WP/2018/01

Dhaman Working Paper

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A Semi-Parametric Analysis

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September, 2018

Abstract

It is often asserted with confidence that foreign direct investment (FDI) is beneficial for economic growth especially in the host developing economy. Nevertheless, there is no empirical consensus on a positive effect of FDI on host-country growth, nor on the direction of causation. One of the reasons behind the lack of consensus is likely the presence of nonlinearities in FDI and growth relationship. Most of the previous studies either used the linear empirical growth model or tried to bypass the nonlinearity issue by using ad hoc procedures. However, it is also true that growth theory provides little guidance about the exact nature of nonlinearity. Consequently, it is almost impossible to determine the exact form of nonlinear specification that would be appropriate for all data sets and data ranges. Our paper investigates this challenging question in empirical growth literature that is the impact of FDI in promoting economic growth in developing economies without adopting any ad hoc procedure to capture the nonlinearity in FDI-growth relationship. Based on a dualistic growth framework originally developed by Feder (1982) and partial linear regression approach, we are able to separate measure for sector externality and factor productivity effects between the two sectors (exports and non-exports sector). We define sectoral externality, as a function of FDI stocks per capita. Thereby, our theoretical framework allows us to capture both direct and as well as indirect effects of FDI on economic growth across 58 developing countries during the period 1990-2011.

We contribute to the existing literature in two ways. Firstly, the linearity constraint in investigating the role of FDI on economic growth is released by using a nonlinear econometric model. Secondly, the adoption of the dualistic growth model framework allows identifying the spillover effects of FDI.

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1. Introduction

Along with the deepening international economic and financial integration, the last two decades saw a significant increase in foreign direct investment (FDI) to developing countries. Between the period 2002 and 2017, total FDI inflows to developing countries increased by 304%, from $166 billion to $671 billion (UNCTAD, 2018). The upward trend has been reversed in 2008, following the global economic slowdown that started in the end of 2007. However, developing economies, which proved relatively resistant to this global turmoil, did better than developed countries and continued to absorb nearly half of global FDI flows (47% in 2017). In these countries FDI continue to be the most important source of foreign financing, by far surpassing inflows of official development assistance, and other types of private capital inflows.

Policymakers in developing countries in particular often perceive attracting FDI and multinational enterprises as a privileged channel of introducing high-capability firms into relatively low-capability industrial settings. Based on the assumption of automated diffusion mechanisms or knowledge spillover, the idea is that advanced production technology, managerial knowledge, and working practices will be transferred from foreign investors to local firms, boosting the productivity of local producers and consequently the growth in the host country. FDI is then considered as a vehicle for growth and governments have since competed for it through tax incentives and subsidies.

A review of the abundant empirical literature related to the impact of FDI on the economic growth highlights the diversity of the scenarios adopted and provides mixed results. The impact of FDI on growth on cross sections and panel of developed and developing countries as well as for individual economies has been assessed in this literature.

A number of studies reported support for the theory that FDI benefits growth. The following studies conclude that the link between FDI and growth is positive and significant: Walz (1997), Reisen and Soto (2001), Choe (2003), Mullen and William (2005), Yao (2006), Basu and Guariglia (2007), Ekanayake and Ledgerwood (2010), Azam and Ahmed (2014), Tan and Tang (2016), Williams (2017) and Begum et al. (2018) among others.

Several other studies find growth positive effects of FDI conditional on the host country environment or strategy. Balasubramanyam et al. (1996) examined the effect of FDI on average

growth rate for 46 countries over the period 1970–85. They found that FDI has a positive effect on economic growth in only host countries that have an export promoting strategy. Borensztein, De Gregorio, and Lee (1998) argue that FDI boosts growth via technology diffusion, if the host economy disposes of sufficient absorptive capacity proxied by the human capital. Durham (2004) finds in a large multicountry study that FDI is not significantly correlated with growth, interpreting this as evidence of needed absorptive capacity of the host economy. So developed economies with greater human capital should benefit more from FDI. This interpretation is supported by Prasad, Rajan, and Subramanian (2007) and Batten and Vo (2009).

In contrast, Bornschier, Chase-Dunn, and Rubinson (1978) conclude that FDI has a negative impact on the growth of developing countries. Fry (1993) confirms by reporting that in eleven countries FDI exerts a negative impact on growth. Nair-Reichert and Weinhold (2001) report causality running from FDI to economic growth, Hansen and Rand (2006) concur and report strong causality from FDI to growth regardless of development level. Carkovic and Levine (2005) criticize earlier studies on the effect of FDI on growth due to endogeneity. The authors perform a multicountry test using the generalized method of moments and find no robust boost of growth from FDI. Alagoz et al. (2008), Yaoxing (2010) and Roy and Mandal (2012) come to the same conclusion while adopting diverse empirical methodologies for different regions of the world.

In sum, despite the seemingly general agreement among policy-makers in many developing countries regarding the productivity and growth effects from FDI, there is no empirical consensus on a positive effect of FDI on host-country growth, nor on the direction of causation. One of the reasons behind the wide range of contradictory empirical results is likely the presence of nonlinearities in FDI and growth relationship. Most of the previous studies either used the linear empirical growth model or tried to bypass the nonlinearity issue by using ad hoc procedures such as adding the quadratic or interaction terms in the linear regressions. However, it is also true that growth theory provides little guidance about the exact nature of nonlinearity. Consequently, it is almost impossible to determine the exact form of nonlinear specification that would be appropriate for all data sets and data ranges.

Under certain circumstances, the researcher might feel more confident about the functional form of some parts of the regression equation, but be less assertive about the form of the other parts. Then combining the parametric and non-parametric techniques could help obtain the consistent estimates of the parameters of interest.

This paper investigates the challenging question in empirical growth literature that is the impact of FDI in promoting economic growth in developing economies without adopting any ad hoc procedure to capture the nonlinearity in FDI-growth relationship. Based on a dualistic growth framework originally developed by Feder (1982) and semi-parametric regression approach, we are able to separate measure for sector externality and factor productivity effects between the two sectors (exports and non-exports sector)[2]. We define sectoral externality, as a function of FDI stocks. Thereby, our theoretical framework allows us to capture both direct and as well as indirect effects of FDI on economic growth across 58 developing countries during the period 1990-2011.

This paper contributes to the existing literature in two ways. Firstly, the linearity constraint in examining the role of FDI on economic growth is released by using a nonlinear econometric model. This model allows economic growth to respond to its nonlinear determinants differently in different countries. Secondly, the adoption of the dualistic growth model framework allows identifying the spillover effects of FDI from a different angle.

The rest of the paper is organized as follows. Section 2 presents an extension of the dualistic growth model to evaluate the impact of FDI and human capital on economic growth. Section 3 briefly exposes the econometric framework. Data set and empirical results are discussed in Section 4. Section 5 concludes the paper.

2. Dualistic Growth Framework

In order to stress the relationship between foreign direct investment, exports and growth process, we start with the original Feder (1982) dualistic two-sector spillover growth model and the extension proposed by Aurangzeb and Stengos (2014). The economy is composed of two

[2] A partial linear model is a model, part of which takes a parametric from, and the remaining part is non-parametric. This type of model assumes little about the shape of the regression function beyond some degree of smoothness. It constitutes an important advantage to deliver estimators and inferences that are less dependent on the assumptions about the functional from.

mutually exclusive and exhaustive sectors. One sector produces only for the domestic market (D) and the other produces only for the international market (X). The two sectors have general technologies employing both homogeneous physical domestic capital (K) and human capital (H) as inputs. The multinational enterprise considers the host economy as an export platform for serving its home market as well as other markets. Consequently, the exports sector benefits from the foreign capital stock (F) as an additional production input. This sector is also supposed to have external effects on real domestic sector production. Thus, the respective production functions for the domestic-oriented sector and the export sector are:

$$D(t) = D(H_D(t), K_D(t); X(t)) \quad (1)$$

$$X(t) = X(H_X(t), K_X(t), F(t)) \quad (2)$$

In equation (1), *X* represents externalities rather than an input since firms in the real domestic goods sector are supposed to ignore exports sector outputs in their profit maximizing decisions. D(.) and X(.) are assumed to be constant-returns-to-scale production functions.

The factor endowment constraints are given by:

$$H(t) = H_D(t) + H_X(t) \text{ and } K(t) = K_D(t) + K_X(t) \quad (3)$$

Domestic output is defined as:

$$Y(t) = D(t) + X(t) \quad (4)$$

The model allows the values of the marginal productivities of both human capital $(\partial X/\partial H_X \equiv X_H, \partial D/\partial H_D \equiv D_H)$ and capital $(\partial X/\partial K_X \equiv X_K, \partial D/\partial K_D \equiv D_K)$ to differ across sectors by a constant uniform proportion δ:

$$X_H(t)/D_H(t) = X_K(t)/D_K(t) = 1 + \delta \quad (5)$$

δ measures the productivity differential between export and non-export sector. The model does not impose the existence of any productivity differentials. Instead, it is set up with the possibility

of testing for them[3]. However, the formulation (5) assumes, in an ad-hoc manner, that the productivity differential between the two sectors is the same for all inputs.

Foreign Direct Investment (FDI) coming to the exports sector is assumed to introduce some new technologies and this will translate into higher productivity of the foreign capital compared to domestic capital. It follows:

$$\partial X(t)/\partial F(t)/\partial X(t)/\partial K_X(t) \equiv X_F(t)/X_K(t) = \lambda > 1 \quad (6)$$

By differentiating aggregate output identity (4) with respect to time (omitted for simplicity), substituting from (1) into (3), and making use of (5) and (6), the following equation can be derived:

$$\dot{Y} = D_H\dot{H} + D_K\dot{K} + \left(\frac{\delta}{1+\delta} + D_X\right)\dot{X} + \lambda D_K\dot{F} \quad (7)$$

where "·" denotes change over time and $D_X \equiv \partial D/\partial X$.

The exports sector output is supposed to affect the production of the domestic sector output by some non-constant parameter θ formulated as a function of the host country's ability (z) to absorb new incoming investment from a foreign country; accordingly, the real domestic goods sector's output could be reformulated as follows:

$$D = X^{\theta(z)}d(H_D, K_D) \quad (8)$$

The function θ(.) denotes the degree of export output externalities. We suppose that z is a function of FDI stocks in the host country and is considered as exogenous.

Using (8), equation (7) can be rewritten in the following form:

$$\dot{Y} = D_H\dot{H} + D_K\dot{K} + \left(\frac{\delta}{1+\delta} - \theta(z)\right)\dot{X} + \theta(z)Y\frac{\dot{X}}{X} + \lambda D_K\dot{F} \quad (9)$$

or equivalently:

[3] According to Feder's original model, exporting activities encourage producers to improve their technology and adopt more efficient process management to face foreign competition. Moreover, foreign competition generates a sort of natural selection mechanism among firms, and throughout this mechanism, less efficient firms are constrained to adapt or to leave the market. At the end of this mechanism, the remaining firms are those whose marginal factor productivity is higher.

$$\frac{\dot{Y}}{Y} = D_H \frac{H}{Y}\frac{\dot{H}}{H} + D_K \frac{\dot{K}}{Y} + \left(\frac{\delta}{1+\delta} - \theta(z)\right)\frac{\dot{X}}{Y} + \theta(z)\frac{\dot{X}}{X} + \lambda D_K \frac{\dot{F}}{Y} \quad (10)$$

The most straightforward way of considering human capital (H), as an input in the production of Y, in a manner that is consistent with the large literature on schooling and wages is to use the following exponential formulation:

$$H = e^{\omega s} L \,,\ \omega > 0 \quad (11)$$

where L is the number of workers, s denotes the time spend in accumulating human capital or equivalently the average years of schooling and ω represents the rate of returns to education (supposed to be constant).

By assuming a linear relationship between marginal productivity of human capital and average output per skilled worker ($D_H = \alpha\frac{Y}{H}$) and taking into account (11), equation (10) could be rewritten as follows:

$$\frac{\dot{Y}}{Y} = \alpha\frac{\dot{L}}{L} + \alpha\omega\dot{s} + D_K\frac{\dot{K}}{Y} + \frac{\delta}{1+\delta}\frac{X}{Y}\frac{\dot{X}}{X} + \lambda D_K\frac{\dot{F}}{Y} + \theta(z)\frac{\dot{X}}{X}\left(1 - \frac{X}{Y}\right) \quad (12)$$

or equally:

$$\frac{\dot{Y}}{Y} = \underbrace{\alpha\frac{\dot{L}}{L} + \beta\dot{s} + \gamma\frac{I}{Y} + \kappa\frac{FDI}{Y}}_{\text{parametric component}} + \underbrace{\left(\frac{\delta}{1+\delta} - \theta(z)\right)\frac{X}{Y}\frac{\dot{X}}{X} + \theta(z)\frac{\dot{X}}{X}}_{\text{nonparametric component}} \quad (13)$$

where $\beta = \alpha\omega$, $\gamma = D_K$, $\kappa = \lambda D_K$, $\dot{K} = I$ denotes net domestic investment, $\dot{F} = FDI$ inward flows and $\frac{\dot{Y}}{Y}$ represents the real GDP growth.

The nonparametric component of (13) can be formulated as a general unknown function:

$$\phi(z) \equiv \underbrace{\left(\frac{\delta}{1+\delta} - \theta(z)\right)\frac{X}{Y}\frac{\dot{X}}{X}}_{\phi_1(z)} + \underbrace{\theta(z)\frac{\dot{X}}{X}}_{\phi_2(z)},$$

where the functional form of ϕ(.) is unspecified. This unknown function is supposed to capture the indirect effect of FDI on economic growth in the host country. It refers, as mentioned above, to a host country's ability to absorb and capitalize on knowledge spillover resulting from FDI.

3. Econometric Framework

Equation (13) will represent the basis for the empirical investigation carried out in this paper in order to evaluate the direct as well as indirect effects of FDI on economic growth. It belongs to the following general class of semi-parametric partially linear model:

$$y_i = \rho_0 + W_i\rho + \phi(z_i) + \varepsilon_i,\ i = 1,...,N \quad (14)$$

where the dependent variable y_i is the value taken by the real growth rate of GDP for country *i*, $W_i = \left\{\frac{\dot{L}}{L}, \dot{s}, \frac{I}{Y}, \frac{FDI}{Y}\right\}$ a vector of dimension 4, ρ is a 4x1 vector of unknown parameters, the variable z is an explanatory variable that enters the equation nonlinearly according to a non-binding function $\phi(.)$ and ε_i is the random error term assumed to have zero mean and constant variance.

A flexible and attractive approach to investigate the possible non-linearity in (13), while allowing for the linear effect of other conditioning variables, follows the semi-parametric approach proposed by Robinson (1988) using the Kernel regression estimator.

This approach, also known as double residual methodology, starts by applying a conditional expectation to both sides of (14) leading to:

$$E(y_i/z_i) = \rho_0 + E(W_i/z_i)\rho + \phi(z_i),\ i = 1,...,N \quad (15)$$

By subtracting (15) from (14), it follows:

$$y_i - E(y_i/z_i) = \big(W_i - E(W_i/z_i)\big)\rho + \varepsilon_i,\ i = 1,...,N \quad (16)$$

Given a known conditional expectations, parameter vector ρ can be estimated by fitting (16) by ordinary least squares (OLS). Otherwise, they have to be estimated by calling on some consistent estimators $y_i = m_y(z_i) + \varepsilon_{1i}$ and $W_{ki} = m_{W_k}(z_i) + \varepsilon_{2ki}$, where k = 1,..., K is the index of the explanatory variables entering the model parametrically. Robinson (1988) proposed OLS estimation of:

$$y_i - \hat{m}_y(z_i) = (W_i - \hat{m}_W(z_i))\rho + \varepsilon_i,\ i = 1,...,N \quad (17)$$

where $\hat{m}_y(z_i)$ and $\hat{m}_W(z_i)$ are predictions for y_i and W_i based on nonparametric regressions of y and W on z, respectively. The author showed that this estimator for ρ is consistent, asymptotically normal, and that it converges to ρ at a rate of $\sqrt{N}$.

Having estimated the parameter vector ρ, it is possible to fit the nonlinear (unknown) relation between y_i and z_i by simply estimating the equation (18) presented below nonparametrically:

$$y_i - W_i\hat{\rho} = \rho_0 + \phi(z_i) + \varepsilon_i,\ i = 1,...,N \quad (18)$$

4. Empirical Results

The empirical implementation amounts to estimating the semi-parametric partially linear relationship (14) by adopting Robinson's (1988) double residual semi-parametric regression approach presented in the previously. The dependent variable is the real GDP growth, $W = \left\{\frac{\dot{L}}{L}, \dot{s}, \frac{I}{Y}, \frac{FDI}{Y}\right\}$ representing labor force growth rate, average years of schooling of adults variation, gross domestic investment to GDP ratio and inward FDI flows to GDP ratio, respectively.

The dataset consists of a cross-section of 58 developing countries and comprises measures for FDI and for other determinants of economic growth between 1990 and 2011. Four sources were used to construct the data. The FDI (stock and flows), merchandise exports and export price index series are obtained from the United Nations Cooperation on Trade and Development data set (UNCTADstat). The mean years of schooling (males aged 25 years and above) data comes from UNESCO Institute for Statistics based on methodology from Barro and Lee. The data for real GDP, gross domestic capital formation and population are obtained from the Conference Board Total Economy Database. The labor force data comes from the World Bank's World Development Indicators.

A ten-year period averages are considered in order to avoid the cyclical factors and the cross-sectional analysis includes a wide range of developing countries[4]. The semipar Stata command, coded by Verardi and Debarsy (2012), is implemented to fit Robinson's double residual estimator where a unique variable, the logarithm of inward FDI stocks per capita, enters the model nonparametrically.

The empirical analysis starts with the estimation of the basic Feder's dualistic growth model by assuming a linear parametric specification and using OLS procedure. The aim is to confirm or refute the presence of dualistic growth phenomenon in the considered sample of countries. The

[4] The selection of developing countries is based on the IMF's country classification systems. It also takes into account the availability of the data and especially those concerning the gross capital formation, the average years of schooling and FDI. The list of countries included is provided in Appendix.

results are reported in Table 1 column (1) provide support to the presence of dualistic growth phenomenon measured by the positive and significant coefficient of the term $(X/Y\,.\,\dot{X}/X)$ or the product of the share of merchandise exports to GDP and the exports growth rate. The hypothesis that marginal productivities in exports sector are higher than in the non-export sector is validated. In the absence of externalities (the conventional neo-classical model), the computed differential marginal productivity parameter (δ) is 0.3 (δ/(1+ δ) = 0.23) which indicates the existence of a substantial productivity differential between exports and non-exports sector.

At a second step, the reduced form equation of the basic dualistic growth model specifying the sector externality effect (associated to the dependent variable Exports real growth rate) separately is estimated. The results reported in Table 1 column (2) indicate that the inter-sector externality parameter (θ) is statistically significant and positive confirming the presence of beneficial spillover effects of exports on non-exports sector. Moreover, the substantial estimated magnitude of the parameter is consistent with Feder (1982)'s expectations. Further, it may also be noted that when the externality effect is introduced, the adjusted R^2 increases by 35 %. This suggests that the simple formulation inspired by the conventional neo-classical model of column (1) is misspecified.

Table 1
OLS estimation of the classic dualistic growth model.
Dependent variable: real GDP growth (Five-year average).

	(1)	(2)
Labor force growth	0.13	0.35***
	(0.23)	(0.21)
Average years of schooling (variation)	0.02	0.03***
	(0.02)	(0.01)
Gross domestic capital formation to GDP	0.16*	0.10*
	(0.04)	(0.04)
Exports growth x Exports to GDP	0.23*	0.15**
	(0.09)	(0.07)
Exports real growth	-	0.27*
		(0.06)
Adjusted R^2	0.40	0.54

Note: Values in (.) are the standard errors. "*", "**" and "***" represents the 1%, 5% and 10% significance levels, respectively.

In the third stage, the Feder extended parametric model taking into account the impact of FDI is estimated using OLS and the results are reported in Table 2 column (1) and (2). OLS estimates indicate that exports contribute to growth through increased productivity and also through the external effects. However, it has also been found that the parameter of the FDI to GDP variable is statistically insignificant in the sample countries. We suggest that economic growth and FDI

can bear a complex and non-linear relationship if policy makers try to impact on one (say, FDI) by influencing the other (economic growth). Not taking into account the potential non-linearity of FDI on economic growth could explains the OLS results. It may also be noted that after introducing the sectoral externality effect separately most coefficients change magnitude and significance level, an indication that the linear formulations could be misspecified. The estimation of the semi-parametric model presented in equation (13) is an attempt to explain such results.

The robustness of the semi-parametric model against the parametric model is tested by using the test proposed by Hardle and Mammen (1993). The authors proposed a statistic that compares the nonparametric and parametric regression fits using squared deviations between them[5]. The null hypothesis is defined as: "the parametric model is the correct specification". The estimated p-value is 0.08, and hence the null of linear is rejected vs. the nonlinear specification. Accordingly, the semi-parametric smooth coefficient model estimation is legitimated. The semi-parametric estimation results are reported in column (3) of Table 2. An improvement in the quality of the regression is noted compared to the OLS results exposed in columns (1) and (2). Consistent with theoretical predictions, the results of the parametric part show that labor force, quality of human capital, domestic investment and FDI were individually and separately found to be positively and significantly correlated with economic growth in the considered sample of developing countries. Interestingly enough, the estimated impact of FDI on GDP growth rate is now 4 times larger than the estimated impact based on the linear specification with sectoral externality (Column (2) of Table 2). A one percent increase in foreign investment, FDI to GDP, increases GDP growth by 0.52 percent.

As far as the effect of the log of the FDI inward stocks per capita is concerned, as an explanatory variable that enters the equation (13) according to a non-binding function $\phi(.)$, Figure 1 shows that it is clearly nonlinear.

[5] The test option implements Hardle and Mammen's (1993) statistic to test whether the nonparametric fit could be approximated by a polynomial fit, the order of which must be set by the user. In other words, the proposed statistic assesses the adequacy of a polynomial adjustment compared to a nonparametric fit.

Table 2
Estimation of the extended Feder model.
Dependent variable: real GDP growth (Five-year average).

	OLS		Semi-parametric
	(1)	(2)	(3)
Labor force growth	0.28	0.41***	0.49**
	(0.23)	(0.21)	(0.21)
Average years of schooling (variation)	0.03	0.03**	0.03**
	(0.18)	(0.01)	(0.01)
Gross domestic capital formation to GDP	0.15**	0.10*	0.17*
	(0.04)	(0.04)	(0.04)
FDI to GDP	0.22	0.13	0.52*
	(0.12)	(0.11)	(0.11)
Exports growth x Exports to GDP	0.18*	0.13***	-
	(0.09)	(0.07)	
Exports real growth	-	0.25*	-
		(0.07)	
Adjusted R^2	0.43	0.54	0.57[a]

Note: Values in (.) are the standard errors. "*", "**" and "***" represents the 1%, 5% and 10% significance levels, respectively.
[a] The reported R^2 for the semi-parametric model is the unadjusted R^2

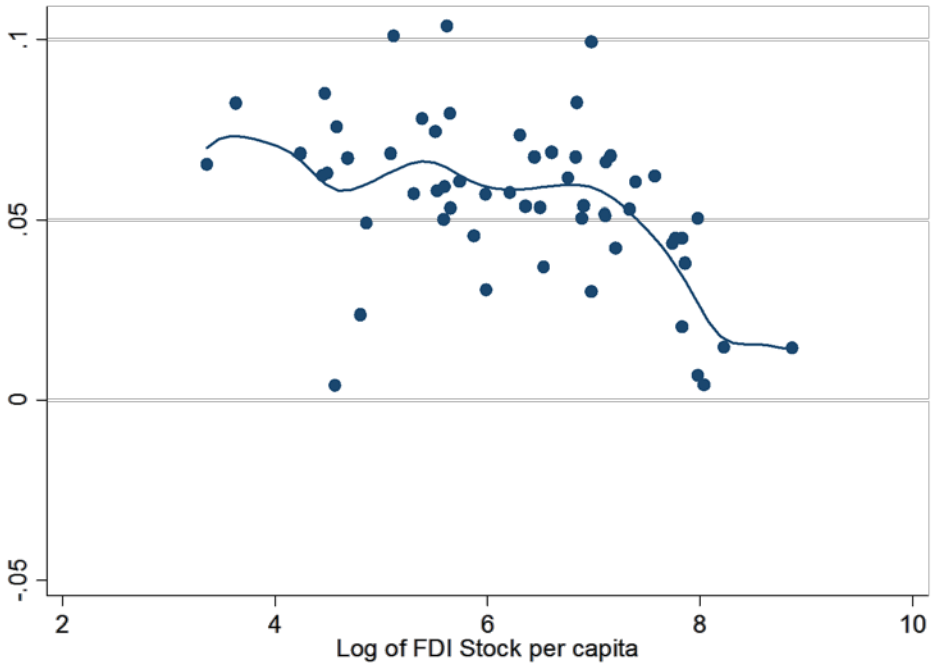

Figure 1. Nonlinear link between the real GDP growth rate and FDI inward stocks per capita in logs

5. Conclusion

The relationship between FDI and economic growth has long been a subject of great interest in the development literature. Despite the seemingly general agreement among international financial institutions advisors and policy-makers in many developing countries regarding the productivity and growth effects from FDI, there is no empirical consensus on a positive effect of FDI on host-country growth, nor on the direction of causation.

One of the reasons behind the wide range of contradictory empirical results is likely the presence of nonlinearities in FDI and growth relationship. This paper provides updated exploration of the impact of FDI in promoting economic growth in developing economies. Based on a dualistic growth model originally developed by Feder (1982) and partial linear regression approach, the theoretical framework allows capturing both direct and as well as indirect effects of FDI on economic growth across 58 developing countries during the period 1990-2011. It contributes to the existing literature in two ways. Firstly, the linearity constraint in investigating the role of FDI on economic growth is released by using a nonlinear econometric model. Secondly, the adoption of the dualistic growth model framework allows identifying the spillover effects of FDI.

Consistent with theoretical predictions, the results of the parametric part show that labor force, quality of human capital, domestic investment and FDI were individually and separately found to be positively and significantly correlated with economic growth. Moreover, the semi-parametric smooth estimated impact of FDI on GDP growth rate is now 4 times larger than the estimated impact based on the linear specification with sectoral externality. The robustness of the semi-parametric model against the parametric model is tested and corroborated.

The findings of the present study tend to support the view that inward FDI plays an important role during the development process. Firstly, as an important determinant of growth, secondly, by creating higher factor productivities in exports sector and finally, through spillover affects due to fostering the linkages between the foreign investors and their host country partners.

Appendix

Table A
Countries covered and data averages

		Ten-year period averages (2011-2002)					
COUNTRY	**REGION**	**Real GDP growth**	**FDI inward Stocks per capita**	**FDI inflows to GDP**	**Mean years of schooling**	**Labor force growth rate**	**Real Export goods growth rate**
		(%)	**(US $)**	**(%)**	**(years)**	**(%)**	**(%)**
Albania	Central-Eastern Europe and Central Asia	5.01	685	5.6	8.9	-0.5	14.9
Algeria	Africa	3.85	356	1.4	6.7	2.2	6.8
Angola	Africa	11.49	1074	3.4	4.5	3.7	10.2
Armenia	Central-Eastern Europe and Central Asia	8.01	863	6.1	10.9	0.9	7.9
Azerbaijan	Central-Eastern Europe and Central Asia	13.82	936	10.8	10.8	2.4	16.4
Bangladesh	Asia	5.98	29	0.9	4.7	2.0	13.0
Barbados	Latin America	1.32	7121	8.8	9.3	0.5	-2.2
Belarus	Central-Eastern Europe and Central Asia	7.53	549	2.5	10.5	0.5	8.0
Bolivia	Latin America	4.20	627	2.7	7.3	2.5	7.9
Bosnia & Herzegovina	Central-Eastern Europe and Central Asia	3.49	1069	4.4	7.5	0.1	12.2
Brazil	Latin America	3.97	1632	2.5	6.5	1.8	6.1
Bulgaria	Central-Eastern Europe and Central Asia	4.45	3748	12.4	10.3	-0.5	9.4
Cambodia	Asia	7.96	269	7.3	3.7	3.0	13.7
Cameroon	Africa	3.27	129	1.4	5.2	2.9	-2.9
China	Asia	11.04	284	2.6	6.9	0.6	18.4
Colombia	Latin America	4.58	1227	3.6	6.8	3.3	5.6
Costa Rica	Latin America	4.41	2367	5.9	8.1	2.4	7.4
Côte d'Ivoire	Africa	0.68	286	1.6	3.9	1.3	0.2
Dominican Republic	Latin America	4.73	1220	3.9	7.1	2.1	1.8
Ecuador	Latin America	4.52	736	1.3	7.3	1.8	6.4
Egypt	Africa	4.71	576	4.0	5.9	3.2	7.6
Ethiopia	Africa	8.41	38	2.6	2.0	3.5	8.6
Georgia	Central-Eastern Europe and Central Asia	6.64	999	9.6	12.1	-0.7	11.2
Ghana	Africa	6.78	218	4.1	6.5	3.2	9.2
Guatemala	Latin America	3.53	396	1.7	4.1	3.0	4.5
India	Asia	7.69	89	1.8	5.0	1.3	13.8
Indonesia	Asia	5.65	311	1.3	7.3	1.6	2.5
Iran	Middle East	4.92	266	1.1	7.4	2.2	1.8
Jamaica	Latin America	0.67	2918	5.7	9.2	1.3	-3.5
Jordan	Middle East	6.05	2514	10.5	9.8	4.1	5.0
Kazakhstan	Central-Eastern Europe and Central Asia	7.73	2931	8.6	11.5	1.4	8.8
Kenya	Africa	4.45	69	1.7	5.9	2.6	3.8
Madagascar	Africa	2.34	96	5.8	5.7	3.6	3.7

Table A (continued)

COUNTRY	REGION	Ten-year period averages (2011-2002)					
		Real GDP growth (%)	FDI inward Stocks per capita (US $)	FDI inflows to GDP (%)	Mean years of schooling (years)	Labor force growth rate (%)	Real Export goods growth rate (%)
Mexico	Latin America	2.36	2582	2.6	7.8	2.4	2.4
Morocco	Africa	4.75	978	2.6	4.0	1.7	3.5
Mozambique	Africa	7.61	163	9.2	2.9	2.3	9.6
Myanmar	Asia	9.78	167	5.3	3.8	0.5	8.2
Nigeria	Africa	8.73	275	2.2	5.2	2.5	2.1
Oman	Middle East	2.78	3095	3.1	7.3	6.9	0.0
Pakistan	Asia	4.75	85	1.8	4.4	3.0	5.5
Peru	Latin America	6.20	925	4.2	8.4	3.1	5.7
Philippines	Asia	4.85	202	1.3	8.6	2.6	3.6
Sudan	Africa	6.18	246	3.8	2.9	1.9	5.1
Syria	Middle East	3.56	251	2.1	5.9	1.3	-3.3
Thailand	Asia	4.36	1344	3.0	6.9	1.1	7.6
Tunisia	Africa	3.73	2305	4.0	6.0	1.7	2.8
Turkey	Central-Eastern Europe and Central Asia	5.86	1285	1.8	6.3	1.9	9.5
Turkmenistan	Central-Eastern Europe and Central Asia	12.74	1229	7.6	9.9	2.3	6.8
Uganda	Africa	7.71	108	3.7	4.8	3.8	7.1
Ukraine	Central-Eastern Europe and Central Asia	3.83	661	4.6	11.1	-0.5	5.3
Uruguay	Latin America	4.17	1951	4.8	8.2	0.7	9.3
Uzbekistan	Central-Eastern Europe and Central Asia	7.35	98	2.1	10.2	3.0	5.2
Venezuela	Latin America	3.54	1542	1.0	7.9	2.4	-2.1
Vietnam	Asia	6.76	399	5.6	6.7	2.0	10.7
Zambia	Africa	7.48	498	6.2	6.4	2.4	8.7
Zimbabwe	Africa	-2.17	122	1.1	7.0	2.6	3.4

References

Alagöz, M., Erdoğan, S., Topalli, N. (2008), Foreign direct investment and economic growth: Evidence from Turkey 1992-2007. Gaziantep University-Journal of Social Sciences, 7, pp.78-89.

Aurangzeb, Z and Stengos, T, (2014), The role of Foreign Direct Investment (FDI) in a dualistic growth framework: A smooth coefficient semi-parametric approach, Borsa Istanbul Review, 14, pp.133–144.

Azam, M. & Ahmed, A.M. (2014), Role of human capital and foreign direct investment in promoting economic growth: Evidence from Commonwealth of Independent States. Journal of Economic Studies, vol. 41, no. 6, pp.434-449.

Basu, P., and Guariglia, A. (2007), Foreign direct investment, inequality, and growth. Journal of Macroeconomics 29 (4), pp.824–39.

Batten, J. A., and Vo, X. V. (2009), An analysis of the relationship between foreign direct investment and economic growth. Applied Economics 41 (13), pp.1621–41.

Begum, M., Salahuddin, M., Chowdhury, M. and Wahid, A.N. (2018), Foreign Direct Investment-growth Nexus Revisited: New Evidence from Bangladesh. International Journal of Economics and Financial Issues, 8(3), pp.168-174.

Borensztein, E., De Gregorio, J., and Lee, J.-W. (1998), How does foreign direct investment affect economic growth? Journal of International Economics 45 (1), pp.115–35.

Bornschier, V., Chase-Dunn, C., and Rubinson, R. (1978), Cross-national evidence of the effects of foreign investment and aid on economic growth and inequality: A survey of findings and a reanalysis. American Journal of Sociology 84 (3), pp.651–83.

Carkovic, M., and R. Levine. (2005), Does Foreign Direct Investment Accelerate Economic Growth? in T.H. Moran, E.M. Graham, and M. Blömstrom. Does foreign direct investment promote development? Washington, DC: Institute for International Economics and Center for Global Development.

Choe, J.I. (2003), Do foreign direct investment and gross domestic investment promote economic growth? Review of Development Economics, 7, pp.44-57.

Durham, J. B. J. (2004), Absorptive capacity and the effects of foreign direct investment and equity foreign portfolio investment on economic growth. European Economic Review 48 (2), pp.285–306.

Ekanayake, E.M. & Ledgerwood, J.R. (2010), How does foreign direct investment affect growth in developing countries? An empirical investigation. The International Journal of Business and Finance Research, vol. 4, no.3, pp. 43-53.

Feder, G. (1982), On exports and economic growth. Journal of Development Economics, 12, pp.59-73.

Fry, M. J. (1993), Foreign direct investment in a macroeconomic framework: Finance, efficiency, incentives, and distortions. Working Paper 1141. Washington, DC: World Bank International Economics Department.

Hansen, H., and Rand, J. (2006), On the causal links between FDI and growth in developing countries. World Economy 29 (1), pp.21–41.

Hardle W. and E. Mammen. (1993), Comparing nonparametric versus parametric regression fits, Annals of Statistics, 21, pp.1926-1947.

Robinson P.M. (1988), Root-N-consistent semiparametric regression. Econometrica, 56 pp.931-954.

Mullen, J.K., Williams, M. (2005), Foreign direct investment and regional economic performance. Kyklos, 58, pp.265-282.

Nair-Reichert, U., and Weinhold, D. (2001), Causality tests for cross-country panels: A new look at FDI and economic growth in developing countries. Oxford Bulletin of Economics and Statistics 63 (2), pp.153–71.

Prasad, E. S., Rajan, R. G., and Subramanian, A. (2007), Foreign capital and economic growth. Brookings Papers on Economic Activity 2007 (1), pp.153–230.

Reisen, H., and Soto, M. (2001), Which types of capital inflows foster developing country growth? International Finance 4 (1), pp.1–14.

Roy, S., Mandal, K.K. (2012), Foreign direct investment and economic growth: An analysis for selected Asian countries. Journal of Business Studies Quarterly, 4, 15.

Tan, B., Tang, C. (2016), Examining the causal linkages among domestic investment, FDI, trade, interest rate and economic growth in ASEAN-5 Countries. International Journal of Economics and Financial Issues, 6(1), pp.214-220.

UNCTAD World Investment Report (2018), United Nations, New York

Verardi, V. and N. Debarsy, (2012), Robinson's square root of N consistent semiparametric regression estimator in Stata, Stata Journal, vol. 12(4), pp.726-735.

Walz ,U. (1997), Innovation, foreign direct investment and growth, Economica, pp.63-79.

Williams, K. (2017), "Foreign Direct Investment, Economic Growth, and Political Instability," Journal of Economic Development, vol. 42(2), pp.17-37.

Yao, S. (2006), On economic growth, FDI and exports in China. Applied Economics, 38, pp.339-351.

Yaoxing, Y. (2010), The relationship between foreign direct investment, trade openness and growth in Cote d'Ivoire. International Journal of Business and Management, 5, 99.