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Simulation of Private Sector Poverty and Inequality Impacts by Income and Expenditure Sources in Cameroon

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Abstract: This paper assesses the impacts on private sector poverty of changes in the within inequalities of expenditure and income sources. This paper employs the most recent Cameroon Household Consumption Survey which provides the necessary data for our analyses. Our results showed that the largest impact on poverty is registered with increasing food inequalities and the smallest with increasing health inequalities. Concerning regressed income sources, we found that the highest increase in poverty incidence is recorded by increasing inequalities in human capital. Our results also underlined that if we only have a small proportion of private sector workers who are vulnerable in employment, poverty depth will reduce appreciably. Importantly, we observed that the marginal poverty impacts and elasticities of within-component inequalities are sensitive in magnitude to the choice of poverty aversion measures and poverty lines. The government of Cameroon should invest in a system of education that reduces the number of dropouts at primary and secondary levels; this should be probably a system of education that meets the demands of the labour market. If policy provisions allow for only a small proportion of private sector workers to be vulnerable in employment, poverty depth will reduce considerably.

Keywords: Private Sector; Vulnerable Employment; Poverty and Inequality

JEL Classification: O1

1. Introduction

The past decade has witnessed a growing interest in the impact of development on poverty. Poverty remains a major issue for developing countries, especially of the Sub-Saharan Africa (SSA) region. According to the World Bank (2000b), SSA is one of the poorest regions in the world. The problem of widespread poverty in SSA is rooted in the economic downturn of the early 70s (seventies) and late 80s (eighties). This period is marked by serious deteriorations in economic indicators. For instance, collapsed of oil and other exports, terms of trade deteriorated, growth rates decreased, investments dropped, real interest rates rose, and overambitious public investment supported by external debt and distorted incentives. Economic performance, only made her way in by the late 90s (nineties) and this recovery was strongly characterized by high inequality in most countries, preventing the poor from benefiting (Collier & Gunning, 1999). The vision of development underscored in the World Development Report 2006 (WDR) culminates in a conception of development as opportunity equalization (World Bank, 2005). In this context, equity is defined in terms of a level playing field where individuals have equal opportunities to pursue freely chosen life plans and are spared from extreme deprivation in outcomes. In this perspective, the pursuit of equity also entails that of inequality reduction as a whole and employment vulnerability reduction in particular. Inequality in endowments and employment status stands out here as an inevitable component in the struggles to improve standards of living in SSA countries as a whole and Cameroon in particular. Ravallion (1997), Chen and Ravallion (2000) and Ravallion (2001) suggest a negative impact of initial inequality in retarding the impact of growth on relative poverty. However, informed knowledge on the link between inequalities (in human capital endowments and decent employment) and poverty in low income countries as a whole and

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Cameroon in particular is still at large. Essentially, knowledge on this linkage in the private sector, where poverty and inequality are more wide spread, is still absent.

A recent ILO report estimates that roughly 500 million people (that is, 18 % of the work force) in low income countries are "working poor", living with an annual income below the poverty line (ILO, 2007). Although these numbers have fallen, this decline has been driven essentially by development in China, South Asia, and middle-income countries. Despite the important gains during the second half of the 1990s, nearly 4 out of every 10 Cameroonians in 2001 were "working poor", living with an annual income below the poverty line of FCFA 185,490, roughly equivalent to US $1 per person, per day, or FCFA 19,000 per month (Government of Cameroon, 2003). According to the Government of Cameroon (2007), the monetary poverty threshold in 2007 stood at 269, 443 francs CFA per adult equivalent per year and the number of people living under this poverty threshold has increased in the last few years. These disappointing poverty levels may be attributable to the comprising effects of inequalities in endowments (human capital or financial capital) and/or inequalities in decent employment.

Currently, research and development discussions underline or indicate two main prerequisites for meaningful and sustained poverty reduction. The first prerequisite points to sufficient and sustained high growth (Easterly, 2002). Some evidence also highlights that for high and sustained growth to play an effective role in poverty reduction, the poor must significantly share in the fruits of such growth. This way, the second prerequisite acknowledges equality in income distribution or reduction of inequality index (Ravallion, 2004b). According to Araar and Duclos (2010), whether growth reduces poverty, and whether in particular growth can be deemed to be "pro-poor", depends, however, on the impact of growth on inequality and on how much this impact on inequality feeds into poverty. One may say the place of inequality in development programmes and discussions is not too apparent because most development stakeholders and policy authorities still ignore the links between poverty and inequality. However, the recent World Development Report of the World Bank (2005) highlighted one aspect of this link in the phrase "inequality traps", by which it is meant that inequality may be self-reinforcing, hindering growth, and hampering poverty reduction in the longer term. To empirically quantify these suggestions, this paper attempts to explore the nexus between poverty and inequality via an analysis of the poverty impact of changes in the inequalities of regressed income sources and in between- and within-component inequality of these sources among private sector workers in Cameroon. This paper further explores this linkage across employment sectors (formal-informal and farm-nonfarm employment sectors) to account for cross-sector sensitivity.

The designed strategy to cut the number of poor people by half by 2015 through strong and sustainable economic growth, somehow, has been given an additional push by the government of Cameroon. In addition to reducing poverty through sustained economic growth, the government of Cameroon has elaborated the growth and employment strategy paper (GESP) to incorporate an additional instrument called decent employment (opposite of vulnerable employment). The considerations of the poverty impacts of inequalities in vulnerability, job status, labour skills and other labour market variables across employment sectors will further enhance and heighten discussions to promote decent employment in Cameroon. To provide crucial inputs to the stakeholders concerned with the GESP, this paper addresses the following research question: what are the impacts on poverty and inequality of small changes in within-source inequality? Specifically, this paper provides responses to the following questions:

- How much poverty reduction can be obtained with a small change in the inequality of food, health, education, and housing expenses in Cameroon?

- How much poverty reduction can be obtained with a small change in the inequality of employment vulnerability and other regressed-earnings sources in Cameroon?

- Are these poverty impacts sensitive to poverty aversion measures, poverty lines and sectors of employment?

- Which policies would be good at reducing poverty and inequality simultaneously?

The government of Cameroon has declared poverty reduction through decent employment and sustainable economic growth the central objective of its socio-economic policy. This paper employs available household survey data to assess the impacts on poverty and inequality of small changes in within-source inequality. This entails specifically to:

- To assess the headcount poverty impact of a small change in the inequality of food, health, education, and housing expenses in Cameroon;

- To investigate the headcount poverty impact of a small change in the inequality of employment vulnerability and other regressed income sources in Cameroon;

- To assess the sensitivity of this impact across poverty aversion measures, poverty lines and employment sectors (farm/nonfarm and formal/informal); and

- To provide policy measures that tackle poverty and inequality simultaneously.

The objectives may help inform policy makers better on regressed variables-cum-policies which may impact both income inequality and poverty. Confirming this policy objective, Kakwani, Khander and Son (2004) asserts that a policy menu that targets both distributional concerns and poverty reduction worries could lead to the enhancement of both economic growth and equity. Accounting for both the within- and between-components inequality of regressed sources and their impacts on poverty across employment sectors may be crucial for policy design. These objectives would permit both policy analysts and policy makers to better appreciate some of the theoretical and empirical complexities of the nexus between poverty and inequality in Cameroon. The rest of this chapter is organized as follows: section 1.2 reviews the literature that has attempted to simulate the poverty impacts of inequality; section 1.3 presents the theoretical framework; section 1.4 develops the methodology of the study; section 1.5 submits the findings; and section 1.6 concludes and provides recommendations for the study.

2. Literature Review

The most frequently used manner to achieve poverty reduction is through economic growth. But the extent to which this growth reduces poverty depends on its impact on inequality and how much this impact on inequality feeds into poverty. In this perspective, the nexus between growth and inequality has witnessed considerable attention, inter alia, from Kuznets (1955), Bruno et al. (1998), United Nations (2000), World Bank (2000a), Eastwood and Lipton (2001), Dollar and Kraay (2002), and Bourguignon (2003). Some recent attempts show expressed concern on how globalization affects poverty and inequality; we have World Bank (2002), Watkins (2002) and Heshmati (2004). The conceptual definition of pro-poorness displays marked concern on the impact of growth on absolute poverty or on relative inequality; see for instance Kakwani and Pernia (2000), Ravallion and Datt (2002), Kakwani, Khandker, and Son (2003), Ravallion and Chen (2003), Klasen (2003), Son (2004), Essama-Nssah (2005), and Kakwani et al. (2006). The reverse of this link (impact of inequality on poverty or growth) should equally be of concern to policy analysts and policy makers (Araar & Duclos, 2010).

The analysis of the elasticities of poverty and inequality with respect to various types of distributive changes is conceptually analogous to the literature on the contribution of growth and changes in inequality to the evolution of poverty, though methodologically different. Pioneer works in this direction include, Datt and Ravallion (1992), Kakwani (1997), Shorrocks (1999) and Araar and

Awoyemi (2006). The INS (2002) has applied the Datt and Ravallion approach in Cameroon using Cameroon household and consumption survey data, CHCS I and II, collected in 1996 and 2001 respectively, Baye (2006) has also applied both the Datt and Ravallion and the Shapley approach using Cameroon data in the period 1984-1996.

Recent attempts by Essama-Nssah and Lambert (2006), Son (2006), and Essama-Nssah (2010), though methodologically different, track the changes in income component on the pro-poorness of growth.[1] A new approach by Araar and Duclos (2010) provides the theoretical and empirical links between poverty and inequality. This approach considers the poverty impacts of changes in the inequality of income components and changes in the inequality of socio-economic groups in Nigeria. The study concludes that poverty-inequality elasticities can be sensitive to the initial distribution of incomes and the assumptions made in measuring inequality and poverty. These findings suggest the need for more context-specific studies on the elasticities of poverty with respect to inequality. In this respect, we further the regression-based decomposition to assess the nexus between poverty and inequality among private sector households in Cameroon, through analysis of the poverty impact of small changes in inequality among regressed income-components applying the approach developed by Araar and Duclos (2010). For all the regressed sources and for each combined set of regressed sources, variation in within inequality is fashioned to capture the link between poverty and inequality.

3. Theoretical Framework

The heart of the debate surrounding the link between growth, inequality and poverty is to find policies that can commonly maintain growth, reduce poverty and inequality. A recent World Development Report of the World Bank (2005) highlights that inequalities in the economic, social, political and cultural domains may be self-reinforcing, hindering long term growth and poverty reduction potentials. This suggests that it may be helpful to look at the joint evolution of poverty and relative inequality even if the primary goal is to reduce poverty in the long run. However, Araar and Duclos (2010) in underlining that the most recurrent manner to achieve poverty reduction is through economic growth, further emphasis that the poverty reduction potentials of any growth process depends on the impact of growth on inequality and how this impact translate into poverty.

In this light, the link between poverty and inequality should also be of interest from a policy perspective. Thus, the consideration of the poverty impacts of inequalities in vulnerability, job status, labour skills and other labour market variables across employment sectors will provide inputs to complement the decent employment and growth strategy currently earmarked to reduce poverty in Cameroon. This paper draws from the approach developed in Araar and Duclos (2010). Though methodologically different, this approach is analogous to the investigation of the contributions of growth and changes in inequality to the evolution of poverty as developed in Datt and Ravallion (1992), Kakwani (1993; 1997), Shorrocks (1999), Araar and Awoyemi (2006) and Baye (2006).

4. Methodology of Study

To investigate the poverty impact of say a 1% change in inequality within regressed sources of income, we employ the framework proposed by Araar and Duclos (2010). This approach considers that a 1% change in inequality can be expected to generate many different impacts on poverty, depending on the nature of the distributive change and the assumptions made on measuring poverty and inequality. In this sense, it is not appropriate to perceive the poverty-inequality nexus as deterministic; as a given inequality

[1] See (Essama-Nssah, 2010 for Cameroon).

change can possibly affect poverty in many different ways. After a brief presentation of the approach, we will apply it to Cameroon's data to investigate the poverty and inequality impacts of expenditure components and regressed income sources.

4.1. Brief Presentation of the Framework

Let λ be the proportional spread of all incomes away from the mean μ. Let Q(P) be the income at the quantile P. To investigate the impact of the bipolarization (λ) on Foster, Greer, and Thorbecke (1984) (FGT) poverty, post-bipolarization poverty can be defined as:

$$P(z;\alpha;\lambda)=\int_0^1\left(\frac{z-Q(P;\lambda)}{z}\right)^{\alpha}dP \tag{1}$$

Where $Q(P;\lambda)$ is the post-bipolarization P-quantile, which does not affect average income,[1] μ z is a poverty line and α is the poverty aversion parameter (α =0, α =1 or α =2).

The poverty impact of a change in λ can then be shown to be equal to:[2]

$$\left.\frac{\partial P(z;\alpha;\lambda)}{\partial\lambda}\right|_{\lambda=1}=\begin{cases}\alpha\left[P(z;\alpha)+\left((u-z)/z\right)P(z;\alpha-1)\right] & \text{if } \alpha>1\\ f(z)(u-z) & \text{if } \alpha=0\end{cases} \tag{2}$$

It is important to note that three cases determine the sign of equation (2):

Case 1: μ > z, equation (2) is unambiguously positive whatever the value of α ;

Case 2: μ = z, equation (2) is zero for α =0 and positive otherwise;

Case 3: μ < z, equation (2) is negative for α =0.

Considering inequality, the post-bipolarization S-Gini can take the form:

$$G(\rho;\lambda)=u^{-1}\int_0^1\lambda(\mu-Q(P))w(P;\rho)dP \tag{3}$$

Where $w(P;\rho)$ is the relative weight attributed to the distance between the line of perfect equality and the Lorenz curve.

From (3) we then have:

$$\left.\frac{\partial G(\rho;\lambda)}{\partial\lambda}\right|_{\lambda=1}=G(\rho;\lambda) \tag{4}$$

Equation (4) tells us that, at λ =1, the bipolarization derivative of the S-Gini index is just the S-Gini index itself.

The elasticity of FGT poverty with respect to the S-Gini is then given by:

[1] See (Araar & Duclos, 2010).
[2] See (Kakwani, 1993; Araar & Duclos, 2010).

$$\varepsilon_{\lambda}(z;\alpha;\rho)=\left.\frac{\frac{\partial P(z;\alpha;\lambda)/\partial\lambda}{P(z;\alpha;\lambda)}}{\frac{\partial G(\rho;\lambda)/\partial\lambda}{G(\rho;\lambda)}}\right|_{\lambda=1} \quad (5)$$

4.2. Application to Poverty and Inequality of Regressed Sources of Earnings

This application is done in two stages – in stage one, we consider how variations in a expenditure components or regressed income source m affects all Cameroonians in the private sector; and in stage two, we investigate how these variations might have deferential impacts on socio-demographic groups (such as, farm-nonfarm and formal-informal employments sectors).

a) Poverty Impact of Inequality Changes in Expenditure Components and Regressed Income Sources for the Whole Population

To account for the sensitivity of the poverty and inequality elasticity in Cameroon, we consider two poverty lines (the official poverty line, expressed in per capita terms, and the 40th percentile); two poverty aversion parameters, the headcount and the average poverty gap (α =0 and α =1), and the within- and between-components of each regressed income source for specific employment sectors.

Let the expected amount of regressed income source/component m found at percentile P be denoted by $s(P;m)$. Suppose the sum of M regressed income sources equals total income, then:

$$Q(P)=\sum_{m=1}^{M}s(P;m) \quad (6)$$

The overall mean of the regressed income source m is simply $\mu(m)=\int s(P;m)dP$. Note that $s(P;m)$ can be negative if the source m is a tax or a capital income loss, like employment vulnerability for instance.

Within-component inequality

Increased within-component inequality amounts to increasing the bipolarization (or distance), $\eta(m)$ [1], between overall mean component and the individual value of all regressed income components.

Let the post-bipolarization S-Gini be given by:

$$G(\rho;\eta(m))=\mu^{-1}\int_{0}^{1}\left[u-\left(Q(P)+(\eta(m)-1)(s(P;m)-\mu(m))\right]w(P;\rho)dP \quad (7)$$

The impact on inequality of a change in $\eta(m)$, obtained by replacing λ by $\eta(m)$ in equation (4), is as follows:

$$\left.\frac{\partial G(\rho;\eta(m))}{\partial\eta(m)}\right|_{\eta(m)=1}=\psi(m)IC(\rho;m) \quad (8)$$

where $\psi(m)=\mu(m)/\mu$ is the share of regressed income source m in total income and $IC(\rho;m)$ is the coefficient of concentration of source m.

[1] Which replaces the bipolarisation, λ, used in the general presentation of the approach.

Concerning poverty, let the FGT post-polarization poverty be given by:

$$P(z;\alpha;\eta(m)) = \int_0^1 \left(\frac{z - Q(P;\eta(m))}{z} \right)^{\alpha} dP \tag{9}$$

Equation (9) is obtained by simply replacing λ by $\eta(m)$ in equation (1).

Now, the poverty impact of within-component increased bipolarization is written:

$$\left. \frac{\partial P(z;\alpha;\eta(m))}{\partial \eta(m)} \right|_{\eta(m)=1} = \begin{cases} \alpha z^{-1} \mu(m) \left[P(z;\alpha-1) - CD(z;\alpha;m) \right] & \text{if } \alpha > 0 \\ -f(z)\left(s(F(z);m) - \mu(\mathrm{m}) \right) & \text{if } \alpha = 0 \end{cases} \tag{10}$$

Where $CD(z;\alpha;m) = \int_0^1 \left(\frac{z - Q(P)}{z} \right)^{\alpha-1} \frac{s(P;m)}{\mu(m)} dP$ is the Makdissi and Wodon's (2002) normalized consumption-dominance curve for component m and F(z) is the distribution function with density f(z).

Equation (10) can be negative or positive depending on z, α, μ(m) and the distribution of s(P;m). Specifically, the sign of the headcount poverty impact (α =0) depends on the difference between the expected level of regressed income source m at the poverty line and the overall mean value of that source. If $(s(F(z);m)$ is greater than μ(m), then an increase in the inequality of source m will reduce headcount poverty.

The elasticity of poverty with respect to within-component inequality is therefore given by:

$$\varepsilon_{\eta(m)}(z;\alpha;\rho) = \left. \frac{\dfrac{\partial P(z;\alpha;\eta(m))/\partial \eta(m)}{P(z;\alpha;\eta(m))}}{\dfrac{\partial G(\rho;\eta(m))/\partial \eta(m)}{G(\rho;\eta(m))}} \right|_{\eta(m)=1} \tag{11}$$

Between-component Inequality

With between-component inequality, we consider the average amounts of regressed-components and allow within-component inequality unchanged. In this sense, increasing between-component inequality is tantamount to increasing the bipolarization of average income without changing within-component inequality. Keeping the overall mean constant, let $\tau(m)$ be the component-specific factor of change in the average of component m. The marginal impact on the S-Gini of a change in τ is given by:

$$\left. \frac{\partial G(\rho;\tau)}{\partial \tau} \right|_{\tau=1} = \left[G - \sum_{m=1}^{M} \frac{IC(\rho;m)}{M} \right] \tag{12}$$

The poverty impact of this increased bipolarization equals:

$$\left. \frac{\partial P(z;\alpha;\tau)}{\partial \tau} \right|_{\tau=1} = \begin{cases} \alpha \left[P(z;\alpha) - P(z;\alpha-1) + \dfrac{\mu}{z} \sum_{m=1}^{M} \dfrac{CD(z;\alpha;m)}{M} \right] & \text{if } \alpha > 0 \\ -f(z) \sum_{\mathrm{m}=1}^{M} \left(s(F(z);m) \left(1 - \dfrac{\mu/\mathrm{M}}{\mu(m)} \right) \right. & \text{if } \alpha = 0 \end{cases} \tag{13}$$

From (12) and (13), the elasticity of poverty with respect to between-component inequality is therefore given by:

$$\varepsilon_{\tau}(z;\alpha;\rho)=\left.\frac{\frac{\partial P(z;\alpha;\tau)/\partial\tau}{P(z;\alpha;\tau)}}{\frac{\partial G(\rho;\tau)/\partial\tau}{G(\rho;\tau)}}\right|_{\tau=1} \tag{14}$$

Equation (14) could equally be obtained by replacing λ by τ in equation (5) above.

b) Poverty Impact of Changes in Regressed Income Source Inequality by Employment Sectors

Here we investigate how inequality variations in regressed income-source affect deprivation across employment sectors (farm-nonfarm and formal-informal employment sectors).

Specific within Component Inequality

Let $\eta^s(m)$ be the bipolarization between overall mean component of sector s, $\eta^s(m)=\mu(m)/\varphi(m)$, and the individual value of all income components. Let $\varphi(P;m)$ be the proportion of individuals at percentile P that belong to sector s and $\varphi(m)=\int\varphi(P;m)dP$ is the overall population share of those in sector s. In the same manner as in sub-section (a) above, the impact of the bipolarization $\eta^s(m)$ on the S-Gini is written:

$$\left.\frac{\partial G\left(\rho;\eta^s(m)\right)}{\partial\eta^s(m)}\right|_{\eta^s(m)=1}=\psi(m)\left[IC(\rho;m)-IC\left(\rho;\varphi(\rho;m)\right]\right. \tag{15}$$

And the impact on total FGT poverty is given by:

$$\left.\frac{\partial P\left(z;\alpha;\eta^s(m)\right)}{\partial\eta^s(m)}\right|_{\eta^s(m)=1}=\begin{cases}\alpha z^{-1}\mu(m)\left[P(z;\alpha-1;m)-CD(z;\alpha;m)\right] & \text{if } \alpha>0\\ -f(z)\left(s(F(z);m)-\varphi(F(z);m)\mu^s(m)\right) & \text{if } \alpha=0\end{cases} \tag{16}$$

The elasticity of total poverty with respect to within-component inequality is derived by replacing $\eta(m)$ by $\eta^s(m)$ in equation (11) or using (15) and (16).

$$\varepsilon_{\eta^s(m)}(z;\alpha;\rho)=\left.\frac{\frac{\partial P\left(z;\alpha;\eta^s(m)\right)/\partial\eta^s(m)}{P\left(z;\alpha;\eta^s(m)\right)}}{\frac{\partial G\left(\rho;\eta^s(m)\right)/\partial\eta^s(m)}{G\left(\rho;\eta^s(m)\right)}}\right|_{\eta^s(m)=1} \tag{17}$$

Specific between-Component Inequality

With between-component inequality, our interest is on the distance between the mean of all components, the mean of a component being conditional on those in sector s. Here we use a bipolarization factor τ^s and the impact of a change in τ^s on the S-Gini is given by:

$$\left.\frac{\partial G\left(\rho;\tau^{s}\right)}{\partial \tau^{s}}\right|_{\tau^{s}=1}=\left[G-\sum_{m=1}^{M}\frac{\varphi(m)IC(\rho;m)}{\sum_{m}\varphi(m)}\right] \tag{18}$$

Equally, the impact of the bipolarization on poverty equals:

$$\left.\frac{\partial P\left(z;\alpha;\tau^{s}\right)}{\partial \tau^{s}}\right|_{\tau^{s}=1}=\begin{cases}\alpha\left[P(z;\alpha)-P(z;\alpha-1)+\dfrac{\mu}{z}\sum_{m=1}^{M}\dfrac{CD(z;\alpha;m)}{\sum_{m}\varphi(m)}\right] & \text{if } \alpha>0\\ -f(z)\sum_{m=1}^{M}\left(s(F(z);m)\left(1-\dfrac{\mu/\sum_{m}\varphi(m)}{\mu(m)/\varphi(m)}\right)\right. & \text{if } \alpha=0\end{cases} \tag{19}$$

From equation (18) and (19), the elasticity of poverty with respect to between-component inequality is given by:

$$\varepsilon_{\tau^{s}}\left(z;\alpha;\rho\right)=\left.\frac{\dfrac{\partial P\left(z;\alpha;\tau^{s}\right)/\partial\tau^{s}}{P\left(z;\alpha;\tau^{s}\right)}}{\dfrac{\partial G\left(\rho;\tau^{s}\right)/\partial\tau^{s}}{G\left(\rho;\tau^{s}\right)}}\right|_{\tau^{s}=1} \tag{20}$$

This extension of the regression-based decomposition helps provides a link between inequality and poverty using regressed income sources as measures of welfare. It considers both the within- and between-components inequality of regressed sources and their impacts on poverty. Findings from this study may help policy makers to design targeted policies which are expected to affect both poverty and inequality among private sector workers in Cameroon.

5. Data and Poverty Lines Used

Data used

The variables used in this study are obtained from the third Cameroon household and consumption survey, ECAM III. The regressed income sources are combined as per the table below (Table 1) to obtain the following: employment vulnerability; human capital; financial capital; and household demographics. Given that the constant is not an income source per se, a regression without the constant term was done and all the independent income sources were combined[1] into components as in Table 1.

Table 1. Combined income sources

Combined regressed income sources	Income sources
Employment vulnerability	Employment vulnerability indicator[2]
Human capital	Experience, experience square; years of schooling; and head of enterprise.
financial capital	Access to micro-credit
Household demographics	Children below five years old; currently married; and urban residency
Other income sources	Residual term

Source: computed by author

[1] See appendix 2 for the regression results and a comprehensive not on the combination of income sources into components.
[2] See appendix 1 for briefings on the construction of the employment vulnerability indicator.

The expenditure components of the dependent variable are also considered and their descriptive statistics are submitted in Table 2 below.

Table 2. Descriptive statistics of expenditure components and combined income sources

Variables	Number of Observations	Mean	Standard Deviation
Expenditure components (per capita per month)			
Food	9219	10454.16	8458.08
Health	9219	933.57	2176.89
Education	9219	976.74	1945.21
Housing	9219	4582.33	5345.06
Other nonfood	9219	5912.66	11674.14
Combined income sources			
Employment vulnerability	9219	87.56361	16.42563
Human capital	9219	4620.39	7411.41
Financial capital	9219	341.87	528.11
Household demographics	9219	2141.98	7571.17
Other income sources	9219	14.67	17229.32

Source: Compiled by author

Poverty lines

The poverty line estimates the amount of money individuals and families of different sizes need to cover the cost of their basic food and non-food needs. According to the Government of Cameroon (Government of Cameroon, 2003), the poverty line represents the estimated annual income necessary for an individual in Yaoundé to buy a minimal basket of basic food and non-food items, including health, education, and housing expenditure. It is often used to assess the incidence and depth of poverty in countries. The poverty line equally permits us to separate the poor from the non-poor. In this study we consider two cut-off points: the official poverty line and the 40th percentile[1] to account for the sensitivity of our results across poverty lines.

The poverty line in 2007 was constituted using the minimal basket of the basic food and non-food items of 2001; they include health, education and housing expenditures. From the poverty thresholds (food and non-food) of Yaoundé in 2001 and the deflators of this same year, poverty thresholds were constituted for all the regions. These poverty thresholds were then inflated to obtain the food and non-food thresholds for all the regions in 2007. The sum of the two thresholds (food and non-food) gave the poverty line for each region. For consistency with 2001, the poverty line of Yaoundé was retained as the national poverty line and the ratio of each regional poverty line to that of Yaoundé provided the deflator of aggregate consumption. The poverty line in 2007 was estimated at 269443 CFA francs per adult equivalent per year (giving 22 454 CFA francs per adult equivalent per month). In this study, the poverty line is translated in per capita terms for consistency reasons; since our dependent variable is evaluated in per capita and not per adult equivalent terms. This is obtained by simply multiplying the adult equivalent poverty line by the mean size of per adult equivalent and dividing by the mean of household size. Thus, the poverty line is estimated at 200800 CFA francs per capita per year (or 16733 CFA francs per capita per month)[2].

[1] Since for all household level distribution, the cut-off point considered is often the 40th percentile.
[2] An individual is poor if he/she lives in a household that spends less than 16733 CFA francs per month. Thus, each member in this household spends less than 16733 CFA francs per month or 540 CFA francs per day.

6. Empirical Results

6.1. Simulated Poverty and Inequality Outcomes of Expenditure Components and Regressed Income Sources: Overall

Table 3 and 4 host the marginal impacts (MIP) on poverty and inequality, as well as the associated elasticities, of changing within- and between-component inequalities. Here we consider the expenditure components (food, health, education, housing and other non-food expenses) that underlie our dependent variable, income per capita. For $\alpha = 0$ and $z = 16733$, the impact on poverty of changing any within-component inequality is smaller than for between-component inequality. The largest impact (MIP) on poverty is registered with increasing food inequalities and the smallest with increasing health inequalities (Table 3). However, when the within-component is changed for all expenditure components simultaneously, the marginal impact of changing within-component inequality (0.00207) is well over that of changing between-component inequality (-0.00019). Between-component elasticities are typically numerically larger than within-component elasticities (Tables 3 and 4).

Table 3. Elasticity of poverty with respect to within- and between-component inequality ($\rho = 2$)

		Poverty line 16733						
			MII (10^{-3})	MIP (10^{-3})	ELS	MII (10^{-3})	MIP (10^{-3})	ELS
Scheme	Expenditure Components m	Share	alpha = 0			alpha = 1		
$\eta(m)$	Food	0.457	1.287	0.432	0.265	1.287	1.214	2.125
	Health	0.041	0.177	0.091	0.406	0.177	0.161	2.056
	Education	0.043	0.180	0.088	0.384	0.180	0.173	2.167
	Housing	0.200	0.816	0.484	0.469	0.816	0.739	2.044
	Other non-food	0.259	1.483	1.056	0.562	1.483	1.289	1.959
η	All components together		3.944	2.071	0.415	3.944	3.577	2.044
τ	Between		-0.290	-0.193	0.526	-0.290	-0.290	2.250

Source: Computed by author with the help of the DASP[1] package

Note: *MII* represents marginal impact on inequality; *MIP* represents marginal impact on poverty; and *ELS* represents elasticity of poverty with respect to inequality.

Table 4. Elasticity of poverty with respect to within- and between-component inequality ($\rho = 2$)

		Poverty line 20272						
			MII (10^{-3})	MIP (10^{-3})	ELS	MII (10^{-3})	MIP (10^{-3})	ELS
Scheme	Expenditure Components m	Share	alpha = 0			alpha = 1		
$\eta(m)$	Food	0.457	1.287	-0.025	-0.013	1.287	1.024	1.298
	Health	0.041	0.177	0.030	0.112	0.177	0.143	1.319
	Education	0.043	0.180	0.002	0.008	0.180	0.152	1.377
	Housing	0.200	0.816	0.192	0.154	0.816	0.665	1.331
	Other non-food	0.259	1.483	0.517	0.227	1.483	1.205	1.326
η	All components together		3.944	0.670	0.111	3.944	3.188	1.320
τ	Between		-0.290	-0.024	0.053	-0.290	-0.266	1.495

Source: computed by author with the help of the DASP package

[1] DASP stands for Distributive Analysis Stata Package. DASP is developed by Araar A. and Duclos J. Y. (University of Laval, CIPREE and Poverty and Economic Policy Research Network).

Note: *MII* represents marginal impact on inequality; *MIP* represents marginal impact on poverty; and *ELS* represents elasticity of poverty with respect to inequality.

Essentially, moving from $z = 16733$ to $z = 20272$[1] maintains all the signs of the impacts on the headcount poverty and elasticities of poverty unchanged but, for that of food expenditure. Headcount poverty reduces with increasing food inequalities only, this is not the case with the depth ($\alpha = 1$) of poverty. The marginal impacts (MIP) and elasticities of within-component inequalities are sensitive in magnitude to the choice of α and z. For instance, a 1% change in the inequality of housing expenses has a marginal impact of 0.000484 on poverty incidence with $z = 16733$ as opposed to 0.000192 when $z = 20272$ (Tables 3 and 4). Similar comparisons across these two poverty lines are true for the other expenditure components.

However, it may be quite interesting to instead consider but the regressed income sources that explain the dependent variable to uncover some evidence in terms of marginal impacts and elasticities. These regressed sources include employment vulnerability, human capital, financial capital, household demographics and other income sources. Tables 5 and 6 host the marginal impacts on poverty and inequality, as well as the associated elasticities of changing within- and between-source inequality across poverty lines and poverty aversion parameters ($\alpha = 0 \; and \; 1$). Table 5 presents results obtained with the official absolute poverty line (16733 CFA francs per capita per month). Table 6 considers the 40th percentile which corresponds to a 12.8% increase in the official poverty line (17633 + 0.128(17633)), obtaining 18885 CFA francs per capita per month, to track the sensitivity of our findings to the poverty line.

Table 5. Elasticity of poverty with respect to within- and between-source inequality ($\rho = 2$)

Scheme	Sources	Poverty line 16733						
		Share	MII (10^{-3})	MIP (10^{-3})	ELS	MII (10^{-3})	MIP (10^{-3})	ELS
			alpha = 0			alpha = 1		
$\eta(m)$	Vulnerability	0.768	-0.189	0.002	-0.006	-0.189	-0.178	1.966
	Human capital	0.215	0.826	0.151	0.134	0.826	0.723	1.826
	Financial capital	0.016	0.006	-0.007	-0.941	0.006	0.008	3.144
	Household demographics	0.0003	1.128	0.050	0.032	1.128	1.097	2.028
	Other income sources	0.0007	2.030	1.542	0.553	2.030	1.663	1.708
η	All sources together		3.800	1.681	0.322	3.800	3.313	1.818
τ	Between		-589.916	-450.346	0.556	-589.916	-482.721	1.706

Source: Computed by author with the help of the DASP package

Note: *MII* represents marginal impact on inequality; *MIP* represents marginal impact on poverty; and *ELS* represents elasticity of poverty with respect to inequality.

An increase in any within-income source inequality generally increases private sector poverty irrespective of the poverty line used (Tables 5 and 6). Besides other income sources, the highest increase (MIP) in poverty incidence is recorded by increasing inequalities in human capital followed by increasing inequalities in household demographics (Tables 5). This observation lays emphasis on the importance of human capital (in this case education, job experience and leadership skills), geography, as well as family planning schemes in the struggle against private sector poverty in Cameroon. Thus, worsening inequality within-geographical locations (urban and rural) affects overall private sector poverty considerable.

[1] 20272 is the 40th percentile of the sum of all the expenditure components.

In this perspective, worsening inequality in education programmes, capacity building or technical training should be checked to ensure a successful fight against poverty. These programmes (education, training and capacity building) most often benefit the rich or the privileged passing-over the educational and capacity enhancement needs of the poor (or the poorest) or less privileged who need them most. Inequality in financial capital, in terms of access to loans or credit, is another component that should be incorporated into the policy package to enhance the fight against deprivation. Birth control and family planning measures should also not be left out of this struggle.

Worthy to note, increasing inequality in employment vulnerability decreases the depth of poverty considerably, this is true across poverty lines (Table 5 and 6). This is indication that if only a small proportion of private sector workers are vulnerable, poverty depth will reduce appreciably. This observation corroborates with the drive of the Government of Cameroon (2009) to place decent employment as an engine of poverty reduction. Thus, increasing decent employment inequality (or decreasing employment vulnerability inequality, that is, many are vulnerable) may only worsen the poverty situation of the poor household heads in the private sector in Cameroon.

Table 6. Elasticity of poverty with respect to within- and between-source inequality ($\rho = 2$)

		Poverty line 18885						
			MII (10^{-3})	MIP (10^{-3})	ELS	MII (10^{-3})	MIP (10^{-3})	ELS
Scheme	Sources	Share	alpha = 0			alpha = 1		
$\eta(m)$	Vulnerability	0.768	- 0.189	0.038	-0.127	- 0.189	- 0.160	1.433
	Human capital	0.215	0.826	0.044	0.034	0.826	0.679	1.388
	Financial capital	0.016	0.006	-0.008	-0.882	0.006	0.005	1.548
	Household demographics	0.0003	1.128	-0.341	-0.194	1.128	0.944	1.413
	Other income sources	0.0007	2.030	1.125	0.356	2.030	1.605	1.335
η	All sources together		3.800	0.800	0.135	3.800	3.073	1.365
τ	Between		-589.916	-329.665	0.359	-589.916	-466.363	1.334

Source: computed by author with the help of the DASP package

Note: *MII* represents marginal impact on inequality; *MIP* represents marginal impact on poverty; and *ELS* represents elasticity of poverty with respect to inequality.

This shows that if employment vulnerability inequality worsens among private sector workers or household heads (that is, so many workers become vulnerable), poverty depth may suffer unusual effects. This finding is consistent with the observation by the NIS (2011) according to which growth that does not generate decent jobs or reduce employment vulnerability is not of satisfactory quality as it may lead to social strife. This finding is in line with Malo (2018) who intimated that 'poor people facing shocks can fall into deeper poverty'. This way, the quality of economic growth, in terms of decent jobs, should be at the forefront of current policy undertakings in Cameroon to boost growth. Thus, ongoing efforts like the recruitment of 25 000 educated youths in the public sector, with relatively commendable working conditions, should be encouraged or/and replicated in time. Notwithstanding, the public sector cannot conveniently curb or cushion the problem of employment in Cameroon, efforts to encourage private sector development through the creation of new industries and promotion of a good business environment are worthy to consider.

In Table 5 and 6, the marginal impact on poverty for changing any within-source inequality is higher than for between-source inequality, which is generally negative. The observation is true across poverty lines and for $\alpha = 0$. The marginal impact on poverty of any within-source inequality is considerably lower than that of the between-source inequality if we measure the impact in terms of elasticity. However, when within-source inequality is changed for all income sources simultaneously (scheme η),

the marginal impact on poverty for changing within-source inequality is well over that for changing between-source inequality for $\alpha = 0$ and $\alpha = 1$ and also true across poverty lines (Tables 5 and 6).

In Table 5, we observe that the marginal impact on poverty of a change in any within-income source inequality is sensitive in magnitude to the poverty line and to the poverty aversion measured used. For instance, the marginal impact on poverty of a 1% change in human capital inequality stands at 0.00015 point for $\alpha = 0$ compared to 0.00072 point for $\alpha = 1$. Equally for $\alpha = 0$ and $z = 16733$, the impact (MIP) on poverty of increasing human capital inequality stands at 0.00015 point as opposed to 0.00004 point for $z = 18885$. This sensitivity in magnitude across poverty aversion measures and poverty lines is true for the other income components. Notwithstanding, interesting policy messages and more broad base sensitivity may be drawn with a cross-sector analysis of these impacts.

6.2. Simulated Poverty and Inequality Outcomes of Regressed Income Sources across Employment Sectors

Tables 7, 8, 9 and 10 show the marginal impacts on poverty and inequality, as well as the associated elasticities of changing within- and between-source inequality across poverty lines, poverty aversion parameters ($\alpha = 0 \; and \; 1$) and employment sectors. From these tables it is visible that the marginal impacts on poverty and inequality, as well as the associated elasticities of changing within- and between-source inequality are sensitive across employment sectors. Moving from the private sector to the informal and farming sectors, the signs of the impact (MIP) on poverty and elasticities (ELS) changed with increasing inequalities (see Tables 7, 9).

Table 7. Formal and informal employment sectors: Elasticity of poverty with respect to within- and between-source inequality ($\rho = 2$)

		Poverty line 16733						
			MII (10^{-3})	MIP (10^{-3})	ELS	MII (10^{-3})	MIP (10^{-3})	ELS
Scheme	Sources m	Share	alpha = 0			alpha = 1		
$\eta^s(m)$	Vulnerability	0.510 (0.718)	-0.110 (-0.298)	-0.208 (-0.008)	4.927 (0.017)	-0.110 (-0.298)	-0.103 (-0.254)	11.505 (1.546)
	Human capital	0.302 (0.153)	0.640 (0.708)	1.015 (-0.032)	4.135 (-0.029)	0.640 (0.708)	0.537 (0.573)	10.370 (1.474)
	Financial capital	0.008 (0.013)	-0.004 (0.007)	0.002 (-0.008)	-0.938 (-0.757)	-0.004 (0.007)	0.000 (0.009)	0.656 (2.318)
	Household demographics	0.092 (0.103)	0.403 (1.148)	0.662 (-0.075)	4.291 (-0.042)	0.403 (1.148)	0.538 (1.024)	16.516 (1.623)
	Other income sources	0.087 (0.012)	3.144 (1.975)	4.137 (1.243)	3.435 (0.403)	3.144 (1.975)	1.861 (1.573)	7.321 (1.450)
η^s	All sources together		4.072 (3.539)	5.894 (1.072)	3.778 (0.194)	4.072 (3.539)	2.833 (2.926)	8.604 (1.505)
τ^s	Between		-4.274 (30.929)	-5.936 (17.752)	3.625 (0.368)	-4.274 (30.929)	-2.907 (24.869)	8.411 (1.463)

Source: computed by author with the help of the DASP package

Note: Informal sector results are in parentheses; *MII* represents marginal impact on inequality;

MIP represents marginal impact on poverty; and *ELS* represents elasticity of poverty with respect to inequality.

Table 8. Formal and informal employment sectors: Elasticity of poverty with respect to within- and between-source inequality ($\rho = 2$)

Scheme	Sources *m*	Poverty line 18885						
		Share	MII (10^{-3})	MIP (10^{-3})	ELS	MII (10^{-3})	MIP (10^{-3})	ELS
			alpha = 0			alpha = 1		
$\eta^s(m)$	Vulnerability	0.510 (0.718)	-0.110 (-0.298)	-0.206 (0.046)	3.654 (-0.088)	-0.110 (-0.298)	-0.127 (-0.227)	9.419 (1.125)
	Human capital	0.302 (0.153)	0.640 (0.708)	0.991 (-0.082)	3.029 (-0.066)	0.640 (0.708)	0.636 (0.530)	8.095 (1.106)
	Financial capital	0.008 (0.013)	-0.004 (0.007)	0.000 (0.009)	-0.132 (-0.712)	-0.004 (0.007)	-0.005 (0.006)	8.743 (1.217)
	Household demographics	0.092 (0.103)	0.403 (1.148)	0.548 (0.451)	2.660 (-0.223)	0.403 (1.148)	0.550 (0.866)	11.128 (1.114)
	Other income sources	0.087 (0.012)	3.144 (1.975)	4.386 (0.806)	2.730 (0.232)	3.144 (1.975)	2.167 (1.492)	5.619 (1.116)
η^s	All sources together		4.072 (3.539)	5.901 (0.256)	2.836 (0.041)	4.072 (3.539)	3.222 (2.666)	6.447 (1.113)
τ^s	Between		-4.274 (30.929)	-6.099 (10.591)	2.792 (0.195)	-4.274 (30.929)	-3.191 (23.357)	6.084 (1.116)

Source: Computed by author with the help of the DASP package

Note: Informal sector results are in parentheses; *MII* represents marginal impact on inequality;

MIP represents marginal impact on poverty; and *ELS* represents elasticity of poverty with respect to inequality.

Importantly, increasing vulnerability inequality (that is, making only a small portion of the population vulnerable) decreases the headcount poverty and the depth of poverty in the formal and informal employment sectors (Table 7 and 8). In the farm and nonfarm sectors, increasing vulnerability inequality only reduces the depth of poverty, as observed with the overall private sector for $z = 16733$ and $z = 18885$ (Table 9; 10; and 5). This is indication that more wide spread employment vulnerability (that is, low employment vulnerability inequality) will worsen poverty incidence, especially in the formal and informal employment sectors, and worsen the poverty situation of the poor across all private employment sectors. Worthy of note, the highest poverty depth decreasing potentials of increasing employment vulnerability inequality (that is, improving decent employment) is recorded in the informal sector, followed by the nonfarm private sector. This is evidence that efforts geared at lifting the working conditions of private sector household heads or workers may register commendable outcomes on the poverty situation of the poor, especially those in informal and nonfarm activities.

Table 9. Farm and nonfarm employment sectors: Elasticity of poverty with respect to within- and between-source inequality ($\rho = 2$)

Scheme	Sources m	Share	Poverty line 16733 MII (10^{-3})	MIP (10^{-3})	ELS	MII (10^{-3})	MIP (10^{-3})	ELS
			alpha = 0			alpha = 1		
$\eta^s(m)$	Vulnerability	0.682 (0.724)	-0.183 (-0.189)	0.106 (0.002)	-0.272 (-0.006)	-0.183 (-0.189)	-0.101 (-0.178)	0.698 (1.966)
	Human capital	0.091 (0.179)	0.555 (0.826)	-0.241 (0.151)	-0.203 (0.134)	0.555 (0.826)	0.307 (0.723)	0.670 (1.826)
	Financial capital	0.012 (0.013)	0.008 (0.006)	-0.009 (-0.007)	-0.530 (-0.941)	0.008 (0.006)	0.008 (0.008)	1.315 (3.144)
	Household demographics	0.200 (0.083)	0.739 (1.128)	-0.383 (0.050)	-0.243 (0.032)	0.739 (1.128)	0.485 (1.097)	0.830 (2.028)
	Other earnings sources	0.016 (0.001)	2.048 (2.030)	0.294 (1.542)	0.067 (0.553)	2.048 (2.030)	1.471 (1.663)	0.907 (1.708)
η^s	All sources together		3.167 (3.800)	-0.296 (1.681)	-0.044 (0.322)	3.167 (3.800)	2.170 (3.313)	0.866 (1.818)
τ^s	Between		17.723 (-589.916	2.049 (-450.346)	0.054 (0.556)	17.723 (-589.916	12.679 (-482.721)	0.904 (1.706)

Source: Computed by author with the help of the DASP package

Note: Nonfarm sector results are in parentheses; *MII* represents marginal impact on inequality; *MIP* represents marginal impact on poverty; and *ELS* represents elasticity of poverty with respect to inequality.

Table 10. Farm and nonfarm employment sectors: Elasticity of poverty with respect to within- and between-source inequality ($\rho = 2$)

Scheme	Sources	Share	Poverty line 18885 MII (10^{-3})	MIP (10^{-3})	ELS	MII (10^{-3})	MIP (10^{-3})	ELS
			alpha = 0			alpha = 1		
$\eta^s(m)$	Vulnerability	0.682 (0.724)	-0.183 (-0.189)	0.054 (0.038)	-0.126 (-0.127)	-0.183 (-0.189)	0.089 (0.161)	0.506 (1.431)
	Human capital	0.091 (0.179)	0.555 (0.826)	-0.098 (0.044)	-0.076 (0.034)	0.555 (0.826)	0.289 (0.679)	0.544 (1.388)
	Financial capital	0.012 (0.013)	0.008 (0.006)	-0.003 (-0.008)	-0.188 (-0.882)	0.008 (0.006)	0.006 (0.005)	0.789 (1.561)
	Household demographics	0.200 (0.083)	0.739 (1.128)	-0.538 (-0.341)	-0.310 (-0.194)	0.739 (1.128)	0.371 (0.944)	0.525 (1.412)
	Other income sources	0.016 (0.001)	2.048 (2.030)	-0.157 (1.125)	-0.033 (0.356)	2.048 (2.030)	1.282 (1.606)	0.654 (1.335)
η^s	All sources together		3.167 (3.800)	-0.801 (0.801)	-0.107 (0.135)	3.167 (3.800)	1.860 (3.073)	0.613 (1.365)
τ^s	Between		17.723 (-589.916	-2.040 (-329.676)	-0.049 (0.359)	17.723 (-589.916	0.979 (-466.425)	0.647 (1.334)

Source: Computed by author with the help of the DASP package

Note: Nonfarm sector results are in parentheses; *MII* represents marginal impact on inequality; *MIP* represents marginal impact on poverty; and *ELS* represents elasticity of poverty with respect to inequality.

Moreover, it is vital to highlight that the signs of the impact (MIP) on poverty incidence of increasing inequalities in human capital, financial capital, and household demographics change across sectors. For $\alpha = 0$, in the formal sector, the MIP are all positive as opposed to the informal and farm sectors where they are negative (Tables 7 and 9). This observation is true across poverty lines (for instance Tables 7 and 8). These rather controversial results, in the informal and farm sectors, depict the decreasing importance of education and a highly restricted access to credit or loans among informal workers and

those in farming activities. This constitutes a particular call for attention. The government of Cameroon should invest in a system of education that reduces the number of dropouts at primary and secondary levels; this should be probably a system of education that meets the demands of the labour market. In the nutshell, this observation implies that the impact (MIP) on poverty and elasticities vary in terms of signs and magnitude across employment sectors.

7. Concluding Remarks and Policy Implications

This paper allowed for the understanding of the micro-link between inequality and poverty. The study centred on both the within- and between-component inequalities and on within- and between-source inequalities. The paper provides a fair premise to understanding the complex theoretical and empirical links between poverty and inequality from a microeconomic perspective. Concerning the marginal impacts on poverty and inequality of changing within- and between-component inequalities, the following observation were made: (i) we observed that the largest impact on poverty is registered with increasing food inequalities and the smallest with increasing health inequalities; (ii) we found that the impact on poverty of changing any within-component inequality is smaller than for changing between-component inequality; and (iii) The marginal impacts and elasticities of within-component inequalities are sensitive in magnitude to the choice of poverty aversion measures and poverty lines.

Considering the regressed income sources, it was recorded that: (a) an increase in any within-income source inequality generally increases private sector poverty irrespective of the poverty line used; (b) the highest increase in poverty incidence is recorded by increasing inequalities in human capital followed by increasing inequalities in household demographics. This observation highlighted the importance of human capital (in this case education, job experience and leadership skills), geography, as well as family planning schemes in the struggle against private sector poverty in Cameroon. Worsening inequality in education programmes, capacity building or technical training should be checked to ensure a successful fight against poverty. More targeted programmes (education, training and capacity building) to meet those most in need should be encouraged (for example those in informal and farming activities); (c) increasing inequality in employment vulnerability decreases the depth of poverty considerably irrespective of the poverty line used. That is, if policy provisions allow for only a small proportion of private sector workers to be vulnerable, poverty depth will reduce appreciably. This further indicated that increasing decent employment inequality, that is, making many workers vulnerable, will go a long way to only worsen the poverty situation of the poor people in private sector activities. These observations show that reducing decent employment inequality (or embarking on more wide spread improvement in working conditions or increasing vulnerability inequality) should be placed at the heart of anti-poverty measures.

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APPENDICES

Appendix 1: Multiple Correspondence Analysis (MCA) of employment vulnerability

To construct the employment vulnerability indicator, we employ the MCA as developed by Asselin (2002) and used by Ki et al. (2005) and Kamgnia Dia et al. (2008).

Table A1 presents the explained inertia by the factor axes. From Table A1, it follows that the first factor axis that represents almost 29% of total inertia (quantity of information)[1] is the one that describes better employment quality of workers.

Table A1. Explained Inertia by the Factor Axis

	Principal Inertia	Percentage	Cumulated percentage
Factorial axis 1	0.57	28.5	28.5
Factorial axis 2	0.23	11.3	39.8
Total inertia	2.00		

Source: Constructed by author

[1] Note that the adjusted inertia approach, proposed by Benzecri (1979), to measure the quantity of information brought by an axis can only be used for an axis, α, with principal inertia (eigenvalue) $\lambda_\alpha \leq 1/K$ (Nenadic and Greenacre, 2007 – p.7).

Table A2 hosts the initial indicator variables/categories used for the construction of employment vulnerability (column 1). The scores of the initial indicators coded in 0 /1 obtained with the MCA and the contributions of the various categories are presented in Table A2. This table host the initial scores on the first axis as well as the squared correlations or squared cosines which represent the quality of representation of each initial indicator.

Table A2. Scores, Contributions and Squared Cosines of MCA on the Initial Indicators of Employment Quality

Variables/categories	Initial scores on the First axis	Squared correlations	Contributions	Numbers of observations	Percentage
Employment contract			**6.43**		
Open-ended (written)	2.147	0.292	4.59	1,302	11.43
Fixed term (written)	1.223	0.047	0.79	749	6.58
Verbal agreement	-0.104	0.009	0.13	1,024	8.99
No contract	-0.346	0.249	0.92	8,316	73.01
Payslip			**15.77**		
Possess a payslip	2.573	0.907	12.75	2,752	24.16
No payslip	-0.619	0.907	3.02	8,639	75.84
Social security			**15.36**		
Affiliated to NSIF	2.653	0.881	12.60	2,548	22.37
Not affiliated to NSIF	-0.584	0.881	2.76	8,843	77.63
Job satisfaction			**7.36**		
Training matches job	1.216	0.425	4.86	4,503	39.53
Training does not match job	-0.615	0.425	2.50	6,888	60.47
Under-employment			**1.18**		
Less hours fixed by employer	1.226	0.012	0.26	224	1.97
Indifferent	0.102	0.034	0.13	9,607	84.34
Less hours due to economic situation	-0.708	0.007	0.13	305	2.68
Less hours due to health problems and domestic work	-0.779	0.044	0.66	1,255	11.02
Remuneration			**14.98**		
Fixed salary	1.697	0.336	4.86	2,378	20.88
Daily/hourly pay	3.115	0.406	6.57	1,080	9.48
Indifferent	-0.173	0.001	0.00	157	1.38
Piece rate	-0.290	0.008	0.13	319	2.80
Commissions/benefits	-0.677	0.678	3.29	7,324	64.30
In-kind and no payment	-0.606	0.007	0.13	133	1.17
Labour status			**8.8**		
Permanent regular	0.066	0.004	0.13	7,116	62.47
Permanent seasonal	2.967	0.389	6.30	1,106	9.71
Indifferent	-0.774	0.155	1.84	2,318	20.35
Temporary undefined/defined	-0.212	0.021	0.53	851	7.47
Housing allowance			**14.45**		
Receive housing allowance	2.834	0.828	12.22	2,171	19.06
Do not Receive housing allowance	-0.513	0.828	2.23	9,22	80.94
Paid leaves			**15.31**		
Perceive paid leaves	2.697	0.891	12.75	2,469	21.68
Do not perceive paid leaves	-0.580	0. 891	2.56	8,922	78.32

Union membership			**0.26**		
Member of a trade union/association	0.194	0.019	0.13	5,351	46.98
Not a member of a trade union/association	-0.169	0.019	0.13	6,04	53.02

Source: Constructed by author with help of STATA 10 using CHCS III

We normalise the indicator predicted from the first axis using:

$\widetilde{C_i} = 100(r\max(C) - C_i)/(r\max(C) - r\min(C))$[1]

The normalised indicator $\widetilde{C_i}$ classifies workers in terms of increasing employment vulnerability, with values ranging from 0 to 100.

Appendix 2:

Appendix 2.1. Income Production Function - Dependent Variable is Household Per Capita Monthly Income

Variables	Coefficient Estimates
Employment vulnerability indicator	-.0049409
	(-13.4)
Labour experience	-.0134395
	(-8.54)
Labour experience squared	.000167
	(8.08)
Years of education	.0300503
	(20.7)
Seniority in the enterprise	.2981945
	(15.3)
Access to microcredit (cluster level)	.393897
	(6.89)
Number of younger children (cluster level)	-.1106704
	(-27.3)
Number of married household heads (cluster level)	-.2993556
	(-10.4)
Gender of household head (male = 1)	-.0532025
	(-3.93)
Location of household head (urban = 1)	.4172043
	(33.00)
Fisher Test-statistic (df;p-value)	638.67 ((10, 9208; 0.0000)
Adj R-squared	0.6521
Number of observations	9219

Source: computed by author using ECAM III

Appendix 2.2. Combined income components

Given the following linear regression, with no constant (as per appendix 2.1):

$$y_i = \beta_1 x_{i,1} + \beta_2 x_{i,2} + - - - + \beta_m x_{i,m} + \varepsilon_i \qquad m = 1,2,\ldots\ldots,M \text{ and } i = 1,2,\ldots\ldots,n \quad (2.A)$$

[1] Note that $r$max and $r$min simply mean absolute maximum and minimum respectively.

Where, Y_i is per capita monthly income of household i; β_0, β_1, …., β_m are parameters to be estimated; x_i $(i = 1,2,\dots,n)$ the set of independent variables; and ε is the error term.

It is possible from the regression results to generate the estimated income flows attributable to the various explanatory variables. These estimated income flows are obtained from $\hat{y}^m = X\hat{\beta}_m$. It then follows that total income is the sum of these income flows plus the residual:

$$y_i = \sum_{m=1}^{M+1} \hat{y}_i^m \qquad \text{where } \hat{y}_i^m = \begin{cases} \hat{\beta}_m x_i^m & \text{for m} = 1 \dots\dots\text{M} \\ \hat{\varepsilon}_i & \text{for m} = \text{M}+1 \end{cases} \tag{2.2B}$$

The regressed-income source '1', C_1, is obtained as follows:

$$C_1 = y_i - \sum_{m \neq 1}^{M} \hat{y}_i^m \tag{2.2C}$$

Which can also be written:

$$C_1 = y_i - \left[\sum_{m \neq 1}^{M-1} \hat{y}_i^m - \hat{\varepsilon}_i \right]$$

The other regressed-income sources (C_2, C_3, ……,C_M, C_{M+1}) are obtainable in the same manner. Thus we have:

$$y = \hat{y} + \varepsilon$$

Where $\hat{y} = C_1 + C_2 + C_3 + \dots\dots + C_M$ and $\varepsilon = C_{M+1}$

These regressed-income sources can now be combined in groups of regressed-income components according to the needs of the study. For instance, $C_1 + C_2$ could form a component, $C_3 + C_4$ another component and so on.