

Effectiveness of Aid: Panel Data Analysis of Foreign Aid in Africa

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Abstract:

This paper investigates the effectiveness of international foreign aid flows into the continent of Africa. The study incorporates economic information into an econometric model to examine the influence of variables including natural resources, types of government, corruption, and education. The influence of gender equality and rule of law in relation to developed countries is factored in through a dependent variable. These findings provide an analysis on the efficiency of foreign aid and its effects on economic development in the region.

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1.0 INTRODUCTION

Foreign Aid has become an increasingly contentious topic as a multitude of countries in Africa continue to diverge from the developed economies of the West. Cash payments, structuralized loans, and other subsidies have played a key role in development plans for decades, all which have had varying degrees of success. Attempts to effectively develop these nations in Africa have been constantly altered to suit our globalized world. Each nation in need has individual needs dependent on their resources, economy, and infrastructure, making the task of economic development a multidimensional issue.

This study aims to enhance understanding of how efficiently and effectively foreign aid is being used to help develop economies and enhance the quality of life of people living in these countries. From a policy perspective, this analysis is important because it can help identify the effective policies set by institutions such as the United Nations, developing nations, or other sovereign states responsible for many of the development projects internationally. The relevance of this study is to help contribute to the ongoing research regarding how to help the roughly 800 million people living in extreme poverty in Africa.

This paper was guided by three research objectives that differ from other studies: First it investigates the possibility of institutional capacity as a nation using dynamic data; Second, it incorporates a multitude of national and international factors that could affect Foreign Aid; Last, it analyzes the relationship of Foreign Aid to institutional strength in relation to labor markets, economic freedom, and international aid.

2.0 Foreign Aid to Africa

Figure 1 shows the breakdown of foreign aid payments internationally by continent. Using econometric techniques, the researchers identified recent trends of decreased aid flows towards the regions of Africa and Asia in the years leading up to 2016. The divestment is suspected to be due to the slight increase in aid towards Eastern European and South American countries also in need of capital. Moreover, aid has shifted greatly from debt relief to more social and economic purposes. Figure 2 identifies the trends of sectoral aid programs, drawing data from NGO's, international agencies, and national aid programs.

Figure 1: Yearly Foreign Aid Flows Internationally

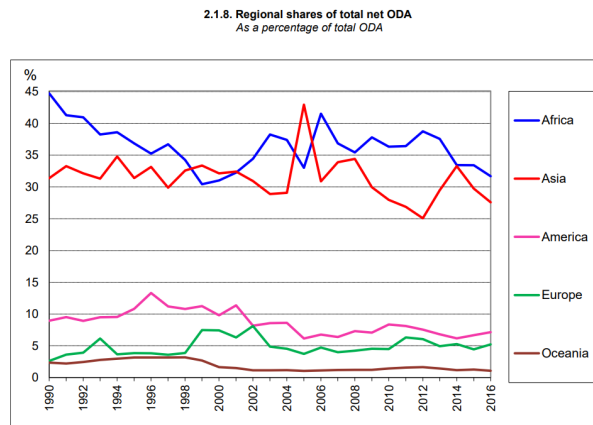
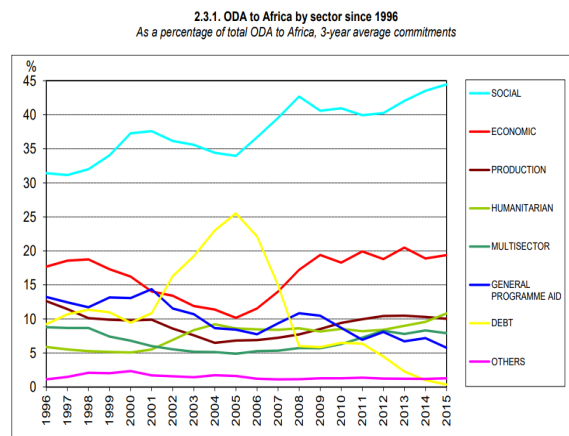


Figure 2: Yearly Foreign Aid by Sector



Source: OECD, (2018)

3.0 LITERATURE REVIEW

Foreign aid has become a contentious issue in the past decades due to repeated failures and continuing divergence of many developing nations, specifically in sub-Saharan Africa (Kamguia, Tadadjeu, Miamo, et al 2022). Despite foreign aid almost tripling from 1970's to the 1990's, growth in Africa remained relatively stagnant. (Easterly, 2005) identifies this issue as not a lack of capital, rather an absence of responsibility from the wealthier nations to ensure effectiveness of development. He states that the quality of aid is being overlooked for more quantity-oriented marketing campaigns, where it delivers the "feel good" moment the public desires. While there are a multitude of reputable arguments criticizing the application and effectiveness of aid, (Moyo, 2011) suggests that aid has had a net negative effect on the continent. Citing that Africa has diverged further, increased its debt load, increased civil conflict, and caused more volatile inflationary periods because of aid.

The debate over the application and effectiveness is what dominates the discourse regarding aid internationally and within development agencies. (Brautigam and Knack, 2004) argue that the central issue is of bad governance, citing that no matter the amount of aid if it is not allocated to trustworthy or qualified hands it will continue to be ineffective. The issue of governance can be attributed to a multitude of factors such as colonialism, indigenous institutions, and civil conflict. Contrary theories to identify the specific factors inhibiting aid have risen, (Andrews, 2009) claims that the focus on macro-economic factors have hindered development and believes that smaller socio-cultural factors may be the root cause. Overall, the effectiveness of aid is a developing

argument with studies being constructed and cited to identify new trends in the effort to alleviate millions from poverty.

4.0 DATA AND EMPIRICAL METHODOLOGY

The study uses annual panel data from 2000 to 2020. Data was obtained from the World Development Banks (IRDB) website on World Development Indicators. Publicly available World Bank data excludes countries that are viewed as developed and in this study, I will only be using 20 countries in the African region. Shown below is the econometric model, ordinary least square regression, fixed effect regression, random effect regression, and the Hausman test results.

Model:

$$\text{LnGDP Per Capita} = \beta_0 + \beta_1 \text{Rent} + \beta_2 \text{SECEDU} + \beta_3 \text{FDI} + \beta_4 \text{WOMIDX} + \beta_5 \text{BRDMONY} + \beta_6 \text{BIRTHS} + \beta_7 \text{HIV} + \beta_8 \text{FAID} + \varepsilon$$

4.2 Empirical Model

I followed the Hongli and Vitenu-Sackey (2020) model for the relationship between foreign aid and development indicators.

The model:

$$\text{Economic Growth}_{it} = \beta_0 + \beta_1 \text{lnAid}_{it} + \beta_2 \text{HDI}_{it} + \beta_3 \text{Rule of Law}_{it} + \beta_4 \text{Corruption}_{it} + \beta_5 \text{Voice Equality}_{it} + \beta_6 \text{Govt Effectiveness}_{it} + \varepsilon_{it}$$

There are six independent variables in the model, each with an individual relationship to the dependent variable of lnGDP Per Capita. Appendix A and B provide data source, acronyms, descriptions, expected signs, and justifications for using the

variables. LnAid is the annual flow of foreign aid from international institutions and individual countries to the nation. It represents the total allocation of capital being transferred for development purposes. HDI represents the United Nations Development Project's Human Development Index which is a measurement of average achievement in key dimensions of human development. Rule of Law is derived from the World Justice Project's index that measures the perceived effectiveness and application of laws in the country. Corruption is reflected by the authors estimate of corruption control, indicating how many citizens believe that there is corruption in their government. Voice equality is a control variable used to identify freedom levels of press and speech. Lastly, Government Effectiveness is a proxy for the country's ability to collect taxes, provide public goods, and implement policy.

The dependent variable in this model is the natural log of GDP Per Capita, a proxy for economic growth. GDP Per Capita as calculated by the World Bank is the country's yearly GDP divided by the country's population. This figure is associated with economic growth, although it does not necessarily reflect the distribution of the growth. The proxy is broad but provides a reliable macro-economic indicator for the nation's economic success year over year. Studies such as Easterly (2005) and Acemoglu and Robinson (2010) utilize GDP Per Capita in models to identify growth patterns.

5.0 EMPIRICAL RESULTS

The results estimated by the model are presented below in Table 2, with Ordinary Least Squares, Fixed Effect, and Random Effect outputs presented. After performing the

Hausman test, I identified the Fixed Effect model to be the most accurate estimator for this data set.

Table 2: Regression results for African Aid Panel-Data

	FDI		
Model	OLS	Fixed Effect	Random Effect
RENT	-22.06* (9.64)	-1.70 (3.77)	-4.29 (2.77)
SECEDU	611.05*** (109.83)	484.60*** (178.32)	720.29*** (199.13)
FDI	1.06* (3.58)	.896* (.231)	9.37** (2.34)
WOMIDX	18.92*** (4.73)	26.29*** (5.33)	25.06*** (5.08)
BRDMNY	3.73 (2.55)	12.48* (4.96)	11.59* (4.49)
BIRTHS	-317.02*** (39.33)	-77.43*** (10.82)	-63.86** (12.37)
HIV	-.280* (.00927)	-.116 (.0017)	-.083* (.0015)
FAID	14.77** (6.90)	22.15** (7.87)	19.32* (6.33)
R ²	.6378	.6211	.5952
Number of obs.	394	394	394

Note: ***, **, and * denotes significance at the 1%, 5%, and 10% respectively. Standard errors in parentheses

The most statistically significant variables are the Women's Index, Birth Rate, Foreign Aid, and Secondary Education. Specifically, the WOMIDX variable was statistically significant at the 1% level, Hongli and Vitenu-Sackey (2020) also found high levels of significance in the Women's Index variable proxy through their estimations. Birth Rate and Secondary Education are also both statistically significant at the 1% level, with education representing the largest variable difference of 484.60. Foreign Aid holds a

lower statistical significance at only a 5% level but still holds a relevant impact on the independent variable. Estimators that negatively affected GDP Per Capita were Birth Rate, HIV, and Resource Rents, with Birth Rate having the largest coefficient of -77.43. The variables that were not statistically significant to the 5% level were Resource Rents, Foreign Direct Investment, and HIV cases.

Examining these results, we find several trends and impacts of variables within the model that give us insight to the estimator's significance. Increases in the variable Secondary Education had a large impact on GDP Per Capita, showing the correlation between increases in education and economic development. Alternatively, the second largest coefficient was the Birth Rate variable. Increases in birth per woman have negatively affected the GDP Per Capita of the entire population possibly due to the responsibility of raising children instead of participating in the workforce. Other notable estimators are the Women's Index, where increases in the equality of genders results in a positive impact on GDP Per Capita. Additionally, Foreign Aid's significance and coefficient is relatively low compared to other variables. This may be attributed to inefficient applications of aid, lackluster programs, or corruption within a country.

5.0 CONCLUSION

To conclude, this study attempted to expand on the literature presented identifying factors relevant to the development of African nations. I found there to be a statistically significant impact of increases in secondary education, foreign aid, and gender equality to increases in GDP Per Capita. Moreover, I found negative statistically significant impacts of increases in the Birth Rate on GDP Per Capita. Several coefficients that were not

significant to the 5% level were Resource Rents, Foreign Direct Investment, Broad Money, and HIV cases.

Identifying indicators of economic growth in developing African countries is only one aspect of the research and it has several limitations. This study's limitations include the use of proxy variables for variables with insufficient data points, exclusion of countries from the panel data set, and exclusion of possibly significant indicators from model. Nevertheless, the results of this study reinforced several empirical studies, Hongli and Vitenu-Sackey (2020) and Acemoglu and Robinson (2010). This research validated the impacts of variables such as the importance of education and institutional equality found in these studies. Aid is a controversial and difficult concept to apply effectively to promote positive economic and social outcomes. The weaker relationship of GDP per capita growth to foreign aid in my model may be due to the ineffective application of aid but can also include other factors such as civil war, political conflict, global recessions, and resource dependence. Overall, my model identified key variables that played a role in GDP per capita growth in developing African countries.

Appendix A: Variable Description and Data Source

Acronym	Description	Data source
FDI	Net inflows of investment to acquire a lasting management interest.	World Development Indicators
WOMIDX	A rating of laws, regulations, and reform trends that advance women's economic empowerment.	World Development Indicators
FAID	Total yearly foreign aid inflows through bi-lateral and multi-lateral institutions.	World Development Indicators

RENT	Sum of oil rents, natural gas rents, coal rents, mineral rents, and forest rents.	World Development Indicators
BRDMNY	Measure of the amount of money, or money supply, in a national economy.	World Development Indicators
SECEDU	Average years of secondary education.	World Development Indicators
HIV	Total amount of HIV cases in the country yearly.	World Development Indicators
BIRTHS	Birth rate, crude (per 1000 people).	World Development Indicators

Appendix B- Variables and Expected Signs

Acronym	Variable Description	What it captures	Expected sign
FDI	Foreign Direct Investment	Total yearly inflows of lasting FDI	+
WOMIDX	Women's Business and Law Index	Gender Equality Nationally	+
FAID	Foreign Aid	Total inflows of bi-lateral and multi-lateral aid	+
RENT	Total Yearly Resource Rents	Amount of money received from natural resource sales	-
BRDMNY	Broad Money	Rate of movement of money within an economy	+/-
SECEDU	Secondary Education	Average education levels in a country	+
HIV	Total Positive HIV Cases	Health crisis issues within a country	-

BIRTHS	Birth Rate	Average amount of children per female	—
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