

# Foreign Aid's Effect on Economic Growth, New Results from WAEMU's Countries

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## Abstract

This study investigates whether foreign aid (AID) has a significant influence on economic growth in WAEMU's (West African Economic and Monetary Union) countries. We use two (2) types of aid data: aggregate aid and disaggregate aid (aid in education, aid in agriculture, aid in trade policies and regulations and humanitarian aid) to run two (2) different regressions. Both the within-dimension and between-dimension estimators reveal that in the long run, the effect of AID on economic growth is heterogeneous across sectors and aid in agriculture, aid in trade policies and regulations as well as aid in education encourages economic growth.

## Keywords

Foreign Aid, WAEMU, Within-Dimension Estimators, Between-Dimension Estimators

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## 1. Introduction

Debate concerning the relationship between foreign aid and economic growth in the receiving country is subject to different points of view. Several studies have been carried out in order to estimate the impact of foreign aid on the economic growth.

The famous work of [1] finds that aid has a positive impact on economic growth, but this can happen only in the economies in which aid is associated with good fiscal, monetary, and trade policies. [2] has shown that this positive aid-growth nexus exists even in countries with unfavorable policy environment; thus what matter more are the methodological approach and the control variables to be used since it suggests that when human capital and investment are used as control variables the positive effect does not exist.

[3] points out the importance of foreign aid to African economies. It reveals that aid does not only contribute

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to increasing growth but also to reducing poverty which might constitute a threat for the achievement of the Millennium Development Goals (MDGs), which is to reduce the percentage of people living in extreme poverty to the half of the 1990 level by 2015.

Then, the study of [4] highlights the mechanisms through which aid affects economic growth in 25 Sub-Saharan African countries and concludes that foreign aid has a significant and positive effect on economic growth with investment as the most significant transmission mechanism.

Moreover, [5] uses three kinds of aid (emergency and humanitarian aid, short-impact aid defined as aid that stimulates growth within 4 years and long-impact aid which refers to aid that affects growth over the long term) to evaluate the impact of aid on growth. The paper suggests that short-term aid has a positive and robust effect on growth. Disagreement arises with [6] which analyzes the effect of short-term as well as long-term aid, economic, social, and food aid on growth, and finds that none of these types of aid has a robust effect on growth. [7] uses annual data from 1960 to 1997 for a sample of 71 aid-receiving developing countries to investigate the aid-growth nexus and concludes that the effect of foreign aid on economic growth is positive, permanent, and statistically significant. More precisely a permanent increase in foreign aid by \$20 per person results in a permanent increase in the growth rate of real GDP per capita by 0.16 percent.

The paper of [8] examines whether foreign aid in education has a significant effect on growth. The analysis covers 90 developing countries, 56 middle-income countries and 34 low-income countries over the period of 1990-2004 and they average the data over three years. The authors take into consideration the heterogeneous nature of aid as well as the heterogeneity of aid recipients; they disaggregate the aid data into primary, secondary, and higher education, and run separate regressions for low-income and middle-income countries. They find that the effect of aid varies by income as well as by the type of aid.

In the same context [9] investigates the long-run relationship between foreign aid and economic growth using a panel data set comprising of five South Asian economies over the period of 1975-2002. The author applies panel unit root tests, mean group and pooled mean group estimation techniques for the econometric analyses and finds results which support the theoretical hypothesis of a positive relationship between aid and GDP growth. But his study makes use of aggregate aid data and does not consider the heterogeneity of aid which is very important for making policies.

As contribution, the present study considers the heterogeneous nature of aid by disaggregating aid's data into different sectors (aid in education, aid in agriculture, trade policies and regulations aid and humanitarian aid) because different types of aid may have different effects on growth. It also provides new results on the long-run effect of the foreign aid on the economic growth using a large data set on WAEMU's countries. All the eight (8) countries are taken over the period of 2002-2013 (see Appendix for the list of countries). These data are essentially based on availability, which nevertheless provides a greater number of observations hence better and more reliable estimates. Finally, it makes use of robust econometric techniques, to solve problems such as endogeneity as well as possible biases. These techniques take into account the possibility of cross-country heterogeneity in the coefficients of AID.

The rest of the paper is structured as follows: Section 2 deals with the data and model; the empirical results are discussed in Section 3 whereas Section 4 concludes.

## 2. Data and Model

Our dataset contains annual data on GDP growth rate (GDPR), aggregate aid (Aid), aid in agriculture (AGR), aid in trade policies and regulations (TPR), humanitarian aid (HUM) and aid in education (EDU), from all the eight (8) WAEMU's countries covering the period 2002-2013 (see Appendix for the list of countries). Foreign aid disbursement data are from the creditor reporting system (CRS) on the OECD website while the data on GDP growth rate and GDP are from the UNCTAD.

In order to investigate the long-run impact of AID on GDPR, we consider the following equation:

$$\text{GDPR}_{it} = \alpha_i + \beta_i \left( \frac{\text{AID}}{\text{GDP}} \right)_{it} + \varepsilon_{it} \text{ for aggregate aid} \quad (1)$$

$$\text{GDPR}_{it} = \alpha_i + \beta_{1i} \left( \frac{\text{AGR}}{\text{GDP}} \right)_{it} + \beta_{2i} \left( \frac{\text{TPR}}{\text{GDP}} \right)_{it} + \beta_{3i} \left( \frac{\text{HUM}}{\text{GDP}} \right)_{it} + \beta_{4i} \left( \frac{\text{EDU}}{\text{GDP}} \right)_{it} + \varepsilon_{it} \quad (2)$$

where Aid, AGR, TPR, HUM and EDU are shares of GDP;  $\alpha_i$  is a country-specific fixed effect,  $\beta_{1i}$ ,  $\beta_{2i}$ ,  $\beta_{3i}$  and  $\beta_{4i}$  may or may not be homogeneous across  $i$  and  $\varepsilon_{it}$  stands for error term.

### 3. Empirical Results

#### 3.1. Panel Unit Root and Cointegration TESTS

As a requirement, the first step is to check the univariate properties of the variables, precisely whether the series are stationary at level. In case they are non-stationary, their first difference series should be.

**Table 1** reports the results of the ADF Fisher panel unit root test proposed by [10] and the panel unit root test of [11]. All these tests accept the null hypothesis of non-stationary series at level, but they couldn't fail to reject it after the first difference; meaning that all the series are stationary at first order.

The next step is to test for cointegration since we previously found first order stationary variables. Thus, we use the panel and group ADF and PP t-tests developed by [12] [13] as they all allow the intercepts to be heterogeneous across countries [14] [15]. ADF t-statistic is also employed. The outputs are reported in **Table 2**. All the tests reject the null hypothesis of no cointegration, suggesting that the variables are indeed cointegrated.

#### 3.2. Estimates of the Long-Run Relationship

In order to estimate the long run effect of the different types of aid on GDP, and assess the robustness of the results; we employ both Within-dimension Fully Modified OLS (FMOLS) and Dynamic OLS (DOLS) panel estimators which allow for homogeneous coefficient across countries and Between-dimension FMOLS and DOLS panel estimators that consider heterogeneity of the coefficient across countries.

However, before performing DOLS in both cases; Equations (1) and (2) are augmented with leads and lags of the first-differenced aid variables. This serves to control for endogeneity problem. Hence, the new equations are given as follows:

$$GDPR_{it} = \alpha_i + \beta_i \left( \frac{AID}{GDP} \right)_{it} + \sum_{j=-p_i}^{p_i} \phi_{ij} \Delta \left( \frac{AID}{GDP} \right)_{it-j} + \varepsilon_{it} \quad \text{for aggregate aid} \quad (3)$$

$$GDPR_{it} = \alpha_i + \sum_{i=1}^4 \beta_{.i} \left( \frac{AID}{GDP} \right)_{it} + 4 \sum_{j=-p_i}^{p_i} \phi_{.ij} \Delta \left( \frac{AID}{GDP} \right)_{it-j} + \varepsilon_{it} \quad (4)$$

where  $\beta_{.i} = \beta_{1i}, \beta_{2i}, \beta_{3i}$  and  $\beta_{4i}$ ; AID stands for AGR, TPR, HUM and EDU; and  $\phi_{ij}$  are coefficients of leads and lags differences.

As developed by Pedroni (2001); the between-dimension estimators (FMOLS and DOLS) are constructed as:

**Table 1.** Panel unit root test.

Variables	Deterministic terms	IPS statistic	ADF Fisher statistic
<b>Levels</b>			
(Aid/GDP) <i>it</i>	Constant	-2.51302	111.603
(AGR/GDP) <i>it</i>	Constant	3.77751	88.1204
(TPR/GDP) <i>it</i>	Constant	-114.884	144.765
(HUM/GDP) <i>it</i>	Constant	0.16035	137.521
(EDU/GDP) <i>it</i>	Constant	2.13143	73.1593
<b>First differences</b>			
$\Delta$ (Aid/GDP) <i>it</i>	Constant	-13.0403*	293.747*
$\Delta$ (AGR/GDP) <i>it</i>	Constant	-2.19512*	194.380*
$\Delta$ (TPR/GDP) <i>it</i>	Constant	-120.375*	180.313*
$\Delta$ (HUM/GDP) <i>it</i>	Constant	-3.00551*	187.147*
$\Delta$ (EDU/GDP) <i>it</i>	Constant	-11.2402*	103.301*

Note: two lags were selected to adjust for autocorrelation. \*Indicate significance at the 5% level of significance.

$$\hat{\beta}_i = N^{-1} \sum_{i=1}^N \hat{\beta}_i$$

where  $\hat{\beta}_i$  is the conventional FMOLS and DOLS estimator depending on the one estimated, applied to the  $i^{\text{th}}$  country. Likewise, the associated t-statistic is:

$$t_{\hat{\beta}_i} = N^{-1/2} \sum_{i=1}^N t_{\hat{\beta}_i}$$

Since the main interest is to estimate the coefficient of the long-run effect; first, we perform the pooled FMOLS proposed by Pedroni (1996) and the pooled DOLS of Kao and Chiang (1997). The results are reported in **Table 3** (first and second column respectively). In order to compare the effects of aid on growth, we run two (2) separate regressions (aggregate aid and disaggregate aid). In the case of Equation (1) that is for aggregate aid, both of them show negative and insignificant effect of Aid on GDP. However, for Equation (2) we notice positive coefficients for all the variables; and only the coefficient of HUM is not significant. Another interesting remark is the little difference observed in the magnitude of these coefficients.

Then, the group-mean panel FMOLS and DOLS estimators developed by Pedroni (2001) were run; the outputs are reported in the third and fourth column of **Table 3**. They also show similar results with the pooled FMOLS and pooled DOLS estimators regarding the sign and significance of the coefficients. Thus, these findings suggest that aggregate aid has a negative and insignificant effect on the economic growth in the WAEMU's countries. Meanwhile, when aid is disaggregated into different sectors, there exists a positive long-run impact of the aid in agriculture, aid in trade policies and regulations and aid in education on the economic growth in the WAEMU's countries whereas the effect of humanitarian aid is insignificant even though it is positive. They also

**Table 2.** Panel cointegration tests.

Pedroni (1999)	Aggregate aid	Disaggregate aid
Panel PP t-statistic	-11.23613*	-4.301020*
Panel ADF t-statistic	-2.01403*	-6.948675*
Group PP t-statistic	-13.01415*	-18.91068*
Group ADF t-statistic	-0.73197*	-5.101243*
<b>Kao (1999)</b>		
ADF t-statistic	4.73521*	-9.241825*

Note: the number of lags is based on the Schwarz information criterion with a maximum number of five. \*Indicate a rejection of the null hypothesis of no cointegration at the 5% level of significance.

**Table 3.** Estimates of the long-run effect of AID on GDP.

Variables	Within-dimension estimators		Between-dimension estimators	
	FMOLS	DOLS	FMOLS	DOLS
Aid/GDP	-0.008018 (0.0811)	-0.014976 (0.0605)	-0.205418 (0.0697)	-0.202830 (0.0718)
AGR/GDP	0.0361 (0.0098)*	0.0236 (0.0084)*	0.0451 (0.0250)*	0.0252 (0.0338)*
TPR/GDP	0.0207 (0.0362)*	0.0187 (0.0484)*	0.0572 (0.0173)*	0.0265 (0.0405)*
HUM/GDP	0.0649 (0.9905)	0.0265 (0.9582)	0.0433 (0.6930)	0.0678 (0.9330)
EDU/GDP	0.0663 (0.0079)*	0.0487 (0.0182)*	0.0672 (0.0434)*	0.0531 (0.0067)*

Note: P-values are in parentheses. The DOLS regressions were estimated with one lead and one lag. \*Indicates significance at the 5% level.

indicate a heterogeneous effect of the foreign aid on the economic growth across sectors. More precisely, the point estimates for the coefficients indicate that, on average, any increase (decrease) in the AGR-to-GDP (TPR-to-GDP; EDU-to-GDP) ratio by one percentage point increases (decreases) the GDPGR by approximately 0.0361, 0.0236 (0.0207, 0.0187; 0.0663, 0.0487) using the Within-dimension estimators (pooled FMOLS and pooled DOLS respectively) and by 0.0451, 0.0252 (0.0572, 0.0265; 0.0672, 0.0531) percentage points using the Between-dimension estimators (group-mean panel FMOLS and group-mean panel DOLS). In addition, the coefficients are slightly different in terms of magnitude. We therefore, argue having found robust results based on different estimation techniques since the within-dimension and between-dimension estimators produce similar results.

#### 4. Conclusion

This study examined the effect of aid on economic growth in WAEMU's countries. We found that the impact of aid on growth depends on the sector in which it is allocated. All the estimation techniques used point out that in the long run, aggregate aid has no significant effect on economic growth while aid directed to specific sectors such as agriculture, trade policies and regulations and education enhances economic growth. Thus, these findings lead us to notice the heterogeneous nature of aid across sectors which can help policy-makers to channel properly foreign aid into significant sectors of the recipient countries. The possibility that some additional factors such as institutional, social and economic, specific to each aid receiving country could be considered as this can shape targeted policies toward enhancing the aid-growth nexus. Moreover, the degree of heterogeneity across countries and the related reasons would be deeply investigated in future researches.

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## Appendix

**Table A.** List of countries.

Benin	Niger
Burkina Faso	Senegal
Côte d'Ivoire	Togo
Mali	Guinea-Bissau

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