

## DOES FOREIGN CAPITAL REALLY MATTER FOR EMPLOYMENT? EVIDENCE FROM AGRICULTURAL DOMINANCE AFRICAN COUNTRIES



Boker Poumie<sup>1+</sup>  
 Dounya Matsop  
Claude<sup>2</sup>

<sup>1</sup>Faculty of Economics and Management, University of Maroua, Cameroon.

Email: [b.poumie@yahoo.fr](mailto:b.poumie@yahoo.fr) Tel: +237697927902

<sup>2</sup>Institut Universitaire de la Cote (IUC) Douala Cameroon.

Email: [claudeanal2008@yahoo.fr](mailto:claudeanal2008@yahoo.fr) Tel: +237691735513



(+ Corresponding author)

### ABSTRACT

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This paper examines the impacts of foreign capitals (FDI, migrant remittances, and agricultural aid) on overall and sectoral employment using a simple labor demand model for a panel of 43 African countries from 2002 to 2018. Our econometric investigation reveals the presence of cross-section dependence and a long-run relationship among variables. Using the dynamic ordinary least square (DOLS), the augmented mean group (AMG), and the common correlated effects means group (CCEMG) methods, we find that only migrant remittances and FDI positively affect total employment. Still, FDI has a positive significant effect on agriculture, industry, and service employment. Our findings also indicate that migrant remittances reduce employment in agriculture and increase job creation in the service and industry sectors. Finally, aid to agriculture does not contribute to job creation in African countries and even negatively affects industry employment. This study supports the view that migrant remittances contribute to transforming the employment structure in Africa countries. Some recommendations are proposed.

**Contribution/ Originality:** This study contributes to the existing literature by investigating the effects of foreign capital on overall and sectoral employment. Also the study uses new methodology to control the problem of cross-sectional dependence between the countries in our panel.

## 1. INTRODUCTION

The creation of decent jobs is the objective of economic policies by the promotion of national and international investments in many countries. However, Africa's structure of employment today is unchanged in the two last decades.

Indeed, the African economy's structure has remained almost the same during this period despite a positive and sustainable economic growth. The rapid economic growth of African countries and investment has not created more good jobs. Moreover, the various governments of African countries are struggling to increase public and para-public jobs. Private investment does not seem sufficient to reduce poverty through employment creation, particularly for young people. Therefore, national development policies have not led to the enhancing of employment opportunities on the continent.

In African countries, the development policies, institutional crisis, and economic crisis are partly responsible for the slow pace of employment growth. It is also important to note that the problem of employment in Africa is

masked by a moderate unemployment rate. Indeed, the regional unemployment rate has been relatively stable since 2000 and is lower than those for Europe and Central Asia. However, this low unemployment rate in Africa is explained by a growing informal sector which absorbs those African workers who cannot find wage employment. In many African countries, self-employment and informal employment occupy the majority of the labor-force entrants, this in both rural and urban areas. Thus, studies on employment in Africa are limited by the informal sector, which is difficult to measure.

African countries are characterized by the scarcity of capital for finance job-creating investment projects. The contribution of foreign capital for this creation is not negligible. Nevertheless, Africa is the region where aid, FDI inflows, and migrant remittances are the most important. It is also the continent where development and economic policies have failed to create enough decent jobs for a growing population. Numerous studies have focused on showing the contribution of foreign capital to job creation in a country. This work shows that FDI contributes strongly to a country's employment dynamics (Coniglio, Prota, & Seric, 2015; Giulletti, Wahba, & Zimmermann, 2013; Jude & Silaghi, 2016; Mickiewicz & Bell, 2000; Mirza, 1998; Peluffo, 2015). However, the other studies show that Africa's high growth has not created more jobs because the assistance programs or aids have not sufficiently supported the structural change for job creation (Page & Shimeles, 2015).

Our paper contributes to the limited literature on foreign capital and employment. Especially this work contributes to the literature by investigating the effects of migrant remittances, aid to agriculture and foreign direct investments on overall and sectoral employment in Africa countries. We also use estimation techniques that control the problem of cross-sectional dependence between the countries in our panel.

The paper is organized as follows: section 2 provides an overview of the literature on the effect of foreign capital mainly the FDI, the migrant remittances, and the aid to agriculture on employment. Section 3 presents the theoretical framework of our study. In section 4, we describe the empirical methodology and descriptive statistics while in section 5, we discuss results. The conclusions are finally highlighted in section 6.

## 2. RELATED LITERATURE

Studies on the labor market effects of the internationalization of economies generally focus on the employment effects of international trade and trade openness (Asaley, Okodua, Oloni, & Ogunjobi, 2017; Van der Hoeven & Lübker, 2006). Some works have explicitly interested in the effect of foreign capital on job creation. Moreover, the employment effects of FDI have received increasing attention in recent decades (Coniglio et al., 2015; Giulletti et al., 2013; Jude & Silaghi, 2016; Mickiewicz & Bell, 2000; Mirza, 1998; Peluffo, 2015). But very few works have focused on the labor market effects of foreign aid and migrant remittances in the host countries. FDI influences employment in a country and leads to a regional redistribution of jobs (Mirza, 1998).

However, the FDI are not only a source of new job creation. They also improve the structure of jobs (Mickiewicz & Bell, 2000). Mickiewicz and Bell (2000) assert in their theoretical study that the employment effects of the FDI in the host country have three stages. At the first stage, FDI through targeted investment mainly concentrates on the commercial, service, and consumer goods. At the second stage, FDI influences enhancing employment level and transferring new technology. Finally, in the third stage, the effect of FDI on employment is higher since FDI through innovative technology improves productivity in the domestic industry. However, the low human capital, inefficient management, and inappropriate technology may compromise the impact of FDI on the overall employment level.

The large body of empirical literature related to the effects of FDI on the local economy is focused on technology transfers and spillovers. Only small but growing studies address the employment effects of FDI in a destination country. On the other way, Empirical studies on the employment effects of foreign capital bring forward different results. The results vary depending on the foreign capital type.

The studies analyzing the effect of FDI on employment in developing countries are scarce. The literature shows an overwhelmingly positive impact of FDI on total employment in developing countries (Hale & Xu, 2016). Therefore, many studies have confirmed this positive employment effect of FDI in developing countries (Coniglio et al., 2015; Peluffo, 2015). However, the effect of FDI on employment can also depend on the sector considered and overall employment (Nesabiyan, 2006). Relatively to the impact of FDI on sectoral employment, Malik (2019) shows in his study of the employment effect of FDI on India's manufacturing industries that FDI does not affect the employment in India's manufacturing industries. These findings contrast with the former ones of Karlsson, Lundin, Sjöholm, and He (2009) whose find a positive effect of FDI on job creation in the Chinese manufacturing sector. Once again, Onaran (2009) studies the impact of FDI on employment in eight CEEC countries and finds that FDI does not influence employment. This study also reveals that FDI significantly affects job opportunities in the manufacturing industry. Moreover, the FDI may directly or indirectly affect the employment in host countries. However, the direct effect is more reliable (Lipse, 2004). Jude and Silaghi (2016) find that FDI leads to the phenomenon of generation and destruction of employment in Central and Eastern European countries from 1995 to 2012. The authors use the fixed effects estimator and GMM estimator to analyze the impact of FDI on employment. Their findings show that FDI does not affect employment with the fixed effect method whereas the effect becomes negative with the GMM method. This study also supports that the current increase in the FDI stock leads to job losses.

Contrary to the studies that support an overwhelmingly positive employment effect of FDI, other studies have found that FDI can generate an overall negative influence on employment (Jenkins, 2006; Pfaffermayr, 2001).

The second axis of this review turns towards works analyzing the effect of foreign aid on employment. It appears from the studies on this subject that the fastest economic growth of African countries has the least responsiveness on employment, and also, development aid is partly responsible (Page & Shimeles, 2015). The authors show that in Africa more and more foreign aid is being granted to countries with a low employment intensity of growth. Thus they propose an innovative approach to aid in focusing on supporting structural change for job creation. Similarly, Page (2012) supports that industrialization in Africa is facing a lack of structural change and aid should do more to assist Africa's economies to master global drivers of industrial location. Simpasa, Shimeles, and Salami (2015) investigate the employment impact of development aid in Africa from 1995 to 2015. Their findings support a heterogeneous employment effect of aid. They assert that international aid focus on small-scale enterprises and microcredit institutions has a larger employment return than those focusing on health and education. The study of Wolf (2007) shows that the drain of a significant amount of aid in social service positively affects employment through the recruitment of frontline health personnel or teachers. The literature broadly supports the employment benefits of development assistance in Africa. The job creation of youth or women employment is addressed by the multilateral institutions like the World Bank, International Monetary Fund, and UNICEF in many of their programs and policies (Soucat, Scheffler, & Ghebreyesus, 2013). Other authors assess the different effects of aid depending on sectoral employment. Quartapelle (2011) study of the case of Mozambique shows that the impact of foreign aid on employment was strongest in agriculture and manufacturing but insignificant in service sectors.

The last group of works regroups the studies underlined the interrelationship between migration and employment. Due to the financial constraint of many countries of origin of some migrants, migrant remittances can sustain the promotion of entrepreneurial activities and thus increase employment opportunities (Woodruff & Zenteno, 2007). Moreover, remittances and repatriated savings are a way to finances new projects whose lead to job creation (Dustmann & Kirchkamp, 2002; Mesnard, 2004). Furthermore, Rapoport (2002); Démurger and Xu (2011); Giulietti et al. (2013) assert that migrant remittances encourage the self-employment of recipients and help also to create employment opportunities in the home country's labor market. Finally, Vadean, Randazzo, and Piracha (2019) analyze the role of remittances on labor supply and activities of household members left behind in Tajikistan

and find no dependency effect of remittances. Their findings also show that remittances received by households decrease the probability of wage employment and increase that of small-scale self-employment activities of men staying behind. However, migrant remittances can also negatively affect those remaining in the home country when the recipients exert minimum effort and enjoy leisure at the expense of the migrant (Chami, Fullenkamp, & Jahjah, 2005).

### 3. THEORETICAL FRAMEWORK AND EMPIRICAL MODELS

We address the issue of foreign capital induced changes in employment in Africa by a simple model of labor demand, extended to include FDI, remittances of migrants, and aids to agriculture. To take the role of foreign capital on the labor market into account, we follow the theoretical literature on the employment effect of international trade (Greenaway, Hine, & Wright, 1999; Stehrer, 2004) and proceed with the construction of labor demand function, where the total factor productivity is a function of foreign capital.

We begin our theoretical framework by assuming a profit-maximizing representative firm, for the country  $i$  at time  $t$ , that has a technological constraint given by a Cobb-Douglas production function:

$$Y_{it} = A^{\gamma} K_{it}^{\alpha} L_{it}^{\beta} \quad (1)$$

Where  $Y$  is the real output,  $A$  the terms of technological progress,  $K$  the capital stock,  $L$  the labor factor,  $\alpha$  and  $\beta$  represent the elasticity of output with respect to capital and labor respectively. The coefficient  $\gamma$  captures the change in production process due to improvement in efficiency of factors Greenaway et al. (1999).

The main objective of firms is to maximize their profits, and this implies that they use inputs until their marginal revenue equals their price. It also means that the labor marginal revenue equals the wage and the capital marginal revenue equals the cost of capital. However, we eliminate the capital stock from Equation 1 because the estimation of its aggregate level is problematic, and the interest rate is a poor proxy for the cost of capital:

$$Y_{it} = A^{\gamma} \left( \frac{\alpha}{\beta} N_{it} \frac{w_{it}}{c_{it}} \right)^{\alpha} L_{it}^{\beta} \quad (2)$$

$N$  represents the employment level. Taking logarithms on both sides and rearranging the terms, we obtain the labor demand of country  $I$  at time  $t$ :

$$\ln L_{it} = \theta_0 + \theta_1 \ln Y_{it} + \theta_2 \ln \frac{w_{it}}{c_{it}} \quad (3)$$

$$\text{Where } \theta_0 = -\frac{\gamma \ln A + \alpha \ln \alpha - \alpha \ln \beta}{\alpha + \beta}; \theta_2 = -\frac{\alpha}{\alpha + \beta}$$

Concerning the role of foreign capital, the literature supports that the technical efficiency parameter is affected by foreign capital (Borensztein, De Gregorio, & Lee, 1998). Foreign capital and trade can induce technological change. To model the technical efficiency factor as a function of foreign capital, we adopt the approach of Greenaway et al. (1999) as follow:

$$A_{it} = e^{\delta_0 T_i} FC_{it}^{\delta_1} open_{it} \quad (4)$$

$FC$  is the foreign capital in country  $i$  at time  $t$ . It is measured by the amounts of aid to agriculture, the migrant remittances and the FDI.  $t$  is the time trend and  $\delta_0, \delta_1 > 0$ . By replacing logarithm of  $A_{it}$  in Equation 3 we obtain:

$$\ln L_{it} = \lambda + \theta_1 \ln Y_{it} + \theta_2 \ln \frac{W_{it}}{c_{it}} + \theta_3 \ln FC_{it} + \theta_4 \ln open_{it} + \theta_5 T \quad (5)$$

$$\text{Where } \lambda = -\frac{\alpha \ln \alpha - \alpha \ln \beta}{\alpha + \beta}; \theta_3 = \mu \delta_1; \theta_4 = \mu \delta_0; \mu = -\frac{\gamma}{\alpha + \beta}$$

The present study adopts the agriculture value-added as the measurement of output as the studied countries are mostly agriculture production. Thus, we specify the model we estimate as follow:

$$\ln empl_{it} = \theta_0 + \theta_1 \ln vaagr_{it} + \theta_2 \ln sal_{it} + \theta_3 \ln open_{it} + \theta_4 \ln FC_{it} + \varepsilon_{it} \quad (6)$$

Where empl is the employment variable and represents the dependent variable. It will be measured in our study by the overall employment (empl), agriculture employment (agrempl), industry employment (indempl), and service employment (serempl). The key variable of our study is the foreign capital (FC) variable. This key variable is measure in our empirical model by aid to agriculture measure by the amount of foreign aid to agriculture, farming and fishing (aff), remittances of migrants (efm), and foreign direct investment (FDI). The other control variables are given by vaagr which is the agricultural value-added, sal represents the wage and is measure by the level of output per employment worker, open is the openness of the economy measured by the exports plus imports related to GDP. All variables provides from WDI 2019 (for empl, agrempl, indempl, serempl, sal, and open), UNTACD statistics (for efm, fdi, and vaagr), and OECD statistics (for aff). Additional information on variable are given in descriptive statistic section.

#### 4. ECONOMETRIC METHODS AND DATA

In this section, we first explain the panel estimation technique. Then next, we present the empirical results that come from a group of panel estimation methods.

##### 4.1. Cross-Sectional Dependence and Unit Root Test

Our methodological begin with an analysis of the cross-sectional dependence issue. Our study then employs three different cross-sectional dependence approaches. According to Baltagi, Kao, and Peng (2016) cross-sectional dependence describes unidentified mutual shocks, geographical effects, or interactions between social networks. Ignoring the cross-sectional dependence in a panel study may weak estimation result because the cross-sectional dependence may lead to biased estimates in an econometric model, estimator inefficiency, and invalid test statistic Iheonu (2019). In general, the null hypothesis of the test is given by:

$$H_0 : \rho_{ij} = \text{corr}(\mu_{it}, \mu_{jt}) = 0 \forall i \neq j \quad (7)$$

The study proceeds to test the presence of unit root in the variables of the model. Because of the eventual cross-sectional dependence, we utilize the second-generation unit root tests like the first generation ones assume no cross-sectional dependence. The second-generation unit root tests (Pesaran., 2007) that we employ is known as Cross-sectional augmented IPS (CIPS) unit root test and Cross-sectional augmented Dickey-Fuller (CADF). As stated by Pesaran. (2007) CADF regression is:

$$\Delta y_{it} = \alpha_i + b_i y_{i,t-1} + c_i \bar{y}_{t-1} + d_i \Delta \bar{y}_t + \varepsilon_{it} \quad (8)$$

By adding one lag in equation 8 we have equation 9 stated as:

$$\Delta y_{it} = \alpha_i + b_i y_{i,t-1} + c_i \bar{y}_{t-1} + \sum_{j=0}^i d_{ij} \Delta \bar{y}_{t-j} + d_{i1} \Delta y_{i,t-1} + \varepsilon_{it} \quad (9)$$

The last formula is the CADF statistic including one lag (Aslanidis & Fountas, 2014). The simple average of the Equation 8 shows the CIPS statistic.

#### 4.2. Westerlund Cointegration Test

To test cointegration between our variables, we first use the Pedroni (2001) technique. But, as we identified cross-sectional dependence in the panel, the Pedroni cointegration test might give misleading information. Then next, we use the Westerlund panel cointegration test with bootstrap proposed by Westerlund and Edgerton (2007). It is to check the existence of a long-run relationship among all the variables. The choice of Westerlund cointegration test is due to property which accounts for cross-sectional dependence as it is the case for our data present in the table of cross-sectional dependence test. The Westerlund panel constitutes a model with panel-specific-AR test statistic and the same-AR test statistic, which can be calculated by Equation 10 and 11 respectively:

$$VR = \sum_{i=1}^N \sum_{t=1}^T E_{it}^2 R_i^{-1} \quad (10)$$

$$VR = \sum_{i=1}^N \sum_{t=1}^T E_{it}^2 \left( \sum_{i=1}^N R_i \right)^{-1} \quad (11)$$

Where  $\hat{E}_{it}^2 = \sum_{j=1}^t \hat{\epsilon}_{ij}$ ,  $\hat{R}_i = \sum_{t=1}^T \hat{\epsilon}_{it}^2$  and  $\hat{\epsilon}_{it}^2$  are the residuals from the panel regression model and VR represents group variance-ratio ratio statistic.

#### 4.3. Panel Long-Run Parameters Estimations

In the context of a long-run relationship between time series variables, we apply the cointegration methods to estimate the model. We first utilize the panel ordinary least square (DOLS) developed by Pedroni (2001) to estimates the long-run parameters, which can be specified as follows:

But, since the DOLS estimator does not account for cross-sectional dependence in the panel, we also applied the Augmented Mean Group (MG) estimator developed by Eberhardt and Teal (2010) and the common correlated effects mean group (CCEMG) of Pesaran (2006). The CCEMG estimator controls the cross-sectional dependence and heterogeneity with a simple and powerful augmentation of the group-specific regression equation. It includes the exogenous variables and intercepts, with the cross-sectional averages of the dependent and independent variables as additional regressors.

Pesaran (2006) assume the following equation with heterogenous coefficients:

$$y_{it} = \alpha_i + \beta_i' X_{it} + u_{it} \quad (12)$$

$$u_{it} = \gamma_i' f_t + \epsilon_{it}$$

Where  $f_t$  is an unobserved common factor,  $\gamma_i$  a heterogenous factor loading and  $\alpha_i$  a unit-specific fixed effect.

$\epsilon_{it}$  is a cross-section specific unit-specific independent and identically distributed (iid) error term.

Equation 12 can be consistently estimated by approximating the unobserved common factors with a cross-sectional average under the strict Exogeneity of Pesaran (2006). This estimator is commonly known as the CCE estimator. However, the CCEMG is consistent only in non-dynamic panels (Chudik & Pesaran, 2015; Everaert & De Groote, 2016).

However, the AMG estimator developed by Eberhardt and Teal (2010) allows for cross-sectional dependence by incorporating the common dynamic effect parameter and can be estimated by a two-stage method, defined as:

AMG-stage 1

$$\Delta y_{it} = \alpha_i + \beta_i \Delta x_{it} + \gamma_i f_t + \sum_{t=2}^T \delta \Delta D_t + \varepsilon_{it} \quad (13)$$

AMG-stage 2

$$\beta_{AMG} = N^{-1} \sum_{i=1}^N \beta_i \quad (14)$$

Where  $\Delta$  denotes the first difference operator, and denotes observables, denotes the countries-specific estimators of coefficients, is the unobserved common factor with the heterogeneous factor; denotes the coefficient of the time dummies and referred to as the common dynamic process; denotes the mean group estimator for AMG; denotes the intercept and the error term respectively.

#### 4.4. Descriptive Statistics

Table 1 and Table 2 present descriptive statistics and pair-wise correlation respectively. In the pairwise correlation table, we find that open is negatively correlated with different employment variables. Also, salary is negatively correlated with agricultural and service employment and positively linked to total and industrial employment. Moreover, the agriculture value added (vaagr) is the most correlated with different employments follows by foreign direct investment (fdi) and migrant transfer (efm). Moreover, the highest correlation coefficient between all the endogenous variables and our different explanatory variables is less than 0.8 which is the value used as the rule of thumb for high correlation. This result indicates that neither collinearity nor multicollinearity is considered as an issue in our data.

**Table-1.** Statistical description of the variables after (after logarithm) for the 43 African countries.

Variables	empl	agrempl	indempl	serempl	vaagr	sal	open	aff	efm	fdi
Mean	21.583	14.894	13.455	14.575	21.387	8.052	4.243	16.201	19.164	21.704
Std deviation	3.973	1.668	1.403	1.334	1.508	1.083	0.687	1.644	1.824	1.882
Minimum	9.299	10.436	10.699	11.823	16.733	6.134	2.122	9.047	14.165	14.096
Maximum	30.548	17.854	16.272	17.724	25.456	10.657	7.986	19.386	24.088	25.914
Observation	731	731	731	731	731	731	731	731	586	729

**Table-2.** Correlation of the ten variables (after logarithm).

Variables	empl	agrempl	indempl	serempl	vaagr	sal	open	aff	efm	fdi
empl	1.000									
agrempl	0.332	1.000								
indempl	0.715	0.730	1.000							
serempl	0.717	0.783	0.965	1.000						
vaagr	0.677	0.763	0.779	0.787	1.000					
sal	0.435	-0.403	0.152	-0.009	0.060	1.000				
open	-0.187	-0.465	-0.461	-0.473	-0.460	0.086	1.000			
aff	0.380	0.639	0.589	0.595	0.614	-0.072	-0.373	1.000		
efm	0.463	0.410	0.679	0.671	0.688	0.048	-0.323	0.432	1.000	
fdi	0.748	0.265	0.651	0.681	0.657	0.355	-0.204	0.303	0.555	1.000

## 5. EMPIRICAL RESULTS AND DISCUSSION

### 5.1. Results of Cross-Sectional Dependence Tests

The results of the Pesaran CD, Breusch-Pagan LM, and Bias adjusted LM tests are displayed in table 3. For all variables, the three statistics indicate that the hypothesis of no cross-sectional independence (null hypothesis) this rejected at the 1% level.

Table-3. Results of cross-sectional dependence tests.

Variables	empl	agrempl	indempl	serempl	vaagr	sal	open	aff	efm	fdi
Pesaran CD	91.378***	92.72***	91.51***	126.79***	94.64***	56.94***	14.29***	13.16***	34.99***	105.6***
Breusch-Pagan LM	100073***	10230***	13263***	16179***	10991***	8882***	4268***	4390***	4117***	12089***
Bias adjusted LM	197.23***	200.67***	267.33***	331.43***	217.39***	171.04	69.63***	72.31***	74.31***	241.5***

Notes: \*\*\* indicates significance at 1%. All the variables are in the log form.

The results of Table 3 support the existence of the spatial effects across the countries of our panel. Therefore, the second-generation panel unit root tests are appropriate in this study. The results of the unit root tests are presented in the next step.

5.2. Results of Unit Root Tests

To check the Stationnarity of our variables, we use the Pesaran CADF and the Pesaran CIPS. The results are reported in Table 4.

Table-4. Results of CIPS and CADF unit root tests.

Variables	Level		1st difference		Order
	CIPS	CADF	CIPS	CADF	
empl	-1.456	-1.488	-4.385***	-2.939***	I(1)
agrempl	-1.112	-1.393	-2.611***	-2.141***	I(1)
indempl	-1.425	-1.736	-2.495***	-1.956*	I(1)
serempl	-1.514	-1.842	-2.288**	-1.966*	I(1)
vaagr	-2.01	-1.725	-3.837***	-2.949***	I(1)
sal	-1.709	-1.864	-3.140***	-2.604***	I(1)
open	-1.526	-1.317	-3.738***	-2.385***	I(1)
aff	-1.978	-1.849	-4.261***	-2.973***	I(1)
efm	/	-1.094	/	-2.005**	I(1)
fdi	/	-1.967	/	-3.384***	I(1)

Notes: The lag length is selected using Akaike information criterion automatically. \*, \*\*, \*\*\* indicate significance at 10%, 5%, and 1% respectively. The table is not display value of CIPS tests for variables lefm and lfdi because their panel series are not balanced as required for the CIPS test implementation in stata. All the variables are in the log form.

It appears from these results that variables are stationary at the first difference and are therefore integrated at order 1 I (1). It implies that cointegration tests should be applied in the next step to examine the existence of long-run relationships among all the variables.

Table-5. Results from Westerlund (2007) panel cointegration test.

	Model 1		Model 2		Model 3		Model 4	
	Z-value	R p-value	Z-value	R p-value	Z-value	R p-value	Z-value	R p-value
Gt	11.868	0.300	4.605	0.080*	-101.574	0.040**	-1.132	0.130
Ga	13.255	0.020**	13.107	0.910	13.236	0.050*	13.098	0.020**
Pt	13.793	0.000***	13.540	0.030**	16.170	0.020**	13.408	0.010**
Pa	10.499	0.040**	10.476	0.010**	10.523	0.060*	10.422	0.100
	Model 5		Model 6		Model 7		Model 8	
	Z-value	R p-value	Z-value	R p-value	Z-value	R p-value	Z-value	R p-value
Gt	11.568	0.400	4.711	0.075*	-103.987	0.051*	-1.097	0.143
Ga	13.055	0.022**	12.201	0.890	13.067	0.058*	13.543	0.019**
Pt	12.843	0.040**	13.413	0.034**	15.340	0.030**	13.568	0.009**
Pa	10.889	0.038**	10.411	0.020**	10.562	0.059*	10.343	0.110
	Model 9		Model 10		Model 11		Model 12	
	Z-value	R p-value	Z-value	R p-value	Z-value	R p-value	Z-value	R p-value
Gt	11.053	0.230	5.008	0.067*	-101.001	0.041**	-1.765	0.110
Ga	13.562	0.016**	12.304	0.840	13.765	0.045**	13.954	0.010**
Pt	13.987	0.000***	13.986	0.021**	16.541	0.011**	13.782	0.009**
Pa	11.234	0.023**	10.432	0.018**	10.655	0.055*	10.555	0.099*

Notes: \*\*\*, \*\* and \* denotes the rejection of the null hypothesis on no cointegration at 1%, 5% and 10% significance levels respectively; R p-value is the robust p-value.



### 5.3. Result of Westerlund Cointegration Tests

Table 5 presents the results of the Westerlund cointegration tests. For our different models, the null hypothesis of no cointegration is rejected. These results show a long-run relationship between employment and the different independent variables within the 46 study countries. They also imply that we can use the dynamic ordinary least squared (DOLS), the augmented mean group (AMG), or the common-correlated effects mean group (CCEMG) are appropriate to estimate our long run coefficients.

### 5.4. Estimation of Long Run Parameters

After establishing the cointegration between the variables and accounting for the existence of cross-sectional dependence in our panel, we turn to disclose the effect of foreign capitals on different employment variables by using the dynamic ordinary least squared method (DOLS), the augmented mean group (AMG) method, and the common-correlated effects mean group (CCEMG). The estimation of long-run parameters for PDOLS, AMG, and CCEMG are reported in Tables 6 to 8. The three estimations provide similar results for our different models.

### 5.5. Benchmark Results

Tables 6 to 8 presents the results of the effect of foreign capital on employment. Table 6 displays the results of the effects of different types of foreign capital using panel dynamics ordinary least square (DOLS) method.

Table 6 shows that the effect of foreign capital depends on the measure of foreign capital used and the sector considered. It appears that aid for agriculture (laff) does not has a significant effect on total employment. On the other hand, migrant remittances and foreign direct investment have positive and significant effects on total employment. These results suggest that a one-point increase in migrant remittances and foreign direct investment augments total employment by 0.217 and 0.143 respectively. The result of FDI confirms the findings of Hale and Xu (2016) and Coniglio et al. (2015) who show that FDI has positive effects on employment in developing countries. For the results of the agricultural aid, our findings contrast the one of Page and Shimeles (2015) whose support that development aid is partly responsible for the low reaction of employment in response to the fastest growth of African countries.

However, the results of sectoral employment show some differences between agriculture, industry, and service employment.

For the sectoral results, we observe from table 6 that aid to agriculture has no significant effect on agriculture and service employment while its effect on industry employment is negative and significant. It means that a 1% increase in aid to agriculture leads to a reduction of industrial employment by 0.9%. This result contradicts the one of Quartapelle (2011) who finds in the case of Mozambique that the effect of aid on employment is stronger in the agriculture and manufacturing sectors and non-significant in the service sector. On the other hand, migrant remittances have a significant effect on different sectoral employment. This effect is negative for agriculture employment and positive for industry and service employment.

Table-6. Results of panel dynamic ordinary least square (DOLS).

Var.	Total employment			Agricultural employment			Industrial employment			Services employment		
	1	2	3	4	5	6	7	8	9	10	11	12
aff	0.044 (1.170)			0.006 (1.419)			-0.009* (-1.659)			-0.012 (-1.590)		
efm		0.217*** (3.506)			-0.014** (-2.118)			0.042*** (2.871)			0.088*** (4.672)	
fdi			0.149*** (3.519)			0.018*** (3.440)			0.102*** (11.867)			0.104*** (10.881)
vaagr	1.767*** (18.718)	1.741*** (14.678)	1.612*** (14.979)	0.185*** (15.155)	0.097*** (6.769)	0.171*** (14.562)	0.209*** (11.198)	0.152*** (5.623)	0.080*** (4.531)	0.303*** (15.537)	0.271*** (9.279)	0.185*** (9.084)
sal	0.883*** (3.603)	0.584** (2.377)	0.988*** (3.878)	-0.260*** (-8.078)	-0.138*** (-5.022)	-0.247*** (-8.804)	0.440*** (8.086)	0.508*** (7.396)	0.345*** (8.067)	0.402*** (7.101)	0.254*** (4.144)	0.251*** (5.184)
Open	1.519*** (14.464)	1.444*** (15.249)	1.453*** (12.560)	-0.053*** (-4.175)	-0.050*** (-4.732)	-0.053*** (-4.932)	-0.002 (-0.096)	-0.004 (-0.175)	-0.071*** (-3.209)	0.042* (1.788)	0.028 (1.068)	-0.012 (-0.576)
Obs	688	450	686	688	450	686	688	450	686	688	450	686

Notes: t statistics are in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. All the variables are in the log form.

The negative effect of migrant remittances on agricultural employment confirms the findings of [Chami et al. \(2005\)](#) who assert that remittances can negatively affect the persons who remained in the home country by inciting them to prefer leisure than any effort for work. The positive effect of migrant remittances on industry and service employment agrees with the findings of [Woodruff and Zenteno \(2007\)](#). Indeed, a 1% increase in migrant transfer leads to a reduction of agriculture employment by 1.4% ( $-0.014 \times 100$ ) and increases industry and service employment by 4.4% ( $0.042 \times 100$ ) and 8.8% ( $0.088 \times 100$ ) respectively. It suggests that migrant remittances stimulate activities and employment in industry and service sectors. Finally, the results of foreign direct investment show that it has a more significant effect on employment in African countries. The effect of FDI is positive and significant on all sectoral employment. The results show that a one point increase of FDI contributes to an augmentation of 1.8% ( $0.018 \times 100$ ), 10.2% ( $0.120 \times 100$ ), and 10.4% ( $0.104 \times 100$ ) in agriculture employment, industry employment, and service employment respectively. However, this result does not agree with the findings of [Jude and Silaghi \(2016\)](#) who find no significant and negative effects of FDI on employment depending on the econometric method used. This result also contradicts the one of [Malik \(2019\)](#) who finds that FDI does not influence manufacturing employments in India.

Table 6 also shows that our control variables significantly affect employment. Agriculture value added has a positive and significant effect on total employment and sectoral employment. The results support the hypothesis that an increase in agriculture value-added leads to more employment in agriculture, industry, and service sectors. On the other hand, the variable salary has a positive effect on total, industry, and service employment. His effect on agriculture employment is negative. This means that an improvement of productivity conduce to the transfer of employment from agriculture with weak salaries to industry and service employment where salaries are higher. Moreover, openness has various effects on employment. While openness has a positive and significant effect on total employment and service employment, these effects become negatives and significant for agriculture and industry employment. These results imply that the openness of African countries destroys employment in industry and agriculture which face the competition of imported products.

### 5.6. Robustness Checks

To assess the sensitivity of our results, we study robustness by considering alternative methods of cointegration estimations namely augmented mean group (AMG) and common correlated effect mean group (CCEMG).

The first set of robustness checks is related to the use of the augmented mean group estimation method. The results reported in [Table 7](#) are qualitatively similar to those of panel dynamic ordinary least square. More specifically, the effect of FDI on overall employment remains positive and significant. While the migrant remittances have the same effect on employment even if it is not significant. Like in [Table 6](#) results, the effect of AFF on total employment is not significant with the AMG estimators. However, the effects of AFF on sectoral employment are not significant but have the same sign as the DOLS estimators. Finally, we obtain the positive and significant effects of FDI on different sectoral employment like in [Table 6](#). These results of table 7 strengthen our benchmark results obtained with the DOLS method.

Table-7. Results of Augmented Mean Group estimations (AMG).

Var. Models	Total employment			Agricultural employment			Industrial employment			Services employment		
	1	2	3	4	5	6	7	8	9	10	11	12
Aff	0.0212 (0.0527)			0.00639 (0.00525)			-0.00660 (0.00722)			-0.00226 (0.00454)		
efm		0.169 (0.470)			-0.0220* (0.188)			0.0104* (0.189)			0.0007* (0.191)	
fdi			0.112* (0.200)			0.0064* (0.203)			0.025** (0.258)			0.304* (0.184)
vaagr	0.694*** (0.227)	1.133*** (0.302)	0.608*** (0.199)	0.0350 (0.0260)	0.0338 (0.0292)	0.0284 (0.0241)	0.0138 (0.0233)	0.0210 (0.0246)	0.0156 (0.0283)	0.00464 (0.0178)	0.0239 (0.0157)	-0.00353 (0.0155)
sal	0.612 (0.943)	-0.425 (1.251)	0.676 (0.914)	-0.258*** (0.0909)	-0.196 (0.126)	-0.301*** (0.102)	0.185* (0.0943)	0.163 (0.111)	0.259** (0.129)	-0.0731 (0.0610)	-0.155 (0.112)	-0.0680 (0.0617)
open	1.363*** (0.316)	2.297*** (0.690)	1.246*** (0.298)	-0.0174 (0.0258)	-0.0424* (0.0229)	-0.0107 (0.0186)	-0.00147 (0.0273)	-0.0377 (0.0249)	-0.0128 (0.0262)	0.0322 (0.0212)	0.0577** (0.0285)	0.0389 (0.0240)
Constant	-4.867 (8.021)	-13.68 (11.50)	-0.361 (7.134)	16.27*** (1.039)	15.64*** (1.515)	16.74*** (1.176)	11.68*** (0.972)	11.24*** (0.886)	11.02*** (1.064)	14.62*** (0.613)	14.72*** (0.858)	14.69*** (0.727)
Observations	731	586	729	731	586	729	731	586	729	731	586	729
Number of id	43	41	43	43	41	43	43	41	43	43	41	43

Notes: Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. All variables are in the log form.

Table-8. Results of common correlated mean group (CCEMG) estimations.

Var. Models	Total employment			Agricultural employment			Industrial employment			Services employment		
	1	2	3	4	5	6	7	8	9	10	11	12
Aff	0.0235 (0.0528)			0.00289 (0.00335)			-0.00358 (0.00645)			-0.00127 (0.00411)		
efm		0.660 (0.475)			-0.0265 (0.0288)			0.0146 (0.0261)			0.0189 (0.0256)	
Lfdi			0.0212 (0.166)			0.0175 (0.0189)			0.0281 (0.0228)			0.0179 (0.0229)
vaagr	1.279*** (0.332)	1.838*** (0.551)	0.834** (0.330)	0.0111 (0.0159)	0.00785 (0.0347)	0.0231 (0.0195)	0.0584 (0.0560)	0.120 (0.104)	0.0199 (0.0230)	0.0115 (0.0187)	0.00642 (0.0845)	0.00449 (0.0139)
sal	-1.395 (1.575)	-1.937 (2.049)	0.836 (1.197)	-0.337*** (0.0950)	-0.232** (0.0920)	-0.327*** (0.113)	0.0910 (0.108)	0.261* (0.153)	0.195 (0.139)	0.0796 (0.0677)	0.241*** (0.0832)	0.0639 (0.104)
open	0.604* (0.355)	2.148** (1.070)	0.729** (0.352)	-0.0116 (0.0166)	-0.0564 (0.0464)	-0.0344 (0.0222)	-0.054** (0.0238)	-0.0135 (0.0466)	-0.0442 (0.0315)	0.0472** (0.0219)	0.00481 (0.0594)	0.0480** (0.0195)
__00000m_employ	1.040** (0.408)	-0.0695 (0.400)	0.493 (0.326)									
__00000l_vaagr	-1.539 (1.133)	0.661 (1.409)	-0.0726 (0.932)	0.00791 (0.0504)	-0.0238 (0.0768)	0.0369 (0.0617)	-0.0698 (0.0886)	0.00556 (0.113)	0.0433 (0.0615)	-0.00758 (0.0326)	0.267 (0.235)	0.0487 (0.0478)
__00000l_sal	1.701 (2.230)	-1.885 (1.641)	0.580 (1.939)	0.236 (0.174)	0.0825 (0.114)	0.469*** (0.149)	0.0177 (0.269)	-0.00712 (0.0888)	0.374** (0.159)	-0.0683 (0.233)	0.0667 (0.0736)	0.573*** (0.119)
__00000l_open	-0.485 (1.533)	-0.147 (1.830)	0.887 (1.485)	-0.0381 (0.0459)	-0.0880 (0.105)	-0.0931* (0.0545)	-0.00747 (0.0657)	-0.0426 (0.424)	-0.138 (0.0882)	0.00207 (0.0455)	-0.322** (0.158)	-0.127** (0.0502)
__00000l_aff	-0.0718 (0.153)			0.00353 (0.00731)			-0.0115 (0.00967)			-0.0109 (0.00980)		
__00000l_efm		0.941 (0.882)			0.112** (0.0570)			-0.0331 (0.179)			0.0368 (0.0643)	
__00000l_fdi			0.00883 (0.457)			-0.0143 (0.0186)			-0.0747*** (0.0257)			-0.0522** (0.0243)
__00000m_agriempl				1.035*** (0.257)	0.0469 (0.0422)	0.371* (0.195)						
__00000m_iduempl							0.907*** (0.225)	0.444 (0.365)	0.619*** (0.163)			
__00000m_serempl										1.034*** (0.0904)	0.210 (0.129)	0.797*** (0.136)
Constant	3.654	-14.84	-21.31	0.158	14.34***	7.436***	0.622	3.527*	0.547	0.590	3.890***	-1.179

	(23.53)	(18.83)	(19.28)	(2.949)	(1.433)	(2.832)	(1.587)	(2.019)	(1.565)	(1.348)	(1.474)	(1.768)
Observations	731	586	729	731	586	729	731	586	729	731	586	729
Number of id	43	41	43	43	41	43	43	41	43	43	41	43

Note: Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. All variables are in the log form.

The second set of robustness checks uses the common correlated effect estimation group estimation. The results reported in table 8 confirm the previous ones obtained with DOLS and AMG. The results of the table 8 are in line with those of the table 6 and table 7 in terms of sign of coefficient. It can however be highlighted that the coefficients obtained in table 8 are in the majority non-significant like many CCEMG estimators results.

## 6. CONCLUSION

The African continent is facing a social crisis. The relatively low unemployment level contrasts with growing poverty due to the lack of decent jobs and underemployment. We investigate the impacts of migrant remittances, FDI, and aid to agriculture on employment in African countries. Empirical studies focus on the effect of foreign capital on employment. However, little attention is paid to the effect of migrant remittances and aid to agriculture on sectoral employment in African countries. Thus, this study contributes to the literature by investigating the effects of foreign capital (FDI, migrant remittances, and aid to agriculture) on overall and sectoral employment in a panel of Sub-Saharan African countries. Using the cointegrated methods that control cross-sectional dependence, we first find that the FDI is the only interest variable that positively affects all kinds of employment notably overall and sectoral employment. Second, the aid to agriculture does not contribute to job creation in African countries and can even negatively affect industry employment. Finally, the migrant remittances reduce employment in agriculture and increase the number of employees in the service and industry sectors. This last finding can support the hypothesis that migrant remittances contribute to ameliorate or transform the employment structure in Africa.

Our study has the following implications. Governments and donors of agriculture aids need to adapt these aid programs to promote agricultural jobs and foster employment in the industrial and service sectors. If migrant remittances are more to stimulate self-employment at the expense of wage employment as shown in the literature, African governments need to provide a framework for remittance migrants. It will help a better structural transformation for job creation.

To this end, they must promote the building of various infrastructures, particularly in rural areas, and the opening up of production basins. It will permit the recipients of the migrant remittances to be more interested in the agricultural investment projects. Moreover, at the international level, the various donors of foreign aid must be more concerned with the job creation generated by foreign capital that their actions carry.

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