



Determinants of Economic Growth: An Evidence from Pakistan

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Abstract: Current research involved the use of different variables about gross domestic product (GDP), population, inflation, education spending, foreign direct investment, imports, exports and exchange rates to estimate the impact on economic growth. After solving the problem of stationarity and multicollinearity, the time series data was used from 1975-2015 in the analysis. The impact of population and imports was found positive and highly significant, while the impact of inflation and democracy was found significant and negative on the economic growth of Pakistan. The impact of education spending, foreign direct investment (FDI), exports and exchange rates are non-significant.

Key words: Economic growth, Pakistan, Gross domestic product, Population, Time series.

INTRODUCTION

Pakistan, like any other developing country, is on the way to attain and sustain long-run economic growth. In context of globalization, it is very difficult to say what the factors are that determine the economic growth. However, the economic growth is, collectively, the result of a combination of different factors and human capital (Solow, 1956; Romer, 1990). According to Aigbokhan (1995), the increase in average rate of output per person is the economic growth. One can estimate the economic growth of a country by its gross domestic product (GDP) or the change in national income or national output for a given time period. It is often estimated as the rate of change in the real GDP of a country, so, the quantity of goods and services produced actually determine the economic growth. Ullah and Rauf (2013) reported that an increase in real GDP of a country boosts up the total output of that country and this is called economic growth, which is actually important for a country. It has quite useful impact on the overall economy, like an increase in the income of the living people and helping to reduce unemployment and poverty. Economists were always demanding to increase the economic growth and were endeavoring to find how easily one can get economic growth by changing economic policies. There are various important determinants for economic growth, i.e., remittances, FDI, and imports (Erik and Ruiz-Arranz, 2006; Barajas *et al.*, 2009; Azman-Saini *et al.*, 2010; Almfraji and Almsafir, 2014). Economic growth is

also important for a country to improve the living standard of its people by education and other health facilities. Contemporary research shows that economic growth is a necessary factor responsible for human development (Nourzad and Powel, 2003). According to the Neo classical growth models of Solow (1956) and Swan (1956), population is a major determinant of the economic growth. However, imports of a country also play a significant role to increase the growth of its economy. Therefore, the establishment of the relations of Foreign Direct Investment (FDI), imports, remittances, and other important factors with real GDP may be useful for policy makers.

According to Almfraji and Almsafir (2014), the FDI has a positive and significant impact on the economic growth. In order to obtain the objective of high economic growth, it is necessary to keep the inflation rate low (Khan and Senhadji, 2001; Seleteng *et al.*, 2013; Vinayagathan, 2013). Education is also considered a powerful factor in the up-gradation of economic growth of a country by increasing private earnings, reducing poverty, empowering people, encouraging health decisions, and developing competitiveness (Shah, 2011). Schultz (1961) investigated that the education was playing a major role in the determination of economic growth. Education is the only way to convert the population into a desirable useful human capital. Shah (2011) found a strong and positive impact of educated human capital on economic growth. Democracy also has

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always been noticed and remained helpful for maintaining the stable long term growth. Helliwell (1994), and Przeworski and Limongi (1993) found that democracy had no systematic impact on growth, hence the developing countries, like Pakistan, are also yearning to acquire and sustain long term economic growth. How is Pakistan dealing with these factors that are responsible for a long term economic growth? Are the decisions consistent with the economic growth? Current study is aimed at addressing these questions, using the time series data from 1975-2015, about population, inflation, education spending, FDI, imports, exports and exchange rates to estimate the impact on economic growth and to suggest policy measures that can be valuable for unexpected escalation in the economic growth of Pakistan.

MATERIALS AND METHODS

Data: The current research was conducted, using different variables. Time series data (1975-2015) were used in the analysis, which were taken from Pakistan Bureau of Statistics, World Bank, State Bank of Pakistan, Pakistan Economic Survey and IMF.

Variables: Different variables, which were used in the analysis, were population of Pakistan, inflation, FDI, exports, imports, exchange rates, and education spending. Dummy variable for democracy was added in the analysis of GDP of Pakistan and was selected as a dependent variable in the model against the above independent variables. Annual GDP, population, FDI and education spending values were time variant. Data about these variables were taken from statistical databases of World Bank for the time period of 1975-2015. Imports and exports time series data of Pakistan was taken from the website of International Trading Center. Population is the number of people in millions during a specific year. Inflation data was taken from the International Financial Statistics and IMF. Existence of democracy was taken for specific time periods in the analysis for current study on economic growth of Pakistan.

Unit root tests: ADF test was used to check the existence of unit root (Dickey and Fuller, 1979; Dickey and Fuller, 1981) and also commonly used in time series econometric literature for testing stationarity and to make μ_t white noise. If Y_t is the data series (dependent and independent variables), ADF takes the following form.

$$\Delta Y_t = \alpha_1 + (\Phi_1 - 1) Y_{t-1} + \mu_t \quad \dots (1)$$

$$\Delta Y_t = \alpha_2 + \beta_2 t + (\Phi_2 - 1) Y_{t-1} + \sum_{i=1}^k \beta_i \Delta Y_{t-i} + \mu_t \quad \dots (2)$$

where, μ_t is assumed to be identically, and independently distributed random variable. The ADF-test statistic also checks the Null hypothesis that the time series has a unit root i.e. $H_0: (\Phi_2-1) = 0$ against the alternative hypothesis of stationary time series $H_1: (\Phi_2-1) \neq 0$. Joint hypothesis of unit root and no trend i.e. $H_0: (\Phi_2-1) = \beta_2 = 0$ can be tested, against the

alternative hypothesis ($H_1: (\Phi_2-1) = \beta_2 \neq 0$) of trend stationary. This can be checked by using the Φ_2 -statistic with critical values from Dickey and Fuller (Dickey and Fuller, 1981).

Empirical model for economic growth of Pakistan

Multiple regression analysis was used for the estimation of the effect of different factors on economic growth of Pakistan. The relationship between dependent and independent variables is given as;

$$E = f (F_i) \quad \dots 3$$

where; Y = GDP of Pakistan

F_i = Vector of quantitative variables $i = 8$

Eq. 3 can be written as:

$$E_i = \beta_0 F_i^{\beta_i} e^\mu \quad \dots 4$$

Eq. 4 can be additionally clarified as,

$$E = \beta_0 F_1^{\beta_1} F_2^{\beta_2} F_3^{\beta_3} F_4^{\beta_4} F_5^{\beta_5} F_6^{\beta_6} D_1^{\beta_7} e^\mu \dots 5$$

By taking natural log, equation 5 is elaborated as:

$$\ln E = \beta_0 + \beta_1 \ln F_1 + \beta_2 \ln F_2 + \beta_3 \ln F_3 + \beta_4 \ln F_4 + \beta_5 \ln F_5 + \beta_6 \ln F_6 + \beta_7 \ln F_7 + \beta_7 D_1 + \mu \quad \dots 6$$

where; E = GDP of Pakistan (Billion US\$)

F_1 = Population of Pakistan (Million)

F_2 = Foreign Direct Investment (FDI) inflow (US\$)

F_3 = Education Spending (Percent of GDP)

F_4 = Inflation (%)

F_5 = Total Exports of Pakistan (Million US\$)

F_6 = Total Imports (Million US\$)

F_7 = Currency Rates of Pakistan against US\$

D_1 = Democracy or Dictatorship

β_0 = Intercept

β_i = Elasticity

μ = Random error

ln = Natural log

RESULTS AND DISCUSSION

Unit root tests: Time series data set consists of a sequence of observations measured at successive points in time or over successive periods of time. During the analysis a time series data set must be stationary. A horizontal pattern is not satisfactory evidence to conclude that the time series is stationary. If the data is not stationary, it is transformed into stationary series, using different methods. If the series are not stationary, the regressions involving these series can falsely imply the existence of a relationship, which is called spurious regression (Granger and Newbold, 1974). Estimating a regression model comprising non-stationary variables might lead to irrational results. However, the augmented Dickey-Fuller test was applied to variables to check out the unit root presence in the data series.

Table 1 provides the ADF test results revealing all variables less than the critical values at level form of the data. So, the Null hypothesis about all variables was accepted at level form of data. The data series has unit root in all variables at level form. Although, the

values of ADF are more than the critical values at first different data form, at a given level of significance of 95%. As a result, Null hypothesis was rejected, having unit root and data series were stationary after first difference form.

Table 1: Unit root tests.

Variables	Level form		First-difference form	
	ADF	CV (5%)	ADF	CV (5%)
Y	5.461	-2.936	-3.392	-2.940
X ₁ pop	-1.461	-2.960	-3.120	-2.960
X ₂ (fdi)	-2.514	-2.938	-4.172	2.938
X ₃ (Edu)	-3.132	-2.938	-4.803	-3.610
X ₄ (inf)	-4.350	-2.936	-9.121	-2.938
X ₅ (exports)	0.119	-2.936	-5.614	-2.938
X ₆ (Imports)	0.802	-2.936	-5.705	-2.938
X ₆ (currency)	2.773	-2.951	-5.21	-2.938

Source: Author’s calculation.

It was quite necessary to estimate the impact of the independent variables on GDP. Different variables, which were used in the analysis, were population of Pakistan, inflation, FDI, exports, imports, exchange rates and education spending. Dummy variable for democracy was added in the analysis of GDP of Pakistan and was selected as a dependent variable in the model against independent variables.

Table 2 shows the demonstrations about the descriptive statistics of all used variables (GDP of Pakistan, population, FDI, exports, imports, education spending, inflation rate of Pakistan, and currency rate of Pakistani rupee). Table 3 shows the collinearity

statistics of variables. Collinearity or multicollinearity is the objectionable situation, where there is a high correlation among the independent variables included in the model for analysis. Tolerance is a statistic term, which is used to determine the magnitude of correlation among the used independent variables. Variance inflation factor (VIF) was estimated, which is the reciprocal of the tolerance. Large values of VIF indicate the perfect multicollinearity. There is no multicollinearity among the variables, if the value of VIF is less than 10 (Gujarati, 2003). The estimated model is free from the problem of multicollinearity because all values of VIF were less than 10, as shown in Table 3.

Table 2: Statistical data used for the model of economic growth.

Variables	Observations	Minimum	Maximum	Mean	Std. deviation	Variance
Y	41	11.34	269.97	83.0577	71.60450	5127
X ₁	41	68.48	191.70	127.6	37.14082	1379
X ₂	41	8.22	5590	913.4	1352.195	1828000
X ₃	41	1.84	3.02	2.3811	0.34637	0.12
X ₄	41	2.54	20.9	8.6585	4.13427	17.092
X ₅	41	1039.00	25343.77	9713.4	7792.32747	60720000
X ₆	41	2067	47544.88	15489	14269.01	203600000
X ₇	41	8.5	104	40.9042	29.90001	894.01

Source: Author’s calculation.

Table 3: Collinearity Statistics of Variables.

Variables	Collinearity statistics	
	Tolerance	(VIF)
X ₁ (-1)	0.670	1.492
X ₂ (-1)	0.498	2.009
X ₃ (-1)	0.860	1.163
X ₄ (-1)	0.739	1.353
X ₅ (-1)	0.551	1.813
X ₆ (-1)	0.436	2.296
X ₇ (-1)	0.539	1.856
D ₁	0.789	1.267

Source: Author’s calculation.

Coefficient of determination (R^2) in an estimated model is 0.68, which states that 68% change in the dependent variable is due to the independent variables. The F-value in the estimated model is 8.56, which was highly significant and explained the overall appropriateness as shown in the model (Table 4).

Total value of GDP of Pakistan was taken as dependent variable and eight independent variables were taken for the analysis. Table 4 shows the results of regression analysis.

The coefficient of population of Pakistan was 5.12; that had a highly significant positive impact on GDP of Pakistan. Machi (2011) studied the economic

growth determinants and showed a positive impact of human capital, training and manpower development on economic growth. It is estimated here that the main reason or the major factor of the increase in GDP is the number of people living in Pakistan. There is a dire need to improve the population skills, and all other aspects of population, like the spending on skilled training courses and other education purposes so that the impact of population could be increased. Pakistan is quite rich in labor force because of its high population and the importance of a population, especially, in a developing country is hereby acknowledge. There is a need to further invest on its population for the purpose of economic growth.

Table 4: Regression analysis.

Variables	Coefficients	Standard error	Test-statistics	Significance (P-value)
Constant	-12.76061	5.312847	-2.401840	0.0225
X1 (-1)	5.121900	1.521665	3.365983	0.0020
X2 (-1)	-0.002172	0.001835	-1.183311	0.2457
X3 (-1)	-2.177318	3.678461	-0.591910	0.5582
X4 (-1)	-0.475337	0.209235	-2.271782	0.0302
X5 (-1)	0.001187	0.000930	1.276577	0.2112
X6 (-1)	0.002719	0.000548	4.960158	0.0000
X7 (-1)	-0.091464	0.255872	-0.357461	0.7232
D1	0.161776	1.744045	0.092759	0.0467
R^2				0.688476
Adjusted R^2				0.608082
F- Value				8.563836
Prob. (F-statistic)				0.000004
Durbin-Watson stat				1.89599

Source: Author’s own calculation.

FDI of Pakistan has a negative effect on GDP of Pakistan, non-significant at even 5% level of significance, as shown in Table 4. The impact of FDI on GDP is assumed to be positive as proved by Khathlan (2012), Antwi *et al.*, (2013). Almraji and Almsafir (2014) reviewed a broad range of literature and showed that the impact of FDI on economic

growth was positive and significant but in some cases, it was negative. They further explained that the relationship between FDI and economic growth deeply depended on other regulating factors, e.g. the development of financial markets, open trade rules, complementarities between domestic and foreign investment, exchange rate policies, legal framework,

etc. Anyway, the estimated negative impact of FDI on GDP is consistent with Siddiqui and Iqbal (2010), who reported a negative relationship between FDI and economic growth.

Education spending of Pakistan has a negative effect on GDP of Pakistan, which is -2.17. The estimated results are inconsistent with Zafar and Zahid (2013). Literature proved both positive and negative impact of education on economic growth, i.e., there was a significant positive impact of education on GDP (Barro, 1991; Norman and Borrelli, 2008). Hanushek and Kimko (2000) claimed that the productivity and growth will significantly increase due to the quality of education. During current study, it was observed that education without quality did not have a significant impact on the economic growth as in Pakistan, where education is doing nothing positive with the economic growth. The results of this study are consistent with those reported by Sylwester (2000), who observed a negative impact of public education expenditures on economic growth. However, current observation of negative impact shows that, in Pakistan, there is a lack of quality education and the education is not playing its role in the economic development. Hence, it is important to critically analyze the education sector of Pakistan by keeping the economic growth perspective in mind and further research work should be conducted to identify the exact weakness in this sector. Policy makers should try to focus on the policies about spending on quality education and employment opportunities in perspective of economic growth to avoid the wastage of resources.

Inflation, in Pakistan, has a negative impact on the GDP of Pakistan, which is -0.47 and is highly significant. Consequence of inflation, in perspective of economic growth, is known by the policy makers and they may keep low rates of inflation for achieving the targets of economic growth and inflation is one helpful policy tool (Ayres *et al.*, 2014; Öztürk *et al.*, 2014). However, it is important to find a suitable level of inflation for economic growth. However, the optimal level of inflation was identified in many recent research studies (Ghosh and Phillips, 1988; Sarel, 1996; Khan and Senhadji, 2001; Bick, 2010; Seleteng *et al.*, 2013; Vinayagathan, 2013; Baglan and Yoldas, 2014; Eggoh and Khan, 2014). Optimal level or threshold level of inflation is the point of inflation level, which has a positive impact on economic growth when inflation is low and negative it is at a high rate (Seleteng *et al.*, 2013). Khan and Senhadji (2001) used threshold estimation technique of Hansen (2000) and found 1-3% threshold level of inflation for developing countries and 8-12% for all countries. According to Omay and Öznur Kan (2010), the threshold level of inflation was 2.52, and they investigated an empirical relation between inflation and growth by using the time series data for six industrial countries. They further estimated the robustness of this relation by using Seemingly

Unrelated Regression and found the range of threshold inflation rate, which was 2.42-3.18%. There is a need to decrease the inflation rate below 3.18 to get a positive impact on economic growth, because the average value of Pakistan is more than this rate which has negative impact on economic growth of the country.

Total export of Pakistan has a slightly positive impact on GDP of Pakistan, which is 0.001, that is not significant at even 5% confidence interval. Khan and Saqib (1993) reported a positive and significant relationship between GDP and exports. Afzal (2004) reported that export contribution to GDP growth was positive and significant. Pakistani imports have a positive and significant effect on the total value of GDP of Pakistan, which is 0.0027. Shafiq *et al.*, (2012) also found a positive impact of exports and imports on the economic growth. The positive impact of imports on economic growth is mainly due to comprising of technology in the imports to smooth the productivity. Technology imports play a major role in economic growth, especially in developing countries (Zhong and Zou, 1995). On the other hand according to a study by Siddiqui and Iqbal (2005), imports have insignificant relation with economic growth. Pakistan is a developing country where imports play an important role in the economic growth by providing technology to Pakistani industries. Keeping in view the importance of advanced technology for industrial development in the perspective of economic growth, there is a dire need of making import policies

Depreciation of Pakistani rupee has a negative impact of -0.09 on the GDP of Pakistan and more depreciation of Pakistani rupee caused a bad impact on its GDP. The estimated results are consistent with Kolawole (2013) who found a negative impact of exchange rate on the economic growth.

The impact of non-democracy is significant and positive on the GDP of Pakistan instead of being a negative as presumed and the literature showed a negative impact of democracy on the economic growth. There was always a positive impact of democracy on the economic growth (Özler and Rodrik, 1992; Rodrik, 1997; Sen, 1991; Kurzman *et al.*, 2002; Daron *et al.*, 2014; Edison, 2003). The estimated result of a negative impact of democracy is consistent with a number of research reports showing a negative impact (Barro, 1996; Tavares and Wacziarg, 2001; Narayan *et al.*, 2011; Aisen and Veiga, 2013). In the same route of ideas, Rock (2009) showed that the growth of democracy depended on the relationship between the level of development of institutions and policies implemented in the countries of Asia. Since, democracy in Pakistan has a negative impact on its economic growth that means the level of development of institutions in Pakistan was not good during democracy, as compared to non-democracy. You (2011) reported that democracy increased the level of corruption and, therefore, negatively affected the economic growth. In democracy, due to more

corruption, injustice and nepotism the institutions of the country performed low, as compared to dictatorship and hence the democracy has a negative impact on the economic growth. It is important to reduce the effect of winning political party on institutions of Pakistan to improve their performance without being disturbed by democracy elements. In fact, a direct influence of MNAs and MPAs on the institutions of Pakistan is the main reason of negative impact of democracy on economic growth.

CONCLUSION AND RECOMMENDATIONS

The major factor of an increase in GDP is population. It is important to improve the population skills, and all other aspects of population like the spending on skilled training courses and other education purposes, so that, the impact of population could be increased. Further, Pakistan is quite rich in labor force because of its high population and its importance in a developing country is greatly acknowledged. There is a need to further invest on its population for the purpose of economic growth. It may be concluded that the education without quality does not have a significant impact on economic growth as found in Pakistan. However, the results of a negative impact showed that, in Pakistan, there is a lack of quality education. Policy makers should try to focus on the policies about spending on quality education in order to avoid the wastage of resources.

Further, it is required to decrease the inflation rate below 3.18 to get a positive impact on economic growth. There is a need to make import policies by keeping in view the importance of advanced technology for industrial development in perspective of economic growth. Regarding democracy, due to more corruption, injustice and nepotism, the institutions of the country perform low, as compared to non-democracy era leading to a negative impact on economic growth. Further, there is a need to reduce the effect of winning political party on institutions of Pakistan to improve their performance without disturbing the democracy elements.

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