

## The Impact of Foreign Direct Investment on Economic Growth in High- and Middle-Income Countries: Evidence from Panel Data Analysis

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### Abstract

The last two decades have seen a growing trend towards foreign direct investment (FDI), particularly in developing countries, where FDI is seen as an important component of their economic development strategy. Aside from being an essential factor in economic growth in emerging and developed countries. Hence, this study examined the relationship between (FDI) and economic growth in a sample of 60 countries- according to different income levels- using panel data for the period 2000-2019. The study concluded that (FDI) has a positive impact on economic growth. Interestingly, there were also differences in impact ratio, according to income levels; (FDI) in the lowest-income countries has a greater impact on economic growth compared to the high countries; increasing FDI by 1% boosts economic growth by 0.13%, 0.17%, and 0.03% in middle-income countries (lower segment), middle-income countries (upper segment), and high-income countries, respectively. In contrast to earlier findings, however, the results of this investigation show that (FDI) is statistically significant in explaining variation in the growth rates of the economies of the observed countries.

**Keywords:** Foreign Direct Investment, FDI, Economic Growth, Income, Panel Data.

JEL Classification: F21, F43, C23, O47

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## أثر الاستثمار الأجنبي المباشر على النمو الاقتصادي في البلدان مرتفعة ومتوسطة الدخل باستخدام نماذج بانل داتا

### ملخص

في العقد الماضي، نمت تدفقات الاستثمار الأجنبي المباشر بسرعة في جميع أنحاء العالم، ولا سيما في البلدان النامية، حيث ترى الاستثمار الأجنبي المباشر عنصراً مهماً في استراتيجية التنمية الاقتصادية. إلى جانب كونه عاملاً أساسياً في النمو الاقتصادي في الدول الناشئة والمتقدمة. من هنا بحثت هذه الدراسة في العلاقة بين الاستثمار الأجنبي المباشر والنمو الاقتصادي في عينة من (60) دولة على مستوى العالم - طبقاً لمستويات الدخل المختلفة- باستخدام بيانات (البانل داتا) للفترة 2000-2019. وقد توصلت الدراسة إلى أن الاستثمار الأجنبي المباشر له تأثيراً إيجابياً على النمو الاقتصادي وإن كانت تختلف نسبة التأثير حسب مستويات الدخل؛ حيث اتضح أن الاستثمار الأجنبي المباشر في الدول الأقل دخلاً يؤثر بصورة أكبر على النمو الاقتصادي مقارنة بالدول الأعلى دخلاً؛ زيادة الاستثمار الأجنبي المباشر بنسبة 1% تعزز النمو الاقتصادي بنسبة 0.13% و 0.17% و 0.03% في البلدان المتوسطة الدخل (الشريحة الدنيا) والبلدان المتوسطة الدخل (الشريحة العليا) والبلدان المرتفعة الدخل، على التوالي. على النقيض من نتائج سابقة، تشير نتائج هذه الدراسة أن الاستثمار الأجنبي المباشر ذو دلالة إحصائية في تفسير التباين في معدلات نمو اقتصادات البلدان محل الدراسة.

الكلمات المفتاحية: الاستثمار الأجنبي المباشر، النمو الاقتصادي، الدخل، بانل داتا.

## 1. Introduction

Foreign direct investment (FDI) is one of the main determinants of economic growth in emerging economies, especially those that suffer from a financing gap because of the low level of saving over investment as a percentage of GDP. Foreign investment is characterized by relative stability compared to foreign investment in financial markets (Harms & Méon, 2018; Hayat, 2018), which is affected by short-term changes in both foreign exchange and international financial markets (Lipsey, 2001). Therefore, FDI flows have become preferred for both developing and developed countries (Iihan, 2007).

FDI provides for developed and developing countries the capital investments required to achieve economic growth and development. FDI differs from other types of capital flows because it not only includes capital, but also includes job

creation, enhancing workers' skills, and technology transfer and processing for developing countries and management methods and experiences about production and markets, which contribute to economic growth (Jude & Levieuge, 2015; Morrissey, 2012; Rehman, 2016; Umeora, 2013). FDI also plays a role in marketing exports, encouraging productivity and increasing the competitiveness of local industries (Madariaga & Poncet, 2007). It also works to replace imports, thus increasing the efficiency, quality and diversity of the local market (Adams, 2009; Shimul et al., 2009). In addition to introducing new operations to the local market (Alfaro et al., 2009).

In the fifties and sixties of the last century, FDI was viewed with great suspicion by most developing countries, as it was seen as a threat to national sovereignty, and multinational companies were suspected, but as time progresses and the need for developing countries for non-traditional sources of investment and unproductive debt; the loan is used to fund war and relief operations. Unproductive public loans impose a net cost on the community. In addition to the effects of globalization, which have had a significant impact on the dynamics of FDI, and in light of the increasing need for additional foreign capital to achieve development goals, which led to a radical change in the position of developing countries (Chowdhury & Mavrotas, 2006), developing countries strive to attract increasing levels of FDI, by providing direct and indirect incentives represented in resources, relatively cheap labor and new markets, and by relying on greater liberalization policies, and by relying on market forces in the economies (Abbes et al., 2015; Asghar et al., 2011; Carp, 2012; Soltani & Ochi, 2012). Hence, FDI is seen as an effective channel for technology transfer and growth promotion in developing countries, in contrast to the belief prevailing in the fifties and sixties of the last century that it is detrimental to growth (Kok & Ersoy, 2009). Also, FDI may provide new capital, allowing additional investments in both human and physical capital, which is very beneficial for developing countries, and thus FDI becomes of great value, especially if the investments take the form of new or expanded production plants. or a new technology (Busse & Groizard, 2011). This is what benefits these countries in the long term (Popescu, 2014).

The importance of FDI is much higher for developing countries, which is due to the inability of most of these countries to achieve adequate coverage of their consumer needs. Moreover, one of the reasons for high economic growth in Asia is due to FDI flows, and therefore FDI is one of the most effective ways of integrating the economies of the developing world with the world (Pradhan, 2009; Tran Thi Anh & Dinh Thi Thanh, 2013). As a result, FDI is one of the

most effective means of gaining easy access to the global market. (Nicet-Chenaf & Rougier, 2009).

Globally, FDI rebounded strongly during 2019, as the value of FDI flows amounted to 1.54 trillion US dollars, compared to 1.495 trillion US dollars in 2018, an increase of 3%. FDI to developed countries amounted to \$800 billion in 2019, representing 52% of the total global investment flows during the year, while the value of FDI to developing countries during 2019 amounted to \$685 billion, including It represents approximately 44.5%, while the value of FDI to countries in transition amounted to 55 billion dollars during 2019, representing 3.5%. (UNCTAD, 2020). The following table shows the development of FDI in the world during the period from 2000-2019.

**Table (1): FDI Inflows in the World (2000-2019, billion US dollar)**

Years	World	Developed Economies	% Of World	Developing Economies	% Of World	Transition Economies	% Of World
2000	1356	1119	83	232	17	5.9	0.4
2001	772.7	548.5	70.98	216	27.95	8.3	1.07
2002	589.9	413.6	70.11	166.2	28.17	10	1.70
2003	550.6	337.9	61.37	194.8	35.38	17.8	3.23
2004	692.5	401.6	57.99	261.9	37.82	29	4.19
2005	947.7	585.7	61.80	331.3	34.96	30.7	3.24
2006	1403.6	941.1	67.05	403.7	28.76	58.8	4.19
2007	1891.7	1282.1	67.78	522.4	27.62	78.2	4.13
2008	1490.1	794.3	53.31	578	38.79	117.7	7.90
2009	1236.1	714	57.76	460.3	37.24	61.8	5
2010	1396.2	710.4	50.88	622	44.55	63.8	4.57
2011	1615.1	870.8	53.92	664.8	41.16	79.4	4.92
2012	1493.8	762.7	51.06	666.2	44.60	65	4.35
2013	1456.3	716.5	49.20	656	45.05	83.9	5.76
2014	1403.9	669.6	47.70	677.3	48.24	57	4.06
2015	2040.8	1274.4	62.45	729.9	35.77	37.5	1.84
2016	1983.5	1265.2	63.79	652	32.87	66.3	3.34
2017	1700.5	950.2	55.88	700.6	41.20	49.7	2.92
2018	1495.2	761.4	50.92	699.3	46.77	34.5	2.31
2019	1539.9	800.2	51.96	684.7	44.46	54.9	3.57

Source: UNCTAD (<http://www.unctad.org>)

Table (1) shows the increase in the percentage of FDI in both developing countries and countries in transition during the study period. It is noted that the percentage of FDI in developing countries increased from 17% at the beginning of the period to about 45% at the end of the period. This indicates the importance of the increasing role of FDI for these countries, compared to the decline in the proportion of investments to developed countries from 83% at the beginning of the period to 52% at the end of the period.

As for the percentage of the contribution of FDI to the gross domestic product, in terms of the level of income, it can be addressed through the following figure:

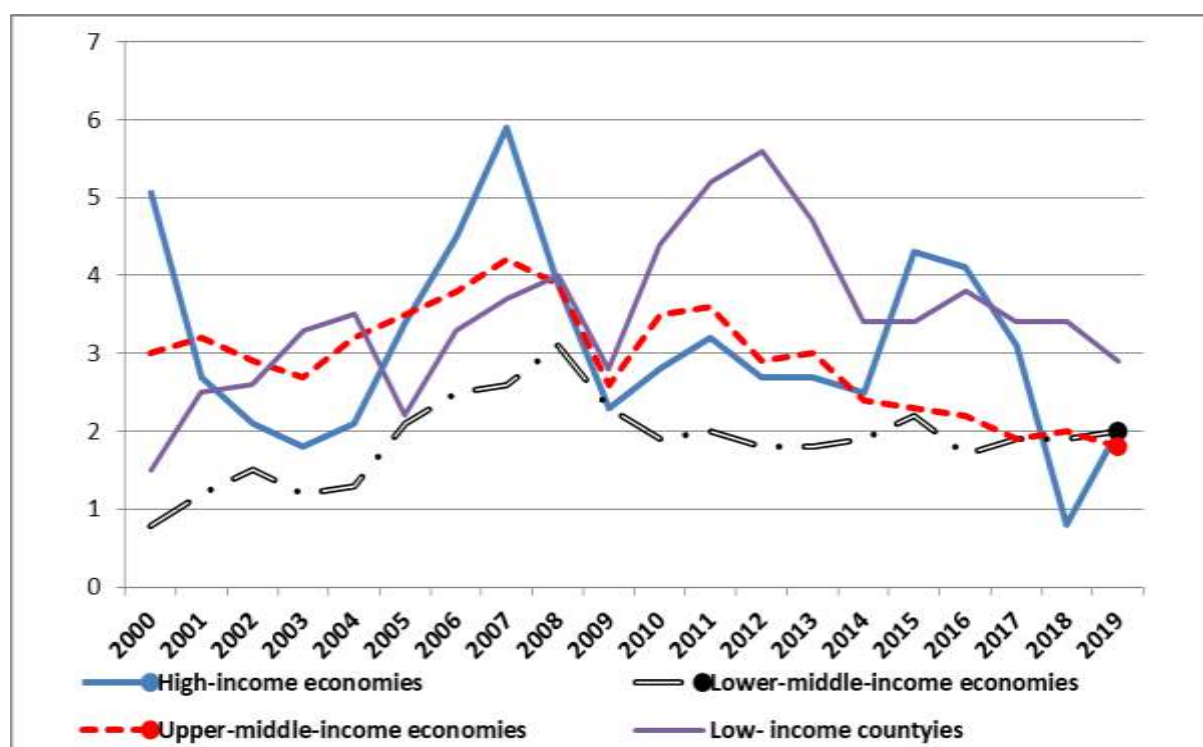


Figure (1): FDI as a Share of GDP, 2000-2019

Source: World Bank.

Figure (1) shows that although high-income countries tend to retain a large proportion of FDI compared to lower-income countries, it is noted that low-income countries, where the proportion of FDI to GDP is high, and it may reach in some years to a greater proportion than that of high-income countries, which is explained by the fact that the increase in FDI in low-income countries by a certain value leads to a significant increase in the proportion of FDI in GDP, since these countries have low GDP. For example, a country whose GDP is \$100 billion, an increase in FDI by \$1 billion, results in an increase in investment to GDP by 1%, unlike a country whose GDP is \$1,000 billion, the increase in investment to GDP would be 0.1%, etc.

**Table (2): The Average Economic Growth and FDI of GDP during the Period (2000-2019)**

High-income economies			Upper-middle-income economies			Lower-middle-income economies		
	Average annual Growth %	Average FDI Inflows of GDP %		Average annual Growth %	Average FDI Inflows of GDP %		Average annual Growth %	Average FDI Inflows of GDP %
Belgium	1.7	12	Albania	4.3	6.9	Angola	5.5	2.8
Canada	2.66	3.26	Argentina	2	2	Bangladesh	6.2	0.9
Switzerland	1.9	5.12	Bulgaria	3.6	8.3	Bolivia	4.2	3
Czechia	2.91	4.97	Brazil	2.4	3.3	Côte d'Ivoire	3.5	1.6
Germany	1.35	2.57	China	9	3.1	Cameroon	4.2	1.8
Denmark	1.46	2	Colombia	3.8	3.8	Algeria	3.3	1.1
Spain	1.85	3.11	Ecuador	3.4	1.1	Egypt	4.4	2.9
Finland	1.67	3.62	Indonesia	5.3	1.3	Ghana	6.1	5.1
France	1.42	2.1	Iraq	5	-0.28	India	6.5	1.6
United Kingdom	1.85	4.42	Jamaica	0.8	5.1	Morocco	4.1	2.8
Iceland	3.18	4.25	Jordan	4.4	7.6	Mauritania	3.5	7.5
Israel	3.46	3.85	Mexico	2.1	2.8	Nigeria	5.7	1.6
Italy	0.4	1.22	Malaysia	5.1	3.2	Pakistan	4.3	1.2
Japan	0.9	0.28	Peru	4.8	3.9	Philippines	5.5	1.6
Netherlands	1.55	22.6	Paraguay	3.4	1.1	Senegal	4.6	2.1
Portugal	0.89	4.04	Russian Federation	3.7	2.2	El Salvador	2	2.4
Saudi Arabia	3.49	2.22	Serbia	3.6	7.4	Tunisia	3.1	3
Singapore	5.12	19.8	Thailand	4	2.7	Ukraine	2.6	3.8
Sweden	2.3	3.7	Turkey	5	1.6	Viet Nam	6.5	5.5
United States	2.09	1.8	South Africa	2.6	1.6	Zambia	5.9	5.4

Source: Data from the World Bank.

Table (2) shows a great variation among countries in the rate of economic growth. It is noted that this rate is high in some Asian countries, compared to the rest of the countries, where the average growth in China during the period reached 9%, as a primary result of China's openness to the international economy, in parallel with the domestic reform, attracting FDI, in addition to investing abroad and participating in global governance (Garnaut & Fang, 2018). India follows with an average of 6.5%, which is due to the recovery in the index of industrial production (IIP), gross fixed capital formation (GFCF), and indicators of consumer demand (Paruchuru et al., 2020). Vietnam followed with the same rate of 6.5%, which is due to the growth in

export earnings, FDI, value added in agriculture, forestry, and fisheries sector, in addition to regional economic integration with the Association of Southeast Asian Nations (ASEAN), which had positive effects on the economic growth (Tru, 2018). It is followed by Bangladesh with an average of 6.2%, which is mainly due to the growth in private sector investments and the significant growth in exports, specifically in ready-made garments, which represent about 84% of the total exports, which represents about 35% of the sector's contribution to the economy. (Hossain, B., & Wadood, S. N. 2020).

For the Netherlands and Singapore, the attractive investment climate, with advantages such as the country's physical and digital infrastructure, educated labour force, stable government and policy, tax regime, efficient labour market, and investments in innovation and technology, is an important factor in Singapore and the Netherlands achieving high levels of FDI.

As for the contribution of investment to GDP, it is noted that high-income countries tend to maintain a large volume of FDI compared to lower-income countries (Johnson, 2006), where the average ratio of FDI to GDP for a sample of high-income countries during the period 5.3% and middle-income countries (the upper group) reached 3.4%, and in the countries of the (lower group) this percentage reached 2.9%.

## **2. Literature Review**

The specific objective of this study is to investigate the relationship between FDI and economic growth, through a sample of 60 countries, during the period from 2000-2019. Although FDI is very important to countries, there is no agreement about the positive relationship between FDI inflow and economic growth. Much of the literature indicates that studies only in less developed economies tend to clearly show a positive relationship, while research that focused on developed countries only finds no benefit to the economic growth of the recipient country (Gürsoy et al., 2013). FDI promotes economic growth only if certain economic conditions are met in the host country, such as a minimum level of human capital. The extent to which a country can benefit from FDI is determined by its trade policies, labour force skills, and absorptive capacity. According to Agrawal and Khan (2011), economic development is dependent on the conduciveness of the economic climate. In the absence of such a climate, FDI may be counterproductive, stifling rather than stimulating growth.

The following table shows some of these studies, which dealt with the relationship between FDI and economic growth during the period from 1999 to 2020.

**The relationship between FDI and economic growth: a critical review of the literature**

Studies	Type of data	Sample	Period	Effects of FDI on Growth
De Mello (1999)	Panel data and time series	32 countries (15 OECD and 17 non- OECD)	1970-1990	Not strong: Positive for OECD, but negative effect for non-OECD
Choe (2003)	a panel VAR model	80 countries	1971-1995	Positive
Bacic et al, (2004)	Panel data	11 transition economies	1994-2002	FDI is not statistically significant in explaining variation in the growth rates of the observed economies.
Makki& Somwaru, (2004)	SUR, 2SLS, Estimates	66 developing countries	1971-2000	Positive
Carkovic & Levine,( 2005)	Panel data	72 countries	1960-1995	Negative
Hansen & Rand, 2006	Panel data and time series	31 developing countries covering three continents	1970-2000	Positive
Johnson, (2006)	Panel data	90 countries developed and developing economies.	1980-2002	FDI has a positive impact on developing countries, and on the contrary, it has no impact on the group of developed countries.
Bhandari et al., (2007)	Panel data	6 Countries in the former socialist countries of East urope	1993-2002	Positive
Chee & Nair, (2010)	Panel data	44 countries in the Asia and Oceania	1996-2005	Positive
Herzer,( 2010)	time-series estimators	50 countries		Positive
Neto et al., (2010)	Panel data	53 countries	1996-2006	Positive
Babatunde, (2011)	Panel data	42 Countries in Saharan Africa (SSA) countries	1980-2003	Positive
Kherfi & Soliman, (2011)	Panel data	6 MENA and 17 CEE countries	1979-2002	FDI has a positive impact on economic growth in the European Union countries, while the impact is negative in the Middle East and North Africa and Central and Eastern European countries that are not in the European Union
Tiwari & Mutascu, (2011)	Panel data	23 Asian countries	1986-2008	Positive
Pradhan (2013)	Cointegrated Panel	Indonesia, Malaysia, Philippines, Singapore and Thailand	1970-2005	Positive
Yucel,( 2014)	Panel data	Baltic countries	1996-2008	Positive
Zekarias, (2016)	Panel data	14 eastern asia countries	1980-2013	Positive
Harms & Méon, (2018)	Panel data	127 industrialized, emerging, and developing countries	1990-2010	Positive
NGUYEN (2020)	OLS	Vietnam's	2000-2018	Positive

Previous studies have reported that FDI has had a positive impact on economic growth, and in general, FDI has a significant impact on economic growth through several channels such as capital formation and technology transfer,



enhancing human capital (knowledge and skill), etc. Most of the studies examined the relationship between FDI and economic growth, either on the basis of dividing countries into developed and developing countries, or on the basis

that these countries belong to a particular continent, a particular union, a particular bloc, or a particular organization.

When choosing this sample of countries, the research was based on two basic criteria. The first is to divide these countries into three different groups (in terms of income level). The second criterion is to consider that each of the three groups is representative of different geographical areas, as diverse as possible. This can be seen from the following table.

**Table (3): Geographical Distribution of the Selected Countries**

Continent name		Country	Income Level
Europe (19)	Central Europe (5)	Germany	High-income economies
		Switzerland	High-income economies
		Czechia	High-income economies
		Serbia	Upper-middle-income economies
		Bulgaria	Upper-middle-income economies
	south of Europe (4)	Albania	Upper-middle-income economies
		Italy	High-income economies
		Spain	High-income economies
		Portugal	High-income economies
	Northern Europe (4)	Finland	High-income economies
		Sweden	High-income economies
		Denmark	High-income economies
		Iceland	High-income economies
	western Europe (4)	Belgium	High-income economies
		Netherlands	High-income economies
		United Kingdom	High-income economies
		France	High-income economies
	Eastern Europe (2)	Russian Federation	Upper-middle-income economies
		Ukraine	Upper-middle-income economies

Continent name		Country	Income Level
Asia (16)	East Asia (2)	Japan	High-income economies
		China	Upper-middle-income economies
	Southeast Asia (6)	Indonesia	Upper-middle-income economies
		Thailand	Upper-middle-income economies
		Viet Nam	Lower-middle-income economies
		Philippines	Lower-middle-income economies
		Singapore	High-income economies
		Malaysia	Upper-middle-income economies
	west Asia (5)	Saudi Arabia	High-income economies
		Turkey	Upper-middle-income economies
		Jordan	Upper-middle-income economies
		Iraq	Upper-middle-income economies
		Israel	High-income economies
	South Asia (3)	Pakistan	Lower-middle-income economies
		Bangladesh	Lower-middle-income economies
		India	Lower-middle-income economies
Africa (13)	North Africa (4)	Egypt	Lower-middle-income economies
		Tunisia	Lower-middle-income economies
		Morocco	Lower-middle-income economies
		Algeria	Lower-middle-income economies
	Central Africa (1)	Cameroon	Lower-middle-income economies
	South Africa (3)	South Africa	Lower-middle-income economies
		Angola	Lower-middle-income economies
		Zambia	Lower-middle-income economies

Continent name		Country	Income Level
	West Africa (5)	Ghana	Lower-middle-income economies
		Côte d'Ivoire	Lower-middle-income economies
		Nigeria	Lower-middle-income economies
		Mauritania	Lower-middle-income economies
		Senegal	Lower-middle-income economies
south America (7)		Argentina	Upper-middle-income economies
		Brazil	Upper-middle-income economies
		Colombia	Upper-middle-income economies
		Ecuador	Upper-middle-income economies
		Peru	Upper-middle-income economies
		Paraguay	Upper-middle-income economies
		Bolivia	Lower-middle-income economies
North America (5)		United States	High-income economies
		Canada	High-income economies
		Mexico	Upper-middle-income economies
		El Salvador	Lower-middle-income economies
		Jamaica	Upper-middle-income economies

Table (3) shows the distribution of the countries selected in the study among the five major continents, in addition to the geographical distribution of these countries within the continent. The following table shows geographical distribution and income level of the selected countries.

**Table (4): Geographical Distribution and Income Level of the Selected Countries**

High-income economies		Upper-middle-income economies		Lower-middle-income economies	
Country	Area	Country	Area	Country	Area
Belgium	western Europe	Albania	south of Europe	Angola	South Africa
Canada	North America	Argentina	south America	Bangladesh	South Asia
Switzerland	Central Europe	Bulgaria	Central Europe	Bolivia	south America
Czechia	Central Europe	Brazil	south America	Côte d'Ivoire	West Africa
Germany	Central Europe	China	East Asia	Cameroon	Central Africa
Denmark	Northern Europe	Colombia	south America	Algeria	North Africa
Spain	south of Europe	Ecuador	south America	Egypt	North Africa
Finland	Northern Europe	Indonesia	Southeast Asia	Ghana	West Africa
France	western Europe	Iraq	west Asia	India	South Asia
United Kingdom	western Europe	Jamaica	North America	Morocco	North Africa
Iceland	Northern Europe	Jordan	west Asia	Mauritania	West Africa
Israel	west Asia	Mexico	North America	Nigeria	West Africa
Italy	south of Europe	Malaysia	Southeast Asia	Pakistan	South Asia
Japan	East Asia	Peru	south America	Philippines	Southeast Asia
Netherlands	western Europe	Paraguay		Senegal	
Portugal	south of Europe	Russian Federation	Eastern Europe	El Salvador	North America
Saudi Arabia	west Asia	Serbia	south America	Tunisia	North Africa
Singapore	Southeast Asia	Thailand	Southeast Asia	Ukraine	Eastern Europe
Sweden	Northern Europe	Turkey	west Asia	Viet Nam	Southeast Asia
United States	North America	South Africa	South Africa	Zambia	South Africa

### 3. Methods/Data

The study seeks to apply an empirical model to measure the impact of net FDI flows on economic growth, during the period from 2000-2019, and the study relies on the panel data analysis method, a model that combines time series data and cross-sectional data together (Pooled Time Series - Cross Section Analysis).

The data was obtained from the World Development Indicators (WDI), except for the human capital variable, which was obtained from the United Nations Development Program. A sample of 60 countries was selected. These countries were divided into three groups, each group 20 countries, according to income levels (according to the classification of the World Bank), as follows:

The first group: middle-income countries (lower tier), which includes:

Angola, Bangladesh, Bolivia, Côte d'Ivoire, Cameroon, Algeria, Egypt, Ghana, India, Morocco, Mauritania, Nigeria, Pakistan, Philippines, Senegal, El Salvador, Tunisia, Ukraine, Viet Nam, Zambia.

The second group: middle-income countries (the upper group), which includes:

Albania, Argentina, Bulgaria, Brazil, China, Colombia, Ecuador, Indonesia, Iraq, Jamaica, Jordan, Mexico, Malaysia, Peru, Paraguay, Russian Federation, Serbia, Thailand, Turkey, South Africa.

The third group: high-income countries, which includes:

Iceland, Belgium, Canada, Switzerland, Czechia, Germany, Denmark, Spain, Finland, France, United Kingdom, Israel, Italy, Japan, Netherlands, Portugal, Saudi Arabia, Singapore, Sweden, United States.

The model includes several variables. The structure of the model used will take the following form:

$$GDP = \beta_0 + \beta_1FDI + \beta_2GFCG + \beta_3HDI + \beta_4OPEN + \beta_5P-GROTH + \beta_6INF + \beta_7UNEMP + \mu_t$$

Where,

Real growth rate	GDP	Y
Net FDI inflow of GDP	FDI	X1
Gross fixed capital formation as a percent of GDP	GFCG	X2
Human capital composite index, including rate of change in health, knowledge, and standard of living	HDI	X3
Trade openness (goods and services exports and imports from GDP)	OPEN	X4

Population Growth Rate	P-GROTH	X5
Inflation rate	INF	X6
Unemployment rate	UNEMP	X7
Random variable	Mt	

As discussed above, the general model will take into account both cross-sectional and temporal effects, in order to express the existence of unobserved and heterogeneous differences between the sample countries, and that these effects - cross-sectional and temporal - will be treated either as fixed effects or as random effects, so the general model will branch into two basic models:

### 1- Fixed Effect Model (FEM)

This model assumes that unobserved and heterogeneous differences, whether cross-sectional or temporal (the period from 2000-2019) will be treated as constants, meaning that the model assumes that there are constants that vary according to each country, or according to each time (every year) of in order to contain the unseen effects. Thus, this model relies on the basic assumption that country- or year-specific effects are related to the explanatory variables included in the general model.

### 2- Random Effect Model (REM)

Unlike the fixed-effect model, this model assumes that cross-sectional and temporal effects are treated as independent random features with a mean equal to zero and a specific variance and added as random components within the random error limit of the general model. Thus, this model is based on a basic assumption that random effects are not related to the explanatory variables of the model, or at least to one of them.

To compare between (FEM) and (REM), to determine which of the two models is more significant for estimating the relationship, the Hausman test will be conducted, which states whether there is a correlation between the explanatory variables and the unobserved effects, specifically testing the estimations of the two models, under the null hypothesis (H0) that (REM) is better than (FEM), versus (H1) which states that the (FEM) is the best (William, 2003).

### The effect of FDI on economic growth in lower middle-income countries

Before estimating the regression equation, the stability of the economic variables included in the model must be ensured to avoid misleading results. In general, this requires conducting a test to avoid the Spurious Regression. The following table shows the results of these tests.

**Table (5): Stationarity Tests (Lower Middle-Income)**

Variable		First difference			Level				Decision
		ADF	PP		ADF		PP		
	trend and intercept	intercept	trend and intercept	intercept	trend and intercept	intercept	trend and intercept	intercept	
GDB	238.2 (0.0000)	320.4 (0.0000)	353.9 (0.0000)	1231 (0.0000)	115.7 (0.0000)	83.86 (0.0001)	111.46 (0.0000)	111.87 (0.0000)	I (0)
FDI	218.2 (0.0000)	522.2 (0.0000)	281.65 (0.0000)	564.49 (0.0000)	93.156 (0.0000)	102.3 (0.0000)	78.64 (0.0003)	96.69 (0.0000)	I (0)
GFCG	159.60 (0.0000)	203.258 (0.0000)	185.458 (0.0000)	226.07 (0.0000)	55.05 (0.0568)	42.96 (0.3467)	30.596 (0.857)	37.127 (0.6003)	I (1)
HDI	263.43 (0.0000)	390.69 (0.0000)	407.96 (0.0000)	2281.93 (0.0000)	199.10 (0.0000)	144.38 (0.0000)	221.58 (0.0000)	167.54 (0.0000)	I (0)
OPEN	162.26 (0.0000)	199.2 (0.0000)	189.98 (0.0000)	243.08 (0.0000)	33.22 (0.767)	36.208 (0.64)	31.49 (0.829)	37.57 (0.579)	I (1)
P-GROTH	144.31 (0.0000)	64.99 (0.0075)	40.89 (0.431)	60.389 (0.0202)	48.03 (0.179)	113.26 (0.0000)	59.91 (0.0223)	52.87 (0.0836)	I (0)
INF	254.67 (0.0000)	341.71 (0.0000)	402.81 (0.0000)	1165.1 (0.0000)	148.29 (0.0000)	119.59 (0.0000)	129.46 (0.0000)	340.41 (0.0000)	I (0)
UNEMP	157.68 (0.0000)	189.518 (0.0000)	186.29 (0.0000)	208.839 (0.0000)	48.90 (0.157)	65.16 (0.0072)	35.89 (0.65557)	60.004 (0.0219)	I (0)

As shown by the results of the Unit Root test using two Augmented Dickey Fuller (ADF) Test, PP - Fisher Chi-square, the time series of GDP growth rate, the net inflow of FDI, change in human capital, and rate of increase the population, the inflation rate, and the unemployment rate are stationary at 1%, integrated of degree I (0). As for the time series of both fixed capital and trade openness, both are stationary after taking the first difference, that is, they are integrated of the first degree I (1).

A comparison was made between Fixed Model & Random Model using the Hausman Test, to determine which of the two models is more significant for estimating the relationship, and the results were as follows:

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	14.644763	7	0.0408

The results of the Hausman Test showed that the P-value is less than 5%, then we can reject the null hypothesis (H0) in favor of the alternative hypothesis (H1). That is, the fixed effect model is the best. The results of the estimation using the fixed effect model were as follows:

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.141185	1.813442	5.040794	0.0000
X1_?	0.128663	0.049788	2.584227	0.0102
X2_?	0.087905	0.052730	1.667066	0.0964
X3_?	1.867746	0.195303	9.563312	0.0000
X4_?	0.092961	0.034023	2.732325	0.0066
X5_?	-2.474206	0.819194	-3.020293	0.0027
X6_?	-0.044619	0.015492	-2.880075	0.0042
X7_?	-0.297297	0.077709	-3.825779	0.0002
<b>Fixed Effects (Cross)</b>				
01--0	4.548999			
02--0	-1.167084			
03--0	-1.489388			
04--0	-0.598519			
05--0	0.475561			
06--0	0.985383			
07--0	1.946709			
08--0	2.680607			
09--0	0.102061			
10--0	-1.826546			
11--0	2.339901			
12--0	2.443474			
13--0	-0.885077			
14--0	0.383875			
15--0	1.638201			
16--0	-5.443534			
17--0	-0.789284			
18--0	-6.534828			
19--0	-2.178797			
20--0	3.572408			
<b>Effects Specification</b>				
Cross-section fixed (dummy variables)				
R-squared	0.409605	Mean dependent var	4.634730	
Adjusted R-squared	0.366120	S.D. dependent var	3.150419	
S.E. of regression	2.508257	Akaike info criterion	4.745455	
Sum squared resid	2220.847	Schwarz criterion	5.025414	
Log likelihood	-874.6364	Hannan-Quinn criter.	4.856544	
F-statistic	9.419407	Durbin-Watson stat	1.627909	
Prob(F-statistic)	0.000000			

(R-squared = (41%) that is, 41% of the changes in the dependent variable (GDP) are due to the change in the independent variables (FDI, GFCG, HDI, OPEN, P-GROTH, INF, UNEMP) and 59% are due to other factors. The explanatory variables explain 41% of the change in the rate of economic growth in the sample of countries located in the lower middle-income bracket, and the value of F test = (9.41294) is greater than critical value @ 1%, then we can reject the null hypothesis (H0) in favor of the alternative hypothesis (H1). That is, there is a long-term relationship between the dependent variable and the independent variables at 1%.

The model results indicate the significance of the parameter of FDI as a percentage of GDP, at 5%, as its sign is positive (which is consistent with economic theory) and with a coefficient of (0.13), which means that the increase in FDI as a percentage of GDP by 1 percent will result in an increase in the economic growth rate in the lower middle-income countries by 0.087 percent, and this result is consistent with many studies, as we mentioned previously. The results of the other variables were also significant at 1%, the fixed capital as a percentage of the GDP, as it was significant at 10%. The signs of the variables were all in agreement with the economic theory.

The effect of FDI on economic growth in a sample of countries located in the upper middle-income countries. The following table shows the results of these tests.



**Table (6): Stationarity Tests (Upper Middle-Income)**

Variable	First difference				Level				Decision
	ADF		PP		ADF		PP		
	trend and intercept	intercept	trend and intercept	intercept	trend and intercept	intercept	trend and intercept	intercept	
GDB	244.127 (0.0000)	325.75 (0.0000)	357.69 (0.0000)	1358.8 (0.0000)	109.87 (0.0000)	138.145 (0.0000)	117.49 (0.0000)	147.03 (0.0000)	I (0)
FDI	221.27 (0.0000)	342.39 (0.0000)	318.83 (0.0000)	1154.06 (0.0000)	115.85 (0.0000)	137.267 (0.0000)	128.03 (0.0000)	139.53 (0.0000)	I (0)
GFCG	119.80 (0.0000)	156.34 (0.0000)	165.87 (0.0000)	171.79 (0.0000)	22.918 (0.986)	47.87 (0.1836)	18.87 (0.9982)	42.613 (0.3593)	I (1)
HDI	267.86 (0.0000)	522.96 (0.0000)	376.09 (0.0000)	2977.09 (0.0000)	173.45 (0.0000)	205.98 (0.0000)	202.15 (0.0000)	402.69 (0.0000)	I (0)
OPEN	165.97 (0.0000)	241.55 (0.0000)	251.12 (0.0000)	265.71 (0.0000)	66.94 (0.0048)	44.8356 (0.2762)	59.23 (0.0255)	49.616 (0.1417)	I (0)
P-GROTH	187.20 (0.0000)	182.94 (0.0000)	84.58 (0.0000)	144.45 (0.0000)	58.84 (0.0276)	242.05 (0.0000)	45.238 (0.2625)	82.456 (0.0001)	I (0)
INF	273.35 (0.0000)	426.24 (0.0000)	329.85 (0.0000)	1272.03 (0.0000)	148.26 (0.0000)	379.82 (0.0000)	166.27 (0.0000)	431.39 (0.0000)	I (0)
UNEMP	151.001 (0.0000)	163.77 (0.0000)	197.62 (0.0000)	199.19 (0.0000)	57.219 (0.038)	78.10 (0.0003)	51.07 (0.1127)	324.32 (0.0000)	I (0)

The results of the Unit Root test, using Augmented Dickey Fuller (ADF) test and PP - Fisher Chi-square, show that all the variables are stationary and integrated of order I (0) except for the fixed capital variable, which is stationary and integrated of order I (1).

A comparison was made between Fixed Model & Random Model using the Hausman Test, to determine which of the two models is more significant for estimating the relationship, and the results were as follows:

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	19.566460	7	0.0066

The Hausman Test showed that the P-value is less than 5%, then we can reject the null hypothesis (H0) in favor of the alternative hypothesis (H1). That is, the random effect model is the best. The results of the estimation using the fixed effect model were as follows:

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.472250	1.742474	1.992712	0.0471
X1_?	0.172069	0.081604	2.108591	0.0357
X2_?	0.193416	0.099440	1.945059	0.0526
X3_?	3.090981	0.316875	9.754588	0.0000
X4_?	-0.045099	0.028981	-1.556174	0.1206
X5_?	-0.123544	0.525797	-0.234966	0.8144
X6_?	-0.016280	0.028390	-0.573442	0.5667
X7_?	-0.051658	0.110438	-0.467753	0.6403
<b>Fixed Effects (Cross)</b>				
01--C	-1.283783			
03--C	-0.517558			
04--C	-2.223195			
05--C	-2.220087			
06--C	-1.107736			
07--C	-0.494573			
08--C	0.333389			
09--C	2.847899			
10--C	-2.471006			
11--C	2.566217			
12--C	-1.768661			
13--C	3.470763			
14--C	-0.015071			
15--C	0.322310			
16--C	-0.839356			
17--C	-0.700775			
18--C	0.272435			
19--C	-0.471794			
20--C	-0.139571			
<b>Effects Specification</b>				
<b>Cross-section fixed (dummy variables)</b>				
R-squared	0.356992	Mean dependent var		3.982056
Adjusted R-squared	0.309007	S.D. dependent var		4.599250
S.E. of regression	3.823173	Akaike info criterion		5.589335
Sum squared resid	4896.578	Schwarz criterion		5.889421
Log likelihood	-982.8750	Hannan-Quinn criter.		5.700691
F-statistic	7.439567	Durbin-Watson stat		2.259449
Prob(F-statistic)	0.000000			

(R-squared = (36%) that is, the explanatory variables (FDI, GFCG, HDI, OPEN, P-GROTH, INF, UNEMP) explain 36% of the change in the rate of economic growth in the sample of countries located in the upper middle-income bracket, and the value of F test = (7.439567) is greater than critical value @ 1%, therefore there is no reason to reject the linear relationship between the dependent variable and the explanatory variables.

The results of the preliminary analysis of the explanatory variables show the significance of the parameter of FDI as a percentage of GDP, at 5%, as its sign is positive (which is consistent with economic theory) and with a coefficient of (0.17), which means that the increase in FDI as a percentage of GDP by 1 percent will result in an increase in the economic growth rate in the lower middle-income countries by 0.17%, and this result is consistent with many studies, as already mentioned. The results of the fixed capital and the human capital growth were significant, with a sign consistent with the economic theory. As for the variables of trade openness, population growth rate, inflation rate and unemployment rate, their significance has not been proven, and therefore there is no evidence of a relationship between these variables and the rate of economic growth in a sample of upper middle-income

The effect of FDI on economic growth in a sample of countries located in high-income countries. The following table shows the results of these tests.

**Table (7): Stationarity Tests (High Middle-Income) Countries**

Variable	First difference				Level				Decision
	ADF		PP		ADF		PP		
	trend and intercept	intercept	trend and intercept	intercept	trend and intercept	Intercept	trend and intercept	intercept	
GDB	212.06 (0.0000)	291.09 (0.0000)	412.78 (0.0000)	961.212 (0.0000)	116.57 (0.0000)	170.22 (0.0000)	143.45 (0.0000)	190.91 (0.0000)	I (0)
FDI	249.956 (0.0000)	335.75 (0.0000)	360.788 (0.0000)	931.15 (0.0000)	126.6 (0.0000)	189.87 (0.0000)	142.768 (0.0000)	225.928 (0.0000)	I (0)
GFCG	103.05 (0.0000)	147.547 (0.0000)	100.83 (0.0000)	137.69 (0.0000)	64.66 (0.0081)	72.50 (0.0013)	33.49 (0.7566)	53.55 (0.0743)	I (0)
HDI	218.34 (0.0000)	310.95 (0.0000)	373.40 (0.0000)	2136.2 (0.0000)	135.45 (0.0000)	162.028 (0.0000)	164.56 (0.0000)	167.846 (0.0000)	I (0)
OPEN	141.726 (0.0000)	198.06 (0.0000)	205.89 (0.0000)	266.247 (0.0000)	45.59 (0.2507)	24.648 (0.9730)	38.72 (0.5436)	30.1317 (0.8715)	I (1)
P-GROTH	149.40 (0.0000)	168.30 (0.0000)	129.003 (0.0000)	149.508 (0.0000)	83.067 (0.0001)	90.16 (0.0000)	33.09 (0.7721)	47.954 (0.1814)	I (0)
INF	242.98 (0.0000)	318.84 (0.0000)	411.94 (0.0000)	1085.09 (0.0000)	106.55 (0.0000)	123.02 (0.0000)	123.315 (0.0000)	131.17 (0.0000)	I (0)
UNEMP	95.859 (0.0000)	130.172 (0.0000)	97.3103 (0.0000)	120.999 (0.0000)	53.6248 (0.0734)	59.822 (0.0227)	24.70 (0.9724)	31.1395 (0.8411)	I (0)

The results of the Unit Root test, using (ADF) test and PP - Fisher Chi-square, show that all the variables are stationary and integrated of order I (0) except for trade openness variable, which is stationary and integrated of order I (1).

The Hausman test was used to compare the fixed and random models to determine which of the two models was more significant in estimating the relationship. The results are as follows.

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	20.185135	7	0.0052

The results of the Hausman Test showed that the P-value is less than 5%, then we can reject the null hypothesis (H0) in favor of the alternative hypothesis (H1). That is, the random effect model is the best. The results of the estimation using the fixed effect model were as follows:

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.825086	0.911518	-0.905177	0.3660
X1_?	0.025618	0.011648	2.199235	0.0285
X2_?	0.098929	0.037043	2.670683	0.0079
X3_?	1.623189	0.249818	6.497490	0.0000
X4_?	0.180172	0.028188	6.391765	0.0000
X5_?	0.850571	0.146551	5.803936	0.0000
X6_?	-0.073496	0.064912	-1.132239	0.2583
X7_?	-0.109974	0.035186	-3.125503	0.0019
Random Effects (Cross)				
01--C	-0.042608			
02--C	0.115741			
03--C	-0.167152			
04--C	0.049282			
05--C	0.006576			
06--C	-0.068414			
07--C	0.123864			
08--C	-0.007930			
09--C	-0.003365			
10--C	0.080032			
11--C	0.088764			
12--C	0.176623			
13--C	-0.118753			
14--C	-0.181599			
15--C	-0.169368			
16--C	-0.050564			
17--C	-0.136044			
18--C	0.139824			
19--C	0.075344			
20--C	0.089744			
Effects Specification				
			S.D.	Rho
Cross-section random			0.230673	0.0129
Idiosyncratic random			2.015304	0.9871
Weighted Statistics				
R-squared	0.326277	Mean dependent var		1.768046
Adjusted R-squared	0.313600	S.D. dependent var		2.475227
S.E. of regression	2.050708	Sum squared resid		1564.410
F-statistic	25.73659	Durbin-Watson stat		1.524975
Prob(F-statistic)	0.000000			
Unweighted Statistics				
R-squared	0.340954	Mean dependent var		1.975884
Sum squared resid	1587.414	Durbin-Watson stat		1.502875

As can be seen from the table above, (R-squared = (32.6%)) that is, the explanatory variables explain 33% of the change in the economic growth in the sample of countries located in the high-income bracket, and the value of F is greater than critical value @ 1%, therefore there is no reason to reject the linear relationship between the dependent variable and the explanatory variables.

The results obtained from the analysis show the significance of the parameter of FDI as a percentage of GDP, at 5%, as its sign is positive (which is consistent with economic theory) and with a coefficient of (0.025), which means that the increase in FDI as a percentage of GDP by 1 percent will result in an increase in the economic growth rate in the lower middle-income countries by (0.025), and this result is consistent with many studies, as we mentioned previously. However, its impact is weak compared to middle-income countries. The results of the rest of the variables were also significant at the 1% level, except for the inflation rate variable, which was not significant.

## 4. Results

This study has identified the relationship between FDI and economic growth in a sample of 60 countries- according to different levels of income - using panel data for the period 2000-2019. The study concluded that FDI has a positive impact on economic growth, although the effect varies according to income levels, as it was found that FDI in the lowest-income countries has a greater impact on economic growth compared to the higher-income countries.

This study has shown that an increase in FDI by 1% results in an increase in economic growth by 0.13%, 0.17%, and 0.03% in middle-income countries (lower segment), middle-income countries (upper segment) and high-income countries, respectively.

On the other hand, the results of this investigation show that the average ratio of FDI to the GDP of the sample of high-income countries during the period reached 5.3%, and middle-income countries (the upper group) reached 3.4%, and in the countries of the (lower group) reached 2.9%.

During the study period, the percentage of FDI in both developing and transition countries increased. The percentage of FDI in developing countries increased from 17% in 2000-2010 to around 45% in 2019. This highlights the significance of FDI's growing role in these countries, particularly considering the decline in the proportion of investments to developed countries from 83% in 2002 to 52% in 2010. (2011-2019).

## 5. Discussion

This study set out with the aim of assessing the importance of FDI to countries. Several reports have shown a strong relationship between FDI and economic growth. The current study found that the effect of FDI varies according to income levels; FDI in low-income countries has a greater impact on economic growth than high-income countries. A possible explanation for this might be those inflows of FDI have a positive impact on the economic growth of developing countries, whether low or middle income, where there is a set of determinants that are somewhat similar between them, but this is not the case for developed economies. This result may be explained by the fact that in a mature market economy, the difference between domestic and cross-border investment is not prominent.

It is therefore likely that such connections exist between FDI and output growth; the flow of FDI to developing countries is likely to have a greater impact on output growth through productive repercussions. Hence, developing countries

should attract more FDI than in the past from a broader group of countries. Recipient countries can boost FDI by improving their business environment. The focus should be on improvements in areas that are critical to attracting FDI such as the availability of adequate and reliable infrastructure, the rule of law, and the reduction of red tape and corruption.

It can thus be suggested that reducing trade barriers is vital, especially for FDI looking for intermediate inputs and regional exports. While the important objective of attracting FDI is to increase local employment and enhance local production capacity, which will further enhance economic growth in these countries. Accordingly, developing countries can fully exploit the impact of FDI if they have a trained workforce and other essential capabilities that can drive the growth and sustainability of FDI in their economies. Given the significance of FDI in economic development, all governments strive to attract it. The global market for such investment is indeed highly competitive, and developing countries, in particular, seek such investment to accelerate their development efforts. With liberal policy frameworks becoming more common and governments losing some of their traditional ability to attract FDI, they are focusing more on measures that actively facilitate it. However, economic factors continue to be important. What will be more important in the future is the unique combination of locational advantages and, particularly, created assets that a country or region can offer potential investors.

This combination of findings provides some support for the conceptual premise that FDI has an impact on GDP growth regardless of the level of development. There is, therefore, a definite need for sustainable economic growth in the economy, the absence of FDI may restrict or impede economic growth. Future studies on the current topic are therefore recommended.

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