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Inclusive education and economic growth in the WAEMU zone

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Abstract

In developing countries, economic growth is generally meager; i.e. 3.1% in 2018 (World Bank, 2019). Several factors explain the low growth in developing countries, and among these factors is inclusive education, because in Africa, girls are the least educated in society due to income inequality (Elu, 2018). This raises the question of whether inclusive education contributes to dynamic economic growth in the WAEMU zone.

This article aims to show the contribution of inclusive education (gender parity) to economic growth in the WAEMU over the period 2001-2017. Using an ARDL model, the PMG estimation method reveals that inclusive education contributes to growth. Hence, it calls for economic policy implications to foster education for all, as advocated by the Sustainable Development Goals.

Keywords: inclusive education, economic growth, PMG method, ARDL model

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1. Introduction

Economic growth is a long-term phenomenon that differs from expansion, a term used in the analysis of fluctuations and cycles. Perroux (1903-1987), who equated growth with an increase

in the output of a country's economy, remains a benchmark. Today, however, a growing number of economists define economic growth as a long-term increase in per capita output. In developing countries, economic growth is generally meager. According to a recent World Bank report, the economic growth rate in developing countries was 3.1% in 2018. More specifically, according to the World Bank report, the WAEMU (West African Economic and Monetary Union) zone will post a growth rate of 2.4% in 2020, compared with a projected 6.6%. Enormous progress is being made to revive economic activity in the union, but it remains too slow. Several factors explain the low economic growth in developing countries, more specifically in the union; and among these factors is inclusive education.

Education generates knowledge, skills, values, and open-mindedness. It is essential for civil order and the formation of civic-minded citizens, as well as for the achievement of sustained economic growth and poverty reduction. Indeed, according to UNICEF (United Nations International Children's Fund) in 2014, inclusive education is about having real learning opportunities within mainstream school systems for those who are generally excluded (gender inequality, disabilities). In Africa, girls are the least educated in society due to income inequality (Elu, 2018). Also, education, one of the most important ingredients of human capital, is considered an important determinant of a country's economic growth (Schultz, 1961). According to the GEM[1] report, interest in inclusive education is relatively recent.

In our societies, young girls are generally vulnerable to dropping out of school due to sexual harassment, early marriage, and discrimination. However, according to a UNICEF report published in June 2018, more than half of the world's out-of-school children live in countries affected by conflict. Indeed, the macroeconomic stability of countries appears to be one of the most important determinants in the accumulation of human capital. Lack of access to quality education is very often seen as a "development" issue that needs to be addressed through campaigns, anti-poverty programs, reduction of income inequalities, and gender economic inclusion, to progressively improve and think about quality and inclusive education. None of these measures will be effective unless we first put an end to harmful or abusive policies in this area. Despite much research and attempts to achieve the goal of quality, inclusive education, countries are still struggling to follow the guiding principle set out in the SDGs (Sustainable Development Goals) to achieve education for all, i.e. 0% marginalization and exclusion.

[1] The GEM report is the annual global education monitoring report published by UNESCO in 2020.

Today, in industrialized nations, education contributes to development simply by changing the character of societies. Considered by great economic thinkers as a sector of sovereignty par excellence, whatever the community, education aims to produce fulfilled, responsible, respectable individuals who respond to a vision desired by society. It is a factor in individual fulfillment, social cohesion, and the development of a country. Since the Universal Declaration of Human Rights in 1948, education has been recognized as a human right.

According to (UNESCO, 1997), educational attainment is essential not only to the economic well-being of individuals but also to that of nations. This statement is all the more justified given that educational success depends on access to education, which is a source of human capital accumulation and economic growth. The level of inclusive education in developing countries is still low, and the countries of the WAEMU zone are no exception. To this end, the budget devoted to education in each of the countries is 5.4% of GDP for Burkina Faso and Togo; Benin, Côte d'Ivoire, Guinea Bissau, Mali, Niger, and Senegal, for their part, inject 2.9%; 3.3%; 2.1%; 3.8%; 3.5% and 4.8% (World Bank, 2018); giving the union a rate of 3.9%. Faced with this situation, we wonder about the real contributions of inclusive primary and secondary education, and gender parity to economic growth in the union. In other words, does inclusive education contribute to dynamic economic growth in the WAEMU zone?

To this end, this research question is closely linked to one of the main Sustainable Development Goals (SDGs), namely the fourth SDGs for inclusive education, which reads: “Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all”. Thus, to answer our question, we propose as a general objective to show the contribution of inclusive education (gender parity) to economic growth in the WAEMU. From this objective stems a research hypothesis: inclusive education contributes to increase in the WAEMU zone. The remainder of the article is structured as follows: section 1 provides an overview of the literature review, section 2 reviews the methodological approach, section 3 presents the empirical results, and a discussion of the results in section 4. Finally, the last section presents the conclusion, followed by economic policy implications.

2. LITERATURE REVIEW

The main interest of this section is to identify, through the existing literature, the relational dynamics between inclusive education, gender parity, and economic growth in the WAEMU. Education, one of the most important ingredients of human capital, is considered an important

determinant of a country's economic growth (Schultz, 1961). Thus, considered by the great economic thinkers as a sector of sovereignty par excellence whatever the community, education aims to produce fulfilled, responsible, respectable individuals who respond to a vision desired by society.

2.1. Human capital in theoretical growth models

In the economic literature, the main recent contributions on the role of human capital in economic growth are based on an extended version of the neoclassical growth model of Solow (1956) and Swan (1956) proposed by Mankiw and al (1992).

2.1.1. Human capital theory

The theory of human capital in the literature distinguishes two possible forms of training, namely: training enabling the acquisition of general knowledge (school, classic training structures) and training offering specific knowledge which takes place in most cases within a company (The contribution of human capital accumulation to company productivity and economic growth is widely recognized by the new theories of growth, developed by Romer, 1990 and Lucas, 1988). Human capital is essential to high value-added production and, in turn, to the acquisition of comparative advantages and the competitiveness of companies in a country (Ouattara, 2007).

2.1.2. Endogenous growth models

Endogenous growth theories place human capital at the very heart of the production process. Designating the stock of economically valuable knowledge embodied in individuals is a growth factor. In Solow's model, growth comes, on the one hand, from an increase in the active population (the quantity of human capital is linked to the number of active people); and, on the other hand, from an increase in the efficiency of the productive combination (which can be interpreted both by technical progress and by an increase in "quality", in the sense of the productive efficiency of human capital). Human capital can therefore be appropriated by the individual who owns it, unlike technological capital, which is in part a public good.

2.2. Empirical work on the education-growth relationship

Very little direct work and a fair amount of indirect work have been done by several authors on the relationship between inclusive education and economic growth.

2.2.1. Education and economic growth: a direct relationship

In his work, Poilon (2006) examined the impact of human capital (measured by recurrent expenditure on education) and public investment on growth, using an "augmented" Solow model. The methodology used is that developed by Mankiw and al (1992). Tests are carried out on a panel of six European EU countries (Austria, Belgium, Germany, France, Italy, and Netherlands). The various regressions confirm that human capital and public investment are key drivers of economic growth in Europe.

Ahishakiye (2012) finds that enrolment rates are low across the different levels of education in Burundi. To measure the impact of education on economic growth in this country, he studies cointegration and establishes the existence of a long-term relationship between economic growth and the different levels of education. Their econometric estimates show that only primary school enrolment has a positive impact on economic growth in Burundi in the long term, while secondary school enrolment has a negative effect. In the short term, no level of education has a significant impact on economic growth.

2.2.2. Inclusive education and economic growth: an indirect relationship

In their work on 42 sub-Saharan African countries for the period 2004-2014, Asongu et al (2020b), using the generalized method of moments, have shown that income inequalities reduce the impact of access to financing services on inclusive education. Indeed, for the latter, a public policy measure must be applied to reduce income inequalities, which would have a positive impact on the promotion of inclusive education.

Also, Asongu et al (2019), in their studies on the link between income inequality, information and communication technologies (ICT), and inclusive education in 42 Sub-Saharan African countries for the period 2004-2014. Using the generalized method of moments, they identified the following results. On the one hand, they established income inequality thresholds that should not be exceeded for Internet penetration to have a positive influence on inclusive education, namely 0.400 and 0.625 for the Gini coefficient and the Atkinson index. On the other hand, they established income inequality thresholds beyond which, if exceeded, fixed broadband subscriptions would no longer positively affect inclusive education (0.574; 0.676, and 9,000 respectively for the Gini coefficient, Atkinson index, and Palma ratio).

3. METHODOLOGICAL ASPECTS OF THE STUDY

This section aims to describe the methodological approach followed. This consists of specifying the model and describing the estimation process that will enable us to achieve our objective, then presenting the data used for this purpose.

3.1. Econometric model specification

3.1.1. Basic model

Our analysis of the relationship between education and economic growth from 2001 to 2017 is based on the methodology used by Fousséni (2018). He uses the Solow (1956) growth model, developed by Mankiw and al. (1992), to specify a cobb-Douglas production function, as follows:

$$Y_{it} = A_{it}(K_{it})^{\alpha}(H_{it})^{\beta}(X_{it})^{1-\alpha-\beta}e^{(\varepsilon_{it})} \quad (1)$$

With $0 < \alpha < 1$ and $0 < \beta < 1$

Y_{it} represents a gross domestic product (GDP), K_{it} indicates physical capital captured here by gross fixed capital formation (GFCF), H_{it} designates the level of human capital in the economy captured by equity and inclusion of girls boys dan access to education), X_{it} is a vector of exogenous variables likely to influence output such as the degree of openness of the economy, and public spending on education ; A_{it} shows technological progress; e is the base of the natural logarithm and ε_{it} indicates the error term. α and β are parameters to be estimated.

3.1.2. Data sources

The various macroeconomic data on which our study focuses come mainly from the following different databases : the World Bank for variables such as gross domestic product (GDP), gender parity index in the education system (idparit), gross fixed capital formation (GFCF), public expenditure on primary and secondary education (dpe). On the other hand, data relating to the degree of openness of the economy (degouv) are collected from the CBWAS database. As for the study period, we start with the period from 2001 to 2017 for the eight (8) WAEMU countries. The justification for our choice of period lies in the fact that the theme of "inclusive education" surfaced in the 2000s with the Millennium Development Goals.

3.1.3. Presentation of the ADRL panel model

This approach is essentially a version of the ARDL panel procedure and consists in estimating the ARDL model by maximum likelihood, which can be rewritten as an error-correction model

(ECM). Formally, let's consider a sample of N individuals observed over T periods. Consider the following ARDL (p,q) model:

$$Y_{it} = \sum_{j=1}^{p} \delta_{ij} Y_{i,t-j} + \sum_{j=0}^{q} \alpha_{ij} X_{i,t-j} + \mu_t + \varepsilon_{it} \qquad (2)$$

With $i = 1, \ldots\ldots, N$ and $t = 1, \ldots\ldots, T$

Where $X_{i,t-j}$ is the matrix of explanatory variables (idparit, gfcf, dpe, degouv) of format $(k \times 1)$; μ_t represents individual fixed effects ; δ_{ij} are coefficients assigned to lagged dependent variables ($Y_{i,t-j}$), and α_{ij} is a matrix of scalars of format $(1 \times k)$. For this study, we obtain :

$$lngdp_{it} = \sum_{j=1}^{p} \delta_{ij} lngdp_{i,t-j} + \sum_{j=0}^{q} \alpha_{ij} idparit_{i,t-j} + \sum_{j=0}^{q} \beta_{ij} lngfcf_{i,t-j} + \sum_{j=0}^{q} (1 - \alpha_{ij} - \beta_{ij}) lndpe_{i,t-j} + \sum_{j=0}^{q} (1 - \alpha_{ij} - \beta_{ij}) lndegouv_{i,t-j} + \mu_t + \varepsilon_{it}$$

Clearly, the above equation can be reformulated to obtain a representation in terms of error correction that proves more advantageous, as the following equation shows :

$$\Delta Y_i = \emptyset_i Y_{i,t-j} + \omega_i X_{it} + \sum_{j=1}^{p-1} \delta_{ij} \Delta Y_{i,t-j} + \sum_{j=0}^{q-1} \alpha_{ij} \Delta X_{i,t-j} + \mu_i + \varepsilon_{it} \qquad (4)$$

Applied to our study, we obtain the following equation :

$$\Delta lngdp_i = \emptyset_i lngdp_{i,t-j} + \omega_i X_{it} + \sum_{j=1}^{p-1} \delta_{ij} \Delta lngdp_{i,t-j} + \sum_{j=0}^{q-1} \alpha_{ij} \Delta X_{i,t-j} + \mu_i + \varepsilon_{it} \qquad (5)$$

3.2. Results of diagnostic tests

3.2.1. Descriptive characteristics

The results of the various variable statistics are shown in the table below.

Table 1 : Descriptive statistics of variables

Variables	Mean	min	max
lngdp	22.591	19.787	24.288
idparit	- 0.287	-0.832	0.590
lngfcf	20.824	17.229	22.621
lndpe	3.909	3.230	4.239
lndegouv	3.451	2.876	4.032

Source: Author, based on World Bank (2019) and CBWAS (2019)

The minimums and maximums allow us to check whether there is a considerable spread on each variable by observing the number of samples taken into account in our work. Thus, by

observing the mean of each variable, we can conclude that the dispersion around each variable is not too great.

3.2.2. Homogeneity test

The table below shows the results of Fisher's global homogeneity test.

Table 2 : Result of the homogeneity test

	Probability
Homogeneity test	0.000

Source : Author, based on World Bank (2019) and CBWAS (2019)

The probability of the homogeneity test is lower than the critical probability threshold of 5% (0.00 < 0.05). We therefore reject the H0 hypothesis of homogeneity and accept the H1 hypothesis of heterogeneity.

3.2.3. Dependency test

Table 3 : Dependency test results

Variable	CD-test	p-value	corr	Prob
Ols_res	- 2.70	0.007	-0.124	0.000

Source: Author, based on World Bank (2019) and CBWAS (2019)

The result of Pesaran's (2004) test of inter-individual independence presented in the table shows that $|CD-test| > 1.96$, leading us to reject the null hypothesis of inter-individual independence. Inter-individual dependence is therefore present. This leads us to perform the second-generation stationarity tests.

3.2.4. Second-generation unit root test

Since inter-individual dependence has been demonstrated in our case study, it is de facto appropriate to rely on second-generation tests, particularly that of Pesaran (2007) in the remainder of this work. The null hypothesis of Pesaran's (2007) second-generation unit root test postulates that the series contains a unit root presence. Rejection of the null hypothesis shows that the series is stationary.

The results of the Pesaran (2007) test show that the lngdp and lnidparit variables are stationary in level at the different 10% and 1% thresholds respectively. On the other hand, the other variables lngfcf, lndpe, and lndegouv are stationary in the first difference according to the second-generation tests. We can therefore confirm that our variables are integrated of order 0

and 1. Given the orders of integration of our series, we can corroborate the existence of a presumption of cointegration (long-term relationship) between your variables.

3.2.5. Cointegration test

Stationarity tests have shown us that our variables are integrated in different orders. We therefore investigate the long-term relationship between our variables using the cointegration test.

Table 4 : Results of Pedroni's (2004) cointegration test

Pedroni cointegration test	Panel	Group
V	- 0.529	
Rho	1.762	2.463
PP_t	- 0.306	- 0.961
ADF	3.319	3.167

Source: Author, based on World Bank (2019) and CBWAS (2019)

- Westerlund cointegration test

Table 5 : Results of the Westerlund (2007) cointegration test

Variables	Gt	Ga	Pt	Pa
idparit	- 4.654***	- 17.924***	- 9.301***	- 17.451***
lngfcf	- 4.331***	- 23.952***	- 8.423***	- 16.3***
lndpe	- 2.447	- 13.958	- 6.409	- 14.199***
lndegouv	- 3.235***	- 16.777***	- 7.709**	- 12.669**
Conclusion	Cointegration			

Source : Author, based on World Bank (2019) and CBWAS (2019)

NB : (*), (**), and (***) represent significance at the 1%, 5%, and 10% critical thresholds.

The results of Pedroni's (2004) and Westerlund's (2007) cointegration tests reveal that we reject the null hypothesis of no cointegration and thereby accept the alternative hypothesis of the existence of a cointegrating relationship between our series.

- Hausman test

As mentioned in Tables 4 and 5, Pedroni and Westerlund's cointegration tests indicate a long-run relationship between our variables; hence the need to investigate the short- and long-run coefficients of our variables. But first, we need to determine the efficient estimator. To achieve this, we use the Hausman test to determine which of the MG (Mean Group) and PMG (Pooled Mean Group) estimators is efficient for estimating long-term relationships. The results of the Hausman test are shown in the following table:

Table 6 : Hausman test results

Test de Hausman	Chi 2 (4) = (b-B)' [(V_b-V_B) ^ (-1)] (b-B) = 15.68 Prob > chi2 = 0.0035

Source: Author, based on World Bank (2019) and CBWAS (2019)

The hypothesis of long-term coefficient homogeneity is supported by the Hausman test. This allows a choice to be made between the PMG and MG estimators, by testing the null hypothesis of a non-systematic difference between the model's coefficients. The test result in Table 6 shows a probability of less than 5%. Ipso facto, we accept the null hypothesis that the PMG estimator is the appropriate estimator; this leads us to reject the relevance of the MG estimator in the context of this work.

4. RESULTS AND DISCUSSION

4.1. Results of short-term dynamics estimation

The short-term results shown in the table above reveal that none of the variables in our study is significant in the short term, except for gross fixed capital formation. It should also be noted that the adjustment coefficient or recall force is statistically significant and negative at the critical threshold of 1%, which validates the existence of a long-term relationship between our variables (cointegration) and thus confirms the existence of an error correction mechanism. Indeed, this coefficient reflects the time required to correct an imbalance following a shock.

Table 7 : Results of short-term coefficients

Variables	Coefficients	P-value
Didparit	0.391	0.383
Dlngfcf	- 0.079***	0.056
Dlndpe	- 0.085	0.367
Dldegouv	- 0.295	0.227
Ec	- 0.696	0.000

Source: Author, based on World Bank (2019) and CBWAS (2019)

NB: (*), (**), and (***) represent significance at the critical threshold of 1%, 5% and 10%.

The short-term estimation results show that gross fixed capital formation has an unfavorable and significant effect on economic growth in the WAEMU zone. Indeed, a 1% increase in GFCF leads to a 0.08% drop in economic activity in the WAEMU zone. This negative result

could be explained by the fact that an adjustment lag before annual investment flows into the WAEMU zone allows for an increase in investment in the WAEMU zone.

4.2- Estimated long-term dynamics

The results in the table above show that, in the long term, inclusive primary and secondary education, with gender parity, has a positive and significant influence on the value added to gross domestic product (GDP) at the 5% threshold. Similarly, gross fixed capital formation (GFCF) positively impacts value-added gross domestic product (GDP) at the critical 1% threshold.

Table 8 : Long-term coefficient results

Variables	Coefficients	P-value
idparit	2.186**	0.041
lngfcf	0.491***	0.003
lndpe	0.394**	0.025
ldegouv	- 0.278	0.231
C	7.562***	0.000

Source: Author, based on World Bank (2019) and CBWAS (2019)

NB: (*), (**), and (***) represent significance at the critical threshold of 1%, 5% and 10%.

3.3. Economic interpretation of results

The long-term estimation results show that the inclusive education system has a significant and favorable effect on economic growth in the WAEMU zone. Indeed, a 1% increase in primary and secondary school enrolment, with gender parity, leads to a 2.186% increase in economic activity in the WAEMU zone. This positive result could be explained by the fact that the inclusive education system reduces the marginalization of girls in our societies, more specifically in Africa (WAEMU zone). As for the positive impact in the WAEMU zone, this is justified by the fact that the 2000s were marked by the MDGs and SDGs programs. Our results are in line with Tchamyou's (2020) conclusion that the inclusion of the education system has a positive impact on various determinants of economic growth.

In contrast to the short-term result, the long-term one shows that gross fixed capital formation has a favorable and significant effect on economic growth in the WAEMU zone. Indeed, a 1% increase in GFCF leads to a 0.4% rise in economic activity in the WAEMU zone. This positive result can be explained by the fact that annual investment flows into the WAEMU zone have boosted investment in the union, which in turn has boosted economic activity in the various

countries of the zone. As for the positive impact within the WAEMU zone, this is justified by the fact that certain countries in the zone, such as Côte d'Ivoire, have seen an increase in private and public investment over the decade. Our results are in line with Mamadou's (2013) conclusion that gross fixed capital formation has a positive impact on various determinants of economic growth.

Furthermore, the results show that public spending on education has a favorable and significant effect on economic growth in the WAEMU zone. Indeed, a 1% increase in public spending on education leads to a 0.491% rise in economic activity in the WAEMU zone. This positive result could be explained by the fact that the various governments, concerned with the well-being of their populations, inject part of their gross domestic product into their education system, to train their human capital as effectively as possible. Our results are in line with Mamadou's (2013) conclusion that public spending on education has a positive impact on economic growth.

CONCLUSION AND RECOMMENDATIONS

This article examining the impact of inclusive education on economic growth in the WAEMU zone over the period 2001-2017, had the general objective of showing the contribution of inclusive education (gender parity) to economic growth in the WAEMU. To achieve this objective, we were led to relate through a careful literature review that the inclusive education system aims to increase women's participation in the economic fabric of the formal sector.
Subsequently, for our results, the Pooled Mean Group (PMG) estimator was applied. The ARDL model by Pesaran et al (2001) used in this study produced results of varying degrees of interest. Our results show that, in the short term, inclusive primary and secondary education with gender parity has no influence on economic growth in this zone; whereas, in the long term, inclusive primary and secondary education with gender parity has a positive influence on the evolution of GDP in this union.

However, this study, using other control variables such as gross fixed capital formation, public expenditure on primary and secondary education, and the degree of openness of the economy, highlighted certain determinants of economic growth that act directly on economic activity in the WAEMU zone. The test revealed that in the short term, none of these variables is significant except for gross fixed capital formation, which has an impact on economic growth. However, in the long term, gross fixed capital formation and public spending on education were found to be significant and positive for economic growth in the union.

Therefore, in light of these results, public policies should be aligned with the vision of the Sustainable Development Goals (SDGs) for 2030, to promote inclusive education to foster the economic inclusion of gender in the formal sector; this will translate into increased economic growth in these countries of the union.

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ACRONYMS AND ABBREVIATIONS

ARDL : Autorégressive Distributed Lag

CBWAS: Central Bank of West African States

DEGOUV : degree of openness of the economy

DPE : public expenditure on primary and secondary education

GDP : Gross domestic product

GFCF : gross fixed capital formation

IDPARIT : gender parity index in the education system

ICT : Information and Communication Technologies

PMG : Pooled Mean Group

MG : Mean Group

SDGs : Sustainable Development Goals

UNESCO : United Nations Educational, Scientific and Cultural Organization

UNICEF : United Nations International Children's Fund

MDGs : Millennium Development Goals

WAEMU : West African Economic and Monetary Union