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Foreign Direct Investment, Public Debt and Economic Growth in Developing Countries

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ABSTRACT

This study focuses on the FDI-public debt-economic growth nexus in developing countries. Two-step system generalized method of moments (GMM) estimation is applied in dynamic panel data models using a dataset covering 67 developing countries in the period from 2000 to 2019. The findings reveal that FDI is a growth stimulus factor and the growth effect of public debt is nonlinear. While FDI enhances the positive growth effect of public debt, public debt impedes FDI-induced growth. In country groups by region, public debt has a largest negative impact on the growth effect of FDI in African, while in Asian and Latin American countries, this impact is less. In country groups by income level, the impact of public debt on FDI growth effect is negative in middle income countries and none in high income countries. FDI extends the range of positive growth effect of public debt in middle income countries while it reduces the negative growth effect of public debt in high income countries.

Keywords: Developing countries, Economic growth, FDI, Public debt

1. Introduction

The role of foreign direct investment (FDI) and public debt in economic growth of developing countries has received great attention from researchers (Rahman et al., 2019; Cicea and Marinescu, 2021). As a prominent determinant of economic growth, FDI is well considered as an effective source of capital contribution and an important vehicle for transfer of technology to host countries (De Mello, 1999). Via FDI, developing countries not only acquire foreign capital

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to add in their insufficient capital stock, but also can benefit foreign advanced technology and productivity spillovers from foreign to domestic firms. As summarized by Crespo and Fontoura (2007), FDI productivity spillovers work through four main channels including labor mobility, demonstration, competition, and backward and forward linkages. Labor mobility enables local workers who get trained with new skills and knowledge by foreign firms to create positive externality on other workers once they change employment and work for domestic firms. Demonstration effect facilitates the learning and adoption of foreign technology and effective ways of doing business by domestic firms based on their closed observation of foreign firms. High pressure of competition from foreign firms force domestic firms to find ways to increase their productivity. Through linkages that foreign firms establish with local firms, foreign firms provide technical supports to their local firms in form of training and transferring technology and management know-how.

A vast number of empirical works has been conducted to study the growth impact of FDI in developing countries. Majority of the studies supported for growth stimulus factor of FDI. Using a sample of 69 developing countries over the period from 1970 to 1989, Borensztein et al. (1998) found a positive effect of FDI on economic growth of host countries. However, the growth effectiveness of FDI depends upon the absorptive capability of the host country as measured by their stock of human capital. In a study for 31 developing countries in the 1970-2000 period, Hansen and Rand (2006) analyzed the Granger causal relationships between FDI and GDP and concluded that FDI causes growth and the growth impact of FDI is realized via knowledge transfers and adoption of new technology. Using a dataset of 91 countries over the period 1975-2005, Azman-Saini et al. (2010) confirmed a positive growth effect of FDI. However, they stressed on the role of financial development and argued that FDI inserts a positive growth effect only after a certain threshold level of financial development is reached. Liang et al. (2021) considered the case of 113 developing and transition countries from 2000 to 2019 and found a positive relationship between FDI and economic growth of host countries. The same conclusion of FDI-induced growth is reached in a study by Sinha and Sengupta (2022) for 30 Asia-pacific developing countries in the 2001-2017 period.

Theoretically, there are conflicting views on the growth effect of public debt (Saungweme and Odhiambo 2018). In one line of arguments, public debt deteriorates economic growth. The argument is led by well-known debt overhangs theories (Krugman, 1988). The theories claimed that high accumulation of debt causes government to increase taxes which result in lower returns on investment and therefore a reduction in investment. Lower investment slows down economic growth. Ahlborn and Schweickert (2018) further argued that private sector may consider public debt as an indicator of economic uncertainty. An increase in sovereign debt rises economic uncertainty which discourages investors from making investment in the country. In addition, a

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large stock of debt limits government spending and cuts in productive public investment in long term would harm economic growth (Agenor and Montiel, 1996). In another line of arguments, public debt has a positive effect on economic growth. Public debt is the result of excessive government spending over tax revenue. According to Azolibe (2022), when government spending is in productive investment such as provision for infrastructure and human development then such productive investment would increase capital and labor productivity which fosters economic growth. Public debt stimulates economic growth when borrowing funds are used effectively and constructively in the manner that increases productivity of the economy's resources. Yet there is a third view that combines the two lines of arguments and predicts nonlinear effects of public debt on economic growth – that is, reasonable debt level is expected to have a positive growth effect and when the accumulated level of debt is large then the growth effect of debt becomes negative (Reinhart and Rogoff, 2010).

Empirical studies on the impact of public debt on economic growth in developing countries produced mixed results supporting for these three views (Rahman et al., 2019). A negative effect of public debt on economic growth is commonly found, for instance, studies by Tahir et al. (2019) for the South Asian Association for Regional Cooperation (SAARC) countries over the period from 2008 to 2015, Asteriou et al. (2021) for 14 Asian countries from 1980 to 2012, Musa et al. (2023) for 44 developing countries from 1990 to 2000. Other studies supported for a positive effect of public debt on economic growth (among them are Abbas and Christensen (2007) for 93 low-income countries and emerging economies in the 1975-2004 period, Fincke and Greiner (2015) for eight emerging market economies from 1980 to 2012, Jacobo and Jalile (2017) for 16 Latin American countries from 1960 to 2015). Using a dataset of 57 developing countries in the 1990-2011 period, Megersa and Cassimon (2015) found a negative impact of public debt on economic growth. However, when countries are clustered based on the quality of public sector management then a negative growth effect of public debt exists in countries with poor public sector management while in countries where quality of public sector management is strong, public debt has a positive relationship with economic growth.

A nonlinear relation between public debt and economic growth in developing countries is evident in many studies. A threshold analysis is a common technique used to determine the threshold level of public debt. Reinhart and Rogoff (2010) used histograms summarizing evidence from 24 emerging countries for the period 1900-2009 and found that at a low level, public debt has a detrimental effect on growth rate of GDP. When public debt reaches 90% of GDP, it starts to have a negative effect and causes growth to decrease considerably. This public debt-growth nexus is confirmed by Caner et al. (2010) when studying for 75 developing countries from 1980 to 2008, however, the public debt/GDP threshold is found at 64%. Using a dynamic panel dataset of 71 developing countries in the 1984-2015 period, Law et al. (2021)

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found a threshold public debt-to-GDP ratio at 51.65%. Below this threshold level, debt has a positive but insignificant effect on economic growth while above it, the effect of debt on economic growth is negative and significant. A quadratic functional form is another technique used to identify a hump-shaped relationship between public debt and economic growth. Applying fixed effect estimation for a quadratic model on a sample of 99 developing countries, Elbadawiet et al. (1997) found an inverted U-shaped curve between public debt and economic growth or the so called "debt Laffer curve". The turning point of debt is 92% of GDP indicating that below this threshold, pubic debt positively affects economic growth and above it growth effect of debt is negative. In their study for Southern African Developing Communities countries over the period from 2000 to 2018, Makhoba et al. (2022) found a turning point of debt at 60% of GDP.

FDI or public debt plays its own role in economic growth of developing countries. The question that arises is does each factor affect the growth effect of the other? More precisely, does FDI (public debt) stimulate or impede the growth effect of public debt (FDI)? While numerous studies on the impacts of FDI and public debt on economic growth in developing countries have been conducted, the majority of studies focused on the growth effect of FDI and public debt in separation and lack of studies looking into this issue. The aim of this study is to fill this gap when we unveil the influencing impact that FDI or public debt has on growth effect of the other factor. The study is conducted for a sample of developing countries worldwide as a whole group, and country groups by geographical region and by income level.

The rest of the paper is organized as follows. Section 2 provides model specification, data and methodology. Results and discussion are presented in section 3 and finally section 4 is conclusion.

2. Model specification, data and methodology

2.1. Model specification

The economy's production function is assumed to take a Cobb-Douglas form as

$$Y_t = e^{\theta X_t t} A_t K_t^{\alpha} L_t^{\beta} \quad (1)$$

Total output (Y) is a function of capital stock (K), labor stock (L) and total factor productivity (A). To account for the impact of FDI or public debt on total output, in the production function X presents FDI or public debt. FDI and public debt are measured in relative size expressed as the level of FDI or public debt in relative to total output. Total factor productivity accounts for all

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factors other than capital and labor inputs that affect total output. Factors included in TFP for this model are human capital and level of financial development.

Taking the natural logarithm both sides of the production function and differentiating with respect to time to derive the growth equation as

$$\frac{\dot{Y}}{Y} = \frac{\dot{A}}{A} + \alpha\frac{\dot{K}}{K} + \beta\frac{\dot{L}}{L} + \theta X \qquad (2)$$

The growth equation specifies that growth of output $(\dot{Y}/Y)$ is determined by growth of capital $(\dot{K}/K)$, growth of labor $(\dot{L}/L)$, total factor productivity growth $(\dot{A}/A)$ and change in either FDI or public debt. Based on the theoretical growth equation, the baseline regression equation is written as

$$GRGDP_{i,t} = c + \beta_1 GRGDP_{i,t-1} + \beta_2 GRK_{i,t} + \beta_3 GRL_{i,t} + \beta_4 GRHC_{i,t} + \beta_5 RFIND_{i,t} + \beta_6 X_{i,t} + e_{i,t} \qquad (3)$$

where subscript *i* denotes country and *t* denotes time (in year).

To examine the effect of FDI on economic growth and how public debt affects the growth effect of FDI, the interaction term between FDI and public debt is incorporated into the baseline regression equation.

$$GRGDP_{i,t} = c + \beta_1 GRGDP_{i,t-1} + \beta_2 GRK_{i,t} + \beta_3 GRL_{i,t} + \beta_4 GRHC_{i,t} + \beta_5 RFIND_{i,t} + \beta_6 FDI_{i,t} + \beta_7 FDI_{i,t} * DEBT_{i,t} + e_{i,t} \qquad (4)$$

The effect of FDI on economic growth is the sum of its own effect and the influencing effect of public debt.

$$\frac{dGRGDP}{dFDI} = \beta_6 + \beta_7 DEBT \qquad (5)$$

Similarly, to examine the effect of public debt on economic growth and how FDI affects the growth effect of public debt, the interaction term between FDI and public debt is incorporated into the baseline regression equation.

$$GRGDP_{i,t} = c + \beta_1 GRGDP_{i,t-1} + \beta_2 GRK_{i,t} + \beta_3 GRL_{i,t} + \beta_4 GRHC_{i,t} + \beta_5 RFIND_{i,t} + \beta_6 DEBT_{i,t} + \beta_7 SQDEBT_{i,t} + \beta_8 FDI_{i,t} * DEBT_{i,t} + e_{i,t} \qquad (6)$$

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A quadratic functional form of public debt is used as it can detect the nonlinear relation of public debt and economic growth. The effect of public debt on economic growth is the sum of its own effect and the influencing effect of FDI.

$$\frac{dGRGDP}{dDEBT} = \beta_6 + 2\beta_7 DEBT + \beta_8 FDI \quad (7)$$

Variable description

GDP growth (GRGDP): this variable is measured as the annual growth rate of GDP. Data for GDP (in 2011 USD) is taken from the Penn World Table (Feenstra et al., 2015).

Growth of capital (GRK): this variable is measured as annual growth rate of capital stock. Data for stock of capital (in 2011 USD) is taken from the Penn World Table (Feenstra et al., 2015).

Growth of labor (GRL): this variable is measured as the annual growth rate of labor stock. Data for the stock of labor as measured by the number of employed people who are engaged in production activities is taken from the Penn World Table (Feenstra et al., 2015).

Growth of human capital (GRHC): this variable measures the annual growth rate of human capital level. A proxy for human capital level is the level of education attainment which is captured in Education index (UNDP Human Development Reports). The index has score ranging from 0 to 1.0.

Rate of financial development (RFIND): this variable is measured as the annual percentage change in a country's level of financial development. The Financial Development Index which is developed by the International Monetary Fund measures the level of financial development as it captures the complex multidimensional nature of financial development encompassing access, depth and efficiency of countries' financial institutions and financial markets. The index has score ranging from 0 to 1.0.

FDI intensity (FDI): this variable measures the relative presence of FDI which is the ratio of net inflows of foreign direct investment and GDP (in %). Data for net inflows of foreign direct investment is taken from World Development Indicators (World Bank).

Public debt (DEBT): this variable measures the size of public debt which is the ratio of general government gross debt and GDP (in %). Data on public debt is taken from World Economic Outlook Database (International Monetary Fund).

SQDEBT: this variable is square of public debt measured as squaring the size of public debt.

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FDI*DEBT: this variable is the interaction term between FDI and public debt measured as the product of FDI intensity and the size of public debt.

2.2 Data

The study is conducted with 67 developing countries worldwide as classified by the United Nations in the period from 2000 to 2019. Based on the availability and consistency of data for all countries, the starting period of the study is chosen to be 2000. Since data provided by the Penn World Table is unavailable from 2020 onwards, the end period of the study is 2019.

2.3 Methodology

As reasoned in Law et al. (2021), economic growth has its lagged effect since the growth rate in this year is affected by the growth rate in previous year. To capture the persistence of this behavior, a lagged growth rate of GDP variable is incorporated into the model and the inclusion of the lagged dependent variable makes the model a type of dynamic. Generalized Method of Moments (GMM) estimation is an advanced technique which is appropriate to use in a dynamic panel data model. As pointed out by Roodman (2009), GMM estimation is effective for a sample with a large number of identities and a small number of time. In this study, the number of time (20 years) is less than number of identities (67 countries). The Arellano-Bover/Blundell-Bond system GMM is preferred to the Arellano-Bond difference GMM for it moderates the poor instruments of the difference GMM by using additional moment conditions. Moreover, Asamoaha et al. (2016) argued that GMM two-step estimator is known to be asymptotically efficient and robust to all forms of heteroskedasticity. Therefore, the two-step system GMM estimation is chosen by applying xtabond2 package in Stata program developed by Roodman (2009). The estimated results are valid and accepted if the three tests including first-degree and second-degree autocorrelation tests and Hansen test of overidentifying restriction are passed.

3. Results and discussion

The regression results for the growth effect of FDI are presented in Table 1. As can be seen in this table, GDP growth has its lagged effect when growth of GDP in previous year positively affects GDP growth of current year. As well expected, output growth is determined by growth of inputs including capital and labor. However, the contribution of capital to economic growth ($\beta = 0.42$, p-value < 0.01) is much higher than the growth contribution of labor ($\beta = 0.06$, p-value < 0.01).

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Table 1. Growth effect of FDI in developing countries

	Coef.	Std. Err
$GRGDP_{-1}$: Lagged GDP growth	0.172***	0.011
GRK: Growth of capital	0.415***	0.015
GRL: Growth of labor	0.059***	0.018
GRHMC: Growth of human capital	0.083***	0.026
RFIND: Rate of financial development	0.015***	0.003
FDI: FDI intensity	0.311***	0.014
FDI (intensity) * DEBT (size of public debt)	-0.003***	0.000
Year dummies	Yes	
AR(1) test (p-value)	0.000	
AR(2) test (p-value)	0.466	
Hansen test (p-value)	0.267	
Number of instruments	63	
Number of observations	1244	

Note: *** p < 0.01, ** p < 0.05, * p < 0.1

Growth of human capital has a positive effect on economic growth in developing countries (β = 0.08, p-value < 0.01). Higher level of education attainment enriches the quality of labor force and therefore increases labor productivity and speeds up the adoption and diffusion of new technology transferred via FDI. There is a positive relation between the rate of financial development and economic growth (β = 0.02, p-value < 0.01). Higher financial development facilitates the channel of funds from savers to investors that increase capital accumulation and enhance efficient use of the capital stock contributing positively to economic growth. A positive effect of financial development on economic growth of developing countries is evident in Hassan et al. (2011).

FDI shows to be an economic growth stimulus factor (β = 0.31, p-value < 0.01). Foreign direct investment contributes positively to economic growth in developing countries. This result confirms a common finding of a positive growth effect of FDI in literature.

The interaction term of FDI and public debt has a negative and significant effect (β = -0.003, p-value < 0.01). This indicates that public debt has a negative impact on FDI-induced growth or the existence of debt burden reduces the positive effect of FDI on economic growth. There is a plausible explanation for this. The key contribution of FDI to economic growth of the host country is the diffusion of technology and productivity spillovers to domestic firms. As well argued in the literature (Crespo and Fontoura, 2007), FDI productivity spillovers take place via demonstration and competition effects and linkages between foreign and local firms. Domestic firms can observe and mimic foreign technology (demonstration effect), are forced to increase

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their productivity (competition effect) and acquire technical support via established linkages with foreign firms. All of these lead to the need for upgrading their technology level. Investment in new adopted technology requires substantial amount of funds. Public debt is the result of government borrowing from internal and external bodies. Internal borrowing by the government would raise domestic interest rates and make it harder and more costly for private investors to borrow for their investment. Besides, as public debt is considered to be an indicator of economic uncertainty (Ahlborn and Schweickert, 2018), larger public debt raises economic uncertainty causing investment to be more risky and less worthy. Faced with higher interest rates and economic uncertainty, domestic firms are likely to delay their investment in upgrading technology resulting in a slower economic growth.

The growth effect of FDI is equal to 0.31 - 0.003*Debt. This means the existence of public debt reduces the growth effect of FDI. For example, if there is no public debt then an increase in FDI intensity by 1 percent leads to 0.31 percentage point increase in GDP growth rate. If the size of public debt is 10 percent then an increase in FDI intensity by 1 percent leads to 0.28 percentage point increase in GDP growth rate. The higher the size of public debt, the lower the growth impact of FDI. If the size of public debt is 103 percent then it fully crowds out the growth effect of FDI.

The regression results for the growth effect of public debt are presented in Table 2. Except for variables of public debt and its interaction term, the effect of all other variables is almost similar to that in Table 1. With a positive sign for the coefficient value of debt variable ($\beta = 0.0226$, p-value < 0.01) and a negative sign for the coefficient value of square of debt variable ($\beta = -0.00022$, p-value < 0.01), there exists an inverted U-shaped curve between public debt and economic growth. The effect of public debt on economic growth is nonlinear. Public debt shows to have a positive effect on economic growth at first and after reaching the turning point, the growth effect of public debt becomes negative. This finding supports for the view on the existence of a debt Laffer curve in developing countries. The value of turning point of debt is found at 51.13% of GDP, beyond which increases in public debt slow down economic growth.

Table 2. Growth effect of public debt in developing countries

	Coef.	Std. Err
$GRGDP_{-1}$: Lagged GDP growth	0.210***	0.017
GRK: Growth of capital	0.468***	0.021
GRL: Growth of labor	0.083***	0.028
GRHMC: Growth of human capital	0.050	0.031
RFIND: Rate of financial development	0.020***	0.004
DEBT: Size of public debt	0.0226***	0.008

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SQDEBT: Square of size of public debt	-0.00022***	0.0000
DEBT (size of public debt) * FDI (intensity)	0.001***	0.000
Year dummies	Yes	
AR(1) test (p-value)	0.000	
AR(2) test (p-value)	0.635	
Hansen test (p-value)	0.100	
Number of instruments	45	
Number of observations	1244	

Note: *** p < 0.01, ** p < 0.05, * p < 0.1

The interaction term of public debt and FDI has a positive and significant effect (β = 0.001, p-value < 0.01). This indicates that FDI enhances the positive growth effect of public debt. The growth effect of public debt is equal to 0.0226 + 0.001*FDI - 0.00044*Debt. This means the relative presence of FDI affects the debt turning point. For example, if there is no FDI then the value of debt turning point is 51.13% of GDP. If FDI intensity is 10 percent then the debt turning point's value increases to 73.9% of GDP. The higher the FDI intensity, the higher the value of debt turning point. In other words, higher presence of FDI extends the range of positive growth effect of public debt. There are possible explanations for the enhancing effect of FDI on the public debt-growth relation. First, public debt causes higher domestic interest rates and therefore discourages private domestic investment. FDI is not affected by domestic interest rates and the inflow of FDI would offset the reduction of private domestic investment and so keep total investment from declining. For this reason, FDI would lessen the negative effect of public debt on economic growth. Second, FDI may complement government spending on productive investment. Productive public investment on infrastructure and human development increases the country's technological absorptive capacity which facilitates the progress of technology transfer and knowledge diffusion from foreign firms. Higher economic growth is the result of more successfully adoption of advanced foreign technologies via FDI.

Next, the study is extended to examine the growth effects of FDI and public debt in country groups by different regions and income levels. By region, countries are grouped into three regions based on their geographical location namely Asia, Africa and Latin America and the Caribbean. Dummy variables are used to distinguish the regions. FDI growth effect shows differences among the three geographical regions while there is no regional difference in the growth effect of public debt. Table 3 presents the growth effect of FDI in country groups by geographical region. FDI has a largest positive effect on economic growth in African region (β = 0.47, p-value < 0.01), followed by Asian region (β = 0.32, p-value < 0.01) and in Latin American and the Caribbean region, the growth effect of FDI is smallest (β = 0.12, p-value < 0.01). Public debt has a negative impact on FDI-induced growth in all regions, though the magnitude of the impact varies. African region suffers a largest negative impact of public debt on the growth effect of FDI (β = -0.005, p-value < 0.01). The size of the impact of public debt on FDI growth

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effect is smallest in Latin American and the Caribbean regions (β = -0.001, p-value < 0.01) and followed by Asian region (β = -0.002, p-value < 0.01).

Table 3. Growth effect of FDI in country groups by geographical region

	Coef.	Std. Err
$GRGDP_{-1}$: Lagged GDP growth	0.173***	0.011
GRK: Growth of capital	0.378***	0.016
GRL: Growth of labor	0.051**	0.025
GRHMC: Growth of human capital	0.077***	0.025
RFIND: Rate of financial development	0.018***	0.003
FDI: FDI intensity	0.330***	0.039
DUMMY – Africa	0.142***	0.045
DUMMY – Latin America and the Caribbean	-0.207***	0.064
FDI (intensity) * DEBT (size of public debt)	-0.002***	0.000
DUMMY – Africa	-0.003***	0.000
DUMMY – Latin America and the Caribbean	0.001*	0.000
Year dummies	Yes	
AR(1) test (p-value)	0.000	
AR(2) test (p-value)	0.431	
Hansen test (p-value)	0.245	
Number of instruments	67	
Number of observations	1244	

Note: *** p < 0.01, ** p < 0.05, * p < 0.1

By income level, countries are divided into middle income and high income groups. Table 4 presents the growth effect of FDI in country groups by income level. There is a clear difference in the growth effect of FDI between middle and high income country groups. FDI shows a strong positive effect on economic growth in the middle income country group (β = 0.43, p-value < 0.01). In these countries, public debt has a negative impact on FDI-induced growth (β = -0.004, p-value < 0.01). In the high income country group, there is a limited positive growth effect of FDI (β = 0.04, p-value < 0.01), however, public debt has no impact on the growth effect of FDI (β = 0, p-value < 0.01).

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Table 4. Growth effect of FDI in country groups by income level

	Coef.	Std. Err
$GRGDP_{-1}$: Lagged GDP growth	0.165***	0.011
GRK: Growth of capital	0.372***	0.017
GRL: Growth of labor	0.087***	0.022
GRHMC: Growth of human capital	0.066**	0.025
RFIND: Rate of financial development	0.013***	0.003
FDI: FDI intensity	0.421***	0.021
DUMMY – High income	-0.381***	0.021
FDI (intensity) * DEBT (size of public debt)	-0.004***	0.000
DUMMY – High income	0.004***	0.000
Year dummies	Yes	
AR(1) test (p-value)	0.000	
AR(2) test (p-value)	0.386	
Hansen test (p-value)	0.205	
Number of instruments	65	
Number of observations	1244	

Note: *** p < 0.01, ** p < 0.05, * p < 0.1

Regression results for the growth effect of public debt in country groups by income level are presented in Table 5. Public debt has a nonlinear effect on economic growth in the middle income country group. The value of debt turning point is found at (50.87 + 2.17*FDI) % of GDP indicating that higher presence of FDI extends the range of positive growth effect of public debt. In the high income country group, public debt has a negative effect on economic growth (β = -0.011, p-value < 0.01). However, higher presence of FDI reduces the negative growth effect of public debt (β = 0.001, p-value < 0.01).

Table 5. Growth effect of public debt in country groups by income level

	Coef.	Std. Err
$GRGDP_{-1}$: Lagged GDP growth	0.204***	0.017
GRK: Growth of capital	0.473***	0.022
GRL: Growth of labor	0.096***	0.030
GRHMC: Growth of human capital	0.030	0.031
RFIND: Rate of financial development	0.018***	0.004
DEBT: Size of public debt	0.0233***	0.009
DUMMY – High income	-0.0339***	0.012
SQDEBT: Square of size of public debt	-0.00023***	0.0000

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DUMMY – High income	0.00026***	0.00009
DEBT (size of public debt) * FDI (intensity)	0.001***	0.000
DUMMY – High income	-0.0002	0.000
Year dummies	Yes	
AR(1) test (p-value)	0.000	
AR(2) test (p-value)	0.614	
Hansen test (p-value)	0.078	
Number of instruments	48	
Number of observations	1244	

Note: *** p < 0.01, ** p < 0.05, * p < 0.1

4. Conclusion

FDI or public debt plays its own role in economic growth of developing countries. However, each factor can have an influencing impact on the growth effect of other factor. Using a dataset comprising of 67 developing countries over the period from 2000 to 2019, the study investigates the impact that FDI or public debt has on the growth effect of the other. There are several remarkable findings from this study.

In group of developing countries as a whole, FDI plays as a growth stimulus factor when larger inflows of FDI foster economic growth. The effect of public debt on economic growth is nonlinear. Public debt has a positive effect on economic growth until it reaches the turning point, beyond which increases in public debt hamper economic growth. Public debt impedes the growth effect of FDI as an increase in the size of public debt reduces the positive effect that FDI has on economic growth. FDI enhances the positive growth effect of public debt. Higher presence of FDI increases the value of debt turning point and therefore extends the range of positive growth effect of public debt. This finding stresses on the importance of FDI when FDI plays two roles in determining economic growth - its own role and its indirect role via the positive influencing impact on the growth effect of public debt.

In country groups by geographical region, FDI has a largest positive growth effect in African region, however, this region suffers the highest negative impact of public debt on the growth effect of FDI. The growth effect of FDI is higher in Asian region than in Latin American and the Caribbean region, while the negative impact of public debt on FDI growth effect is the same in these regions. In country groups by income level, the positive growth effect of FDI is much higher in middle income countries than in high income countries. However, while public debt has a negative impact on FDI growth effect in middle income countries, the impact is none in high income countries. In middle income countries, the growth effect of public debt is nonlinear,

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but in high income countries, public debt has a negative effect on economic growth. FDI enhances the positive growth effect of public debt in middle income countries and reduces the negative growth effect of public debt in high income countries.

Some important policy implications can be drawn from these findings. First, since FDI plays such an important role in economic growth in developing countries, governments should take the status of FDI in the economy seriously and therefore should attract more inflows of FDI to the countries. In order to achieve this goal, determinants of FDI in developing countries need to be identified and based on which appropriate policies and measures are provided to lure inward FDI. Second, for public debt to have a positive effect on economic growth, borrowing funds should be used effectively and constructively in the manner that increases productivity of the economy's resources. Public spending should be allocated to productive investment in infrastructure development and human capital formation including education, training and health care activities. However, quality of public investment projects should be of concern. Transparency would be a key point to avoid corruption, waste of resources and ensure projects are well managed.

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Appendix

List of 67 developing countries in the study

Algeria, Argentina, Bahamas, Bahrain, Barbados, Belize, Brazil, Bolivia, Botswana, Cabo Verde, Cameroon, Chile, China, Colombia, Congo, Costa Rica, Côte d'Ivoire, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Fiji, Gabon, Ghana, Guatemala, Honduras, Hong Kong, India, Indonesia, Iran, Israel, Jamaica, Jordan, Kenya, Korea (Republic of), Kuwait, Lebanon, Maldives, Malaysia, Mauritius, Mexico, Mongolia, Morocco, Namibia, Nicaragua, Nigeria, Oman, Pakistan, Panama, Paraguay, Peru, Philippines, Qatar, Saudi Arabia, Singapore, South Africa, Sri Lanka, Suriname, Thailand, Trinidad and Tobago, Tunisia, Turkey, United Arab Emirates, Uruguay, Venezuela, Viet Nam

