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Impact of FDI on GDP per capita in India using Granger causality

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Abstract

This research investigates the causality between FDI and GDP per capital in the context of India. Using WDI data from 1970-2019, We applied two types of Granger causality tests: long-run causality and short-run causality tests. For the long-run causality, we applied pairwise Granger causality test, and for short-run, we performed the Wald test approach under VECM (Vector Error Correction Model). The long-run causality test indicates that there is a unidirectional causality running from FDI to GDP per capita, implying that FDI causes the GDP per capita to change and not vice-versa. The short-run causality test indicates that there is no causality between FDI and GDP per capita, suggesting that, in the short-run, FDI and GDP per capita does not cause each other. The central policy conclusion from this study is that although FDI does not cause GDP per capita in the short-run, it causes in the long-run. Therefore, according to our study, India should attract FDI to sustain a long-run growth of GDP per capita.

Keywords: GDP per capita, Granger causality, FDI, India, VECM,

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Introduction

An person or a company from another country makes a foreign direct investment (FDI) into a business or a market. Portfolio investment, on the other hand, is rendered more indirectly into another country's economy by using financial instruments such as bonds and stocks. Depending on the types of companies involved and the motives for investment, there are different levels and types of foreign direct investment. A foreign direct investor may merge or acquire a business in the target country, start a new venture, or expand the operations of an existing one. Acquisition of shares in a related business, incorporation of a

wholly owned company or subsidiary, and involvement in an equity joint venture across international borders are all examples of FDI (Borensztein, De Gregorio, & Lee, 1998).

Foreign direct investment is considered to be crucial for a developing economy like India. It helps the target country grow economically, resulting in a more favorable market for policy make as an investor and benefits for local businesses (Asiedu, 2002). A country's own import tariff is normal, and it's one of the reasons why doing business with it can be difficult. In addition, certain companies need a presence in foreign markets in order to ensure that their profits and targets are met fully. Both of these will be made simpler with FDI. Job creation and economic growth. As investors establish new businesses in the target nation, foreign direct investment generates new employment and opportunities. As a result, people's income rises and their purchasing power increases, resulting in a boost in the economy.

One of the major benefits of FDI is the production of human capital resources, which is frequently overlooked because it is not readily visible. Human capital refers to the expertise and abilities of those who can do labor, most generally referred to as the workforce. A country's education and overall human resources will benefit from the attributes acquired through training and sharing knowledge. Its resource is not a tangible asset that businesses own, but rather something that is borrowed. With this in mind, a country that receives FDI will greatly benefit from improving its human capital while retaining power.

Foreign direct investment can promote capital transfers and other forms of information exchanges, allowing different countries to gain access to new technology and skills. Foreign direct investment will be provided by parent companies in order to obtain additional expertise, technology, and goods. As a foreign investor, policy make might be eligible for tax advantages that would be extremely advantageous in policy maker chosen area of business (De Mello, 1997). Foreign direct investment has the ability to close the gap between sales and costs. As a result, countries will be able to ensure that manufacturing prices are consistent and that their goods are readily available for sale. International investors can improve the productivity of a workforce in a target country by providing facilities and equipment.

Another important gain of foreign direct investment is the rise in the income of the target country. The national income usually rises as a result of more employment and higher salaries. As a result, economic development is accelerated. Keep in mind that larger companies typically pay higher wage levels than those found in the target country, which may lead to an increase in income.

FDI, however, has some major flaws particularly in developing countries like India. Foreign direct investment may also stifle domestic investment because it concentrates its capital elsewhere than the investor's home country. Foreign direct investment is highly risky since political problems in other countries can change in a moment. Furthermore, the majority of the risk factors policy make will face are extremely high. Foreign direct investments may often manipulate exchange rates in one country's favor and in the other's disadvantage. policy make will note that investing in certain foreign countries is more costly than exporting goods. As a result, it is critical to budget adequately for the start-up of policy maker company.

Since foreign direct investments are often capital-intensive from the investor's perspective, they can be risky or economically unviable at times. Expropriation is a term used to describe the act of taking something from someone else. Political reforms will result in expropriation, which is when the

government takes ownership of policy maker property and properties. Foreign exchange rate and direct investment regulations can have a negative effect on the investing nation. Some international markets may prohibit investment, making it difficult to pursue a potentially lucrative opportunity.

Many third-world countries, or at least those with a colonial legacy, are concerned that foreign direct investment would result in a kind of modern-day economic colonialism, exposing host countries to foreign corporations' exploitation.

Investing in the economy of another country, acquiring a foreign corporation, or otherwise expanding policy maker business globally can be highly lucrative and provide policy make with the boost policy make need to achieve new heights of success. Foreign direct investment, on the other hand, comes with its own set of risks, so policy make should carefully analyze the economic environment before continuing. It is also important to employ a financial analyst with international experience, as he would be able to provide policy make with a good picture of the current economic landscape in policy maker's target market. He can also assist policy make in keeping an eye on market stability and forecasting future development.

We live in an increasingly globalized economy, so foreign direct investment will become a more open business choice for policy make. However, policy make must first weigh the benefits and drawbacks to decide if this is the right direction to take. This study aims to investigate whether FDI and the Indian economic development has any causal relationship.

Literature review

Using data on FDI flows from industrial countries to 69 developing countries over the last two decades, (Borensztein et al., 1998) used a cross-country regression method to examine the impact of FDI on economic development. Their findings indicate that foreign direct investment (FDI) is an effective tool for technology transfer, contributing significantly more to growth than domestic investment. The higher efficiency of FDI, on the other hand, only holds true when the host country has a certain level of human resources. As a result, FDI only contributes to economic growth when the host economy has a proper absorption capacity of advanced technologies.

The aim of this research by (Zhang, 2001) is to examine the position of foreign direct investment (FDI) in China's economic growth and market-oriented transition. We begin by identifying potential channels through which FDI could have a positive or negative impact on China's economy. We provide an empirical evaluation using a growth model and cross-section and panel data for the period 1984-98, which indicates that FDI appears to assist China's transition and promote income growth, and that this positive growth impact appears to increase over time and is stronger in the coastal than inland regions.

The effect of foreign direct investment (FDI) on Nigeria's economic growth is explored (Benjamin Badeji & Olufunsho Abayomi, 2011). It also uses a two-stage-least squares system of simultaneous calculations to investigate foreign investors' locational preferences and the feasibility of FDI to Nigeria. The findings show that in Nigeria, there is a negative relationship between economic growth (as measured by real GDP) and foreign direct investment (FDI). The scale of exports, the exchange rate, and political stability have all been found to be important factors in foreign investment location decisions in Nigeria. To attract more FDI to Nigeria, the government should encourage more domestic investment, ensure political stability, and make directed economic openness the watchword in this era of global trade and FDI policies, in order to boost FDI growth in the country.

(Mun, Lin, & Man, 2009) intends to use time series data to investigate the relationship between FDI and economic growth in Malaysia from 1970 to 2005. Using annual data on FDI and economic growth in Malaysia from 1970 to 2005, ordinary least square (OLS) regressions and empirical research was carried out. To examine the relationship between FDI and economic growth in Malaysia, the paper used annual data from IMF International Financial Statistics tables released by the International Monetary Fund. The LGDP, LGNI, and LFDI series in Malaysia are all I(1) series, according to the findings. There is ample evidence to indicate that economic growth and foreign direct investment inflows (FDI) have a significant relationship in Malaysia. FDI has a direct positive effect on RGDP; for example, a 1% increase in FDI would result in a 0.046072 percent increase in growth. Furthermore, FDI has a direct positive effect on RGNI since an improvement in the FDI rate of one will result in a 0.044877 percent increase in growth.

(Belloumi, 2014) investigates this problem for Tunisia using the bounds checking (ARDL) method of cointegration for the years 1970 to 2008. When foreign direct investment is the dependent variable, the bounds tests show that the variables of interest are linked together in the long run. The related equilibrium correction is also noteworthy, indicating the presence of a long-run relationship. In the short run, the findings also show that there is no major Granger causality between FDI and economic growth, economic growth and FDI, trade and economic growth, and economic growth and trade. Despite widespread belief that FDI will result in positive spillover externalities for the host nation, our empirical findings for Tunisia do not support this belief. They contradict the widely held belief that foreign direct investment has an automatic positive effect on economic development. The Tunisian findings can be extrapolated and contrasted to other developing countries with similar experiences attracting foreign direct investment and liberalizing trade.

(Chakraborty & Nunnenkamp, 2008) test this hypothesis by using a panel cointegration system to run Granger causality tests on industry-specific FDI and output data. It turns out that the effects of FDI on growth differ significantly across industries. In the production sector, FDI stocks and output are mutually reinforcing, while there is no causal relationship in the primary sector. We find only transitory effects of FDI on production in the services sector, which is particularly striking. Cross-sector spillovers from FDI in the services sector, on the other hand, appear to have boosted manufacturing growth.

(Agrawal & Khan, 2011) investigate the impact of FDI on China's and India's economic development. The study's time frame is set to 1993-2009 in order to address the problem of economic structural change. First and foremost, we built their updated growth model using the basic growth model. GDP, Humal Capital, Labor Force, FDI, and Gross Capital Creation were among the factors used in the growth model, with GDP acting as the dependent variable and the other four as independent variables. After using the OLS (Ordinary Least Square) regression process, we discovered that a 1% increase in FDI would result in a 0.07 percent increase in China's GDP and a 0.02 percent increase in India's GDP. We have discovered that FDI has a greater effect on China's development than it does on India's. The study also discusses the possible reasons for China's strong FDI efficiency, as well as the lessons India can learn from China in order to improve its FDI utilization.

The key contribution of (Choi & Baek, 2017) is to use the cointegrated vector autoregression model to investigate the productivity spillover effects of India's inward foreign direct investment (FDI), thus adjusting for trade (CVAR). The aggregate total factor productivity (TFP) in India is calculated using the Solow residual method to calculate FDI-induced spillovers for this reason. The findings show that FDI

inflows to India do indeed boost TFP growth due to positive spillover effects. We also discovered that trade appears to be having a negative impact on India's TFP development.

Using quarterly data, (Mohanasundaram & Karthikeyan, 2015) explores the relationship between FDI flows into the country and economic growth from January 2000 to December 2014. The study's aim is to determine the interrelationship between foreign direct investment (FDI) and India's gross domestic product (GDP). To investigate the interrelationship between the variables, the researchers used correlation, Granger causality test, Johansen co-integration test, and vector auto-regression (VAR). This research investigates whether there is a connection between FDI inflows and GDP in the Indian economy. The thesis investigates the unidirectional relationship between FDI and GDP.

(Ray, 2012) uses the cointegration method to analyze the causal relationship between Foreign Direct Investment (FDI) and economic growth in India, as well as to empirically estimate the impact of FDI on economic growth in India for the period 1990-91 to 2010-11. The empirical study based on the ordinary Least Square Method indicates that foreign direct investment (FDI) investment and GDP have a positive relationship, and vice versa. Using the Kwiatkowski, Phillips, Schmidt, and Shinn (KPSS) test for unit root only, the unit root test revealed that both economic growth and foreign direct investment are incorporated of order one. The cointegration test verified the existence of a long-run equilibrium relationship between the two, which was also confirmed by the findings of the Johansen cointegration test. Finally, the Granger causality test demonstrated the existence of unidirectional causality that connects economic growth and foreign direct investment. The error correction calculations revealed that the Error-Correction Term is statistically important and has a negative sign, indicating that the long-run equilibrium relationship between the independent and dependent variables is in good shape. India will do better by focusing on improving infrastructure, human capital, developing local entrepreneurship, establishing a stable macroeconomic environment, and creating conditions favorable for profitable investments to complement the development process in order for FDI to be a significant contributor to economic growth.

There are three main aims for this research by (Goswami & Saikia, 2012). First, it looks at the developments in foreign direct investment in India from 1991 to 2011. Second, using the vector error correction model, the relationship between FDI and manufactured exports for the same duration was investigated using yearly time series data. The researchers discovered that FDI and exports have a bidirectional causal relationship. Finally, the paper examines the current state of foreign direct investment (FDI) and exports in the North East Region (NER), with an emphasis on their future prospects. Because of the region's strategic position, the government's Look East Policy (LEP) could be beneficial. Despite having a natural advantage in trade with neighboring countries and the ability to grow various industries as a result of vast natural resources, the NER is unable to attract substantial FDI due to infrastructural and other bottlenecks. The need for strategic action to eliminate certain fundamental constraints is crucial.

Research objective:

The main objective of this research is to investigate the direction of causality between GDP per capita and FDI in Indian economy. More specifically, it aims to test whether the level of foreign direct investment causes level of GDP per capita in Indian economy, both in long-run and in short-run.

Research Hypothesis:

With suitable econometric techniques, Following null and alternative hypothesis will be tested:

Long-run

Null hypothesis: FDI does not causes GDP per capita in the long-run in Indian economy

Alternative hypothesis: FDI does not causes GDP per capita in the long-run in Indian economy

Null hypothesis: GDP per capita does not causes FDI in the long-run in Indian economy

Alternative hypothesis: GDP per capita does not causes FDI in the long-run in Indian economy

Short-run

Null hypothesis: FDI does not causes GDP per capita in the short-run in the Indian economy

Alternative hypothesis: FDI does not causes GDP per capita in the short -run in the Indian economy

Null hypothesis: GDP per capita does not causes FDI in the short -run in the Indian economy

Alternative hypothesis: GDP per capita does not causes FDI in the short -run in the Indian economy

Methodology:

To investigate the direction of causality, this study employs Granger causality test in two ways. Firsts, for the long-run, it employs the general Granger causality. Second, for short-run, it employs Granger causality under Block Exogeneity test.

Granger causality test:

Correlation does not necessarily imply causation in any substantive sense of the term. The econometric sector is full of magnificent correlations, which are actually spurious or meaningless.

The Granger solution to the issue of whether x causes y is to see how much of the present y can be explained by past values of y and then to see whether including lagged values of x can strengthen the explanation. y is said to be Granger-caused by x if x aids in the prediction of y , or equivalently if the coefficients on the lagged x's are statistically important (Friston et al., 2014).

$$y_t = \alpha_0 + \alpha_1 y_{t-1} + \ldots + \alpha_l y_{t-l} + \beta_1 x_{t-1} + \ldots + \beta_l x_{-l} + \epsilon_t$$

$$x_t = \alpha_0 + \alpha_1 x_{t-1} + \ldots + \alpha_l x_{t-l} + \beta_1 y_{t-1} + \ldots + \beta_l y_{-l} + u_t$$

for the possible combinations of x, and y of series in the group. We report F-statistics or the Wald statistics for the joint hypothesis:

$$\beta_1 = \beta_2 = \ldots = \beta_l = 0$$

The null hypothesis is that x does not Granger-cause y in the first regression and that y does not Granger-cause x in the second regression.

Short-run causality under VECM

The VEC has cointegration relations built into the design such that it limits the long-run nature of the endogenous variables to converge to their cointegrating relationships while enabling for short-run adjustment dynamics. The cointegration term is also known as the error correction term since the deviation from long-run equilibrium is corrected gradually through a series of partial adjustment

The VECM mode is given below

$$\Delta y_{1,t} = \alpha_1(y_{2,t-1} - \beta y_{1,t-1}) + \epsilon_{1,t}$$
$$\Delta y_{2,t} = \alpha_2(y_{2,t-1} - \beta y_{1,t-1}) + \epsilon_{2,t}$$

Under the VECM system, we carry out pairwise Granger causality tests and tests whether an endogenous variable can be considered as exogenous. For each equation in the VAR, the output shows Chi-square (Wald) statistics for the joint significance of each of the other lagged endogenous variables in that equation.

Data:

We collected the yearly time series data for FDI inflows and GDP per capita (at constant price 2010 USD) for India from the World Development Indicators (WDI). The data ranges from 1970-2019.

Results

Long-run Granger causality

We first report the long-run granger causality. Table 2(a) and Table 2(b) reports the long-run causality test results. Table 2(a) reports the results at first lag and Table 2(b) reports the results in second lag. The reason for choosing two different lags is that it ensure whether the results are consistent across different lags. Both Table 2(a) and Table 2(b) show that the null hypothesis of no-causality from FDI to GDP-per capita has been rejected (P-value is less than 1% level of significance). But the null hypothesis of no-causality from GDP to FDI could not be rejected. This implies that the direction of causality runs from FDI to GDP per capita, and not from GDP per capita to FDI.

Table 2(a): Long-run Granger causality test at first lag

Pairwise Granger Causality Tests

Sample: 1970 2019
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
GDP Per Capita does not Granger Cause FDI	49	0.43108	0.5147
FDI does not Granger Cause GDP Per Capita		13.5012	0.0006

Table 2(b): Long-run Granger causality test at first lag

Pairwise Granger Causality Tests

Sample: 1970 2019
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
GDP Per Capita does not Granger Cause FDI	48	0.55968	0.5755
FDI does not Granger Cause GDP Per Capita		7.57248	0.0015

Table 3 reports the results of short-run causality. The table shows that the null hypothesis of no causality could not be rejected from either sides. This implies that none of FDI and GDP per capita cause one another in the short-run.

Table 3: Short run Granger causality test

VEC Granger Causality/Block Exogeneity Wald Tests

Sample: 1970 2019
Included observations: 47

Dependent variable: D(GDP)

Excluded	Chi-sq	df	Prob.
D(FDI)	3.902540	2	0.1421
All	3.902540	2	0.1421

Dependent variable: D(FDI)

Excluded	Chi-sq	df	Prob.

D(GDP)	3.020680	2	0.2208
All	3.020680	2	0.2208

Conclusion:

This study explores the causality between FDI and GDP per capital in the Indian context. Using WDI data from 1970-2019, We applied two forms of Granger causality tests: long-run causality and short-run causality tests. For the long-run causality, we implemented pairwise Granger causality test, and for short-run, we conducted the Wald test approach under VECM (Vector Error Correction Model) (Vector Error Correction Model). The long-run causality test shows that there is a unidirectional causality running from FDI to GDP per capita, indicating that FDI triggers the GDP per capita to shift and not vice-versa. The short-run causality test suggests that there is no causality between FDI and GDP per capita, signaling that, in the short-run, FDI and GDP per capita may not trigger each other. The key policy conclusion from this study is that while FDI does not induce GDP per capita in the short-run, it induces in the long-run. Therefore, according to our research, India should obtain FDI to maintain a long-run growth of GDP per capita.

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