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Nexus between Foreign Direct Investment and Poverty Reduction: A case of Pakistan

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ABSTRACT

The key objective of this paper is to examine the direct and causal association between foreign direct investment (FDI) and the reduction of poverty in Pakistan. Poverty reduction is the fundamental task and issue for developing economies like Pakistan. This study uses annual data set from 1987 to 2018 and implies the ARDL method for data analysis. The data has been taken from economic surveys of the Federal statistics house (FSH) of Pakistan. The finding shows the bidirectional causality between poverty and FDI. The outcome of this study also reveals that the causal effects of FDI on reducing poverty are stronger than poverty reduction effects on FDI.

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1. Introduction

Many countries succeeded in reducing hunger, and extreme poverty level from the economy by 2015 has followed the Millennium Development Goal (MDG) directions. Nonetheless, various countries still face excessive levels of poverty (Nations, 2015). These countries could not fulfil the goals of MDG, so the Sustainable Development Goals (SDG), which United Nations introduced to eradicate poverty, continues and attempts to discover the most efficient solutions to poverty reduction both in terms of domestic and international relations. According to World Bank statistics, 70 % of the extremely poor of the world are living in the Democratic Republic of Congo, China, Pakistan, India, Indonesia, Ethiopia, Tanzania, Madagascar and Nigeria (Bank & Bank, 2014).

All the eight goals of the 2015 Millennium Declaration are allied with poverty minimization and human development, especially in developing nations. Pakistan is a developing nation with limited capital resources to overcome the financial gap between savings and investments. For this reason, Pakistan depends heavily on foreign capital inflows (Siddiqui & Kemal, 2006). In addition to the saving-investment gap, Pakistan also suffers from economic and political instability, lack of physical and trained human capital. For these reasons, foreign inflows is needed to supplement its development (Ali, Nishat, & Anwar, 2009). The minimal ratio of FDI

inflow found in Pakistan and its dispersion found only in a few sectors, especially in energy and power. Pakistan could not increase the inflow of FDI in the country even after it introduced liberal policies. This is because of several issues, the most relevant of which are inward-looking FDI policies and obstacles to foreign investment (Khan & Kim, 1999). However, in recent years, Pakistan has established itself as a suitable location for the international market, especially for attracting FDI because of Pakistan with its liberal investment policy, availability of cheap labour, and profitable place for foreign investors with tax incentives policies.

Most of the prior studies have focused on the FDI and its causal impact on economic growth (Alfaro, 2003; Alfaro, Chanda, Kalemli-Ozcan, & Sayek, 2004, 2010; Apergis, Lyroudi, & Vamvakidis, 2008; Carkovic & Levine, 2005; Chowdhury & Mavrotas, 2006; Hansen & Rand, 2006). This empirical literature assumed a perfect positive association between economic growth and economic welfare and showed only the relationship between FDI and economic development. So, the question has been raised due to this assumption (Anand & Sen, 2000). High Economic growth may increase inequality and poverty if such economic growth is not distributed fairly among the population, especially the poor. Inequality can indeed increase, and this may adversely impact the welfare of a society (Ravallion, 2007).

We didn't find any comprehensive study on this topic, especially for developing countries where poverty is high. According to millennium development report, more than 836 million people are impoverished, and of them, one in five individuals is living in South Asia (SA) or Africa, where their incomes are less than $1.25 (per day). So, effective economic policies must be developed to tackle these issues. Elements of poverty reduction can reduce the rate of poverty, and the FDI is the central element. However, identifying the advantage of FDI on poverty reduction in Pakistan, this study will help fill the gap in prior literature and guide policymakers about the benefits of FDI inflows and its impact on poverty. The next section is related to the theoretical and empirical analysis to determine the association between FDI and poverty. The empirical analysis and robustness of the results are discussed in section 3. The concluding remarks and policy suggestions are given in chapter 4.

2. Empirical Literature Review

Limited empirical research has been conducted on the casual and direct association between inflow of FDI and poverty reduction. The results of these studies are inconclusive, FDI and poverty were found insignificant in some empirical analyses, and others have revealed that FDI is significantly contributing to poverty reduction. Various empirical research such as Hung (2005); Jalilian and Weiss (2002) found that FDI has a positive impact on poverty reduction; similarly findings of these studies of Bharadwaj (2014); Calvo and Hernandez (2006); Fowowe and Shuaibu (2014); Gohou and Soumaré (2012); Israel ; Mahmood and Chaudhary (2012); Reiter and Steensma (2010); Shamim, Azeem, and Naqvi (2014); Soumaré (2015); Ucal (2014); Uttama (2015); Zaman, Khan, and Ahmad (2012) found the same results as mentioned in the introduction of the study that millennium development goals aim to overcome the problem of poverty by identifying those factors which can be helpful in this regard.

Mirza et al. (2004) explored that empirical analysis depends on developed and developing countries and found that FDI has significantly contributed to poverty reduction. The statistical results showed that the influence of FDI on reducing poverty in the ASEAN nations as compared to other countries. Santarelli and Figini (2002) discussed the effects of globalization on poverty in especially third world economies and found a significant coefficient of FDI. Hung (2005) used the people living below the poverty line as the proxy of poverty incidence in Vietnam and found the negative coefficient of FDI, which showed a significantly positive relationship between poverty reduction and FDI. Huang, Teng, and Tsai (2010) also investigated the effects of growth and trade openness on poverty alleviation in the economy of Taiwan. The expected signs of all these variables were positive and significant, i.e., trade openness, income and government consumption (Arif et al., 2020; Sadiq, Usman, Zamir, Shabbir, & Arif, 2021).

Calvo and Hernandez (2006) conducted an empirical analysis based on FDI and poverty nexus in countries of Latin American. In this analysis, the poverty gap and headcount are used as two main dependent variables. The results of domestic as well as foreign investment found contrary and statistically significant to poverty reduction. Nunnenkamp, Schweickert, and Wiebelt (2007) examined the association between FDI and poverty using CGE analysis in Bolivia. Zaman et al. (2012) used ordinary least squares (OLS) method and found that FDI contributes significantly to poverty reduction.

According to Gohou and Soumaré (2012) and the recent analysis of Fowowe and Shuaibu (2014) used the data of African countries to identify the effects of FDI on poverty reduction. Gohou and Soumaré (2012) used welfare as the proxy of the poverty variable, and the measurement of HDI was criticized by various economics (McGillivray, 1991; McGillivray & White, 1992; Wolff, 2010) and full of measurement errors. Then Fowowe and Shuaibu (2014) applied people living below the poverty line as the proxy of poverty. Various empirical literature examined the indirect relationship between FDI and poverty through economic growth and concluded mixed results. Most empirical literature is based on FDI and its effects on economic growth, is ubiquitous and indicates different results, but the direct relationship between FDI and its impact on poverty is lacking (Saleem, Shahzad, Khan, & Khilji, 2019; Shabbir, Bashir, Abbasi, Yahya, & Abbasi, 2020). Usually, prior literature analyses have supposed that poverty and economic growth are positively and entirely interrelated and have thus employed gross domestic growth as the primary proxy of poverty and the welfare of the economy. However, recently, many economists have pointed out and criticized when they observed from several sources about GDP growth and its positive impact on income inequality (increases the income inequality) and poverty also increases (Ejaz, Amır, & Shabbır, 2017). Sharma and Gani (2004) examined the positive effect of FDI on the human development index for developing (middle- and low-income) countries between 1975 and 1999.

3. Data Description

Many developing countries could not have time-series data efficiently; similarly, statistical data on poverty in Pakistan is also scant. Data based on WDI statistics also have limited poverty, especially for developing countries because in the late 1990s, various developing nations started recording poverty data. This study used annual time series data began from 1987 to 2018. According to the different empirical literature, multiple proxies are used for measuring poverty in developing countries, and Gini coefficient is used mainly in developing countries.

The ARDL approach is used to determine the long-run correlation between these two variables, as established by (Pesaran & Shin, 1995). Our data is based on a small sample size, so to identify the robustness of the results, the bootstrap simulations (with leverage adjustments) is also applied to conduct tests for causality. This methodology is more appropriate than other techniques in the case when the size of the sample is small. The ARDL framework consists of less endogeneity problems as it's free from the correlation of residual. The method of vector autoregressive (VAR) is applied with order q, VAR (q) as follows,

$$x_t = \text{v} + \text{Å}_1 x_{t-1} \ldots\ldots + \text{Å}_q x_{t-q} + \varepsilon_t \quad (1)$$

The FDI and poverty variables are the two primary dimensional vectors which denote as x_t, (Hatemi-j, 2003, 2008) developed a minimizing information criterion, so the lag order q is determined by it, which is defined as

$$\text{HTJC} = \ln(dter\Omega) + \text{g}(nu^2 lnSZ + 2nu^2 ln(lnSZ)|2SZ) \quad (2)$$

The maximum likelihood estimated determinants in the VAR (g) model are denoted asΩ. The description nu represents the number of the variables, SZ show the sample's size and ln signifies the natural logarithm. The strength and performance of HTJC are related to ARCH effects and highly depend on the VAR model objective.

As the null hypothesis "H_O" indicates that the component of x_t denotes as kth, which doesn't Granger-cause the with a component of "x_t" is described as,

Null hypothesis (H_0): "m" is the row, column "k" component in,
$\mathring{A}_{ro}$= 0 for ro=1……., q (3)

This study tries to describe the VAR model more efficiently with the help of some equations as follow,

Z = DY + ε (4)

The next equation showed the H_0 of non-Granger causality analysis as follow,

Null hypothesis (H_0): Gß = 0 (5)

This study tries to describe the VAR model more efficiently with the help of some equations as follow,

Wald statistics= $(G\beta)'\ [G\ ((Y'Y)^{-1}\ \times VR)\ G']^{-1}(G\beta) \sim \chi_p^2$, (6)

The denotation ß = vect (D)where the column stacking vector operator is related to vect. The multiplication $(\times)$ indicates the product of Kronecker and G is connected to (p$\times nu$) $(1 + p \times nu)$, this matrix of indicators with components including of 0 and 1. The VR is related to the unrestricted VAR model with its variance-covariance matrix. Where the VR is equal to the$(\hat{e}U'\hat{e}U|SZ - bp)$, as in the underlying model, the number of estimated parameters are denoted as bp. Equation (6) shows the Wald statistics with χ^2distribution, where p shows the degree of freedom under the condition of normal distribution, then the values of Wald statistics are not accurate, so recommended by (S. Hacker & Hatemi-J, 2012) is used and more appropriate to deal with the problem. When the variables are used with lag and selected endogenously, this test still didn't lose performance.

The bounds testing analysis of the ARDL method (to cointegration) is estimating the "unrestricted error correction method" (UECM); the following equations are related to the ARDL approach.

$$\Delta \ln \mathrm{PVE_t} = \alpha_1 + \alpha_{\mathrm{INN}} \ln \mathrm{PVE_{t-1}} + \alpha_{\mathrm{GDP}} \ln \mathrm{FDIN_{t-1}} + \sum_{i=1}^{p} \alpha_i \Delta \ln \mathrm{PVE_{t-i}} + \sum_{l=0}^{m} \alpha_k \Delta \ln \mathrm{FDIN_{t-l}} + \mu_{1i} \quad (7)$$

$$\Delta \ln \mathrm{FDIN_t} = \beta_1 + \beta_{\mathrm{FDIN}} \ln \mathrm{FDIN_{t-1}} + \beta_{\mathrm{GDP}} \ln \mathrm{LPVE_{t-1}} + \sum_{i=1}^{p} \alpha_i \Delta \ln \mathrm{PVE_{t-i}} + \sum_{l=0}^{m} \alpha_k \Delta \ln \mathrm{FDIN_{t-l}} + \mu_{2i} \quad (8)$$

Where the H_0:α_{PVE}=α_{FDIN}, H_0:$\beta_{\mathrm{PVE}} = \beta_{FDIN} = 0$, while alternative hypotheses are, H_2:$\alpha_{\mathrm{PVE}} \neq \alpha_{FDIN} \neq$0, H_2:$\beta_{\mathrm{PVE}} \neq \beta_{FDIN} \neq 0$,

If calculated value of F-statistic is more than upper bounds I (1) which indicate the existence of a long-run (cointegration) relationship. If the F statistics (computed) value is less than Lower bounds I (0), there is no cointegration, and no cointegration is found between variables.

4. The Empirical Results

The section of the empirical result represents the result and concludes from statistical outcomes that FDI and poverty found a long-run steady-state correlation in Pakistan. The F statistics scores are 8.96 and 7.80, while the upper bound values are 4.78, 5.73 and 6.94 at 1, 5 and 10 levels of significance. The two cointegration vectors found among FDI and poverty over the study duration of 1987 to 2018 in the case of Pakistan.

Table 1
Results of Bounds statistical F-test with the level of poverty and FDI

Estimated model	$\mathbf{PVE_t = f(FDIN_t)}$	$\mathbf{FDIN_{t_t} = f(PVE_t)}$
Optimal lag length	(2)	(3)
F statistics (Wald test)	8.96	7.80
	Critical values (T=… 20)	
	Lower bounds I(0)	Upper bounds I(1)
1 percent level of significance	4.04	4.78
5 percent level of significance	4.94	5.73
10 percent level of significance	6.84	6.94

Notes: The Akaike Information Criterion (AIC) is used for the selection of optimal lag length.

Table 2 showed that long run, a direct/positive found between inflow of FDI and reducing of poverty in Pakistan.

Table: 2
Statistical results of ARDL model (Long run analysis)

Dependent Variable	**Model**	**Independent variables**		
$\mathbf{FDIN_t}$	**ARDL (2,1)**	**Constant**	**with trend**	$\mathbf{PVE_t}$
		-1.92	-0.03	0.13**
		(0.11)	(0.14)	(0.03)
$\mathrm{PVE_t}$	ARDL (3,1)	Constant	with trend	$\mathrm{FDIN_t}$
		60.20*	-0.32*	-1.88**
		(0.001)	(0.003)	(0.04)
F statistics	1199.397			
(χ^2)J-B normality test	1.02 (0.59)			
(χ^2)Breusch–Godfrey LM test	3.25 (0.26)			
(χ^2) Breusch-Pagan-Godfrey	4.37 (0.22)			
Durbin-Watson (DW) test	2.12			
(χ^2) Ramsey reset statistics	0.55(0.48)			

Notes:The Jarque–Bera statistic is used to detect the normality of the data, for detection of serial and autocorrelation, the test of Breusch– Godfrey LM and Durbin-Watson (DW) test is applied, and Breusch-Pagan-Godfrey is used to detect heteroscedasticity from the model, model specification is checked by Ramsey reset test. Results indicate that data does not have a problem of heteroscedasticity, serial and auto correlation and is normally distributed and well specified. The diagnostic tests show that all assumptions are fulfilled in this analysis, and * shows at 1 % and ** indicate the 5 % level of significance.

The error correction statistical results are provided in table 3, where the poverty reduction with the first difference is used as the dependent variable and estimation results are given in Panel (A). The Panel B FDI is used as an independent variable with first different and estimation results are presented. The statistically significant results indicate that in the short run, FDI significantly affects poverty and the effect of poverty on FDI. The error correction term with its negative sign and statistically significance indicates the estimated values o the FDI and poverty alleviation. The value of error correction statistics found that 57% showed that disequilibrium of the previous year (based on these outcomes) are corrected in the current year, this high rate of adjustment signifying that once poverty reduction took a shock. FDI required two years of the speed of adjustment to poverty. Panel (B) showed that the error correction term with its expected negative sign explains the process of convergence of FDI (in the long-run dynamics) as a function of poverty. The value of Error correction statistics found 34% presented those disequilibria of

the previous year outcomes, this sign of the speed of adjustment demonstrating that once a shock has given in FDI, Poverty required 3 to 4 years speed of adjustment to divert their equilibrium position.

Table 3
Statistical Results of ECM for the selected ARDL models

ARDL(2,1)	Constant	Independent variables with trend	ΔFDIN_t	ΔFDIN_{t-1}	ECM_{t-1}	R^2	Adjusted. R^2
Coefficient	20.5	-0.20	-1.01	-0.92	-0.57	0.85	0.80
SE.	4.5	0.06	0.42	0.44	-0.52		
p-(Values)	0.0001	0.004	0.02	0.04	-0.53		
Panel (B): Estimation of Error Correction Model (ECM) with ΔFDIN_t used as the dependent variable.							
ARDL(3,1)	**Constant**	**with trend**	ΔPVE_t	ΔPVE_{t-1}	ECM_{t-1}	Adjusted. R^2	
Coefficient	-0.70	0.01	-0.03	-0.05	-0. 34	0.87	0.85
SE.	1.38	0.009	0.05	0.04	0.01		
p-(Values)	0.60	0.09	0.04	0.03	0.003		
ECM with ARDL(2,1)= FDIN - 0.0324*PVE -0.7011 CONSTANT + 0.0466*TREND							
ECM with ARDL(3,1) = PVE -1.8870*FDIN + 62.2045 CONSTANT -0.3241 *TREND							

This study applied bootstrap causality statistical tests (with leveraged adjustments) to check the robustness of the statistical findings. The multivariate tests for "autoregressive conditional heteroscedasticity" (ARCH) and normality are used to check the causality between the variables. Table 4 represents the multivariate normality and ARCH test results, where (accepted the effects of ARCH) at the 5% significance level in the case of multivariate ARCH analysis. The bootstrap causality test used in this study and Table 5 showed the statistical results, and causal parameters are also estimated. The results showed that the causal influence of FDI on reducing poverty is 0.04, and the impact of poverty alleviation of FDI is 0.26. The causal effects of FDI on poverty reduction are more robust than the poverty reduction effects of FDI.

Table 4
Tests for multivariate ARCH and normality in the model of VAR

Multivariate ARCH test statistics	Multivariate LM test statistics
0.001	0.18

Notes: The H_0 of multivariate normality is tested by the test recommended by (Doornik & Hansen, 2008).

Similarly, R. S. Hacker and Hatemi-J (2005) have developed a bootstrap multivariate LM test to check the effects of ARCH, and both multivariate tests are used in this study.

Table 5
Statistical results of Bootstrap simulations for causality testing

Null hypothesis (H_0)	Test values	CTV of boost trap at 10%	CTV of boost trap at 5%	CTV of boost trap at 1%
FDI≠>PVE	1.98	2.99	3.21	3.66
PVE≠>FDI	0.16	0.22	0.26	0.36

This study used three (3) as minimum lag, VAR model was selected according to the criterion of minimizing the optimal lag, so the order of lag is 2 for selection. The subscription of FDI≠>PVE indicates that variable FDI "does not Granger-cause" PVE variable, critical values are denoted as CTV. The importance of parameters of causal are 0.042 and 0.26 for the two hypotheses.

5. Conclusion

This study has been conducted to detect the casual and co-integration relationship between inflows of FDI and its effect on poverty reduction. The statistical data has been taken from various sources between 1987 and 2018 in Pakistan. This analysis discussed the direct dynamic impact of FDI on reducing poverty. This study tried to fill the gap by examining the direct association between poverty reduction and FDI.

This study has generated novel critical values (CTV) for both causality and co-integration tests via simulations; we used a small sample size due to the scarcity of data. The findings of our empirical analysis are more precise when compared to the other standard methods. For robustness checking, we used the bootstrap causality test, the advantage is that if the required statistical assumptions of the model are violated, it still performs well. The statistical results present that FDI and poverty reductions are interrelated to each other in the short run and in the long run time period in the case of Pakistan. This relation is bidirectional; these two variables are causally reinforcing each other in Pakistan. Furthermore, study's findings suggest that Pakistani policymakers ought to explore how FDI can be beneficial in reducing poverty.

Pakistan has been trying to increase the development process by minimizing the poverty ratio and increasing the FDI ratio. So, FDI is the most critical component for the alleviation of poverty. According to the statistical results of this paper, the bidirectional and causal impact support the concept that policymakers of Pakistan can definitely influence FDI and / reduction of poverty simultaneously, especially in the long run.

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