

# Foreign direct investment, trade openness and economic growth in pakistan and turkey: an investigation using bounds test

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**Abstract** In the literature empirical evidences regarding export-led growth (ELG), FDI-led exports, and growth-driven exports (GDE) hypotheses have been mixed and inconclusive. This paper uses the autoregressive distributed lags (ARDL) model (Pesaran and Shin, *Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium*, 1990) and tests the existence of long run equilibrium relationship between the determinants of growth during the period 1975–2004 for Pakistan and Turkey. The results indicate that in the short run there is bi-directional causal relationship between trade openness and exports for Pakistan and FDI and exports relationship for Turkey. The long run relationship results support the growth-driven exports hypothesis for Turkey and openness-growth nexus in Pakistan.

**Keywords** Economic growth · Foreign direct investment · Autoregressive distributed lags model (ARDL) · Causality · Pakistan and Turkey

## 1 Introduction

Perhaps the main critical issue that mostly occupies the minds of policy makers is ‘how the economic growth of a country could be accelerated?’ In other words, what are the factors that affect economic performance of a country? The answer to this question remained uncertain. To some, it is the export-promoting strategy, others name FDI-friendly strategy as a main contributor to economic growth, and to others it is the extent of trade openness of a country that matters for economic growth. There appears no consensus among researchers in the literature on this issue. Their views remain mixed and inconclusive.

Quite a large number of economists broadly agree that FDI plays a major role in the development process of a country. They argue that FDI affects economic growth through various venues like, increasing capital formation, advanced technology and know-how, employment

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and possible spillovers effects on the local firms. Many studies tried to quantify its contribution to economic growth and came up with mixed results. For example [Borensztein et al. \(1998\)](#), [De Mello \(1999\)](#) and [Obwona \(2001\)](#), while exploring the relationship between FDI and economic growth confirmed the FDI-led growth hypothesis. But some studies like, [Zhang \(2001\)](#), [Balasubramanyam et al. \(1999\)](#) and [Woo \(1995\)](#), though, found FDI beneficial for economic growth but concluded that its benefits are not automatic rather are contingent upon certain characteristics of the host country.

The nature of association between exports and economic growth also remained widely debated among researchers in the recent past. Researchers remain divided on the question whether economic performance is export-led or growth driven? For example [Gkatak et al. \(1997\)](#) for Malaysia, [Dhawan and Biswal \(1999\)](#) for India supported the export-led growth (ELG) hypothesis. This hypothesis maintains that the economies exporting a major share of their outputs appear to grow faster than other. The growth of exports, in fact, is seen as a stimulating factor across the country and causes economic growth to increase as economy becomes open to international trade. There are, however, some studies that maintain that it is the growth of GDP that leads to corresponding expansion of trade. This growth-driven export (GDE) hypothesis is advocated by [Bhagwati \(1988\)](#), [Findlay \(1984\)](#), [Vernon \(1996\)](#) and [Segerstrom et al. \(1990\)](#). They base their assertion on neoclassical trade theory, which typically stresses the causality that runs from home-factor endowments and productivity to the supply of exports.<sup>1</sup>

There are several studies providing evidences about the positive effects of openness of a country on its economic growth and exports. For example, [Arslan and Wijnbergen \(1993\)](#), [Joshi and Little \(1996\)](#) and some other studies<sup>2</sup> have found that trade liberalization in developing countries caused improvements in their economic performance. The logic behind this outcome has been the exposition that trade liberalization reduces anti-export bias and makes exports more competitive in international markets. Some studies, however, showed some skepticism regarding the link between openness and export performance ([Greenaway and Sapsfor 1994](#); [Jenkins 1996](#); [Greenaway et al. 2002](#)).

In view of the above contradictory findings, it will be worthwhile to re-examine these hypotheses within the context of liberalized economic and trade policies adopted in Pakistan and Turkey. The governments of the both countries, since 1980s, have been widely adopting reforms in their respective economy with the objective to set a good pace of economic development. Until 1980 both countries were following import-substitution policies and import restrictions were quite high. Starting her trade liberalization during 1980s, Pakistan reduced tariff from 150 percent to zero percent until 1995, strengthened export incentive system and liberalized the import licensing system. Out of 5,464 goods, only 70 goods were listed on import restriction list. All export duties were removed with a few exceptions. Export regime was liberalized to do away with public sector monopolies to permit full private sector participation. Some studies quantified the annual gains to Pakistan from lowering of trade restriction from her major trading partners. The extent of these potential gains remained US\$ 538 million to US\$ 3.593 billion ([Ingco and Winter 1996](#)). Recently WTO expressed appreciation for the continued successful implementation of market-driven measures adopted by Pakistan to liberalize its trade and investment regime ([http://www.wto.org/english/tratop\\_e/tpr\\_e/tp187\\_e.htm](http://www.wto.org/english/tratop_e/tpr_e/tp187_e.htm)).

During late 1970s, Turkey, after observing some weakness of import-substitution strategy, embarrassed more outward-oriented economic policies in 1980s. These policies were initially

<sup>1</sup> See [Findlay \(1984\)](#) for detail discussion.

<sup>2</sup> See [Ahmed \(2002\)](#), [Bhagwati \(1978\)](#), [Michael et al. \(1991\)](#), [Krueger \(1997\)](#).

started with the liberalization of foreign trade regime and financial sector and culminated in liberalization of capital accounts during 1989. The liberalization process removed price controls and drastically reduced all government subsidies, reformed tax system, liberalized foreign trade, reduced tariffs and promoted exports. Export-led growth strategy, trade and financial liberalization and privatization efforts remained the defining features in recent periods. These reforms altered the incentive structure and made the private sector more dynamic and responsive ([Government of Turkey 2002](#)).

Against this background of changes in many policies of both these countries, this paper tries to re-investigate the relationship and the causality of major determinants of economic growth of Turkey and Pakistan over the period 1975–2000. The paper is outlined as follows. Next section outlines the research methodology and describes the data used in this study. Section 2 gives and discusses the results of unit root test, cointegration and causality; and in the final section summary and concluding remarks are presented.

## 2 Data and methodology

This paper uses annual time series data on foreign direct investment (FDI), gross domestic product (GDP), Export, and trade openness from 1975 to 2004. All variables are expressed in logarithm. These data are taken from international financial statistics ([IMF 2002 CD ROM](#)).

Literature, though, provides various measures of trade openness but there is no consensus on the clear definition of trade openness.<sup>3</sup> Many empirical studies have used variety of measures to examine the effects of trade openness on economic growth. Following [Harrison \(1996\)](#) we measure the trade openness as a ratio of total foreign trade (exports plus imports) to GDP as it is most often used in empirical studies. This measure of trade openness addresses the question of whether countries that engage in more foreign trade have superior economic performance to countries that trade less. This measure has the advantage of being both clearly defined and well measured and further serves our objective to see the relationship and causality among the variables.

The objective of this study is to find long run relationship and causality among FDI, Exports, GDP and trade openness. The long run cointegrating vector takes the following form:

$$\ln \text{GDP}_t = \beta_0 + \beta_1 \ln X_t + \beta_2 \ln \text{FDI}_t + \beta_3 \ln \text{OPEN}_t + \varepsilon_t \quad (1)$$

where GDP is gross domestic product, FDI is foreign direct investment,  $X$  is export, OPEN is trade openness,  $\ln$  is the natural logarithm and  $\varepsilon_t$  is random error term. Given the small sample size of our data (30 observations), we employed bounds testing approach ([Pesaran et al. 2001](#)) to investigate the existence of a long run relationship between the variables. Relative to other cointegration approaches such as [Engle and Granger \(1987\)](#) and [Johansen \(1988\)](#), this approach tests the existence of long run relationship irrespective of the fact the regressors are  $I(0)$ ,  $I(1)$  or mutually cointegrated. Further, the estimators of short-run and long-run parameters in this approach are consistent in small sample size ([Pesaran and Shin 1999](#)).

<sup>3</sup> See [Edwards \(1993\)](#) and [Rodriguez and Rodrik \(2001\)](#) for detailed review.

The ARDL approach to cointegration investigates the existence of the long run relationship using the following unrestricted error correction model:

$$\begin{aligned} \Delta \ln \text{GDP} = & \alpha_0 \text{GDP} + \sum_{i=1}^n b_{i \text{GDP}} \Delta \ln \text{GDP}_{t-i} + \sum_{i=1}^n c_{i \text{GDP}} \Delta \ln X_{t-i} \\ & + \sum_{i=1}^n d_{i \text{GDP}} \Delta \ln \text{FDI}_{t-i} + \sum_{i=1}^n e_{i \text{GDP}} \ln \text{OPEN}_{t-i} \\ & + \delta_{1 \text{GDP}} \ln \text{GDP}_{t-1} + \delta_{2 \text{GDP}} \ln X_{t-1} + \delta_{3 \text{GDP}} \ln \text{FDI}_{t-1} \\ & + \delta_{4 \text{GDP}} \ln \text{OPEN}_{t-1} + \varepsilon_{1t} \end{aligned} \tag{2}$$

where  $\Delta$  is the first difference operator,  $\ln \text{GDP}$  is the log of Gross domestic product,  $\ln X$  is the log of exports,  $\ln \text{FDI}$  is the log of FDI and  $\ln \text{OPEN}$  is the log of Trade openness. We used the F test to determine the long run relationship between these variables through testing the significance of the lagged levels of the variables. The null hypothesis in [Pesaran and Shin \(1999\)](#) test is the non-existence of long run equilibrium relationship (no cointegration) between the variables in Eq. 2, which can be denoted as;  $H_0 : \delta_{1 \text{GDP}} = \delta_{2 \text{GDP}} = \delta_{3 \text{GDP}} = \delta_{4 \text{GDP}} = 0$ , against the alternative hypothesis  $H_1 : \delta_{1 \text{GDP}} \neq \delta_{2 \text{GDP}} \neq \delta_{3 \text{GDP}} \neq \delta_{4 \text{GDP}} \neq 0$ . Similarly taking each of the explanatory variables as dependent variables, we also estimated other unrestricted error correction models and later tested the existence of long run equilibrium.

Since F-test has a non-standard distribution, we compare the computed F-statistic value with the critical values reported in [Pesaran et al. \(2001\)](#). These authors provide two sets (lower and upper bounds) of critical values. The lower critical values assumed that the explanatory variables included in the ARDL model are  $I(0)$ , while the upper bound critical values assumed that all variables are  $I(1)$ . Therefore, if the computed value of F-statistic is smaller than the lower bound value, the null hypothesis is not rejected; and if the computed F-statistic is greater than the upper bound value then the null hypothesis of no cointegration is rejected. If the computed value of F falls between the lower and upper bound values, then the decision is inconclusive.

After finding the existence of cointegration (long run relationship) among these series, the presence of Granger non-causality is rule out. Following [Engle and Granger \(1987\)](#) we estimate  $k$ th order VAR model which includes the error correction term ( $\text{ECT}_{t-1}$ ) to capture the long run relationship. In other words, standard causality tests augmented with error correction term are formulated as follow:

$$\begin{aligned} \Delta \ln \text{FDI}_t = & \alpha + \Phi_1 \text{ECT}_{t-1} + \sum_{i=1}^k \beta_i \Delta \ln \text{FDI}_{t-i} + \sum_{i=1}^k \chi_i \Delta \ln \text{GDP}_{t-1} \\ & + \sum_{i=1}^k \varphi_i \Delta \ln \text{EX}_{t-i} + \sum_{i=1}^k \eta_i \Delta \ln \text{OPEN}_{t-1} + \mu_{1t} \end{aligned} \tag{3}$$

$$\begin{aligned} \Delta \ln \text{GDP}_t = & \alpha + \Phi_2 \text{ECT}_{t-1} + \sum_{i=1}^k \beta_i \Delta \ln \text{GDP}_{t-i} + \sum_{i=1}^k \chi_i \Delta \ln \text{FDI}_{t-1} \\ & + \sum_{i=1}^k \varphi_i \Delta \ln \text{EX}_{t-i} + \sum_{i=1}^k \eta_i \Delta \ln \text{OPEN}_{t-1} + \mu_{1t} \end{aligned} \tag{4}$$

$$\Delta \ln X_t = \alpha + \Phi_3 ECT_{t-1} + \sum_{i=1}^k \beta_i \Delta \ln X_{t-i} + \sum_{i=1}^k \chi_i \Delta \ln GDP_{t-1} + \sum_{i=1}^k \varphi_i \Delta \ln FDI_{t-i} + \sum_{i=1}^k \eta_i \Delta \ln OPEN_{t-1} + \mu_{1t} \tag{5}$$

$$\Delta \ln OPEN_t = \alpha + \Phi_4 ECT_{t-1} + \sum_{i=1}^k \beta_i \Delta \ln OPEN_{t-i} + \sum_{i=1}^k \chi_i \Delta \ln GDP_{t-1} + \sum_{i=1}^k \varphi_i \Delta \ln EX_{t-i} + \sum_{i=1}^k \eta_i \Delta \ln FDI_{t-1} + \mu_{1t} \tag{6}$$

Here  $\mu_{1t}, \mu_{2t}, \mu_{3t}$  and  $\mu_{3t}$  are the white noise disturbance terms.  $ECT_{t-1}$  is the lagged error term obtained from the long run cointegrating relationship. Note that this error term is not included in the case the variables are not cointegrated. The optimal lag length  $k$  in Eqs. 3–6 is chosen through Schwarz Bayesian Criterion and Akaiik Information Criterion.

### 3 Results and discussion

Table 1 shows the results of unit root tests. Augmented Dickey-Fuller (Dickey and Fuller 1979) and Phillips-Perron (PP) unit root tests revealed that some series are stationary in levels,  $I(0)$ , and some are stationary after differencing once,  $I(1)$ . Based on these mixed results we decided to use bounds test approach, ARDL approach to cointegration, pioneered by Pesaran et al. (2001) as Johansen method would not be appropriate in such case.

Table 2 (panel B) provides the estimation results of Eq. 2 using ARDL approach to cointegration and (Panel A) shows critical values of F-statistics. These results show that the null hypothesis of the ‘nonexistence of long run relationship’ is rejected for GDP (Turkey), FDI (Pakistan), X (Turkey) and Open (both for Pakistan and Turkey) at the 1% significance level, as the computed value of F is greater than the upper critical value. However, the computed

**Table 1** Results of unit root test

Country	Variables	ADF				PP			
		Level		First difference		Level		First difference	
		No trend	Trend	No trend	Trend	No trend	Trend	No trend	Trend
Pakistan	Lnfdi	-1.30	-2.24	-2.72*	-3.27*	-1.09	-5.59***	-15.28***	-14.03***
	Lngdp	-2.57	-3.16	-3.10	-6.08***	-1.50	-1.51	-4.42***	-4.88***
	Lnx	-1.96	-0.08	-3.95***	-4.43***	-1.71	-2.55	-6.32***	-6.57***
	Lnopen	-2.40	-1.07	-4.50***	-4.29***	-3.36**	-2.54	-6.14***	-6.57***
Turkey	Lnfdi	-0.11	-2.21	-4.55***	-4.62***	-0.61	-4.02***	-11.04***	-10.68***
	Lngdp	-0.60	-3.34*	-3.70***	-3.66**	-0.92	-2.94	-6.45***	-6.38***
	Lnx	-1.31	-4.31***	-2.97**	-3.29*	0.02	-2.85	-6.63***	-6.58***
	Lnopen	-0.15	-3.31*	-4.45***	-4.46***	0.20	-2.41	-4.34***	-4.36***

\*\*\* \*\* \* Indicate respectively 10, 5 and 1% level of significance. Lag length is determined through AID criterion. Critical values for the ADF and PP unit root tests were obtained from Mackinnon (1999)

**Table 2** F-statistics for cointegration relationship (Panel A)

Critical value bounds of the F-statistics						
K=3	90% level		95% level		97.5% level	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
	2.72	3.77	3.23	4.35	3.69	4.89

The critical value bounds are taken from Table CI(iii) of [Pesaran et al. \(2001\)](#)

Computed F-Statistics (Panel B)

Dependent variables	F-statistics	
	Pakistan	Turkey
ln Gdp	3.98*	30.77***
ln Fdi	7.56***	3.28
ln X	2.89	24.28***
ln Open	6.53***	100.77***

\* and \*\*\* represent significance at 10 and 2.5% level

values of F for FDI (Turkey) and X (Pakistan) are less than the lower critical values and this implies that there is no long run relationship where these variables are used as dependent variables in respective country's equation.

Given the absence of long run relationship in FDI Eq. 3 for Turkey and in exports Eq. 5 for Pakistan, Granger causality tests for these cases are conducted without lagged error correction term (ECT<sub>-1</sub>). However, in the rest of equations, we constructed Granger causality tests with a lagged error term given that these variables are cointegrated. Long run and short run causality within the error correction mechanism (ECM) are derived respectively through (a) the significance of the lagged ECT (*t* test) and (b) the joint significance of lagged explanatory variables (Wald test F-statistic).

Table 3 presents the results of the causality tests. Beginning with the long run results, the coefficient on the lagged error correction term is statistically significant in the exports equation for Turkey at 5% level with correct sign. The coefficient of the error correction term is also significant in the growth and FDI equations for Pakistan. These long run results confirm the growth-driven exports hypothesis for Turkey and openness-growth nexus in Pakistan.

With regard to Turkish case, the positive influence of domestic output on exports shows that Turkish trade expansion is caused by its rapid economic growth. This outcome supports the neoclassical trade theory, which stresses the causality that runs from home-factor endowments and productivity to the supply of exports. In the case of Pakistan, the positive effect of trade openness on economic growth confirms the efficacy of the efforts of trade liberalization which resulted in to portray Pakistan as a more open and secure market for its trading partners.

Turning to the short run effects, trade openness and FDI appeared significant at the 1% level in the exports equations for both in Turkey and Pakistan. These results indicate a bi-directional causal relationship between trade openness and exports for Pakistan and FDI and exports for Turkey. The evidence of a short run influence of FDI on the dynamic behavior of exports in Turkey confirms the view that FDI-induced export hypothesis is also in place.

**Table 3** Results of Granger causality

Country	Dependent variables	Wald test F-statistics					Causality inference
		$\Delta \ln gdp$	$\Delta \ln fdi$	$\Delta \ln X$	$\Delta \ln open$	ECT <sub>-1</sub>	
Pakistan	$\Delta \ln gdp$		0.71 [0.59]	1.85 [0.18]	2.81 [0.07]*	-2.63 [0.02]**	open $\Rightarrow$ gdp
	$\Delta \ln fdi$	1.21 [0.33]		1.12 [0.36]	0.84 [0.48]	-2.78 [0.01]***	
	$\Delta \ln X$	3.42 [0.03]**	0.10 [0.97]		8.10 [0.001]***		gdp $\Rightarrow$ x open $\Rightarrow$ x
	$\Delta \ln open$	4.62 [0.01]***	0.39 [0.80]	7.23 [0.002]**		-1.18 [0.25]	gdp $\Rightarrow$ open x $\Rightarrow$ open
Turkey	$\Delta \ln gdp$		1.40 [0.28]	2.46 [0.09]	1.76 [0.19]	-3.78 [0.002]	
	$\Delta \ln fdi$	1.02 [0.40]		2.89 [0.05]**	2.32 [0.10]		x $\Rightarrow$ fdi
	$\Delta \ln X$	3.49 [0.04]**	4.69 [0.01]***		5.53 [0.008]***	-2.50 [0.02]**	gdp $\Rightarrow$ x fdi $\Rightarrow$ x open $\Rightarrow$ x
	$\Delta \ln open$	2.17 [0.13]	3.09 [0.05]**	0.33 [0.84]		1.02 [0.32]	fdi $\Rightarrow$ open

Values in square parenthesis are of p values

This outcome seems quite plausible due to the proximity of Turkey to Europe, Middle East and Asia, and more importantly, its well-established exports markets in these regions made her more attractive for foreign investors.

#### 4 Summary and conclusions

There has been much empirical research on the identification of causal relationship among the major determinants of economic growth. The findings of the literature for an association between the determinants of economic growth differ from one study to another. There appears to be no consensus among the researchers. Some studies identified the positive effects of outward-oriented policies in developing countries and some found empirical evidences for export-led growth hypothesis.

Using ARDL approach to cointegration on the annual data from 1975 to 2004, this paper mainly tries to ascertain whether or not exports-led growth hypothesis (ELGH) or growth-driven Exports hypothesis (GDEH) or both hold true for Pakistan and Turkey? The results show that in the long run openness-growth nexus holds true for Pakistan and growth-driven exports hypothesis receives empirical support for Turkey.

Granger-causality test results showed bi-directional association between exports and trade openness for Pakistan and between FDI and exports for Turkey. Exports and FDI appear to be complementary in Turkey. The liberalization process in Pakistan appeared to add positively to exports as the causality results support the effectiveness of trade openness in the short run. The adoption of a more liberal attitude to imports and foreign investments, Pakistan has not only fostered domestic competition through efficient allocation of

domestic resources but also enhanced the economy's productivity and local firms' export competitiveness.

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