

UNDERSTANDING THE RELATIONSHIP AMONG AID, VOLATILITY AND GROWTH IN PAKISTAN: AN ARDL ANALYSIS

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ABSTRACT

Due to the lack of resources in developing nations, most of them depend on foreign aid to increase their saving for further investment to boost economic growth. This study analyzes the influence of foreign aid and its volatility on economic growth of Pakistan for the period of 1975 to 2015. The volatility of aid is measured by GARCH modelling and the ARDL technique is used for long-run estimation of results. Empirics depict that foreign aid have positive bearing on economic growth while aid volatility is inversely related to economic growth. The study also suggests some policies related to foreign aid.

Keywords: Foreign Aid Volatility, Capital Formation, Economic Growth.

JEL Code: F35, F43

1. Introduction

Foreign aid is the inflow of external resources (Chenery & Strout, 1966). In other words, foreign aid is the transfer of goods, services, and money from one country to another country (Morgenthau, 1962). However, the transfer of resources from one developed nation to other developing nations such as foreign direct investments, export credits, or loans from commercial banks are usually referred to as 'flows' (Raffer & Singer, 1996). Foreign aid receives in two forms loans and grants, so far as loans are concerned it takes on a concessional rate (25% of grant amount) and grants are non-refundable according to OECD, (2015) and World Bank, (2015). Foreign aid consists of technical and non-technical skills, physical goods, financial grants, and loans which are transferred from donor to receiver (Riddell, 2008). Despite the fact, foreign aid is the major source of overseas capital flows to poor countries (Radelet, 2006). It is a reality that underdeveloped or developing nations have starved economies that have very limited resources and inadequate levels of capital. For welfare and economic development more capital is required which consequently demands the need for external capital. Most poor nations cannot magnetize significant foreign direct investment, the single option for external capital to sustain development is to come from foreign aid (Nyoni & Bonga, 2017). The grounds for foreign aid are based on a two-gap model because in developing nations the investment need can't be fulfilled by own nation's savings and exports are not sufficient to finance imports. So, foreign aid is used to fill the saving-investment gap and import-export gap in developing countries (Muhammad & Qayyum, 2011). Along with foreign aid, another important factor is Aid volatility, because it affects economic development. Heavy fluctuations in foreign aid can create unemployment, uncertainty in future or running projects, and changes in government budgets. These are the welfare consequences that can be faced due to volatility and aid inflow is more volatile than revenue (Bulir & Hamann, 2003).

Foreign Aid is of two types (Minoiu & Reddy, 2010), one is for developmental and the second is for non-developmental. The study shows that developmental aid has a significant impact on economic growth that indicates to promote of long-run economic growth. In 2005, IMF discovers that foreign aid volatility can be good for some reasons, e.g. in case of natural disasters originating externally. This happens especially in low-income countries which do not tend to overcome the disaster (Markandya, Ponczek, & Yi, 2011). In Pakistan, foreign aid inflows sharply increased when the earthquake came in 2005. The main concern of this paper is to estimate the effect of foreign aid and aid volatility on economic growth in Pakistan. The literature on aid shows some major economic objectives of foreign aid:

- Foreign aid encourages or enhances economic development through infrastructure building, supporting other productive sectors like manufacturing, agriculture, and carrying new technologies and ideas.
- Aid strengthens other sectors like health, education, the political system, and the environment.
- Aid prevents stagflation.
- It helps to prevent the destabilization of the economy.

Therefore, it is admitted fact that aid helps poor nations to fill these gaps (Bacha, 1990).

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A large portion of the underdeveloped and developing nations do not have the strong ability to produce income to fulfil the significant level of open investment. In such a manner, foreign aid is viewed as a fundamental instrument to fill this gap in poor nations. There is huge writing available on aid-growth linkages however fewer studies available on the volatility of aid and economic development in Pakistan. As the pattern of foreign aid and volatility of foreign aid in Pakistan is linked, under the different conditions that are given by the contributors, a large portion of the South Asian nations rely on developed nations for aid getting for the short-term and long-term, for compassionate improvement programs. Foreign aid stream into the South Asian nations is exceptionally unstable and demonstrates no security in its pattern over the huge period. The same circumstance is observed on account of Pakistan. Furthermore, the South Asian region is helpless due to confronting common clash and guerrilla war, political shakiness, and natural disasters in the course of the most recent couple of decades, which authorize aid to be heterogeneous. The literature on the developmental impact of foreign aid and its volatility has not up until now been finished considering single nation impacts in South Asia, this investigation, hence, with our solid goal, satisfies this gap primarily by concentrating on foreign aid volatility. In such a manner, current research has concentrated just on Pakistan by utilizing time-series data. The point of this paper is to attract thoughtfulness regarding a formerly disregarded component in external aid-development writing, to be specific, the volatility of aid streams.

2. Review of Literature

Different studies have analyzed the aid volatility-growth nexus, some of the studies are presented in this section.

Girma (2015) examined the effect of foreign aid on growth in Ethiopia by using the ARDL approach. The paper assessed the efficacy of foreign aid on macroeconomic policy, the cointegration approach by Pesaran & Shin (1997). The results of the study proposed a negative impact of foreign aid on economic growth while foreign aid has a significant and positive impact on economic growth. Siddique et al., (2017) examined the impact of foreign aid on economic growth for a panel of South and East Asian countries for the period 1995-2013. The study was based on the dynamic panel technique for estimation. The findings of the study showed that the promotion of economic growth depends on foreign aid.

Chauvet & Ehrhart (2018) explored the relationship between a firm's growth and foreign aid. For this purpose, the study used data from 4335 firms in 29 nations. The results showed a positive and significant impact on a firm's growth by using the fixed-effect model. Evidence of the study showed a strong positive impact of foreign aid in those sectors which have external finance and infrastructure. Kioko (2018) explored the relationship between economic growth and foreign aid in Kenya by using the Cointegration analysis technique and quarterly data for the period of 20 years from 1995 to 2015. The long-run results of the study explored a positive link between aid and growth, where foreign aid consider as technical aid and information of loans while in the short-run only loans as a proxy of foreign aid affect growth negatively.

The impact of foreign aid on economic growth by using the spatial panel vector-autoregressive model in Uganda was analyzed by Civelli et al., (2018). Data of the regional units were collected through household surveys, disbursement of geo-located aid, and socio-economic activity. The study found a positive and significant impact of foreign aid on luminosity, which leads to economic activity, the study found a small magnitude effect but significant. The impact of foreign aid on the economic growth of Pakistan was investigated by Pohwani et al., (2019). To find out the results data from 1991 to 2015 were used and a linear regression analysis technique was used to estimate the results. The outcomes showed that foreign aid has no significant impact on all three economic growths. After conducting a comprehensive review of the literature, we may infer that aid volatility has mixed effects on economic growth.

3. Research Methodology

This study has used annual time series data for Pakistan ranging from 1975-to 2015 collected from various sources like 'Handbook of Statistics on Pakistan Economy' 2016, Pakistan Economic Survey 2016, and World Development Indicators (WDI). Data on GDPPC, EMP, GFCF, SSE, AIDG, TRADE, and M2 are collected from world development indicators (WDI). The foreign aid volatility is measured through the GARCH technique. We have employed a model to observe the influence of aid volatility on economic growth. The functional form of the model is as follows:

$$GDPPC = f(EMP, GFCF, SSE, AIDG, AIDVOL, TRADE, M2) \quad (1)$$

The Econometric form of the Model is as follows:

$$GDPPC = \zeta_0 + \zeta_1 EMP + \zeta_2 GFCF + \zeta_3 SSE + \zeta_4 AIDG + \zeta_5 AIDVOL + \zeta_6 TRADE + \zeta_7 M2 + \varepsilon_1 \quad (2)$$

Where;

GDPPC= Gross Domestic Product Per Capita Growth (% Annual)

EMP= Employed Labor Force Growth Rate (% Annual)

GFCF= Gross Fixed Capital Formation (% of GDP)

SSE= Secondary School Enrollment (Gross)

AID= Aid Growth Rate (% Annual)

AIDVOL= Aid Volatility Growth (% Annual)

TRADE= Trade (% of GDP)

M2= Broad Money (% of GDP)

The ARDL specifications are in equation (3) and (4).

$$GDPPC = \zeta_0 + \sum_{i=1}^{p_1} \zeta_1 (GDPPC)_{t-i} + \sum_{i=0}^{p_2} \zeta_2 (EMP)_{t-i} + \sum_{i=0}^{p_3} \zeta_3 (GFCF)_{t-i} + \sum_{i=0}^{p_4} \zeta_4 (SSE)_{t-i} + \sum_{i=0}^{p_5} \zeta_5 (AIDG)_{t-i} + \sum_{i=0}^{p_6} \zeta_6 (AIDVOL)_{t-i} + \sum_{i=0}^{p_7} \zeta_7 (TRADE)_{t-i} + \sum_{i=0}^{p_8} \zeta_8 (M2)_{t-i} + \varepsilon_t \quad (3)$$

$$\Delta(GDPPC)_t = \zeta_0 + \sum_{i=1}^{p_1} \zeta_1 \Delta(GDPPC)_{t-i} + \sum_{i=0}^{p_2} \zeta_2 \Delta(EMP)_{t-i} + \sum_{i=0}^{p_3} \zeta_3 \Delta(GFCF)_{t-i} + \sum_{i=0}^{p_4} \zeta_4 \Delta(SSE)_{t-i} + \sum_{i=0}^{p_5} \zeta_5 \Delta(AIDG)_{t-i} + \sum_{i=0}^{p_6} \zeta_6 \Delta(AIDVOL)_{t-i} + \sum_{i=0}^{p_7} \zeta_7 \Delta(TRADE)_{t-i} + \sum_{i=0}^{p_8} \zeta_8 \Delta(M2)_{t-i} + \lambda(ECM)_{t-1} + \varepsilon_t \quad (4)$$

Equation 4 depicts the short-run association between the dependent variable GDPPC and the remaining explanatory variables. In the short-run equation, we have included the $(ECM)_{t-1}$ error correction term lagged to adjust the results. The error correction model depicts the short-run effect on X and Y variables, the long-run effect on X and Y variables, and the adjustment speed.

4. Results and Discussions

In this section, an analysis of the impact of foreign aid volatility on economic growth in Pakistan is presented.

4.1. Unit Root Test

To examine the stationarity of all the variables, we have applied the ADF test to examine the integration properties of variables. Results in Table 1 show that variables used in a study have a mixed order of integration. The variables EMP, AIDG, AIDVOL, TRADE, and M2 are stationary at the level I(0) while the variables GDPPC, GFCF, and SSE are stationary at 1st difference I(1) which suggests that the ARDL cointegration method is a suitable technique for long-run estimation of the variables.

Table 1: Unit Root Test Results

Variable	Individual Intercept	Lag	Trend and Intercept	Lag	None	Lag	Conclusion
GDPPC	-1.3399 (0.6024)	1	-1.8251 (0.6750)	1	-0.0378 (0.6646)	1	I(1)
EMP	-5.1907 (0.0001)	0	-5.1276 (0.0007)	0	-2.5180 (0.0130)	0	I(0)
GFCF	-1.5067 (0.5210)	0	-2.0969 (0.5331)	0	-0.3272 (0.5617)	0	I(1)
SSE	-0.0995 (0.9430)	0	-1.5369 (0.8013)	0	2.6254 (0.9974)	0	I(1)
AIDG	-6.6386 (0.0000)	1	-6.5674 (0.0000)	1	-7.0110 (0.0000)	0	I(0)
AIDVOL	-3.7212 (0.0071)	0	-3.7520 (0.0293)	0	-0.5407 (0.4769)	0	I(0)
TRADE	-3.4667 (0.0137)	0	-3.3811 (0.0670)	0	0.0096 (0.6803)	1	I(0)

M2	-3.3000 (0.0209)	0	-3.2939 (0.0806)	0	-0.9671 (0.2931)	1	I(0)
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4.2. Bounds Test

The bounds test depicts the presence of the long-run relationship between all variables. The cointegration among variables occurred when the F-Statistic value is larger than the value of the upper bound mainly at a 5% level of significance. If cointegration exists then we employ the ARDL technique. In Table 2, the F- statistic results with different levels of significance are given. The outcomes exhibit that the value of the F-statistic is greater than lower and upper bound values, which suggests that there is cointegration between variables.

Table 2: Bounds Test Results

Test Statistic	Value	K
F-statistic	8.0137	7
Critical Value Bounds		
Significance	I(0) Bound	I(1) Bound
10%	2.03	3.13
5%	2.32	3.50
2.5%	2.60	3.84
1%	2.96	4.26

4.3. ARDL Long-Run Estimates

Table 3 shows the long-run ARDL estimates of economic growth in Pakistan. It is found that employment has a positive and significant relationship with the GDP per capita. The reason is that when employment generates, at the same time it increases the saving and investment of that country which causes to increase in GDP per capita. These results are linked with (Ajakaiye, Jerome, Nabena, & Alaba, 2015; Chao & Eden, 1994; Seyfried, 2011; Sudrajat; Văceanu, 2014). Gross fixed capital formation has a positive relationship with the GDP per capita. An increase in the capital of a country leads to the infrastructure development such as roads, railway lines, hospitals, land improvements, schools, offices, buildings, and others, all of these lead to a boost in economic activities in a country resultantly growth in GDP per capita also increases. These findings are matched with those (Bakari & Mabrouki; Nweke, Odo, & Anoke, 2017).

Secondary school enrolment has a positive relationship with the GDP per capita. Secondary school enrolment is important for the human capital accumulation and growth of a country (Afzal, Malik, Begum, Sarwar, & Fatima; Ali, 2011). Foreign aid is also found to be positively and significantly related to economic growth. Enhancement in the foreign aid from the donor countries increases capital formation, investments, and savings that support economic, political, and social development all these factors lead to an increase in GDP per capita. These findings are associated with (Bulir & Hamann, 2003; Chervin & Van Wijnbergen, 2010; Mahmood, 1997; Muhammad & Qayyum, 2011; Ullah, Azim, & Siddique).

Table 3: Long-Run Estimates of Foreign Aid Volatility and Economic Growth

Variables	Coefficient	SE	t-Statistic	Probability
EMP	0.4053	0.0129	31.2831	0.0203
GFCF	2.1839	0.0371	58.7852	0.0108
SSE	0.2804	0.0040	69.5321	0.0092
AIDG	0.1634	0.0039	41.4877	0.0153
AIDVOL	-0.0039	0.0001	-28.3496	0.0224
TRADE	0.9073	0.0124	72.7931	0.0087
M2	0.1831	0.0070	26.0302	0.0244
C	10.5466	1.0344	10.1956	0.0622

The core variable of the study is foreign aid volatility which has a negative relationship with economic growth. Foreign aid volatility creates uncertainty of foreign aid inflows increases which shows negative impacts on running projects and results in reduced growth. These findings are in line with (Bulir & Hamann, 2003; Chenery & Strout, 1966; Markandya et al., 2011; Ullah et al.). The variable of Trade is found to be positively associated with the GDPPC. The reason for the study is if TRADE increases that means our exports and imports of goods and services increase. If our imports and exports of goods and services increase that generates income, employment, and others that increase the GDPPC. These outcomes are associated with (Acet & Baoua; Din, Ghani, & Siddique, 2003;

Fetahi-Vehapi, Sadiku, & Petkovski, 2015; Keho, 2017; Tahir & Azid, 2015; Were, 2015; Zahonogo, 2016). M2 shows the broad money as a percentage of GDP which has a positive relationship with GDPPC. If M2 increases, it generates income, savings, bonds, and currencies other than banks which also leads to an increase in GDPPC. These results are linked with (Chaitip, Chokethaworn, Chaiboonsri, & Khounkhalax, 2015; Chude & Chude, 2016; Ogunmuyiwa & Ekone, 2010).

4.4. Error Correction Model

The error correction assessment model (ECM) is employed to remove the error if some error occurs in the model. To remove the error from the model how much time will be required is known as Error Correction Estimation (ECM). The crucial condition for the correction of error is that the cointegration must be negative and the sufficient condition is that it must be statistically substantial. If the cointegration value is large and negative, then the error could be removed otherwise error cannot be removed. Table 4 shows the error correction results.

Table 4: Error Correction Model Results

Variables	Coefficient	SE	t-Statistic	Probability
D(GDPPC(-1))	1.5667	0.0426	36.7097	0.0173
D(GDPPC(-2))	0.1039	0.0325	3.1969	0.1930
D(EMP)	-0.5284	0.0365	-14.4673	0.0439
D(EMP(-1))	0.6846	0.0727	9.4084	0.0674
D(EMP(-2))	0.2508	0.1650	1.5194	0.3706
D(EMP(-3))	-0.5562	0.0789	-7.0426	0.0898
D(GFCF)	-3.4223	0.1329	-25.7326	0.0247
D(GFCF(-1))	-0.7620	0.0981	-7.7651	0.0815
D(GFCF(-2))	-0.4486	0.1667	-2.6906	0.2265
D(GFCF(-3))	2.7672	0.1060	26.0880	0.0244
D(SSE)	1.1624	0.0648	17.9336	0.0355
D(SSE(-1))	1.3949	0.0377	36.9478	0.0172
D(SSE(-2))	1.9498	0.0419	46.4265	0.0137
D(SSE(-3))	-0.9665	0.0347	-27.8299	0.0229
D(AIDG)	0.0398	0.0016	24.8289	0.0256
D(AIDG(-1))	-0.2115	0.0061	-34.1826	0.0186
D(AIDG(-2))	-0.2002	0.0069	-28.8462	0.0221
D(AIDG(-3))	-0.1401	0.0066	-21.0115	0.0303
D(AIDVOL)	0.0124	0.0004	28.7652	0.0221
D(AIDVOL(-1))	-0.0129	0.0007	-16.9201	0.0376
D(AIDVOL(-2))	0.0038	0.0001	20.2883	0.0314
D(AIDVOL(-3))	0.0204	0.0006	30.7616	0.0207
D(TRADE)	1.4053	0.0512	27.4204	0.0232
D(TRADE(-1))	0.5780	0.0636	9.0795	0.0698
D(TRADE(-2))	0.2419	0.0205	11.7768	0.0539
D(TRADE(-3))	-0.9123	0.0334	-27.2587	0.0233
D(M2)	1.9905	0.0850	23.4146	0.0272
D(M2(-1))	0.1869	0.0226	8.2379	0.0769

D(M2(-2))	0.0761	0.0304	2.5037	0.2419
D(M2(-3))	1.5343	0.0554	27.6842	0.0230
CointEq(-1)	-0.3224	0.0723	-4.4591	0.0107

The parameter of ECM of the model is equal to -0.3224 which shows that the long-run equilibrium follows short-run shock which is adjusted by more than 32 per cent approximately. So the result suggests that the speed of adjustment is very slow and would not restore equilibrium speedily. T-statistic and probability show the significance of the model.

5. Concluding Remarks

A general conclusion arising from the present investigation is that foreign aid and its volatility in itself won't guarantee economic developmental achievements. All things considered, it should be noticed that foreign aid and aid volatility do not consequently build development and that for the situation it does advance the development and increase the source of employment past progress does not ensure future advance. Accordingly, foreign aid must be carefully spent so it can adequately aid economic advancement.

Foreign aid and aid volatility are the much-discussed topics in the recent situation of Pakistan. The majority of the poor nations have a lacking level of reserves and foreign aid can be used as an investment to upgrade economic development and generate employment. In such a manner, the focus of the present investigation is to break down the effect of aid and aid volatility on growth of Pakistan from 1975 to 2015. Outcomes depict that aid and economic growth are positively and significantly correlated, while aid volatility is negatively and significantly correlated with economic development while GFCF, SSE, TRADE, and M2 are positively and significantly correlated with the economic growth. On the premise of paper outcomes, it may suggest that foreign aid plays a supportable role in economic development in Pakistan. At this point, if aid volatility is found that makes uncertainty and irregularity in our social and development and other different running projects which direct influence toward employment and economic growth.

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