Exports Performance under the Role of Foreign Direct Investment in Pakistan: An ARDL Approach

by
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Abstract: Foreign Direct Investment (FDI) is the largest source of inflow of foreign earnings for the countries of the developing world. This study examines the short and long run association between FDI, exports and growth for Pakistan by employing the Autoregressive and Distributed Lags (ARDL) approach in the time series framework from 1975 to 2011. Augmented Dickey Fuller (ADF) test is applied for checking the stationarity of data, while ARDL technique is applied for the presence of cointegration; long run relationship and short run relationship among macroeconomic variables in case of Pakistan. The ARDL model found cointegration at level among the variables while the Error Correction Term (ECT) is insignificant at 1% significance level. The positive relationship between FDI and exports in the short run as well as in the long run is predicted by the parameters of ARDL. The study suggests that government should attract FDI in those sectors which mainly contribute to exports directly (like textile manufacturing) or indirectly (like power generation sector) to make exports competitive in the international market.

Key Words: ARDL, exports, foreign direct investment (FDI), terms of trade.
JEL Classification: F14, F21

1 Introduction

The importance of exports and FDI has been increasing with the passage of time. We are living in the age of globalization and those nations who are recognized as the world leaders in the prevailing times are improving their economies through increasing trade for mutual benefits. This current structure of nations to trade with other countries is not an instant process. Different countries experienced different situations with international trade depending upon their factor endowments. As occurred in the history of the developing world, countries had Import Substitution policies in the late 1950s as well as in the early 1960s are considering international trade between nations (on the basis of their incomplete specialization) significantly and optimistically. They are reaping advantages of mutual gain, promotions of relations, reasonable prices and market expansions. Exports and FDI are considered as the major growth enhancing factors for the development of the economy. FDI is one of the most important tools which make nations especially the developing ones to achieve the investment levels beyond their levels of saving because every country has limited opportunities to grow and save in autarky condition. In this era, it is almost impossible for every nation to close their boundaries for international trade. The impacts of these factors are multidimensional and they have influences on common man whether they are social, economical, political or cultural. World Trade Organization (WTO) has now become an international trading system with a framework of principles and laws between the trading partners. Pakistan (like other developing nations) having problems of low productivity and under utilization of resources due to non-specialization and diseconomies of scale in different sectors of the economy like agriculture etc. There are different classical theories, which
favor the positive impact of international trade and FDI inflows. The increasing globalization all over the world has led to the increasing competition to attract FDI in the developing countries. Export led growth (ELG) hypothesis states that exports are one of the most important growth accelerating factors for the economy. FDI allows the nations to get more benefits (compared to others) by efficient use of their productive resources, whether they are natural resources, human capital etc. At the same time, the host countries also enjoys the benefits in the form of advanced technology (particularly from the developed to the developing world), improved production levels, up gradation of physical and human capital as well, but also have ambiguous impacts (in favor of or against) on the social and cultural values.

The performance of exports shows the nation’s capability to sell goods and services produce in a domestic country to other nations in the world. FDI inflows to the developing world having positive externalities and may be considered as an important component in the development strategies made by the policy makers because of its spillover effect on the exports (Ahmad, Alam and Butt, 2003). Import Substitution policies in the 1950s and 1960s which were followed by Exports Promotion policies in the 1970s, improved resource allocation and increase productivity through technological development and economies of scale (Shirazi and Manap, 2004). There is also a big impact of political integration between the countries to attract FDI. Pakistan should improve its relationship with economically strong countries of the world on the basis of bilateral gains and benefits (Khan, 2011).

1.1 FDI compared to other foreign financial flows to the developing world

According to Migration and Remittances Fact book (2011), FDI inflows are considered as the largest source of overseas receiving for the developing economies if compared with other financial flows like workers’ remittances, Official Development Assistance (ODA) and Private Debt and Portfolio Equity (PD&PE). Figure-1of appendix-d shows that the developing countries are having different sources of foreign earnings but FDI remains the largest one since 1994. They continued to be increasing from 1993 to 2008 then declined due to global crises but improving with the recovery. These financial flows help the developing economies to deal with the problems of financial constraints, low investment opportunities etc.

1.2 Pakistan’s exports structure

Pakistan had been promoted from low income group in 2008 to middle income group in 2011. (World Bank’s Country Classifications, World Bank, 2010). The structure of Pakistan exports is presented in Figure-2 of appendix-d, which shows that the exports of Pakistan are divided into primary (17%); manufactured (74%) and semi manufactured (9%) products. At the time of independence 99% of Pakistan’s GDP share was agriculture products and raw material but today agriculture contributes only 23% in the gross domestic product. Small portion of exports belong to semi manufactured and primary or raw materials. The manufactured exports have the lion share of intermediate and furnished textile products.


Figure 2. Structure of Pakistan Export. Source: economic survey report of Pakistan, 2009-10
Figure 3 presents major exports of Pakistan’s exports. More than half of Pakistan’s exports belong to textile manufacturing; agro food exports contribute 17 percent. Both of which consist of 70 percent of total exports. Although Pakistan remained under world economic and political influence and subject to follow the policies imposed by world leading economies such as economic sanctions of 1998, issue of 9/11, political interruption by the west to mitigate terrorism, capital flight and various other factors contributed to economic slowdown of Pakistan economy but in last decade Pakistan improved its balance of payment by increasing its manufactured export. The export structure is presented in following figure:

![Figure 3. Major products of Pakistan’s exports. Source: Trade development authority of Pakistan, 2009-10](image)

### 1.3 Significance and objectives of the study

This study will examine FDI and exports performance for the period 1976-2011 for Pakistan. It also investigates whether the expansion of FDI has had any significant effect on the exports performance of Pakistan. Further it will help in identifying the key sectors where Pakistan should attract FDI in order to increase the exports performance. Theoretically it seems that FDI significantly impact on the exports performance, however we need to check this phenomenon in the context of Pakistan’s economy. Besides this, there is a need to do the sector analysis of exports to understand and interpret the empirical results.

With the help of empirical analysis, the aim is to answer the following research questions.

- To what extent FDI is more important in determining the exports performance?
- To find out the important sectors for attracting FDI and formulating policies that would yield the highest economic returns for Pakistan.

Rest of the paper consists of review of the related literature, data and methodology, empirical results and discussion of the results and finally we may draw some conclusions and have some policy measures in this regards.

### 2 Literature review

The ambiguous results of different time series, cross sectional and panel data analysis have been analyzed in the literature. The relationship between FDI, exports and output for Pakistan is investigated by Ahmad et al (2003). The time series data for the period 1972-2001 found that there exists a long run relationship between FDI, exports and domestic output. The association between FDI inflows and growth for Pakistan is analyzed by Falki (2009). These inflows act as the growth enhancing catalyst for countries of the developing world. However, the positive impact of the FDI on growth is productive through different channels like increase in the domestic investment and human capital with the transmission of the technological factors.

Zhang and Song (2000) analyze the role of FDI inflows to China from 1986 to 1997. In the provincial panel data analysis, the role of FDI on the exports of the country has been linked and the conclusion of this study is that these foreign inflows have direct impact on exports of the manufacturing sector. Franco (2012) analyzes the productivity spillover effects of the foreign investment flows on the recipient countries. This study uses data from 1990 to 2001 to evaluate the impact of the US FDI on the exports strength at different sectors in 16 OECD countries. The conclusion of this study is that FDI inflows positively influence the exports performance of the host countries. Javed et al (2012) finds out the link between four South Asian economies (India, Pakistan, Bangladesh and Sri Lanka) with panel data analysis of 38 years (1973-2010). By employing Generalized Method of Moments (GMM), this study concludes the direct relation between exports and growth in all the four major...
economies while ambiguous relationship with FDI. Dritsaki, Dritsaki and Adamopoulos (2004) analyze the long run relationship between FDI, growth and trade. The time series analyses for Greece from 1960 to 2002 also justify causal relationship between the said variables and conclude that growth, FDI and trade have amalgamated affect on the country. FDI and workers’ remittances are among the two major sources of foreign earnings for many developing countries. These foreign earnings may lead to appreciation of real exchange rate for Pakistan [Rehmen, Jaffri and Ahmed (2010)]. Yousaf et al (2011) examines the influence of FDI on the growth of Pakistan from 1980 to 2009. The important aspects to increase economic growth through foreign investment are favorable exports policies, local infrastructure and production capacity with improved human capital. Siddiqui and Ahmad (2012) investigate the linkage between FDI and current account by utilizing Johansen Juselius cointegration technique and Granger causality test on quarterly data of Pakistan from 1976 to 2005 and found long run relationship with the unidirectional causality respectively. Vural and Zortuk (2011) discuss the case study of Turkey from 1982 to 2009 to find relationship between FDI and exports. The data analysis of Turkish economy shows that exports growth is comparatively greater than the GDP growth and FDI is one of the important factors that can increase Turkish exports. No short run causality is seen between FDI and current account. It also suggests exports based investment flows are valuable if profit outflows are less. Mahmood and EhsanUllah (2011) explore the impact of different macroeconomic variables (population, import duties, political structure, and manufacturing sector, exchange rate, exports and education level) on FDI for Pakistan from 1972 to 2005. By employing ADF test and OLS regression analysis, this study suggests that the size of the economy, democracy and increasing education are the pull factors of FDI while all the other variable shave negative impact on the inflows of FDI. Rabiei and Masoudi (2012) study the panel data of eight Islamic developing countries including Pakistan. The data set from 1980 to 2009 strongly supports FDI as the growth enhancing factor. FDI inflows work as one of the vital factor to boost economic growth and development of the countries. Technological transfer, efficient allocation of scarce productive resources and employment opportunities in the recipient countries are some of the important long run benefits of these foreign inflows. The directions of FDI should be diverted from the services sector to the exports oriented sectors to get real advantages of these earnings [Muhammad et al (2010)]. Jayachandran and Seilan (2010) explore the causal relation between FDI, trade and growth. The analysis from 1970 to 2007 for India exposes the long run relationship between the macroeconomic variables which jointly strengthen the benefits with the open-door policy.

3 Data sources

Our study is based on four major macroeconomic variables; export (LEXP), foreign direct investment (LFDI) and productivity (LGDP) along with terms of trade (LTOT). Variables are expressed in logarithmic form for the ease of interpretation. Data for all variables has been taken from 1975 to 2011 annually. Data on terms of trade has been taken from various issues of Economic Survey of Pakistan while all other variables are sourced from World Development Indicators.

4 Methodological frameworks

Theoretically; export of goods and services is related to the number of macroeconomic variables. But for the sake of simplicity, we hypothesize that export is a function of gross domestic product, foreign direct investment and terms of trade. Mathematically:

\[ LEXP_t = f (LGDP_t, LFDI_t, LTOT_t) \]

\[ LEXP_t = \beta_1 + \beta_2 LGDP_t + \beta_3 LFDI_t + \beta_4 LTOT_t + \varepsilon_t \]

The expected signs of coefficients of gross domestic product and foreign direct investment
are positive while exports are negatively related with the terms of trade. There are numbers of methods available for the estimation of short as well as long run relation among these variables. Among these methods some are like Angel-granger (1987) test, Johansen (1991) test and OLS based autoregressive and distributed lag (ARDL) model. First two tests that is Angel-granger and johansen tests are of low power because both of these tests are subject to stationarity test, if for example at 5% significance level we test the stationarity of a variable. There is 5% chance of making type-I error, that is making an incorrect conclusion of placing stationary series as a non-stationary. As a result the test based on such data stationarity test will also be of low power that is there is a high chance of making an incorrect conclusion. In case of ARDL model there is no need pre-testing for data stationarity. In johansen and Angel-granger test it is necessary for all series to be I(1) in order to test the cointegation among variables but in case of ARDL it is not necessary, we can test the presence of cointegration among variables of different order of integration. In our case one variable that is FDI is not I(1) but is only a trend stationary. For the above two reasons we have used ARDL technique for analysis in this study.

4.1 Estimation

The ARDL framework of equations addresses three basic questions. Firstly; is there exist any long run relation among the variables? This question is addressed by the following equation (3):

\[
\Delta \text{LEXP}_t = \theta_0 + \sum_{i=1}^{p_1} \alpha_i \Delta \text{LEXP}_{t-i} + \sum_{i=0}^{p_2} \beta_i \Delta \text{LGD}_P_{t-i} + \sum_{i=0}^{p_3} \gamma_i \Delta \text{LFDI}_{t-i} + \sum_{i=0}^{p_4} \eta_i \Delta \text{LTOT}_{t-i} + \delta_i \text{LEXP}_{t-1} 
\]

In above equation \(\alpha_i, \beta_i, \gamma_i, \text{and} \eta_i\) are short run coefficients while \(\lambda_i\) are long run coefficients. \(p_1, p_2, p_3,\) and \(p_4\) are number of lags used for each variable like LEXP, LGDP, LFDI and LTOT respectively. We used Akaike information criteria (AIC) for the determination of lag structure of each variable. The null hypothesis in equation (3) is:

\[
H_0 : \delta_1 = \delta_2 = \delta_3 = \delta_4 = 0
\]

It means that all variables do not have any long run relation. Alternatively;

\[
\text{LEXP}_t = \theta_0 + \sum_{i=1}^{p_1} \beta_i \text{LEXP}_{t-i} + \sum_{i=0}^{p_2} \gamma_i \text{LGD}_P_{t-i} + \sum_{i=0}^{p_3} \alpha_i \text{LFDI}_{t-i} + \sum_{i=0}^{p_4} \eta_i \text{LTOT}_{t-i} + \varepsilon_t
\]

where \(\beta_i, \gamma_i, \alpha_i\) and \(\eta_i\) are long run coefficients of export, output, FDI and terms of trade respectively. Finally the short run dynamics were captured by estimating the equation (5), which consists of only difference term and error correction term (ECT) as given below:

\[
\Delta \text{LEXP}_t = \theta_0 + \sum_{i=1}^{p_1} \alpha_i \Delta \text{LEXP}_{t-i} + \sum_{i=0}^{p_2} \beta_i \Delta \text{LGD}_P_{t-i} + \sum_{i=0}^{p_3} \gamma_i \Delta \text{LFDI}_{t-i} + \sum_{i=0}^{p_4} \eta_i \Delta \text{LTOT}_{t-i} + \theta_1 \text{ECT}_{t-1} + \varepsilon_t
\]

In the above equation; \(\alpha_i, \beta_i, \gamma_i, \text{and} \eta_i\) are representing short run coefficients, while \(\theta_1\) is an adjustment coefficient. It depicts the speed and direction of change toward equilibrium in the long run. Some diagnostic techniques were applied to check the suitability of the model.
used. They suggest that there is no serial correlation, violation of normality assumption and none of the problems associated with functional form. The reader may verify all results presented in appendix C.

5 Empirical results and discussion

In ARDL framework it is important to test the data for stationarity in order to determine short run dynamics. We applied ADF (1979) and Philip Perron (1988) tests for testing data stationarity. The outcomes are included in appendix A. Table (1) shows that all variables; output, terms of trade and export are I(1) except foreign direct investment which becomes stationary after de-trending it and hence it is denoted by LFDIT.

Next part of the analysis examines the estimate of ARDL framework of equations. The study provides evidence in the support of existence of long run relationship among the variables. Because F-statistics value is almost high and the null of no long run relationship is rejected significant at 1% level of significance. Akaike information criteria suggested a long run model of order (3,3,3) is given in the appendix. (B) The normalized form of the model is given in table-1:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficients</th>
<th>t-statistics</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-0.839420</td>
<td>-0.536597</td>
<td>0.5975</td>
</tr>
<tr>
<td>LFDIT_1</td>
<td>0.059798</td>
<td>2.048613</td>
<td>0.0499</td>
</tr>
<tr>
<td>LFDIT_3</td>
<td>-0.110348</td>
<td>-4.009872</td>
<td>0.0007</td>
</tr>
<tr>
<td>LGDP_3</td>
<td>1.262984</td>
<td>7.340525</td>
<td>0.0000</td>
</tr>
<tr>
<td>LTOT_1</td>
<td>-0.550944</td>
<td>-4.426146</td>
<td>0.0003</td>
</tr>
<tr>
<td>LTOT_3</td>
<td>-0.224639</td>
<td>-1.887577</td>
<td>0.0737</td>
</tr>
<tr>
<td>MA(3)</td>
<td>0.92964</td>
<td>16.78285</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

The short run and long run coefficients of foreign direct investment and terms of trade shows the analogous relationship with export and are positively correlated, while there exists negative relation with output and is not significant. Output does not have any impact on export in short run suggested by ARDL equation; the coefficient of output is statistically insignificant in that equation. The coefficient of ECT_t,1 is large and highly significant. The sign of error correction term shows that when there is any disequilibrium from normal situation it will converge back to equilibrium. The speed of adjustment is fast as the magnitude of coefficient of ECT_t,1 is very large; it suggests that 93% of adjustment towards equilibrium will occurs within one year. Generally speaking our estimates provide evidence in the support of short run as well as long run relationship among the variables.
6 Conclusion and policy recommendations

This study analyzed the impact of FDI on exports using annual times series data from 1970 to 2011 by employing ARDL technique. The results conclude that there is short run as well as long run positive relationship between exports and FDI, whereas output has positive impact on FDI in the long run but statistically no significant impact in the short run. All variables are non-stationary at their level except FDI, which is trend stationary at level. The model shows that there is quick adjustment towards equilibrium in case of any disequilibrium from equilibrium level.

The study advocates that exports may be increased due to enlarging FDI. The policy makers should make policies to attract FDI in prominent exports sectors (textile manufacturing) or in those which indirectly contribute to exports (power generation) to make it competitive in the international market. The work also proposes that law and order conditions should be improved in the country to attract comparatively more FDI. This inflow of FDI in manufacturing sector can be helpful to increase exports and economic growth which will lead to prosperity in the country. Increase in FDI leads to stabilization of the deficit in balance of payment in two ways that is directly due to inflow of foreign exchange and indirectly due to increase in export receipts.

The study suggest that in order to remove deficit in balance of payment and get rid of IMF, instead of foreign assistance government should focus on economic policies like attracting foreign direct investment by bringing betterment in law and order situation and attractive investment opportunities for foreigners.

References


Dickey, D. A. and Fuller, W. A. (1979) Distribution of Estimators for Time Series Regressions with a Unit Root,

Journal of the American Statistical Association 74, 427-431


Appendix. A. Unit Root test results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Augmented-Dicky Fuller Test</th>
<th>Phillips Perron Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>t-statistic (At level)</td>
<td>Probability</td>
</tr>
<tr>
<td>LEXP</td>
<td>-2.833048</td>
<td>0.1955</td>
</tr>
<tr>
<td>LTOT</td>
<td>-1.606945</td>
<td>0.7691</td>
</tr>
<tr>
<td>LGDP</td>
<td>-1.042354</td>
<td>0.9249</td>
</tr>
<tr>
<td>LFDIT</td>
<td>-5.423436</td>
<td>0.0004</td>
</tr>
</tbody>
</table>

@5% level of significance; the critical value for t-stat is (1) At Level = -3.548490 (2) At first difference = -2.948404

Appendix. B. Long run equation coefficient equation

Dependent Variable: LEXPD, Non normalized long run ARDL equation

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficients</th>
<th>t-statistics</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-</td>
<td>-0.536597</td>
<td>0.5975</td>
</tr>
<tr>
<td>LEXP_{t-1}</td>
<td>0.839420</td>
<td>4.470446</td>
<td>0.0002</td>
</tr>
<tr>
<td>LEXP_{t-3}</td>
<td>0.417162</td>
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<td>0.0006</td>
</tr>
<tr>
<td>LFDI_{t-2}</td>
<td>-</td>
<td>2.048613</td>
<td>0.0499</td>
</tr>
<tr>
<td>LFDI_{t-3}</td>
<td>0.387040</td>
<td>-4.009872</td>
<td>0.0007</td>
</tr>
<tr>
<td>LGDP_{t-3}</td>
<td>0.058298</td>
<td>7.340525</td>
<td>0.0000</td>
</tr>
<tr>
<td>LTOT</td>
<td>-</td>
<td>-4.426146</td>
<td>0.0003</td>
</tr>
<tr>
<td>LTOT_{t-3}</td>
<td>0.107348</td>
<td>-1.887577</td>
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</tr>
<tr>
<td>MA(3)</td>
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<td>0.0000</td>
</tr>
<tr>
<td></td>
<td>0.534944</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.218639</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.898964</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

R^2 = 0.994522  F-stat = 453.8760  DW = 2.058455  Log likelihood = 49.79952
AIC = -2.813760  Prob = 0.000000  RSS = 0.054747

Appendix .C
C.1 Diagnostic checking results

<table>
<thead>
<tr>
<th>TEST</th>
<th>PROBABALITY</th>
</tr>
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<tbody>
<tr>
<td>Ramsy’s functional form</td>
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<tr>
<td>Normality</td>
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<tr>
<td>Serial correlation LM TEST</td>
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</tr>
<tr>
<td>ARCH TEST</td>
<td>0.2714</td>
</tr>
<tr>
<td>Heterosedacity</td>
<td>0.7754</td>
</tr>
</tbody>
</table>
C.2 Recursive residuals

C.3 Cusum test

C.4 Cusum square test
C.5 Recursive coefficients test