IN WHAT WAYS AND TO WHAT EXTENT COULD FOREIGN AID INCREASE ECONOMIC GROWTH IN DEVELOPING COUNTRIES?

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ABSTRACT

This paper aims to contribute to the ongoing debate on the effectiveness of foreign aid. The focus is to examine the relationship between foreign aid and economic growth (growth in real GDP per capita) amongst developing countries whilst addressing country heterogeneity. In a panel regression estimated by ordinary least squares, fixed effects, and two-stage least squares between 2006 and 2019 for twenty developing countries – ten low income countries and ten lower middle income countries, the study finds that aid is more effective in low income countries. The results also show that the positive effect of foreign aid on economic growth is conditional on the recipient country having a good policy environment.

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1. INTRODUCTION

Over the past few decades, different initiatives for foreign aid have been introduced to support developing countries. As a result of the early stage of development being characterised by high inflation, high poverty, lower levels of education, poor infrastructure and so on, external sources of funding have been considered an effective way to boost economic growth and welfare in developing countries. Many empirical studies have tried to understand the relationship between foreign aid and economic growth to assess if foreign aid is meeting its primary objective – boosting welfare and economic development. The aim is not to discontinue foreign aid donation if we do not find a positive relationship but to find the most effective way to provide necessary financial assistance.

The effectiveness of aid for economic growth is an empirical question. Previous literature has attempted to understand the relationship between foreign aid and economic growth using Ordinary Least Squares, Two-stage Least Squares, Fixed Effects and Generalised Methods of Moments estimators. Nevertheless, there have been inconclusive results. Some studies state that aid only has a positive effect on growth when it is non-fungible or in the presence of specific conditions such as a good policy environment, whilst others state that foreign aid has a positive relationship irrespective of the policy environment.

This paper examines the relationship between foreign aid and economic growth in 20 developing countries using the fixed effects and two-stage least squares estimators. The results show that there is a positive relationship between foreign aid and economic growth, but it is conditional on the policy environment. An increase in foreign aid per GDP is insignificant to economic growth in lower middle income countries even in a good policy environment. Although, in low income countries, a 1% increase in aid per GDP increases GDP per capita by 47% in a good policy environment.

The second section of this paper reviews previous literature on the effects of aid on economic growth. The third section explains the model specifications and variables for this paper's analysis. The fourth section discusses the data sources used in the study and descriptive statistics. Section five is where the main empirical findings and analysis are presented. Section six presents a robustness check on the cointegration of the trend variables. Finally, sections seven and eight are the limitations of the study and conclusion, respectively.

2. LITERATURE REVIEW

The increase in the use of foreign aid as a tool to reduce poverty and stimulate economic growth has prompted the question of whether foreign aid is effective. For example, the total official development assistance given to developing countries has increased by 292.17% between 1961 to 2020 from 39,990 billion USD to 156,830 billion USD (OECD 2021). Most literature have used empirical models to try to estimate this relationship and establish what factors encourage or inhibit the effectiveness of aid for increasing economic growth. According to an earlier study by Chenery and Strout (1966), aid can accelerate growth because it can potentially relax skill, savings, or foreign exchange bottlenecks within the recipient country. Thus, filling the temporary saving-investment ability and the import-export gap. In the Dalgaard and Hansen (2001) model, aid increases the level of consumption, yielding less socio-political instability, which is good for growth. The extent to which foreign aid can accelerate growth has been measured in previous literature using empirical models estimated by Ordinary Least Squares (OLS), Fixed Effect, Two-Stage Least Squares (2SLS) and Generalised Methods of Moments.

According to Rosenstein-Rodan (1961), one of the main factors affecting aid effectiveness in boosting economic growth is the recipient's absorptive capacity. Absorptive capacity is the ability to use capital productively. Literature following this has tried to define what characteristics can be attributed to absorptive capacity.

The framework in Boone (1996) paper estimated the effectiveness of aid on economic growth between 1971 and 1990. Its primary aim was to understand the relationship between the effectiveness of foreign aid programs and the political regimes of recipient countries. Their findings suggested that all political regimes allocate aid to the political elite and foreign aid does not correlate with factors that encourage growth and investment. It indicated a negative relationship between foreign aid and economic growth. In their model, foreign aid could only be effective when it is conditional on policy reforms and in cases where foreign aid is non-fungible.

Addressing the need for non-fungibility of aid highlighted by Boone (1996), Chatterjee and Turnovsky (2006) classified foreign aid as tied or untied. Where tied means that foreign aid is either linked to a specific investment, commodity, or service or linked to procurement in a

specific country and untied means aid is not subject to any restrictions. This paper used an open economy model that consumes and trades a single good. Their model showed that if the recipient has a flexible supply of labour, untied aid stimulates consumption and encourages more leisure over labour, causing a fall in equilibrium growth rate. In contrast, tied aid stimulates public investment, which raises labour productivity by encouraging labour over leisure and substitution away from consumption which would gradually increase the growth rate.

Likewise, Redelet *et al*. (2005) argued that some types of aid are more impactful than others. They took a broader view of aid by discussing the three major questions about foreign aid: the effect of different kinds of aid on growth, the diminishing returns of aid on growth, and the condition needed for aid to increase growth. However, they only estimated a model for a four-year period, so the result does not show the long-term impacts. The three types of aid considered were: humanitarian aid, early impact aid and late impact aid. They argued that humanitarian aid is aimed at consumption in times of emergency or crisis; therefore, they found that it had a negative relationship with growth. However, aid-financed activities to provide healthcare, food, education, or develop political institutions are only likely to indirectly stimulate economic growth over a long time. However, early impact aid aimed at production such as agriculture, transportation, construction, or industry has the most significant impact on growth. They also found that there are diminishing returns to early impact aid, so after a certain point, each dollar of aid is less effective in promoting growth, therefore aid is at its maximum effect when early impact aid is about 8-9 per cent of GDP and when total aid is about 16 to 18 per cent of GDP. Although there are diminishing returns to aid, aid is absorbed more effectively in countries with stronger institutions and human capital (Redelet *et al*. 2005).

A common assertion is that foreign aid has a non-linear relationship with economic growth. In this case, a non-linear relationship indicates diminishing returns to an additional unit of foreign aid received after a certain point. Ali and Isse (2005) used an empirical model to estimate the relationship between foreign aid and economic growth with data from 1975 to 2000 covering over 90 countries. Firstly, the model showed that the effect of aid on growth is non-linear, indicating diminishing returns to aid. The turning point at which aid begins to have a negative impact on growth is between 15 to 45 per cent (Addison *et al*. 2005).

The non-linearity of aid (diminishing returns), endogeneity of foreign aid, and country heterogeneity should be considered when measuring the impact of foreign aid on developing countries (Moreira 2005). Using data for a sample of 48 developing countries over the period 1970 to 1998, Moreira (2005) estimated this nexus by the Generalised Method of Moments (GMM) approach. They found that aid's contribution to growth was roughly the same across the 48 developing countries. However, some types of aid could have more rapid effects on growth than others (e.g. project aid). Therefore, they argue that future studies should focus on country-specific factors and case studies to measure aid effectiveness. Like similar studies, their results show that foreign aid increases the economic growth of developing countries. In addition, the "square of foreign aid" term used to find evidence of decreasing returns to aid was found to be negative and significant, indicating diminishing returns to aid.

Rahnama *et al*. (2017) attempted to understand the relationship between aid and developing countries by using an empirical model estimated by generalised method of moment (GMM) with annual data from the world bank on 55 low-income developing countries and 56 high-income developing countries from 1970 to 2010. They compared the effects of foreign aid on economic growth in low-income developing countries and high-income developing countries. The use of two separate models was to account for the heterogeneity across groups of countries, as previous studies have pooled together all countries, which may mask the effects of foreign aid. Their finding was that foreign aid increases growth for high-income developing countries but reduces growth in low-income developing countries. The results suggest that the effectiveness of foreign aid is dependent on the stage of development of the recipient country. Therefore, some factors present in the early stage of development, such as poor institutional quality and corruption, could be inhibitors to the efficiency of foreign aid. A limitation of this study is that it did not observe the impact of foreign aid in the presence of good policy for developing countries.

Similarly, Yahyaoui and Bouchoucha (2019) empirical results suggest that aid is more significant for encouraging economic growth in developing countries. However, the long-term effect of aid is more significant than the short-term effect. A potential weakness of this paper is that it only uses data for Tunisia in a Vector Error Correction Model (VECM) empirical model; hence, it does not give a complete view of the effect of aid on all developing countries.

In contrast with most literature, Karras (2006) findings suggested that there is a linear long-run relationship between aid and economic growth, meaning there are no diminishing returns to aid. Two measures of foreign aid – aid per capita and aid as a proportion of GDP were used to estimate its effect on economic growth, using a dynamic time-series model with panel data from 1960 to 1997 for 71 developing countries. The result was that on average, a permanent increase in aid by $20 per capita would lead to a permanent 16 per cent increase in GDP growth rate, and a permanent 1 per cent increase in aid as a proportion of recipients GDP will permanently raise GDP growth rate by 14 to 26 per cent. However, their model did not control for the effects of the policies of the recipient country; therefore, the results might not represent the actual effect of aid alone on GDP growth.

Burnside and Dollar (2000) is a widely influential study because it was one of the first papers to investigate the relevance of good policies in recipient countries in accelerating economic growth through aid. They stated that foreign aid is simply an income transfer; thus, its effect on growth is dependent on how it is used. The extent to which it is efficiently invested or merely consumed is based on sound fiscal, monetary, and trade policies in the recipient developing countries. An empirical model was developed with OLS and 2SLS to estimate growth and aid equations, using data from 56 countries over six 4-year periods between 1970 and 1993. They included a policy variable called a policy index, formed by using the regression of inflation, openness to trade and budget surplus. The use of the 2SLS model was to account for the endogeneity of aid, policy, and GDP. They used the World Bank aid data for 56 countries from 1970 to 1993. The empirical model produced two findings. Firstly, aid only has a positive relationship with economic growth in a good policy environment because the variable where policy was interacted with aid (policy × (Aid/GDP)) was positive and significant whilst aid per GDP (aid/GDP) was negative and insignificant. Secondly, the model showed that good policy is not favoured when allocating foreign aid; this was attributed to multilateral aid being allocated in favour of sound policy whilst there is a positive correlation between bilateral aid and government consumption.

Arslanalp and Henry (2004) agreed with Burnside and Dollar (2000) that multilateral aid tends to favour good policy while bilateral aid is driven by the political interests of donor countries. Therefore, the latter tends to be less effective. They argued that for aid to be effective in improving growth and reducing poverty, it should be distributed based on aid project

productivity and social returns. Drawing on examples of aid projects such as the provision of clean water and malaria treatments, aid-in-kind rather than aid-in-cash will filter out recipients with corrupt governments and encourage donors to be more thoughtful about the needs of recipients. It is important to note that this paper did not use an empirical model, so there was no empirical evidence to corroborate this argument.

Salisu and Ogwumike (2010) estimated a model using Ordinary Least Squares (OLS) and Two-Stage Least Squares methods. The data used covered 20 Sub-Saharan African countries over six 4-year periods between the years 1970 to 2001. They incorporated a policy index in the regression like the work of Burnside and Dollar (2000); their policy index is the combination of fiscal policy, monetary policy, and trade policy. The variable for aid, policy and the interaction of aid and policy (aid × policy) were all positive in the OLS and 2SLS regression models. Therefore, they found that aid and policy are positively related with economic growth, and the effectiveness of aid can be affected by the recipient country's institutional quality and policy environment.

In conclusion, previous literature has found that the relationship between aid and economic growth is conditional on the nature of the recipient country and the nature of foreign aid received by the recipient country. So far, empirical results have shown that institutions, human capital, sound policy, and low corruption are some of the factors on which the effectiveness of aid is conditional. Given that these factors are present in various degrees across countries, there is apparent heterogeneity in aid effectiveness. Therefore, further research should consider the stage of development of countries when grouping them for analysis to address heterogeneity across countries. Collier and Dollar (2004) argued that countries with high poverty are likely to have poor policy. For this reason, my study will focus on low-income and lower middle-income countries, as they receive a large proportion of foreign aid based on world bank data, and they tend to have weaker policies. Therefore, examining the conditionality of the relationship between foreign aid and economic growth in a low income and poor policy environment within a more recent period (post-2000).

3. MODEL SPECIFICATION

3.1. EMPIRICAL MODEL

To understand the relationship between foreign aid and economic growth, I estimated the model in Table (1) below using the Fixed-Effect and Two-Stage Least Squares (2SLS) method. The fixed effect method was chosen rather than pooled Ordinary Least Squares (OLS) because it provided more robust results than the pooled OLS results; this might be due to the nature of panel data for various countries between 2006 and 2019 used in the model. According to Cai *et al.* (2018), economic growth is affected by geographical location, natural conditions, and historical factors. Therefore, we need to control for country-specific factors when using panel data such as geographical locations, natural conditions, and historical factors that do not change over time and eliminate the impact of external shocks in a given year.

There is a potential correlation between these three variables (aid per GDP, logarithm of aid and Lag of GDP per capita) and the error term. I am using 2SLS instead of OLS because the independent variable of interest (aid per GDP), log of aid, and GDP per capita lag are endogenous. Hence, we need to use instrumental variables in the two-stage least squares model to mitigate this issue. Endogeneity is likely to be the main issue causing inconsistency in the OLS results; therefore, we would rely on the 2SLS results instead. Nevertheless, you can find the OLS results in the appendix of this paper for reference purposes.

$$Y_{it} = \beta_0 + GDPpercap_{it-1}\beta_1 + aid/GDP_{it-1}\beta_2 + LnAid_{it-1}\beta_3 + (Policy \times aid/GDP)_{it-1}\beta_4 + (Policy \times LnAid)_{it-1}\beta_5 + Z_{it}\beta_6 + \epsilon_{it}$$

The model above is the general regression model. My main variables for observation are aid/GDP_{it-1}, $LnAid_{it-1}$, $(Policy \times aid/GDP)_{it-1}$ and $(Policy \times LnAid)_{it-1}$. Z_{it} denotes the control variables and ϵ_{it} is the error term.

The Two-Stage Least Squares method was chosen to address the endogeneity problem within the growth model. The endogenous variables and the instruments that will be used to address the endogeneity within the two-stage least squares method have been indicated in table 1.

Firstly, I used the fourth lag of GDP per capita to address the endogeneity of the first lag of GDP per capita, as stated in Rahnama *et al*. (2017).

Secondly, I used the first lag of the logarithm of population as an instrument for the aid variables. The use of the lag of the logarithm of population was also done by Burnside and Dollar (2000) and Boone (1996). Boone (1996) considered the logarithm of population as a suitable instrument because small economies tend to receive more aid than larger economies due to structural and political reasons; therefore, population affects economic growth through foreign aid. They also stated that the stance that population affects economic growth directly is not an empirically relevant issue.

Finally, the first lag of aid per GDP squared is also an instrument seen in Dalgaard and Hansen (2001). Boone (1996) stated that lagged aid is uncorrelated with business cycle factors and emergencies while correlated with long-term strategic and political factors that attract aid. So, lagged aid affects current growth through current aid.

Given the exogeneity of lagged aid stated by Boone (1996) and the use of $(Policy \times aid/GDP)_{it-1}$ the lag of policy multiplied by aid per GDP as an exogenous instrument for aid Dalgaard and Hansen (2001), I have considered $(Policy \times aid/GDP)_{it-1}$ and $(Policy \times LnAid)_{it-1}$ as exogenous variables.

Key independent variables in a growth equation are lagged to reflect that it takes time for their impacts to be realised (Rahnama *et al*. 2017). I have lagged the first three variables in equations (1) and (2) and the first four variables in equations (3) and (4). These five variables are the main variables we are using to understand aid's relationship with economic growth better. Therefore, they have been lagged to allow us to observe the real impact of the respective variables after a reasonable amount of time, which is a year in this case.

Table 1

Equation 1	Equation 2	Equation 3	Equation 4	
$GDPpercap_{it-1}$	$GDPpercap_{it-1}$	$GDPpercap_{it-1}$	$GDPpercap_{it-1}$	Endogenous
aid/GDP_{it-1}	$LnAid_{it-1}$	aid/GDP_{it-1}	$LnAid_{it-1}$	Endogenous
		$(Policy \times aid/GDP)_{it-1}$	$(Policy \times LnAid)_{it-1}$	Exogenous - included
$Policy_{it-1}$	$Policy_{it-1}$	$Policy_{it-1}$	$Policy_{it-1}$	Exogenous - Included
$Grosscapform_{it}$	$Grosscapform_{it}$	$Grosscapform_{it}$	$Grosscapform_{it}$	Exogenous - Included
$Humancapindex_{it}$	$Humancapindex_{it}$	$Humancapindex_{it}$	$Humancapindex_{it}$	Exogenous - Included
$inflation_{it}$	$inflation_{it}$	$inflation_{it}$	$inflation_{it}$	Exogenous - Included

$tradeopenness_{it}$	$tradeopenness_{it}$	$tradeopenness_{it}$	$tradeopenness_{it}$	Exogenous - Included
$GDPpercap_{it-4}$	$GDPpercap_{it-4}$	$GDPpercap_{it-4}$	$GDPpercap_{it-4}$	Exogenous - Instrument
$Lnpop_{it-1}$	$Lnpop_{it-1}$	$Lnpop_{it-1}$	$Lnpop_{it-1}$	Exogenous - Instrument
$(aid/GDP)^2{}_{it-1}$	$(aid/GDP)^2{}_{it-1}$	$(aid/GDP)^2{}_{it-1}$	$(aid/GDP)^2{}_{it-1}$	Exogenous - Instrument

Y_{it} : logarithm of GDP per capita.

$GDPpercap_{it-1}$: first lag of the logarithm of GDP per capita.

aid/GDP_{it-1}: first lag aid as a proportion of GDP (aid per GDP).

$LnAid_{it-1}$: first lag of the logarithm of Aid.

$(Policy \times aid/GDP)_{it-1}$: first lag of policy interacted with aid per GDP (policy index multiplied by aid per GDP).

$(Policy \times LnAid)_{it-1}$: first lag of policy interacted with the logarithm of aid (policy index multiplied by the logarithm of aid).

$Policy_{it-1}$: first lag of the policy index.

$Grosscapform_{it}$: gross capital formation.

$Humancapindex_{it}$: Human capital index.

$inflation_{it}$: consumer price index.

$tradeopenness_{it}$: openness to trade (imports and exports as a percentage of GDP).

$GDPpercap_{it-4}$: fourth lag of the logarithm of GDP per capita.

$Lnpop_{it-1}$: first lag of the log of population.

$(aid/GDP)^2{}_{it-1}$: the square of lagged aid as a proportion of GDP (aid per GDP squared).

3.2. VARIABLE DESCRIPTION

The dependent variable is the natural logarithm of GDP per capita; it measures the rate of expansion of the economy (economic growth) per capita. We want to observe the changes in the economic growth rate rather than simply how much GDP increased.

The first lag of the log of GDP per capita has been included as an independent variable. It has been included to control for the effect of economic growth from the previous year. Rahnama

et al. (2017) also included this independent variable to prevent biased results; they used this variable to address the persistence of economic growth among countries.

Similar to the work done by Burnside and Dollar (2000) and Salisu and Ogwumike (2010), I will include a policy index in my model. I will be interacting the policy index with aid per GDP and the natural logarithm of aid to estimate the relationship between aid and economic growth in a good policy environment. Burnside and Dollar (2000) used regression of inflation, openness to trade and budget surplus while Salisu and Ogwumike (2010) used a combination of fiscal policy, monetary policy, and trade policy. I have used a slightly different approach in my study, as I used the CPIA fiscal policy index developed by the World Bank. The CPIA fiscal policy index measures the quality of policies and institutions across all countries, taking into account exchange rate, monetary policy and sustainability of the countries' public debt (The World Bank, 2022). The CPIA index rating is between 1 and 6, but for simplicity, I have normalised it (between 0 and 1).

Additionally, the variable for aid is the net official development assistance and official aid received. It represents the total bilateral and multilateral aid received by the recipient country.

Finally, the model includes a number of covariates that are known to affect economic growth based on previous studies. These covariates will be used as control variables, to allow us to see the actual effect of aid on economic growth. If these variables are not controlled for, they will mask the effect of foreign aid and cause bias. The covariates included in my model are gross capital formation, human capital index, inflation (CPI index), log of government expenditure and openness to trade.

I have incorporated variables from a range of previous literature such as Burnside and Dollar (2000), Yahyaoui and Bouchoucha (2019) and Rahnama *et al*. (2017) to create a unique model that will estimate economic growth.

4. DATA

4.1. DATA SELECTION AND SOURCES

As discussed earlier in this paper, developing countries receive a large proportion of foreign aid on average across all countries in order to accelerate their economic growth. Developing countries being in the early stage of development and being the main recipients of foreign aid make developing countries an excellent sample to observe the conditional and unconditional relationship between foreign aid and economic growth on policy. This study draws on data of developing countries within a more recent time period than previous literature.

The model will be constructed using the World Bank Global Development data and Penn World Table version 10.0 from the University of Groningen website. I will be using panel data covering 20 developing countries – 10 low income and 10 lower middle income (world bank classification) between the years 2006 and 2019. The 10 low income countries are Burkina Faso, The Gambia, Burundi, Mali, Mozambique, Niger, Rwanda, Sudan, Uganda, and Madagascar. The 10 lower middle income countries are Bangladesh, Ghana, Pakistan, Nigeria, Tanzania, Nepal, Senegal, Kenya, Nicaragua, and Cambodia.

4.2. DESCRIPTIVE STATISTICS

Table (2) below shows all 20 developing countries between 2006 to 2019. Tables 3 and 4 represent low income developing countries and lower middle income developing countries, respectively, between 2006 and 2019.

Table 2: All Twenty Developing Countries

Statistic	N	Mean	St. Dev.	Min	Max
GDP per capita	280	1,019.445	536.958	278.319	2,688.267
Ln GDP per capita	280	1.023	0.024	0.984	1.102
Ln Aid	280	0.992	0.153	0.489	1.612
Aid per GDP	280	0.070	0.051	0.004	0.255
Policy × Aid per GDP	280	0.040	0.033	0.002	0.141
Policy × Ln Aid	280	0.531	0.125	0.244	0.755
Gross capital formation	280	22.495	6.475	8.984	42.554
Human capital index	280	1.675	0.351	1.126	2.527
Inflation	280	7.649	7.457	-3.233	63.293
Ln government expenditure	280	1.018	0.016	0.987	1.075

Policy	280	0.536	0.104	0.250	0.750
Trade openness	280	30.085	36.446	0.012	144.614

Table 3: Low Income Developing Countries

Statistic	N	Mean	St. Dev.	Min	Max
GDP per capita	140	663.069	270.961	278.319	1,423.379
Ln GDP per capita	140	1.017	0.023	0.984	1.096
Ln Aid	140	0.973	0.088	0.715	1.246
Aid per GDP	141	0.103	0.050	0.016	0.255
Policy × Aid per GDP	140	0.062	0.033	0.007	0.141
Policy × Ln Aid	140	0.574	0.121	0.301	0.755
Gross capital formation	140	22.183	6.681	8.984	40.607
Human capital index	140	1.471	0.295	1.126	2.437
Inflation	140	7.492	9.352	-3.233	63.293
Ln government expenditure	140	1.018	0.016	0.987	1.059
Policy	140	0.586	0.100	0.333	0.750
Trade openness	140	0.501	0.204	0.012	1.272

Table 4: Lower Middle Income Developing Countries

Statistic	N	Mean	St. Dev.	Min	Max
GDP per capita	140	1,375.821	499.466	630.687	2,688.267
Ln GDP per capita	140	1.028	0.024	1.000	1.102
Ln Aid	140	1.010	0.196	0.489	1.612
Aid per GDP	141	0.036	0.022	0.004	0.094
Policy × Aid per GDP	140	0.018	0.012	0.002	0.055
Policy × Ln Aid	140	0.488	0.113	0.244	0.689
Gross capital formation	140	22.808	6.269	11.764	42.554
Human capital index	140	1.879	0.276	1.395	2.527
Inflation	140	7.807	4.909	-2.248	26.240
Ln government expenditure	140	1.019	0.016	0.999	1.075
Policy	140	0.486	0.081	0.250	0.667
Trade openness	140	59.669	30.051	20.723	144.614

5. EMPIRICAL ANALYSIS AND RESULTS

5.1. EMPIRICAL FINDINGS

Table (5) below shows the results for all four equations listed in table (1), using panel data for the twenty developing countries listed under section 4.1. data selection and sources.

Table 5: Twenty Developing Countries								
Dependent variable:	Log of GDP per Capita							
	Fixed Effect				2SLS			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Ln GDP per Capita (lagged)	0.935***	0.913***	0.926***	0.909***	0.864***	0.782***	0.852***	0.812***
	(0.024)	(0.025)	(0.024)	(0.026)	(0.041)	(0.047)	(0.041)	(0.044)
Aid per GDP (lagged)	0.054***		-0.054		0.065***		-0.050	
	(0.013)		(0.043)		(0.014)		(0.076)	
Ln Aid (lagged)		0.008***		0.033		0.030***		0.105
		(0.003)		(0.020)		(0.007)		(0.147)
Policy × Aid per GDP (lagged)			0.200***				0.213	
			(0.077)				(0.134)	
Policy × Ln Aid (lagged)				-0.053				-0.197
				(0.042)				(0.311)
Policy (lagged)	0.003	0.006	-0.015*	0.060	0.006	0.007	-0.015	0.207
	(0.005)	(0.005)	(0.008)	(0.043)	(0.005)	(0.005)	(0.013)	(0.312)
Gross capital formation	0.0001	0.0001	0.0001	0.0001	0.0002***	0.0003***	0.0002***	0.0002**
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Human capital index	-0.001	0.0005	-0.002	0.0001	0.002	0.003	0.001	0.002
	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.006)	(0.005)	(0.007)
Inflation	-0.0001***	-0.0001***	-0.0001***	-0.0001***	-0.0002***	-0.0002***	-0.0002***	-0.0002***
	(0.00004)	(0.00004)	(0.00004)	(0.00004)	(0.00005)	(0.0001)	(0.00005)	(0.0001)
Trade openness	0.0001***	0.0001***	0.0001***	0.0001***	0.0001	0.00004	0.0001	0.0001
	(0.00004)	(0.00004)	(0.00004)	(0.00004)	(0.00005)	(0.0001)	(0.00005)	(0.0001)
Ln Government Expenditure	0.115***	0.093***	0.148***	0.099***	0.193***	0.215***	0.236***	0.194***
	(0.034)	(0.034)	(0.036)	(0.034)	(0.045)	(0.051)	(0.053)	(0.048)
Observations	260	260	260	260	200	200	200	200
R^2	0.964	0.962	0.965	0.962	0.953	0.942	0.955	0.948
Adjusted R^2	0.960	0.958	0.961	0.958	0.946	0.933	0.948	0.940
F Statistic	772.321*** (df = 8; 232)	737.772*** (df = 8; 232)	704.535*** (df = 9; 231)	657.637*** (df = 9; 231)	3,047.040***	2,436.913***	3,152.248***	2,724.485**
Note:						*p<0.1; **p<0.05; ***p<0.01		

In equation (1) of both fixed effects and 2SLS (two-stage least squares), the lag of aid per GDP is positive and significant at 1% level, indicating that real GDP per capita grows faster with higher amounts of aid received as a proportion of GDP. GDP per capita grows by 54% (fixed effects) and 65% (2SLS) when foreign aid per GDP increases by 1%. The same applies to the log of aid (Ln Aid) in equations (2); as the amount of aid given to recipient countries increases by 1%, GDP per capita grows by 8% (fixed effects) and 30% (2SLS). Based on this, we can interpret that foreign aid relaxes bottlenecks that inhibit growth by increasing the cash available for saving and investment in developing countries, just as explained by Chenery and Strout (1966). If invested efficiently in growing exports, developing infrastructure, or reducing trade deficits, an income transfer should boost future income. Therefore, it makes sense for aid to accelerate economic growth.

The results change when we evaluate the conditional relationship between aid and economic growth in a good policy environment. Aid per GDP is negative and insignificant, while aid per GDP × policy (aid in the presence of policy) is positive. We can interpret the results in equation (3) as aid per GDP having a negative relationship with economic growth in the absence of good policy but having a positive relationship on average with economic growth in the presence of sound policy. GDP per capita grows by 20% (fixed effects) and 21% (2SLS) when foreign aid per GDP increases by 1% in a good policy environment. As mentioned earlier, aid is only helpful if it is utilised efficiently. Policy in this model represents exchange rate, monetary and fiscal policy rating, so a high policy rating indicates that the economy is being effectively managed. Thus, aid is more likely to be invested efficiently in such an environment.

Similarly, log of aid (Ln Aid) is positive and insignificant, while Ln Aid × policy (aid in the presence of policy) is negative and insignificant. We can interpret the results in equations (3) as log of aid (Ln Aid) having a positive relationship with economic growth in the absence of good policy but having a negative relationship on average with economic growth in the presence of sound policy. Because the results in equations (4) show that' ln aid' and 'ln aid × policy' are not significant at 10% level, we can also conclude that an increase in foreign aid has a negligible effect on real GDP per capita. This result might be because an increase in aid does not necessarily equate to a rise in aid effectiveness for economic growth in a good policy environment; instead, we should focus on the proportion of aid per GDP, as concluded by Redelet *et al*. (2005). It could also mean that an increase in foreign aid in the presence of good

policy is a bad signal for economic growth. For example, humanitarian aid given to Sri Lanka when it experienced a tsunami showed a negative relationship between an increase in foreign aid and economic growth (Redelet *et al*. 2005). Therefore, a rise in foreign aid will have mixed results as it could be due to disasters and emergencies.

5.1.1. THE ROLE OF POLICY

The results in table (5) have some similarities to the results of Dalgaard and Hansen (2001) and Cai *et al*. (2018). Cai *et al*. (2018) included a variable "aid × stability", while Dalgaard and Hansen (2001) included "aid/GDP × policy" in their regressions. The variables for aid per GDP and log of aid are positive and significant in equations (1) and (2) when policy's interaction with aid is not considered but becomes insignificant when the aid variables interacted with policy ('Policy × Aid per GDP' and 'Policy × Ln Aid') are introduced in equations (3) and (4). Cai *et al*. (2018) explained the significance of aid disappearing when the "stability × aid" variable was included in their model, as an indication that foreign aid is conditional on social and political stability. Therefore, this model has shown that foreign aid is dependent on the policy environment.

Dalgaard and Hansen (2001) stated that the government's actions – good policy will reduce the returns to aid. Their justification for this is that good policy tends to reduce the consequences of social unrest and social discontent by way of capital accumulation. Therefore, if aid works in the same way by lowering socio-political instability, then aid may act as a substitute for policy and vice versa. Expanding on this idea, Dalgaard *et al*. (2004) pointed out that some kinds of aid and policy work as complements that enhance the impact of aid, whilst some kinds of aid and policy work as substitutes that diminish the effect of aid. So, the net impact of foreign aid in the presence of sound policy may turn out to be insignificant.

Table (5) also shows that aid in the presence of good policy does not necessarily impact growth as the variables ' Policy × Aid per GDP' and 'Policy × Ln Aid ' were found to be insignificant at 10% level in the 2SLS model. This agrees with the results of Dalgaard and Hansen (2001) and Dalgaard *et al*. (2004). It shows that aid and policy may not be perfect complements, as Burnside and Dollar (2000) implied. The type of foreign aid and policy needs to be taken into consideration when defining the true relationship. If some kinds of aid work

as substitutes, as stated by Dalgaard *et al*. (2004) then this might incentivise governments with good policies to reduce their actions when they begin to receive foreign aid.

I have also found the variable for policy to be positive and insignificant on average, meaning that improvements in policy have little or no effect on economic growth (GDP per capita). The policy variable in my model is the CPIA fiscal policy index, which considers monetary policy and fiscal policy. Therefore, I will consider the individual effects of monetary and fiscal policy on the economic growth of developing countries. Twinoburyo and Odhiambo (2018) noted that the relationship between monetary policy and economic growth is weaker in developing countries due to their underdeveloped financial markets and weak integration into global markets. On the other hand, Gupta *et al*. (2005) results suggested that sound fiscal policy adjustments significantly affect low-income countries; however, this is only the case for countries with stable macroeconomic conditions. Thus, macroeconomic conditions or the stage of development in particular countries impact the significance of monetary and fiscal policy on economic growth.

5.1.2. COUNTRY HETEROGENEITY

I have separated the 20 developing countries into two groups based on their income levels assigned by the world bank. This is to address heterogeneity amongst countries, thus making the samples more homogenous. According to the World Bank, low income countries are those in which 2020 GNI per capita was $1,045 or less, while lower middle-income countries are those in which 2020 GNI per capita was between $1,046 and $4,095.

Burnside and Dollar (2000) argued that the effect of aid on low income countries would be different from its effect on middle income countries due to middle income countries having better access to international capital markets. Rahnama *et al*. (2017) found that factors present at different stages of development facilitate or impede the effectiveness of foreign aid for economic growth.

Table 6: Lower Middle Income Developing Countries								
Dependent variable:	Log of GDP per Capita							
	Fixed Effect				2SLS			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Ln GDP per Capita (lagged)	0.914***	0.911***	0.914***	0.895***	0.901***	0.907***	0.902***	0.894***
	(0.039)	(0.039)	(0.039)	(0.040)	(0.065)	(0.067)	(0.063)	(0.084)
Aid per GDP (lagged)	0.015		0.034		-0.011		-0.126	
	(0.024)		(0.132)		(0.032)		(0.220)	
Ln Aid (lagged)		0.002		0.034		-0.003		0.209
		(0.002)		(0.021)		(0.006)		(0.164)
Policy × Aid per GDP (lagged)			-0.037				0.230	
			(0.251)				(0.429)	
Policy × Ln Aid (lagged)				-0.068				-0.444
				(0.045)				(0.348)
Policy (lagged)	0.001	0.002	0.003	0.070	0.003	0.003	-0.006	0.461
	(0.007)	(0.007)	(0.012)	(0.046)	(0.008)	(0.008)	(0.018)	(0.359)
Gross capital formation	0.0002*	0.0002*	0.0002*	0.0002*	0.0002**	0.0002**	0.0002**	0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Human capital index	-0.001	-0.001	-0.001	0.001	0.006	0.009	0.003	0.003
	(0.007)	(0.007)	(0.007)	(0.007)	(0.012)	(0.013)	(0.013)	(0.016)
Inflation	-0.0002**	-0.0002**	-0.0002**	-0.0002***	-0.001***	-0.001***	-0.001***	-0.001***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0002)
Trade openness	0.0002***	0.0002***	0.0002***	0.0002***	0.0001***	0.0001***	0.0001***	0.0002***
	(0.00004)	(0.00004)	(0.00004)	(0.00004)	(0.00004)	(0.00004)	(0.00004)	(0.0001)
Log of Government Expenditure	0.184***	0.181***	0.184***	0.183***	0.177***	0.182***	0.168**	0.096
	(0.049)	(0.048)	(0.049)	(0.048)	(0.065)	(0.065)	(0.068)	(0.107)
Observations	130	130	130	130	100	100	100	100
R^2	0.984	0.984	0.984	0.985	0.939	0.938	0.939	0.906
Adjusted R^2	0.982	0.982	0.982	0.982	0.918	0.916	0.916	0.871
F Statistic	881.942*** (df = 8; 112)	885.095*** (df = 8; 112)	777.100*** (df = 9; 111)	796.299*** (df = 9; 111)	882.367***	866.013***	874.912***	519.767***
Note:								*p<0.1; **p<0.05; ***p<0.01

Table 7: Low Income Developing Countries								
Dependent variable:	Log of GDP per Capita							
	Fixed Effect				2SLS			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Ln GDP per Capita (lagged)	0.872***	0.839***	0.878***	0.838***	0.744***	0.724***	0.800***	0.447
	(0.046)	(0.046)	(0.046)	(0.047)	(0.103)	(0.101)	(0.096)	(0.308)
Aid per GDP (lagged)	0.048***		-0.083		0.051**		-0.192*	
	(0.017)		(0.075)		(0.020)		(0.116)	
Ln Aid (lagged)		0.015**		0.014		0.023**		-0.403
		(0.007)		(0.039)		(0.011)		(0.376)
Policy × Aid per GDP (lagged)			0.250*				0.470**	
			(0.140)				(0.212)	
Policy × Ln Aid (lagged)				0.003				0.881
				(0.080)				(0.770)
Policy (lagged)	0.003	0.003	-0.023	-0.0003	0.008	0.006	-0.041*	-0.873
	(0.007)	(0.007)	(0.017)	(0.081)	(0.009)	(0.010)	(0.022)	(0.766)
Gross capital formation	0.0001	0.0001	0.00003	0.0001	0.0002**	0.0003***	0.0002*	0.0003
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0002)
Human capital index	-0.001	0.001	-0.001	0.001	0.007	0.009	0.002	0.040
	(0.006)	(0.006)	(0.006)	(0.006)	(0.010)	(0.010)	(0.010)	(0.031)
Inflation	-0.0001	-0.0001	-0.0001*	-0.0001	-0.0001*	-0.0001	-0.0001**	-0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Trade openness	0.004	0.002	0.007	0.002	0.006	0.001	0.012*	0.024
	(0.004)	(0.004)	(0.004)	(0.005)	(0.006)	(0.007)	(0.007)	(0.023)
Log of Government Expenditure	0.118**	0.104*	0.142**	0.103*	0.270***	0.249**	0.293***	0.378*
	(0.058)	(0.058)	(0.059)	(0.059)	(0.103)	(0.103)	(0.105)	(0.207)
Observations	130	130	130	130	100	100	100	100
R^2	0.931	0.929	0.933	0.929	0.870	0.872	0.875	0.663
Adjusted R^2	0.920	0.918	0.922	0.917	0.824	0.826	0.828	0.536
F Statistic	188.270*** (df = 8; 112)	182.891*** (df = 8; 112)	170.962*** (df = 9; 111)	161.121*** (df = 9; 111)	338.077***	342.502***	378.292***	144.224***
Note:								*p<0.1; **p<0.05; ***p<0.01

The results show that all aid variables and variables where aid interacts with policy are insignificant for lower middle income countries; therefore, foreign aid has little or no effect on their economic growth even in a good policy environment. Contrarily, aid was found to be significant on average in low income countries. Consequently, the primary contrast between tables (6) and (7) is that aid is more effective on average for accelerating economic growth in low income countries than in lower middle income countries. This is in sharp contrast with Rahnama *et al*. (2017), as they found that aid was more effective in high-income developing countries than in low income developing countries.

According to Redelet *et al*. (2005), foreign aid has a non-linear relationship with economic growth. They found that foreign aid is most effective on average when it is about 16 to 18 per cent of GDP, so the returns to aid are lower when the foreign aid received is greater than or less than this amount.

Based on the descriptive statistics in tables (3) and (4), aid per GDP is 10.3 per cent for low income countries and 3.6 per cent for lower middle income countries on average. Considering that lower-income countries are closer to the 16 to 18 per cent threshold, we can expect aid to be more effective in accelerating economic growth.

When the interaction variable 'Policy × Aid per GDP' is included in the fixed effect and 2SLS models for low income countries (see table (7), equations (3)), the aid per GDP variable becomes negative whilst 'Policy × Aid per GDP' is positive and significant. This result was also found by Burnside and Dollar (2000). It signifies that aid is more effective for accelerating economic growth in the presence of good policies but will have an insignificant or negative effect in the absence of good policies for low income countries. Earlier in this paper, I discussed Dalgaard *et al*. (2004) finding that some types of aid and policy combinations work as substitutes while some other aid and policy combinations work as complements. Based on the result for low income countries, a 1% increase in aid per GDP boosts economic growth by 47% (2SLS results), so we can deduce that the type of aid received and policies in low income countries work as complements.

On the other hand, in lower middle income countries, a 1% increase in aid per GDP boosts economic growth by 23% based on the 2SLS results, but it is not significant at 10% level. So,

policy and foreign aid in lower middle income countries are substitutes because foreign aid has little or no effect in a good policy environment (see table (6), equations (3)).

Although the other interactive variable – 'Ln Aid x Policy' is insignificant in both low income and lower middle income countries, it is negative in lower middle income countries and positive in low income countries. The Redelet *et al*. (2005) example given earlier in this paper on humanitarian aid showing a negative relationship between an increase in foreign aid and economic growth explains this relationship. It might have a slight positive effect on low income countries due to their stage of development. However, because the results show that the effects are insignificant on economic growth, we can infer that a rise in aid in a good policy environment will have mixed impacts due to disasters and emergencies leading to little or no effect on economic growth.

6. ROBUSTNESS CHECKS

I have carried out a Johansen cointegration test. I have regressed two trend variables – the logarithm of the log GDP per capita and the logarithm of foreign aid on the logarithm of GDP per capita.

The null hypothesis of the Johansen cointegration test is that there is no cointegration. In this case, we have three alternative hypotheses: R is less than or equal to 2, R is less than or equal to 1, and R is equal to zero. R represents the number of distinct cointegrating relationships. We reject the null hypothesis if the test statistic value is greater than the critical values at either 10%, 5% or 1%.

VALUES OF TEST STATISTIC AND CRITICAL VALUES OF JOHANSEN TEST:

	Test	10%	5%	1%
R <= 2	15.23	6.50	8.18	11.65
R <= 1	35.86	15.66	17.95	23.52
R = 0	129.00	28.71	31.52	37.22
(Test type: trace statistic, with linear trend)				

The results above show that we reject the null hypothesis at all significance levels when R is less than or equal to 2, R is less than or equal to 1, and R is equal to zero. Therefore, we can conclude amongst the three variables tested that, the number of cointegrated relationships is greater than 2. We can also deduce from these results that there is no spurious regression problem.

7. LIMITATIONS OF THE STUDY

Previous literature has empirically established the dependence of aid receipts on the level of income, so it is difficult to treat aid as a lump-sum transfer, independent of the level of income. Therefore, it cannot be considered exogenous with respect to economic growth (Hansen and Tarp 2001).

The main issue with the empirical results is the endogeneity problem. The 2SLS method was used to address this issue. It is challenging to identify suitable instruments for aid; hence, the instruments selected have varied broadly from paper to paper. As a result, the issue of over-identification of the 2SLS model is common in previous papers and has also arisen in this paper; there are three instruments for two endogenous variables.

Another issue is the use of the World Bank's CPIA fiscal policy rating as the policy variable. The CPIA policy index incorporates exchange rate, monetary and fiscal policy to arrive at a rating for each country (The World Bank, 2022). The reasoning for using this was that the CPIA exercise focuses on elements and decisions within the country's control rather than only outcomes that may have been out of the country's control (The World Bank, 2022). Therefore, I believe this would be suitable for countries in the early stage of development. However, there is no complete information on how the fiscal policy rating is set, so we cannot be entirely sure if it is the best policy measure in this context. Also, we cannot rule out any possibility of country bias within the rating exercise.

8. CONCLUSION

This paper analyses the relationship between foreign aid and economic growth using panel data from the World Bank and Penn World Table version 10.0 from the University of Groningen website on 20 developing countries, split into 10 low income countries and 10 lower middle income countries (World Bank classification). The fixed effects and two-stage least squares methods were used to estimate the model; the latter was selected mainly to address the endogeneity of foreign aid in growth equations.

Based on the world bank classification, I examined developing countries in two groups, low income and lower middle income. The aim was to address the heterogeneity between countries and understand the effects of their income levels on the effectiveness of aid in accelerating economic growth. The model showed that even in the presence of good policy aid has little or no effect on economic growth in lower middle income countries. This is possibly because there is a substitution effect between foreign aid and policy for lower middle income countries (Dalgaard et al., 2004).

For low income countries, I found a conditional relationship between foreign aid and economic growth on policy. Consistent with current literature, aid is conditional on policy in low income countries. A 1% increase in foreign aid as a proportion of GDP will increase economic growth by 47% in a good policy environment; otherwise, a 1% increase in aid as a proportion of GDP will decrease economic growth by 19% in low income countries.

Aid allocation policies should evaluate the policies of recipient countries when making donations. Non-fungible or tied aid should be considered for low income countries that do not have sound policies, and lower middle income countries where aid received might have become a substitute for policy. Arslanalp and Henry (2004) stated that non-fungible aid is a good way to ensure aid recipients use aid efficiently and encourage donors to be more thoughtful about the recipients' needs.

9. REFERENCES

Addison, T., Mavrotas, G., McGillivray, M. (2005) 'Aid, Debt Relief and New Sources of Finance for Meeting the Millennium Development Goals', *Journal of Internal Affairs*, 58(2), pp. 113-127, Available at: https://www.jstor.org/stable/24358268 (Accessed: 29 November 2021)

Ali, A.M. and Isse, H.S. (2005) 'An Empirical Analysis of the Effect of Aid on Growth', *International Advances in Economic Research*, 11(2005), pp. 1-11. doi: 10.1007/s11294-004-7177-6.

Arslanap, S., Henry P.B. (2004) 'Helping the poor to help themselves: debt relief or aid', *National Bureau of Economic Research*, Working paper 10230, pp. 1-33. doi: 10.3386/w10230.

Boone, P. (1996) 'Politics and the effectiveness of Foreign Aid', *European Economic Review*, 40(1996), pp. 289-329. doi: https://doi.org/10.1016/0014-2921(95)00127-1

Burnside, C. and Dollar, D. (2000) 'Aid, Policies and Growth', *The American Economic Review,* 90(4), pp. 847-868. Available at: https://www.jstor.org/stable/117311 (Accessed: 29 November 2021).

Cai, J., Zheng, Z., Hu, R., Pray, C.E. and Shao, Q. (2018) 'Has international aid promoted economic growth in Africa?', *African Development Review,* 30(3), pp.239-251. Doi: https://doi.org/10.1111/1467-8268.12333

Chatterjee, S. and Turnovsky, S.J. (2006) 'Foreign aid and Economic growth: The Role of Flexible Labor Supply', *Journal of Development Economics*, 84(2007), pp. 507-533. doi: https://doi.org/10.1016/j.jdeveco.2006.03.001

Chenery, H.B. and Strout, A.M. (1966) 'Foreign Assistance and Economic Development', *The American Economic Review*, 56(4), pp. 679-733. doi: https://www.jstor.org/stable/1813524

Collier, P. and Dollar, D. (2004) 'Development effectiveness: what have we learnt?', *The economic journal*, 114(496), pp.F244-F271. Available at: https://www.jstor.org/stable/3590062 (Accessed: 04 April 2022).

Dalgaard, C-J. and Hansen, H. (2001) 'On Aid, Growth and Good Policies', *Journal of Development Studies*, 37:6, 17-41, DOI: 10.1080/713601081

Dalgaard, C.J., Hansen, H. and Tarp, F., (2004) 'On the empirics of foreign aid and growth', *The Economic Journal*, 114(496), pp.F191-F216. Doi: https://doi.org/10.1111/j.1468-0297.2004.00219.x

Gupta, S., Clements, B., Baldacci, E. and Mulas-Granados, C. (2005) 'Fiscal policy, expenditure composition, and growth in low-income countries', *Journal of International Money and Finance*, 24(3), pp.441-463. Doi: https://doi.org/10.1016/j.jimonfin.2005.01.004

Hansen, H. and Tarp, F. (2001) 'Aid and growth regressions', *Journal of development Economics*, 64(2), pp.547-570. Doi: https://doi.org/10.1016/S0304-3878(00)00150-4

Karras, G. (2006) 'Foreign aid and Long-run Economic Growth: Empirical Evidence for a Panel of Developing Countries', *Journal of International Development*, 18(2006), pp. 15-28. doi: 10.1002/jid.1187.

Moreira, S. B. (2005) 'Evaluating the Impact of Foreign Aid on Economic Growth: A Cross-Country Study', Journal of Economic Development, 30(2), pp. 25-48. Available at: http://hdl.handle.net/10400.26/4464 (Accessed: 14 December 2021)

OECD (2021) *Official Development Assistance (ODA)*. Available at: https://www.oecd.org/dac/financing-sustainable-development/development-finance-standards/official-development-assistance.htm (Accessed: 4 December 2021).

Radelet, S., Clemens, M., Bhavnani, R. (2005) 'Aid and Growth', *International Monetary Fund,* Volume 0042: Issue 003, pp. 16-20. doi: https://doi.org/10.5089/9781451953985.022

Rahnama, M., Fawaz, F., Gittings, K. (2017) 'The effects of foreign aid on economic growth in developing countries' *The Journal of Developing Areas*, 51(3), pp. 154-171. doi: 10.1353/jda.2017.0066

Rosenstein-Rodan, P. N. (1961) 'International Aid for Underdeveloped Countries', *The Review of Economics and Statistics,* 43(2), pp. 107-138. Available at: https://www.jstor.org/stable/1928662 (Accessed: 29 November 2021).

Salisu, A.A. and Ogwumike, F.O. (2010) 'Aid, macroeconomic policy environment and growth: Evidence from sub-Saharan Africa', *Journal of Economic Theory*, 4(2), pp.59-64. Available at: https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.580.1102&rep=rep1&type=pdf (Accessed: 13 March 2022).

The World Bank (2022) *Data*. Available at: https://data.worldbank.org/ (Accessed: 24/03/2022).

The World Bank (2022) *Metadata Glossary*. Available at: https://databank.worldbank.org/metadataglossary/country-policy-and-institutional-assessment/series/IQ.CPA.FISP.XQ (Accessed: 23/03/2022).

Twinoburyo, Enock Nyorekwa; Odhiambo, Nicholas M. (2018) 'Monetary Policy and Economic Growth: A Review of International Literature', *Journal of Central Banking Theory and Practice*, 7(2), pp. 123-137. Doi: http://dx.doi.org/10.2478/jcbtp-2018-0015

University of Groningen (2020) *Groningen Growth and Development Centre*. Available at: https://www.rug.nl/ggdc/productivity/pwt/?lang=en (Accessed: 18/03/2022).

Yahyaoui, I. and Bouchoucha, N. (2019) 'Does aid enhance economic growth?', 4(2), pp. 23-39. Available at: https://econpapers.repec.org/article/seg012016/v_3a4_3ay_3a2019_3ai_3a2_3ap_3a23-39.htm (Accessed: 08/12/2021).

10. APPENDIX

Table 1A: Twenty Developing Countries				
Dependent variable:	Log of GDP per Capita			
	OLS			
	(1)	(2)	(3)	(4)
Ln GDP per Capita (lagged)	1.048***	1.021***	1.027***	1.026***
	(0.019)	(0.020)	(0.019)	(0.019)
Aid per GDP (lagged)	0.008	-0.109***		
	(0.007)	(0.034)		
Policy × Aid per GDP (lagged)		0.210***		
		(0.059)		
Ln Aid (lagged)			0.007***	0.020
			(0.002)	(0.016)
Policy × Ln Aid (lagged)				-0.028
				(0.034)
Policy (lagged)	0.007**	-0.008	0.010***	0.038
	(0.003)	(0.005)	(0.003)	(0.034)
Gross capital formation	0.0001	0.0001**	0.0001	0.0001
	(0.00004)	(0.00004)	(0.00004)	(0.00004)
Human capital index	-0.0003	0.001	-0.0005	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Inflation	-0.0001**	-0.0001***	-0.00005	-0.00004
	(0.00004)	(0.00004)	(0.00004)	(0.00004)
Trade openness	0.00004***	0.00004***	0.00004***	0.00004***
	(0.00001)	(0.00001)	(0.00001)	(0.00001)
Log of Government Expenditure	-0.015	0.008	0.010	0.010
	(0.025)	(0.025)	(0.024)	(0.024)
Constant	-0.036**	-0.028	-0.048***	-0.060***
	(0.018)	(0.018)	(0.017)	(0.022)
Observations	260	260	260	260
R^2	0.975	0.976	0.976	0.976
Adjusted R^2	0.974	0.975	0.975	0.975

F Statistic	1,212.182*** (df = 8; 251)	1,128.223*** (df = 9; 250)	1,279.903*** (df = 8; 251)	1,136.252*** (df = 9; 250)
Note:				*p<0.1; **p<0.05; ***p<0.01

Table 2A: Low Income Developing Countries				
Dependent variable:	Log of GDP per Capita			
	OLS			
	(1)	(2)	(3)	(4)
Ln GDP per Capita (lagged)	1.045***	1.030***	1.024***	1.013***
	(0.032)	(0.033)	(0.033)	(0.035)
Aid per GDP (lagged)	0.031***	-0.065		
	(0.010)	(0.058)		
Policy × Aid per GDP (lagged)		0.167*		
		(0.100)		
Ln Aid (lagged)			0.013**	-0.017
			(0.005)	(0.033)
Policy × Ln Aid (lagged)				0.060
				(0.065)
Policy (lagged)	0.008	-0.008	0.012**	-0.047
	(0.005)	(0.011)	(0.005)	(0.064)
Gross capital formation	0.0001**	0.0001**	0.0001	0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Human capital index	0.001	0.002	0.0005	0.001
	(0.002)	(0.002)	(0.002)	(0.002)
Inflation	-0.0001	-0.0001**	-0.00003	-0.0004
	(0.00005)	(0.0001)	(0.00005)	(0.0001)
Trade openness	0.001	0.001	0.002	0.003
	(0.002)	(0.002)	(0.002)	(0.002)
Log of Government Expenditure	-0.066*	-0.045	-0.029	-0.023
	(0.039)	(0.040)	(0.037)	(0.038)
Constant	0.012	0.012	-0.016	0.017

	(0.027)	(0.027)	(0.026)	(0.045)
Observations	130	130	130	130
R^2	0.970	0.971	0.969	0.970
Adjusted R^2	0.968	0.969	0.967	0.967
F Statistic	491.242*** (df = 8; 121)	443.511*** (df = 9; 120)	478.297*** (df = 8; 121)	424.796*** (df = 9; 120)
Note:				*p<0.1; **p<0.05; ***p<0.01

Table 3A: Lower Middle Income Developing Countries				
Dependent variable:	Log of GDP per Capita			
	OLS			
	(1)	(2)	(3)	(4)
Ln GDP per Capita (lagged)	0.980***	0.979***	0.990***	0.978***
	(0.025)	(0.025)	(0.024)	(0.025)
Aid per GDP (lagged)	-0.051**	-0.251*		
	(0.022)	(0.140)		
Policy × Aid per GDP (lagged)		0.406		
		(0.282)		
Ln Aid (lagged)			0.007**	0.038*
			(0.002)	(0.021)
Policy × Ln Aid (lagged)				-0.065
				(0.043)
Policy (lagged)	0.010**	-0.006	0.008*	0.074*
	(0.005)	(0.012)	(0.004)	(0.044)
Gross capital formation	0.0002***	0.0002***	0.0001	0.0001*
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Human capital index	-0.002	-0.002	-0.002	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Inflation	-0.00003	-0.00001	0.0001	0.00005
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Trade openness	0.00003**	0.00004**	0.00001	0.00001
	(0.00002)	(0.00002)	(0.00001)	(0.00001)

Log of Government Expenditure	0.094***	0.106***	0.103***	0.102***
	(0.036)	(0.037)	(0.035)	(0.035)
Constant	-0.079***	-0.083***	-0.101***	-0.120***
	(0.026)	(0.026)	(0.025)	(0.028)
Observations	130	130	130	130
R^2	0.981	0.982	0.983	0.983
Adjusted R^2	0.980	0.980	0.982	0.982
F Statistic	799.121*** (df = 8; 121)	716.861*** (df = 9; 120)	856.814*** (df = 8; 121)	769.907*** (df = 9; 120)
Note:				*p<0.1; **p<0.05; ***p<0.01