

# An Efficiency based Approach to Evaluate Attractiveness of Host Countries for Foreign Direct Investment

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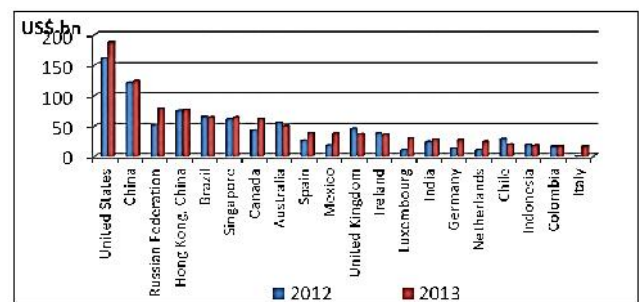
## Abstract

This paper investigates the impact of efficiency of countries for attracting foreign direct investment. Top 20 foreign direct investment receiving countries in 2013 were used for the study for a 20-year period from 1994 to 2013. The efficiency of countries was evaluated using non-parametric data envelopment analysis and the empirical analysis was estimated using pooled estimated generalised least square model. The results suggest that inflows of foreign direct investment have a significant positive relationship with efficiency scores of countries. Fully efficient countries, nine out of the sample of 20 countries, have counted for 41.6 per cent of the global foreign direct investment in 2013. This indicates that multinational corporations operate in efficient countries in order to maximise the wealth of shareholders by reducing overall cost of operations through efficiencies.

**Keywords:** Foreign direct investment, data envelopment analysis, multinational corporations, wealth of shareholders, efficiency

Movement of Foreign Direct Investment (FDI) across countries has increased dramatically over the time as a result of rapid globalisation. The growth rate of FDI flows has been accelerated with the beginning of 21st century. Despite the slump in 2012, global FDI flows grew at a rate of 9 per cent in 2013 to reach US\$ 1.47 trillion (UNCTAD, 2014). The inflow of FDI is expected to improve efficiency and productivity in a developing country through new technology, export expansion, increased employment opportunities and development of human capital. FDI is also very important and sensitive when it comes to a developing country as FDI flows contribute to build strong economic links between developed and developing countries. FDI affects growth through improvement in technology, knowledge and physical capital of the recipient country (Husain *et al.*, 2011). View of multinational corporations (MNCs) about FDI is also a matter of establishing a policy framework to attract FDI flows to a country. The countries, which are targeting FDI inflows, have to consider the objectives of MNCs in order to establish a policy framework for FDI. The main objective of an MNC may vary from the

view of shareholders to a broad view of stakeholders. This study focuses on the view of maximising the wealth of their shareholders. Such MNCs expect to improve return on investment through global investments by reducing operating and financing costs and increasing revenue in new and developed markets. Therefore, countries offer various incentives to attract FDI inflows, which are favourable to achieve objectives of MNCs, in order to achieve high rate of economic growth. Top 20 FDI destinations of the world in 2013 are shown at figure 1.



**Fig. 1: Top 20 FDI destinations in 2013**

(Source: UNCTAD, World Investment Report 2014)

FDI theories have attempted to explain why a firm invest abroad rather relying on exporting, licensing, or arranging management contracts. Many previous studies have revealed that FDI inflows are determined by various political, social, economic and cultural factors, which are favourable to achieve objectives of MNCs. Therefore, investors may analyse the efficiency or productivity profile of countries prior to making investment decisions. In this study, a country is considered as a unit, which consumes inputs to produce certain outputs. Accordingly, production ratio shows the efficiency of countries. Rational investors consider the productivity profile of countries prior to making investment decisions in order to maximise the wealth of shareholders. Therefore, the level of efficiency of a country is a concern for potential investors.

Locational attractiveness for FDI flows has been viewed in different perspectives and various theoretical models have been proposed to explain such locational decisions. Subsequent to the Second World War, some authors have attempted to explain FDI in terms of the motives of international production. Macdougall (1960) used the concept of capital arbitrage in a perfectly competitive environment to explain the transfer of capital flows across borders. This Neoclassical trade theory, which explained international capital trade due to differences in returns on capital, was heavily criticized because of its assumption of perfect competition. Then, Hymer (1976) suggested that MNCs are oligopolistic firms that need to locate their production in various countries to compete against rivals. This became a landmark of the studies on FDI. He explained ownership of specific assets using the variables derived from the market failures to explain FDI. Since then, two groups of theories developed based on the classification of two variables of the work of Hymer. One group framed within locational decisions of MNCs and the other group focused on internalisation process.

Buckley and Casson (1976) and Rugman (1981) extended the Coasian theory of the firm to explain why and how the production decisions are made among MNCs. Buckley and Casson (1991) explained that market failures are more prevalent in an international framework. Therefore, MNCs organise an internal market to avoid excessive transaction costs (Williams, 1997). Vernon (1966, 1979) explained using product lifecycle concept that movement of production operations from one country to another occurs as a result of searching lower cost of productions and new markets. However, eclectic paradigm framework (Dunning, 1977, 1981, 1993), which is also known as the OLI framework,

proved to be a better approach of explaining FDI over the other concepts. OLI framework combined ownership, location and internalization advantages as determinants of FDI, which were previously discussed in separate theories. In brief, ownership advantage explains who will undertake FDI; location advantage explains where FDI flows to; and the internalisation advantage explains how the FDI or the mode in which international production will take place. Considering previous literature, some authors have identified four main reasons of undertaking international production activities by MNCs i.e. Market seeking, resource seeking, efficiency seeking, and strategic asset seeking investments (UNCTAD, 1998: Mallampally and Sauvart, 1999: Dunning, 2000).

In contrast to the above theoretical models, some other researches and organisations have used indices to evaluate locational attractiveness for FDI flows. UNCTAD (2002) has proposed two indices in order to avoid the comparison of absolute values of FDI inflows among host countries. Inward FDI Performance Index considers the market size of the host country and potential index considers the un-weighted average of the normalized values of eight variables. According to the UNCTAD (2002), the two indices are intended neither to provide a comprehensive model explaining the locational decisions of MNCs nor to measure the impact of FDI on host countries. Considering the stability view of an economy, Jayasekara (2014) has proposed an FDI index, which is useful to measure the locational attractiveness of countries for FDI in terms of the stability aspects of a country. According to Jayasekara (2014), a country is considered more attractive over the others when it has a lower value of the index. According to the above review, there are number of factors, which have been identified theoretically and empirically in a number of studies, as locational determinants of FDI. The rest of this paper is organized as follows. Section two explains the research methodology and section three presents and discusses the empirical results. The final section gives the description of the findings and conclusions of the study.

## Database and Methodology

This study is based on the secondary data of top 20 FDI receiving countries in 2013 for a twenty-year period from 1994 to 2013. The efficiency of countries is measured using non-parametric data envelopment analysis. Charnes, Cooper and Rhodes (1978) first introduced DEA to measure the efficiency of Decision Making Units (DMUs). DMU is the unit or entity, which

is subjected for the evaluation. The efficiency is obtained as a maximum of a ratio of weighted outputs to weighted inputs. This study considers a country as a DMU, which produces certain outputs using inputs. Improvement of efficiency of the process of converting inputs to outputs may attract investors since the overall efficiency of a country may reduce costs of investors. Therefore, a country is considered as a DMU for this study. Two output variables and three input variables were selected for the study to provide a parsimonious model to evaluate the efficacy of countries. All variables are measured in terms of millions of United States Dollars (USD). Accordingly, Gross Domestic Product ( $Y_1$ ) and exports ( $Y_2$ ) are outputs, which are generated by employing labour force ( $X_1$ ), imports ( $X_2$ ) and gross capital formation ( $X_3$ ) as inputs. Definition and measurement details of variables are given at the table 1.

Relationship between FDI and efficiency of countries is estimated using pooled estimated generalised least square (GLS) model. The GLS model is a generalization of ordinary least square (OLS) regression, which relaxes the assumption that the errors are homoskedastic and uncorrelated. The OLS model assumes that  $\text{Var}(\varepsilon) = \sigma^2 I$ , while GLS assumes that  $\text{Var}(\varepsilon) = \sigma^2 \Omega$ .  $\sigma^2 \Omega$  is an  $n \times n$  symmetric, invertible matrix whose diagonal elements

specify the error variances for each case and whose off-diagonal elements indicate the error correlations for each pair of cases. With this change in assumptions, GLS rather than OLS is the unbiased estimator of  $\beta$  with the minimum sampling variance among the class of linear unbiased estimators (Greene, 2008). Considering the above, the following equation is fitted using Pooled estimated GLS model.

$$\text{FDI} = \beta_0 + \beta_1 \text{Efficiency} + e \quad (1)$$

## Results and Discussion

Summary of the sample statistics of the study are shown in the table 2. Efficiency scores of top 20 FDI receivers in 2013 under the CCR model are shown at the figure 2.

UNCTAD (2014) reveals that total FDI inflows in 2013 were US\$ 1.47 trillion. Top 20 FDI receiving countries have accounted for 70.63 per cent of global FDI flows in 2013. Most notable observation is that fully efficient countries have accounted for 41.6 per cent of global FDI inflows and 58.9 per cent of top 20 FDI receiving countries in 2013. These results suggest that the efficiency of a country is a matter of attracting FDI.

**Table 1: Profile of input and output variables**

Variable	Description	Definition	Source
$X_1$	Labour Force	The total population at the ages between 15- 64	2
$X_2$	Imports	Values of merchandise imports	1
$X_3$	Gross Capital Formation	Gross capital formation consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories.	3
$Y_1$	Gross Domestic Product	Gross domestic product represents the total value of final goods and services produced within a country during a period of one year.	1
$Y_2$	Exports	Values of merchandise exports	1

*Source:* Compiled by the Author

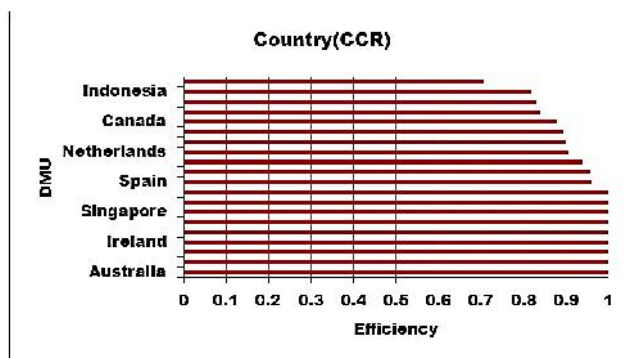
1. UNCTAD Stat database compiled by United Nations Conference on Trade and Development <http://unctadstat.unctad.org/wds/TableView/tableView.aspx>
2. World Development Indicators (WDI) database compiled by the World Bank
3. World Bank national accounts data, <http://data.worldbank.org/country>

**Table 2: Sample summary of descriptive statistics**

Statistics	Variables	
	FDI	Efficiency
Mean	40,029.72	0.9017
Median	21,593.50	0.9392
Maximum	347,848.73	1.0000
Minimum	145.05	0.5337
Std. Dev.	60,313.80	0.1122
Observations	400	400
Cross sections	20	20

*Source:* Compiled by the Author

Table 3 shows the FDI inflows of fully efficient countries in 2013.



**Fig. 2: Efficiency scores of top 20 FDI receiving countries in 2013**

(Source: Compiled by the author)

MNCs expect to accumulate wealth to shareholders by investing in efficient countries since such investments reduce cost of operations through efficiencies. This is one of the main objectives of MNCs, which is expected to achieve through international diversification. Empirical results reveal a significant positive relationship between FDI inflows and efficiency scores of countries. The results are summarised at table 4.

The results confirm the rational behaviour of MNCs, which are operating to maximise the wealth of shareholders. Such MNCs may invest in efficient countries in order to reduce cost of operations through efficiencies. Accordingly, appropriate degree of financial leverage will be determined to maximise the wealth of

shareholders. The results also provide evidence of the concept of capital arbitrage of neoclassical trade theory (Macdougall, 1960). However, this neoclassical trade theory, which explains international capital trade due to differences in returns on capital, was criticized because of its assumption of perfect competition. Nevertheless, we assume that differences in return on capital occur as a result of the differences in efficiencies among countries.

The relationship of FDI and efficiency is also in line with the product life cycle view of FDI (Vernon, 1966, 1979). According to the concept, movement of production operations from one country to another occurs as a result of searching markets and lower cost production bases. According to the empirical results of this study, MNCs expect to achieve lower cost of production by investing in efficient countries. This also provides evidence of the theory of comparative advantage, since the suggestion of comparative advantage that state each country specialises in the production of goods and services that it can produce more efficiently than others can and imports the goods that other countries can produce more efficiently. Therefore, it is very clear that the movement of global foreign direct investment occurs due to the desires of MNCs to maximise the wealth of shareholders by investing in efficient countries.

## Conclusion

The primary objective of the study was to investigate whether the efficiency of countries influence the movement of global foreign direct investment. The

**Table 3: FDI inflows of fully efficient countries in 2013**

Country	Ranking among the top 20 FDI receiving countries	FDI inflow (USD bn)
United States	1	188
Russian Federation	3	79
Hong Kong	4	77
Brazil	5	64
Singapore	6	64
Australia	8	50
United Kingdom	11	37
Ireland	12	36
Italy	20	17

Source: UNCTAD, World Investment Report 2014.

**Table 4: Empirical results of the equation 1**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Intercept	60042.38	7395.08	8.1192	0.0000
Efficiency	22194.64	7753.89	2.8623	0.0044

efficiency of top 20 FDI receiving countries in 2013 was evaluated using non-parametric data envelopment analysis. Gross Domestic Product and exports were considered as outputs, which were generated by employing labour force, imports, and gross capital formation as inputs. The relationship of efficiency of countries and FDI inflows were estimated using pooled estimated generalised least square model. The results revealed that there is a significant positive relationship between the efficiency scores of countries and FDI inflows. Nine out of 20 top FDI countries were fully efficient and they have counted for 41.6 per cent of global FDI inflows. The results confirm the rational behaviour of MNCs, which are operating to maximise the wealth of shareholders by providing evidence of the concept of capital arbitrage of neoclassical trade theory, the product life cycle theory, and the theory of comparative advantage. Accordingly, it is concluded that MNCs invest in efficient countries in order to maximise the wealth of shareholders.

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