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The Impact of Foreign Direct Investment on Poverty Reduction an Applied Study on the Egyptian Economy

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Abstract

Poverty problem is not only inadequate income, but it could be a reflection of hunger, no shelter, sickness, malnutrition, illiteracy, school dropout, unemployment, unserviceable water, powerlessness, crimes, and insecurity. Poverty rates will be higher without applying all possible economic reforms that sustain economic development, modernization, income growth, and employment. By considering foreign direct investment as a tool of the economic reforms, it's important to answer one main question; to what extent does FDI affect poverty reduction? This empirical study aims to examine the relationship between FDI inflows and poverty reduction in the Egyptian Economy. The time-series data covers the period 1990–2020. This study used ordinary least squares (OLS) technique to find the correlation between FDI inflows and poverty reduction. The study uses the principal components analysis (PCA) to construct a poverty reduction index by using five proxies namely GDP per capita, individuals using internet, primary education pupils, household final consumption expenditure, and life expectancy ratio to cover multidimensional features of poverty and to increase the robustness of the results due to lack of time-series data on the poverty variable. Results show that FDI has a statistically significant positive impact on poverty reduction in the Egyptian economy.

Keywords: FDI, poverty reduction index, PCA; OLS; multidimensional feature; Egyptian Economy

Introduction

Poverty is one of the endemics, complex, multidimensional, and persistent problems confronting many nations of the world today, targeted in the Millennium Development Goals (MDGs) to reduce extreme poverty and hunger by 2015, and in Sustain-able Development Goals (SDGs) to end poverty in all its forms by 2030 (Osondu-Oti, 2020). Although global level contributions in reducing poverty through (MDGs), poverty is still at a high level, so United Nations (UN) through (SDGs) added more pressure to governments to seek solutions to end poverty by 2030 (Magombeyi and Odhiambo, 2017). Countries' government anti-poverty policies can be categorized into three main categories. First, markets facilitations

Policies which maintain greater access to markets for the poor, by encouraging productive small and medium investments, availability of small loans with short installments, and improving access to information. Second, good governance Policies which aim to improve accountability, equity, inclusive, transparency and reduce corruption in all public services. Third, effective social security systems policies which aim to explicit redistributive in nature by transferring resources to the poor, whether in cash or in kind; cash can be unconditional cash transfers, or conditional on children's school attending and preventative health care receiving, or in kind by providing public services free or at a subsidized rate to the poor (Ghatak, 2015).

Poverty is multifaceted deprivation. It is a worse situation than inadequate income, it's a situation of poor health, malnutrition, low level of education and skills, bad housing conditions, inadequate livelihoods, social exclusion, and lack of participation in decision making (UNDP, 2010). Poverty problem was exacerbated by COVID-19 pandemic and the lockdown status which occurred across the world, resulting not only millions of lost lives, but also leading to fail many people into extreme poverty which might lead to long term poverty traps (Günther and Lahoti, 2020). Stephen Smith (2005) described in his book (Ending Global Poverty), that the poverty is not only a problem in itself but causes other problems (traps), which make getting out of vicious cycle of poverty so hard as: child labor, illiteracy, lack of education, debt, undernutrition and illness, high fertility, farm erosion, property mismanagement, criminality distribution, and social and political powerlessness. Ragnar Nurkse (1961) established the trap of vicious circle of poverty in his book (Problems of Capital Formation in Underdeveloped Countries); there is a circular relationship that exists on both demand and supply sides of the problem of capital formation. Circle starts with small capacity to save (small capacity to invest) leads to lack of capital, lack of capital leads to low productivity, low productivity leads to low real income, then low real income leads to small capacity to save and invest, and the circle starts again. To end poverty, governments must look towards tackling poverty from the root of its occurrence and establish all possible wise policy reforms (Adeyemi and others, 2009).

FDI is defined as an investment which includes at least a 10 percent ownership of an enterprise, made to acquire a lasting management or voting power, to indicate significant influence in an enterprise operating in a country other than that of the investor (IMF, 1993). FDI is considered as an efficient way of creating job opportunities, improving workers' income, transferring technological knowledge to domestic enterprises, increasing trade movements, expanding international investment cooperation, contributing to economic growth and macroeconomic stability (Do and others, 2021). FDI has a role in supplementing domestic savings mobilization which accelerates the pace of economic development, breaking the vicious circle of poverty (Ogunniyi and Igberi, 2014). From the point of view that confirms that economic growth is good for poverty reduction, FDI is considered a good factor for growth, so FDI must be good for poverty reduction (Andrew, 2004: 92).

From the point of view that accelerating the eradication of poverty is inevitable not optional. This hence the question of to what extent does FDI affect poverty reduction in the Egyptian economy? This paper interrogates the contribution of FDI inflows in generating benefits that help the poor to get out of poverty, by constructing a poverty reduction index to evaluate the impact of FDI on poverty reduction, as well as to introduce suitable policies to promote poverty reduction.

Literature Review

According to Solow (1956), De Mello (1999), Klein, Aaron and Hadjimichael (2001), Chang (2003), Hung (2005), FDI is considered as a tool that helps in improving welfare through

many channels; job creation, infrastructural development, technological transfer, local skills strengthen, human capital enhancement, labor productivity intensifies, exports generator, domestic investment supplementary, economic growth accelerator, income growth, safety nets insuring and poverty reduction.

FDI & Economic Growth Stimulation can be represented by different channels as increasing capital stock, transferring new technology, improving market competition, increasing productivity, opening export markets, and enhancing domestic investment (Karimi and Yusop, 2009). FDI through increasing growth and incomes benefits the poorest segments of the population. FDI beneficial effects appear strongly when it works on labor-intensive industries, respects national labor law, and accepts international labor standards (OECD, 2002). FDI & Management Enhancing can be represented by better training, better entrepreneurial capability, new managerial and organizational practice, better investment opportunities, and externalities arising from training received by employees that can transfer to local firms (Lall and Streeten, 1977). FDI &Technology Transferring can be in the form of superior machinery and patents, or in a form of knowledge such as research and development R&D activities, new marketing techniques, and organizational skills (Kvinge, 2004). Host firms may gain access to foreign firm's superior technology by hiring its workers (Glass and Saggi, 2002). FDI & Employment Opportunities aren't only in the quantity of jobs, but also in the quality (Wei, 2013). FDI supplements domestic investment which will tend to increase the demand for labor, especially when FDI is interested in labor-intensive industries (Jenkins, 2006). Transfer of employees from one enterprise to another through collaboration between foreign and domestic enterprises creates new jobs and allows workers to join new enterprises (Mishra and Palit, 2020). FDI & Balance of Payments Improvement can be divided into three potential balance of payments consequences: First, it's an initial capital inflow that benefits the capital account. Second, it's a substitute for imports of goods or services that benefit the current account. Third, it's the generator of exports of goods and services (Kastrati, 2013). FDI & Competition Encouraging can be represented by the way of strengthening local firms to respond to this competition to maintain their market shares, leading to an increase in productivity, decrease in prices and a more efficient allocation of re-sources (Pessoa, 2007). Many countries tend to provide incentives to attract and support FDI in their economies to get its benefits and positive impact. Developing countries suffer from national savings shortage to finance their investments, this demonstrates the need of FDI which is the easiest way to get foreign capital instead of taking loans from international commercial banks which undertakes highly risks linked to the debt (Khachoo and Khan, 2012).

Empirical studies that examined the relation between FDI and poverty reduction used different methodologies and different poverty proxies. Hung (2005) examined the direct and indirect relation of FDI on poverty reduction in 12 Vietnam provinces from 1993 to 2002, using OLS method. Poverty was measured by people living under the poverty line. Results showed that FDI has both direct and indirect impact on poverty. Directly, by its significant impact on the number of people living under the poverty line. Indirectly, by its positive significant impact on the economic growth, which in turn has a positive significant impact on the reduction of poverty. Magombeyi and Odhiambo (2018) used 3 proxies of poverty reduction: infant mortality rate, life expectancy ratio and household consumption expenditure in South Africa from 1980 to 2014, using auto regressive distributed lags (ARDL). Results showed that by using infant mortality rate infant mortality rate as a proxy of poverty, FDI responded positively to poverty reduction in the long run and negatively in the short run. When household consumption expenditure and life expectancy ratio were used as a proxy for poverty reduction, the relation between

FDI and poverty reduction was not significant. Assadzadeh, and Pourqoly (2013) used Human Development Index (HDI) as a proxy of poverty reduction. The study on 21 members of the MENA countries from 2000 to 2009, used generalized least squares (GLS). Results showed that FDI has a significant positive effect on reducing poverty and welfare. Bilal Khan, Huobao and Saleem (2019) applied a study on Pakistan from 1985 to 2016, using autoregressive distributed lags (ARDL). Poverty was measured by the number of people who consume less than 2350 calories per day. Results showed that there is a bidirectional causality between FDI and poverty reduction (both are Granger causes of each other). Topalli, Papavangjeli, Ivanaj and Ferra (2021) examined the relationship between FDI and poverty in 6 Western Balkan countries from 2002 to 2021, using generalized method of moments (GMM). Results showed that FDI has significantly contributed to poverty alleviation in the Western Balkan countries, by its negative impact on the number of people who live under $1.90 a day (head count ratio (HCR)). Chindengwike (2022) applied a study on Tanzania from 1988 to 2018, using Multiple Linear Regression Model, using real per capita gross domestic product as a measure of poverty reduction. Results showed that FDI has statistically significant effects on poverty alleviation.

Research Methodology

The study applied an econometric approach to test the degree of correlation between the FDI and poverty reduction in the Egyptian economy from 1990 to 2020. The study sample size was 31 annual observations. Ordinary Least Square (OLS) used to estimate the regression and to carry out the analyses to test the significance of the study. The data for the variables collected from World Bank data. Due to the fact of lacking time-series data on the poverty variable, the study applied principal component analysis (PCA) to carry out the poverty reduction index in the Egyptian economy. Methodology divided into two parts; first part describes the PCA to create the poverty reduction index. The second part describes the relation between the poverty reduction index (the dependent variable) which is constructed by PCA and FDI inflows (the independent variable).

Principal component analysis (PCA) is a multivariate technique uses orthogonal transformation called principal components, converting a set of observations of correlated variables into a set of values of linearly uncorrelated variables in order to handle variables. The principal component transformation is defined in such a way that has the largest possible variance (Abdi and Williams, 2010).

Multidimensional poverty index measures poverty as an extreme deprivation from all necessities of living. Therefore, the study uses five variables (GDP per capita, individuals using internet, primary education pupils, household final consumption expenditure and life expectancy ratio) to generate the index by employing the Principal Component Analysis (PCA) which covers the three dimensions of multidimension-al poverty which are: education, health and living standard. Firstly, the study used principal components analysis to reduce the five proxies of the poverty reduction into a single index. This index is more relevant since none of the five indicators can solely serve as an adequate proxy for poverty reduction. By using the PCA, the poverty reduction index is designed by 31 observations for each variable from the five variables.

The PCA poverty reduction index is specified as:

$$POV. = W_g G + W_i I + W_e E + W_c C + W_l L \quad (1)$$

Table 1. *The description of variables*

Pov.	Estimated poverty reduction index. A higher Pov. value reflects a lower degree of poverty which indicates a higher degree of poverty reduction.
$W_{..}$	W_g,W_i, W_e, W_c and $W_l$are weights of each sub index.
G:	GDP per capita converted by purchasing power parity (PPP) represents the average living standards of the country's citizens.
I	Number of individuals who are using the internet in all forms (computer, mobile phone, games machine, personal digital assistant, digital TV etc.) represents the citizens' accessibility to services which reflects the living standard dimension.
E	Primary education pupils who are enrolled in public and private schools represents the education dimension.
C	Household final consumption expenditure represents the direct satisfaction and the collective needs of individuals which reflects the living standard.
L	Life expectancy ratio represents the number of years a newborn infant would live which reflects the health dimension.

Table 2. *Results from principal components analysis*

Principal Components Analysis

Sample: 1990- 2020
Included observations: 31
Computed using: Ordinary correlations
Extracting 5 of 5 possible components

Eigenvalues: (Sum = 5, Average = 1)

Number	Value	Difference	Proportion	Cumulative Value	Cumulative Proportion
1	4.763353	4.588906	0.9527	4.763353	0.9527
2	0.174447	0.140562	0.0349	4.937800	0.9876
3	0.033885	0.010334	0.0068	4.971685	0.9943
4	0.023550	0.018786	0.0047	4.995235	0.9990
5	0.004765	---	0.0010	5.000000	1.0000

Eigenvectors (loadings):

Variable	PC 1	PC 2	PC 3	PC 4	PC 5
X1	0.453241	0.115067	-0.586046	-0.538194	0.385005
X2	0.441311	-0.612004	0.021904	0.511063	0.411134
X3	0.451625	-0.187779	0.684225	-0.517511	-0.157458
X4	0.456205	-0.055846	-0.353964	0.191296	-0.791754
X5	0.433277	0.757516	0.250233	0.380462	0.176274

Ordinary correlations:

	X1	X2	X3	X4	X5
X1	1.000000				
X2	0.934324	1.000000			
X3	0.963950	0.963389	1.000000		
X4	0.986953	0.965448	0.973296	1.000000	
X5	0.941160	0.835036	0.908305	0.932206	1.000000

PCA results indicate that: The Eigen values in table 1 indicate that the principal

component data explains more than 95% of the total standardized variance of all variables. Hence, the principal component is a more relevant measure of poverty reduction, as it explains the variations of the dependent variable better than any other linear combination of explanatory variables. Therefore, the study used PCA poverty data which expresses the poverty reduction index to estimate the relationship with FDI.

Figure 1 represents the trend of the Egyptians' poverty reduction index which reflects the evolution of the poverty reduction index from 1990 to 2020.

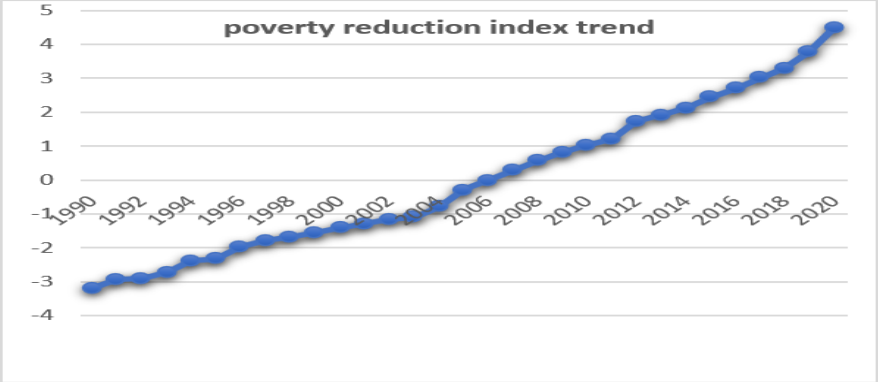

Figure 1. *Trend of PCA Egyptians' poverty reduction index*

Secondly, the study applied an econometric technique by using ordinary least square (OLS) which implemented by the Economic views (E-views) software, to carry out the regression and other analyses to ensure the significancy of this study.

The model is specified as:

$POV. = \beta_0 + \beta_1 FDI + \mu$ (2)

Linear simple regression will be employed. The Poverty reduction index serves as the dependent variable while FDI net inflows were a core independent variable. μ is the error term.

Table 3. *Summary of regression results*

Dependent Variable: POV **Independent variable: FDI** **Method: Least Squares** **Sample: 1990 - 2020** **Included observations: 31**				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	-1.595049	0.423461	-3.766697	0.0008
FDI	4.21E-10	0.000135	5.195569	0.0000
R-squared	0.482087	**F-statistic**		26.99394
Adjusted R-squared	0.464228	**Prob(F-statistic)**		0.000015

Results and Findings

Table 3 showed that FDI has a positive significant impact on poverty reduction. The t-test is used to know the statistical significance of each individual parameter. By comparing t-statistic (5.195569) with the tabulated t-statistic (2.045) (two-tailed test at 5% significance level), with degree of freedom (df) = n-k = 31-2 = 29. Therefore, we reject the null hypothesis (coefficient of FDI is equal to zero) and accept the alternative hypothesis (coefficient of FDI is not equal to zero). This means that FDI has a significant impact on poverty reduction.

The coefficient of determination (R^2) is given as 0.482087, which indicates that the explanatory power of FDI inflows is relatively high. This implies that 48% of the total variations of poverty reduction is being accounted only by the variations in FDI inflows in the Egyptian economy, while other determinants of poverty reduction which aren't included in the model explain 52% of the variation in poverty reduction in the Egyptian economy.

The F-test is applied to check the significance of the model as whole. By comparing F-statistic (26.99394) with the tabulated F-statistic at F= 4.183 at 5% significance level, with numerator of degrees of freedom n-k= 31-2= 29, and denominator degrees of freedom k-1= 2-1=1. Therefore, we reject H0 (The model has no goodness of fit) and accept H1 (the model has goodness of fit and is statistically different from zero). There is a significant impact between the dependent variable (poverty reduction) and independent variable (FDI inflows).

Research Conclusion

This study analyzes the relationship between FDI inflows (the independent variable) and poverty reduction (the dependent variable) in the Egyptian economy during the period 1990-2020, by using ordinary least squares (OLS) technique. Variables' data are collected from world bank statistical data. Due to lack of time-series data of poverty variable, it has been necessary to construct an index reflects the poverty reduction. The study makes use of the principal components analysis (PCA) to construct a poverty index by using five proxies namely GDP per capita, individuals using internet, primary education pupils, household final consumption expenditure, and life expectancy ratio to capture multidimensional feature of poverty. The study reveals that FDI inflows during the period 1990-2020 has been an effective tool to reduce poverty and generate a distributional effect on living standards improvement in the Egyptian economy. The single linear regression analysis results revealed that FDI has a statistically important significant impact on poverty reduction.

In order to further improve the climate for FDI within the remarkable technological advancement and digital transformation, there is a necessity of automating all investment services by using the latest technologies available in communications and information technology, to maintain an uncomplicated investment environment free from bureaucratic complications, this will help investors to invest in such a quality way that saves time and effort, maintains doing business procedures easiest, and enables investors to access all information which is related to their investment decisions and their projects development. Applying and generalizing the electronic invoices system, in which all companies are required to submit electronic invoices for value-added tax (VAT) and selling taxable goods or services will help to achieve tax justice and eliminate tax evasion. Supporting technical education and creating international partnerships to qualify the students to deal with modern technology, and new manufacturing techniques (know how) will prepare a skilled and trained labor, automatically will be hired from investors.

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