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**Foreign Direct Investment and Growth:
An Empirical Investigation Based on Cross-Country Comparison**

by

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Abstract

This paper investigates empirically the impact of FDI on economic growth of Turkey and Pakistan over the period of 1975-2004. To analyse the causal relationship between FDI and economic growth, the Engle-Granger cointegration and Granger causality tests are used. It is found that these two variables are cointegrated for both countries studied. Our empirical findings suggest that it is GDP that causes FDI in the case of Pakistan, while there is strong evidence of a bi-directional causality between the two variables for Turkey.

Key words: Economic growth, foreign direct investment, Granger causality,

JEL Classification: O4, F21, C32

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I. INTRODUCTION

During the fluctuation of capital flows in the 1990s, foreign direct investment (FDI) was the main source of flows to developing countries. Unlike other capital flows, FDI is less volatile and does not show a pro-cyclical behaviour. It has therefore become the “favourite capital inflows” for developing countries. FDI increased rapidly during the late 1980s and the 1990s in almost every region of the world, revitalizing the long and contentious debate about the costs and benefits of FDI inflows. On one hand, many would argue that, given appropriate policies and a basic level of development, FDI can play a key role in the process of creating a better economic environment. On the other, potential drawbacks do exist, including a deterioration of the balance of payments as profits are repatriated and negative impacts on competition in national markets.

At present, the consensus view seems to be that there is a positive association between FDI inflows and growth provided receiving countries have reached a minimum level of educational, technological and/or infrastructure development. However, there is no universal agreement about the positive association between FDI inflows and economic growth. Research that focuses on data from only less developed countries (LDC's) has tended to find a clear positive relationship, while studies that have focused on data from only developed countries (DC's), have found no growth benefit for the recipient country.

As mentioned by Chowdhury and Mavrotas (2005), a large number of empirical studies on the role of FDI in host countries suggests that FDI: is an important source of capital, complements domestic private investment which is usually associated with new job opportunities; enhances both technology transfer and spillover and human capital (knowledge and skill) enhancement boosts overall economic growth in host countries³.

Concerning developing countries, macro-empirical work on the FDI-growth relationship has shown that—subject to a number of crucial factors, such as the trade regime, the human capital base in the host country, financial market regulations, banking system and the degree of openness in the economy—FDI has a positive impact on overall economic growth⁴.

³ See de Mello (1997, 1999) for a comprehensive survey of the nexus between FDI and growth as well as for further evidence on the FDI-growth relationship, Asiedu (2002), Chakrabarti (2001) and Tsai (1994) on the determinants of FDI, Blomstrom and Kokko (1998) for a critical review of the role of FDI in technology transfer.

⁴ See Balasubramanyam et al. (1996, 1999) and Borensztein et al. (1998), and Nair-Reichert and Weinhold (2001) for a critical assessment of the empirical literature. See Aitken and Harrison (1999) and Harrison (1994) regarding recent assessments for the micro studies at the firm level that examine the impact of FDI on growth in developing countries.

The rest of the paper is organized as follows: Section II describes the methodology employed and the sources of data collected. Section III reports the estimated results, and the last section is the conclusion.

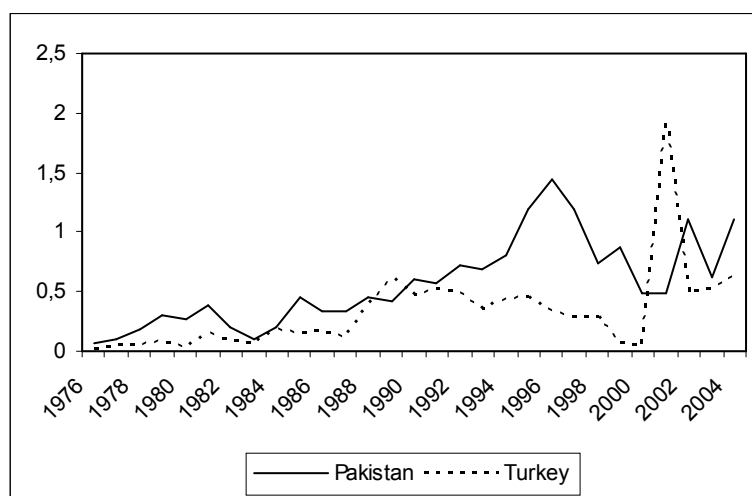
II. MODEL SPECIFICATION AND DATA

We use the following empirical model to investigate the impact of FDI on economic growth:

$$\text{GDP} = \alpha + \beta * \text{FDI} \quad (1)$$

The empirical analysis employs annual data on GDP and FDI for Turkey over the period of 1975-2004 and for Pakistan over the period of 1976-2004. The data for Turkey and Pakistan are obtained from the World Bank Development Indicators 2004 and WDI Online. Figure 1 shows the total amount of FDI as a percentage of GDP for these countries. All the variables considered in the model are expressed in natural logarithms.

Figure 1. FDI in Pakistan and Turkey (% of GDP)



III. EMPIRICAL RESULTS

In this section we analyze the time-series properties of the data. We have conducted the Augmented Dickey-Fuller (ADF) unit root test. These unit-root tests are performed on both levels and first differences of all variables.

Table I reports the results of non-stationary tests for FDI and GDP series for Turkey and Pakistan using Augmented Dickey-Fuller (ADF) test. We reported a constant but no time trend result of ADF tests. Test results indicate that the hypothesis of a unit root in FDI and GDP cannot be rejected as a level while the hypothesis of a unit root in FDI and GDP is

rejected as a first difference at least at the 5 percent level of confidence, indicating that all the variables in question are integrated of order one I(1).

Table I: ADF unit roots test results

	Level	AIC(lag)	First Difference	AIC(lag)
Turkey:				
FDI	-1,683	-0.350 (0)	-8.759 *	0.908 (0)
GDP	-0,593	-2.362 (0)	-5.569 *	-2.327 (0)
Pakistan:				
FDI	-2,184	-0.445 (0)	-5.067 *	-0.272 (0)
GDP	-1,704	-4.044 (0)	-4.114 *	-3.950 (0)

Note: * denote significantly at the 5% level.

Having established that all variables are integrated of the same order, we have conducted the Engle-Granger's (EG) residual-based ADF test. As the first step of the EG cointegration test, we estimated Equation (1) using the OLS method. The second step of the EG procedure is to check the stationarity of residuals by using the ADF test. Table II presents the results from Engle-Granger (EG) cointegration test. These results indicate that long-run equilibrium exists between GDP and FDI for Turkey and Pakistan since test statistics are above the 5 percent critical value.

Table II: Results for EG Cointegration Tests

Country	Model	ADF
Pakistan		
	$GDP = 7.434 + 0.384 * FDI$	-2,996 0*
Turkey		
	$GDP = 8.629 + 0.289 * FDI$	-4,202 0*

Notes: * denote significantly at the 5% level in ADF column.

If there exists a cointegration vector between GDP and FDI, there is causality among these variables at least in one direction. The Granger Test for causality is such a technique searching the direction of causality between the variables. There are four possible outcomes regarding causal relationships between GDP and FDI: uni-directional causality from GDP to FDI or vice versa; bi-directional causality between the two variables; and, finally, lack of any causal relationship.

Table III reports the causality test results for both Turkey and Pakistan. Lag length is selected by using the SC criterion. The probability values for F statistics are given on the right side of Table III. If these probability values are less than any α level, then the hypothesis would be rejected at that level. We found bi-directional causality between GDP and FDI for Turkey. On the other hand, we found uni-directional causality running from GDP to FDI for

Pakistan. The content of policy implications has been determined according to the direction of causality between these two variables.

Table III: Results for Granger Causality Tests

Null Hypothesis:	Lag	F-Statistic	Prob.	Result
Turkey:				
FDI does not Granger Cause GDP	1	8.05161	0.00870	FDI \Leftrightarrow GDP
GDP does not Granger Cause FDI		8.87343	0.00620	
Pakistan				
FDI does not Granger Cause GDP	1	0.05412	0.81793	GDP \Rightarrow FDI
GDP does not Granger Cause FDI		5.50660	0.02717	

IV. CONCLUSION

The paper examines the causal relationship between FDI and economic growth by using Engle-Granger cointegration and Granger causality tests for Turkey and Pakistan over the period 1975-2004. We found that it is GDP that causes FDI in the case of Pakistan, while for Turkey, there is a strong evidence of a bi-directional causality between the two variables.

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