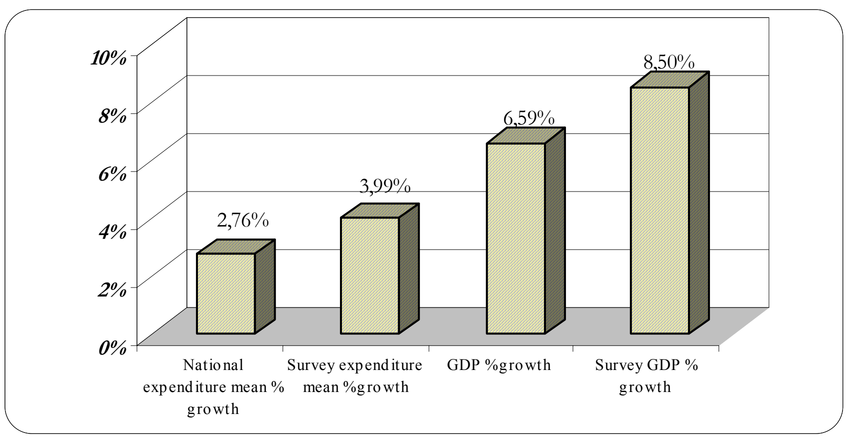
[15] The data for 1998 are based on an expectation.

smallest increase at 39.9% and 42.7% respectively. Furthermore, the consumer price index exhibited a strong increase, which can be explained by the CFA franc devaluation in January 1994. The same trend was observed for all countries of the zone (CFA zone). Since 1995, inflation and consumer prices have remained relatively stable.

National mean expenditure describes the average consumption expenditure obtained from I-O table (C_{nam}) divided by the size of Burkina Faso's population as determined by the national population census. The *survey* mean expenditure is obtained in the same way using C_{hs}, or the total expenditure figure provided by the household survey. We computed the growth rate of this aggregate by applying the consumption deflator. Results revealed that the growth figure from the NAM was lower than the HS figure at 2.76% compared to 3.99% for the HS. Using the same approach, we compared NAS GDP (GDP_{nam}) growth with HS GDP (GDP_{hs}) growth and the result obtained follows the same pattern. The economic growth rate is higher from HS data than NAM data (8.50% and 6.59%).

Figure 1 presents the differences in annual growth rates between *per capita* real consumption and real GDP based on both NAM and Survey data sources.

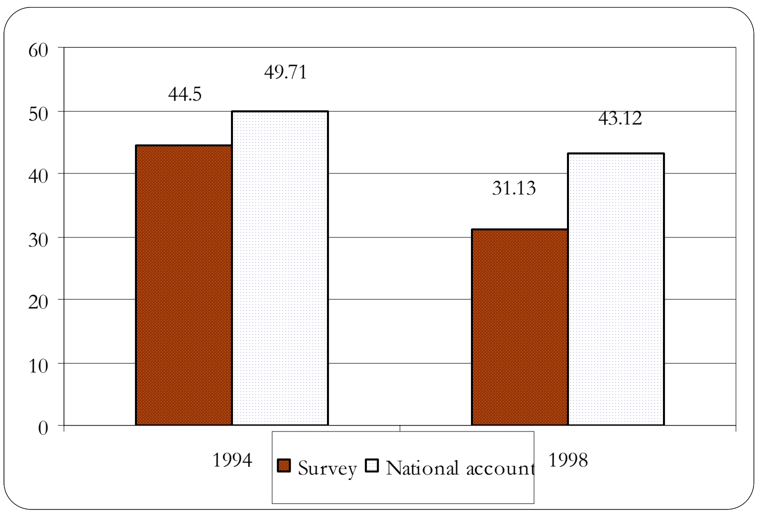
Figure 1: Comparative table of mean expenditure (μ) and GDP growth: Burkina Faso 94-98



Two conclusions can be drawn from these results. The annual growth rate of *per capita* consumption based on NAM (2.76%) is 44.56% smaller compared to the survey figure (3.99%). Similar difference is observed in the GDP growth rate based on the total consumption figure provided by NAM (6.59%) which is 28.98% smaller; compared to the GDP growth rate as computed on the basis of survey total consumption figure (8.5%). On the other hand, using the *per capita* consumption growth rate estimated on the basis of survey data as a proxy of economic growth rate, results in an under-estimation of about 65.16% (3.99% compared to 6.59%).

Figure 2 gives the corresponding poverty incidence. The following poverty measures have been computed on the basis of the total nominal consumption figure provided by NAM and applied it to the household micro consumption structure drawn from the surveys. National accounts consumption figure - which is smaller - gives greater poverty incidences for 1994 and 1998 compared to those obtained from the consumption figure provided by the surveys. On the growth side, an annual 3.99% increase of *per capita* real consumption based on the survey figure gives 30% (44.5% to 31.13%) decrease in poverty incidence. The corresponding decrease in poverty incidence is almost half (13.25%) based on the consumption figure calculated from NAM source (6.59%) annual growth rate of GDP.

Figure 2 : Implication for poverty analysis (FGT_0 %)



National accounts and survey data and their corresponding poverty measures differ markedly and this finding is compatible with what is found in Ravallion, 2001a; Deaton, 2004. Poverty dynamics or essentially the monetary measures of poverty are driven in large part by *per capita* consumption growth. It is therefore possible to experience at the same time a decrease in *per capita* consumption and macroeconomic growth in terms of GDP growth.

5.2. Economic decomposition

By economic decomposition we refer to the decomposition of production sectors of the economy and we refer to this decomposition as *E1* decomposition. Table 3 and 4 (Cf. Appendix) give the respective relative and absolute contributions of growth, redistribution and populations shifts to change in poverty level between 1994 and 1998 respectively based on the consumption figure obtained from survey and national accounts data. The variation in FGT poverty measures over time (ΔP) was decomposed according to "*Shapley value*" as indicated earlier on into contributions of growths (G_k), redistributions (D_k) and changes in population size (Δa_k) for K sectors of each set (Ej). The results shown in Table 3 and Table 4 indicate that poverty incidence (FGT_0) decreases by 0.1337 points between 1994 and 1998 with consumption of HS compared to 0.0658 according to national account source. The gap between the two data sources decreases as poverty aversion (α) rate increases.

It appears from the decomposition of set *E1* with survey data that the primary sector contributes 82.87% of the decrease in the poverty index or 0.1108 points of the 0.1337 points decrease or 82.87% of the decrease. It is the largest single contributor to change in poverty level in this set. This total contribution of the primary sector to the reduction in poverty is explained by a decrease of 0.1143 points (85.45%) associated to the growth, a decrease of 0.0134 points (9.99%) can be attributed to redistribution, and an increase of 0.0168 points (12.56%) that aggravates poverty is caused by the change in population size active in the sector. When using NAM data (Table 3), the contribution of the primary sector and redistribution are reduced to 70.87% and 7.59% respectively. However, growth and changes in population size (in absolute value) increased the contribution. For growth it went from 85.45% to 94.51% and for population change from -12.56% to -31.22%.

Table 3: Relative Impacts of sectoral growth (G_k), redistribution (D_k), and change in population size (Δa_k) on global change in poverty level (ΔP).

Sets	Sectors (k)	Relative contributions to FGT_α / Consumption from survey source (%)				Relative contributions to FGT_α / Consumption from NAM source (%)			
		FGT_0 : ΔP = - 0.1337				FGT_0 : ΔP = - 0.0658			
		G_k	D_k	$\Delta\alpha_k$	Total k	G_k	D_k	$\Delta\alpha_k$	Total k
E1	Primary	85.45	9.99	-12.56	82.87	94.51	7.59	-31.22	70.87
	Secondary	0.23	1.09	1.08	2.39	-0.2	2.79	2.81	5.4
	Service	2.18	-1.72	-0.17	0.29	2.98	-4.88	-0.52	-2.41
	Others	5.39	1.55	7.5	14.44	6.41	1.19	18.53	26.14
E2	West	19.27	-4.42	2.33	17.17	22.18	-9.96	5.84	18.06
	South-Southwest	7.39	16.98	-5.33	19.04	3.58	29.78	-13.63	19.74
	Central North	22.18	7.86	3.53	33.57	18.79	6.39	8.68	33.86
	Central South	29.42	-7.76	0.78	22.45	35.75	-11.43	1.91	26.24
	North	6.9	2.01	-2.41	6.5	8.45	3.62	-5.98	6.08
	Other cities	1.53	0.03	-0.67	0.89	1.12	-1.13	-1.92	-1.93
	Ouaga-Bobo	2.74	-3.06	0.69	0.38	3.75	-7.76	1.96	-2.05
E3	Primary agriculture	88.46	11.82	1.62	101.9	97.13	11.99	4.02	113.14
	Others	2.34	-3.85	-0.39	-1.9	0.62	-12.7	-1.06	-13.14
E4	Crop food	53.35	18.54	9.01	80.9	46.25	20.3	22.4	88.94
	Cotton	24.03	-2.07	-18.65	3.32	34.47	-3.03	-46.26	-14.82
	Non-Agricultural	11.17	0.37	4.24	15.78	15.48	-0.46	10.85	25.88

Sets	Sectors (k)	Relative contributions to FGTα / Consumption from survey source (%)				Relative contributions to FGTα / Consumption from NAM source (%)			
		FGT_1 : ΔP = - 0.0557				FGT_1 : ΔP = - 0.0384			
E1	Primary	81.62	11.21	-8.92	83.91	76.51	18.05	-17.04	77.52
	Secondary	0.27	0.3	0.64	1.2	-0.06	0.85	1.27	2.05
	Service	1.33	-0.4	-0.1	0.84	1.48	-1.17	-0.21	0.1
	Others	5.39	2.82	5.85	14.05	5.36	4.12	10.86	20.33
E2	West	18.03	-3.68	1.56	15.91	18.97	-6.4	3.06	15.63
	South-Southwest	7.15	15.32	-3.9	18.57	2.74	26.4	-7.36	21.78
	Central North	22.71	14.09	2.65	39.45	17.39	20.59	4.98	42.96
	Central South	26.57	-13.16	0.54	13.95	26.97	-19.66	1.04	8.35
	North	700,00%	5.54	-1.85	10.69	7.55	8.03	-3.44	12.14
	Other cities	1.27	0.33	-0.4	1.21	0.71	0.35	-0.83	0.23
	Ouaga-Bobo	1.71	-1.84	0.36	0.23	1.71	-3.6	0.79	-1.1
E3	Primary agriculture	84.69	14.23	1.16	100.07	79.72	22.77	2.2	104.69
	Others	2.17	-1.99	-0.25	-0.07	0.31	-4.49	-0.52	-4.69
E4	Crop food	52.63	21.39	6.47	80.49	36.21	34.2	12.33	82.73
	Cotton	20.67	-5.48	-12.14	3.05	26.67	-7.87	-23.69	-4.88
	Non-Agricultural	9.25	4.09	3.11	16.46	10.71	5.57	5.88	22.16
		FGT_2 : ΔP = - 0.0266				FGT_2 : ΔP = - 0.0204			
E1	Primary	82.11	8.58	-7.86	82.83	75.05	16.22	-14.13	77.14
	Secondary	0.23	0.09	0.49	0.81	-0.05	0.36	0.94	1.24
	Service	1.1	0.1	-0.07	1.12	1.1	-0.24	-0.15	0.71
	Others	5.73	3.99	5.53	15.24	5.53	5.82	9.56	20.91
E2	West	17.34	-2.43	1.28	16.19	18.46	-4.94	2.4	15.91
	South-Southwest	7.36	12.64	-3.42	16.58	2.67	23.18	-6.06	19.79
	Central North	24.04	17.28	2.41	43.73	17.9	26.44	4.26	48.6
	Central South	26.92	-19.16	0.48	8.25	26.27	-27.8	0.87	-0.66
	North	7.13	8.7	-1.82	14.01	7.69	12.29	-3.08	16.9
	Other cities	1.09	0.18	-0.32	0.95	0.56	0.38	-0.62	0.33
	Ouaga-Bobo	1.37	-1.34	0.25	0.29	1.27	-2.68	0.54	-0.87
E3	Primary agriculture	85.47	12.26	1.02	98.76	78.46	21.89	1.83	102.19
	Others	1.98	-0.52	-0.22	1.24	0.28	-2.05	-0.41	-2.19
E4	Crop food	53.57	19.69	5.71	78.98	35.95	34.03	10.27	80.25
	Cotton	19.71	-6.72	-10.29	2.7	24.92	-10.29	-18.79	-4.17
	Non-Agricultural	9.31	6.15	2.87	18.32	10.15	8.75	5.02	23.92

Source: Figures calculated on the basis of decomposition results obtained with DAD4.4 software (Duclos et *al*., 2005)

Total contributions to poverty depth and severity are quite similar except when using HS data albeit there is a change in the ranking of effects because the redistribution effect is stronger than the population effect when poverty aversion rate is superior to zero. Based on NAM data, we observe an increased contribution of the primary sector to poverty depth and severity versus its contribution to poverty incidence changes The major difference between poverty indices is that the negative contribution of population growth sharply decreases with a higher α (31.22% for incidence down to 17.04% and 14.13% respectively for depth and severity). The reduction of the contribution of population growth is compensated by a growing redistributive effect.

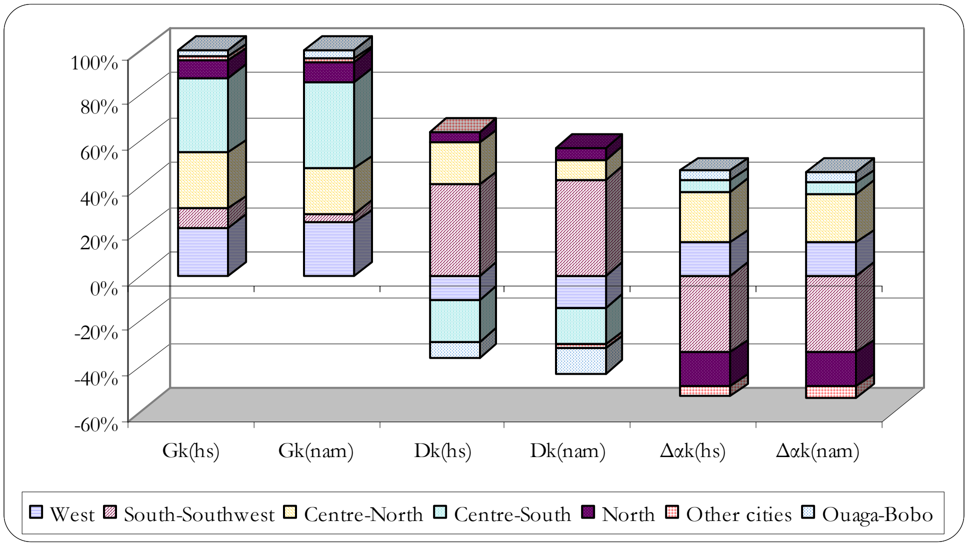
For the other economic sub-sectors of set E_1, their contributions are very marginal, and that of the service sector is even negative when using NAM data to compute poverty incidence (-2.41%). The contribution of secondary sector growth is quite insignificant (less than 1%) irrespective of data sources and poverty aversion rate. Another result is that the contribution of population growth is positive for poverty reduction. The contribution of the service sector growth is slightly stronger but redistributive contribution becomes negative although decreasing with the increase in the poverty aversion rate.

Finally, the primary sector appears to be the single largest contributor to poverty reduction in Burkina Faso based on both data sources with the predominance of growth contribution. However, the changes in the size of the population and this strong growth contribution tend to suggest that regional and sectoral migration as well as birth control should be integrated to poverty reduction policy package to maximize their impact. This result is even stronger when using national accounts data.

5.3. Regional decomposition

As announced earlier herein, we applied the decomposition approach to seven regions or cities since geographic location is a key component of the global poverty reduction strategy especially in the PRSP context. Figure 3 summarizes the FGT_0 variation results presented in Table 3.

Figure 3 : Contributions of regional growth and redistribution to FGT_0 variation



Total contribution (growth, population and distribution) in the South-Southwest, Central North and Central South regions drove 75.06% of the change in headcount over the 4-years period with the survey data. Based on these data source, the two regions with the strongest growth contribution of poverty incidence was Central South region which accounted for 29.42% of the reduction followed by the Central North region with a contribution of 22.18%. In its part, the South-Southwest region exhibited the strongest positive redistributive contribution at 16.98%. Central North region, North region and other cities produced a weak pro-poor redistribution effect. Income distribution helps reduce poverty across these regions while it is the opposite in other regions. Growth contribution in South-Southwest and North regions is less than 10%, with the cities accounting for the lowest contribution (less than 3%). The national accounts data produces a pattern (regional classification) that is not modified when considering growth and redistribution contributions. However, nominal values of estimates are different and generally higher except for the Central North region.

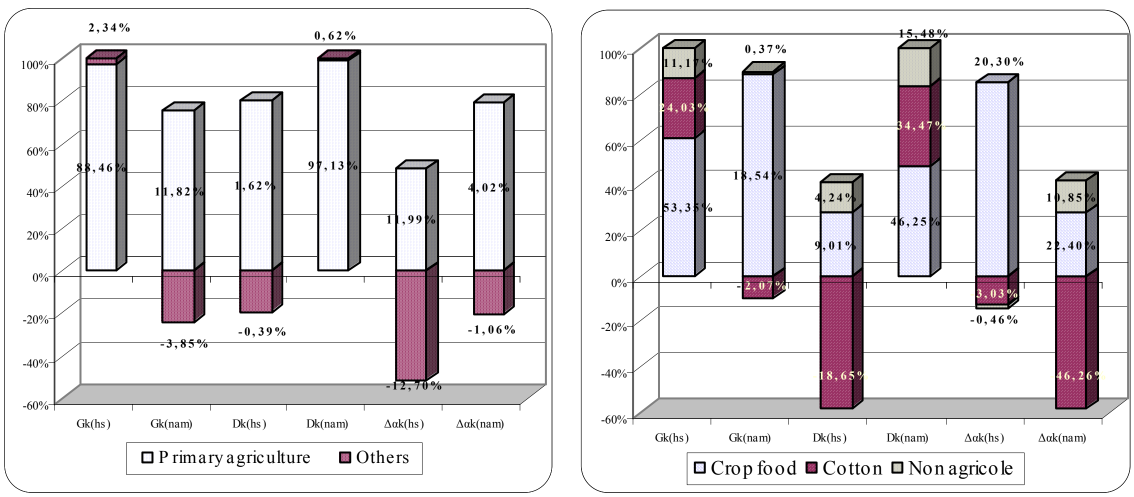
Variations in population size between 1994 and 1998 contributed to poverty reduction in certain regions (West, Central North, Central South, and Ouaga-Bobo) and to poverty aggravation in others (South-Southwest, North, Other cities). Again, these trends are similar when comparing results obtained from HS and NAM although values are higher nominal with the NAM source.

The previous pattern of growth, redistribution and population change (signs of impacts and regional ranking) was maintained for poverty gap (FGT_1) and severity (FGT_2). However, it is not possible to infer on the dominance of contributions when comparing the two data sources. In some instances, contributions from one data source dominate the other and in other cases it is the other data source results that dominate.

5.4. Agricultural decomposition

As we have explained earlier herein, that the « *primary – agriculture* » sector represents households where the head of the household is working as a farmers. The "*other*" sub-sector includes other sectors of the economy (secondary and service sectors) as well as the ones where the head of household work in the fishing and forestry sectors. For E_4 decomposition, we decomposed the primary-agriculture in food crop farmers and cash crop farming (which is mainly composted of cotton producers). The third sub-sector for E_4 includes all other socioeconomic categories. Figure 4 summarizes the results obtained for these two decompositions.

Figure 4: Contributions of agricultural growths and redistribution to FGT0 variation



First, we observe that farmers and especially food crop farmers contribute more to poverty reduction than the households of other sub-sectors. This effect is valid irrespective of data sources (HS versus NAM) and poverty aversion level. For poverty incidence and depth, this contribution even surpasses observed poverty reduction levels with contribution of over 100%. For FGT_0 and HS the contribution is 101.9% and 100.7% for FGT_1 and HS. As for the NAM data, the contribution is 113.14% for incidence 104.69% for depth. These results suggest that the "*other*" sub-sectors contribute to increasing the poverty. This increase comes from the redistribution effects or growth when we expected that is would reduce it. Presumably, this aggravating effect is due to the fact that these sub-groups are composed of very households and therefore higher inequality within the group.

Growth contribution is always negative (in absolute terms[16]) which tends to confirm that growth contributes to reduced poverty. However, as pointed out earlier on, this contribution is different from sub-sector to the other. For example, the food crop farming sector contributes more to

[16] Cf. Table 4 in the appendix.

poverty reduction than the cotton sector. The difference (53.35% compared to 24.03% for FGT_0) is not as strong when using the NAM data where the difference is 46.25% compared to 34.47%. We have also noted that the redistributive and population shift effects always exhibit identical signs excepted for the non-agricultural sub-sector of E_4 decomposition.

When considering each agricultural decomposition using the HS data source, and when we observe poverty reduction, growth produces the strongest effect in absolute terms; it is followed by the redistribution effect and the impact of population change when the signs are similar (positive sign). Moreover, when both contributions (redistribution and population change) have opposite signs compared to growth effect, population effect is clearly higher (in absolute value) to redistribution contribution. When using NAM data we observe much stronger effect from the population shift then with the redistribution effect in absolute value. This contribution of population effect is even stronger then the growth effect at 46.25% compared to 34.4% contributions.

When looking at poverty incidence, some results appear to differ when comparing micro data with macro data. We cannot conclude that relative contribution for growth effect and redistribution effect from one of the two data source is always higher. We observe cases where it is higher for the HS and other cases where it is higher with the NAM. But the impacts associated to population shifts are always stronger in absolute value when using NAM in the case of the agricultural sector decomposition (E_4). The absolute value of redistribution contribution increases with NAM data, when we look at poverty depth and severity.

We have also observed that in the case of a few decompositions, ranking changes depending on the database used. An instance of this is the food crop farming sector in *E4*, the redistribution effect is stronger then the population effects (18.54% versus 9.01%) with HS while the population effect is stronger then the redistribution effect (22.4% versus 20.3%) with the NAM.

The importance of the agriculture sector contribution to poverty reduction clearly comes out in the agricultural decomposition figures presented. However, the decomposition in E_4 shows that sub-sectors don't have the same relative contribution and to implement the most efficient poverty reduction policies needs to go beyond low level of decomposition used in E_3. For instance, food crop farmers contribute strongly to poverty reduction while the "*cotton*" sector farmers barely contribute (3.32%) when using HS. If we use NAM, cotton farmers don't contribute to reduce poverty but contribute to aggravate it (+14.82%). On these grounds, one can suggest focusing on food-crop to achieve pro-growth and pro-poor policies. This should be done in combination to controlling population growth such as birth control, regional or sectoral migration policies to mitigate the negative impact they have on poverty incidence.

6. CONCLUSION AND ECONOMIC POLICY IMPLICATIONS

This purpose of this paper is to discuss the impact of doing growth-inequality-poverty analysis with two types of data sources such as – National Accounts (NAM) versus Households Surveys (HS) – and the effects of sectoral growth on poverty analysis. Based on different consumption figures in HS and NAM data, poverty measured on these two data source were also different . NAM consumption figure - which is smaller than HS - gives greater poverty incidences for 1994 and 1998 than those of NAM. In terms of growth, an annual 3.99% increase in HS *per capita* real consumption generates a 13.37% decrease in poverty incidence. The corresponding decrease in poverty incidence is twice smaller (6.59%) based on NAM figures and the equivalent annual GDP growth of 6.59%. The major force behind poverty dynamics, is the growth of HS *per capita* consumption. It is therefore possible to experience at the same time a decrease in HS *per capita* consumption and macroeconomic (GDP) growth. To have an effective impact on poverty reduction, economic growth (GDP) should be driven by the *per capita* household consumption or income growth. One of the questions raised is what kind of sectoral growth is most beneficial to the poor? This question was examined through a sectoral decomposition of poverty variation over time with the two data sources.

Many economic sectors have been considered in this analysis. Primary sector growth alone accounted for 85.45% of the change in poverty incidence between 1994 and 1998 in Burkina Faso. With NAM figures, the contribution of primary sector growth dropped to 75.05%. The results obtained for regional decomposition indicated that 70.87% of the change in poverty headcount ratio between 1994 and 1998 was driven by growth in three regions (Central South, Central North and West). The growth contribution of each of the other regions is less than 15%. Cities accounted for the lowest growth contribution (less than 3%). Primary agricultural sector growth accounted for 88.46% of the decrease in poverty incidence. Looking at agricultural sub-sectors, the results indicated that food crop sub-sector growth accounted for 53.35% of the change in poverty headcount ratio while the cotton sector growth was responsible for 24.04% change in headcount. However, redistribution impact is negative to the poor in the cotton sub-sector. The results highlighted the importance of the agricultural sector in poverty reduction strategies. The important role played by the agricultural sector in the promotion of economic growth and poverty reduction was also demonstrated in Ethiopia (Block, 1999), and South Africa (Khan, 1999).

Two major lessons can be drawn from the results. The first lesson is that micro side growth, no matter whether its *per capita* consumption or income is low, generally contributes more largely to a decline in poverty than stronger macroeconomic growth. Secondly, the agricultural sector plays an important role in poverty reduction. Focusing in the agricultural sector on food crop sub-sector will result at least in 80% drop in poverty incidence, gap and severity. The importance of this food crop sub-sector can be explained by the fact that it produces the pro-poor distribution and population shift effects that reinforces positive growth impact. In the cotton sub-sector, only growth impact entails poverty reduction. Redistribution and population variations increase poverty in the cotton sub-sector and therefore reduce the global impact of the sub-sector on poverty reduction.

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8. APPENDIX

Table 4: Absolute Impacts of sectoral growth (G_k), redistribution (D_k) and change in population size (Δa_k) on global change in poverty level (ΔP).

Sets	Sectors	Absolute contributions to FGTα / Consumption from survey source				Absolute Contributions to FGTα / Consumption from NAM source			
		FGT_0 : ΔP = - 0,1337				FGT_0 : ΔP = - 0,0658			
		G_k	D_k	$\Delta\alpha_k$	Total k	G_k	D_k	$\Delta\alpha_k$	Total k
E1	Primary	-01143	-0,0134	0,0168	-0,1108	-0,0622	-0,0050	0,0206	-0,0467
	Secondary	-0,0003	-0,0015	-0,0014	-0,0032	0,0001	-0,0018	-0,0019	-0,0036
	Service	-0,0029	0,0023	0,0002	-0,0004	-0,0020	0,0032	0,0003	0,0016
	Others	-0,0072	-0,0021	-0,0100	-0,0193	-0,0042	-0,0008	-0,0122	-0,0172
E2	West	-0,0258	0,0059	-0,0031	-0,0230	-0,0146	0,0066	-0,0038	-0,0119
	South-Southwest	-0,0099	-0,0227	0,0071	-0,0255	-0,0024	-0,0196	0,0090	-0,0130
	Central North	-0,0297	-0,0105	-0,0047	-0,0449	-0,0124	-0,0042	-0,0057	-0,0223
	Central South	-0,0393	0,0104	-0,0010	-0,0300	-0,0235	0,0075	-0,0013	-0,0173
	North	-0,0092	-0,0027	0,0032	-0,0087	-0,0056	-0,0024	0,0039	-0,0040
	Other cities	-0,0020	0,0000	0,0009	-0,0012	-0,0007	0,0007	0,0013	0,0013
	Ouaga-Bobo	-0,0037	0,0041	-0,0009	-0,0005	-0,0025	0,0051	-0,0013	0,0014
E3	Primary - agriculture	-0,1183	-0,0158	-0,0022	-0,1363	-0,0640	-0,0079	-0,0026	-0,0745
	Others	-0,0031	0,0051	0,0005	0,0025	-0,0004	0,0084	0,0007	0,0087
E4	Food Crop	-0,0713	-0,0248	-0,0121	-0,1082	-0,0305	-0,0134	-0,0147	-0,0586
	Cotton	-0,0321	0,0028	0,0249	-0,0044	-0,0227	0,0020	0,0305	0,0098
	Non-Agricultural	-0,0149	-0,0005	-0,0057	-0,0211	-0,0102	0,0003	-0,0071	-0,0170
		FGT_1 : ΔP = - 0,0557				FGT_1 : ΔP = - 0,0384			
E1	Primary	-0,0455	-0,0062	0,0050	-0,0467	-0,0294	-0,0069	0,0065	-0,0298
	Secondary	-0,0002	-0,0002	-0,0004	-0,0007	0,0000	-0,0003	-0,0005	-0,0008

Sets	Sectors	Absolute contributions to FGTα / Consumption from survey source				Absolute Contributions to FGTα / Consumption from NAM source			
		FGT_0 : ΔP = - 0,1337				**FGT_0 : ΔP = - 0,0658**			
		G_k	D_k	$\Delta\alpha_k$	*Total k*	G_k	D_k	$\Delta\alpha_k$	*Total k*
	Service	-0,0007	0,0002	0,0001	-0,0005	-0,0006	0,0005	0,0001	0,0000
	Others	-0,0030	-0,0016	-0,0033	-0,0078	-0,0021	-0,0016	-0,0042	-0,0078
E2	West	-0,0100	0,0021	-0,0009	-0,0089	-0,0073	0,0025	-0,0012	-0,0060
	South-Southwest	-0,0040	-0,0085	0,0022	-0,0103	-0,0011	-0,0101	0,0028	-0,0084
	Central North	-0,0126	-0,0078	-0,0015	-0,0220	-0,0067	-0,0079	-0,0019	-0,0165
	Central South	-0,0148	0,0073	-0,0003	-0,0078	-0,0104	0,0076	-0,0004	-0,0032
	North	-0,0039	-0,0031	0,0010	-0,0060	-0,0029	-0,0031	0,0013	-0,0047
	Other cities	-0,0007	-0,0002	0,0002	-0,0007	-0,0003	-0,0001	0,0003	-0,0001
	Ouaga-Bobo	-0,0010	0,0010	-0,0002	-0,0001	-0,0007	0,0014	-0,0003	0,0004
E3	Primary - agriculture	-0,0472	-0,0079	-0,0006	-0,0557	-0,0306	-0,0087	-0,0008	-0,0402
	Others	-0,0012	0,0011	0,0001	0,0000	-0,0001	0,0017	0,0002	0,0018
E4	Food Crop	-0,0293	-0,0119	-0,0036	-0,0448	-0,0139	-0,0131	-0,0047	-0,0318
	Cotton	-0,0115	0,0031	0,0068	-0,0017	-0,0102	0,0030	0,0091	0,0019
	Non-Agricultural	-0,0052	-0,0023	-0,0017	-0,0092	-0,0041	-0,0021	-0,0023	-0,0085
		FGT_2 : ΔP = - 0,0266				**FGT_2 : ΔP = - 0,0204**			
E1	Primary	-0,0219	-0,0023	0,0021	-0,0221	-0,0153	-0,0033	0,0029	-0,0157
	Secondary	-0,0001	0,0000	-0,0001	-0,0002	0,0000	-0,0001	-0,0002	-0,0003
	Service	-0,0003	0,0000	0,0000	-0,0003	-0,0002	0,0000	0,0000	-0,0001
	Others	-0,0015	-0,0011	-0,0015	-0,0041	-0,0011	-0,0012	-0,0019	-0,0043
E2	West	-0,0046	0,0006	-0,0003	-0,0043	-0,0038	0,0010	-0,0005	-0,0032
	South-Southwest	-0,0020	-0,0034	0,0009	-0,0044	-0,0005	-0,0047	0,0012	-0,0040
	Central North	-0,0064	-0,0046	-0,0006	-0,0116	-0,0036	-0,0054	-0,0009	-0,0099
	Central South	-0,0072	0,0051	-0,0001	-0,0022	-0,0053	0,0057	-0,0002	0,0001
	North	-0,0019	-0,0023	0,0005	-0,0037	-0,0016	-0,0025	0,0006	-0,0034
	Other cities	-0,0003	0,0000	0,0001	-0,0003	-0,0001	-0,0001	0,0001	-0,0001
	Ouaga-Bobo	-0,0004	0,0004	-0,0001	-0,0001	-0,0003	0,0005	-0,0001	0,0002
E3	Primary - agriculture	-0,0228	-0,0033	-0,0003	-0,0263	-0,0160	-0,0045	-0,0004	-0,0208
	Others	-0,0005	0,0001	0,0001	-0,0003	-0,0001	0,0004	0,0001	0,0004
E4	Food Crop	-0,0143	-0,0052	-0,0015	-0,0210	-0,0073	-0,0069	-0,0021	-0,0163
	Cotton	-0,0053	0,0018	0,0027	-0,0007	-0,0051	0,0021	0,0038	0,0008
	Non Agricole	-0,0025	-0,0016	-0,0008	-0,0049	-0,0021	-0,0018	-0,0010	-0,0049

Source: Figures calculated from the decomposition results obtained with DAD4.4 software (Duclos et *al.*, 2005).