Bilateral Investment Treaty and Foreign Direct Investment in India:
A Dynamic Panel GMM Estimation of Causal Effects

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Abstract

India has one of the largest Bilateral Investment Treaty (BIT) networks with other counties around the world. The BITs is to promote foreign investment by increasing investor confidence, empowering individual private parties to take international arbitral proceedings against the threat of appropriation by the government of the host country. This paper analyses the effect of BITs on FDI inflows in India using panel data for 76 countries for the time period 2000-2016 applying a dynamic panel generalised method of moments instrumental variable estimation method. The differenced GMM and system GMM estimates show a significant negative effect of bilateral investment treaties on the FDI inflows in India. While the lagged FDI has a significant positive effect, the financial openness of the source nations is reducing FDI inflows to India. The POLCON index shows that the countries with lesser political constraints have positive FDI outflow towards India. As opposed to domestic variables, the Chinn-Ito and POLCON indices have a greater share of change in FDI inflows to India. It seems that the BITs is not efficient enough to create investor confidence to invest in India.

Keywords: Bilateral Investment Treaty, Foreign Direct Investment, Generalised Method Of Moments

1. Introduction

Foreign direct investment (FDI) is recognised as the most powerful engine of the recent trends in economic growth. The FDI inflows enable capital-poor countries to bridge the gap of domestic savings and investment and build up physical capital in third world countries. The FDI also create employment opportunities, develop productive capacity, enhance skills of local labour through the transfer of technology and managerial know-how, and integrate the domestic economy with the global economy. The FDI is an integral part of the introduction and familiarisation of modern technology and management skills from developed countries. Thus, it is in the interest of every nation to boost its FDI inflows. For effective and substantial FDI inflows, sustained economic growth of either the source nation or the host nation is vital. Further, the macroeconomic environment has an impact on the FDI inflows. The variables like GDP, growth rate, inflation, political stability, international trade and technology transfer agreements, exchange rate, skilled labour are the most important factors that influence the flows of FDI to an economy. There also may be some factors that are difficult to be controlled by the governments in determining the FDI inflows.

Generally, the investors seek to ensure if the investment is profitable; an investor might consider the inflation rate as a crucial determinant for FDI since it can reduce the value of investments over time. This makes investment costly and unstable. There also can be political constraints restricting the flows of FDI. The political environment is particularly relevant to determine the financial openness of the FDI receiving economies and they might influence the minds of investors. The political constraints affect the decision making of an investor as it may make their investment unproductive and uncertain. Less political discretion is supposed to render credible commitments to (foreign) investors more likely. It creates reciprocation in the direction of investment and trade by setting up foreseen barriers which change the challenges and opportunities for investors.

In order to protect the interests of foreign investors, the governments generally direct their policies towards some control measures that determine the FDIs. One of the few control variables is the Bilateral Investment Treaty (BIT). The BIT is to protect the interests of foreign investors against the threat of appropriation by the government of the host country, empowering individual private parties to take international arbitral proceedings against host nations under their terms. In this respect, India has one of the largest BIT networks with other counties around the world. As shown in Figure 1, a good number of India's BITs were signed with many counties in the 1990s and the early 2000s. The signing of BITS is to show that India is competitive and appropriately reform-minded and to signal that the environment is investment friendly so as to deserve a good destination for FDI, as well as much in tune with a trend that was being followed by many countries all over the world.

The BITs promote investment by increasing investor confidence on account of the protections enabled by international agreements. The BITs substitute weaker domestic rights in developing nations. In order to enforce such agreements, the international tribunals may charge heavy fines which not only creates financial pressure but also regulatory pressure on the host economy. Therefore, from this view, the FDI inflows from investors will be greater when a BIT exists than when it does not. As the BITs are heterogeneous, a BIT with a nation is subject to several clauses which may vary for each nation. As the clauses increase, the possibility for an investor to claim a BIT may also increase, in other words, it is difficult to regulate a policy with greater constraints rising due to an international agreement. However, there is also a negative and more discouraging side of BITs. The efficiency of a BIT in order to facilitate an international investor requires not only protection but the scope of growth and long-term sustainability of the business. Also, in case of a failure by the government, once a nation loses in the international tribunal such as the International Centre of Settlement of Investment Disputes (ICSID), it might lead to a negative impact for an investor in line with their operations with the same nation. It is observed that once the claim of an investor gets registered with the international tribunal for arbitration, the FDI flows with the country decline, showing the rising uncertainty and distrust of an investor. The costs and benefits of a ratified BIT are shown in Table 1.
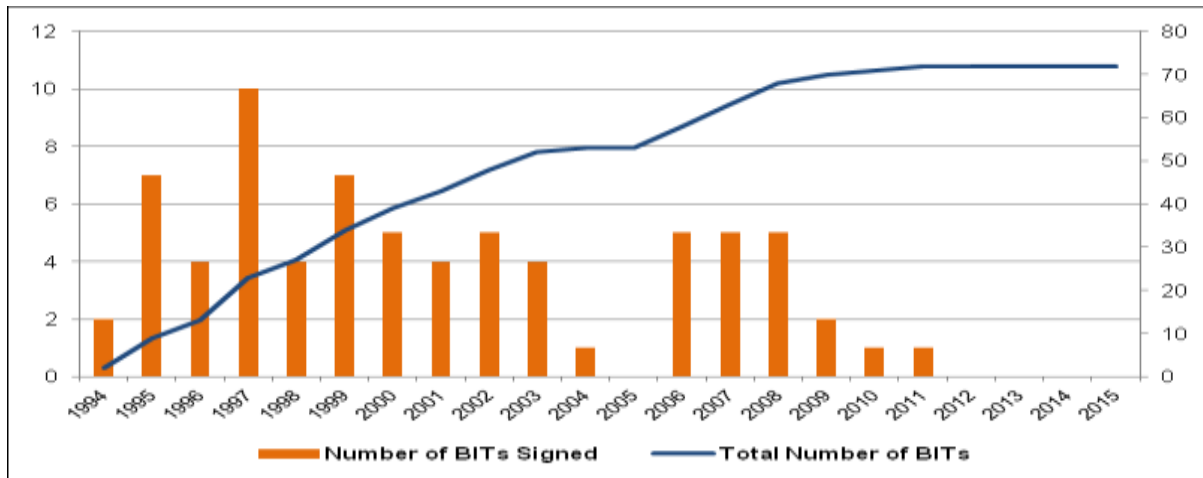
Figure 1 Trend in Bilateral Investment Treaties of India
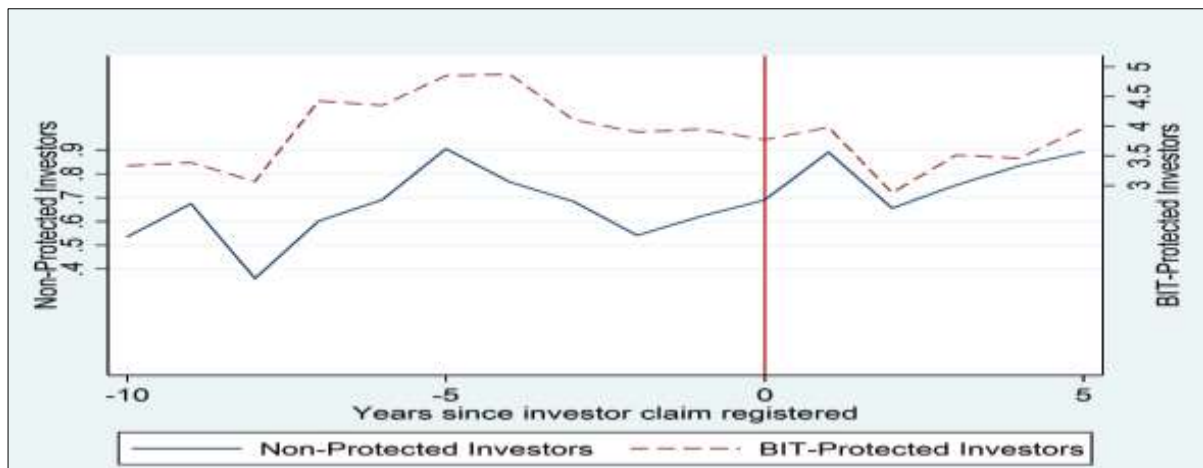
Source: UNCTAD.

Figure 2 FDI Trend Around Lodgement of First Claim Against Host Economy

Figure 2 shows the variation in the FDI inflows after the lodgement of the first claim against a BIT. Before the lodgement of a claim, the difference between protected and non-protected investors is seen to be constant where a BIT protected investor has higher flows of FDI. After the lodgement of a claim against a host nation, the difference between the protected and non-protected investor increases. However, as can be noted from Figure 2, by asking for a claim, the magnitude of flows of the protected investors does not go below the protected investors which make BITs influencing the FDI inflows positively. Both the protected and non-protected BIT investors continue to invest at a similar magnitude. Thus, it can be seen that in the global context the relation between BIT and FDI is positive even after claims by an investor

Table 1 Costs and Benefits of BITs for the Host Countr**y**

Costs of BIT	Benefits of BIT
Loss of sovereignty: loss of regulatory policy autonomy to serve the domestic purpose	Attracting FDI
	Signalling liberalisation policy orientation to some domestic audiences without the intention of ratification
Potential costs of being sued including financial costs of litigations, loss of future FDI due to ICSID litigations	Strengthening intergovernmental political ties
	Behaving in a way that is consistent with the accepted norm of treating foreign investors

Thus, though the BITs constrain host nations for international arbitration, the continued FDI inflows even after lodging of claims by investors in international tribunals, the nature of the relationship between BITs and FDI inflows needs examination, especially in the context of developmental aims such as technology transfer and human resource development with FDI. Therefore, it is relevant to examine the behaviour and determinants of FDI inflows when the BITs are taking place. It is useful for the governments to understand whether this tool which they perceive as a working instrument to encourage FDI is true in its actual form. Hence, the main objectives of this paper are to identify the determinants of FDI inflows in India and to analyse the impact of BITs on FDI inflows in India. The paper uses panel data for 76 countries for the time period 2000-2016. The data for the empirical analysis has been extracted from various databases like UNCTAD, World Bank, POLCON index and Chinn-Ito datasets. The empirical analysis uses a dynamic panel data methodology and the estimation method followed is the Generalised Method of Moments (GMM).

2. Review of Literature

It seems the positive impact of BITs on FDI inflows strongly depends on a supportive political-economic environment. Tobin and Rose-Ackerman (2011) studying the possible consequences of BITs focus on political and economic factors as complements to BITs in 176 countries for the time period of 1984-2000 applying the OLS method. They observe that the BITs have a positive impact on FDI inflows only in countries with a stable business environment and BITs do not seem to encourage FDI except at low levels of political risk.

In contrast, Neumayer and Spess (2005), analysing the issue of BITs affecting the FDI in 119 countries for the time period 1970-2001 applying the panel fixed effects model, observe that developing host countries that have agreed to a larger number of BITs have attracted higher FDI inflows. In particular, countries with a weaker domestic institutional quality stand out most to gain from BITs. While Tobin and Rose-Ackerman reject the view that BITs are a

substitute for a favourable local business environment, whereas Neumayer and Spess report some evidence to this effect.

Ranjan (2010) describes the bilateral investment treaty programmes of India in the light of global experience. The paper argues that the effects of BITs on investment flows may vary from country to country and may also be different for different periods of time and thus there cannot be a general proposition that signing BITs invariably result in more investment inflows. The study observes that that foreign investment is more related to macroeconomic factors such as overall economic stability, location advantage, level of infrastructure and other related factors. According to the paper, there can also be negative results of entering into BIT as the treaties may unduly constrain regulatory discretion.

Busse, Koniger and Nunnenkamp (2010) investigate the role of BIT in promoting FDI in a gravity type model using panel data from World Bank and UNCTAD database for the time period 1978-2004 and applying estimating techniques such as pooled OLS, Poisson Pseudo Maximum Likelihood (PPML) and Generalised Method of Moments (GMM). The dependent variable is the ratio of FDI flows to a particular country to the FDI flows to all the countries, and the independent variables include real GDP growth, inflation, trade openness, GDP per capita, free trade agreement (FTA), double taxation treaty (DTT), common currency and BIT. The empirical results show that there is a positive impact of BIT for foreign investors as they shift their preferences for investing in a country which has signed a BIT.

Buthe and Milner (2008) examine the political factors that affect the FDI flows focusing on the relationship between trade and investment for a panel of 122 developing countries for the time period 1970-2000 using a gravity type model. Using an index variable POLCON as a measure of political violence and instability and instrumental variables estimation method, the paper suggests that the political factors, which should increase the predictability of politics by reducing the risk of policy change, boost inward FDI significantly. Similarly, the BITs, GATT and PTAs have shown a positive impact for boosting the foreign investors to invest in the host nation.

Mina (2015) examines the role of political risk guarantees, which bilateral investment treaties serve, in debt accumulation in 68 low and middle-income countries for the time period 1984-2011 using OLS and GMM estimation methodologies. The paper empirically finds that signed bilateral investment treaties with OECD countries have a positive influence on total and guaranteed debt accumulation. The results suggest that the role of bilateral investment treaties extends beyond attracting FDI to international lending.

Aisbett, Busee and Nunnenkamp (2018) analyse the impact on FDI of claims by investors against hosts for alleged violation of BIT obligations using a gravity model for data covering the time period 1980-2010 and applying two way fixed effects estimation method. The paper finds that FDI flows to developing host countries decline when they are taken before the International Centre of Settlement of Investment Disputes (ICSID), in particular when they lose a dispute in arbitration. The paper finds that when a host faces a claim, FDI from sources with a BIT in place falls significantly more than that from unprotected sources.

The empirical studies show that bilateral investment treaties do impact FDI inflows. However, the significance of the BITs affecting FDI is limited to a stable business and political environment. It can also be inferred that the BIT can be expected to be a tool for the government of the host nation to work in order to generate FDI.

3. **Data and Methodology**

This paper uses panel data for 76 countries for the time period 2000-2016 extracted from the World Bank, UNCTAD, Chinn-ito.com, and DIPP. The variables considered are foreign direct investment (FDI), bilateral investment treaties (BIT), Chinn-Ito (KAOPEN) index, POLCON index, inflation rate and gross domestic product. The dependent variable is FDI inflows, the amount of foreign investment made to the host country by the source country. The annual inward FDI flows is the sum of the year's new direct investment in a host country by capital owners that are foreign to that country (net of direct investments withdrawn by foreign capital owners), calculated as a percentage of GDP. The FDI as a percentage of GDP has been taken in order to eliminate the need to deflate the dependent variable and to make it comparable across countries and across time.

As this paper uses BITs signed by India with other countries as an important determinant of FDI inflows to India, Table 2 shows the frequency of the countries signing BIT with India in the time period 2000-2016. It can be seen that a large number of BITs have been signed before the year 2000. A total number of 51 BITs have been recorded in the data out of 81 BITs which have been signed by India with other countries.

Table 2 Distribution of Countries Signed BIT with India, 2000-2016

Year	BIT signed	BIT not signed	Year	BIT signed	BIT not signed
2000	30	46	2009	48	28
2001	33	43	2010	49	27
2002	38	38	2011	50	26
2003	39	37	2012	50	26
2004	40	36	2013	51	25
2005	40	36	2014	51	25
2006	43	33	2015	51	25
2007	46	30	2016	51	25
2008	47	29			

The independent variables considered are as follows. BIT (bilateral investment treaty) - a treaty between two nations to mutually protect the investors from both countries in order to facilitate their investments in the host country. The BIT in this model has been taken as a dummy variable. If the BIT is assigned on a given year, it is 1, otherwise 0.GDP growth rate - the annual percentage growth rate of GDP at market prices on constant local currency. GDP is the sum of gross value added by the residents in the economy plus any product taxes and minus any subsidies not included in the values of the products. It is calculated without

making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. The inflation rate is the annualised percentage change in the general price index over time. The inflation rate is the percentage increase in the price of goods and services which is taken annually. The Chinn-Ito Index (KAOPEN) is an index measuring a country's degree of capital account openness (Chinn and Ito, 2008). KAOPEN is based on the binary dummy variables that codify the tabulation of restrictions on cross-border financial transactions reported in the IMF's annual report on exchange arrangements and exchange restrictions (IMF-AREAER). This index takes on higher values the more open the country is to cross-border capital transactions. By construction, the series has a mean of zero. It ranges from -2 to 3 with higher digits showing openness of capital.

Political Constraint Index (POLCON) is a direct measure of the feasibility of a change in policy given the structure of a nation's political institutions (the number of veto points) and the preferences of the actors that inhabit them (the partisan alignment of various veto points and the heterogeneity or homogeneity of the preferences within each branch). The institutional development of host countries can be verified by political constraints on the executive branch. The POLCON focuses on the political discretion of the executive branch. Chinn-Ito index for financial openness of nation can also be considered as a determinant of FDI. The index is based on several dummy variables, including the presence of multiple exchange rates, capital account transactions and requirements to surrender export proceeds. This index is calculated so that higher index values indicate greater openness to cross-border capital transactions (with a mean of zero). Thus, POLCON is included as poor institutions may discourage FDI by giving rise to uncertainty. The indicator ranges from zero (total political discretion) to one (no political discretion). Table 3 presents the mean values of the variables by country classification.

Table 3 Descriptive Statistics of the Variables by Classification of Countries

Variable	Developed OECD members	Developed non-OECD members	Developing OECD countries	Developing non-OECD countries
FDI	260.72 (458.44)	755.04 (1338.77)	4.97 (5.48)	175.92 (998.54)
GDP growth rate	1.98 (1.22)	3.94 (1.48)	3.11 (1.33)	3.84 (3.20)
Inflation rate	1.91 (1.01)	2.22 (1.82)	4.71 (0.22)	7.50 (6.47)
Chinn-Ito index	1.79 (0.95)	0.51 (0.70)	1.79 (0.40)	0.01 (0.32)
POLCON	0.48 (0.08)	0.23 (0.20)	0.31 (0.14)	0.14 (0.20)
BIT signed countries	20	1	1	29
BIT not signed countries	8	4	1	12

Note: Standard deviations in parentheses.

Country classifications: Developed OECD economies: Australia, Austria, Belgium, Canada, Czech Republic, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, Liechtenstein, Luxemburg, Netherlands, New Zealand, Norway, Poland, Portugal, South Korea, Spain, Sweden, Switzerland, USA, UK; Developed non-OECD economies - Cyprus, Hong Kong, Isle of Man, Malta, Denmark, Finland, Singapore; Developing OECD economies - Chile, Hungary. Developing non-OECD economies: Bahamas, Bahrain, Belarus, Brazil, Bulgaria, Cayman Islands, Channel Islands, China, Columbia, Egypt, Indonesia, Jordan, Kazakhstan, Kenya, Kuwait, Lebanon, Malaysia, Maldives, Mauritius, Mexico, Morocco, Nepal, Nigeria, Oman, Panama, Philippines, Qatar, Russia, Saudi Arabia, Seychelles, South Africa, Sri Lanka, Thailand, The Bermudas, Turkey, UAE, Ukraine, Uruguay, Vietnam, Virgin Islands, Yemen.

3.1.   Dynamic Panel GMM Model

This paper uses a dynamic panel data model in the empirical analysis as it allows for more flexibility, imposes fewer restrictions and permits modelling individual differences across cross-section units. Also, the issues of serial correlation of error terms and endogeneity due to individual specific fixed effects in the model are taken care of by the panel estimation. The FDI inflow from country i in year t is to be determined in part by the FDI inflows from country i in year t-1, hence, it is a dynamic panel dataset. Since this study is observing FDI inflows into India from its partner countries over time, it is likely that the model will have country-specific fixed effects, leading to the problem of unobserved heterogeneity. Since this is a dynamic model, it is likely that the error terms will not be white noise, and will be serially correlated. To correct for serial correlation and country-specific fixed effects, Generalised Methods of Moments (GMM) estimation is used to estimate the endogenous dynamic panel data model. With GMM estimation, suitable instruments can easily be found which can then be tested for exogeneity with respect to the error term which includes any individual-specific effects. An instrumental variable is a proxy variable that removes the correlation between regressor and error term which permits consistent estimation of the coefficients. A valid instrument therefore has to satisfy both instrument relevance (variation in the instrument is related to the variation in the explanatory variable) and instrument exogeneity (part of the variation in the explanatory variable is captured by the exogenous instrumental variable). In the dynamic panel data model, the lagged values of the dependent variable themselves serve as valid instruments for the lagged variable.

A general panel data model is specified as:

$$y_{it} = \beta x_{it} + u_{it} \quad i = 1, \dots, N; \ t = 1, \dots, T \tag{1}$$

The error term u_{it} is assumed to follow a one-way error component model:

$$u_{it} = \alpha_i + \varepsilon_{it} \tag{2}$$

where α_i is the (unobserved) individual effects, x_{it} is a vector of K_1 explanatory variables, z_i is a vector of K_2 time-invariant explanatory variables. The terms $\alpha_i \sim IID(0, \sigma_\alpha^2)$ and $\varepsilon_{it} \sim IID(0, \sigma_\varepsilon^2)$ are independent of each other and among themselves. A dynamic panel data model is characterised by the presence of a lagged dependent variable among the regressors:

$$y_{it} = \delta y_{it-1} + \beta x_{it} + \gamma z_i + \alpha_i + \varepsilon_{it} \quad i = 1, \dots, N; \ t = 1, \dots, T \tag{3}$$

with $E(\varepsilon_{it}) = 0$, $E(\varepsilon_{it}\varepsilon_{is}) = \sigma_\varepsilon^2$ if j = i and t = s, $E(\varepsilon_{it}\varepsilon_{is}) = 0$ otherwise, $E(\alpha_i) = 0$, $E(\alpha_i x_{it}) = 0$. It is also to be noted that y_{it-2} (or $y_{it-2}y_{it-3}$) is not the only instrument for $(y_{it-1}y_{it-2})$. In fact, Arellano and Bond (1991) note that all y_{it-2-j} satisfy the conditions $E[y_{it-2-j}(y_{it-1} - y_{it-2}] \neq 0$ and $E[y_{it-2-j}(\varepsilon y_{it} - \varepsilon_{it-1}] = 0$. Therefore, they all are legitimate instruments for $(y_{it-1}y_{it-2})$.

In the GMM estimation, the moment conditions are created by taking the orthogonal deviations. These equations contain parameters to be estimated. For the purpose of estimation, the following assumptions for GMM are specified: Convergence of empirical moment – the data generating process is assumed to meet the law of large numbers. The empirical moments converge in probability to its population counterpart:

$$\bar{m}_n(\theta_0) = 1/n \sum_{i=1}^n m_i(\theta_0) \to 0 \tag{4}$$

Asymptotic distribution of empirical moments - empirical moments obey central limit theorem, and finite asymptotic covariance matrix converges to the normal distribution:

$$\sqrt{n} m_i(\theta_0) \to N[0, \phi] \tag{5}$$

Identification - considering n as the number of equations and k as the number of parameters, for any n ≥ k, if θ_1 and θ_2 are different parameter vectors, then:

$$\bar{m}_n(\theta_1) \neq \bar{m}_n(\theta_2) \tag{6}$$

Hence, all θ_i are unique. The probability limit of GMM is uniquely minimised at true parameters, θ_0.

To eliminate the unobservable country-specific (individual) effects, the GMM estimator takes the first difference:

$$\Delta y_{it} = \delta \Delta y_{it-1} + \beta \Delta x_{it} + \Delta \varepsilon_{it} \tag{7}$$

Even when the unobservable country effects are eliminated with differencing, there can still be an endogeneity bias arising from the correlation between the lagged difference of the dependent variable and the error term. In this case, instrumental variables are used. The differenced GMM estimator uses the lagged levels of the explanatory variables as instruments on the conditions that the error term of the differenced equation is not serially correlated and that the lagged levels of the explanatory variables are weakly exogenous. The moment conditions therefore are written as:

$$E[W(\varepsilon_{it}\varepsilon_{it-1})] = 0 \qquad s \geq 2; \ t = 3, \dots, T \tag{8}$$

$$E[V(\varepsilon_{it}\varepsilon_{it-1})] = 0 \qquad s \geq 2; \ t = 3, \dots, T \tag{9}$$

where W is written as:

$$W = \begin{bmatrix} [y_{i1}] & \dots & & 0 \\ \vdots & [y_{i1} \quad y_{i2}] & & \vdots \\ \vdots & \vdots & & \vdots \\ 0 & \dots & [y_{i1} & \dots & y_{iT-2}] \end{bmatrix} \tag{10}$$

and V is written as:

$$V = \begin{bmatrix} [x_{i1}] & \cdots & & 0 \\ \vdots & [x_{i1} \quad x_{i2}] & & \vdots \\ \vdots & \vdots & & \vdots \\ 0 & \cdots & [x_{i1} & \cdots & x_{iT-2}] \end{bmatrix} \tag{11}$$

When the dependent variable is highly persistent over time, the differenced GMM suffer from a weak instrument problem and its asymptotic properties may be affected. Blundell and Bond (2000) propose a system GMM estimator using the lagged differences of explanatory variables as instruments, instead of lagged differences of the dependent variable, assuming the absence of serial correlation in the error term, and between these instruments and the error term. Then, the moment conditions are written as:

$$E[\Delta y_{it-s}(u_{it})] = 0 \qquad s \geq 2; \ t = 3, \dots, T \tag{12}$$

$$E[\Delta x_{it-s}(u_{it})] = 0 \qquad s \geq 2; \ t = 3, \dots, T \tag{13}$$

which can be represented in a general form as:

$$E[m_l(y_{it}, x_{it}, \theta)] = E[m_{il}(\theta)] = 0 \tag{14}$$

where θ represents the β_i parameters to be estimated. This creates a set of M moment equations with K parameters. In the present paper case, we need to estimate β_2, β_3, β_4 and β_5. Therefore, in order to have a unique solution for the given parameters the criterion of the weighted sum of squares can be used:

$$q = \bar{m}(\theta)' W_n \bar{m}(\theta) \tag{15}$$

where $\bar{m}(\theta) = 1/n \sum_{i=1}^{n} m_l(y_i, x_{i,}\theta)$ \hfill (16)

and W_n is a positive definite matrix proportional to the asymptotic covariance matrix of the moment condition $m_l(\theta)$.

GMM can be extended to any number of moment conditions. For the purpose of estimation, this study chooses both the difference GMM and the system GMM estimators which use first differences and the orthogonal condition.

With the application of GMM, a test of over identification of the model is applied in this paper. This test is taken as the number of variables in the model is increasing with each model it may create a situation that there might not be a parameter value β such that the moment condition $E[m_l(y_i, x_i, \beta)] = 0$ holds. Thus, the over identifying restrictions are testable. For example, taking the linear model $y = \beta_1 x_1 + \beta_2 x_2 + u$ with $E(x_1 u) = 0$ and

$E(x_2 u) = 0$. It is possible that $\beta_2 = 0$, so that the linear equation may be written as $y = \beta_1 c_1 + u$. However, it is possible that $\beta_2 \neq 0$ and in this case it would be impossible to find a value of β_1 so that both $E[x_1(y - \beta_1 x_1)] = 0$ and $E[x_2(y - \beta_2 x_2)] = 0$ hold simultaneously. In this sense, an exclusion restriction can be seen as an over identifying restriction.

With IV estimation, the Sargan test is a test of the validity of the instruments. It is a test of over identifying restrictions. The hypothesis being tested by the Sargan test is that the IVs are uncorrelated with some set of residuals and therefore they are acceptable instruments and the excluded instruments are correctly excluded from the estimating equation. The criterion function at the parameter estimates is:

$$J_n = J_n(\beta) \to \chi_l^2 \tag{17}$$

The degrees of freedom of the asymptotic distribution is the number of over identifying restrictions. Under the null hypothesis that the over-identifying restrictions are valid, the Sargan statistic is distributed as a $\chi^2(p - k)$, where k is the number of estimated coefficients and p is the instrument rank. The hypothesis being tested is, given z are the IVs:

H_0: $(z, u) = 0 \to$ J=0, the over-identification restrictions are valid.

H_1: $(z, u) \neq 0 \to$ J≠0, the over-identification restrictions are not valid.

If the statistic J exceeds the chi-square critical value, the model is rejected. Thus, in the case of the alternative hypothesis, the restrictions applied by the estimation are bearable and the fit of the model can be considered good. The GMM over identification test is a very useful by-product of the GMM methodology and thus the J statistic is taken in GMM estimation. However, based on this information alone, it is unclear the problem within the model that is estimated as the reason for overidentification of the restrictions is not known, and therefore it is typically a cause for concern. In the empirical analysis, the Sargan – Hansen J Test has been used in order to verify the over identification of the restrictions imposed over the instruments.

4. Empirical Analysis

The dependent variable used in this paper is the FDI inflow and the independent variables used are GDP growth rate, inflation rate, Chinn-Ito index, political constraints index and the bilateral investment treaty. The dependent variable FDI is measured on a ratio scale as FDI inflow to India for a country i as a ratio to the country's GDP. The independent variable GDP growth rate and inflation rate are measured on the interval scale where the interval values are from -100 percent to 100 percent. The CHIN-ITO index taking the value ranging from – 2 to +3 and the POLCON (0, 1) index are also measured on an interval scale. The dummy variables BIT, OECD is measured on a nominal scale. The descriptive statistics of the variables used in the empirical estimation are presented in Table 4.

From Table 4, the following statements can be inferred. India receives around 1 percent of FDI inflow as percentage share from a country's GDP with a standard deviation of 2 percent. The average GDP growth rate and the inflation rate of the nations in the data are 3.14 percent and 5 percent respectively. The value of Chin-Ito (KAOPEN) index is 0.75 which falls in the middle of a range of [-2, 3] showing neutral openness of nations but with a greater degree of

deviation (1.14). The POLCON index is deviating from 0.1 to 0.5 with an average of 0.3, showing lesser political discretion in the countries. The dummy variable BIT shows in about 58.5 percent of 76 countries from where FDI flows, India has signed BITs. Further, India receives FDI from 38 percent of the countries are OECD and from 46 percent of the developed countries as a whole

Table 4 Descriptive Statistics of Variables in the Determination of FDI

Variable	Description	Mean	Std. dev.
FDI	FDI flow of country to India as a share of its GDP	0.0094	0.02626
GDPGR	GDP growth rate of a country	3.146	6.222
INF	Inflation rate of a country	5.03	9.795
CHINN-ITO	Financial openness index of a country	0.748	1.142
POLCON	Political constraints index of a country	0.316	0.217
BIT	If bilateral investment treaty signed=1, 0 otherwise	0.585	0.492
OECD	If a member of OECD=1, 0 otherwise	0.379	0.485
DEV	If a developed country=1, 0 otherwise	0.462	0.498

The empirical specification of the estimating equation is,

$$FDI_{it} = \alpha + \beta_1 FDI_{it-1} + \beta_2 GDP_{it} + \beta_3 INF_{it} + \beta_4 BIT_{it} + \beta_5 CHIN - ITO_{it} + \beta_6 POLCON_{it} + \beta_7 OECD_{it} + \beta_8 DEV_{it} + u_{it} \qquad (18)$$

Table 5 OLS Estimates for FDI Inflows in India

Variable	Spec.1	Spec.2	Spec.3	Spec.4
Inflation	-0.0001 (0.582)	-0.0003 (1.220)	-0.0001 (0.610)	-0.0003 (1.137)
GDP growth rate	0.0002 (0.549)	0.00003 (0.086)	0.0002 (0.557)	0.00007 (0.190)
BIT	0.014*** (2.808)	0.015*** (3.021)	0.014*** (2.791)	0.014*** (2.770)
Chinn-Ito	-	-0.0062*** (2.722)	-	-0.0074*** (2.937)
POLCON	-	-	-0.0023 (0.194)	0.0152 (1.118)
Constant	0.0007 (0.155)	0.006 (1.29)	0.001 (0.244)	0.002 (0.483)
R squared (within)	0.006	0.01	0.006	0.01
F-value	2.83***	3.99***	2.13	3.44***

| No. of obs. | 1095 | 1241 | 1241 | 1241 |

Note: Absolute t-values in parentheses. *** significant at 1 percent level.

The pooled regression estimates are presented in Table 5. The effect of BIT on FDI inflows is positive and statistically significant. Every BIT signed by India increases FDI by about 1.4 percent. While the GDP growth rate and Chinn-Ito index of openness effects positive FDI, inflation and political discretion dampen FDI inflows. However, none of these variables is statistically significant. Also, the very low R-square value shows that the OLS estimates are poor and show low goodness of fit of the model. The OLS results are biased as they cannot control the serial correlation and country-specific fixed effects. Therefore, GMM is used as an estimation technique which solves these problems and also accommodates a dynamic model.

Table 6 presents the GMM estimates of the determinants of FDI inflows in India during 2000-2016. The models have been estimated by differenced GMM and by system GMM. It is observed by Mina (2013) and Busse, Koniger and Nunnenkamp (2010) that system GMM performs better than differenced GMM since the latter suffers from poor finite sample properties..

Table 6 GMM Estimates for FDI Inflows in India

Variable	Differenced	System 1	System 2	System 3
FDI (-1)	0.68*** (3.97)	0.68*** (7.70)	0.72*** (6.57)	0.66*** (7.03)
Inflation	0.0004*** (7.97)	0.0004*** (3.33)	0.0003*** (3.37)	0.001*** (7.32)
GDP growth rate	0.006*** (5.42)	0.006*** (3.80)	0.003*** (8.47)	0.006*** (5.25)
BIT	-0.06*** (6.24)	-0.06*** (6.65)	-0.03*** (3.25)	-0.16*** (5.19)
OECD	-	-	-	-2.82 (1.73)
DEV	-	-	-	-0.21*** (49.86)
Chinn-Ito	-0.07*** (6.59)	-0.07*** (7.72)	-	-0.07*** (4.15)
POLCON	0.26*** (8.48)	0.26*** (12.73)	0.18*** (17.97)	0.28*** (15.23)
Constant	0.009*** (3.76)	-0.02*** (8.10)	-0.004*** (8605)	-0.08*** (6.50)
J statistic (p-values)	51.53 (0.33)	57.65 (0.21)	62.43*** (0.05)	61.01*** (0.05)
No. of obs.	1095	1095	1095	1095

Note: Absolute t-values in parentheses. *** significant at 1 percent level.

Also, in the present analysis, the differenced GMM may not be suitable as the variable BIT changes its values only in the periods of the signing of the BIT. While in the differenced GMM, the sign of intercept coefficients is positive whereas in system GMM it is negative. The differenced GMM estimates show that, when the explanatory variables are zero, the FDI inflow in India from each investor nation at any time period is 0.9 percent of their share of GDP. In the system GMM estimation, it is however seen that FDI is negative, showing FDI outflows from India

The main variable, the dummy variable BIT shows a statistically significant negative impact on FDI inflows to India. The signing of a BIT by India with the source country reduces in the FDI inflow to India by intercept by 0.06 percent. In the case of India, the negative effect of BIT may be because of the inefficiencies of the BIT signed or due to the apprehension of insecurity of the investors even after the signing of BITs with the source country. Studies like Busse et al. (2010) and Buthe and Milner (2008) find that BIT has been positively associated with FDI inflows. Tobin and Rose-Ackerman (2011) find this relationship to be weak. Further, Mina (2015) and (Aisbett et al. 2018) find a negative relationship between BIT and FDI. Most of these studies use cross-country analysis with BIT and FDI flows. However, the present paper considers the analysis of the interaction of a single country (India) with its experiences with BIT. During the period 2000-2016, it could be seen that a countless number of arbitration cases emerged with India such as the Dabhol power case (2001), White Industries case (2002), Sistema JFSC (2012) and others. It can be noted that due to these cases emerging there was raising insecurity for foreign investors. According to Aisbett et al. (2018), when a host nation (like the Indian case) faces a claim, FDI from source countries with a BIT in place falls significantly more than that from unprotected sources. As observed from Figure 22.2, it could be seen that the distrust of investors increases with arbitration proceedings on the BIT resulting in a lesser difference between protected and non-protected investors of BIT. Thus, it could be seen that there is a drastic increase in the distrust of foreign investors due to arbitration proceedings with BITs.

In the GMM estimates, the coefficients of the lagged FDI are positive and statistically significant in all specifications. An increase in the previous year FDI increases the current year FDI by 6.8 to 7.2 percent. Similarly, an increase in the GDP growth rate pushes India's FDI inflows positively. A unit increase in the percentage of GDP growth rate of a country significantly increases the percentage ratio of FDI inflows to India by 0.6 percent. Further, inflation has also a significant positive effect by enhancing FDI inflows in India. As a unit increase in the percentage of the inflation rate of a country increases the percentage ratio of FDI to GDP by 0.04 percent. In India's case, a country's inflation pushes investors to consider investing in India, except, perhaps inflation carries to a very miser magnitude of change in FDI.

The financial openness variable (Chinn-Ito index) explains the financial borders of a country. In the case of India, as a foreign country is more financially open it may choose not invest in India. A unit increase in the Chinn-Ito index of a country decreases the percentage ratio of FDI to GDP by 7 percent. Thus, the decision of a nation not to invest in India because of the

financial openness of that economy is also an important determinant of FDI inflows to India. The political constraints (POLCON) index is one of the variables which have a significant positive impact. This also has the highest impact on the decision making of an investor. A unit increase in the political stability or less political discretion of a country decreases the percentage ratio of FDI to GDP by 26 percent. Thus, countries with less political discretion in their investment outflows have a higher tendency to invest in India. In the case of an OECD member country, the effect on FDI inflows to India is statistically insignificant negative. The coefficient of the dummy variable DEV shows that a developed nation may not be interested in investing in India as much as a developing nation.

The J statistic shows that the specifications have p-values significant at 1 percent for over identification of restrictions. Thus, the test for over-identification of GMM instruments suggests that instruments are uncorrelated with the error term and they are exogenous in the system.

5. Conclusion

The objective of this paper is to identify the determinants of FDI and their effect on FDI inflows to India, with a specific focus on the effect of bilateral investment treaty (BIT). The paper has used a dynamic panel data GMM-IV analysis on 76 counties for the time period 2000-2016. To analyse the impact of the determining variables on FDI, pooled OLS, differenced GMM and system GMM estimation methods have been employed. As the OLS estimation suffers from serial correlation and endogeneity bias, the estimates of differenced GMM and system GMM have been compared and interpreted.

The empirical estimates of bilateral investment treaties show a significant negative effect on the FDI inflows in India. The sample period is also the time period when India's first arbitration cases emerged that includes the Dabhol power case. These arbitration cases under BIT have led to an impact for the foreign investors not to invest in India. Thus, it is to be seen that the BITs have been inefficient and they are not able to establish a strong foundation for creating confidence and risk-free environment for international investors. The empirical results further show while the lagged FDI has a significant positive effect on FDI inflows to India, the factors like GDP growth, inflation rate contribute very low to India's FDI inflows. The financial openness of the source nations has been reducing FDI inflows to India. However, as shown by the POLCON index, the countries with lesser political constraints have positive FDI outflow towards India. Also, as opposed to domestic variables, the Chinn-Ito index and POLCON index have a greater share of change in FDI inflows to India.

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