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## Panel Data Analysis of Foreign Direct Investment and Poverty from the Perspective of Developing Countries

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### Abstract

The purpose of this paper is to assess the relationship between foreign direct investment (FDI) and poverty at the macro-pathway in selected developing countries. The contribution to host countries from FDI can take several forms, such as the transfer of technology, human capital development, increased competition in domestic markets, and the generation of corporate tax revenues, among others. The paper develops a data set and an econometric model to analyse FDI flows and poverty relations at the macro level panel data set. Results show that there is statistically significant relationship between FDI and poverty and it is obvious that FDI reduces poverty in selected developing countries.

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*Keywords:* FDI; poverty; panel data analysis;

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### 1. Introduction

This study aims to investigate foreign capital and whether or not it reduces poverty in developing countries. There are many articles on this topic in the literature. Some of them are related to developing countries. However, there is very little research on a direct relationship between FDI and poverty and the issue of poverty is usually studied in developing countries. FDI is believed to play an important role in the economic development of a country by providing capital to boost numerous aspects of economic development of a province or country. Due of its computable nature, FDI has attracted many researchers who empirically examine its relationship between other indicators of economies. The impact of FDI on poverty reduction, job opportunities, tax revenues, management and labor skills, and use of technology in the private sector has been examined regionally, countrywide or among several countries.

Aaron (1999) investigates the ways, which FDI could contribute to poverty reduction in developing countries and what policymakers in developing countries should do to maintain and increase this contribution level. He breaks down the relationship between FDI and poverty reduction into two parts: one is the relationship between FDI and growth while the other is that between growth and poverty reduction. Aaron classifies the possible effects of FDI on the host economy as direct and indirect effects and puts stress on this distinction for a clear assessment of

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FDI impact on social development and poverty reduction. He sorts the measurable employment and income generated by FDI as components of its direct contribution. Aaron states that these indirect contributions are extremely difficult to measure due to their qualitative nature. According to his research, FDI serves to create indirect employment opportunities with a 1.6 multiplier, which can be interpreted as the creation of 8 indirect employment opportunities for every 5 direct ones. Another benefit that Aaron claims FDI provides is more female participation in labor force which helps directly increase household income but is accompanied by lower wages compared to male labor force for comparable jobs. He attaches great importance to FDI contributions to improving human capital in host countries, which are generated directly by FIEs or indirectly by spillovers and result in developing skills of workers even those who are unskilled. One of the other benefits that he stresses is technology transfer to the host country, which he states is a natural result of multinational activities such as licensing, subcontracting, and so on.

Klein, Aaron and Hadjimichael (2001) argue that FDI is one of the integral components for economic growth to be successful in a developing country. They state that (something missing here?) comes from the nature of FDI, which satisfies rapid transfer of best practice requirement of economic growth. In their study, they claim that because economic growth is a key factor in poverty reduction, FDI is considered the most important asset to reduce poverty. According to this study, besides the stimulation effect on growth, FDI can improve the quality of growth, and aid to achieving the goal of poverty reduction. They indicate that there are some preconditions for implementing FDI successfully and obtain positive outcomes for poverty reduction. One of the preconditions they state is providing the right environment for foreign investors.. Another one is preventing any kind of protection for domestic or foreign investors and providing an equal and competitive platform. The last precondition they consider crucial is that the government regulate foreign investors reasonably and without any burdensome and/or arbitrary regulations. They believe that although FDI helps to reduce income poverty by promoting growth, it is neither effective in reducing other aspects of poverty nor deals with income inequality.

Athukorala (2003) investigates the short term and long term relationship between FDI and the economy in Sri Lanka. The methodology of this paper involves calculating averages and percentages and also estimating an econometric model using time series data on Sri Lanka between 1952 to 2002. Using basic production function and the Dickey-Fuller test in the process, Athukorala estimates an econometric model of GDP. In his model, GDP is a dependent variable described in terms of independent variables- foreign direct investment and trade liberalization.

Hung (2005) investigates the impact of FDI on growth and poverty reduction by regression analysis using panel data from 1992 to 2002 across 12 provinces and cities of Vietnam. He agrees with Hung in that FDI has direct and indirect effects and uses a wide range of variables to distinguish these effects carefully. As Aaron (1999) suggests, Hung considers the relationship between FDI and poverty reduction in two parts: firstly he examines if inflows of FDI in a province affect the economic growth of the province positively. He also aims to reveal whether there exists a negative correlation between economic growth and the number of people living below poverty line. These two-phased researches would consequently refer to that the increase in inflows of FDI results in poverty reduction. He concludes that there is a positive correlation between FDI and economic growth. He also used partial regression analysis to support his other hypothesis, which states that FDI indirectly reduces poverty in the host province.

Soumaré and Gohou (2009) also investigate the FDI impact on growth and poverty reduction empirically by using econometric models on panel data across African countries. They examine the FDI contribution to poverty reduction in Africa and any possible differences on the function of FDI to reduce poverty between regions of Africa. They refuse to use gross data of variables as GDP and FDI and choose to use ratios such as FDI net inflows over gross capital formation. This way they aim to obtain more specific and detailed results. They also employ the human development index rather than using GDP only as a variable to achieve more specific results on welfare. In this study, they conclude that there is a bi-directional causality link between FDI and log of GDP per capita therefore, FDI reduces poverty and increases welfare. On the other hand, they indicate that the relationship between FDI and welfare varies substantially across regions of Africa. For example, FDI affects welfare in Central and Eastern Africa, despite that its impact in Northern and Southern Africa remains insignificant.

## 2. Evaluation of FDI and Poverty Relationship

Data analysis and comparisons included in this section examine the relationship between FDI and poverty.

When investigating the relationship between FDI and poverty, Mold (2004) asked does FDI affects to the growth? This is the primary question but it is also necessary to evaluate what is going on in the distribution of income and welfare.

FDI in the host country may have direct and indirect affects on poverty reduction. The indirect impact of FDI on the reduction of poverty is through economic growth which results in the improvement of living standards due to the increase in GDP, improvement of technology and productivity, as well as the economic environment. When we consider the relationship between FDI and poverty, it is possible to see that employment growth and the reduction of people living below the poverty line due to the improvement of labor-force, safety nets and the increase in demand for labor have a direct impact on poverty (Nguyen, 2003). The direct and indirect poverty reducing effects of FDI are not the same in all conditions and can vary depending on many factors. These factors are the investment quantity and quality (labor intensive-capital intensive), type of the investment (Greenfield, merger & acquisition, privatization), conditions of the sector where investment occurs, technological improvements, taxes paid by FDI and how they are spent, efficiency of the investments and wages. In addition to this, because these factors are affected by economic and politic conditions, economics and politics are one of the most important determinants of the impact of FDI on poverty (Shahbaz & Aamir, 2008). Therefore, if a country wants to achieve a better result in reducing poverty through FDI, economic and political conditions for such investments should be attractive. FDI (especially labour-intensive) provides direct and important contributions to the reduction of poverty caused by unemployment. In this sense FDI's impact on poverty works through its impacts on employment. FDI clearly does make a direct contribution to poverty reduction, for example through measurable employment and income generation, but its aggregate impact seen in these terms is very small, and it is the indirect contribution that is of greater consequence. The poverty reducing impact of capital-intensive FDI is limited than in labor-intensive ones. Because these investments provide very little employment and employed skilled labor force, capital-intensive FDI is not as effective as labor-intensive investment in reducing poverty caused by unemployment. Although employment growth contributes positively to reduce poverty, the level at which poverty reduction is determined by income wages. If the investors pay wages above the poverty line to people them employ, the poverty reducing impact of these investments is high, but if they pay below the poverty line, the poverty reducing impact is limited. In other words, wages below the poverty line pushes people to poverty line but does not help them recover from poverty.

According to the Carnegie policy outlook (2010) *"The world in 2050 will also be profoundly different in human terms. Rapid growth in the emerging economies will pull hundreds of millions of people out of absolute poverty, leaving only a small fraction of the G20 population behind. Poverty rates are expected to decline significantly in Indonesia, Brazil, Mexico, and Turkey"*.

Mold's (2004) study was based on Moran's (1999) work on "benign" and "malign" models. These models work well in explaining poverty and FDI relations in developing countries. The "benign" and "malign" models are shown below.

### *Data, Modeling and Results*

In this study, I consider unbalanced panel data of 26 countries from UNCTAD over a period of 24 years from 1990-2009. With panel data analysis, different effects on FDI across countries and over time can be investigated, allowing for heterogeneity control. Panel data analysis also provides more, more variability, more degrees of freedom, efficiency and less collinearity among predictor variables (Badi H. Baltagi 2008).

The variables in this study include employment, foreign direct investment, inflation rate, gross domestic product growth rate, interest rate, poverty, gross domestic product growth rate, per capita income growth rate, employment. To eliminate inherent bias from the estimates due to differences in sizes of the economies considered, I use a employment to gross domestic product growth rate ratio.

The functional form of the model:

$$Y = \beta_0 + \beta_1 \text{INF} + \beta_2 \text{GDP} + \beta_3 \text{POP} + \beta_4 \text{IR} + \beta_5 \text{Poverty} + \beta_6 \text{Inf\_rate} + \beta_7 \text{PCI} + \beta_8 \text{EMP} + \varepsilon_i, \quad (1)$$

where,

Y = foreign direct investment, INF = inflation rate, GDP = gross domestic product growth rate, POP = population growth rate, IR = interest rate, Poverty = poverty, Inf\_rate = inflation rate, PCI = per capita income growth rate, EMP = employment,  $\varepsilon_i$  = error term.

Since differences across countries may influence the dependent variable (FDI), therefore we apply a random effect model:

$$Y_{it} = \beta X_{it} + \alpha + u_{it} + \varepsilon_{it},$$

where  $u_{it}$  is between-country error,  $\varepsilon_{it}$  within-country error. The rationale for this model is that a country's error is not correlated with the explanatory variables.

Table 1: Random effects model estimates ( $\sigma_u=58632.122$ ,  $\sigma_e=34691.088$ ,  $\rho=0.740$ )

fdi	Coef.	Std. Err.	z	P>z	95% Conf. Interval	
inf	216.56	257.436	0.84	0.4	-287.99	721.133
ir	-534.93	213.520	-2.51	<b>0.012</b>	-953.42	-116.44
gdp	-1099.2	1452.66	-0.76	0.449	-3946.36	1747.96
pop	-48131.72	7130.99	-6.75	<b>0.00</b>	-62108.22	-34155.22
pci	112.70	1353.83	0.08	0.934	-2540.76	2766.18
poverty	-2207.35	333.823	-6.61	<b>0.00</b>	-2861.63	-1553.07
infl_rate	-243.10	282.578	-0.86	0.39	-796.944	310.74
emp	-61.98	718.155	-0.09	0.931	-1469.55	1345.57
_cons	180272.4	49715.4	3.63	0.00	82831.98	277712.8

Table 1 show the results of the average effect of the predictor variables over the outcome variable (FDI) when the predictor variables change across time and between countries by one unit. P-values test results ( $p < 0.05$ ) indicates that interest rate, population growth rate and poverty variables have significant influence on FDI. As shown in Figure 1 and Figure 2, in the applied model according to the theories of benign and malign model, it is obvious that there is negative relationship between FDI and poverty and the model clearly supports that FDI reduces poverty in selected developing countries.

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