Impact of Foreign Aid and Levels of Education on Democracy in Pakistan

H. Mahmood, M. W. Siddiqi, A. Iqbal and M. A. Tabassum

Abstract—This study examines the relationships between foreign aid, levels of schooling and democracy for Pakistan using the ARDL cointegration approach. The results of study provide strong evidence for fairly robust long run as well as short run relationships among these variables for the period 1973-2008. The results state that foreign aid and primary school enrollments have negative impact on democracy index and high school enrollments have positive impact on democracy index in Pakistan. The study suggests for promotion of education levels and relies on local resources instead of foreign aid for a good quality of political institutions in Pakistan.

Keywords—Cointegration, Democracy, Education, Foreign Aid

I. INTRODUCTION

RELATIONSHIP between democracy and foreign aid is controversial; some studies found the positive relationship between two variables and rest of studies on this topic stated negative relationship between them. Democracy is signal for a good quality of political institutions in which every citizen of a country is free to express his views, equal rights in participation in political process and the governments are representing the majority's decisions. Dreze and Sen [1] defined that democracy means rule by people. It requires respect for legal entitlements; the right to free expression; right to associate freely; holding public discussions and right to organize political movements of protests.

There are two conflicting views regarding the relationship between democracy and foreign aid in developing countries. In the first view, foreign aid is needed to enhance the quality of political institutions by taking technical assistance from donor agency or donor country. Some studies argue that foreign aid is helpful in reducing the corruption and developing democracy in developing countries. Bilateral donors could provide the certain expertise to developing countries and certain conditions that ensure the accountability and efficient use of foreign aid [2]. Tavares [3] also found that

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foreign aid is helping in reducing the corruption levels and enhance democracy. Rodrick [4] and Papaioannou and Siourounis [5] found the strong positive relationship between democracy and economic growth as democracy is the indication for quality of political institutions in any country. Burnside and Dollar [6] found that foreign aid had positive impact on economic growth by using good policies and in the absence of these policies aid had no impact on economic growth in developing countries.

The opposite view is that foreign aid could be exploited by empowered political parties to give strength to their own political parties and to try to exclude others from political process. This process could lead to less democracy and would harm the political institutions. Rajan and Subramanian [7] and Knack [8] argued that foreign aid reduced the democracy in political process and weaken the governance through more reliance on foreign, instead of local source of government finance. Goldsmith [9] observed that foreign aid has adverse effect on state affairs and free political process. Rajan and Subramanian [10] found that foreign aid had not any positive impact on economic growth even with good policies. Lane and Tornell [11] mentioned the voracity effect that economic growth declined due to existence of powerful interest groups, who reduced the share of other community for their self interested rent-seeking activities. Svensson [12] produced the utility function by summing the private consumption of individual and public goods available in his locality and found that powerful social groups in a society exploited the benefits of foreign aid for their rent-seeking behavior and reduced the benefits for rest of society.

Reinnika and Svensson [13] studied the survey of primary schools in Uganda and found that only 13% foreign aid for education reached to the schools and rest was exploited. Knack [8, 14] documented the pattern of corruption with foreign aid, as aid dependence increased accountability would decrease, domestic corruption to disburse the aid fund would increase and there would be weak institutions. Knack and Rahman [15] found that the greater the foreign aid with respect to GDP the greater would be corruption levels and weak democratic and bureaucratic performance.

Foreign aid is bad for political process as natural resources become bad for natural resource-rich countries. Recent literature has studied the impact of natural resources on economic growth and found inverse relationship between them which is known as curse of natural resources. Ross [16] found that the natural resources became the reason for civil

wars. Sach and Warner [17] found that economic growth rate of natural resource-rich countries were slower than resource less countries. Foreign aid and natural resources have the common features of exploitation by corrupt politicians.

Second major determinant of democracy under study is education levels, the higher the education level, the better political process would be and the stronger the development of democracy. Dewey [18] and Lipset [19] suggested that higher education was prerequisite for democracy and helped in political development. Barro [20] and Przeworski et al. [21] had the same views regarding relationship between education and democracy. Glaeser et al. [22] empirically found that democracy is caused by difference in schooling levels and level of education is also helpful in developing political institutions. Dee [23] and Milligan et al. [24] argued that education has high civic returns in democratic society. Civic returns means voter turnover, voter knowledge about political process and community involvement in political process.

Study attempts to find the impact of foreign aid and education levels on democracy and checks whether foreign aid is a curse or a blessing for development of political process in Pakistan, because Pakistan is a developing country having low levels of education and dependence on foreign aid. Recently, Pakistan is taking aid 1.6% of Gross Domestic Product (GDP) and 11.5% of government revenue, which is showing heavy reliance on foreign aid.

II. MODEL OF THE STUDY

A. Empirical Model

To check the relationship between democracy, education levels and foreign aid, study uses the foreign aid as a ratio of GDP, primary school enrollments and high school enrollments for education levels as explanatory variables and democracy index as dependent variable. Model of study is as follows:

$$DEM_t = a + b_1 AID_t + b_2 PR_t + b_3 HI_t + e_t \quad (1)$$

t = 1973, 1976, …,2008

where DEM_t is democracy index generated by Freedom House, AID_t denotes foreign aid to GDP ratio, PR_t represents total primary enrollments, HI_t indicates total high school enrolments and e_t is stochastic error term at time t.

B. Data

Data on democracy index is taken from Freedom House. Data on foreign aid in dollars at constant 2000 prices, GDP in US dollars at constant 2000 prices, total enrollment at primary and high school are taken from World Development Indicators (WDI CD-ROM) [25] for the years 1973 to 2008. Data is not up-dated due to unavailability of democracy index for year 2009 and data before 1973 is not available.

III. METHODOLOGY

At first the study wants to check the stationarity of data, as most of time series data are non-stationary and ordinary least square (OLS) may generate spurious results. Therefore, this study uses the Augmented Dickey-Fuller (ADF) test developed by Dickey and Fuller [26] to find the unit root problem in data, presence of unit root is the indication for non-stationarity of data. ADF test is based on the following equation:

$$(1-L)Y_t = \alpha + \mu Y_{t-1} + \sum_{i=1}^{k} \beta_i (1-L)Y_{t-i} + \varepsilon_{1t} \quad (2)$$

where, L is a lag operator, t denotes time trend, and u_t is a white noise error term. Y_t takes the variables one by one for which study wants to find unit root problem. $(1-L)Y_{t-i}$ are the lagged values of variable at first difference of Y_t. β_i are the coefficients of lagged values of $(1-L)Y_{t-i}$ to capture the optimum lag length (k), k ensures that there is no correlation between error term and regressors of this equation. Lag length is selected by Shawartz Bayesian Criterion (SBC). Same equation can be use with constant and time trend for analysis mentioned above. Accordingly, the study uses ADF equations with constant only and constant and time trend both. ADF test checks the statistical significance of μ, if μ is statistically insignificant then Y_t exhibits unit root problem and is non-stationary vise versa.

After test for a unit root problem, study uses the Auto Regressive Distributive Lag (ARDL) model developed by Pesaran et al. [27] to find the cointegration (long run relationship) between democracy, foreign aid, primary school enrollments and high school enrollments. ARDL or bounds testing test procedure is applied on Vector Autoregressive (VAR) model including lag value of all variables in the model. ARDL based equations in the present study can be written as under:

$$(1-L)DEM_t = c_{0d} + \delta_{1d}DEM_{t-1} + \delta_{2d}AID_{t-1} + \delta_{3d}PR_{t-1} + \delta_{4d}HI_{t-1} +$$
$$\sum_{i=1}^{p} \lambda_{1di}(1-L)DEM_{t-i} + \sum_{i=0}^{q_1} \lambda_{2di}(1-L)AID_{t-i} + \sum_{i=0}^{q_2} \lambda_{3di}(1-L)PR_{t-i} +$$
$$\sum_{i=0}^{q_3} \lambda_{4di}(1-L)HI_{t-i} + \varepsilon_{2t} \quad (3)$$

$$(1-L)AID_t = c_{0a} + \delta_{1a}DEM_{t-1} + \delta_{2a}AID_{t-1} + \delta_{3a}PR_{t-1} + \delta_{4a}HI_{t-1} +$$
$$\sum_{i=0}^{p} \lambda_{1ai}(1-L)DEM_{t-i} + \sum_{i=1}^{q_1} \lambda_{2ai}(1-L)AID_{t-i} + \sum_{i=0}^{q_2} \lambda_{3ai}(1-L)PR_{t-i} +$$
$$\sum_{i=0}^{q_3} \lambda_{4ai}(1-L)HI_{t-i} + \varepsilon_{3t} \quad (4)$$

$$(1-L)PR_t = c_{0r} + \delta_{1r}DEM_{t-1} + \delta_{2r}AID_{t-1} + \delta_{3r}PR_{t-1} + \delta_{4r}HI_{t-1} +$$
$$\sum_{i=0}^{p} \lambda_{1ri}(1-L)DEM_{t-i} + \sum_{i=0}^{q_1} \lambda_{2ri}(1-L)AID_{t-i} + \sum_{i=1}^{q_2} \lambda_{3ri}(1-L)PR_{t-i} +$$
$$\sum_{i=0}^{q_3} \lambda_{4ri}(1-L)HI_{t-i} + \varepsilon_{4t} \quad (5)$$

$$(1-L)HI_t = c_{0h} + \delta_{1h}DEM_{t-1} + \delta_{2h}AID_{t-1} + \delta_{3h}PR_{t-1} + \delta_{4h}HI_{t-1} +$$
$$\sum_{i=0}^{p} \lambda_{1hi}(1-L)DEM_{t-i} + \sum_{i=0}^{q_1} \lambda_{2hi}(1-L)AID_{t-i} + \sum_{i=0}^{q_2} \lambda_{3di}(1-L)PR_{t-i} +$$
$$\sum_{i=1}^{q_3} \lambda_{4hi}(1-L)HI_{t-i} + \varepsilon_{5t} \quad (6)$$

In equation 3 first difference of democracy is used as a dependent variable, the null hypothesis of no cointegration amongst the variables is H_0: $\delta_{1d} = \delta_{2d} = \delta_{3d} = \delta_{4d}=0$ and alternate hypothesis $\delta_{1d} \neq \delta_{2d} \neq \delta_{3d} \neq \delta_{4d} \neq 0$ is showing the long run

relationships amongst the variables, c_{od} is a constant, and ε_{2t} is a white noise error term. This can be denoted as $F_{DEMt}(DEM_t/AID_t,PR_t,HI_t)$. In equation 4 first difference of AID_t is used as a dependent variable, the null hypothesis of no cointegration amongst the variables is (H_0: $\delta_{1a}= \delta_{2a}= \delta_{3a}= \delta_{4a}=0$) and alternate hypothesis $\delta_{1a}\neq \delta_{2a}\neq \delta_{3a}\neq \delta_{4a}\neq 0$ is showing the long run relationships amongst the variables, c_{oa} is a constant, and ε_{2t} is a white noise error term. This can be denoted as $F_{AIDt}(AID_t/DEM_t,PR_t,HI_t)$. In equation 5 first difference of primary school enrollment is used as a dependent variable, the null hypothesis of no cointegration amongst the variables is (H_0: $\delta_{1r}= \delta_{2r}= \delta_{3r}= \delta_{4r}=0$) and alternate hypothesis $\delta_{1r}\neq \delta_{2r}\neq \delta_{3r}\neq \delta_{4r}\neq 0$ is showing the long run relationships amongst the variables, c_{or} is a constant, and ε_{3t} is a white noise error term. This can be denoted as $F_{PRt}(PR_t/DEM_t,AID_t,HI_t)$. In equation 6 first difference of high school enrollment is used as a dependent variable, the null hypothesis of no cointegration amongst the variables is (H_0: $\delta_{1h}= \delta_{2h}= \delta_{3h}= \delta_{4h}=0$) and alternate hypothesis $\delta_{1h}\neq \delta_{2h}\neq \delta_{3h}\neq \delta_{4h}\neq 0$ is showing the long run relationships amongst the variables, c_{oh} is a constant, and ε_{4t} is a white noise error term. This can be denoted as $F_{HIt}(HI_t/DEM_t,AID_t,PR_t)$. The F-test is used to check the significance of lagged levels of variables after finding the lag length through SBC. If at least one vector is found through F-test in any equation mentioned above, that means long run relationship exist between variables.

IV. EMPIRICAL RESULTS

Dickey Fuller (DF) and Augmented Dickey Fuller (ADF) tests are employed to check the unit root problem in all variables in the model. Results are shown in table I and II, in which values given in the tables are t-values of DF and ADF test and values given in the brackets are lag lengths. Table I shows that democracy index, primary and high school enrollments have unit root problem and are nonstationary at level. Foreign aid is nonstationary when its equation takes only constant and is stationary at 5% and 10% level of significance when takes both constant and trend.

Table II shows that all variables are stationary at 1%, 5% and 10% level of significance, only foreign aid differ minutely as stationary at 5% and 10% level of significance when its equation takes constant and trend both.

Table I and II show that foreign aid is stationary at level and other variables are stationary at first difference so there is a mix order of cointegration i.e. I(0) and I(1). ARDL bound test cointegration technique is most suitable to applied here. ARDL requires dependant variable should be I(1) and independent variables can be purely I(1) or a mix of I(0) and I(1). Study used the SBC to find the optimum lag length in the equation 3, 4, 5 and 6. Optimum lag length is 1 for democracy index, 1 for foreign aid, 1 for primary school enrollments and 0 for high school enrollments after setting the maximum lag length 3 in ARDL equations mentioned above. The calculated F-Values are given in the table III.

TABLE I
DF/ADF TEST AT LEVEL

Variables	Constant	Constant & Trend
DEM_t	-2.0196 (0)	-1.8954(0)
AID_t	-2.2916(0)	-3.9455(1)**
PR_t	0.5908(0)	-2.4243(0)
HI_t	0.9716(0)	-1.9940(0)

Notes: The null hypothesis is that series is non-stationarity, or contains a unit root. The rejection of null hypothesis for DF/ADF test is based on the Mackinnon critical values and numbers in parentheses indicate number of lags (k) based on SBC.
** Indicates the rejection of null hypothesis of non-stationary at 5%, level of significance.

TABLE II
DF/ADF TEST AT 1ST DIFFERENCE

Variables	Constant	Constant & Trend
DEM_t	-5.3454(0)***	-5.3541(0)***
AID_t	-5.0770(1)***	-5.9625(1)***
PR_t	-5.4212(0)***	-5.5039(0)***
HI_t	-4.9540(0)**	-5.1533(0)***

Notes: The null hypothesis is that series is non-stationarity, or contains a unit root. The rejection of null hypothesis for DF/ADF test is based on the Mackinnon critical values and numbers in parentheses indicate number of lags (k) based on SBC.
*** and ** Indicate the rejection of null hypothesis of non-stationary at 1% and 5% level of significance respectively.

TABLE III
UNRESTRICTED INTERCEPT AND UNRESTRICTED TREND

VARIABLES (when taken as a dependent)	F-Statistics	At 0.05		At 0.10	
		I(0)	I(1)	I(0)	I(1)
d(DEM$_t$)	7.0404**	4.6877	5.9956	3.9322	5.0108
d(AID$_t$)	--	4.6877	5.9956	3.9322	5.0108
d(PR$_t$)	6.4194**	4.6877	5.9956	3.9322	5.0108
d(HI$_t$)	1.1954	4.6877	5.9956	3.9322	5.0108

** Means at 5% significant level reject the null hypotheses of no cointegration and d indicates first difference of a variable.

TABLE IV
ESTIMATED LONG RUN COEFFICIENTS:

ARDL(2,0,1,1) SELECTED BASED ON SBC, DEPENDENT VARIABLE IS DEM_T

Regress	Coefficient	Standard Error	T-Ratio	Probability
AID$_t$	-42.2196**	18.9937	-2.2334	0.034
PR$_t$	-0.41E(-5)*	0.8E(-5)	-2.0932	0.056
HI$_t$	0.12E(-4)**	0.62E(-4)	2.2407	0.048
C	0.59455	8.8493	0.0672	0.947

Note: *, ** and *** denote rejection of the null hypothesis of insignificance at the 0.10, 0.05 and 0.01 level respectively

For equation 3 the F-statistic is $F_{DEMt}(DEM_t/AID_t,PR_t,HI_t)$= 7.0404, for equation 4 $F_{AIDt}(AID_t/DEM_t,PR_t,HI_t)$ is undefined due to 0 lag length found in its equation, for equation 5 $F_{PRt}(PR_t/DEM_t,AID_t,HI_t)$ = 6.4194 and for equation 6 $F_{HIt}(Y_t/DEM_t,AID_t,PR_t)$ = 1.1954. There are a strong evidences of cointegration in the model when democracy index and primary school enrollments are taken as dependent variables, as F-statistic are greater than upper bound at 5% and 10% level of significance, so null hypothesis of no cointegration is rejected and there are two cointegrated vectors in the model.

Table IV shows that all coefficients are statistically significant at 5% and 10% or 10% level of significance. The results of long run coefficient of estimated ARDL model state that foreign aid has negative and significant impact on democracy index, so rising foreign aid is responsible for

declining the democracy index in Pakistan. Primary school enrollments have negative and significant, only at 10%, impact on democracy and high school enrollments have positive and significant impact on democracy index. That means high schooling could help in promotion of democracy but primary schooling is not sufficient to promote democracy in Pakistan and even may be responsible for declining the democracy index in Pakistan.

TABLE V
ERROR CORRECTION REPRESENTATION FOR THE SELECTED ARDL MODEL

Regresso	Coefficient	Standard Error	T-Ratio	Probability
ARDL(1,1,1,0) Selected Based on SBC, Dependent Variable is DCO_T				
$d(AID_t)$	-85.0763**	38.3716	-2.2172	0.035
$d(PR_t)$	0.23E(-6)**	0.55E(-6)	-0.4123	0.680
$d(HI_t)$	-.304E(-5)**	0.113E(-5)	2.2668	0.012
ECM_{-1}	-0.2406**	.0953	-2.5244	0.018

Note: *, ** and *** denote rejection of the null hypothesis of insignificance at the 0.10, 0.05 and 0.01 level respectively

TABLE VI
DIAGNOSTIC TESTS

Diagnostic Tests	LM version	Probability
Serial Correlation (χ^2)	1.0762	0.30
Functional Form (χ^2)	1.2334	0.267
Normality (χ^2)	2.1847	0.335
Heteroscedasticity (χ^2)	0.2941	0.588

Table VI shows the tests of serial correlation, functional form, normality and heteroscedasticity test based on ARDL equation. Results show that all p-values are greater than 0.1 so there are no problem of serial correlation, functional form, normality and heteroscedasticity in the model.

Table V shows the short run relationship between the variables, as all coefficients of variables at difference with specified lagged are significant except $d(PR_t)$ and lagged value of Error Correction Model (ECM) is negative and highly significant, so there is evidence of short run relationship. So, foreign aid and high school enrollments also have strong impact on democracy index in short run. Negative value of lagged ECM is showing the speed of adjustment from shorn run disequilibrium to long run equilibrium in approximately in 4 years (1/0.24).

V. CONCLUSIONS

Study captures the two very important variables, education levels and foreign aid, which have a strong impact on democracy index. Results of study proves a negative relationship between foreign aid and democracy index, which suggests that Pakistan should rely on local resources instead of foreign aid or loans to protect the quality of political institutions. Secondly, there is negative relationship between primary school enrollments and democracy index and positive relationship between high school enrollments and democracy index, so there is need to enhance the level of education as well to promote democracy, which will ensure the good quality of political institutions in Pakistan.

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