External Sector and Its Impact on Economic Growth in Pakistan

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Received: February 3, 2016
Accepted: April 12, 2016

ABSTRACT

This study investigates the behavior of external sector and its impact on economic growth of Pakistan. Quarterly data has been used for empirical analysis covering the period from 1990:Q1 to 2010:Q4. External sector indices have been developed containing financial integration, net foreign assets and trade integration for theoretical relationships. The analysis is based on Vector Auto Regression followed by Vector Error Correction Model. Augmented Dicky Fuller test confirms that all variables in the study are non-stationary at level, but stationary at first difference. The co-integration test suggests one co-integrating vector among the variables. The empirical findings of cointegration analysis show that financial integration has positive while trade integration has negative effect on economic growth of Pakistan in the long run. However, the short run dynamics shows that output lag accounts for error correction confirming Granger representation theorem. The estimated CUSUM and CUSUM-Square stability test show that the coefficients of the model remains stable in the given sample period.

KEYWORDS: External Sector; Cointegration; Economic Growth

1. INTRODUCTION

External sector of the economy refers to international transactions. The international transaction may be in the form of exports, imports, capital accounts inflows, capital accounts outflow etc. with the rest of the world and are recorded in the form of accounts which shows the contribution of external sector. In open economy, macro-economic variables like financial integration, trade integration and net foreign assets are related to external sector. External sector of a country depend on the policies behavior of the global economy. Macro-economic policies of one country cannot function independently of the policies adopted by other countries. Economic theories suggest that a change in the policies adopted by the economy bring change in the international transaction which not only affect the output, but also may affect the growth rate and economic stability of a country. The external sector affects the economic growth of a country because of changing policies from time to time. “After independence Pakistan’s economy was in initial stage and could not perform better. During 1970s, due to bad political situation (isolation of East Pakistan) and uncertainty in the country, Pakistan faced different crises, domestic saving remained low due to fiscal deficit, and was totally financed by borrowing from different financial institutions. Current account was also in deficit and was about 5.3% of GDP. In 1990s increase in exchange rate occurred and current account appreciated by 5.9% of GDP as compared to 2.7% in 1980s. The policy of 1990s was continued in the period 2000s with the objective to increase export and to recover the economy. Liberalization of foreign exchange and privatization of different institutions took place during 2000s.

2. LITERATURE REVIEW

There is controversy on the literature relating to external sector such as financial liberalization and trade liberalization among the researchers. Quinn (1997) and Edward (1990) presented that financial liberalization stimulate economic growth while many other economist like Donell (2001) and Chanda (2000) found that financial liberalization does not enhance economic growth. Ghosal (2012) investigated the external sector of India’s economy and economic growth with the objective to find the long run relationship between economic growth(GDP) and external sector of India’s economy as well as inflation by taking time series data and applied the co-integration i.e. Engle and Granger test. ECM was also applied to find the short run dynamics. The major
finding of the paper is that external sector liberalization is negatively related to economic growth in the long run but positive related in the short run. Muhammad et al. (2007) presented trade liberalization, financial liberalization and its effect on economic growth (GDP). Objective of the study is to investigate the effect of trade integration, financial integration on economic growth by applying bound testing approach for co-integration. The findings of the study confirm that trade integration and financial integration are positively related to economic growth (GDP) in the long run while trade integration responds negatively in the short run. Bushra et al. (2006) presented trade integration and economic development with the objective to show the effect of trade liberalization on economic development. The methodology used in the study was 2SLS technique and it was found from the estimated results that trade integration does not have positive effect on all variables but also has negative effect on some variables and that is; trade integration affected employment positively and GDP, income distribution negatively.

Fatima (2010) presented the terms of trade and its effect on economic growth. The study confirms that terms of trade is negatively related to economic growth (GDP). Musleh et al (2003) studied openness in economic growth with the objective to investigate the effect of openness on economic growth by using VAR methodology. Major findings of the study confirm that openness is positively related to economic growth in long run. It is found from the results that economic growth is only a long run process, not a short run process. Felicitas et al (2005) studied policies for trade openness and growth. Objective of the study was to investigate trade liberalization effect on growth rate. Co-integration test was applied. Major finding was that output increased with increase in trade openness. Hali et al (2002) studied the effect of financial integration on growth rate. The aims of the study show the effect of variables of international financial integration and growth. The Methodology used in this research were simple OLS, 2SLS and GMM. Major findings were that IFI stimulates with economic success while the data support that IFI associated with economic growth. Kim et al (2011) studied FDI and economic growth for Kenya. The multiple regression model and secondary data has been used in the study. The major findings of the study shows that FDI enhances economic growth. The result shows that Kenya promotes its economic growth through investment plane.

Herath (2010) presented the trade liberalization and its effect on economic growth for Sri Lanka. The objective of the research was to find the causal relationship between trade openness and economic growth of Sri Lanka. Secondary data has been used as well as descriptive, simple and multiple regressions are applied to examine the relationship between variables. Major finding of the study is that there are positive relationship among the trade liberalization and economic growth. Ray (2012) studied the effect of FDI on economic growth in India. Objective of the study was to investigate the causal relationship between FDI and economic growth by applying OLS method. Major findings of the study suggest by OLS that is positive relationship between FDI and economic growth. Cointegration test also showed that FDI and economic growth there exist long run relationship. Umme et al (2012) studied trade openness and growth of Bangladesh. Objective of the study is to investigate the impact of trade integration on growth rate of Bangladesh economy. In the study simple Ordinary Least Square method is applied for empirical results. The major findings of the study is that economic growth enhances due to trade liberalization. Khan et al (2007) presented FDI and its effect on growth rate. The aim of research is to investigate the impact of FDI on growth rate. For Empirical results the test used in the study is bound test approach. The major finding of the study shows that FDI enhance growth both in long and short run. In much of literature, external sector are seen as causing growth. This implies that external sector liberalization play a vital role in economic growth. The theoretical arguments are that external sector increases economic growth. McKinnon (1973) suggests that financial integration in real cash balances enhanced economic growth and also plays an important role in capital formation. Further financial integration appreciates saving and investment and positively affect the output of a country. Low interest rates compress the essential saving which decreases investment and the result is negative effect on growth rate of a country. New growth theory argues that trade integration expands the market, increases research and development, reallocates employment to more innovative activities that require more human capital and enhances knowledge flows among economies. Trade integration brings benefits as well as costs. The problem related to trade integration is decrease in tariff revenue, so developing countries impose high tax on public to finance their budget. This may also lead to an uneven distribution of gains and pains, where the gains are distributed across the country while the burdens of adjustments are borne mainly by a particular group as shown by HDR (2003).

3. Hypothesis
The following hypothesis have been developed for this study

1. Financial integration has positive impact on economic growth
2. Trade integration has positive impact on economic growth
3. Net foreign assets has positive impact on economic growth

4. MATERIALS AND METHODS

The empirical analysis is carried out through Vector Autoregressive model. VAR model is one of the best models for the analysis of multivariate time series data for more than two variables. VAR model is used to study the dynamic behavior of economic theory. This model is also considered one of the best models for policy analysis as well. Ghosal (2012) presented the external sector and economic growth in India by using VAR methodology. Aslam et al (2007) studied trade policy and economic growth in Bangladesh by applying VAR methodology. VAR model developed in this study is presented below

Let $x_t$ be the vector of variables $FI$ (Financial integration), $TI$ (Trade integration), $NFA$ (Net foreign assets) and $GDP$ (Gross domestic product)

$$x_t = \begin{bmatrix} FI_t, TI_t, NFA_t, GDP_t \end{bmatrix}$$

And let $x_{t-i}$ be the vector of lag variables in the study

$$x_{t-i} = \begin{bmatrix} FI_{t-i}, TI_{t-i}, NFA_{t-i}, GDP_{t-i} \end{bmatrix}$$

$$FI_t = \beta_{10} - \beta_{11} TI_t - \beta_{12} NFA_t - \beta_{13} GDP_t + \gamma_{11} TI_{t-i} + \gamma_{12} NFA_{t-i} + \gamma_{13} GDP_{t-i} + \epsilon_{1t}$$

$$TI_t = \beta_{20} - \beta_{21} NFA_t - \beta_{22} GDP_t - \beta_{23} FI_t + \gamma_{21} NFA_{t-i} + \gamma_{22} GDP_{t-i} + \gamma_{23} FI_{t-i} + \epsilon_{2t}$$

$$NFA_t = \beta_{30} - \beta_{31} TI_t - \beta_{32} GDP_t - \beta_{33} FI_t + \gamma_{31} TI_{t-i} + \gamma_{32} GDP_{t-i} + \gamma_{33} FI_{t-i} + \epsilon_{3t}$$

$$GDP_t = \beta_{40} - \beta_{41} NFA_t - \beta_{42} TI_t - \beta_{43} FI_t + \gamma_{41} NFA_{t-i} + \gamma_{42} TI_{t-i} + \gamma_{43} FI_{t-i} + \epsilon_{4t}$$

Where $B$ = vector of coefficient of variables, $B_0$ = vector of intercept, $\gamma$ = vector of coefficient of lag dependent and independent variables, $U_t$ = vector of error term.

4. Unit Root Test
   The analysis starts from unit root test. This test is carried out to determine the order of integration of the variables. The order of integration is important to select the appropriate technique for empirical results. Augmented Dicky Fuller test (ADF) is applied to check whether the data is stationary or non-stationary. By stationarity mean the series with constant mean and constant variance. In this study we are using Augmented Dicky Fuller Test (ADF) for checking unit root problem.

5. Optimal Lag length
   After unit root test, it is also important to select an appropriate lag length. The study used the Akaike information criterion (AIC), Schwartz Bayesian Information Criterion (SBIC) to choose the appropriate lag length. The statistics used for these two criteria are given below:

   $$AIC = -2l + 2n / T$$

   $$BIC = -2l + n \log T / T$$

6. Co-integration Test
   Co-integration shows the long run relationship between economic variables; if the two variables are co-integrated, it means there is long run relationship between them: when the residual is non-stationary and variable is stationary, they are co-integrated and long run relationship is there. If all variables are integrated of I(0), they will be stationary at level and VAR model followed by impulse response function and variance decomposition will be used for the analysis. If all the variables are integrated of I(1) then Johansen co integration analysis will be used for long run relationships. However, if some variables are I(1) and same as I(0), then ARDL will be used.

   The final step of the analysis involved the estimation of short run relationship among variables. Error Correction Mechanism (ECM) integrates the short run dynamics with long run equilibrium without losing long
run information. ECM shows short run dynamic relationship between variables, and help in correcting past disequilibrium. The structural stability test is conducted by employing the CUSUMand CUSUMSQ. Examining the prediction error of the model.

The cointegration and error correction model is given in the following equation.

\[ \Delta x_t = \Phi D_t + \alpha \beta \Delta x_{t-1} + \Gamma_1 \Delta x_{t-1} + \ldots + \Gamma_{p-1} \Delta x_{t-p+1} + \epsilon_t \]  \hspace{1cm} (6)

Where \( \alpha \) represents the long run coefficients while \( \Gamma \) represents the error correction coefficients.

The variables involved in this study are financial integration, trade integration, net foreign assets and gross domestic product. Financial integration, trade integration and net foreign assets play a major part in the growth process as it relieves an economy from the balance of payment, encourage saving, capital accumulation and investment.

The data for variables such as financial integration, trade integration, net foreign assets and GDP were obtained from International Financial Statistics, State Bank of Pakistan. We use time series quarterly data from 1990-2010.

7. Empirical Results and Discussion. ADF test is applied for each variable like GDP, FI, TI, and NFA to test for the presence of unit root. The estimated results are shown in the following table 1.

<table>
<thead>
<tr>
<th>Variables</th>
<th>ADF</th>
<th>Probability Values</th>
<th>Trend</th>
<th>Diagnostic</th>
</tr>
</thead>
<tbody>
<tr>
<td>LogGDP</td>
<td>0.335</td>
<td>0.978</td>
<td>YES</td>
<td>I(1)</td>
</tr>
<tr>
<td>( \Delta ) (logGDP)</td>
<td>-3.268***</td>
<td>0.019</td>
<td>NO</td>
<td>I(0)</td>
</tr>
<tr>
<td>LogFI</td>
<td>-0.159</td>
<td>0.938</td>
<td>YES</td>
<td>I(1)</td>
</tr>
<tr>
<td>( \Delta ) (logFI)</td>
<td>-8.959***</td>
<td>0.000</td>
<td>NO</td>
<td>I(0)</td>
</tr>
<tr>
<td>LogTDI</td>
<td>-1.609</td>
<td>0.472</td>
<td>YES</td>
<td>I(1)</td>
</tr>
<tr>
<td>( \Delta ) (logTDI)</td>
<td>-9.503***</td>
<td>0.000</td>
<td>NO</td>
<td>I(0)</td>
</tr>
<tr>
<td>LogNFA</td>
<td>-0.906</td>
<td>0.780</td>
<td>YES</td>
<td>I(1)</td>
</tr>
<tr>
<td>( \Delta ) (logNFA)</td>
<td>-8.872***</td>
<td>0.000</td>
<td>NO</td>
<td>I(0)</td>
</tr>
</tbody>
</table>

***Implies that the series is stationary at 1%. \( \Delta \) denotes first difference. GDP, FI, TDI, and NFA denote the logarithmic Economic growth, financial integration, Trade integration, and Net foreign assets respectively.

Table 1 shows the estimated results of unit root. The null hypothesis \( H^0 \) for all variables like GDP, FI, TDI, and NFA is not rejected in their original series, so the series are non-stationary. However, by taking the first difference of all variables, it is found that \( H^0 \) is rejected indicating that all variables are integrated of order one, \( I(1) \) i.e. \( X_t = (FI, TDI, NFA, GDP)^{-1}I(1) \).

After analyzing the results of unit root test, the next step is to choose optimal lag length. We determine the optimal lag length, because Johansen test of co-integration requires lag length. As we are using quarterly data in our analysis, which results into small sample size, thus preference will be given to Schwartz information criterion (SIC). The following table shows the selected lag length of SIC.

<table>
<thead>
<tr>
<th>Lag</th>
<th>LogL</th>
<th>LR</th>
<th>AIC</th>
<th>SIC</th>
<th>HQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>380.764</td>
<td>NA</td>
<td>-10.182</td>
<td>-10.058</td>
<td>-10.133</td>
</tr>
<tr>
<td>1</td>
<td>771.162</td>
<td>728.04</td>
<td>-20.301</td>
<td>-18.896</td>
<td>-19.57</td>
</tr>
<tr>
<td>2</td>
<td>776.642</td>
<td>9.626</td>
<td>-20.017</td>
<td>-18.896</td>
<td>-19.57</td>
</tr>
<tr>
<td>4</td>
<td>822.164</td>
<td>54.517</td>
<td>-20.385</td>
<td>-18.268</td>
<td>-19.54</td>
</tr>
<tr>
<td>6</td>
<td>869.044</td>
<td>9.11</td>
<td>-20.784</td>
<td>-17.671</td>
<td>-19.542</td>
</tr>
<tr>
<td>7</td>
<td>881.923</td>
<td>15.663</td>
<td>-20.7</td>
<td>-17.088</td>
<td>-19.259</td>
</tr>
</tbody>
</table>

*Indicate lag length chosen by different criterion.
The above table 2 provides results of different criterion for lag order selection. However, only SBC are chosen and optimal lag length is one, lag (1). Lower the SIC value better will be the model. The lower value of SIC is -19.678* with the optimal lag length suggested is one as an optimal lag.

After applying ADF suggests that all variables like GDP, FI, TDI and NFA are stationary at first difference and determining the lag length, the coming step is to determine the number of co-integrating equations in our VAR model. To investigate the co-integration relationship between variables, we apply trace test value and maximum Eigen values. The estimated results of co-integration test are given in the following table 3.

### Table 3 Summary of Johansen Co-integration test

<table>
<thead>
<tr>
<th>Data Trend</th>
<th>Test Type</th>
<th>None</th>
<th>Linear</th>
<th>Linear</th>
<th>Quadratic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trace Test</td>
<td>No Intercept</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Max.Eigen</td>
<td>No Intercept</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

The above table 3 provides estimated results of co-integration test. Both the trace test statistics and maximum Eigen value are used to check co-integration relationship between GDP, FI, TDI and NFA. The upper panel of the table provides the trace test statistics and max.Eigen value are given in the lower panel of the table. Both tests clearly indicate that there is one co-integrating vector or co-integrating equation in model.

**Normalized Co-integration equations**

The test of co-integration indicates only one co-integrating equation in the analysis. To analyze the long run relationship among GDP and external sector variables like financial integration, trade integration and net foreign assets, we normalize the co-integrating equation on GDP. The normalized co-integrating relationship between economic growth, financial integration, trade integration and net foreign assets are given as under in Table 4.

### Table 4 Estimated statistics of long run equation Dependent variable (LGDP)

<table>
<thead>
<tr>
<th>Indp. Variable</th>
<th>Co-int-Eq</th>
<th>Standard Error</th>
<th>t-statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>9.98</td>
<td>3.18</td>
<td>-3.131**</td>
</tr>
<tr>
<td>LGDP(-1)</td>
<td>1</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>LFI(-1)</td>
<td>-0.915</td>
<td>0.47</td>
<td>-1.918*</td>
</tr>
<tr>
<td>LTDI(-1)</td>
<td>103.42</td>
<td>66.7</td>
<td>1.550*</td>
</tr>
<tr>
<td>LNFA(-1)</td>
<td>-0.594</td>
<td>0.63</td>
<td>-0.929</td>
</tr>
</tbody>
</table>

The above long run relationship can be shown by reduced form equation. The reduce form equation are given as below:

Normalized co-integrating equation

\[
LGDP = 9.980^{**} + 0.915LFI^{*} - 103.42LTDI^{*} + 0.594LNFA..............................(6)
\]

The co-integration test indicates the long run relationship between economic growth, financial integration, trade integration and net foreign assets. The estimated results provides information which shows that financial integration has positive effect on economic growth in the long run in Pakistan, and have the first most substantial effect on economic growth i.e. 0.915. This means that 1 percent increase in financial integration may lead to increase economic growth by 0.915 percent. The results also show that there is a significant relationship between both economic growth and financial integration. This result is in line with the Muhammad (2007) and Umme (2012) result that financial liberalization has positive effect on economic growth. All the parameters estimate elasticity’s due to logarithmic transformation. Results reported in Table 4.4 indicate that the trade integration has no positive effect on economic growth which means that trade integration has negative long run relationship with economic growth. That is 1 percent increase in trade integration leads to reduce economic growth by 103 percent and there is significant relationship between them.

**8. Vector Error Correction Model (VECM):**

The results of external sector and economic growth can be improved by introducing VECM in the long run relationship. The long run relationship among variables can be disturbed by external shocks. According to Granger representation theorem, the presence of co-integration there must be error correction. Error correction mechanism gives information about the speed of adjustment that is deviated from the long run equilibrium. To find the short run dynamics in the frame of vector autoregressive with error correction mechanism equation we
have estimated the Vector Error Correction Model (VECM). The estimated statistics from VECM are given in table 4.5 as follow.

<table>
<thead>
<tr>
<th>Error correction</th>
<th>ΔLGDP</th>
<th>T-statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECT(-1)</td>
<td>-0.061</td>
<td>-5.766*</td>
</tr>
<tr>
<td>ΔLGDP t-1</td>
<td>-0.261</td>
<td>-1.960**</td>
</tr>
<tr>
<td>ΔLFI t-1</td>
<td>-0.051</td>
<td>-0.517</td>
</tr>
<tr>
<td>ΔLTDI t-1</td>
<td>2.277</td>
<td>0.121</td>
</tr>
<tr>
<td>ΔLNFA t-1</td>
<td>-0.050</td>
<td>-0.405</td>
</tr>
</tbody>
</table>

The above table 5 indicates the short term elasticity’s of lag values in the error correction model. The sign of error correction co-efficient should be negative having statistically significant t-value. Engle and Granger (1987) certain percentage of dis-equilibrium by external shock can be corrected in the coming period.

The values of co-efficient in the error correction model indicate the degree of elasticities, representing the percentage change in economic growth due to percentage change in the lag value the of dependent variable GDP. The error correction term (ECT) shows 6.1 percent error correction take place in the GDP co-integrating equation. Overall 6.1 percent error correction is taking place reflecting the Granger representation theorem. The co-efficient of the lag value of GDP shows the short run elasticity due to logarithmic transformation of data. Moreover, the co-efficient of the lag value of GDP is less than one hence inelastic. Further the co-efficient of error correction term (ECT) indicate the speed of adjustment toward long run after short run external shock. The error correction term is found negative and statistically high significant.

To check the stability of estimated parameters in co-integration we have constructed the CUSUM square test of stability. Figures 1 and 2 shows the CUSUM and CUSUM square respectively.

**Figure 1**

**Figure 2**
The above figures 1 CUSUM and figure 2 CUSUM square provide information that the co-efficient of the model are stable because both CUSUM and CUSUM square value is good that is inside the critical region.

The results indicate that there is positive relationship between FI, NFA and GDP in the long run and are statistically significant which support the hypothesis given in literature while TDI has negative effect on GDP in the long run which support the result of Bushra (2006) found that trade integration and PGDP have negative relationship. This is controversy with literature and economic theory. The negative relationship between trade integration and GDP can be justified on the ground that the absence of appropriate trade policies have negative impact on GDP. Pakistan adopted different policies at different times to enhance exports; to achieve the objectives the country had adopted different exchange rate policies. In 1998, SBP adopted new exchange rate mechanism (NERM) with the objective to discourage non-essential imports and enhance their export, but NERM adversely affected the economic growth of Pakistan (Janjua 2007). Secondly Pakistan faced natural disasters like flood which had negative effect on economic growth of Pakistan because major exports like cotton, rice, livestock etc were destroyed and the result was increase in imports and decrease in export, which affect the BOP. K"Robert et al 2006 found that natural disasters have always negative effect on trade. Third reason is that major exports of Pakistan is raw materials they are not furnished goods while import high capital the result is decrease in capital inflow and increase in capital outflow. Behavior of both exports and imports show negative effect of TDI and GDP of Pakistan.

9. Conclusion and Recommendation

The results from the analysis suggest that the government should move towards financial liberalization as it has positive long run relationship with economic growth of Pakistan. It would also result into increase in capital inflow and decrease in capital outflow in Pakistan’s economy. The negative relationship between trade liberalization and economic growth is because of difference between exports and imports of Pakistan. Evidence shows that the imports of Pakistan are higher than exports, so trade policy should be formulated such that exports of economy boost up and imports should be restricted optimally. Moreover, exports of Pakistan should contain manufacture goods rather than primary goods. For this purpose industrialization should be encouraged. Government should adopt such a multi-dimensional policy that comes over all such problems.

REFERENCES


