International Journal of Publication and Social Studies
ISSN(e): 2520-4491
ISSN(p): 2520-4483
DOI: 10.18488/journal.135.2020.52.154.166
Vol. 5, No. 2, 154-166.

URL: www.aessweb.com

IMPACT OF HUMAN CAPITAL ON PRO-POOR GROWTH IN CAMEROON

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Article History
Received: 21 September 2020
Revised: 9 October 2020
Accepted: 26 October 2020
Published: 13 November 2020

Keywords
Human capital
Education indicators
Health indicators
Composite indicator
Pro-poor growth
Cameroon.

ABSTRACT

The objective of this study is to determine the impact of human capital on pro-poor growth in Cameroon. To achieve this goal, we used multiple correspondence analysis to build the composite indicator of education and health. To analyze the impact of human capital on pro-poor growth, we used the relative approach of Kakwani, Neri, and Son (2010). The data used for this study come from the third and fourth Cameroonian household surveys. The results show that there was a loss of growth in education and health between 2007 and 2014, the level of education of the poor improved less while their level of health deteriorated more by compared to the middle layer. The loss of growth in human capital has had a negative impact on the level of well-being of populations. Taking into account these results, the supply and quality of educational and health infrastructures in urban and rural areas but especially in rural area, the promotion and diversification of professional and technical training, the reduction in the cost of consultations and medicines, the increase of education and health personnel are our main recommendations.

Contribution/ Originality: This study contributes to the existing literature on the impact of human capital on pro-poor growth in Cameroon. It shows the contribution of human capital on the level of well-being of populations.

1. INTRODUCTION

Since the end of the 1980s, poverty has hit developing countries in general and countries in Sub-Saharan Africa in particular. According to estimates by the World Bank (1990) in 1987, 217.2 million people lived on less than $ 1 a day in sub-Saharan Africa, in 1998, it rose to 290.9 million, an increase of 34% in 12 years (Kamgnia, Douya, Ongolo, & Keunkeu, 2003). The fight against poverty thus occupies an important place on the agenda of presidents of African countries. Because African countries are invited to adopt economic policies that make it possible to achieve a certain level of growth that benefits everyone (trickle down effects), and naturally reduce poverty (Rostow, 1963) and inequalities (Kuznets, 1955).

In order to reduce poverty, Cameroon has implemented a variety of measures since its admission to the decision point under the Heavily Indebted Poor Countries Initiative; these measures have been recorded in Poverty

Reduction Strategy Document in 2003. In pursuit of the Millennium Development Goals, the government has drawn up the Growth and Employment Strategy Document for a long-term vision (2035).

Despite all the efforts made by Cameroon, monetary poverty has not decreased considerably, it fell from 40.2% in 2001 to 39.9% in 2007 and to 37.5% in 2014 (National Institute of Statistics, 2015). Although the incidence of poverty declined slightly between 2001 and 2014, the number of poor people increased during this period. This increase would result from the strong demographic growth. During the period from 2001 to 2007, Cameroon was marked by a decline in growth which oscillated around 3.6% per year. Between 2007 and 2014, the growth rate increased slightly, standing at around 3.9% (National Institute of Statistics, 2015).

The slight decline in poverty in Cameroon did not prevent the widening of inequality between the rich and the poor, the Gini index fell from 40.4% in 2001 to 39% in 2007 and to 44% in 2014 (National Institute of Statistics, 2015). There are also significant differences in poverty rates between areas of residence. During the period from 2001 to 2014 the incidence of poverty declined in urban area while in rural area it increased.

Recognizing that the development of human capital is both an essential tool for ensuring growth and a means of reducing poverty, several researchers have studied the relationship between human capital and economic growth (Andréosso-O'Callaghan, 2002; Azariadis & Drazen, 1990; Becker, 1964). What we reproach these authors is the failure to take into account qualitative aspects in the assessment of human capital, because the more educated and healthy people are more likely to participate in the labor market.

In Cameroon as in other African countries, studies have been done on human capital. Epo and Baye (2011) found that education and health are key components of economic well-being because they directly and indirectly affect the utility and production function of the household. Nana and Atangana (2012) constructed a composite indicator of human capital to analyze its influence on the well-being of rural agricultural producers. However, they did not take into account the health aspect in the construction of their composite indicator.

As we can see, there is no consensus in the assessment of human capital. However, all of this work converges on the contribution of human capital to improving well-being and the fight against poverty. The comparative advantage in terms of human and financial capital available to the rich allows them to better capture and channel the economic opportunities generated by positive growth. Growth only benefits the poor under these conditions through an indirect effect (Griffoni, 2005). The concept of pro-poor growth emerged from the work of Bourguignon (2003) on the poverty-growth-inequality triangle. After Bourguignon, other authors (for example (Ehrhart, 2009; Epo & Baye, 2012; Fambon & Tamba, 2010; Kakwani et al., 2010; Nembot, Emini, & Ningaye, 2009)) have also worked on pro-poor growth. However, very few researchers have studied the impact of human capital on pro-poor growth.

The problem with this research is that of assessing the impact of human capital on pro-poor growth in Cameroon. Such scientific work is essential for the implementation of any action aimed at combating deprivation. The central question to which we want to answer in this work is that of knowing: What is the impact of human capital on pro-poor growth in Cameroon? This main question can be subdivided into the following secondary questions: What is the level of the human capital of individuals? What is the impact of human capital on pro-poor growth in Cameroon and in areas of residence? To answer the central question, we have set ourselves the main objective of determining the impact of human capital on pro-poor growth in Cameroon. More specifically it is about: (i) Build composite indicators for education and health and (ii) To assess the impact of human capital on pro-poor growth in Cameroon and in the areas of residence.

2. LITERATURE REVIEW

On the empirical side, many researchers have worked on issues of equity, income distribution, poverty and economic growth. Before presenting the work on the impact of human capital (education and health) on pro-poor growth, we will present some work on pro-poor growth.

2.1. Work on Pro-Poor Growth

Pro-poor growth is defined according to the economic literature according to the absolute approach as that which reduces absolute poverty (Kraay, 2004; Ravallion & Chen, 2003) and according to the relative approach as that which reduces inequalities in favor of the poor (Kakwani & Pernia, 2000; Kakwani & Son, 2003; Klasen, 2004). Many authors have focused on the analysis of pro-poor monetary and non-monetary growth. We can cite among others the work of:

Nzingoula and Tchiengang (2009) showed that the growth observed in Cameroon during the period 2001 and 2007 was pro-poor in absolute terms and relative in urban area and pro-poor in absolute terms in rural area. Nembot et al. (2009) did a spatial analysis of pro-poor growth in Cameroon. They constructed two standard of living indicators, one monetary and the other non-monetary. Their results showed that growth was anti-poor between 1996 and 2001 and weakly pro-poor between 2001 and 2007 according to the monetary approach. Considering the non-monetary approach, their results showed that growth was anti-poor for Cameroon in both periods. In the same way, Fambon and Tamba (2010) analyzed the main characteristics of the growth of the Cameroonian economy. They used the approach of Ravallion and Chen (2003) to explain pro-poverty across the place of residence and the different regions in the 1984-1996 sub-periods; 1996-2001 and 2001-2007.

Kakwani et al. (2010) developed a new measure of pro-poor growth that provides a link between the growth rates of average income and of income inequality. Their work then explains the pro-poor growth rate of silver-metric social welfare in terms of the pro-poor growth rate of labor market characteristics during the period 1995-2004 in Brazil. Their results showed that between 1995 and 2004, there was gain in income growth. They also showed that during the period 1995 to 2004, gains in labor income growth can be explained by gains in productivity growth.

Epo and Baye (2012) studied the nature of the absolute and relative pro-poor growth in terms of food, non-food and total expenditure between the period 2001 and 2007, they found that food, non-food and total expenditure households were pro-poor in absolute and relative terms.

2.2. Work on the Impact of Education and Health on Pro-Poor Growth.

Rainer and Cesar (2007) have shown that at the microeconomic level, education provides the poor with specific knowledge that can increase their productivity and their chances of finding employment. They also showed that education improves nutrition and health in poor families. Education increases the ability of individuals to participate in decision making. They also noted that at the macroeconomic level, unequal distribution of education contributes to unequal distribution of income. High levels of human capital positively affect income growth for the poor.

For endogenous growth theorists (Barro, 1996; Romer, 1990) human capital is perceived as an endogenous factor of growth and development in the same way as transport and communication infrastructure. But the non-poor have a comparative advantage in terms of human capital which allows them to reap the benefits of growth more because the non-poor can acquire adequate food, adequate health, adequate education and by therefore participate better and benefit more from the fruits of growth. Indeed, a more educated and healthy individual has access to better jobs, and earns higher income than one who is less well educated, or who is less well.

The most educated societies have the best health indicators and enjoy the highest levels of development. Education and health make individuals more productive, extend their life expectancy, and facilitate group life (Diagne, 2007). It is widely established that education and health play a central role in increasing incomes and economic growth, through which poverty reduction can be achieved (Barro, 1991; Chu & Tanzi, 1998).

These different studies shed light on how an improvement in human capital promotes pro-poor growth. Education and health play a central role in economic development and improving the well-being of the poor. The relationship between an individual's education and their productivity (measured in terms of income) is one of the

best-established stylized facts in economics. According to the World Bank (1990) education increases both wages and labor productivity in agriculture and the informal sector.

According to UNESCO (2014) education reduces poverty mainly through increased income. It enables people in formal paid employment to earn higher wages and provides a better standard of living for those working in the urban informal sector or in rural area. Education not only offers more employment prospects for men and women, but it also enables them to have more stable jobs, offering good working conditions and a living wage.

3. METHODOLOGY OF RESEARCH

In this section we will present the data used, the analysis method and the variables used.

3.1. The Data and Source

In this study we used secondary source data from the third and fourth Cameroonian household survey (ECAM 3, ECAM4) conducted by the National Institute of Statistics of Cameroon. The ECAM 3 survey was collected between September and December 2007. Its principal goals were, on the one hand, to put together a profile of poverty and the various indicators of household living conditions that were established in 2001. The ECAM 4 was designed to enable the Government and its development partners to assess progress in improving people's living conditions. The ECAM 4 survey was collected between September and December 2014. The sampling plan for the two surveys identified twelve survey areas which are the two major metropolises of Douala and Yaounde, Adamaoua, Center, East, Far Nord, Littoral, Nord, Nord West, West, South, and South West. In each region, a distinction is made between urban, semi-urban and rural stratum. The statistical unit is the ordinary household.

3.2. Method of Analysis

3.2.1. Construction of the Composite Indicator of Education and Health

Given the limitations of entropy and axiomatic approaches, the inertia approach is adopted in this research to understand education and health. Variables that measure education and health were subjected to multiple correspondence analysis (MCA). The rationality of the choice of variables is the property of the First Axis Ordinal Consistency (FAOC). This criterion specifies that the well-being of an individual improves from the least favorable situation to the most favorable situation. After this step, we proceeded to group the modalities of the variables that did not satisfy the property of FAOC. The last step was to rule out the variables that affected the quality of the results. After identifying the variables to use, we used the following formula to calculate the composite education and health indicators.

$$C\,i = \frac{\sum_{k=1}^{K}\sum_{h_k=1}^{H_k} W_{h_k}^{k} J_{h_k}^{k}}{K} \qquad \text{(Equation 1)}$$

where K is the number of categorical indicators; H_k is the number of categories of indicator K; $W_{h_k}^{k}$ is the weighting coefficient (normalized score on the first factorial axis, $\frac{score}{\sqrt{V_1}}$) of category h_k, V_1 is the eigenvalue of the first factor; $J_{h_k}^{k}$ is the binary variable taking the value 1 when the individual i has the category h and 0 otherwise (Asselin, 2009).

The weighting coefficients obtained by the MCA correspond to the standardized scores on the first factorial axis.

3.2.2. Method of Analyzing the Impact of Human Capital on Pro-Poor Growth

Kakwani et al. (2010) developed a new measure of pro-poor growth that provides a link between average income growth rates and income inequality.

Our study uses this new measure of pro-poor growth to calculate average growth rates and pro-poor growth rates of education, health, factual well-being, and counterfactual well-being.

In this sense, growth is defined as pro-poor (relative) if there is a gain in growth due to a decrease in inequality.

Let y it is the real income of a person, which is a random variable with the density function f (y). Then the real average income of the population is given by the following Equation 2:

$$\mu = \int_0^{+\infty} yf(y)dy \qquad \text{(Equation 2)}$$

The growth rate of the average income of a country, γ can be measured by the following Equation 3:

$$\gamma = \Delta Ln(\mu) \qquad \text{(Equation 3)}$$

This growth in average income can affect each individual in society differently.

Anchoring on the definition of pro-poor growth proposed by Kakwani and Pernia (2000); Kakwani et al. (2010) describe the model of growth by two factors: (i) the growth rate in average income defined by γ and (ii) changes in income inequality over time. Thus, to understand the pattern of growth, it is necessary to link economic growth with changes in the distribution of income. In order to establish this link, Kakwani et al. (2010) specify a social welfare function that gives greater weight to utility valued by the poor compared to utility valued by the non-poor. If μ (y) is the utility function, which is an increasing function of y and concave, then a general class of the social welfare function w can be written as follows:

$$w = \int_0^{+\infty} \mu(y)w(y)f(y)dy \qquad \text{(Equation 4)}$$

Where w (y) is the weight given to the utility of the person with income y. But this social welfare function is not invariable to a positive linear transformation of the utility function. To solve this problem, an equally distributed equivalent income level is defined according to Atkinson (1970) in order to obtain a social welfare function denoted by μ (y *) from the previous Equation 4 as follows:

$$w = \mu(y^*) = \int_0^{+\infty} \mu(y)w(y)f(y)dy \qquad \text{(Equation 5)}$$

Where y * is the level of equally distributed equivalent income which allows each person in society to enjoy the same level of social welfare at the current distribution of income.

The functions μ (y) and w (y) are then specified to make pro-poor growth operational. The logarithmic utility function, given by μ (y) = Ln (y), which is increasing and concave in y is employed because of its attractive decomposition characteristics. The weighting function w (y) is specified to capture the relative deprivation that is borne by the poor relative to the non-poor in society. The more deprivation is borne by a person with income y, the greater w (y) should be. In this way, w (y) should be a decreasing function of y and the total weights imposed on all individuals should be summed up to unity.

$$\int_0^{+\infty} w(y)f(y)dy = 1 \qquad \text{(Equation 6)}$$

A simple way to screen for relative deprivation is to assume that a person's deprivation depends on the number of people who are better off than they are in society. Such a weighting scheme is given by the following Equation 7:

$$w(y) = 2[1 - F(y)] \qquad \text{(Equation 7)}$$

Where, F (y) is the distribution function which indicates that the relative deprivation suffered by a person with income y is proportional to the proportion of people who are richer than that person.

By replacing μ (y) with Ln (y) and w (y) in Equation 5 by w (y) in Equation 7 we get the social welfare function below:

$$Ln(y^*) = 2\int_0^{+\infty}[1 - F(y)]Ln(y)f(y)dy \quad \text{(Equation 8)}$$

The growth rate of social welfare y * is given by the following Equation 9:

$$\gamma^* = \Delta Ln(y^*) \quad \text{(Equation 9)}$$

which is the proposed measure of pro-poor growth. The average income growth rate is also given by the following Equation 10:

$$\gamma = \Delta Ln(\mu) \quad \text{(Equation 10)}$$

If γ * < γ this implies a loss of growth due to the increase in inequalities. In the case, where

γ * > γ this indicates a gain in the growth rate due to the decrease in inequality. Growth is pro-poor (or anti-poor) if there is a profit (or loss) in the growth rate.

3.2.3. Operationalization of Relative Pro-Poor Income Growth

Let y_{jt} is the real per capita income of the j[th] household in year t. With a population weight variable (size * coef) it is possible to calculate the relative frequency f_{jt}, linked to household j to year t. In this way, the average income of all people in Cameroon in year t is given by the following Equation 11:

$$\mu_t = \sum_{j=1}^{n} f_{jt} y_{jt} \quad \text{(Equation 11)}$$

The average income growth rate is given by the following Equation 12:

$$\gamma = \Delta \text{Ln}(\mu_t) \quad \text{(Equation 12)}$$

Before determining social welfare, we need an evaluation of the probability distribution function F (y). An unbiased estimate of F (y) for the j[th] household in year t, with households ranked in increasing order of their real per capita income, is given by the following Equation 13:

$$F_{jt}(y) = P_{jt} = \sum_{i=1}^{j} f_{it} - f_{jt}/2 \quad \text{(Equation 13)}$$

By substituting Equation 13 into Equation 8 we obtain a consistent assessment of social welfare as follows:

$$Ln(y_t^*) = 2\int_{j=1}^{n} f_{jt}(1 - P_{jt})Ln(y_{jt}) \quad \text{(Equation 14)}$$

From Equation 14 an estimate of pro-poor growth rate is given by the following equation 15:

$$\gamma^* = \Delta \text{Ln}(y_t^*) \quad \text{(Equation 15)}$$

We will use this method of Kakwani et al. (2010) to calculate actual and pro-poor growth rates of education, health, factual well-being, and counterfactual well-being.

In this study we construct factual and counterfactual distributions like Epo and Baye (2012) to determine the impact of human capital on pro-poor growth.

Counterfactual well-being is obtained by assuming that the level of education and health is constant between 2007 and 2014 (to each household, we have allocated the average level of education and health).

The assessment of monetary well-being is usually done on the basis of income or consumption. In general, consumption is preferred over income, as income is not always the best reflection of household consumption expenditure; this is closely linked to the well-being of households. Indeed, a household's income does not always represent its consumption; it is generally largely underestimated, and is a poor proxy for well-being (Fambon, 2004).

Household spending is assumed to be influenced by the independent variables as represented in the Equation 16 below:

$$LnY = \alpha_0 + \sum_{j=1}^{2} \beta_j CH_j + \sum_{k=1}^{n} \alpha_k Z_k + \varepsilon \quad \text{(Equation 16)}$$

Where LnY is the logarithm of household expenditure; CH represents human capital (education and health); Z_k represents the other explanatory variables, namely: the size of the household, the age of the head of household, the sex of the head of household, the sector of activity of the head of household, possession of a dwelling, membership of an association, the possession of savings and the possession of securities or bonds, ε the error term.

The estimated income is given by the following Equation 17:

$$Ln\hat{Y} = \hat{\alpha}_0 + \sum_{j=1}^{2} \hat{\beta}_j CH_j + \sum_{k=1}^{n} \hat{\alpha}_k Z_k \quad \text{(Equation 17)}$$

$$LnY = Ln\hat{Y} + \hat{\varepsilon} \quad \text{(Equation 18)}$$

$$Y = Exp[Ln\hat{Y} + \hat{\varepsilon}] \quad \text{(Equation 19)}$$

$$Y = Exp\left[\hat{\alpha}_0 + \sum_{j=1}^{2} \hat{\beta}_j CH_j + \sum_{k=1}^{n} \hat{\alpha}_k Z_k + \hat{\varepsilon}\right] \quad \text{(Equation 20)}$$

To determine the impact of human capital on pro-poor growth, we need two distributions, one factual and the other counterfactual. To determine the counterfactual income, we allocated each household the average level of education and health. The variation in counterfactual income is attributable to exogenous variables.

The counterfactual income is therefore given by the following Equation 21:

$$Y_C = Exp\left[\hat{\alpha}_0 + \sum_{j=1}^{2} \hat{\beta}_j \overline{CH}_j + \sum_{k=1}^{n} \hat{\alpha}_k Z_k + \hat{\varepsilon}\right] \quad \text{(Equation 21)}$$

3.3. Description of the Variables Used

With regard to education, the variables used were the following: reading a simple sentence in French, reading a simple sentence in English, attending school, having followed technical or vocational training, the distance between the public nursery school closest to the accommodation, the distance between the private nursery school closest to the accommodation, the distance between the public primary school closest to the accommodation, the distance between the private primary school nearest to the accommodation, the distance from the public secondary school closest to the accommodation, the distance from the private secondary school closest to the accommodation.

Regarding health, the variables selected were as follows: the consultation sector in the event of illness, the reason for choosing the consultation sector, the person who was consulted in the event of illness, the duration of the

last consultation. To determine factual and counterfactual well-being, we used household expenditure, household size, age of head of household, gender of head of household, activity sector of head of household, home ownership, membership in an association, possession of savings and possession of securities or bonds.

4. RESULTS AND DISCUSSIONS

Before presenting the result of the impact of human capital on pro-poor growth, we will first present the results of the estimation of household expenditure on the explanatory variables.

4.1. Explanation of Household Expenses by the Level of Human Capital

From the Table 1 we see that education and health positively affect household expenses. In other words, the higher an individual's level of education, the higher their expenses and the higher their level of well-being. This conclusion remains valid for good health. This result corroborates that of Epo and Baye (2012). This result is explained by the fact that when an individual has a good level of education and health, he has more opportunities to have a gainful job and therefore his expenses will be higher than his counterpart who has low level of education and poor health.

Estimates also show that the older the head of the household is, the lower his welfare. This conclusion remains valid for the size of the household. With regard to home ownership, membership in an association, possession of savings and possession of securities, we find that they positively influence the well-being of the household. Likewise, working in the formal sector positively affects household well-being.

Table-1. Estimate of household economic well-being.

	2007	**2014**
Variables	Coefficient	Coefficient
Education	0,0202**(0,0107)	0,4475***(0,0115)
Health	0,0182**(0,0094)	0,1461***(0,0098)
Household size	-0,1098***(0,0019)	-0,1253***(0,0020)
Age of household head	-0,0505***(0,0047)	-0,0014***(0,0004)
Household gender (1 = masculine and 0 otherwise)	0,0640***(0,0137)	0,0823***(0,0139)
Activity area (1 = formal sector and 0 otherwise)	0,5363***(0,0148)	0,3037***(0,0179)
Home ownership (1 = yes and 0 otherwise)	0,2387***(0,0183)	0,2707***(0,0223)
Member of an association (1 = yes and 0 otherwise)	0,0743***(0,0124)	0,0720***(0,0132)
Possession of savings (1 = yes and 0 otherwise)	0,2752***(0,0135)	0,1723***(0,0147)
Possession of a title deed (1 = yes and 0 otherwise)	0,1236**(0,0614)	0,3715***(0,0623)
Constant	13,0908***(0,0235)	12,9051***(0,0279)
Number of observations	10154	10274
Fisher	630,49	913,29
Prob>F	0,0000***	0,0000***
R square	0,3833	0,4709

Note: Terms in parentheses represent standard deviations, and *** means 1% significant, ** means 5% significant.

4.2. Impact of Human Capital on Pro-Poor Growth

The Table 2 below shows the actual growth rates of education, health, factual well-being and counterfactual well-being. It also presents the pro-poor growth rates of education, health, factual well-being and counterfactual well-being. The analysis we make is the comparison of actual growth rates and pro-poor growth rates in order to say whether there have been gains or losses in growth rates between 2007 and 2014. It emerges from this table that in the entire population:

- The pro-poor growth rate of education is 0.0206 points on average compared to 0.1189 points for the actual growth rate, a loss of 0.0983 points. These results show that the level of education of the poor improved less between 2007 and 2014 compared to that of the middle class.
- The pro-poor growth rate of health is -0.636 points in general compared to -0.5971 points for the actual growth rate, ie a loss of 0.0389 points. These results show that the health status of populations deteriorated between 2007 and 2014. The loss of growth rate shows that the poor have experienced the deterioration of their health status more.
- The pro-poor growth rate of factual well-being is 0.1908 points on average compared to 0.3916 points for the actual growth rate of factual well-being, i.e. a loss of growth of 0.2008 points. In other words, in the population as a whole, the growth rate of the poor is lower than the actual growth rate of well-being. These results show that the well-being of the better-off households improved more than that of the less well-off between 2007 and 2014. This situation reflects anti-poor growth. The loss of growth rate of well-being is explained by the low rate of pro-poor growth of education and the deterioration of the health status of the population.
- The comparison between the growth rates of factual well-being and counterfactual well-being shows that taking into account the variation in human capital made it possible to have a loss of growth rate of 0.2008 points on the other hand in assuming that the level of human capital was constant between 2007 and 2014, we obtain a gain of 0.4917 in growth rate. Thus, the slight improvement in the level of education of the poor and the deterioration of the health status of the population has had a negative impact on the well-being of the population, the absolute impact is -0.6925.
- By making a comparison between the pro-poor growth rate of factual well-being and counterfactual well-being, we find that the pro-poor growth rate of factual well-being is lower than the pro-poor growth rate of the counterfactual welfare, the absolute impact is -0.6343. This shows that the deterioration in the health status of the poor has reduced their level of well-being.
- The difference between the average growth rate of factual well-being and counterfactual well-being gives us a positive sign. This sign shows that despite the deterioration in health status, the improvement in the average level of education has had a positive impact on the average well-being of the population. The absolute impact is 0.0582.

Table-2. Growth rate of education, health, evidence-based well-being and counterfactual well-being between 2007 and 2014.

	Education	Health	factual well-being	counterfactual well-being	Impact IA
Logarithm of average well-being in 2007 Ln (μt)	1,0473	1,3532	12,6775	12,6959	_
Logarithm of average well-being in 2014 Ln (μt)	1,1662	0,7561	13,0691	13,0293	_
Logarithm of pro-poor well-being in 2007 Ln(y_t*)	0,6048	0,8448	12,0222	12,0409	_
Logarithm of pro-poor well-being in 2014 Ln(y_t*)	0,6254	0, 088	12,2130	12,8660	_
actual growth rate	0,1189	-0,5971	0,3916	0,3334	0,0582
Pro-poor growth rate	0,0206	-0,6360	0,1908	0,8251	-0,6343
Growth gain (+) / loss (-)	- 0,0983	-0,0389	- 0,2008	0,4917	-0,6925

Note: IA stands for Absolute Impact.

Given the fact that there are disparities between residence stratum, we will present the results obtained in the two residences stratum.

4.3. Results Obtained in the Urban Stratum

The results of the Table 3 below show that the average growth rate of education is 0.4185 points, that of health is -0.5442 points. These results show that the average level of education of the urban population has improved while the average level of health of the population has deteriorated. The improvement in the average level of education has had a positive impact on the average well-being of the urban population, the absolute impact of human capital on the average well-being is 0.1852.

Comparison of the pro-poor growth rates of education and health shows that the pro-poor growth rate of education is positive and that of health is negative. These results show that the level of education of the poor has improved while their level of health has deteriorated. The deterioration of the health of the poor has had a negative impact on their level of well-being. The absolute impact is -0.2878. Indeed, the pro-poor growth rate of factual well-being is 0.3462 and that of counterfactual well-being is 0.6340.

The difference between the pro-poor growth rate of education and the average growth rate of education gives us a growth gain. On the other hand the difference between the pro-poor growth rate of health and the average growth rate of health gives us a loss of growth, this loss of growth has had a negative impact on the level of well-being of the urban population. . The absolute impact is -0.4730

Table-3. Growth rate of education, health, evidence-based well-being and counterfactual well-being between 2007 and 2014 in urban area.

	Education	Health	factual well-being	counterfactual well-being	Impact IA [IR]
Logarithm of average well-being in 2007 Ln (μt)	1,1118	1,3506	13,1336	13,1505	_
Logarithm of average well-being in 2014 Ln (μt)	1,5303	0,8064	13,5191	13,3508	_
Logarithm of pro-poor well-being in 2007 Ln(y_t*)	0,6640	0,8779	12,5535	12,5708	_
Logarithm of pro-poor well-being in 2014 Ln(y_t*)	1,1782	0,2997	12,8997	13,2048	_
actual growth rate	0,4185	-0,5442	0,3855	0,2003	0,1852
Pro-poor growth rate	0,5142	-0,5782	0,3462	0,6340	- 0,2878
Growth gain (+) / loss (-)	0,0957	-0,0340	-0,0393	0,4337	- 0,4730

Note: IA stands for Absolute Impact.

Table-4. Growth rate of education, health, evidence-based well-being and counterfactual well-being between 2007 and 2014 in rural area.

	Education	Health	factual well-being	counterfactual well-being	Impact IA [IR]
Logarithm of average well-being in 2007 Ln (μt)	1,0152	1,3558	12,3358	12, 551	_
Logarithm of average well-being in 2014 Ln (μt)	0,8109	0,7227	12,5835	12,7326	_
Logarithm of pro-poor well-being in 2007 Ln(y_t*)	0,5769	0,8290	11,8430	11,8621	_
Logarithm of pro-poor well-being in 2014 Ln(y_t*)	0,3868	0,1592	11,8948	12,4900	_
actual growth rate	- 0,2043	-0,6331	0,2477	0,3775	- 0,1298
Pro-poor growth rate	- 0,1901	-0,6698	0,0518	0,6279	- 0,5761
Growth gain (+) / loss (-)	0,0142	-0,0367	- 0,1959	0,2504	- 0,4463

Note: IA stands for Absolute.

4.4. Results Obtained in the Rural Stratum

In the rural area, the results show that the level of education and the level of health deteriorated. Indeed, average growth rates and pro-poor growth rates in education and health are negative. The deterioration in the average level of human capital has had a negative impact on the average well-being of the population, the absolute

impact is - 0.1298. The deterioration in the level of human capital of the poor has had a negative impact on their well-being, the absolute impact is - 0.5761. The reduction in the level of human capital has had a negative impact on the well-being of the rural population, the absolute impact is - 0.4463. Indeed, the growth rates of factual well-being are lower than the growth rates of counterfactual well-being. The comparison in the areas of residence shows that in the urban area the poor have improved their level of education more and their level of health more deteriorated. This situation reduced their level of well-being. In the rural area, the poor deteriorated their level of education less and their health more deteriorated. This deterioration in their level of human capital has had a negative impact on their level of well-being.

5. CONCLUSION AND IMPLICATIONS OF POLICIES

This work aimed to determine the impact of human capital on pro-poor growth. To achieve our objective, we constructed the composite indicators of education and health, then we made a linear regression between expenditure, human capital and some other explanatory variables to show the relationship that exists between these variables and finally we used the approach of Kakwani et al. (2010) to calculate the actual and pro-poor growth rates of education and health, the actual and pro-poor growth rates of factual and counterfactual well-being.

The regression between expenditure and explanatory variables showed that education and health positively affect the expenditure of populations, the results also showed that there were losses in growth rate of education and health. The level of education of the poor has improved less than that of other layer, the level of health of the poor has deteriorated more than that of other layer. With regard to factual well-being, the results showed that at the national level, there was a loss of growth rate. In other words, the growth rate of the well-being of the poor has been lower than the average growth rate of well-being. The loss of growth observed at the national level is explained by the slight improvement in the education level of the poor and the deterioration in their health. Comparison of the growth rates of factual and counterfactual well-being showed that assuming that the level of human capital did not change between 2007 and 2014, we register a growth gain at the national level. By taking into account the variation in the level of human capital we obtain a loss of growth rate. These results show that the deterioration of human capital has had a negative impact on pro-poor growth. The comparison by residence stratum shows that in the urban stratum, the pro-poor growth rate of education is higher than the average growth rate. In the rural stratum, the pro-poor growth rate of education although negative is higher than the average growth rate. In health, pro-poor growth rates are lower than the average growth rates in all strata. In the urban stratum, the deterioration in the health status of the poor has reduced their level of well-being. In the rural area, the deterioration of the education and health of the poor has reduced their level of well-being. Based on these results, governments can increase the supply of education services and enable the poor to access quality health services. They can also lower the cost of consultations and medicines, and increase the number of educational and health personnel. Indeed, education and health play a primordial role in improving the well-being of households and in the development of a country, moreover several development theories argue that sustainable development involves the development of human capital. The State should promote and diversify vocational and technical training. Economic policy must be accompanied by effective social policy. Indeed, the worsening of social inequalities and the strong discrimination in access to public social services have a negative impact on the well-being of rural populations.

Funding: This study received no specific financial support.
Competing Interests: The authors declare that they have no competing interests.
Acknowledgement: All authors contributed equally to the conception and design of the study.

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APPENDIX

Table-5. Summary of dimensional scores for education.

Variables	Modalities	Scores 2007	Scores 2014
Know how to read or write a simple sentence in French	- yes - No	0,453 -0,622	0,355 - 0,854
Know how to read or write a simple sentence in English	- yes - No	0,576 -0,441	0,546 - 0,617
Have attended a school	- yes - No	0,340 -1,140	0,290 - 1,300
Have completed technical or vocational training	- yes - No	0,417 -0,447	0,476 - 0,496
Distance between the nearest public nursery school and accommodation	- Less than 1 km - 1Km and more	0,805 -0,270	0,550 -0,495
Distance between the nearest private kindergarten and accommodation	- Less than 1 km - 1Km and more	0,990 -0,539	0,727 -0,819
Distance between the nearest public primary school and accommodation	- Less than 1 km - 1Km and more	0,355 -0,224	0,233 -0,386
Distance between the nearest private primary school and accommodation	- Less than 1 km - 1Km and more	0,920 -0,567	0,714 -0,816
Distance between the nearest public secondary school and accommodation	- Less than 1 km - 1Km and more	0,851 -0,121	0,696 -0,325
Distance between the nearest private secondary school and accommodation	- Less than 1 km - 1Km and more	1,162 -0,299	0,888 -0,444
First Own values		0,291	0,319

Source: Data from ECAM 3 and ECAM 4.

Table-6. Summary of dimensional scores for health

Variables	Modalities	Scores 2007	Scores 2014
Consultation area	- public - private	0,751 -0,740	1,421 - 0,462
Person consulted	- Health personnel - Traditional practitioner / lifeguard	0,373 -1,525	1,143 - 0,776
Reason for choosing the consultation sector	- Service quality - Acceptable cost	1,075 -0,171	1,658 -0,195
Duration of the last consultation	- Less than a year - one year and more	0,463 -0,383	0,950 -0,854
First Own values		0,371	0,669

Source: Data from ECAM 3 and ECAM 4.