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Relationship Between Foreign-Aid and Economic Growth: From The Evidence of Nepal

Liladhar Sapkota
Associate Professor of Finance, Aishwarya Multiple Campus Dhangadhi
Corresponding author email: sapkotalila622@gmail.com

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Abstract

This study has empirically examined the relationship between the foreign aid and economic growth of the nation from the evidence of Nepal. The GDP has considered as proxy variable for economic development and independent variables are official developmental assistance (ODA), and capital formation (CF). This study has empirically analyzed the time series data since 1975 to 2011. Firstly, the stationarity has tested to find out whether the data are stationary or not. The data found non-stationary and the data are transferred into stationary. Then further regression analysis has done considering lnGDP as dependent variable and natural log of official development assistance and natural log of capital formation as independent variable. The model does not incorporate multicollinearity, heteroskedascity, and autocorrelation problem. The result found that there is negative relationship between GDP and ODA but positive relationship between capital formation and GDP. In nutshell there is negative relationship between foreign aid and economic growth of the nation, which is consistent with all the previous studies and contrasts with Anis C., and Iman S. (2005).

Key words: Official Developmental Assistance, Capital Formation, Gross Domestic Production, Nepal, and Economic Growth

Introduction

Nepal has been receiving international help since 1951, following the downfall of the dictatorial Rana Regime. The foreign aid amount rose from 23.6 million US dollars in 1966 to 262.3 million US dollars in 1997, with an annual growth rate of 9.1% (Acharya, 1998). Nepal has made significant progress in its socio-economic development, although it is commonly perceived as more reliant on help. The government is facing challenges in sustaining economic growth and relies on foreign aid to partially bridge the resource deficit. Effectiveness means the efficient utilisation of aid funds. Tools such as Human Development Index, GDP, Millennium Development Goals, and Paris Declaration Evaluation/Monitoring Principles can be used to measure aid effectiveness. Implementing the aid effectiveness agenda outlined in the Paris Declaration and the Accra Agenda for Action has been challenging for the international community. The Principles state that "good" aid should prioritise recipient countries' ownership of development policies, enhance donors' coordination and harmonisation, and promote aid transparency and mutual accountability between donors and recipients. The Nepal Monitoring Survey on Paris Declaration 2011 indicates advancements in all effectiveness indicators.

Establishing a strong association between aid and development is challenging. Despite the positive results in aid effectiveness, Nepal is not achieving targeted growth rate. Thus, an assessment is required whether aid is enhancing growth in the country. This study attempts to analyze whether aid supported economic growth or not.

The study has experimentally investigated whether foreign aid contributes to the economic growth of Nepal. (Isse, 2007)**,** (Bhatta, 2003), Acharya(1998) (Quazi, 2005), (Ali, 2013) (Alberto Chong, 2009), Burnside and Dollar (2000), Easterly (2003), Easterly et al. (2004), and Rajan and Subramanian (2008) discovered that foreign aid had a negative correlation with the economic progress of the nation.

However, Anis C., and Iman S. (2005) argued that foreign aid is positively correlated with a nation's economic progress, but to a lesser degree. Therefore, the empirical examination of the Nepalese evidence is major research question. The study has considered dependent variable gross domestic production in net figure amount ($) and independent variables official development assistance (ODA) in net figure ($) and capital formation (CF) in net figure ($). The interpretation is in percentage. So, analysis has gone through natural log of all the selected variables. Therefore, lnGDP = f (lnODA, and lnCF) has analyzed empirically form the evidence of Nepalese evidence.

The main objective of the study is to examine the relationship of foreign aid to the national economic. Further the foreign has categorized into two category official developmental assistance and capital formation. Then the relationship of official development assistance and capital formation has examined to the gross domestic production as proxy variable of the economic growth. The specific objectives are as follows:

1. To examine the relationship of official development assistance with the gross domestic production.

2. To analyze the relationship of capital formation with the gross domestic production.

3. To evaluate the relationship of foreign aid with the economic development of the nation.

Nepal is a developing country, and our main focus is on enhancing the economic activities of the nation. The caretaker government has just signed a foreign aid agreement for Rs. 17.27 billion in the first two months (Shrawan and Bhadra) of the current fiscal year. The finance ministry has completed the guidebook for the high-level group responsible for coordinating and mobilising foreign aid (The Himalayan times Kathmandu October 17, 2010). It proved that till the date the government of Nepal has been depending a huge portion of budget expenditure on foreign aid. So, to examine empirically whether the foreign aid has positive relationship or not to the economic development of the nation has became a prime concern of all Nepalese and the donor agencies.

Research has shown that over time, ongoing assistance benefits autocratic leaders more than democratic ones as autocrats can accumulate this aid to counteract potential future adversities. (Montinala, 2009). This study does not aim to incorporate the continuity of aid and the type of government regime. Next, this study considers aid as sum of all forms of assistances such as grants, loans and other assistances. The purpose of different types of aid could be different thus, taking aid as a whole to analyze a single objective could limit the generalizations made in the study. Third, despite the availability of information of GDP, Capital formation and aid from 1961 onwards, this study considers data from 1975 only. It is

so because the information on all three variables were available from 1975 onwards only. Mediator and moderator analysis could have been done for analyzing the effect of capital formation on GDP, but so is not considered for this study.

Foreign aid is a primary method used by wealthy nations to improve living circumstances in underdeveloped regions, with the main objectives being poverty reduction and the narrowing of income inequalities. However, the efficacy of foreign help has frequently been doubted, with recent studies mostly examining the typical growth impacts of foreign aid (Alberto Chong, 2009). Burnside and Dollar (2000) support the idea that aid can stimulate growth in nations with strong institutions. Yet, in recent research, even this modest finding has been challenged. Easterly (2003), Easterly et al. (2004), and Rajan and Subramanian (2008) argue that there is little proof of aid having any impact on growth, even in cases of great institutional quality; and Brautigam and Knack (2004) and Knack (2004) contend that aid could lead to a decline in the quality of democratic institutions. Study made by Anis C., and Iman S. (2005) to identify how foreign aid contributed economic growth in Indonesia during 1970-1980 Indicated a positive correlation between foreign aid and economic growth. but at a low rate. Wang, C., and Balasubramanyam, V.N. focused on their research on how foreign direct investment and foreign aid have contributed on economic growth in the economy of Vietnam and found that foreign aid has no contribution on economic growth of Vietnam during the period between 1995 to 2003. Isse (2007) analysed GDP per worker, trade, and foreign aid across 151 countries from 1975 to 2000. The study revealed that countries reliant on help have been marginalised and have not been able to contribute their fair share to global commerce and productivity.

One recent attempt has been made in identifying the impact of aid in economic growth in Arab region particularly in Egypt is found in (Ali, 2013). The author examined the impact of aid on economic growth and concluded that it did not contribute to the country's development. The study discovered a detrimental and noteworthy effect of aid on economic growth throughout both extended and immediate time frames. Loans had a notable impact on increasing GDP growth in Bangladesh, whereas grants did not. Foreign grants primarily funded nonproductive civil expenditures, unlike foreign loans that supported public investment projects, which are more conducive to higher output growth (Quazi, 2005).

Few attempts were made to analyze the impact of aid on development in Nepal during 1990s. Acharya(1998) is of opinion that aid did not substantially contribute to the economic development of Nepal, however the importance of aid cannot be denied especially when the domestic resources mobilization is still very low to fulfill the investment requirement. Among the few attempts to analyze the impact of aid on economic growth, it has been found that that aid has no negative impact on economic growth (Bhatta, 2003). The study used OLS method to analyze the impact of debt on GDP growth rate and export earnings. The study found that the debt coefficient was just significant at five percent and the coefficient of debt servicing had negative impact on GDP growth rate. The study has attempted to empirically examine does foreign aid support the economic growth of the nation from the evidence of Nepal. (Isse, 2007)**,** (Bhatta, 2003), Acharya(1998) (Quazi, 2005), (Ali, 2013) (Alberto Chong, 2009), Burnside and Dollar (2000), Easterly (2003), Easterly et al. (2004), and Rajan and Subramanian (2008) have found that the foreign aid has negative relation with the economic growth of the nation. However, Anis C., and Iman S. (2005) claimed that the foreign aid has positive relation with

the economic development of the nation even though at lower extent. Therefore, the empirical examination of the Nepalese evidence is major research question.

There is tremendous literature in the field of study that relationship between foreign aid and economic growth of the nation. But in the context of Nepal we can found only few study has done, even though has no empirically analyzed and compared with the previous studies. This literature has generated a gap to examine the relationship of Nepalese evidence and compare with the previous literature. This will make the study area wider as well as comparable.

METHODOLOGY

This is a quantitative research, based on deductive approach. This research has attempted to test the established theory that the foreign aid has no significance on economic growth from the evidence of Nepal since 1975 to 2011. The time series analysis has done. Firstly, the data have tested they are stationary or not by using unit root test (Dickey-Fuller) model individually to all the variables. After all the causal relation has tested whether there is causal relation between foreign aid and economic growth or not. Furthermore, the relation between foreign aid and national economic growth has checked. To state foreign aid has contributed or not in the Nepalese national economic growth.

Secondary data have been considered for the purpose of this research. Data considered for empirical analysis are taken from website of World Bank. Other data have been taken from website of National Planning Commission, Ministry of Finance and Nepal Rasta Bank. The sources have been cited wherever required.

Dependent and Independent Variables

GDP is dependent; ODA and Capital formation are independent variables**.** This research has examined the relationship on percentage, so model required natural log of all variables. Therefore, log of GDP is dependable variable and log of ODA and capital formation has considered as independent variables.

As all the data for econometric modeling are taken from the web site of World Bank, the definitions of all the related variables included here are also in according with the reference given in the site.

Gross capital formation refers to investments made in increasing the fixed assets of the economy along with any changes in inventory levels. Fixed assets encompass several categories such as land improvements, plant, machinery, equipment, and construction projects like roads, trains, schools, offices, hospitals, residential homes, and commercial/industrial buildings. Inventories are items retained by companies to address temporary or unforeseen changes in production or sales, as well as work in progress. As per the 1993 System of National Accounts (SNA), net acquisitions of valuables are classified as capital formation. The data is shown as a proportion of inventories.. The net figure of amount of capital formation since 1975 to 2011 has presented in appendix-I.

Net official development assistance (ODA) comprises concessional loans disbursements (excluding principal repayments) and grants provided by official agencies of DAC members, multilateral institutions, and non-DAC countries to enhance economic development and welfare in countries and

territories listed as ODA recipients by DAC. The loans must have a grant element of at least 25%, calculated at a discount rate of 10%. The data is in U.S. dollars at present value.

The total amount of the official development assistance has presented in appendix-I. GDP: Gross Domestic Product (GDP) at purchaser's prices is the total worth of goods and services produced in an economy, including taxes on products and excluding subsidies. It is estimated without accounting for the depreciation of manufactured assets or the depletion and deterioration of natural resources. The data is in current U.S. dollars. The net figure of the gross domestic production has presented in appendix-I.

Regression Model: $\ln(GDP) = \beta 0 + \beta 1 \ln(ODA) + \beta 2 \ln CF$

Where, ln GDP = log of Gross Domestic production (GDP has considered in figure amount not in percentage, so log of GDP has taken.)

ln ODA = Log of Official Development Assistance and ln CF = Log of Capital Formation

Empirical research utilising time series data operates under the assumption that the time series being analysed is stationary. When regressing a time series variable on another time series variable, it is common to observe a high R2 value even if there is no significant link between the two variables. Occasionally, we anticipate no correlation between two variables, but a regression analysis frequently reveals a substantial association between them. It is crucial to determine whether the relationship between economic factors is genuine or illogical. Regression models are frequently utilised for forecasting time series data. We want to determine the validity of predicting when the underlying time series are not stationary. Granger causality and Sims causality tests will be conducted.

Step 1: Graphical representation of the data**:**

The initial step in analysing any time series data is typically creating a visual visualisation of the data. The data are presented in Annex 1. Figure 1: The following figure exhibit the time series plot in amount individually. From the following figure it is clear that the GDP has grown in time series path even though the growth rate is not equal every time. Similarly, the ODA has increased over period of time but in particular time it has constant and decreased too. The CF has also increased on time trend, but the growth rate is not same for all the time. The same variables have presented in figure 2 all together and explanation is same.

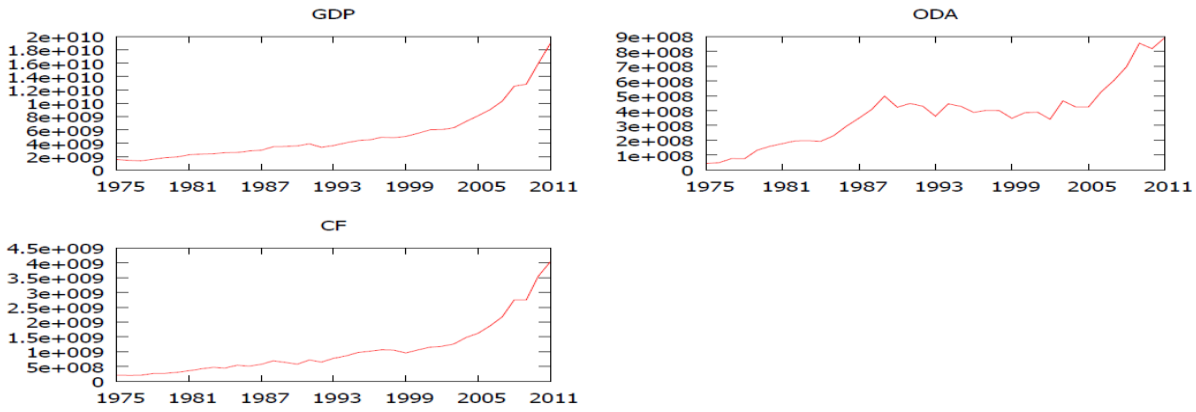

Figure 1: *Time series plot of the variables individually*

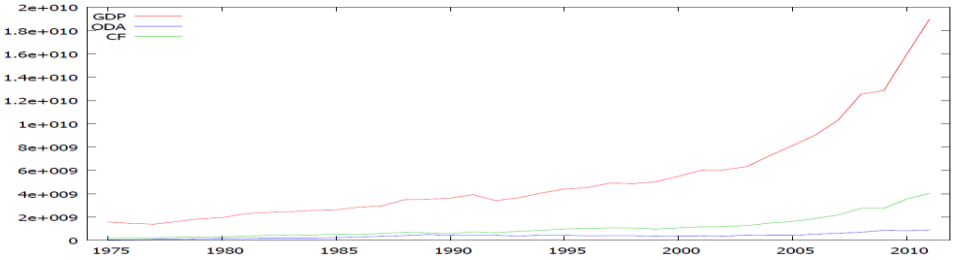

Figure 2: *Time series plot of all variables in same graph*

This study has done on the basis of log value of the variables because this study has attempted to explain in percentage. So, the log value of the GDP, ODA, and CF have presented in the following figure.

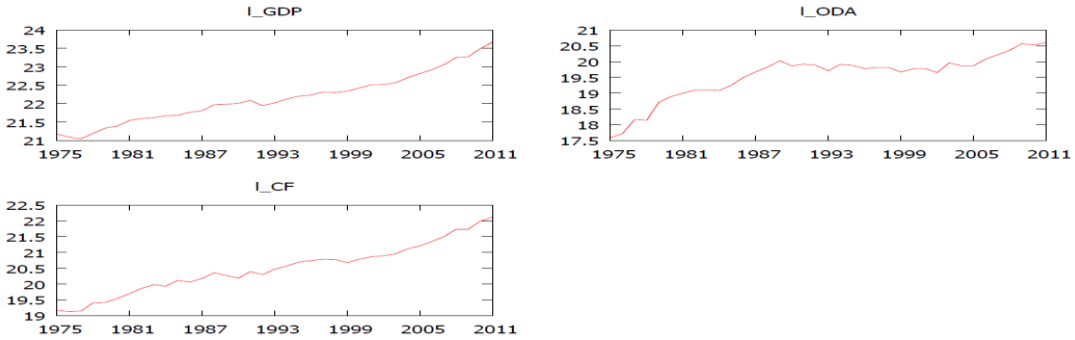

Figure 3: *Time series plot of the variable individually with natural log*

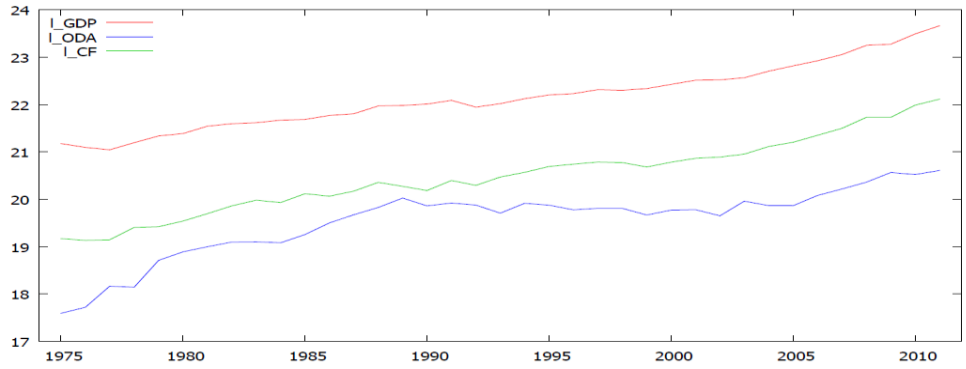

Figure 4: *Time series plot of the all variables with natural log*

Figure 3 displays a time series plot of the logarithm of individual variables, whereas Figure 4 presents a time series plot of all variables. The graph above provides a clear visual representation of variables demonstrating an increased trend over time. This indicates that the variables may not be stationary. For a more formal assessment of stationarity, the unit root test is conducted using the Augmented Dickey-Fuller (ADF) test.

Test of stationarity: Though the graphical plot of log value of the selected variables somehow show a kind of stationarity, formal test of stationarity has been performed because before exploring the causal relationship between the variables, test of stationary must precede test of causality because causality tests usually assumes that the time series involved in analysis are stationary (Gujarati, Porter, & Gunasekar, 2012, p. 780).

In the first step this study has measure the correlogram of the lag of selected variables. The null hypothesis is the lag of the variable is stationary and found that all the selected variables are non-stationary because the p-values have been found significant even at 36 lags, we can reject the hypothesis that time series data of GDP, ODA, and CF are stationary. This means, GDP, CF and ODA time series are non-stationary (Appendix-II). Furthermore, this study has examined the correlogram of the log value of selected variables. However, there is no change in the result. The result shows that the pattern of the variables is non-stationary (Appendix-III).

The investigation confirmed the non-stationarity of the data by doing the Augmented Dickey-Fuller (ADF) stationary test, which found that the variables are similarly non-stationary (Appendix IV). The results of the stationary test align with the typical nature of financial time series data, which exhibit random walks and are therefore non-stationary (Gujarati et al., 2012, p. 838). Both the test with a constant and the test with a constant and trend show that the calculated statistic is lower than the test statistic. This indicates that the null hypothesis that the lnGDP time series has a unit root or is non-stationary is not rejected. The lnGDP time series is non-stationary. When tested under constant conditions, the estimated values are lower than the critical value in absolute terms. This indicates that the variable is not stationary. The test results indicate that the predicted value exceeds the tabulated values when considering both constant and trend factors. This indicates that the variable is stationary. The calculated value exceeds the critical value for capital creation, indicating that the variable capital

formation is stationary. The variables did not exhibit stationarity, hence this research underwent a transformation process from non-stationary to stationary to ensure reliability.

Transformation of Non-Stationary to Stationary Variables: From the empirical analysis of our variables it is found that non-stationary variable in some cases they have shown the feature of stationarity, before proceeding further, they have been transformed into stationary. Generally, financial time series data in their first difference form are stationary (Gujarati et al., 2012, p. 838). After transforming the data in their first difference form and then testing for stationary (ACF and Correlogram), it showed that the transformed variables are stationary (result in appendix -v). The first difference of ln GDP is significant at 2.1% significance level similarly the first lag of ODA is significant at 0.05% significance and the first difference of the lnCF is significant at 8.9%.

Empirical Findings:

The variable has demonstrated stationarity, prompting this study to be explored using the following regression model. In the regression model (Appendix VI) lnGDP is dependent variable, first difference of GDP, lnODA, and lnCF is the independent variable.

Ln GDP = 4.77 + 0.1345 dlnGDP – 0.06766 lnODA + 0.9123 lnCF

The above regression result it is clear that the GDP has negative relation with ODA even it is only significant at 12.9% significance level, which is congruent with the priori theory. The GDP has positive relation with the capital formation, and it is significant at 1% significance level. This implies if the GDP increases by 1% the capital formation also increases by 0.91%, which is also in line with the priory theory. The past years GDP is not significant to determine the GDP in future. If the relation examined consisting lnGDP as dependent variable and lnODA and lnCF as independent variable following result has shown.

Model 5: OLS, using observations 1975-2011 (T = 37)

Dependent variable: l_GDP

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
Const	4.86231	0.334109	14.5530	<0.00001	***
l_ODA	-0.0950741	0.0380487	-2.4987	0.01746	**
l_CF	0.934656	0.0353467	26.4425	<0.00001	***

Mean dependent var	22.15472	S.D. dependent var	0.679295
Sum squared resid	0.186125	S.E. of regression	0.073988
R-squared	0.988796	Adjusted R-squared	0.988137
F(2, 34)	1500.270	P-value(F)	6.91e-34
Log-likelihood	45.40598	Akaike criterion	-84.81195
Schwarz criterion	-79.97920	Hannan-Quinn	-83.10818
Rho	0.458312	Durbin-Watson	1.052073

lnGDP = 4.86 – 0.095lnODA + 0.9346lnCF

The above result implies the GDP has negative relation with the official development assistance and significance at 2% level of significance. This implies that if the GDP increases by 1% the official developmental assistance will decrease by 0.095%. However, the GDP has positice relation with the capital formation if the GDP increases by one percent the capital formation also increases by 0.93 percent. The Adjusted R-squared is 0988 so, the model is well fitted.

Test of Co-Integration: A test of co-integration can be thought of as a pretest to avoid 'spurious regressions' situation (Gujarati et al., 2012, p. 805). Though the variables of the selected model namely lnGDP, lnODA, and ln CF are individually non-stationary, the regression of the variables would still be meaningful (i.e. not spurious), subject to residual of the model being is stationary. Augmented Engle-Granger (AEG) test of co-integration has been conducted to check whether the residual of the model is stationary or not (Gujarati et al., 2012, p. 805). The test result (appendix - VII) showed that the obtained regression is meaningful i.e. the regression of the model is not spurious though the individual variables are non-stationary.

The Granger Causality Test

H_0: There does not exist causality in the regression model.

H_1: H_0 is false

Aft testing for stationarity, the next test is on causality of the model. The Granger causality test has been used for this purpose. For such, the restricted model and then the unrestricted model have been derived with appropriate lags.

F-ratio = $\frac{(R^2_{UR} - R^2_R)/m}{(1-R^2_{UR})/(n-K)} = \frac{(0.9918-0.988)/7}{(1-0.9918)/(36-5)} =$ 0.0005428/0.0002645 = 2.052

Critical F value at 5% level of significance (for 7, 31 degrees of freedom) is 2.3231.

The result showed that there is not causality in the regression model (appendix - VIII). The reason for such might be because the lags included in the model are not appropriate (lag of 1 has been determined by comparing with 7 lags, probably more lags are to be compared). Nevertheless, the model does not constitute spurious regression as indicated by test of co-integration.

Multi-Co-linearity Test:

OLS estimators to be BLUE (best linear unbiased estimator), the model must not have multicollinearity - the existence of significance degree of correlation between independent variables. Tests like condition index, auxiliary regression, and tolerance all suggested that the model does not constitute severe multicollinearity problem (result in appendix - IX).

Test of Heteroskedasticity: White's general test and graphical test (result in appendix - X) showed the model is free from heteroskedasticity, meaning that the error variance for the model is constant.

Test of Autocorrelation: To decide more on BLUE property of OLS estimate, test of autocorrelation i.e. test of correlation of the error terms of the model has been conducted (result in appendix - XI).

Durbin-Watson statistic = 1.34251

p-value = 0.00693328

5% critical values for Durbin-Watson statistic, n = 36, k = 3

dL = 1.2953

dU = 1.6539

d –statistic of the regression model is 1.34251

5% critical values of Durbin-Watson statistic, n = 36, k = 3, d_L = 1.2953 and d_U = 1.6539

Since, calculated d (1.34251) is between d_L and d_U, the result is no decision on positive autocorrelation of the regression model.

Conclusion and Discussion:

The independent variable official development assistance shows consistently negative relation with the gross domestic production, the independent variable capital formation has shown positive relationship with the gross domestic production. In nutshell the foreign aid has negative relation with the economic development of the nation. This finding is in consistent with the findings of (Isse, 2007)**,** (Bhatta, 2003), Acharya (1998) (Quazi, 2005), (Ali, 2013) (Alberto Chong, 2009), Burnside and Dollar (2000), Easterly (2003), Easterly et al. (2004), and Rajan and Subramanian (2008). The results differ from those of Anis C. and Iman S. (2005), who found that foreign aid had a positive but minor impact on economic growth in Indonesia from 1970 to 1980.

The study has gone through multi-Collinearity test, heteroskedasticity test, and autocorrelation test all those problems have not seen the analysis, but the result has shown no causal relation between the variables.

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