The Role of Foreign Aid in the Development of Pakistan’s Education Sector: A Time-Lag Analysis

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Abstract
This study examines the role of foreign aid in the development of Pakistan’s education sector by using the time series data of foreign aid and educational outcomes (number of schools, students, teachers and literacy rates) from 1967 to 2010. Time lag analysis shows, the foreign aid of the current year (T) has no impact on educational outcomes. However, foreign aid of the previous year (T -1) had a significant positive effect on all educational outcomes. Similarly, financial aid received by the country in the two previous years (T -2) also established a positive relationship with all the education development indicators, except literacy rates.

Keywords: Foreign aid, Education development, Time lag analysis, Developing countries

Introduction
Developing countries face many problems, such as poverty, unemployment, illiteracy, environmental degradation, and so forth. The scarcities of financial and economic resources are the roots of the main problems for these countries. Because of this, developing countries need financial aid from developed countries. The IMF and other financial institutions (e.g., Islamic Development Bank, European Investment Bank, etc.) provide financial aid to developing countries for the purpose of economic development. Usually developing countries get foreign aid to minimize the gap in imports, exports, and savings investment, along with helping with improvements in economic growth, education development, installation of industry, and disaster management. How much the foreign aid effectively achieves its objective is yet to be established. This study attempts to address this question by examining the effect of foreign aid on the development of Pakistan’s education sector.

Multilateral financial institutions target investments in developing countries to support policy reforms concerning societal and environmental issues and hope that a small amount of funding can be multiplied to have a great impact on growth(Andrew Steer, 1995). Historical studies have analyzed the impacts of foreign aid in different societal aspects, such as health, economic growth, education, and so forth. The impact of foreign aid varies from country to country because of the change of economic position of the country, political factors, and government policies. Extant research has shown that foreign aid has mixed effects on economic growth in developing countries. Few studied show that there is a positive impact of foreign aid on economic growth(Carl-Johan Dalgaard, Henrik Hansen, & Tarp, 2004; Fasanya & Onakoya, 2012; Hamid, 2013). However, (Akram, Mansoor, and Mahpara (2011)) found an insignificant impact of foreign aid on economic growth in the short and long runs in Pakistan(Akram et al., 2011). It does have a positive significant impact on the GDP growth rate. When capital inflow increases, GDP growth rates also increase as a result(Pesmazoglu, 1972). Asiedu and Nandwa (2007) found a positive significant impact of foreign
education aid on economic growth (Asiedu & Nandwa, 2007). Subsequently, Williamson (2008) analyzed the impact of foreign aid on the health sector. Analysis was performed on the data of 208 countries, but the results indicated insignificant impact of foreign aid on the health sector (Williamson, 2008). Some studies also showed a positive impact of foreign aid on primary enrollment (K Michaelowa, 2004; K. Michaelowa & Weber, 2007); however, the impact of foreign aid on educational development at all levels (primary, secondary and higher education) is not studied yet.

This study attempts to examine the effectiveness of foreign aid in Pakistan’s education sector. The time series data of foreign aid, and educational outcomes (number of schools, enrollments of students, number of teachers, and literacy rates) was used in this study. As the investments do not produce immediate results; therefore, we propose here a time-lag effect of financial aid on educational outcomes. A polynomial-distributed lag model was used to measure the time-lag effects of aid on educational outcomes. A regression analysis was performed in SPSS to measure the relationship between foreign aid and educational outcomes.

**Literature review**

Limited studies have been done on the effectiveness of financial aid. Hansen and Tarp (2001) found a positive impact of foreign financial aid in the education sector; however, some scholars also analyzed that foreign aid is ineffective (Akram et al., 2011). Financial aid effectiveness is based on many factors including the economic and political policies of the countries. If these policies are efficient then the impact of financial aid is greater on growth rate rather than in a less-stable policy environment (Burnside & Dollar, 2000).

Andersen and Evia (2003) studied the impact of foreign aid on different sectors in Bolivia such as education, health, environment, road construction, sanitation. The results of this study demonstrate the positive impact of foreign aid in all sectors. Fielding, McGillivray, and Torres (2006) have been studied the impact of foreign aid on human development indicators including health, education and fertility. They found the positive relationship of foreign aid on all indicators except for primary completion rate.

Turrent and Oketch (2009) studied the impact of financing on primary education development in fragile states. The data set of 52 low-income countries compiled by Organization for Economic Co-operation and Development (OECD), Development Assistance committee (DAC) was used for analysis. It is concluded that in the provision of financial aid, the attitude of international donor toward the ‘good performer’ has led to education put aside in fragile states.

There is a positive and significant impact of education spending on school enrollment rate. To conclude this result, data was collected from 118 developing countries (Baldacci, Clements, Gupta, & Cui, 2008). It was found that there is a positive relationship between foreign aid and the education sector; the analysis was performed using primary school enrollment and completion rates. Aiglepierre and Wagner (2013) studied the impact of international aid on education development. He used the international data produced by UNESCO institute for Statistics (UIS). They concluded that international aid has a strong positive impact on primary school enrollment and gender equality.

Developed countries have also provided a massive infusion of aid to developing countries for the achievement of the Millennium Development Goals (MDGs) including poverty reduction, education development and development of health care activities in developing countries. Data from the World Bank shows that Pakistan receives massive aid from the International Development Association (IDA), the European Commission, the Canadian International Development Agency, and the Department for International Development (DFID) for health, education, disaster.

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management, and poverty reduction. Therefore, it is necessary to study the effectiveness of this foreign aid in each particular sector.

Several studies investigated the positive impact of foreign aid on economic growth; however, that information describes a broader picture. It is quite possible that when aid, which is intended to increase outcomes, is allocated to sectors as different as education and health, economic growth increases. Extant literature suggests that foreign aid will also have the positive impact on education development in developing countries. Moreover, we argue that the foreign aid is the long-term investment in education sector that shows the time-lag effect on its outcomes. So, the present study is an attempt to address this research question.

**Methodology**

Financial aid was provided to Pakistan for education sector in 1964 by World Bank. The time-series data of financial aid in education sector was collected from World Bank. In this study, financial aid is used as an independent variable. Educational outcomes are dependent variables and measured by time-series data of the number of schools, number of teachers, total enrollment, and literacy rates in Pakistan. To calculate the number of institutes, teachers and enrollment of students, the data of primary, secondary, college and universities was summed up. The data of these aforementioned variables is collected from the Pakistan Economy Book 2010 (State Bank, 2010). Literacy rate data was collected from Federal Bureau of Statistics, Population Census Organization, and UNESCO (State Bank, 2010; UNESCO, 2013). The missing values in literacy rate are imputed with SPSS by using linear trend at point imputation technique.

When any country receives financial aid, the outcomes are not retrieved immediately. Some of the objectives are achieved in the current year but remaining outcomes can appear in subsequent years. Thus, we propose time-lag effect on aid effectiveness in Pakistani educational development. In some studies, the time-lag analysis was also used to determine the impact of monetary policy on different factors (Darby, 1975; Friedman, 1961). In current study to measure the time-lag effect, a polynomial-distributed lag model was used that can analyze the static data. This model measures the impact of past lag variables with current time period variables. In this analysis, the outcomes appearing through lag variables are compared with each other. Generally, this model is described in following form (1):

\[ Y_t = \alpha + \beta_0 X_t + \beta_1 X_{t-1} + \beta_2 X_{t-2} + \ldots + \beta_s X_{t-s} + \nu_t \]

(1)

In this study, the impact of financial aid was studied by looking at the total number of schools, total number of teachers, total enrollments, and literacy rates in Pakistan. As a result, these four equations were developed:

\[ NS(t) = \alpha + \beta_0 Fa(t) + \beta_1 Fa(t-1) + \beta_2 Fa(t-2) + \beta_3 Fa(t-3) + \nu_t \]

(2)

\[ NT(t) = \alpha + \beta_0 Fa(t) + \beta_1 Fa(t-1) + \beta_2 Fa(t-2) + \beta_3 Fa(t-3) + \nu_t \]

(3)

\[ TE(t) = \alpha + \beta_0 Fa(t) + \beta_1 Fa(t-1) + \beta_2 Fa(t-2) + \beta_3 Fa(t-3) + \nu_t \]

(4)

\[ LR(t) = \alpha + \beta_0 Fa(t) + \beta_1 Fa(t-1) + \beta_2 Fa(t-2) + \beta_3 Fa(t-3) + \nu_t \]

(5)

A time-lag effect of three years is calculated in this study. NS is used for the number of schools, NT for the number of teachers, TE for total enrollments, LR for literacy rates, and Fa for financial aid. To measure the effect of the independent variable on dependent variables the beta coefficient and P value are calculated using SPSS software. Coefficients describe relationship strength; however, the P value describes the significance level. If the coefficient value is closer to 1, then the relationship is strong. A coefficient value close to zero describes a weak relationship. The P value should be less than 0.05 for a significant relationship. For the model estimation, the R2 value is also considered, which describes the explanatory power of the model; value close to 1 is considered a good explanatory power of the model.
Empirical results and discussion

Several studies have been conducted to measure aid effectiveness on educational outcomes (K Michaelowa, 2004; K. Michaelowa & Weber, 2007). K Michaelowa (2004) found a positive relationship of foreign aid on primary educational outcomes. The current study also examined the foreign aid effectiveness in the Pakistani education sector with a time-lag effect. When countries receive foreign aid for educational promotions, different educational projects are launched as a result. According to the most-pressing educational needs of the people, new schools, colleges, and universities can be established. Immediate results cannot be produced in these types of projects. However, with the passage of time, foreign aid effectiveness appeared.

Table 1 shows the relationship of financial aid and the number of institutes. Time-lag analysis shows that foreign aid (T) of current year had an insignificant positive relation with the number of institutes. However, the financial aid (T-1) of previous year was found more significant positive relationship at 0.001 significance level with number of institutes. The financial aid (T-2) received before two years also have approximately same relation with number institutions. The explanatory power (R2) of the model 1 shows total variance in number of schools explained by foreign aid is 35%. The coefficients of foreign aid to T-1 and T-2 with the number of institutes are small that indicates the less utilization of foreign funding. This study confirmed the results found by existing studies(Gyimah-Brempong & Asiedu, 2008; Wolf, 2007). Just foreign aid is not sufficient for the achievement of educational development goals, the other factors GDP spending and private spending can play their role as catalysts to increase the number of institutions. In other studies, the role of GDP spending was found to be positively associated with educational outcomes (Baldacci et al., 2008; Dreher, Nunnenkamp, & Thiele, 2006).

Table 1: Effect of financial aid on educational outcomes

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Number of schools</th>
<th>Number of Teachers</th>
<th>Total Enrollments</th>
<th>Literacy Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1</td>
<td>Model 2</td>
<td>Model 3</td>
<td>Model 4</td>
</tr>
<tr>
<td>Financial Aid (T)</td>
<td>0.13</td>
<td>0.19</td>
<td>0.17</td>
<td>0.15</td>
</tr>
<tr>
<td>Financial Aid (T-1)</td>
<td>0.35**</td>
<td>0.41***</td>
<td>0.39***</td>
<td>0.35**</td>
</tr>
<tr>
<td>Financial Aid (T-2)</td>
<td>0.36*</td>
<td>0.38**</td>
<td>0.36*</td>
<td>0.35*</td>
</tr>
<tr>
<td>R² of Model</td>
<td>0.351</td>
<td>0.472</td>
<td>0.419</td>
<td>0.338</td>
</tr>
</tbody>
</table>

The cell values are standardized regression weights, N = 44 , * p < 0.05; ** p < 0.01; *** p < 0.001

When financial aid increases, the number of schools also increases. More teachers are required in these institutions to teach the students. So, the foreign aid can impact positively the number of teachers. According to Table 1, foreign aid (T) of current year has insignificant positive relationships with number of teachers. Whenever, the foreign aid received before one year and two years has 0.41 and 0.38 relationship respectively with number of teachers. Therefore, it is clear that foreign aid requires one or two years’ time-lag effect because of the maturity of educational projects. The explanatory power of model 2 showed during analysis was 47% in terms of the variance related to teachers, which is explained by the dispersal of financial aid.

The main purpose of educational foreign aid is to provide the educational facilities to the society. The student enrollment increases when educational spending is increased. In a study, Baldacci et al. (2008) found positive impact of social spending on school enrollment. For this study, the data set of 118 developing countries was used. However, in another study, Gyimah-Brempong and Asiedu (2008) measured the impact of foreign aid on school enrollment, which was also found.
positive and significant. Present study confirmed the results of aforementioned studies. Table 1 shows, the positive and insignificant impact of foreign aid (T) of current year on the enrollment of students. Foreign aid (T-1) received before one year has 0.39 relationship with enrollment that is positive and significant at 0.001. The aid received before two years has 0.36 relationship with enrollment, but that is less significant as compare to the results of 1 year time lag. The explanatory power of model 3 was found at 0.42, which shows a 42% variance of enrollments being extracted through foreign aid.

When educational spending is increased, the people have more education facilitation that can lead toward increase their literacy rate. Therefore, if foreign aid for education is spent efficiently, then it can have a positive impact on literacy rates. In Table 1, model 4 shows that the foreign aid of T period has an insignificant impact on literacy rates. The relationship between foreign aid (T-1) and literacy rate was 0.35 at a significance level of 0.01. Whenever, this relationship of literacy rate becomes less and insignificant with foreign aid (T-2) having the coefficient value of 0.33 at 0.06 significance level. The relationship shows that there is a 1-year time-lag impact in financial aid and literacy rates. The results also confirmed the existing study of Gyimah-Brempong and Asiedu (2008).

**Conclusion**

The basic objective of this study was to examine the role and effectiveness of international financial aid on educational outcomes. For this study, we collected time-series data from 1967 to 2010. To test the results, four models were developed by using a polynomial-distributed lag model. We found an insignificant impact of financial aid of current year on the number of educational institutions, number of teachers, enrollment of students, and literacy rates. The results indicated the positive significant impact of foreign aid (T-1) on all aforementioned educational development indicators. Moreover, the foreign aid (T-2) received before two years also has significant positive relations with aforementioned educational outcomes except literacy rate.

**Managerial implications for donor agencies and public policy**

Effectiveness of foreign aid in developing countries has been remained an intense and disputed issue. It has been transformed into an uphill task to achieve now, so policy makers must need to take certain cautions to settle it (Khan & Ahmed, 2007). Foreign capital inflow in education sector can yield better and effective results not only in education sector but also for entire economic growth. Therefore it is very crucial to design such investment policies in education sector which could increase number of institutes, number of faculty members to enroll and educate more students to eradicate or lessen the rate of illiteracy. As the literacy rate of Pakistan is very low as compared to developed countries, so during policy creation government should encourage and welcome such beneficial investments by donor agencies. Few scholars pointed out that high level of corruption, poor quality institutes, and strict controls over information distort the aid effectiveness in developing countries. So policy makers and government should take care of it that aid should be utilized positively (Bräutigam & Knack, 2004). Therefore, present study will surely assist them to overcome this issue. The results of this study highlighted that foreign aid has impact on the educational development indicators within one or two years. So, it is proposed that donor agencies should continue to provide funding to education sectors with a control system. The results of this study also suggest that policy makers must need to give one or two years to evaluate the impact of the investment made. Donor agencies or institutes should not seek for immediate results. They should wait until the maturity time of that funding or investment being made. Our findings employ that the funds are found to be more economical and significant in previous year as compared to current year. Developmental funding often needs maturity of time to examine its dynamic outcomes. The results
also revealed that the investment in education sector is being useful and results in advancing the number of institutions, teachers, students and literacy rate which actually determines the progress of a developing country how it capitalize its human and financial resource in order to provide quality education.

As the literacy rate of Pakistan is very low as compared to developed countries, so during policy creation government should encourage and welcome such beneficial investments. Furthermore, Pakistan may focus on those external financing resources that are much stable, sustainable and have positive impact in their educational sector. Aid agencies have significant impact on overall educational policy formulation, programming and its implementation during certain period. Therefore, such aid/investment should follow certain principles to support basic education, increasing number of institutes, enrollment of students and faculty and other indicators. Government has to make sure that foreign aid should be selective and purposive. If it is to be invested for development in education, it should be inclined toward its core objective to increase the literacy level (Tilak, 1988).

Limitations

In this research study, a regression analysis was performed by ordinary least squares. The conclusions are drawn based on regression weights and significance values. The model fitness was measured by just R² whenever other fitness indices, for example, goodness of fit index (GFI), normative fit of index (NFI) are not used to measure the model fitness. Many factors affect educational outcomes; just increasing financial aid is not sufficient to increase educational attainment. Factors such as GDP spending, private spending on education, inflation, and people’s personal financial position are not studied in this research. If these factors were controlled then the results of the study could be further improved.

References


