# Exports and FDI in Developing Countries: Substitutes or Compliments?

Muhammad Tariq Majeed and Eatzaz Ahmad*

**Abstract**

This study analyzes the relationship between FDI and Exports, as well their common determinants in developing countries of the world using panel data of 49 countries for the period 1970-2004. Following panel data model, we apply fixed effects model to clearly identify the factors affecting FDI and exports in developing countries.

The analysis shows that GDP, economic growth, domestic absorption and exports positively affect FDI, a result consistent with market seeking behavior of multinational corporations. On the other hand external debt and BOP deficit have negative effects on FDI. The effect of domestic investment in explaining FDI flow is negative. This is so because an increase in domestic investment leaves little room for FDI. The effect of taxes is negative and insignificant. The negative relationship implies that lack of fiscal incentives is a hurdle for FDI. However if overall investment climate is sound then MNEs overlook it.

It is also found that depreciation of real exchange and industrialization and development of communication facilities significantly promote exports. Empirical evidences indicate that the effect of increased FDI has been found significantly positive, whereas, in the reverse direction, the positive impact from increased exports on FDI is confirmed at lower levels of significance. Thus, there is no evidence of a substitution relationship of FDI and exports so far.

***JEL Classification:*** *F21*

***Keywords:*** *Investment, Foreign Investment, Exports and FDI.*

## I. Introduction

Multinational enterprises (MNEs) generate the global flows of foreign direct investment but they are also extremely important for global trade flows. UNCTAD (2004) estimates that MNEs account for around two-thirds of world exports. Since MNEs are responsible for a large proportion of world trade, one may inference that there is a close relationship between flows of FDI and trade. An MNE network, consisting of a parent and affiliates, generates simultaneous flows of goods and investments. There is an increasing body of knowledge and associated models, which explain international trade, but there is less theoretical consensus about the relationship between trade flows and FDI. The fact that exporting and local production are alternative ways for an MNE to serve the demand in a foreign market suggests a substituary relationship between FDI and trade. MNE production in the host country implies that local production is a substitute for exports from the home country. On the other hand, MNE affiliate production in a host country can generate a demand for intermediate goods from the parent, resulting in a complementary relationship between flows of FDI and trade (exports). Theoretical reasoning therefore supports both a complementary and a substituary relationship between FDI and trade, providing a strong incentive for empirical analysis.

A multinational can serve the foreign demand in two ways, either it can export its product or it can create productive capacity via foreign direct investment. The advantage of FDI is that it allows lower marginal cost than exports. The disadvantage is that FDI is irreversible and, hence, entails the risk of creating under-utilized capacity in case the market turns out to be smaller than

*The authors are Lecturers in Economics and Professor of Economics, Quaid-i-Azam University, Islamabad, respectively.

expected. The presence of demand uncertainty and irreversibility gives rise to an interior solution, whereby the multinational does– under certain conditions – both exports and FDI.

As most developing countries experience a shortage of capital, this is reflected in their respective savings-investment and import-export gaps, which implies that developing countries have insufficient savings and/or foreign exchange to finance their investment needs. To bridge this gap they need an inflow of foreign capital and exports growth. FDI is an important source of capital for growth in developing countries. In the 1960s and 1970s many countries maintained a rather cautions and sometimes an outright negative, position with respect to foreign investment. In the 1980s, however, the attitudes shifted radically towards a more welcoming policy stance. This change was mainly due to economic problems facing the developing world. While FDI is surging, other forms of capital flows to developing countries are diminishing. Aid has continuously declined as a share of capital inflows since the 1960s. Commercial loans, a major source of capital flows in the 1970s has virtually disappeared since the debt crisis of the 1980s.

In earlier literature the determinants of FDI were described theoretically without giving empirical results [for example Lall (1978)]. Latter on, the studies based on empirical analysis have increasingly appeared in the literature. These studies differ from the earlier studies on the basis of theory. First the pure economic theory, that of international trade and the theory of firm were adopted as the theoretical base for empirical study of FDI determinants. These theories assume the presence of perfect competition and identical production function and attribute FDI flows to difference in the interest rates across countries. But it hardly explains the large volume of FDI flows across countries.1

Recent theories as a base for FDI, and in particular of MNCs (multinational corporations) growth, have turned to the explanations based on market imperfections, oligoplistic interdependence and the possession of the monopolistic advantage. It is assumed that for FDI to take place a necessary condition is that the investing firms have some monopolistic advantages, not possessed by local competitors.

Given the important role that they have played in rapid expansion of countries most notably in East Asia during the 1970s (see, e.g., Nayyar 1978 and Dunning in 1993), (MNEs) multinational enterprises are increasingly seen as capable of helping their host countries in promoting their manufacturing exports. The country experiences with respect to the role of MNEs in export promotion, however, vary a great deal (see Kumar and Siddartahan 1997 for recent review). That is because MNEs are highly selective about the location of export-platform, export-oriented or offshore production.

In a survey article, Mello (1997) discuss the latest development in literature on the determinants of FDI and impact of inward FDI on growth in developing countries. The study argues that policy regime of the host countries is a potentially important FDI determinant. The recent literature has provided policy makers in developing countries with more adequate tools and more accurate benchmarks for cross-country comparisons and policy evaluation.

The study further argues that the foreign investors are motivated primarily by international rent seeking under standard profit maximizing assumptions. The most important factors explaining the gush of FDI inflows into the developing countries in recent years have been the foreign acquisition of domestic firms in the process of privatization, the globalization of production, and increased economic and financial integration.

[1]The FDI flows to developing countries increased manifold, rising from us $ 33.7 billion in 1990 to $ 172.9 billion in 1997[Government of Pakistan (2000-2001)].

Mello (1997) also present a brief summary of the case studies such as O, Sullivan (1993), Bajorubio and Sovilla-Rivero (1994), Wang and Swain (1995), Milner and Pentecost (1996), and Lee and Mansfield (1996), which specify inflation, exchange rate, domestic expenditures, and net trade ratio as important determinants of FDI.

Wang and Swain (1995) point out that most literature published in both the West and East on the determinants FDI and joint ventures (jvs) in Eastern Europe and China is of rather general nature and is based on the author's own experience and news paper clippings. These "quick – shut" studies are not very useful for the purpose of building up a good research base. They, therefore, design to shed light on these issues by exploring and analyzing the factors that explain foreign capital inflow into Hungry and China during the period 1978-92. More specifically, they test the relative importance of independent variables, including market size, cost of capital, labor costs, tariff barriers, exchange rates, import volumes and economic growth in OECD countries as well as political stability, within the framework of a one-equation model.[2] Time series data between 1978 and 1992 for Hungary and China were fitted into one-equation models and were estimated by ordinary least squares (OLS) regression. Estimates suggest that the size of host country market plays a positive role, while the cost of capital variable and political instability are negatively correlated with investment inflows. These results support the hypotheses that low-cost labor and currency depreciation are important factors in explaining how much capital inflow in to particular country. There is little evidence to support classical hypotheses concerning tariff barriers and import variables. The OECD growth rates show significant positive correlation with FDI in Hungry.

Funke and Holly (1992) argue that the majority of the previous approaches have emphasized demand factors. Such models have generally been rather unsuccessful in explaining long run trends in export performance.[3] The study takes into account both supply side and demand side factors and applies the model to the West German manufacturing sector using quarterly data over the period 1961.1 to 1987.4. The findings of the study suggest that supply side factors are much more important for explaining export performance than demand side factors.

Togan (1993) investigates the changes in the structure of export incentives in Turkey from 1983 to 1990. The export incentives are export credits, tax rebate scheme, premium from the "Support and Price Stabilization Fund", duty free imports of intermediates and raw materials, and exemption from the value added tax, foreign exchange allocations, exemption from the corporate income tax and other subsidies. The study finds that during the 1980s the level of the economy-wide subsidy rates and that of inter-industry dispersion of incentives has substantially been lowered. The study also finds that the Turkish export- and import-competing industries have benefited from the export incentives more than the other sectors.

In a comprehensive study Riedel, Hall and Grawe (1984) investigate quantitatively the determinants of export performance in India on the basis of time-series analysis over the period 1968-1978. The study analyzes the effects of relative price of exports, relative domestic demand and domestic profitability on export performance. The dependent variable used is the ratio of

[2] Except the cost of capital and the average growth rates in home countries, most of these independent variables could be found in Agrawal's (1980) article. Many empirically studies (for example, Petrochilos1989; Huang1992) have supported Jorgenson's (1963) hypotheses that FDI is determined by cost of capital. Other suggests that faster growth of the home countries has played a role in promoting FDI in host countries (Jeon1992). A variable OECD growth rate is, therefor, applied to test whether economic prosperity in the major FDI home countries helps directly or indirectly parent firms to get bigger and accumulate assets for both licensing and FDI in both Hungary and China.

[3] See the debate between Landesman and Snell (1989) and Holly and Wade (1991), for example.

indexes of constant price exports to industrial production. Exports are expressed as a ratio to output in order to account for the effect of expansion of production capacity. The results support the view that domestic market conditions strongly influence export behavior. The variable measuring domestic profitability or relatively domestic demand is found to be statistically significant in explaining export behavior in 23 of 30 sectors. Relative price, incorporating export policy incentives and the exchange rate turn out to be statistically significant in only 10 of the 30 sectors. However, relative prices tended to be significant in those sectors where comparative advantage is presumed to be strongest, for example, ready-made garments, carpet weaving, handicrafts and metal products. The study has the loophole of using short period. It requires a long period for better estimates.

A more recent study of Sharma (2001) investigates exports determinant in India using annual data for 1970-98. The study uses simultaneous equation framework. The results of study suggest that demand for Indian exports increase when its export price falls in relation to world prices. Furthermore, the real appreciation of the rupee adversely effects Indian exports. Exports supply is positively related to the domestic relative price of exports and higher domestic demand reduces export supply. Foreign investors appear to have statistically no significant impact on export performance, although the coefficient of FDI has a positive sign.

Hoekman and Djankov (1998) analyze the magnitude of change in the export structure in Central and Eastern European countries. The study investigates the relative importance of processing (subcontracting) trade, imports of input, and FDI as determinants of the countries' export performance in European Union markets. The findings of the study suggest that in most countries export of intermediate goods and machinery drive the changes in export structure. Local enterprises apparently exploit the opportunity to acquire foreign inputs and know-how in order to improve production quality, thereby expanding their export market share in the European Union.

The study observes that FDI has been concentrated in the sectors where the Central and Eastern European countries do not have a revealed comparative advantage (that is, they are not relatively specialized in terms of their export share in Eastern Union markets). Of the five countries for which data are available, Poland is the only one with a significant positive association between FDI and exports structure. The negative relationship for the other countries implies that FDI could be a force for change. Foreign investors must perceive the industries concerned to be viable in the median term, and over time this FDI may lead to greater changes in the countries' export composition. Thus FDI complements efforts by domestic industries to restructure and upgrade production facilities.

It appears from the above review that studies on FDI determinants are mostly based on host country characteristics that play important role in determining FDI inflows. While studies on export determinants are mostly based on country specific factors as export expansion schemes, subsidies, etc. There is hardly any study that conducted panel data estimation on export determinants and FDI determinants with specific emphasis on the relationship of both for a large number of developing countries.

The objective of the study is to find out common determinants of exports and FDI. The study also explores the relationship between exports and FDI whether both are substitutes or compliments. The rest of the discussion is organized as follows: section II explains the model and framework of analysis: section III introduces the data set and estimation procedure. Section IV puts forward the main findings from empirical analysis. Section V presents a summary results which some policy implications.

## II. Methodology.

In this chapter, we formulate a framework of analysis to determine the effects of various factors on FDI and exports in developing countries, which we have taken in our sample. The underlying objective is to explain the rational behind foreign direct investment and exports. It is generally believed that MNCs invest in those countries where they expect higher rates of return on their investments. There are many economic and non-economic factors, which determine the profits of firms on foreign direct investment. The economic factors include macro-economic indicators of performance problems like external debt, high rates of inflation, trade and investment policies of the government and physical infrastructure. The non-economic factors are political instability, bureaucratic bottlenecks and law and order situation of the country. The model, which we have developed, takes into account those factors, which play an important role in the determination of FDI and exports in the developing countries. Specified equation for FDI inflow is as follow.

$FDI = f\ (EX_{it}\ GDP_{it}\ GROW_{it}\ DA_{it}\ EXCH_{it}\ BOP_{it}\ ED_{it}\ SAV_{it}\ DI_{it}\ CRED_{it}\ GC_{it}\ OD_{it}\ IT_{it,}\ TV_{it}\ TP_{it}\ UP_{it}\ FDI_{it-1})$

where the subscript i (=1,…n) represents country and t (= 1,…T) the period of time (years). The variables appearing in the equation are defined as follows.

*EX* = Exports as a percentage of GDP,
*FDI* = Foreign Direct Investment as a percentage of GDP,
*GDP* = *G*ross domestic production in constant prices of 1989,
*GROW* = Annual percentage of growth rate of GDP in percentage,
*DA* = Domestic absorption is equal to GDP plus trade deficit,
*EXCH* = Real exchange rate. It is obtained by multiplying the nominal exchange rate with US CPI and then divided by domestic CPI,
*BOP* = Balance of payments as a percentage of GDP,
*ED* = External debt as a percentage of GDP,
*SAV* = National savings as a percentage of GDP,
*DI* = Domestic investment as a percentage of GDP,
*CRED* = Credit facilities to domestic sector as a percentage of GDP,
*GC* = General government consumption expenditures as a percentage of GDP,
*OD* = Official development assistance as a percentage of GDP,
*IT* = Indirect taxes as a percentage of GDP,
*TV* = Number of televisions per 1000 persons,
*TP* = Number of telephones per 1000 persons,
*UP* = Urban population as a percentage of total population,
*FDI (-1)* = Foreign Direct Investment as a percentage of GDP in the previous year,

**Justification of FDI determinants**

In empirical literature a number of economic, social & incentive variables have been used that determine FDI & exports. Our study incorporate the following variables:

***Market size***

The market size hypotheses argue that inward FDI is a function of the size of the host country market, usually measured by GDP. We take gross domestic product as a proxy for market size. High demand, prospects for economies of scale, good economic health and absorptive capacity are the factors that give green signal to foreign investors. Combined effect of such factors can be captured by market size. Large market size is expected to have a positive

impact on FDI. The positive impact is also justified in literature by Reuber (1973), Schneider and Fry (1985), Wheeler and Mody (1992), and Zhang and Markusen (1999).

***Growth of GDP***

Market size exhibits existing demand in an economy while growth represents the future potential. A high level of economic growth is a strong indication of market opportunities. The growth of the host market is deemed to be significant for expansionary direct investment (Clegg and Scott-Green, 1998). Growth is also important because of higher rates of economic growth are usually associated with an increase of the profitability of corporations (Gold, 1989). There exists relatively little support in the existing literature for this determination of FDI as compared to market size variable (Goldberg, 1972; Scaperlanda and Balough, 1983; Culem,_1988 and Clegg1995).

***Domestic Absorption***

Higher the domestic absorption higher will be the inflow of FDI [De Mello (1999)]. We measure the domestic absorption as a sum of GDP and trade deficit. Since GDP is already present among the determinants of FDI, any variations in domestic absorption that are not explained by GDP, must be explained by trade deficit. In other words keeping GDP constant, changes in trade deficit translate one to one into changes in domestic absorption. Hence we expect the positive impact of this variable.

***Exchange Rate:***

Exchange rate affects FDI in several ways. Froot and Stein (1991) have discussed the relative wealth effect of exchange rates. A rise in the exchange rate in terms of host country currency over the home country currency implies a depreciation of the host country currency. A real depreciation of the host country currency favors home country purchases of host country assets and therefore leads to an increase in inward FDI in the host country. Gushman (1985, 1987) and Culem (1988) emphasize the effect of exchange rate changes on relative labor cost. A real depreciation of the host country currency allows home country investors to hire more labor for a given amount of the home country currency, and therefore is associated with an increase in inward FDI in the host country. The study of Klein and Rssengren (1994) supports the significance of the relative wealth effect and fails to support the relative labor cost effect.

***Balance of Payment Deficit:***

It is measured by current account balance. The expected sign of the coefficient of BOP is negative, because it indicates that larger deficit in accounts mean a country is living beyond its means and foreign investors feel the danger of restrictions on free capital movement and the profit of the firms will be difficult to transfer (Schneider and Frey (1985).

***External Debt Burden:***

It shows the external imbalances. Higher debt burden creates constraints not only in terms of new private lending but also in terms of FDI flows (Nunnenicamp (1991)). Hence it is expected to discourage FDI and the coefficient on external debt could be negative.

***Savings:***

Feldstein and Horioka (1980) proposed that there should be no relationship between domestic saving and domestic investment. Saving in each country responds to the worldwide opportunities for investment while investment in that country is financed by the worldwide pool of capital. Conversely, if international savings tend to be invested in the country of origin, differences among countries in investment rates should correspond closely to saving rates. This relationship between domestic savings domestic investment is an indirect approach to test the degree of capital mobility. We expect favorable effect of savings on FDI.

***Domestic Investment:***

It may be a substitute or a complement for FDI it depends upon the investment climate of the host country and the types of FDI. However, the literature shows the mixed results. When domestic investment increases marginal productivity of investment decreases, if marginal productivity of FDI will also decrease then relationship will be substitute. This may happen when domestic investment dominates in production sector. On the contrary, if marginal productivity of FDI increases then relationship will be compliment. This may happen when domestic investment dominates in infrastructure. Further if domestic investors and foreign investors compete for joint ventures then this relationship will be substitute (see, for example, Buffie (1993)).

***Credit Facilities***

Credit facilities create investment climate for domestic investors. Better credit facilities mean more domestic investment. In this situation there will be little room for foreign investors. So we expect the negative influence of this variable on FDI.

***Government Consumption***

Government consumption leads to higher level of fiscal deficit that in turn generate macroeconomic instability and poor credit position of an economy. Rise in government consumption also leads to higher rate of interest, which crowds out investment including foreign investment. Hence we expect adverse effect of this variable on FDI.

***Official Development Assistance***

Official development assistance expenditures are the indicator of development activities. Such expenditures favorably determine infrastructure and also indicate the good terms with international institutes that buildup the confidence of foreign investors. So foreign investors like to come in these countries. Luger and Shetty (1985) have presented suggestive evidence issue.[4]

***Indirect Taxes:***

It is expected to have negative effect on FDI because high taxes increase the cost of production that is a disincentive for foreign investors [Coughlin, Terza and Arromdee (1991)]. However, in empirical literature the effect of this variable is controversial.[5]

***Urbanization:***

The extent of urbanization is a social variable, which is expected to have positive impact on FDI as proposed by Root and Ahmad (1979). Urban demand for manufacturing is higher than rural. Moreover, if a country covers a vast area under urbanization, the production environment for MNCs would be better. However urbanization also creates overcrowding, crime, and burden existing facilities, hence its negative influence on FDI is also expected.

**Determinants of Export**

Export promotion strategies have a great deal in trade liberalization regime. On one hand, as developing countries are facing twin deficits, namely, fiscal deficit and trade deficit. On the other hand, external debt crises create further financial problems. In such sorry state of financial crises, the sole inflow of FDI is not sufficient. But the expansion of export sector for the improvement of financial disturbance also needs to be addressed. In this respect, we identify various determinants of exports. Export growth is basically determined by external factors, for this we employ two variables FDI and real exchange rate. However, exports are also effected by domestic factors. In this respect we incorporate GDP, GDP growth rate, indirect taxes,

[4] See for more detail Luger and Shetty (1985)

[5]Evidence of conflicting results is plentiful. For example, Carlton (1983) concludes that taxes did not have major effects on the location of new plants. However, Bartik (1985) finds that taxes deter the location decisions of MNCs.

communication facilities, savings, industrialization, labor force and official development assistance. Specified equation for export promotion is as follow:

$EX_{it} = f(FDI_{it}, GDP_{it}, SAV_{it}, IT_{it}, EXCHit, TV_{it}, TP_{it}, VAD_{it})$

where the subscript i (=1,…n) represents country and t (= 1,…T) the period of time (years). The variables appearing in the equation are defined as follows.

*EX* = Exports as a percentage of GDP,
*FDI* = Foreign Direct Investment as a percentage of GDP,
*GDP* = *G*ross domestic production in constant prices of 1989,
*SAV* = National savings as a percentage of GDP,
*IT* = Indirect taxes as a percentage of GDP,
*EXCH* = Real exchange rate. It is obtained by multiplying the nominal exchange rate with US CPI and then divided by domestic CPI,
*Vad* = Industry value added as a percentage of GDP,
*TV* = Number of televisions per 1000 persons,
*TP* = Number of telephones per 1000 persons,

**Justification of Exports Determinants**

***Production level***

It is the supply side determinant of exports (see Bertil, 1968). The higher level of production is the main cause of export expansion, because surplus of output can be exhausted in international markets. In a close economy surplus of production leads to fall in prices, which, in turn, creates pessimism among producers. In an open economy such surpluses create foreign reserves by exporting production. So we expect the positive impact of GDP on exports growth. In empirical literature Kumar (1998) confirms the positive impact of GDP on exports.

***Real Exchange Rate***

A fall in the relative domestic prices due to exchange rate depreciation makes exports cheaper in international markets resulting in increased demand for exports, therefore we expect the positive impact of real exchange rate on export growth.

***Communication Facilities***

In this era, when time is shrinking, the importance of communication facilities has become more important. For the measurement of communication facilities we employ two variables, namely, the number of television sets and the number of telephones sets in use. These two variables have also been justified in empirical literature [Kumar (1998)]. Expansion of such facilities has favorable effect for exploration and excess to the world markets. Hence we expect the positive impact of provision of such facilities.

***Indirect Taxes***

The effect of this variable is expected to be adverse on production decisions. But we cannot rule out the possibility of positive effect on exports due to fiscal incentives by government. Specifically, if government provides tax exemptions for the expansion of exports sector, higher rate of indirect taxes can have the negative effect on domestic demand resulting in exportable surplus.

***Savings***

Generally, in developing countries the proportion of savings used for non-productive factors, for example purchasing of jewelry, property, etc. is larger. Therefore higher savings result is large volume of goods made available for exports. So we expect positive impact of this variable on exports.

***Industrialization***

The agricultural output is subjected to uncertainty, particularly because of operation of nature's vagaries. Accordingly, now a day, just on the basis of agricultural output no country has greater incomes and outputs. On the other hand, it is the industrialization that results in maximum utilization of natural and human resources of the country and industrial output is more or less stable. Thus industrialization will provide greater stimulus to output and national income of the country. Industrialization also promotes agriculture sector and agriculture uplifts the industrial sector. The industrial development will have the effect of developing the allied and related sectors.

The situation of persistent deficit in balance of payments is attributed to concentration in agriculture exports, falling prices of exports, the imports restrictions by rich countries and the increasing import bill due to increased demand for oil and manufactured products, etc. Through industrialization a country can enhance industrial production; replace the agriculture exports by the industrial exports, which command reasonable and stable prices in the world markets. Moreover, industrialization reduces dependence on imports by initiating the process of import substitution. Keeping in view all such arguments, we conclude that industrialization has favorable effect on exports.

***Foreign Direct Investment***

In empirical literature the role of FDI in exports promotion is controversial. Many studies (e.g. Pfaffermayr, 1996) find positive effect of FDI on exports. The main reason underlying is the export oriented MNCs. Since government provides facilities for export promotion, such facilities also attract foreign investors. In order to promote exports government can adopt FDI-led export growth strategies with twin objectives of capturing the benefits of both FDI inflow and exports growth. On the other hand, many studies find insignificant or weak impact of FDI on exports [see Hoekman and Djankov (1997), Majeed and Ahmad (2006)]. Such studies point out that the role of FDI in export promotion in developing countries remains controversial and depends crucially on the motive for such investment. If the motive behind FDI is to capture domestic market (tariff-jumping type investment), it may not contribute to export growth. On the other hand, if the motive is top tap exports markets by taking advantage of the country's comparative advantage, then FDI may contributes to export growth.

**III. Data and Estimation Procedure.**

The data for this study have been taken from *World Development Indicators (WDI) 2005*. Originally a sample of 155 countries was selected but after screening process 49 countries were chosen for which data on most of the variables were available for at least 15 years. All the variables are measured in US dollar at constant prices.

We now discuss estimation procedure for our model. The use of pooled time-series and cross-section data provide large sample that is expected to yield efficient parameter estimates. Since political, structural and institutional characteristics vary from country to country, imposing a single relationship to all units is likely to suppress information. In order to overcome this problem we will use the approach of uniform shifts. The econometric literature suggests two approaches for uniform shifts [Green (1993), Kmenta (1986) and Maddla (1977)] the fixed effects and random effects model. In the present study we will follow fixed effects model.

**Simultaneous equations for fixed effects models**

$$FDI_{it} = \alpha_i + \beta X_{it} + \varepsilon_{it}$$

$$EXP_{it} = \delta_i + \theta Z_{it} + \varepsilon_{it}$$

Where $\alpha_i$ is country specific fixed effects. In this form $X_{ti}$ is vectors. By applying OLS with dummies is called fixed effects model.

Here we are using simultaneous estimation technique because in the first equation $X_{ti}$ includes $EXP_{ti}$ as independent variable and in the second equation $Z_{ti}$ contain $FDI_{ti}$ as independent variable. As we can see there will be simultaneous equation bias problem. In this situation OLS will give inconsistent estimates. To avoid this problem 3SLS is the best technique of estimation.[6]

## IV. Empirical Results and Interpretation.

In this chapter we report the empirical results based on pooled data for 49 developing countries over the period 1970 to 2004. The panel data model is estimated by allowing the deterministic shifts across the countries. Since the model uses panel data, it is likely to suffer from autocorrelation as well as hetroskedasticity. Both are removed by applying appropriate econometric techniques.

**Table 1a: Parameter Estimates of the Fixed Effects Model**

| **Exports as a Dependent Variable** | | **FDI as a Dependent Variable** | | | |
|---|---|---|---|---|---|
| **Variables** | **Fixed effects** | **Variables** | **Fixed effects** | **Variables** | **Fixed effects** |
| **FDI** | 0.011<br>(1.873)* | **EXP** | .002<br>(1.64)** | **DI** | -0.052<br>(-1.274) |
| **GDP** | 2.17E-18<br>(2.486)* | **GDP** | 2.21E-18<br>(2.296)* | **SAV** | 0.034<br>(1.083) |
| **EXCH** | 1.56E-06<br>(1.122) | **GROW** | 0.017<br>(2.545)* | **OD** | 0.022<br>(0.361) |
| **SAV** | 0.080<br>(1.747)* | **AB** | 0.071<br>(1.6308)** | **EXCH** | -3.49E-08<br>(-0.060) |
| **IT** | 0.325<br>(4.853)* | **BOP** | -0.064<br>(-1.998)* | **UP** | 0.0007<br>(1.853)* |
| **VAD** | 0.007<br>(9.082)* | **ED** | -0.0007<br>(-3.134)* | **TP** | 0.0003<br>(3.921)* |
| **TP** | 0.0001<br>(0.894) | **IT** | -0.072<br>(-1.168) | **TV** | 5.68E-05<br>(1.166) |
| **TV** | 0.0004<br>(3.688)* | **CR** | 0.075<br>(1.065) | **FDI (-1)** | 0.002<br>(3.854)* |
| | | **GC** | 0.075<br>(1.069) | | |
| **$R^2$** | .84 | | | | .88 |
| **Adj. $R^2$** | .82 | | | | .85 |
| **D W** | 1.63 | | | | 1.92 |

Note: The numbers in parentheses are the computed t-values. The statistics significant at 5 % level are indicated by *.

**Table 1b: Country Specific Intercepts of the Fixed Effects Model**

| **Countries** | **Fixed Effects** | **Countries** | **Fixed Effects** | **Countries** | **Fixed Effects** | **Countries** | **Fixed Effects** |
|---|---|---|---|---|---|---|---|
| Argentina | -0.382<br>-(6.865)* | Argentina | -0.039<br>(-0.318) | Sri Lanka | 0.056<br>(2.535)* | Sri Lanka | 0.026<br>(1.260) |
| Benin | 0.107<br>(2.5)* | Benin | 0.033<br>(1.845)* | Lesotho | -0.203<br>(-5.381)* | Lesotho | -0.032<br>(-0.735) |
| Burkina Faso | -0.081<br>(-2.412)* | Burkina Faso | 0.005<br>(0.275) | Madagascar | 0.031<br>(1.003) | Madagascar | 0.015<br>(1.660)** |

[6] For detail, see Green, W. H. (1993)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Brazil | -0.342 (-12.863)* | Brazil | 0.040 (0.640) | Mexico | -0.131 (-6.036)* | Mexico | 0.050 (1.172) |
| Botswana | 0.092 (2.336)* | Botswana | 0.065 (1.665)** | Mauritius | 0.213 (9.953)* | Mauritius | 0.031 (0.839) |
| Chile | -0.101 (-4.084)* | Chile | 0.073 (1.716)** | Malaysia | 0.220 (7.623)* | Malaysia | 0.091 (2.482)* |
| Cote d'Ivoire | 0.148 (6.946)* | Cote d'Ivoire | 0.047 (3.492)* | Niger | 0.044 (1.612) | Niger | 0.021 (1.433) |
| Cameroon | -0.023 (-0.821) | Cameroon | 0.043 (2.713)* | Nigeria | -0.005 (-0.194) | Nigeria | 0.076 (4.301)* |
| Colombia | -0.147 (-7.118)* | Colombia | 0.047 (1.137) | Nicaragua | 0.061 (1.945)* | Nicaragua | 0.041 (1.712)** |
| Costa Rica | 0.032 (1.542) | Costa Rica | 0.037 (2.917)* | Pakistan | -0.089 (-4.389)* | Pakistan | 0.028 (2.148)* |
| Dominican Republic | -0.012 (-0.537) | Dominican Republic | 0.046 (2.308)* | Peru | -0.208 (-8.913)* | Peru | 0.047 (1.054) |
| Algeria | -0.201 (-6.441)* | Algeria | 0.045 (1.879)** | Philippines | -0.028 (-1.223) | Philippine s | 0.047 (3.636)* |
| Ecuador | -0.084 (-3.613)* | Ecuador | 0.047 (2.571)* | Papua New Guinea | 0.155 (4.972)* | Papua New Guin | 0.074 (1.623)** |
| Egypt, Arab Rep. | -0.066 (-2.972)* | Egypt, Arab Rep. | 0.054 (3.725)* | Paraguay | 0.044 (2.096)* | Paraguay | 0.045 (3.450)* |
| Fiji | 0.282 (8.678)* | Fiji | 0.062 (1.713)** | Senegal | 0.120 (4.783)* | Senegal | 0.035 (2.910)* |
| Gabon | 0.066 (1.657)** | Gabon | 0.075 (3.699)* | El Salvador | -0.105 (-3.225)* | El Salvador | 0.011 (0.577) |
| Ghana | -0.015 (-0.573) | Ghana | 0.026 (1.938)* | Swaziland | 0.364 (13.217)* | Swaziland | 0.078 (1.009) |
| Gambia, The | 0.347 (9.522)* | Gambia, The | 0.045 (1.090) | Thailand | -0.049 (-1.839)* | Thailand | 0.035 (2.447)* |
| Guatemala | -0.027 (-1.348) | Guatemala | 0.034 (2.447)* | Togo | 0.233 (9.399)* | Togo | 0.047 (1.202) |
| Honduras | 0.065 (3.325)* | Honduras | 0.041 (3.751)* | Trinidad and Tobago | -0.082 (-2.145)* | Trinidad & Tobago | 0.072 (3.833)* |
| Indonesia | -0.094 (3.371)* | Indonesia | 0.048 (3.812)* | Tunisia | 0.077 (3.419)* | Tunisia | 0.063 (4.122)* |
| Jamaica | 0.097 (3.824)* | Jamaica | 0.046 (1.968)** | Turkey | -0.252 (-4.016)* | Turkey | .001 (2.58)* |
| Jordan | 0.144 (7.281)* | Jordan | 0.046 (2.385)* | Venezuela, RB | -0.142 (-5.403)* | Venezuela , RB | .034 (1.46) |
| Kenya | 0.089 (3.469)* | Kenya | 0.031 (1.833)** | Zimbabwe | 0.016 (0.492) | Zimbabwe | .033 (1.20) |
| Korea, Rep. | -0.152 (-5.085)* | Korea, Rep. | 0.001 (0.034) | | | | |

The main findings of the study are as follows. The variable GDP, which is a suitable proxy for market size, turned out to be significant. The effect of growth rate is also significant. The variable growth is much important because higher rates of economic growth are usually associated with an increase in the profitability of MNCs. The variables external debt and BOP have negative impact for FDI flow. The increasing debt burdens and persistent deficit in BOP mean a country is suffering financial crises. Further more debt service charges create financial disturbance. Such situation reflects that government will less spend on development activities and increase debt burden and import duties that create negative effect for foreign investors.

The affect of domestic investment is insignificant possessing negative sign. This is so because an increase in domestic investment leaves little room for FDI. The effect of domestic investment on FDI varies across the countries. It is positive in some countries as Asian countries. Although we found domestic investment as a substitute for FDI, but it may be compliment if we further change our sample size. The impact of communication facilities is also turned out to be significant with positive signs in explaining FDI flow and export growth. Such facilities are helpful in exploring and access to new markets.

The effect of GDP is significant with positive signs in explaining export. Higher the production level of a country is the main source of exports. The effect of FDI is significant and positively associated. This is in lines with the success stories of Asian countries that FDI led export growth. The effect of real exchange rate on export growth rate is insignificant with positive sign. The benefits of depreciation in currency are not fruitful across the countries, depending upon their domestic structure of economies. This is why our results find week positive relationship.

The industrial output more or less is stable. The prices of manufacturing goods are stable in the world markets. Our results suggest positive significant effect of industrialization on export growth. The effect of savings is also significant. It facilitates investment tendencies that determine exports. It is not necessary that investment take place in export sector. But it is generally observed that trade sector is providing more investment opportunities due to trade liberalization at domestic and international level.

FDI led export growth because most of MNCs are export oriented. These firms use developing countries as export platform. Further export sector is facilitated by various fiscal incentives. Such advantages of export promotion policy are exhausted by MNCs. Empirical literature has a great deal in this regard.[7]

On the other hand export growth attracts foreign investors. Export growth is an indicator of trade liberalization and friendly investment climate in the host countries. Export growth favorably affects the macroeconomic variables that in turn attract foreign investors.

The effect of savings is also turned out to be significant with positive sign. This may be the fact in this sample savings are utilized by domestic investors. The affect of numbers of telephone is significant with positive sign.

In literature the first and foremost determinant of exports is FDI. However, in empirical literature the effects of FDI on exports are controversial. Our study finds positive and significant impact of FDI on export growth. The success stories of East and South East Asian countries suggest that FDI is a powerful tool of export promotion because multinational companies (MNCs) through which most FDI is undertaken have the well-established contacts and the up-to-date information about foreign markets. If the motive behind FDI is to capture domestic market (tariff-jumping type investment), it may not contribute to export growth. On the other hand, if the motive is top tap exports markets by taking advantage of the country's comparative advantage, then FDI may contribute to export growth to the extent permissible under the prevailing policy regime. By now it is well known that an outward oriented regime encourages export-oriented FDI while an inward-oriented policy regime attracts FDI mainly to capture domestic rather than exports markets.

The effect of GDP is significant with positive sign. The level of production can be utilized at domestic and international level at the same time. The developing countries have relative advantages for agriculture goods. They can exhaust benefits of lower cost production by

[7]See for example Kumar and Siddartahan (1997)

export growth policies. Moreover, large size of GDP creates environments for investment decisions.

According to the regression results real exchange rate positively affects export. It turned out to be the less significant variable affecting export. Our empirical estimates are consistent with theory as well as empirical evidence found in other studies (e.g. Sharma, 2001).

In the globalization era, when the value of time is most important, the need of wide spread communication facilities is becoming most important. For the measurement of communication facilities we employed two variables, namely, number of Tele visions and number of Tele phones. The effects of expansions in communication facilities are positive and both the variables turned out to be significant. Thus expanding the net of such facilities is helpful in exploration of new international markets. Further, these make easy to access the world markets. As developing countries' exports are concentrated in few markets they can reap the benefits of global communication facilities. The results are in line with Kumar (1998).

The results show that increase in savings significantly contributes to exports. Higher savings imply lower interest rates that promote investment opportunities. The investment is the key channel for export growth. In developing countries government provide many incentives for export promotion strategies. The domestic investment take place in different sectors but it is much responsive in trade sector to incentives provided by government. After the activism of WTO developing countries are enhancing export oriented investment schemes. These are the arguments that support our hypotheses of investment led export growth. The empirical results also support our hypotheses. Over and above, savings are the source of removal of internal and external gaps in developing countries. As two-gap theory explains saving-investment and exports-imports gaps in developing countries, large savings are the source of removal of domestic gap that in turn remove external gap by enhancing export growth.

The industrialization variable is highly significant in explaining export growth. The importance of industrialization for developing countries is obvious because production levels in agricultural remains unstable due to uncertainty of weather conditions and pest attacks and, hence, on the basis of agricultural output alone a country cannot expand its exports potential. The results signify the importance of industrialization as means of sustained exports growth.

## V. Conclusion and Policy Implication

The objective of this study has been to find out factors, which are important in determining the location decisions of MNCs and exports in developing countries and to determine relationship between exports and FDI. For this purpose the study used a sample of panel observations for 49 developing countries over the period 1970-2004. The data are derived from the *World Development Indicators (WDI) 2005*. Fixed effects (country specific intercepts) model, with system of equations, is employed for the estimation of the relationship of exports and FDI with their potential common determinants based on the panel data. A number of conclusions can be drawn from the study, which are summarized as follows.

The analysis shows that GDP, economic growth, domestic absorption and exports positively affect FDI, a result consistent with market seeking behavior of multinational corporations. On the other hand external debt and BOP deficit have negative effects on FDI. The effect of domestic investment in explaining FDI flow is negative. This is so because an increase in domestic investment leaves little room for FDI. The effect of taxes is negative and insignificant. The negative relationship implies that lack of fiscal incentives is a hurdle for FDI. However if overall investment climate is sound then MNEs overlook it.

It is also found that depreciation of real exchange and industrialization and development of communication facilities significantly promote exports. This study provides a significant complementary relationship between FDI and exports with causation in both directions. The effect of increased FDI has been found significantly positive, whereas, in the reverse direction, the positive impact from increased exports on FDI is confirmed at lower levels of significance. Thus, there is no evidence of a substitution relationship of FDI and exports so far.

It is of critical importance to maintain a high and sustainable economic growth rate. The study shows that a sustainable growth patterns attract FDI and promote exports. The developing countries can attract FDI inflows by removing the artificial barriers and control on exports and imports. An open and export-oriented policy can be promoted by lowering tariffs and allowing free mobility of capital. Widening of the net of communication facilities is also instrumental in attracting FDI inflows and exports growth. To this end subsidies may be provided to the communication sector.

**References**


Aggarwal, J. P. (1980). "Determinants of FDI: A Survey", *Weltwirtschaftliches Archive,* 116: 739-773.

Arrow, K. (1969). "Classificatory Notes on the Production and Transmission of Technological Knowledge", *The American Economic Review*, Papers and Proceedings, 52: 29-35.

Bajorubico, O. and S. Sosvilla-Rivero (1994). "An Econometric Analysis of FDI in Spain", *Southern Economic Journal*, 61: 104-120.

Bartik, T. J. (1985). "Business Location Decisions in the United States: Estimates of the Effects of Unionization, Taxes, and Other Characteristics of States", *Journal of Business and Economic Statistics*, 3: 14-22.

Bertil, O. (1968). "Model Construction in International Trade Theory", *Published in Induction, Growth and Trade. Clarendon Press*. Oxford PP: 325-341.

Buffie, S. E. (1993). "Direct Foreign Investment, Crowding out and Underemployment in the Domestic Economy", *Oxford Economic Paper,* 45: 639-667.

Carlton, D. W. (1983). "The Location and Employment Choices of New Firms: An Econometric Model With Discrete and Continuous Endogenous Variables", *This Review,* 65: 440-490.

Clegg , J. (1995). "The Determinants of United States Foreign Direct Investment in the European Community: A Critical Reappraisal", *Paper Presented at the 21st Annual Conference of the European Business Academy*, University of Urbino.

Clegg, J. and S. Scott-Green (1998). "The Determinants of Japanese Foreign Direct Investment Flows to the European Community, 1963-1990", *in J. -L. Mucchielli, ed*., Multinational Location Strategy, 6: 29-49.

Coughlin, C. C., J. V. Terza and V. Arromdee (1991) "State Characteristics and the location of FDI within the United States", *Review of Economics and Statistics*, 73: 675-683.

Culem, C. (1988). "The Locational Determinants of Direct Investment among Industrial Countries", *European Economic Review,* 32: 885-904.

Cushman, D. (1985). "Real Exchange Rate Risk, Expectations, and the Level of Direct Investment", *Review of Economics and Statistics*, 67(2): 297-308.

De Mello L. R. (1999) " Foreign Direct Investment – Led Growth: Evidence from Time Series and Panel Data", *Oxford Economic Papers*, 51: 133-151.

De Mello, L. R. (1997). "FDI in Developing Countries and Growth: A selective survey" *The Journal of Development Studies*, 34 (1): 1-34.

Dunning, J. H. (1993). "Multinational Enterprises and The Global Economy", *Working-ham*: Addison- Wesley.

Feldstein, M. and C. Horioka (1980). "Domestic Saving and International Capital Flows", *Economic Journal*, 30: 314-329.

Froot, K. A. and J. C. Stein (1991). "Exchange Rates and Foreign Direct Investment: An Imperfect Capital Market Approach", *Quarterly Journal of Economics,* 106(4): 1191-1217.

Funke, M. and S. Holly (1992). "The Determinants of West German Exports of Manufactures: An Integrated Demand and Supply Approach", *Weltwirtschaftliches Archive,* 128(3): 498-512.

Gold, D. (1989). "Foreign Direct Investment", in A. P. Harvey, ed., *International Corporate Finance.*

Goldberg, M. A. (1972). "Determinants of U.S. Direct Investment in the EEC: Comments", *American Economic Review*, 62: 692-699.

Government of Pakistan, Economic Survey. Islamabad: Economic Advisors Wing Ministry of Finance. (Various Issues).

Hoekman, B. and S. Djankov (1997). "Determinants of Export Structure of Countries in Central and Eastern Europe", *The World Bank Economic Review*, 11(3): 471-487.

Jeon, Y. D. (1992). "The Determinants of Korean Foreign Direct Investment in Manufacturing Industries", *Weltwirtschaftliches Archiv,* 128: 527-541.

Jorgenson, D. W. (1963). "Capital Theory and Investment Behavior", *American Economic Review*, 53: 247-259.

Klein,M. W. and E. Rosenjgren (1994)."The Real Exchange Rate and Foreign Direct Investment in the United States", *Journal of International Economics*, 36: 373-389.

Kmenta, J. (1986). "*Elements of Econometrics"*, Second Edition, New York: MacMillan.

Kumar, N. (1998). "Multinational Enterprises, Regional Economic Integration, and Export-Platform Production in the Host Countries: An Empirical Analysis for the US and Japanese Corporations", *Weltwirtschaftliches Archiv,* 134: 450-483.

Kumar, N. and N. S. Siddarthan, (1997). "Technology, Market Structure and Internationalization: Issues and Policies for Developing Countries". *London: Routledge.*

Lall, S. (1978). "Transnationals, Domestic Enterprises and the Industrial Structure in Host LDCs: A Survey", *Oxford Economic Papers*, 30: 217-248.

Lee, J.Y. and E. Mansfield (1996). "Intellectual Property Protection and US Foreign Direct Investment", *Review of Economics and Statistics*, 30: 217-248.

Luger, M. I. and S. Shetty (1985) "Determinants of Foreign Plant Start-Ups in the United States: Lessons for Policymakers In the Southeast", *Vanderbilt Journal Of Transnational Law,* 18: 223-245.

Maddala, G. S. (1977). "*Econometrics",* New York: McGraw-Hill.

Majeed. M. Tariq and Eatzaz Ahmad (2006). "Determinants of Exports in Developing Countries", International Conference on Governance and Institutions, 22nd Annual General Meeting and Conference of the Pakistan Institute of Development Economics, Islamabad.

Majeed. M. Tariq and Eatzaz Ahmad (2007). "Host Country Characteristics and FDI: A Panel Data Analysis" One Day National Level Seminar on "Trade and Economic Growth Linkages" organized by Department of Economics, Quaid-i-Azam University in collaboration with Higher Education Commission, Islamabad.

Milner, C. and E. Pentecost (1996). "Locational Advantage and US Foreign Direct Investment in UK", *Applied Economics*, 28: 605-615.

Nayyar, D. (1978). "Transnational Corporations and Manufactured Exports from Poor Countries", *Economic Journal,* 88: 59-84.

Nunnenkamp, P. (1991). "Developing Countries' Attractiveness for Foreign Direct Investment, Debt Overhang and Sovereign Risk as Major Impediments?" *The Pakistan Development Review*, 3(4): 1145-1158.

O'Sullivan, P. J. (1993). "An assessment of Irelands' Export-Led Growth Strategy via Foreign Direct Investment, 1960-1980", *Weltwirtschaftliches Archive*, 129: 139-158.

Petrochilos, G. A. (1989). "Foreign Direct Investment and the Development Process: The Case of Greece", *Avebury: Gower Publishing Company Ltd*.

Pfaffermayr, M. (1996). "Foreign outward Direct Investment and Exports in Austrian Manufacturing: Substitutes or Complements?" *Weltwirtschaftliches Archive,* 132(2): 501-522.

Rehman, K. (1991). "Firms' Competitive and National Comparative Advantages as Joint Determinants of Trade Composition", *Weltwirtschaftliches Archive,* 127(1): 83 -97.

Riedel, J., C. Hall and R. Grawe (1984). "Determinants of Indian Exports Performance in the 1970s", *Weltwirtschaftliches Archive,* 120(1): 40-63.

Root, F. and A. Ahmed (1979). "Empirical Determinants of Manufacturing Direct Foreign Investment in Developing Countries", *Economic Development and Cultural Change*, 27: 751-767.

Scaperlanda, A. E. and R. S. Balough (1983). "Determinants of U.S. Direct Investment in the E. E. C. Revisited", *European Economic Review,* 21: 381-390.

Schneider, F. and B. S. Frey (1985) "Economical Political Determinants of FDI" *World Development*, 13(2): 161-175

Sharma, K. (2000). "Export Growth in India: Has FDI Played a Role?" at:http://www.econ.yale.edu/~egcenter/

Teece, D. J. (1977). "Technology Transfer by Multinational Firms: The Resource Cost of International Technology Transfer", *Economic Journal*, 87: 242-261.

Todaro, M. P. (1997) "*Economic Development*" Sixth Edition. New York: Longman.

Togan, S. (1993). "How to Assess the Significance of Export Incentives": An Application to Turkey", *Weltwirtschaftliches Archive,* 129 (4): 777-799.

Wang, Z.Q. and N. J. Swain (1995) "The Determinants of Foreign Direct Investment in Transforming Economies: Evidence from Hungary and China", *Weltwirtschaftliches Archive,* 131: 359-382.

Wheeler, D. and A. Mody (1992). "International Investment Location Decisions: The Case of US Firms", *Journal of International Economics*, 33: 57-76.

World Bank (1991). World Development Report, New York: Oxford University Press, Various Issues.

Zhang, K. H. and J.R. Maskusen (1999). "Vertical Multinationals and Host Country Characteristics", *Journal of Development Economics*, 59: 233-252**.**