RESEARCH NOTE

CAUSALITY BETWEEN FOREIGN DIRECT INVESTMENT AND TOURISM: EMPIRICAL EVIDENCE FROM INDIA

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India's liberalization and deregulation policies during the early 1990s have attracted a huge amount of foreign direct investment (FDI) into India in recent years. India has been ranked as the second most favored FDI destination in the world, just behind China. Policy makers in many countries believe that FDI will lead their country's overall development, including the tourism sector. This article investigates the causal link between FDI and tourist arrivals in India by employing the Granger causality test under a VAR framework. A two-way causality link is found between FDI and tourist arrivals in India. This explains the rapid growth in the tourism sector as well as FDI in India during the last decade. Our two-way causality results in relation to India are similar to the findings of a number of small island developing states (SIDS).

Key words: Foreign direct investment (FDI); Inbound tourism; Growth; Cointegration; Causality

Introduction

Many countries make changes to their economic policies in order to attract foreign investors and India is no exception. India's liberalization and deregulation policies during the early 1990s have since attracted a huge amount of foreign direct investment (FDI) into India. India has been ranked as the second most favored FDI destination in the world, just behind China. Policy makers in many developing countries believe that FDI will lead

their country's overall development, including the tourism sector.

The National Tourism Policy was introduced in 2002, with the specific aim of promoting the tourism industry, as it was believed that increased tourism would lead to growth and overall development through employment generation and poverty reduction. Schemes and programs were introduced during the X Five Year Plan (2002–2007) to improve finances of the state governments through private partnerships and to attract more FDI. These

investments were spent largely on infrastructure development while development of specific locations and training of personnel in the hospitality sector were also given importance. The XI Plan further emphasizes the need for developing the industry through rationalization of taxes, reducing the cost of air travel and local transport, procuring land for building hotels, particularly budget hotels, and development of site-specific tourism like cultural and heritage sites or ecotourism. Encouraging positive prospects of this industry have led to a target of attracting 10 million international tourists by 2011 being set.

Foreign tourist arrivals in India have been increasing steadily within this decade, from about 2.7 million in 2000 to 5.1 million in 2009, increasing the foreign exchange earnings from US\$2.2 billion in 2002 to US\$11.4 billion in 2009.¹ The FDI in the "Hotel and Tourism" sector was US\$0.38 billion in 1991 and has grown upwards to US\$2.2 billion in 2010. Although tourism is one of the few sectors where the Indian government has allowed 100% FDI, this has not yet put this sector among the most attractive ones. The importance of the tourism sector and its relevance to the Indian economy in relation to the FDI it attracts are discussed in detail in S. Selvanathan, Selvanathan, & Visnathan (2010). More importantly, it is also found that there has been a surge in business tourists who come mainly for the purpose of doing business but also take time off to visit places of tourist interest (E. A. Selvanathan, Selvanathan, & Viswanathan, 2009). Thus, in the case of foreign tourists apart from "direct" tourism, "latent" tourism is also of relevance and this will be related largely to total FDI. Therefore, this article tries to assess a causal link between FDI and foreign tourist arrivals in India.

Theory of FDI and Causality

There are a number of theories on FDI and they mostly try to explain the factors that determine the amount of flow of FDI into a country or explain why a local firm in a country may wish to engage in FDI activities in another country. Among such theories, the eclectic theory or oil theory is considered as the main contributor. The eclectic theory is considered unique as it combines all existing FDI

theories into a single unified analytical framework together with macroeconomic theory of international trade and microeconomic theory of a firm. The eclectic theory stipulates that the level and structure of a firm's FDI activities will depend on three factors: (1) its ownership; (2) market internationalization; and (3) location specific advantage. Under eclectic theory, it is argued that the firms use market internationalization and location-specific advantages in order to make decisions about their FDI activities. These activities tend to lead to a two-way causal link between tourism and FDI.

FDI and tourism could be interlinked and may have a two-way impact on each other's growth. Increased foreign visitors who come for business purposes from corporations that have invested in India during their side-trips visit places of tourist interest. The limited amenities and the potential of the cultural heritage could prompt FDI into this sector and form a link from tourist arrivals to investment. Alongside this, the development of the tourism sector needs investment and the government's policies would attract investment into this sector that would result in attracting foreign tourists, establishing a reverse link between FDI and foreign tourist arrivals.

A number of empirical studies at individual country level have been published in the last two decades that analyze the link between FDI and the tourism sector in other countries (e.g., see Contractor & Kundu, 1995; Kundu & Contractor, 1999; Sanford & Dong, 2000; Tisdell & Wen, 1991). However, these studies used only a basic regression framework. Our study differs from the existing studies on FDI and tourism in at least two ways:

1. Uses more recent data on FDI and tourism for India.
2. Applies recent developments in time series analysis to investigate the link between FDI and tourism in India.

While the number of international tourist arrivals to India depends on several factors, such as consumers' income, the cost of airfare, cost of accommodation, etc., the aim of this article is not to determine the factors that influence tourist arrivals but rather the aim is to investigate whether there is

any causal link between the number of tourist arrivals and FDI, and if any such link(s) exist, then the direction of such link(s).

The organization of the article is as follows. In the next section a preliminary time series data analysis of FDI and tourism data in relation to India is presented. Then the direction of causality under a VAR framework is investigated. In the last section, conclusions are presented.

A Preliminary Time Series Data Analysis of Tourism and FDI

We use quarterly time series data for the period 1995(2) to 2007(2) for the two variables in natural log form, namely the number of foreign tourist arrivals (TOUR) in India and the amount of foreign direct investment (FDI) into India (in rupees core). These data were collected from various issues of the *Reserve Bank of India Bulletin* (published by the Reserve Bank of India) and *Indiastats*.

Figure 1 shows the plot of the two series in natural logarithm. Expectedly, tourism shows clear seasonal pattern, although some seasonality could also be observed in the FDI series. Both the series are deseasonalized by testing for seasonal unit roots and applying the relevant seasonal filters to the original series (Engle & Granger, 1987).

In order to investigate the possibility of seasonal unit roots in the series, we apply the commonly used HEGY (Hylleberg, Engel, Granger, & Yoo, 1990) test. This test is based on the following auxiliary regression model:

$$y_{4t} = \pi_1 y_{1t-1} + \pi_2 y_{2t-1} + \pi_3 y_{3t-2} + \pi_4 y_{3t-1} + \varepsilon_t \quad (1)$$

where

$$y_{4t} = (1 - B^4)y_t = y_t - y_{t-4}$$

$$y_{1t-1} = (1 + B + B^2 + B^3)y_{t-1} = y_{t-1} + y_{t-2} + y_{t-3} + y_{t-4}$$

$$y_{2t-1} = -(1 - B + B^2 - B^3)y_{t-1} = -y_{t-1} + y_{t-2} - y_{t-3} + y_{t-4}$$

$$y_{3t-2} = -(1 - B^2)y_{t-2} = -y_{t-2} + y_{t-4}$$

$$y_{3t-1} = -(1 - B^2)y_{t-1} = -y_{t-1} + y_{t-3}$$

and ε_t is a normally and independently distributed error term with zero mean and constant variance. The HEGY test involves testing the following three hypotheses:

$$\text{H1: } H_0: \pi_1 = 0 \text{ versus } H_1: \pi_1 < 0$$

$$\text{H2: } H_0: \pi_2 = 0 \text{ versus } H_1: \pi_2 < 0$$

$$\text{H3: } H_0: \pi_3 = \pi_4 = 0 \text{ versus } H_1: \text{at least one } \pi_i \neq 0, i = 3, 4.$$

The first two hypotheses (H1 and H2) involve the use of the t -test and the third involves the use of F -test. If the null hypothesis in H1 is not rejected, it

Figure 1. Foreign direct investment (FDI) and foreign tourist arrivals (TOUR) (in natural logarithm).

means that there is a unit root at the zero frequency [i.e., a nonseasonal unit root in the series and $(1 - B) = 0$]. If null hypothesis in H2 is not rejected, it means that there is a seasonal unit root at the semi-annual frequency [i.e., $(1 + B) = 0$]. If the null hypothesis in H3 is not rejected, it means that there is a seasonal unit root at the annual frequency [i.e., $(1 + B^2) = 0$]. (We used the SHAZAM software package for estimation.) Table 1 presents the values of the test statistic (with and without seasonal dummies included) and the corresponding critical values at the 5% level for the two time series, TOUR and FDI.

The results show that all three null hypotheses are not rejected for the two time series, indicating that both series have a nonseasonal unit root and a seasonal unit root at semiannual and annual frequencies. The overall conclusion from this analysis is that both time series are nonstationary in their level form and in order to remove the seasonal unit roots we need to apply the seasonal filter $S(B) = (1 + B)(1 + B^2)$ (see Engle, Granger, & Hallman, 1989). Therefore, the resulting series $S(B)\ln(Y_t)$ is of order $I(1)$. From here onwards we focus our analysis on the two filtered series $S(B)\ln(FDI_t)$ and $S(B)\ln(TOUR_t)$.

Obviously both the filtered series $S(B)\ln(FDI)$ and $S(B)\ln(TOUR)$ must be of order $I(1)$ as the original series has a nonseasonal unit root. From the plots of the two filtered series, it is noted that some structural changes have occurred to the two series around 2002 when the National Tourism Policy was introduced in India. When there are structural breaks, the Dickey-Fuller and Phillips-Perron test statistics are biased towards the nonrejection of a unit root (Enders, 1995). Thus, it is necessary to use the procedure developed by Perron (1989) to test for a unit root in the presence of a

structural change. To perform this Perron test, we consider the regression equation (2) for each time series $S(B)y_t$ and test the null hypothesis of a unit root by testing $H_0: \alpha_1 = 1$. The critical values for such hypothesis testing are available in Perron (1989). The model to be estimated for this test is given by:

$$y_t = \alpha_0 + \mu_1 DL_t + \mu_2 DT_t + \alpha_1 y_{t-1} + \alpha_2 t + \sum_{i=1}^k \beta_i \Delta y_{t-i} + \varepsilon_t \quad (2)$$

where

$$DL_t = \begin{cases} 1 & \text{if } t \geq \tau + 1 \\ 0 & \text{otherwise} \end{cases}$$

$$DT_t = \begin{cases} t - \tau & \text{if } t \geq \tau + 1 \\ 0 & \text{otherwise} \end{cases}$$

where $\tau = 29$ is the structural break which took place in 2003(1). DL_t is a level dummy variable; DT_t is a slope dummy variable; α_0 is an intercept term; t is a deterministic trend; α_1 , μ_1 , and β_i are the parameters; k is the lag length; and ε_t is the disturbance term.

The value of the test statistics of the Perron (1989) test at various lag lengths of each time series are reported in Table 2. The Perron test results presented in the table indicate that the null hypothesis of a unit root is not rejected by both the series in the presence of a structural break at all lag lengths. The results so far confirm that both original time series have seasonal and nonseasonal unit roots and the filtered series of the form $S(B)y_t$ has a nonseasonal unit root in the presence of a structural break. We now test the first difference of both series for

Table 1
HEGY Test Results for Seasonal Unit Roots

Hypothesis	Data-Based Value of the Test Statistic				Critical Value	
	FDI		TOUR			
	WOSD	WSD	WOSD	WSD	WOSD	WSD
	H1	0.89	0.54	1.22	0.58	-2.96
H2	-1.28	-1.34	-0.45	-2.19	-1.95	-3.04
H3	3.15	3.43	0.34	4.30	3.04	6.60

Table 2
Perron Test for a Unit Root in the Presence of a Structural Change

	<i>T</i>	λ	Value of the Test Statistic						Critical Value at	
			<i>K</i> = 1	<i>K</i> = 2	<i>K</i> = 3	<i>K</i> = 4	<i>K</i> = 5	<i>K</i> = 6	5%	1%
FDI	49	0.6	-2.26	-2.23	-3.71	-1.95	-2.23	-2.77	-4.24	-4.88
TOUR	49	0.6	-3.14	-2.67	-2.85	-2.62	-2.90	-3.01	-4.24	-4.88

T = number of observations, λ = proportion of observations occurring before the structural change, and *K* = lag length.

stationarity by applying the Augmented Dickey-Fuller (ADF) test on the first difference series using the systematic procedure described in Enders (1995). The results for the $(1 - B)S(B)y_t$ series are presented in Table 3. As can be seen, the results show that both series are stationary in their first difference form. This means both filtered series $S(B)y_t$ are $I(1)$. The results so far confirm that both filtered time series $S(B)y_t$ have one nonseasonal unit root and both series are $I(1)$.

Even if the two filtered variables TOUR and FDI individually are $I(1)$, it may be possible that a linear combination of the two variables may be stationary. If we are modeling a linear relationship between the filtered series of TOUR and FDI, even if each of them are individually nonstationary [i.e., $I(1)$]; as long as they are cointegrated, the regression involving the two series may not be spurious. Thus, we now investigate whether the two series are cointegrated and have a long-run equilibrium relationship. We employ the Engle and Granger (1987) procedure, which is based on testing for a unit root

in the residual series of the estimated equilibrium relationship by employing the Dickey-Fuller test. Therefore, the null and alternative hypotheses are:

- H_0 : The residual series has a unit root (or TOUR and FDI are not cointegrated).
 H_A : The residual series has no unit root (or TOUR and FDI are cointegrated).

Rejection of the null hypothesis in both cases would mean that the two filtered series TOUR and FDI are cointegrated. The critical values for the unit root test on the residuals of the cointegrating regression are not the same ones used in the ADF test as the test statistics are not invariant to the number of variables included in the regression. The appropriate critical values are given in Davidson and MacKinnon (1993).

The residual unit root test results are presented in Table 4. The results in the table clearly show that both the least squares residual series are nonstationary and hence the filtered series TOUR and FDI are

Table 3
ADF Test Results for a Unit Root on the First Difference of the Filtered Series

Model	Null Hypothesis	Critical Value at the 10% Significance Level	TOUR		FDI	
			Data-Based Value of the Test Statistic	Results	Data-Based Value of the Test Statistic	Results
Constant and trend	$H_0: \gamma = 0$	-3.13	-3.131	Reject H_0	-2.51	Do not reject H_0
Constant and trend	$H_0: \alpha_0 = \gamma = 0$	5.34			3.62	Do not reject H_0
Constant and no trend	$H_0: \gamma = 0$	-2.57			-2.41	Do not reject H_0
Constant and no trend	$H_0: \alpha_0 = \gamma = 0$	3.78			2.92	Do not reject H_0
No constant and no trend	$H_0: \gamma = 0$	-1.62			-2.44	Reject H_0
Conclusion			$(1 - B)S(B)\{\text{TOUR}\}$ has no unit root and the series is stationary		$(1 - B)S(B)\{\text{FDI}\}$ has no unit root and the series is stationary	

not cointegrated, indicating that there is no long-run equilibrium relationship between FDI and the number of foreign tourist arrivals in India.

Testing Granger Causality

From the analysis so far, we found that both filtered series TOUR and FDI are $I(1)$ and are not cointegrated. Therefore, they have no long-term relationship. They may nevertheless be related in the short run. Their short-run fluctuation can be described by their first differences, which are stationary. The interactions in the short-run fluctuations may therefore be described by a VAR system in first differences.

We determine the optimal lag length for the VAR system by using the Schwarz (1978) Criterion (SC) and the Akaike (1974) Information Criterion (AIC). We use a VAR system of k lags and estimate it for various lag lengths. We found that the optimal lag lengths for both the FDI and TOUR series to be 3 lags. Therefore, the final system to be used is a VAR(3). We estimate the VAR(3) system in the following form with all variables in first-difference form and test various hypotheses.

$$\begin{aligned} \text{TOUR}_t = & \alpha_{01} + \alpha_{11} \text{TOUR}_{t-1} + \alpha_{21} \text{TOUR}_{t-2} \\ & + \alpha_{31} \text{TOUR}_{t-3} + \beta_{11} \text{FDI}_{t-1} + \beta_{21} \text{FDI}_{t-2} \\ & + \beta_{31} \text{FDI}_{t-3} + e_{1t} \end{aligned} \quad (3a)$$

$$\begin{aligned} \text{FDI}_t = & \alpha_{02} + \alpha_{12} \text{TOUR}_{t-1} + \alpha_{22} \text{TOUR}_{t-2} \\ & + \alpha_{32} \text{TOUR}_{t-3} + \beta_{12} \text{FDI}_{t-1} + \beta_{22} \text{FDI}_{t-2} \\ & + \beta_{32} \text{FDI}_{t-3} + e_{2t} \end{aligned} \quad (3b)$$

Table 4
Test for Cointegration of TOUR and FDI on the Residuals

Model	Null Hypothesis H_0	Critical Value at the 10% Significance Level	Data-Based Value of the Test Statistic	Results
TOUR = $\alpha + \beta$ FDI + e	H_0 : The residuals series has a unit root	-3.04	-1.50	Do not reject H_0
FDI = $\alpha + \beta$ TOUR + e	H_0 : The residuals series has a unit root	-3.04	-1.34	Do not reject H_0
TOUR = $\alpha + \beta$ FDI + γ_t + e	H_0 : The residuals series has a unit root	-3.50	-2.60	Do not reject H_0
FDI = $\alpha + \beta$ TOUR + γ_t + e	H_0 : The residuals series has a unit root	-3.50	-1.54	Do not reject H_0
Conclusion				{Residual series} has a unit root and the two filtered variables TOUR and FDI are not cointegrated

We test the hypothesis that FDI does not cause TOUR (i.e., H_0 : FDI $\Rightarrow$ TOUR) by investigating whether FDI_{t-1} , FDI_{t-2} , FDI_{t-3} do not appear in the TOUR_{*t*} equation and TOUR_{t-1} , TOUR_{t-2} , and TOUR_{t-3} do not appear in the FDI_{*t*} equation to test TOUR does not cause FDI (i.e., H_0 : TOUR $\nRightarrow$ FDI).

Hence, the null hypothesis to test “noncausality” that “FDI does not cause TOUR” is that:

$$H_0: \beta_{11} = \beta_{21} = \beta_{31} = 0.$$

Rejection of the null hypothesis H_0 means that FDI causes TOUR in the Granger sense.

Similarly the null hypothesis to test “noncausality” that “TOUR does not cause FDI” is that:

$$H_0: \alpha_{12} = \alpha_{22} = \alpha_{32} = 0.$$

We perform the above estimation in SHAZAM and Table 5 presents the results. As can be seen from Row 1 of Table 5, for testing the null hypothesis, H_0 : FDI $\nRightarrow$ TOUR, the p -value is 0.007, which is less than the level of significance (0.05). Hence, we reject the null hypothesis that “FDI does not cause TOUR” and conclude that there is some support for the alternative H_A : “FDI causes TOUR” in the Granger sense at the 5% level of significance. Looking at Row 2 of the table, for the testing of H_0 : TOUR $\nRightarrow$ FDI, the p -value is 0.00, which is lower than the level of significance (0.05). Therefore, we reject the null hypothesis H_0 : “TOUR does not cause FDI” and conclude that there is support for the alternative H_A : “TOUR causes FDI.”

Table 5

Results of Granger Causality Test Between Tourism and FDI in India, 1995–2007

	Null Hypothesis	<i>p</i> -Value of the <i>F</i> -Test Statistic	Conclusion at the 10% Significance Level
1	$H_0: \text{FDI} \nRightarrow \text{TOUR} (\beta_{11} = \beta_{21} = \beta_{31} = 0)$	0.00718	Reject H_0 (i.e., $\text{FDI} \Rightarrow \text{TOUR}$)
2	$H_0: \text{TOUR} \nRightarrow \text{FDI} (\alpha_{12} = \alpha_{22} = \alpha_{32} = 0)$	0.00001	Reject H_0 (i.e., $\text{TOUR} \Rightarrow \text{FDI}$)

Conclusion

In this article we have investigated the causal relationship between foreign direct investment (FDI) and the number of foreign tourist arrivals (TOUR) in India using the quarterly data for the period 1995(2) to 2007(2). For this investigation we employed various time series econometric techniques such as unit root test, cointegration, and causality. The analysis reveals that the two filtered time series $S(B)\text{TOUR}$ and $S(B)\text{FDI}$ where $S(B) = (1 + B)(1 + B^2)$ are both $I(1)$ and are not cointegrated. We then used the VAR system in first difference of the two filtered variables to investigate the causality between TOUR and FDI. The results show that there is a two-way causal relationship between FDI and tourism. That is, FDI has a causal effect on the number of foreign tourist arrivals in India and vice versa. The two-way causality results found here in relation to India is similar to the findings for a number of small island developing states (SIDS) (Craigwell & Moore, 2008).

Since growth in FDI plays a significant role in influencing the growth in the tourism sector in India, the Indian government should introduce appropriate policies to attract FDI from the multinational corporations. The contributions of MNCs through FDI in the tourism sector would help increase tourism resources, new tourist venues and facilities in order to increase the number of foreign tourist arrivals, and to meet the increasing demand for international tourism to India.

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Note

¹Annual Report 2009–10 of the Ministry of Tourism (www.tourism.gov.in) and Department of Industrial Policy and Promotion on the FDI Statistics (http://www.dipp.nic.in/fdi_statistics/india_fdi_index.htm).

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