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The Determinants of Foreign Direct Investment in Pakistan: an Empirical Investigation

ZAHIR SHAH and QAZI MASOOD AHMED

1. INTRODUCTION

The changing modes of international transactions and the cross-border mobilisation of factor resources, in pursuance of transnational production, constitute new dimensions for sustained economic growth. Foreign Direct Investment (an influential element of this process) is defined as the source of acquisition of managerial control by a business enterprise of a foreign country over a business activity in a host country [Graham (1982)].

The changing perceptions and more attractive policies of the host developing nations have changed the destinations of FDI flows from industrially developed countries to high growth developing centres. FDI stock held by developing countries has risen from $ 132.95 billion in 1980 to $ 1438.48 billion in 1999. Their share in inward stock has reached to 30.14 percent in 1999 as against 26.2 percent in 1980. FDI inflows during this period were raised from $ 4.42 billion to $ 208.0 billion, at an annual growth rate of 22.5 percent while GDP growth rate for that period was 3.9 percent.

FDI brings the most needed capital fund, advanced production technique, snobbish managerial skills, advertising and marketing expertise, global links and the controversial phenomenon of "transfer pricing".[1]

Pakistan, the world's 7th most populated country with 140 million people, a relatively high growth rate of GDP (averaging around 6 percent), with a significant stock of natural resources and a variety of investment provisions has remained unattractive for FDI inflows.

Zahir Shah is Assistant Professor, Government College of Commerce, Mansehra. Qazi Masood Ahmed is Associate Professor at the Institute of Business Administration, Karachi, and Technical Adviser at the Social Policy and Development Centre (SPDC), Karachi.

[1]The concept of "transfer pricing" is used to indicate a unique relationship between TNCs and their affiliates in other countries. It is the price set by a TNC for intra-firm exports and imports across national boundaries.

Foreign loans, grants and foreign private investment are the major external sources of funds to meet the obligations of external resource gaps and developmental goals in Pakistan. Table 1 shows a comparison of the three external sources and their inflows for the period 1960–61 to 1999-00.

Table 1

Inflow of External Resources to Pakistan

(US $ Million)

(1) Source/Year	(2) 1960-61	(3) 1970-71	(4) 1980-81	(5) 1990-91	(6) 1995-96	(7) 1999-00
Loans and Credits	306.6	777.5	755.3	2250.3	2477.3	540.8
Official Grants	154.3	157.7	233.2	325.6	203.6	124.6
Foreign Private Investment	17.63	92.85	36.6	277.72	514.85	456.00
FDI/Total Flows	1.05%	6.77%	6.96%	8.62%	34.48%	41.90%

Source: *Pakistan Economic Survey* and *SBP's Annual Report* (Various Issues).

Increasing external debt and declining share of official grants indicate that Pakistan will have to rely more on attracting private investment inflows to meet its future requirements of sustained economic growth and to retire external debt (Table 1).

Pakistan's interest in FDI is primarily on account of technological know-how, its transference and managerial skills that accompany such investment. During the second and third five-year plans it was supposed that foreign investment and skill related to it are more important for capital goods and other sophisticated industries.

This paper is organised in the following sequential order. Section 2 reviews the literature by including the theoretical and empirical findings from the past studies on FDI and its determinants. Section 3 elucidates the methodological framework keeping in view the investment environment in Pakistan and opportunities that are available to foreign investors. Section 4 explains the regression results in two steps. The regression results by OLS estimation and then the application of Co-Integration, using Johansen-Juselius technique. Finally Section 5 summarises the study's findings and recommends policy formulations.

2. REVIEW OF THE LITERATURE

The economic factors that determine Foreign Direct Investment can be grouped into two categories, (a) size of the market, the potential for growth and the absorption of output, and (b) the incentive mechanism of the host country and the cost of international production as compared to export and licensing. Most of the empirical work on FDI produced conclusive evidences, which support the positive relationship between FDI and market size (market size hypothesis). Proxies used for size, growth rate and absorption are Gross Domestic Product, Gross National Product, Per Capita GNP, GDP growth rate and exports from the home country. These reflect expected sales of the subsidiaries and their profitability [Scaperlanda

and Maues (1969); Goldberg (1972); Dunning (1973); Friedman, *et al.* (1992); Lucas (1993); Moore (1993); Rubio and Rivero (1994); Nishat and Aqeel (1998); Chang and Kwan (2000); Akhtar (2000); Ghura and Goodwin (2000)].

The investment incentive mechanism is conceived to be two-dimensional, attractiveness due to low costs of production (the taxation policy) and the future expectation of the investing firms. The cost factors consist of the cost of capital, relative wage rate, transportation costs and the fiscal incentives in the form of tax expenditure provisions offered by the host country. Empirical studies have found a significant negative relationship between FDI and the cost of capital in both developed and developing countries [Root and Ahmed (1979); Auerbach (1990); Lucas (1993); Rubio and Rivero (1994); Wang and Swain (1997); Khan (1997); Love and Hidalgo (2000)]. These studies have found positive relationship between FDI and fiscal incentives offered by host countries [Nishat and Anjum (1998)].

Future expectations of the investing firms are affected by the ability of the host country to serve external liabilities and the structure of the economy. Highly indebted countries with low level of foreign exchange resources are unable to attract FDI [Spitaller (1971) and Lucas (1993)]. Similarly an agrarian economy with small share of manufacturing sector has little attractiveness for FDI inflows. Conversely, an increasing share of industrial output in GDP is a positive sign of encouragement for inward FDI. Sectoral structure indicates the balance of payments position of the recipient country.

Social factors are significant and influential indicators reflecting the outlook of the host country. The availability of highly skilled and trained labour force and the extent of urbanisation are good signs for TNCs. Investment in human capital and an urbanised economy is treated to be an attractive destination for foreign firms [Root and Ahmed (1979); Nunnenkanp (1997); Borensztein (1998); Nishat and Anjum (1998); Ghura and Goodwin (2000)]. Most of these studies considered a high literacy rate and positive attitude of the host country's people a welcoming sign for foreign investing firms [Root and Ahmed (1979)].

Political factors reflect the consistency of the governmental policies that are closely related to stable political environment. Instable political environment along with frequent changes in the ruling regime indicate inconsistencies in governance and reflecting possible negative effects on business activities in the host country. Such uncertainties affect the performance and sustainability of governmental decisions and contracts. Most of the studies conclude that FDI flows to developing countries are more susceptible to political atmosphere, as these countries are perceived to be riskier for investment [Root and Ahmed (1979); Lucas (1993); Ferris, *et al.* (1995); Wang and Swain (1997) and Akhtar (2000)].

3. DEVELOPMENT OF THE THEORETICAL MODEL

The theoretical model developed in this research study is the same as developed by Ray (1977); Goldsbrough (1979); Rubio and Rivero (1994); Love and

Hidalgo (2000). For any monopolistic firm seeking production abroad, it is assumed that it first decides the level of production in a foreign market along with the production in the home market and then selects the appropriate combination of inputs for that level of production in the host country. The two choices are the minimisation of total cost at home and abroad and the efficient combination of inputs. These two choices are analysed in sub-sections below.

3.1. Production Abroad

The total cost (*TC*) of production at home and abroad for a transnational enterprise is formulated as;

$$TC = TC_h + TC_a \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (1)$$

Where *h* and *a* represent cost at home and abroad respectively,

The total cost function Equation (1) can be rearranged after introducing average cost *c* as;

$$TC = c_h\,(Q_h)\,Q_h + c_a\,(Q_a)\,Q_a \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (2)$$

where *Q* represent output at home and abroad. Under the presence of total demand constraint at home and abroad, $Q_h + Q_a = D$ the firm will minimise Equation (2). Lagrangean function for resolving the problem of constraint optimisation gives us partial derivatives in the form:

$$c'_h\,Q_h + c_h = c'_a\,Q_a + c_a \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (3)$$

These are known as the acceptable conditions for equalising marginal costs at the plants located at home and abroad. This implies the producer's decision to distribute his output between plants at home and abroad. Solving for decision to produce abroad and replacing $Q_h = D - Q_a$ from above, the equilibrium level of production abroad is given as:

$$Q_a = \delta(c'_h\,D) + \delta(c_h - c_a) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (4)$$

where $\delta = {}^{1}\!\!\diagup\!\!_{(c'_h - c'_a)}$ and is assumed to be positive.

This concludes that production abroad is positively related to demand and negatively related to the access of unit cost abroad over unit cost at home.

3.2. Combination of Inputs

Once decided to produce abroad in response to the foreign demand, the multinational firm will face the problem of combining inputs to be put in foreign production. To simplify the analyses, it is assumed that there are two factors of production, labour *L* and capital *K* and that the firm chooses the optimal factor

combination. Using the Cobb-Douglas production function a Multinational firm will minimise the total cost of its affiliate abroad given by:

$$TC_a = w_a L_a + u_a K_a \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (5)$$

Where *w* and *u* are the real wage rate and real user cost of capital abroad. It will take the form as:

$$Q = w_a L_a + u_a K_a + \lambda(Q_a - AL^{\alpha}K^{1-\alpha}) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (6)$$

The application of Lagrangean to Equation (6) and its differentiation with respect to L_a, K_a and λ gives us the first order conditions and then we obtained the familiar condition of equalising marginal costs of labour and capital given by:

$$(w_a L_a)/(\alpha Q_a) = (u_a K_a)/1-\alpha)Q_a \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (7)$$

The replacement of La from Equation (6) and solving Equation (7) for Ka gives:

$$K_a = [(\alpha/(1-\alpha))(w_a/u_a)]^{\alpha/\alpha+(1-\alpha)} Q_a{}^{\alpha+(1-\alpha)} \quad \ldots \quad \ldots \quad \ldots \quad (8)$$

While replacing Q_a from Equation (4) in Equation (8) we get the final expression:

$$K_a = [(\alpha/(1-\alpha))(w_a/u_a)]^{\alpha/\alpha+(1-\alpha)}[\delta(c_h' D) + \delta(c_h - c_a)]^{\alpha+(1-\alpha)} \quad \ldots \quad (9)$$

That is the desired stock of capital for a TNC's firm abroad. Expression Equation (9) implies that the desired stock of capital is positively related to demand in the host country, as greater demand signifies higher return for foreign investment, and is negatively related to the unit cost of capital in the host country relative to that of home country. However a strong substitution effect between labour and capital due to higher wage rate in the host country could result in a higher capital stock in that country. Further elaboration of the previous discussion and the past decisions of the MN firm regarding any change in the desired stock (FDI here) can be incorporated in a lagged function as given:

$$FDI_t = \psi K_t^* + (\delta - \psi)K_{t-1} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (10)$$

Where 't' is the time period, 'ψ' a distributed lag function and "δ" is the replacement cost of depreciation in the previous period. It is therefore concluded from the theoretical discussion that FDI flows depend upon the determinants derived from Equations (9) and (10) along with other economic and non-economic factors available in a developing country. An expression can be derived for inward FDI as a desired stock of capital by an affiliate of a TNC after considering the investment environment and the expected gains from establishing its subsidiary. This desired stock will take the form as:

$$K_f = \gamma \text{ [Demand, Costs, Tariff, Political and Social Environment]} \quad \ldots \quad (11)$$

The desired stock of foreign capital K_f would depend positively on demand factors, negatively on costs related elements, positively on trade barriers (Tariff) and favourable political and social conditions in the host country.

The last four expressions contribute significantly in the development of theoretical and empirical FDI model and are used in the forthcoming section for testing the hypothesis of this research study. The final regression model is based on the findings from the literature on the determinants of FDI flows.

3.3. Specification of Variables and Data Description

3.3.1. *Endogenous Variables*

The foreign direct investment (FDI) inflows in Pakistan are taken as the dependent variable. These are flows entering the balance of payments in terms of equity financing from abroad and have constituted at least 10 percent of the share (as specified by the World Bank) in a business activity. FDI includes purchases of fixed capital assets, import of capital equipments and foreign exchange for other business transactions. The present study examines the behaviour of FDI flows in the context of capital formation and its influencing capacity with regard to other determining factors, with special reference to taxation policy of Pakistan.

3.3.2. *Exogenous Variables*

Due to poor quality of data and other constraints, only those variables are selected as exogenous variables that can be quantified and are available from the published sources. Explanatory variables are classified into four categories namely: demand or market size factors, cost factors, political and social factors. Root and Ahmed (1979) have found 28 such explanatory variables affecting FDI in developing countries. Market size represents the absorption of output produced by a TNC in the host country and reflects the level of profits from sale. This is the total demand from the consumers of that country where the foreign firms are looking for investment. In the present study we incorporate per capita GNP in terms of US dollar and absolute change in GDP.

In order to test the cost hypothesis per unit cost of foreign capital in the develop areas is used as an explanatory variable of FDI in Pakistan [Shah and Ahmed (2003)]. This proxy has strong implications for investment firms and public institutions as it can be influenced by the fiscal incentives and public actions. Per unit cost of capital is computed by using the Jorgenson's (1963) model and adopted by Ahmed (1997) to incorporate in the regression analysis. It is preferred over discount rate and long-term bond yields as it reflects the real price paid for one unit of investment capital.

To test the effects of political environment dummy DM1 is used for democratic government versus military rule. It is argued that a democratic government is more acceptable to investing institutions and therefore value 1 is assigned to that period of democracy and 0 to military regime.

Tariff barriers indicate the host government's policy to protect home industry by restricting imports through tariff walls. FDI might be encouraged if it is found difficult to export and realised that there is more profitability by establishing its affiliate. It can be a source of reduction in transportation cost and marketing expenses and ultimately can avoid tariff restrictions. The proxy used for tariff rate is the effective import duty and is obtained by finding out the ratio of import duty to total value of imports in Pakistan. Majority of the past studies conclude that devaluation encourages FDI inflows and discourage outflows. By inclusion of the exchange rate variable we have tested this hypothesis.

Infrastructure, a source of reducing overhead production cost, has significant relationship with the investment opportunities. Most of the developing countries are emphasising more on the provision of infrastructural facilities as it provides access to market and production location opportunities. The public sector development programmes are allocating more funds for these provisions as these are considered as the pre-requisites of investment promotion. Expenditure on PSDP was used in this analysis but that made the results inconsistent and is replaced by expenditure on transport and communication (REXPTC). The variable is included in the final model and is converted into real values after adjusted for inflationary changes.

These functional equations are based on the theoretical formulation developed earlier in this section. The linear formulation of FDI function is given as:

$$RFDI_t = \beta_0 + \beta_1 CCFA = \beta_2 PCGNP + \beta_3 TARIFF + \beta_4 CRGDP + \beta_5 REXPTC + \beta_6 DM1 + u_t \quad \ldots \quad \ldots \quad (12)$$

u_t, is the stochastic error term capturing the left over effects. It is assumed as distributed independently and normally with zero mean and constant variance. Explanations of the variables are given in Appendix A.

Our hypotheses suggest that the size of the market and the expected growth potentials in output and its absorption might have positive effects on inward FDI. These hypotheses also indicate that the public sector's developmental expenditures, specifically in providing good infrastructure, can attract more FDI. Finally, a democratic and stable government seems to have the capacity to get the attention of transnational producers.

4. REGRESSION RESULTS AND COINTEGRATION

This empirical investigation on the determinants of Foreign Direct Investment (FDI) in Pakistan uses the Time-Series data for the period from 1960-61 to 1999-00.

First, Phillips-Parron (PP) tests are employed for unit roots to find out that the variables are concluded to be integrated of the same order then Johansen-Juselius (1990) test for cointegration is employed following by Error Correction Model (ECM) to find short-run relationship of the variables using standard methods and diagnostic tests.

Time-Series data has the property of non-stationarity in level and the resulted estimates usually involve 'spurious regression'. First unit root tests are performed for the stationarity in levels and in first differences of the variables. Results of the Phillips-Perron (PP) tests are presented in Table 2.

Table 2

PP Unit Root Test for Stationarity

(1) Variable	(2) Level/First Difference		(3) Without Trend	(4) With Trend	(5) Conclusion
RFDI	ADF(1)	Level	–0.8910	–2.4891	
		First Difference	–7.4543*	–7.3283*	I(1)
PCGNP	ADF(1)	Level	–0.8572	–2.7958	
		First Difference	–6.6249*	–6.9131*	I(1)
CCFA	ADF(1)	Level	–0.646	–0.8452	
		First Difference	–4.8893*	–5.3683*	I(1)
TARIFF	ADF(1)	Level	–0.6447	–2.706	
		First Difference	–5.3404*	–5.2284*	I(1)
CRGDP	ADF(1)	Level	–0.5795	–3.7244**	
		First Difference	–8.2323*	–8.1925*	I(0)
REXPTC	ADF(1)	Level	–0.2318	–2.1561	
		First Difference	–4.5147*	–4.4851*	I(1)
DM	ADF(1)	Level	–1.6282	–2.5319	
		First Difference	–5.5527*	–5.4559*	I(1)

Note: PP tests were performed using Eviews 3.0.

PP tests show the presence of unit roots in levels of all variables except for CRGDP at 5 percent level of critical values with trend. Therefore all of the remaining variables are non-stationary in levels at 95 percent critical values with and without trends. However, in first differences all of the variables are stationary at 95 percent critical values including CRGDP. This conclusion suggests that we cannot reject the null hypothesis that these variables are all non-stationary in levels. But all of them are stationary series in first differences.

4.1. Regression Results

The estimated regression results of the FDI model in three different forms are given in Table 3 necessary diagnostic tests for the best model. The dependent

Table 3

Regression Results for FDI Inflows

(1) Variable	(2) Model I	(3) Model II	(4) Model III
Independent Variables		Dependent Variable	
	RFDI	RFDI	RFDI
Constant	3650.22	2402.47	2547.328
	(2.5726)	(1.6595)	(1.7542)
PCGNP	14.52	11.74	7.06
	(4.7156)	(3.7847)	(2.8249)*
CCFA	–36789.12	–32994.15	–26268.59
	(–5.4734)	(–4.9662)	(–4.9074)*
TARIFF	13469.42	15098.83	11444.83
	(4.3916)	(4.8878)	(3.9259)*
CRGDP	0.0307	0.0385	0.0278
	(2.0281)	(2.5243)	(1.7482)***
REXPTC	0.1621	0.2001	0.2666
	(1.9106)	(2.3604)	(3.0934)*
DM1	930.46	925.55	1084.25
	(2.4903)	(2.4411)	(3.0230)*
Adjusted R^2	0.6651	0.6964	0.7376
D.W.	1.587	1.765	1.9769
LM χ^2 (1)			29.9212
RESET			1.0217
JB NORM χ^2 (2)			0.9845
White's HET χ^2 (1)			21.9837
BG χ^2 (1)			0.009338
ARCH χ^2 (1)			0.6707

Notes: (*), (**) and (***) present significance at 1 percent, 5 percent, and 10 percent level respectively. The diagnostic test statistics show no evidence of misspecification, (LM, RESET), no serial correlation (BG, ARCH), "nor" any problem of heteroscedasticity (HET) and no problem of non-normality in residuals (NORM) in Model III.

variable in each of the model of Table 3 is RFDI, a measure of overall FDI flows in Pakistan in real terms. The time period of the analysis is 1960-61 to 1999-00. Diagnostic tests clear model III from all evidences of misspecification, serial correlation, heteroscedasticity, problem of functional form and non-normality (column 4).

The diagnostic test statistics show no evidence of misspecification, (LM, RESET), no serial correlation (BG, ARCH), "nor" any problem of heteroscedasticity (HET) and no problem of non-normality in residuals (NORM) in Model III.

Using the OLS technique, estimators are all significant at 5 percent level of significance (Table 3, last column). CCFA, the cost of capital co-efficient has the

highest *t*-ratio with the expected negative sign and is significant even at the 1 percent level of significance. This suggests that our hypothesis of the cost is proved effectively and is quite valid for the inclusion of the cost of capital factor as explanatory variable in determining FDI flows in Pakistan. This result is consistent with that obtained by Rubio and Rivero (1994).

TARIFF and REXPTC have also the expected signs and are significant at 1 percent level of significance, which confirms the hypothesis of trade policy and infrastructural provisions by the public sector. This suggests that the governmental role in Pakistan, in infrastructural provision has positive effects on inward FDI and an increase in Tariff encourage more investment to produce locally so as to avoid tariff barriers. REXPTC is lagging by two years, which suggests that the investor's response may come after a longer period as these projects are taking time to be completed.

The market size hypothesis works efficiently according to the previous studies. The co-efficient is highly significant and has the positive sign and suggests that an increase in per capita income leads to more investment in the country. However the growth hypothesis is significant only at 10 percent level with the expected positive sign. The possible explanation for this might be the reason that the share of manufacturing remained small in GDP and most of the FDI related activities are concerned with manufacturing sector for its consistency and technological reasons.

Finally, the political dummy is also highly significant and is positive as was hypothesised. It indicates that a democratic regime is more likely to attract FDI, as the investors considered it the most favourable for their corporate goals.

4.2. Johansen Co-integration Test

For the application of co-integration we can verify the results by proceeding with the Johansen and Juselius (JJ) (1990) co-integration test. For this purpose we use Eviews 3.0 to get the results for Likelihood Ratios. As before, first we find that all of the variables are stationary in first difference and we can proceed for co-integration. These results are presented in Table 4.

Before the cointegration tests, we determine the appropriate lag length (k). Using Haffer and Janson (1991) procedure, Eviews 3.0 gives us the specification of our model with k=2, the optimum lag length. At this lag length the restrictions are strongly rejected at 5 percent against the value of 7.8147 from the chi-square table. Hence the model is specified with k=2.

Likelihood ratio (LR) tests indicate 3 cointegrating equation at 5 percent level of significance in each case. Our null hypothesis of no co-integration, i.e., Ho: r = 0 as against the alternative Ha: r = 1, for maximum eigen value test is rejected even at 1 percent level of significance and suggests that the variables are co-integrated. The trace test also indicates 3 cointegrating equations at 5 percent significance level. The

Table 4

Johansen Test for Co-integration

(1) Ho:	(2) Ha:	(3) Test Statistic	(4) 95% Critical Value
	Maximum Eigen Value Test		
r=0	r=1	77.117*	45.28
r=1	r=2	58.707*	37.37
r=2	r=3	34.807*	33.46
r=3	r=4	19.951	27.07
r=4	r=5	12.991	20.97
r=5	r=6	9.713	14.07
r=6	r=7	3.726	3.76
	Trace Test		
r=0	r≥ 1	214.056*	124.24
r=1	r≥ 2	136.935*	94.15
r=2	r≥ 3	78.211*	68.52
r=3	r≥ 4	46.395	47.21
r=4	r≥ 5	26.438	29.68
r=5	r≥ 6	13.444	15.41
r=6	r≥ 7	3.728	3.76

Notes: LR tests were performed using Eviews 3.0.
(*) Denotes rejection of the hypothesis at 5 percent significance level.

null hypothesis is rejected up to r = 2 but it could not reject r =3. Consequently we can conclude that there are three co-integrating relationships among the variables, specified in the model. Eigen values show the relative importance of the linear combination of the variables.

Table 4a shows the normalised coefficients of the explanatory variables on RFDI from the Johansen cointegration test. All of the signs are as were expected and the variables are normalised on RFDI equal to 1. Significance of the variables confirms their validity in the model and suggests that there is a long-run stable relationship between RFDI and exogenous variables.

All of the variables are highly significant even at 1 percent and validating their presence in the model. (CRGDP is significant at 5 percent and hence proved its validity in the model).

Table 4a

Normalised Coefficients of Johansen Test on RFDI

(1) Variables	(2) Coefficients	(3) Standard Errors
TARIFF	–19302.7*	–1525.74
PCGNP	–6.70292*	–1.77203
REXPTC	–0.61165*	–0.09664
CRGDP	–0.01859**	–0.01267
DM1	–610.301*	–191.915
CCFA	36405.69*	–2693.71
C	–2748.92	–505.246

Note: (*) and (**) represent significance at 1 percent and 5 percent critical values.

4.3. Estimation of an Error Correction Model (ECM)

After establishing the cointegration relationship an Error Correction Model (ECM) can be established to determine the short-run dynamics of the regression model. Following Handry's approach known as "top-down" or "general to specific" we include different lags from top to low, of the explanatory variables and error correction term EC(–1). Then we gradually eliminate the insignificant variables. The following ECM is found to be the most appropriate and fits the data best

$$\Delta RFDI = \beta_0 + \beta_1 \Delta TARIFF + \beta_2 \Delta PCGNP + \beta_3 \Delta CCFA + \beta_4 DM_{96} + \beta_5 EC_{(-1)} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (13)$$

All of the variables are stationary in first differences except the dummy, DM96, used for capturing the effects of a drastic increase in FDI flows during the year 1995-96 (FDI flows cross the limit of one billion US dollar during that fiscal year).

Results of the ECM are presented in Table 5. These results suggest that out of six explanatory variables in the actual model only two are establishing short-term relationship with the FDI flows. Both of these variables are significant at 5 percent level of significance, thus showing their effects on FDI in the short run. The signs are correct even for all of the variables that are dropped from the ECM for their insignificance.

Table 5

Error Correction Model Estimates

	Dependent Variable D(RFDI)	
(1)	(2)	(3)
Explanatory Variables	Coefficient	t-ratios
EC(–1)	–0.5403*	–5.7693
TARIFF	6316.050*	3.5400
PCGNP	4.8611**	2.0339
CCFA	–5140.830#	–1.0791
DM96	3616.3160*	6.8796
C	–31.8205	–0.3950
Adjusted R^2	0.7865	
D.W.	2.0265	
LM $\chi^2(1)$	17.6202	
RESET	6.9368	
NORM $\chi^2(2)$	1.2308	
HETRO $\chi^2(1)$	8.1022	
ARCH $\chi^2(1)$	0.6725	

*Note*s: (*), (**) and (***) present significance at 1 percent, 5 percent and 10 percent level respectively. The diagnostic test statistics show no evidence of misspecification, (LM, RESET), no serial correlation (BG, ARCH), "nor" any problem of heteroscedasticity (HET) and no problem of non-normality in residuals (NORM) in EC Model. # Indicating insignificance at 10 percent.

This proves that in the short run PCGNP, TARIFF and DM96 have emerged significant variables while others do not prove their existence in the short run. The coefficient of the cost of capital (CCFA) is insignificant in the ECM but is still contributing in determining FDI flows. Its *t* value greater than 1 with the expected negative sign support the idea of its influential power on incoming FDI flows in Pakistan.

Dummy used for the year 1996 (as D=1 for that year and 0 otherwise) is highly significant (with $t = 6.88$) capturing the effect of that significant volume of FDI flows in Pakistan for 1995-96. These investments were mainly attracted by the utility sector particularly in the power generation projects after offering lucrative incentives by the government. The error correction co-efficient estimated at (–0.5403) with ($t = –5.77$) is highly significant even at 1 percent level of significance and with the correct sign. It suggests a high speed of convergence to equilibrium if there appears a disequilibrating shock. The diagnostic test statistics show no evidences of misspecification, serial correlation, any problem of heteroscedasticity and non-normality in the residuals.

5. CONCLUSION AND POLICY IMPLICATIONS

About 63,500 TNCs with 690,000 foreign affiliates [UNTAD (1999)], mostly from the developed dynamic centres, are enhancing international production under

their common governance corresponding to technological change, competition and worldwide economic liberalisation. Following an overview of the worldwide influx of cross-border investment and international production, this paper empirically attempted to investigate the determinants of Foreign Direct Investment in Pakistan.

There are hardly few studies on the determinants of FDI inflows with reference to Pakistan. These are mainly concerned with the available business environment and its impact on the FDI flows. In contrast this study is more relevant to the public policies and their impacts on the inward FDI flows in Pakistan. Using a wider range of time series data (1960-61 to 1999-00), in testing the hypotheses empirically, we used the co-integration technique advanced by Johansen and Juselius (1990).

After considering the real economic fundamentals that are related to FDI regime and the investigated determining forces provide us an opportunity to conclude and formulate some specific policy implications. These implications might be valuable for policy-makers and researchers.

- The emergence of globalisation and a consistently growing environment for international competition in resource utilisation is growing persistently. Changing perceptions, attitudes and competitive outlook does change the restrictive and protectionist policy stance in favour of liberalised and outward looking policies. There is no exception for Pakistan to keep itself apart of this internationalisation process. Instead the size, resources and perceptions are advocating for fruitful and fast growing investment opportunities.
- Resource gap, declining official inflows and technological advancement can only be achieved by reducing public burden and by the encouragement of private business activities in the country. FDI is a potential source of filling this multidimensional gap.
- The statistical results found the selected variables highly significant in the long run with the expected signs (Johansen-Juselius Test). In computing the cost of capital we employed the Jorgenson's investment model advanced by Ahmed (1997); Shah and Ahmed (2002). This computation considers all the provisions and liabilities that are related to foreign investment in Pakistan. Empirical results suggest that the presumed hypotheses are fully complying with the outcomes. Highly significant co-efficients for cost of capital, tariff and expenditure on transport and communication are signalling for greater public sector role in attracting FDI in Pakistan.
- Econometric results are obtained after careful considerations for the problems related to model selection and other time series complications. All diagnostic test statistics were performed to get appropriate estimators.
- The model works effectively in the long run as being proved by Johansen and Juselius (1990) tests for cointegration. Likelihood ratio (LR) tests

indicate 3 co-integrating equation at 5 percent level of significance. Our null hypothesis of no co-integration, i.e., Ho: r = 0 as against the alternative Ha: r = 1, for maximum eigen value test is rejected even at 1 percent level of significance and suggests that the variables are co-integrated. However the short-term dynamics have conflicting results and most of the explanatory variables show insignificant effect in this period. Even then signs of all variables are found as were expected.

- The regression results confirmed that an increasing size of the market has positive effects on inward FDI flows in Pakistan. Hence the authorities should positively concentrate on increasing per capita GNP by utilising maximum capacities of the economy. A highly significant co-efficient of the cost of capital, tariff and infrastructure suggests an effective role of the government (particularly, in providing fiscal provisions) in promoting investment in the country. There is further need of the effective and encouraging policies from the public sector to restore the confidence of the investors including a stable political environment.
- Adjusted R^2 for the best model explained ¾ variations in FDI and suggests that these factors should be given proper treatment by the policy-makers.

It is expected that the empirical results from this research paper and the influence of the hypothesised deterministic factors may have produced deeper understanding about FDI related activities for policy-makers and researchers. An in-depth treatment of the concluded outcomes and policy formulations might have opened new ideas of exploring FDI regime and its effectiveness for the achievement of developmental goals.

APPENDIX 1A

DESCRIPTION OF VARIABLES AND SOURCES OF DATA

RFDI = Real FDI annual flows in Pakistan

Source: Annual Reports of the State Bank of Pakistan for FDI and Economic Survey for import unit price indices. It is also mentioned here that figures for FDI, for the period from 1965 to 1971 are obtained from the overall private foreign investment flows and adjusted for FDI after considering that ¾ of these flows are consist of FDI (Foreign Liabilities and Assets and Foreign Investment in Pakistan, SBP).

CCFA = Cost of capital for foreign firms computed from the available data on Income tax rate, Depreciation allowance and the Rate of interest.

Source: Taxation Structure of Pakistan (Ministry of Finance, GOP) and Taxman for the period from 1993 to 2000. For interest rates Statistical Bulletin (SBP).

PCGNP = Per capita Gross National Product in terms of US Dollar.

Source: Pakistan Economic Survey (Various Issues).

CRGDP = Change in real GDP.

Source: Pakistan Economic Survey for figures on GDP and GDP deflator, 1980-81 as the base year.

TARIFF = Incidence of import duty (a proxy for tariff rate).
Source: Central Board of Revenue (CBR) Year Book (various issues).

REXPTC = Real expenditures on transport and communication by the public sector.
Source: Pakistan Economic Survey (nominal expenditures are deflated by consumer price index, 1980-81 as the base year).

DM1 = Dummy variable taking value 1 if there is democratic government and 0 otherwise.

REFERENCES

Ahmed, Qazi Masood (1997) The Influence of Tax Expenditures on Non-residential Investment. Unpublished PhD Dissertation, University of Bath, UK.

Akhtar, Muhammad Hanif (2000) The Determinants of FDI in Pakistan: An Econometric Analysis: *The Lahore Journal of Economics* 5:1.

Auerbach, Alan (1990) The Cost of Capital and Investment in Developing Countries. The World Bank. (PRE Working Papers No. 410.)

Borensztein, E., J. De Gregorio, and J. W. Lee (1998) How Does FDI Affect Economic Growth? *Journal of International Economics* 45:1.

Cheng, Leonard K., and Y. K. Kwan (2000) What are the Determinants of the Location of FDI? The Chinese Experience. *Journal of International Economics* 51:2.

Dunning, John H. (1973) The Determinants of International Prediction. *Oxford Economic Papers* 25:3.

Ferris, Stephen P., G. Rodney Thompson, and Clain Valsan (1995) Foreign Direct Investment in Latin America: An Application to Guyana. *International Journal of Developing Banking* 13:2.

Friedman, Josef Daniel, A. Gerlowshi, and Johnathan Silberman (1992) What Attracts Foreign MNCs? Evidence from Branch Plant Location in the United States. *Regional Science* 32:4.

Ghura, Dhaneshwar, and Barry Goodwin (2000) Determinants of Private Investment; A Cross-regional Empirical Investigation. *Applied Economics* 32:6.

Graham, Edward M. (1982) *FDI: In Douglas G. Encyclopedia of Economics*. McGrahill Book Co.

Goldberg, Murray A. (1972) The Determinants of US Direct Investment in the EEC: Comments. *The American Economics Review* 62:4.

Goldsbrough, David J. (1979) The Role of FDI in the External Adjustment Process. *IMF Staff Papers* 26:1.

Haffer, R. W., and Dennis W. Jansen (1991) The Demand for Money in the United States: Evidence from Cointegration Tests. *Journal of Money, Credit and Banking* 23:2.

Johansen, Soren, and Katrina Juselius (1990) Maximum Likelihood Estimation and Inference on Cointegration—With Application to the Demand for Money: *Oxford Bulletin of Economics and Statistics* 52:2.

Jorgenson, Dale W. (1963) Capital Theory and Investment Behaviour. *The American Economic Review* 53:2.

Khan, Ashfaq H. (1997) FDI in Pakistan: Policies and Trends. *The Pakistan Development Review* 36:4, 959–985.

Love, James H., and Francisco Lage-Hidalgo (2000) Analysing the Determinants of US Direct Investment in Maxico. *Applied Economics* 32:10.

Lucas, Robert E. B. (1993) On the Determinants of DFI: Evidence from East and Southeast Asia. *World Development* 21:3.

Moore, M. O. (1993) Determinants of German Manufacturing Direct Investment 1980-1988. *Weltwrtschaftliches Archive* 129:1.

Nishat, Muhammad, and Aqeel Anjum (1998) The Empirical Determinants of Direct Foreign Investment. *Savings and Development* 22:4.

Nunnenkanp, Peter (1997) FDI in Latin America in Era of Globalised Production. *Transnational Corporations* 6:1. Manufacturing Journal.

Pakistan, Government of (Various Issues) *Economic Survey Report*. Islamabad.

Ray, Edward John (1977) Foreign Direct Investment in Manufacturing. *Journal of Political Economy* 85:2.

Root, Franklin R., and Ahmed A. Ahmed (1979) Empirical Determinants of DFI in Developing Countries. *Economic Development and Cultural Change* 27:4.

Rubio, Oscar Bajo, and Simon Sosvilla-Rivero (1994) An Econometric Analysis of FDI in Spain 1964-89. *Southern Economic Journal* 61:1.

Scaperlanda, A., and L. Mauer (1969) The Determinants of US Direct Investment in the EEC. *The American Economics Review* 59:4.

Shah, and Ahmed (2002) Measurement of the Cost of Capital for Foreign Direct Investment: A Neo-classical Approach. *The Pakistan Development Review* 41:4.

Spitaller, Eric (1971) *IMF Staff Papers* 18:1.

State Bank of Pkistan (Various Issues) *Annual Reports*. Karachi: State Bank of Pakistan

UNCTAD (1999) *World Investment Report.*

Wang, Shen Quan, and Swain Nigel (1997) Determinants of Inflow of FDI in Hungary and China: Time Series Approach. *Journal of International Development* 9:5.

World Bank (Various Issues) *World Development Indicators*. Washington, D. C.