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INDIAN CIVIL AVIATION INDUSTRY:
ANALYSING THE TREND AND IMPACT OF FDI INFLOW

Priyanka Saharia[1], Krishna Raj[2]

Abstract

FDI is the major source of external financing to developing countries and it plays a major role in economic growth. Attracting FDI with flexible policies has therefore become a major task in emerging markets. FDI brings large capital inflows across the industries. In this study, we examine the trend and pattern of FDI inflow to the Indian civil aviation industry. The period of the study is from 2008 to 2017. Data is taken from secondary sources for all the selected variables. Selected variables of our study are FDI inflow to the air transportation industry, employment of airlines, and output of the industry. Statistical tools such as CAGR, average annual growth rate, ANOVA, Pearson's correlation coefficient and simple linear regression have been applied for analysis. The findings of our study are that FDI alone cannot work as a game-changer for the Indian civil aviation industry. Relaxing the norms of FDI policy is not always helping to bring more inflow to the industry. Indian policymakers should focus more on the financial health of the industry.

Introduction

Foreign direct investment (FDI) is considered one of the remarkable features of globalisation. FDI helps the countries by bringing in new growth opportunities and massive profits with spillover effects across the various sectors in the economies in terms of technical and managerial know-how, better and improved infrastructure, employment opportunities, increased competitiveness, and opportunity for local markets to expand globally(Singh, 2019).Other studies(Goutam Das, 2018-19), (Van Thi Cam Ha, 2019), (Carmen Bogheana, 2015), (Siwage Dharma Negara, 2012), (Xiaming Liu, 2001), have also found that FDI has a positive effect on the labour productivity of the domestic firm. For all these advantages, attracting FDI inflows with favourable policies is a major task for policymakers of emerging markets.

In India also, when the economy was liberalised in 1991, various sectors within the economy started attracting foreign direct investment. The civil aviation industry is one among them. The industry was liberalised in the year 1994 and currently, it is the ninth largest civil aviation market in the world. According to the International Air Transport Organisation (IATA), India's aviation market is one of the five fastest-growing aviation markets globally, growing at over 20% year by year. Its total market size is USD 16 billion. The industry is projected to become the third largest aviation market globally by 2022(Lee, 2015) and the largest by 2030.The growing middle class population and rapidly developing economy is making India suitable for the growth of an aviation market. Yet, there is an imparity in terms of regulatory evolution. Strict regulations are holding back the Indian aviation market from expanding faster. To tackle these challenges, the government of India is initiating two policies: National Civil Aviation Policy 2016 and Consolidated FDI Policy Circular of 2016. This consolidated FDI policy

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allows 100% foreign direct investment into Indian airline operators under the automatic route. As per the policy, foreign airlines are allowed to invest under the government approval route in Indian companies up to the limit of 49 percent of their paid-up capital in operating scheduled and non-scheduled air transport services, Foreign investment has been allowing Indian airline players to offer competitive fares, attracting a huge middle-class population to choose domestic air travel. The intervention of FDI in airline industries has brought stiff competition among the airlines and has brought down the airline ticket prices and enhanced air penetration in both domestic and international routes.

Being one of the propellers for the growth of India's civil aviation industry, the policy related to foreign direct investment has undergone many changes and phases. The objective of the current paper is to analyse the changing trends and patterns of Foreign Direct Investment in the Indian civil aviation industry. The paper is organised into six sections. The first section provides a brief introduction to FDI and its importance for the Indian civil aviation industry. The second section traces the role of FDI and the overall inflow of FDI to the economy. The third section deals with the existing literature in the related area. The fourth section explains the methodology, data, and data sources. The fifth section analyses the trends in FDI inflow, output, and employment of the Indian civil aviation industry. The sixth section gives the results and discussions, followed by conclusions in the last section.

Stylised Facts

Policymakers in developing countries mostly try to have economic policies to attract foreign direct investment by luring multinational enterprises through various investment incentives and relaxing trade regulations. One important reason to have more FDI inflow is that FDI is said to have a significant impact on employment by its direct effect or through spillover effect. In the following graph, we plotted the growth rate of total FDI inflow and GDP at factor cost to the economy from 2000-01 to 2018-19. Data are taken from the Department for Promotion of Industry and Internal Trade (DPIIT) and the Ministry of Statistical and Program Implementation.

Graph 1: Inflow of FDI to India
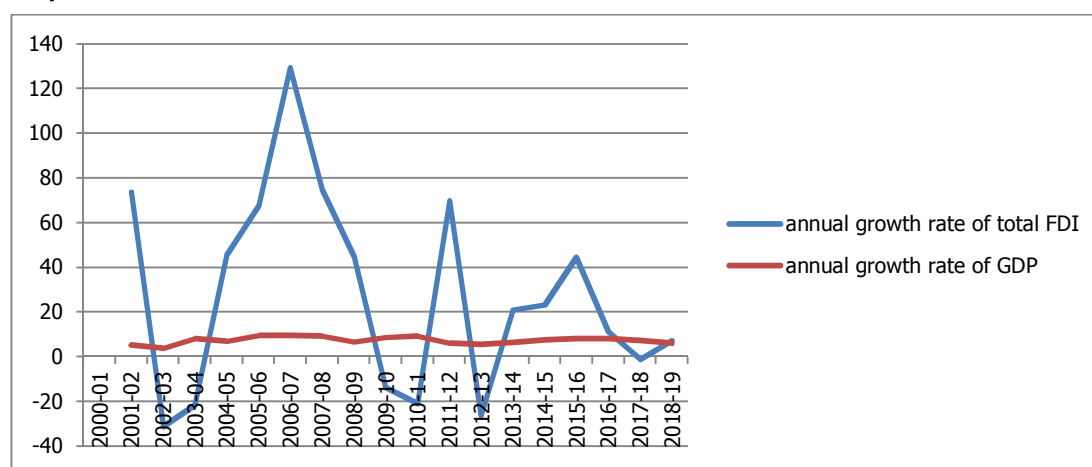
Source: DPIIT

The graph shows that there is a steep fall in FDI inflow from 2000-01 to 2003-04 and it has started rising from the year 2004-05. There are many reasons behind the decline of FDI inflow for the period 2002-03 and 2003-04. In post-2001, a series of events took place where the environment in the economy was not conducive for investment for foreign investors. These were the Gujarat earthquake (January 2001), the terrorist attack on parliament (December 2001), and the terrorist attack on the World Trade Center (September 2001) (Singh, 2019). However, FDI inflow from the year 2004 to 2007 was enormous. An inclusive review of literature (Singh S. , 2009) has found that the FDI policy of 2006 has a more rationalised approach. Percentage change in FDI inflow has become negative in the post-2008 period due to the global economic crisis though India as a nation was less exposed to it, compared to other countries. The reason for the fall in FDI inflow during 2012-13 is the Euro crisis. There was a decline in world growth prospects as well as investors' confidence leading to a negative impact worldwide. After 2014, the revival sign started for FDI inflow into the economy. In the year 2017, the government came up with a more relaxed FDI policy by easing 87 FDI rules across 21 sectors in the last three years (Singh, 2019).

Review of Literature

The post-liberalisation period has been remarkable in many ways because it has created a significantly positive environment for foreign investors. In 1991, only 29 countries invested in India, but now more than 130 countries have their share of investment. Many studies have established the contribution of FDI to the national economy.

The inflow of FDI is said to have a positive impact on the GDP and employment of host countries. A study (Gaurav Agrawal, 2011) investigated the effect of FDI on the economic growth of China and India for the duration of 1993 to 2009. The factors included in the growth model for estimation were GDP, human capital, labour force, FDI and gross capital formation. GDP was the dependent variable and the others were independent variables. The finding of the study reveals that one percent increases in FDI would result in a 0.07 per cent increase in the GDP of China and a 0.02 per cent increase in the GDP of India.(Pooja Sengupta, 2018), studied the causal relationship between GDP and FDI in India and its neighboring countries. The study employed the pair-wise Granger-Causality test. The study found that in the case of India, FDI has a causal impact on GDP but GDP does not have a causal impact on FDI.

(Maitri Ghosh, 2015), examined the impact of FDI on firm-level labour demand in India. The estimated result showed that foreign ownership does not play a significant role in determining firm-level labour demand in Indian manufacturing. It was also found that though an increase in output significantly increases labour demand, technology acquisition by such firms does not have any impact on labour for most sectors.

(Someshu, 2015), found that the size of the manufacturing sector has a positive impact on FDI inflows. The service sector has been attracting a huge amount of FDI inflows to India in the recent past and it has also a positive impact on FDI inflows.

(Mafruza Sultana, 2019), investigated the factors influencing FDI in terms of growth and human development of the Indian economy. Sensex, HDI, population, inflation, and GDP are considered

as independent variables and FDI is the dependent variable. The study mainly focused on the relationship between FDI and GDP by using yearly data for the period 2006-07 to 2016-17. Collected data were analyzed through regression. The study found that FDI has a considerable on HDI, population, and Sensex index. Ironically, analysis of the study shows that FDI has no significant impact on GDP.

(Jaya Prakash Pradhan, 2004), analysed the role of FDI in determining the wage rate and employment performance in Indian manufacturing. The finding of the study revealed that foreign firms do not harm the manufacturing employment in India as compared to their domestic counterparts while they pay relatively higher to their workers. They concluded that labour had benefited from foreign direct investment.

(Malik, 2018),examined the employment effect of FDI in the local manufacturing industries in India. Since the economic reform, India has been undertaking so many policy measures to make the economy an investor-friendly environment. The study looked at Indian manufacturing industries during 2008-09 through 2015-16. Analysis of the study found that there is not any significant effect of FDI on employment in manufacturing industries for the mentioned period.

(Ahmad Zubaidi Baharumshah, 2005), assessed the effect of various types of capital flow on the growth process of East Asian countries including China. To find out the long-run relationship between GDP and FDI, the panel co-integration method was adopted. The period of the study was from 1980-2010. To know the direction of causality, Engle and Granger causality test was applied. The study found that there was unidirectional causality from FDI to GDP.

(Khandare, 2016), undertook a study to find the relationship between gross domestic product and employment and the relationship between employment and foreign direct investment in India for the period 2001 to 2012. The study found that for the given period, a compound annual growth rate of FDI was 25.58% followed by a GDP of 12.59 per cent and it was only 0.49 per cent for employment in India. Employment was considered as a dependent variable and both GDP and FDI were considered as independent variables in the study. Econometric analysis of the study says that a one-unit increase in FDI will increase employment by 0.857 units and a one-unit increase in GDP will increase employment by 0.875 units in India.

From the above literature, we see that role of FDI in the national economy in terms of output and employment is quite significant. FDI inflow is said to have a positive impact on the Indian civil aviation sector too. The report of the working group on Civil Aviation Sector by the Ministry of Civil Aviation Industry also suggests investment by foreign airlines in domestic carriers. By allowing foreign players to take an equity stake in Indian carriers, we can unlock more funds, technical know-how, and global access.

(John F. O'Connell, 2006), mentioned the recommendations of the Naresh Chandra Committee Report. The report suggests that foreign equity investment in both domestic and international scheduled air transport services should be further liberalised from 40 % to 49 %.

To have a better understanding of the role of FDI in the civil aviation industry, the study has reviewed some pieces of literature as follows:

(Mattijs Backx, 2002), examined the performance of international airlines concerning public, private, and mixed ownership. They considered 50 international airlines from across the globe. Hypotheses were tested through series of ordinary least square models. The study found that ownership structure has a strong impact on the performance dimensions of international airlines. It was found that the public sector and airlines with mixed ownership have lower profit levels than private airlines. Employee productivity was also lower in public and mixed ownership airlines.

(Christopher Findley, 2004), brought out the key points of liberalisation and foreign direct investment in the Asian aviation market. It found that due to liberalisation, greater competition has arrived among the domestic airlines; especially from low fare airlines. A higher level of foreign participation in airline operations helped to provide funding and management capabilities that would support the adjustment process required in the incumbent carrier.

(Fukunari Kimura, 2004) estimated the ad valorem equivalents of barriers to foreign direct investment in the maritime and air transportation sector in Russia. FDR index is the same as the FR index. The study found that foreign entry was highly restricted for domestic air transportation services. For both direct investment in international air transportation and domestic air transportation, the maximum foreign ownership was regulated at 49 % and the maximum proportion of foreign members was one-third. These regulations prevented foreign entry to the air transportation services in Russia.

(Salih Kalayci, 2016), examined the relationship between FDI, GDP, and air transportation in Turkey and the study found that there was a long-run relationship between the three variables. The empirical finding of the study demonstrated that the effect of GDP was found to increase air transportation more than GDP. However, considering the direction of the relationship in terms of FDI to air transportation in Turkey, there was no impact of FDI on air transportation.

(Aarti Sharma, 2012), suggested that for the smooth inflow of FDI to the Indian civil aviation industry, bureaucratic delays had to be overcome and various governmental approval and clearances involving different ministries needed to be speeded up. The government needed to ensure consistency of policy to improve the business and investors' confidence.

Nandi et al (2013), mentioned in their paper that FDI might be important and helpful to reduce the financial deficit of the civil aviation industry and might also lead to the growth of GDP but much would depend upon oil prices and other input costs on airfares. The government needed to allow international airlines to participate in the foreign direct investment that would help in the reduction in sales taxes which are required to be paid by airlines.

(P, 2014), suggested that inviting foreign direct investment to the Indian aviation industry would help to bring in a good aviation environment. Further, it was also suggested that government should show the political will to push things through and launch a package of aviation reform. But liquidity crunch was the biggest problem as Indian aviation did not have enough money for investment. A more liberal foreign direct investment could work as a viable option for the Indian aviation industry.

Literature has shown that the inflow of FDI plays important role in the employment and output of the industry. The importance of FDI in creating employment and contributing to GDP in various

sectors of the economy is well studied but concerning the output and employment of the civil aviation industry in India is not studied enough. Its importance is well highlighted in recent policy initiatives taken by the government of India. On March 4th, 2020, FDI up to 100 per cent was allowed in scheduled air transport services/ domestic scheduled passenger airlines (automatic up to 49 per cent and government route beyond 49 percent). Keeping its importance in mind, this study attempts to examine the effect of FDI inflow on employment and output of the civil aviation industry along with analysing its trend and pattern. The following section deals with the methodology, data, and data sources of our study.

Data and Methodology

Selection of Variables

The study is based on secondary data collected from different sources. The period of the study is from 2008 to 2017. Data on FDI inflow to the air transportation industry is not available before 2008. The main variables selected for the study are FDI inflow to air transportation, employment in airlines, and output of the industry. Output of the industry represents the value added by air transportation in GDP. We have deflated FDI inflow to air transport and output of the industry to the constant base year price level of 2011-12. Data on FDI inflow to the air transport industry is collected from the Department for Promotion of Industry and International Trade. No separate data is mentioned by the ministry at the disaggregated level of the industry. So this study considers the total FDI inflow to the air transportation industry.

Table 1: Data sources and variables

Sl. No.	Variables	Units	Sources of data
1	FDI inflow	Rs in Crore	Department for Promotion of Industry and Internal Trade
2	Output of air transportation	Rs in Crore	Ministry of Statistical and Program Implementation
3	Employment	Numbers	Director General of Civil Aviation

It is important to cite some literature behind the choices of variables. (Shib Shankar Jana, 2019), has considered FDI inflows in agriculture, manufacture and service sector and, GDP of all three sectors respectively as the variables for the study. The study explored the sector-wise relationship between FDI and economic growth in India. (Malhotra, 2014), studied the impact of FDI on the Indian economy. The paper considered FDI and GDP as variables and calculated growth rates for both the variables to analyse the trend and pattern. (Pooja Sengupta, 2018) considered a bivariate ordinary least square regression where FDI is an independent variable and GDP is a dependent variable to support the fact that FDI has an overall significant effect on GDP. (Nosheen, 2013), investigated the impact of FDI on GDP in Pakistan. GDP was taken as a dependent variable and FDI was taken as an independent variable for the analysis.(Mohammad, 2013), estimated the impact of FDI in employment generation in India. The study considered FDI as an independent variable and employment as dependent variable. The study used ordinary least square (OLS) method to find that FDI has a negative impact on employment generation in the Indian retail sector. These studies have worked as support for the

choices of our variables. They have also considered bivariate analysis of GDP and FDI for determining an empirical relationship between them. Growth and employment being the major determinant of industry; we attempt to look at the impact of FDI inflow on both the variables of civil aviation industry. Hence, the paper considers two simple linear regression equations (since there are two dependent variables):

Equation (1): GDP =f (FDI)

      GDP = $\alpha1$ + $\beta1$ FDI + u_t

Equation (2): EMT= f (FDI)

      EMT = $\alpha2$ + $\beta2$ FDI + u_t

In equation (1), GDP= output of air transportation industry, FDI = foreign direct investment, $\alpha1$= intercept, B1= coefficient of FDI and u_t = error term.

In equation (2), EMT= employment in the airlines, FDI = foreign direct investment, $\alpha2$ = intercept, $\beta2$= co efficient of FDI and u_t = error term

We have formulated the following hypotheses for both equation (1) and equation (2).

A null and an alternative hypothesis have been taken for the above-mentioned regression equations.

Equation 1:

Null hypothesis: FDI does not have a positive impact on output of air transportation (GDP)

Alternative hypothesis: FDI has a positive impact on output of air transportation (GDP)

Equation 2:

Null hypothesis: FDI does not have a positive impact on employment in the airline industry

Alternative hypothesis: FDI has a positive impact on employment in the airline industry

Methodology

The primary objective of the study is to analyse FDI inflow to the air transportation industry. The annual growth rate is computed for the underlying period and it is computed to determine the magnitude of FDI inflow to the industry. This study has also considered the other two variables; the output of the air transport industry and employment of Indian airlines. A compound annual growth rate is also computed for the subsequent number of years for FDI inflow, output, and employment. Further, the study also analyses the role of FDI in employment and output. For empirical analysis, the bivariate regression method and Karl Pearson's correlation coefficient method has been used.

We have calculated Pearson's coefficient of correlation. The degree of relationship between the variables under consideration is measured through the correlation analysis. Correlation can be either positive or negative. If both the variables are varying in the same direction, correlation is said to be positive. If on the other hand, variables are varying in the opposite direction, i.e, as one variable is increasing, the other is decreasing or vice versa then the correlation is said to be negative. The value of

the coefficient of correlation always lies between − 1 to + 1. If the value of the coefficient is +1, there is a perfect positive correlation between the variables and if the value of the co-efficient is -1, there is a perfect negative correlation between the variables. The co-efficient of correlation describes not only the direction but also the strength and significance between independent and dependent variables.

We have also estimated bivariate regression analysis. A bivariate regression model is also known as a simple linear regression model and it is used to study the relationship between a dependent variable and one independent variable. A simple linear regression model requires certain assumptions to be fulfilled to specify the deterministic relationship between a dependent variable and the independent variables. It must satisfy the assumptions of normality of data, absence of autocorrelation, and absence of heteroskedasticity. Our study will undertake the diagnostic tests to satisfy the assumptions of a simple linear regression model.

Hypotheses of our study will be tested using ANOVA to evaluate the significance of our regression model. In the following section, we have calculated the annual growth rate and CAGR of FDI inflow, output, and employment of the industry.

Trends in FDI Inflow, Output, and Employment of Civil Aviation Industry in India

The major policy changes related to the Indian civil aviation industry took place in the years 2006, 2012, and 2016. In 2006, the government brought changes to FDI policy by allowing 100 per cent FDI under the automatic route for the greenfield airports. In the case of brownfield airport, FDI beyond 74 per cent is allowed if there is prior approval of the government. For domestic scheduled passenger airlines, FDI up to 49 per cent by foreign investors and investment by NRI up to 100 per cent is allowed under the automatic route. Until 2012, foreign airlines were not allowed to invest directly or indirectly in domestic airlines. It is only in 2012 that the government allowed the ceiling of 49 per cent of foreign direct investment in domestic passenger airlines. Before investing in domestic airlines, foreign airlines have to take the approval of the Foreign Investment Promotion Board. However, foreign investment is allowed in all the sectors of the civil aviation industry.

In 2016, the government of India eased the norm of allowing foreign investment up to 49 per cent under the automatic route in scheduled air transport services/ domestic scheduled passenger airlines and regional air transport service. According to the current FDI policy, the limit of foreign direct investment by investors is raised to 100 per cent where investment beyond 49 per cent needs government approval. However, foreign airlines are continued to allow only up to 49 per cent of the capital of domestic passenger airlines.

Table 3 shows the trends in FDI, output and employment trends in the civil aviation industry in India from 2008 to 2018. FDI inflow to the air transportation industry was Rs 207.51 crore in 2008 which increased by 18 per cent compound annual growth rate and goes up to Rs 1098.844 crore. The FDI shows mixed trends during the study period and increased by approximately 5 times in absolute terms in 2018 compared to 2008. The output of the air transportation industry was Rs 39149.635 crore which increased by 3 times and stood at Rs 118908 crore. The compound annual growth rate of output was approximately 11 per cent from 2008 to 2018. The total number of employees appointed by

different airlines was 60729 in 2008 which has decreased to 57226 in 2018. The compound annual growth rate of employment is - 0.5 percent. It is found that the highest 18 per cent compound annual growth rate is recorded by FDI inflow to air transportation industry which is followed by the output of air transportation industry of 11 per cent compound annual growth rate and it was only -0.5 per cent for employment for the period 2008 to 2018.

Table 2: FDI Inflows, Output and Employment

Years	FDI (crore)	Output (crore)	Employment
2008	207.512	39149.635	60729
2009	152.564 (-26)	44462.885 (13.5)	57792 (-4.8)
2010	424.457 (178)	51389.085 (15.5)	59697 (3.2)
2011	284.54 (-32)	55884 (8.7)	53386 (-10.5)
2012	100.54 (-64)	53586 (-4.1)	54616 (2.3)
2013	250.84 (149)	58412 (9)	55070 (0.83)
2014	449.61 (79)	66398 (13.6)	57429 (4.28)
2015	324.21 (-27)	76963 (15.9)	54092 (-5.8)
2016	2686.55 (728)	90520 (17.6)	58308 (7.7)
2017	3844.02 (43)	106141 (17.2)	63401 (8.7)
2018	1098.844 (-71)	118908 (12)	57226 (-9.7)
CAGR	**18 %**	**11%**	**-0.5%**

(Author's calculation)

(*Figures in parenthesis are the annual growth rate of FDI inflow to the industry, output, and employment in airlines)

The annual growth rate (AGR) for FDI inflow, output and employment is also calculated. The growth rate of FDI is negative in the year 2009. The global financial crisis of 2008 can be a possible reason as aviation was one of the worst-hit industries. There is a huge fall in the FDI growth rate for 2011 and 2012. In the year 2012, the Indian economy witnessed an overall fall in FDI inflow by 34 per cent compared to the previous year due to global uncertainties including the air transportation industry. The growth rate of output is negative only for the year 2012.

Here we find a similar pattern in the growth rate of FDI and growth rate of employment for our study duration. With the negative growth rate of FDI inflow, the employment growth rate is also negative for the years 2009, 2011, 2015, and 2018. But the growth rate of output is independent of the growth rate of FDI inflow. The compound annual growth rate of the study suggests that FDI inflow and output of the industry have increased over time but the number of employees in the airline industry is decreasing with a negative CAGR during our study period.

Results and Discussion

Correlation Analysis

Table 3 reveals Pearson's co-efficient of correlation between FDI inflow, the output of air transportation industry, and employment during the period 2008 to 2017. The coefficient of correlation value between FDI inflow and aviation output is 0.86. It is significant at a P-value of 0.0006. The coefficient of correlation 0.86 shows the FDI has a very strong correlation with the output of the air transportation industry. The coefficient of correlation between foreign direct investment and employment is 0.65 or 65per cent at a significance level of 0.05. The coefficient value indicates that there is a moderate correlation between FDI inflow and employment of airlines during the period of our study. The correlation coefficient of aviation output to employment is 0.30 which can be considered as a weak positive correlation between the two variables. It is observed from Pearson's co-efficient correlation result that the significance level of FDI with aviation output is higher than the significance level of FDI with employment. FDI inflow to the air transportation industry has a strong positive correlation with dependent variable aviation output and a moderate positive correlation with the employment of airlines. The table below represents the result of Pearson's coefficient of correlation.

Table 3: Pearson's Coefficient of Correlation Results

	FDI	Aviation output	Employment
FDI	1		
aviation output	0.86	1	
employment	0.65	0.30	1

Regression Analysis

Regression analysis has been used to show the accuracy between dependent and independent variables. Two simple linear regression models were adopted to show the impact of FDI inflow on aviation output and employees in airlines separately. The following table represents the result of regression analysis.

Table 4: Regression result (linear model)

Variable	Co-efficient	t-stat	Std Error	p-value
FDI	16.65	4.93	0.009	0.0011

** $R^2 = 0.75$ and adjusted $R^2 = 0.72$

(Author's calculation)

Table 4 represents the regression result of equation (1) where the dependent variable is aviation output and the independent variable is FDI inflow. It is found that a Rs1crore increase in FDI inflow increases the output of the industry on an average by Rs 17 crore during our study period. R-square value of 0.75 indicates that independent variable FDI inflow explains 75per cent of the variations in the dependent variable aviation output. An adjusted R-square of 0.72 indicates that the regression model is explained 72per cent by the FDI inflow.

Table 5: Regression result (Linear model)

Variable	Co-efficient	t-stat	Std Error	p-value
FDI	1.9	2.4	0.091	0.039

** R-square= 0.43& Adjusted R-square= 0.35

(Author's calculation)

Table 5 reveals the regression result of equation 2 where the dependent variable is employment and the independent variable is FDI. The coefficient value of FDI is 1.5 which indicates that a 1 crore increase in FDI inflow to the air transportation industry increases the employment of airlines by 1.9 times. The R-square value is 0.43 and the adjusted R-square value is 0.35. R-square value implies that the model explains 35per cent of the variance in the dependent variable, employment. Following are the diagnostic tests of the above regression model.

Normality test

Normality is an important assumption for the regression analysis. The result of a confidence interval, t-test and F-test will not be valid if the normality assumption is violated. So, it is important to know if the residuals are normally distributed. We formulate the following hypotheses:

H_0: U_t is normally distributed

H_1: U_t is not normally distributed

The probability value of the Jerque-Bera test determines if we should be rejecting the null hypothesis or accepting the alternative hypothesis. If the p-value is less than 0.05, we reject the null hypothesis and accept the alternative one and if the p-value is greater than 0.05, we accept the null hypothesis. We have presented the result of the normality test on the following graph.

Graph 2
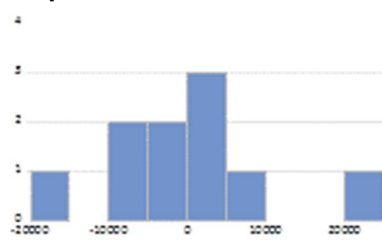
Graph 3
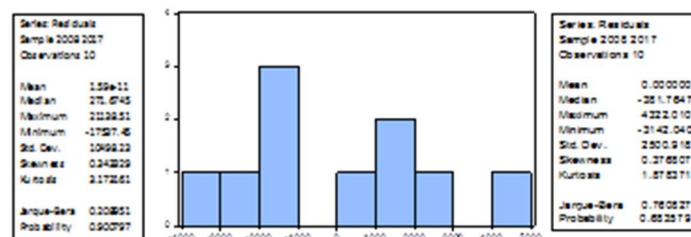
Source: Author's calculation

Graph 2 represents the normality of residuals for equation (1) and graph 3 represents the normality of residuals for equation (2). Graph 1 shows that resulted p-value for Jerque- Bera test is 0.20 and it is greater than 0.05. So, we accept the null hypothesis and conclude that residuals for equation (1) are normally distributed. Graph 2 shows that the resulted p-value for the Jerque-Bera test is 0.76 and it is also greater than 0.05. So, we accept the null hypothesis and conclude that residuals for equation (2) are also normally distributed.

Heteroskedasticity test

One of the important assumptions made by the classical linear regression model is that the error term should be homogeneous. Violation of this assumption leads to the problem of heteroskedasticity. The presence of heteroskedasticity affects the estimation and test of the hypothesis. To avoid this problem, we conduct the Breusch-Godfrey test for heteroskedasticity. The null hypothesis set for the test is there is no heteroscedasticity.

Table 6: Heteroskedasticity Test: Breusch- Pagan Godfrey

F-statistics : 0.796	Prob F (1,8) : 0.398
Obs* R- squared : 0.905	Prob Chi-Square(1) : 0.341
Scaled explained SS : 0.629	Prob Chi-Square(1) : 0.427

Table 7: Heteroskedasticity Test: Breusch- Pagan Godfrey

F-statistics : 0.390	Prob F (1,8) : 0.54
Obs* R- squared : 0.465	Prob Chi-Square(1) : 0.495
Scaled explained SS : 0.120	Prob Chi-Square(1) : 0.728

Table 6 represents the result of heteroskedasticity for equation (1) and table 7 represents the result of the heteroskedasticity test for equation (2). The above test results show that for both equations, the p-value is greater than 0.05 and hence we conclude that error terms for equation (1) and equation (2) are homogeneous.

Serial correlation test

The problem of serial correlation occurs when the error term observations in a regression model are correlated. The serial correlation will not affect the unbiasedness and consistency of the OLS estimator, but it affects their efficiency. In the presence of serial correlation, we conclude that parameter estimates are either less precise or more precise than they are. To avoid this problem, we check if there is any serial correlation in the error term by setting a null hypothesis with no serial correlation.

Table 8: Breusch- Godfrey Serial Correlation LM test

| F-statistics : 1.44 | Prob F (1,8) : 0.306 |
| Obs* R- squared : 3.25 | Prob Chi-Square(1) : 0.1963 |

Table 9: Breusch- Godfrey Serial Correlation LM test

| F-statistics : 0.16 | Prob F (1,8) : 0.85 |
| Obs* R- squared : 0.51 | Prob Chi-Square(1) : 0.77 |

Table 8 represents the result of the serial correlation test for equation (1) and table 9 represents the result of the serial correlation test for equation (2). Since the calculated p-value is greater than 0.05 in both the tables, we can conclude that error terms of equation (1) and equation (2) are free from serial correlation and it satisfies the assumption of the classical linear regression model.

The Analysis of Variance (ANOVA)

ANOVA refers to an analysis of variance and it is a statistical procedure used to test the degree to which two or more groups vary or differ in an experiment finding from research. In the process of examining the relationship between the variables, researchers can use t-test or ANOVA, to compare the means of two groups on the dependent variable.

One-way ANOVA is conducted on both equation (1) and equation (2ANOVA test on equation (1) evaluates the relationship between FDI inflow and employment of airlines. ANOVA test on equation (2) evaluates the relationship between FDI inflow and output of the air transport industry.

The overall significance of the regression model is tested using ANOVA. The F-statistics of ANOVA indicate the significance of the model. The summarised result is shown in table 10 and table 11.

Table 10: ANOVA analysis for FDI inflow and aviation output

	SS	df	MS	F	Sig
regression	3141841753	1	3141841753	28.75	0.0006
residual	874099323.4	8	109262415.4		
Total	4015941076	9			

Table 11: ANOVA analysis for FDI inflow and employment

	SS	df	MS	F	Sig
regression	37265666	1	37265666	5.29	0.05
residual	56291330	8	7036416		
Total	93556996	9			

Hypotheses for table 10 which represents the equation (1):

Ho: the regression model does not explain the significant proportion of variation in aviation output

Ha: the regression model explains the significant proportion of variation in aviation output.

Hypotheses for table 11 which represents the equation (2):

Ho: the regression model does not explain the significant proportion of variation in employment.

Ha: the regression model does explain the significant proportion of variation in employment.

In table 10, the regression F-test (F=24.38) is significant at $p< 0.0006$. Therefore the null hypothesis is rejected. Thus, this supports that the regression model explains the dependent variable, aviation output.

In table 11, the regression F-test (F= 6.05) is significant at $p< 0.05$

Therefore the null hypothesis is rejected. This supports that the regression model explains the dependent variable, employment.

Discussion and Implications

Data for the period 2008 to 2018 (Table 2) analyses the trend of FDI inflow and output of the air transport industry and employment of airlines. It is found that the CAGR of output of the air transportation industry is positive for FDI inflow and employment of airlines is negative during our study

period. The annual growth rate of FDI inflow and employment follows a similar pattern. In the year 2012, FDI inflow to the air transportation industry fell by 64 percent. In the same year, Government of India relaxed the FDI norms in the Indian civil aviation industry by allowing foreign airlines to invest in domestic passenger airlines up to the limit of 49 percent. In 2013, we saw an increase in the annual growth rate of FDI inflow by 149 percent. It again decreased by 27 per cent in the year 2015. In 2016, the government launched a national civil aviation policy and further eased the norms of FDI policy. For the first time, thegovernment allowed 100 per cent FDI in domestic passenger airlines by the foreign investors but beyond 49 per cent of investment had to come through prior government approval. After the policy changes in 2016, for the next two years, the industry witnessed a positive annual growth rate of FDI inflow and it again became negative in 2019. Trend analysis of the study shows that the industry experiences a positive annual growth rate of FDI inflow immediately after the changing of the FDI policy by the Government of India but it becomes negative again.

The study has also examined the Pearson's correlation coefficient among the variables to see whether as the value of one variable changes, do we see corresponding changes in the other variable. Correlation analysis (Table 3) shows that there is a positive correlation between FDI inflow, the output of the air transportation industry, and employment of the airline industry in our study. Though year-on-year growth of FDI inflow and output of the industry does not have a similar pattern, the amount of FDI inflow has a positive correlation with the amount of output. It also shows that there is a positive correlation between aviation output and the employment of the airline industry.

As our correlation test shows a positive relationship among the selected variables of our study, we estimate the relationship between the dependent variable and independent variables using the simple linear regression model. Regression analysis result (table 4 and table 5) shows that a Rs 1 crore increase in FDI inflow to the air transportation industry increases the output of the industry by approximately Rs 14 crore and employment by one and half times. There is a common belief that FDI generally has a positive impact on output growth. But at the same time, the impact of FDI on economic growth is always not positive as it depends on characteristics of the investment resulting from FDI, such as type, sector, scope, duration, the proportion of domestic business on the sector, and so on.

ANOVA test is also performed (table 10 and table 11) to look at the overall significance of our regression models. F-statistics of ANOVA test confirms that both the regression model (1) and (2) explain its dependent variable aviation output and airlines employment, respectively.

All the diagnostic tests to fulfill the assumptions of simple linear regression are also conducted. The result of the normality test shows that residuals of both equation (1) and equation (2) are normally distributed. Breusch-Pagan Godfrey test for heteroskedasticity also results shows the absence of heteroskedasticity. Breusch- Godfrey serial correlation test also specifies that error term of both equation (1) and equation (2) are free from serial correlation. The result of the diagnostic test concludes that our regression model is statistically stable.

Conclusions

The study analyses the trend and pattern of FDI inflow with other two variables; the output of the air transport industry and employment of the Indian airline industry. It calculates the annual growth rate and compound annual growth rate for all three variables. Along with Pearson's correlation coefficient, it also estimates the empirical relationship between the variables. The paper concludes that FDI inflow to the air transportation industry does have a positive impact on its output and the employment of airlines. But the annual growth rate shows that changes in the FDI policy of the civil aviation industry are not helping the industry to gain more inflow of FDI. Year on year growth of FDI inflow continues to decline even after the major policy changes. The inflow of FDI depends not only on the FDI policy of host countries but also on other factors like the global economic scenario. The financial health of the industry is also a major factor for investors to invest in the industry. We can take the example of the national carrier Air India. The Ministry of Civil Aviation is trying for the disinvestment of Air India as it has been suffering a loss but it is facing many challenges. Due to its poor financial health, no investor is coming forward to buy Air India.

FDI brings foreign capital to the industry with improved technology and better management organisation. This paper suggests that since easing FDI norms is not always increasing the FDI inflow to the air transportation industry, policymakers should focus more on maintaining the healthy financial performance of the industry and make it investment friendly.

Finally, it should be admitted that although the disaggregated data such as FDI inflow to the airport, airline industry, maintenance, and overhaul would produce more robust results, this study is not able to explore the pattern of FDI inflow to the other segments of civil aviation industry. Also, the inflow of FDI is available only for ten years. Hence more robust econometric analysis could not be performed. As a relatively new area in academic research, there is a dearth of relevant literature to support the empirical findings of our study. These issues should be addressed in further research.

References

Aarti Sharma, L K (2012). New Dimensions in FDI: FDI in Civil Aviation. *International Journal of Advanced Research in Management and Social Sciences*.

Ahmad Zubaidi Baharumshah, M A-M (2005). Foreign Capital Flows and Economic Growth in East Asian Countries. *China Economic Review*, 70-83.

Bayar, Y (2014). Effects of Economic Growth, Export and Foreign Direct Investment Inflows on Unemployment in Turkey. *Investment Management and Financial Innovations* .

Carmen Bogheana, M S (2015). The Relation between Foreign Direct Investments (FDI) and Labour Productivity in the European Union Countries. *Economics and Finance*.

Chandana Chakraborty, P N (2008). Economic Reforms, FDI, and Economic Growth in India: A Sector Level Analysis. *World Development*, 1192-1212.

Christopher Findley, A G (2004). Liberalization and Foreign Direct Investment in Asian Transport Systems: The case of Aviation. *Asian Development Review*, 37-65.

Fukunari Kimura, M A (2004). Estimating the Ad Velorem Equivalent of Barriers to Foreign Direct Investment in the Maritime and Air Transport Services Sector in Russia.

Gaurav Agrawal, M A (2011). Impact of FDI on GDP: A Comparative Study of China and India. *International Journal of Business and Mangament* , 71-77.

Goutam Das, B R (2018-19). Impact of FDI on Labour Productivity of Indian IT Firms: Horizontal Spillover Effects. *Prajnan*.

Jaya Prakash Pradhan, V A (2004). Foreign Direct Investment and Labor: The Case of Indian Manufactruing. *Labor and Development*, 58-79.

John F O'Connell, G W (2006). Transformation of India's Domestic Airlines: A case study of Indian Airlines, Jet Airways, Air Sahara and Air Deccan. *Air Transport Management*, 358-374.

Khandare, V (2016). Employment Generation in India: Role of GDP and FDI. *International Journal of Humanities and Social Science Research*.

Lee, J W (2015). India's New Foreign Direct Investment (FDI) Regime in the Airline Industry: Changes and Challenges. *NUS Centre for Asian Legal Studies Working Paper 16/04*.

Mafruza Sultana, V K (2019). Impact of FDI on Indian Economy. *Journal of Critical Reveiws*.

Maitri Ghosh, S S (2015). FDI, Technology Acquisition and Labour Demand in an Emerging Market Economy: A firm level exploration of Indian Manufacturing Industries. *The Journal of Industrial Statistics*, 19-36.

Malhotra, B (2014). Foreign Direct Investment: Impact on Indian Economy. *Global Journal of Business Management and Information Technology*, 17-23.

Malik, S K (2018). Employment Effect of Foreign Direct Investment in Indian Manufacturing Industries. *14th Annual Conference on Economic Growth and Development*.

Mattijs Backx, M C (2002). Public, Private Andmixedownership and the Performance of International Airlines. *Journal of Air Transport Management*, 213-220.

Mehmet Mucuk, M T (2013). The Effect of Foreign Direct Investments On Unemployment: Evidence From Panel Data For Seven Developing Countries. *Journal of Business, Economics and Finance*.

Mohammad, N (2013). FDI in Multi Brand Retail and Employment Generation in India. *Munich Personal RePEc Archive*.

Nandi, V T (2013). FDI in Aviation: Restrospection in the Indian Economy. *Business and Information*.

Nizamuddin, M (2013). FDI in Multi Brand Retail and Employment Generation in India. *Munich Personal RePEc Archive*.

Nosheen, M (2013). Impact of Foreign Direct Investment on Gross Domestic Product. *World Applied Sciences Journal*, 1358-1361.

P V (2014). Foreign Direct Investment Role in Indian Aviation Market. *Indian Journal of Research*.

Pooja Sengupta, R P (2018). Exploration of Relationship between FDI and GDP: A Comparison between India and Its Neighbouring Countries. *Global Business Review* , 1-17.

S Chandrachud, D N (2013). The Economic Impact of FDI in India. *International Journal of Humanities and Social Science Invention*, 47-52.

Sahraoui Mohammed Abbes, B M (2015). Causal Interactions between FDI, and Economic Growth: Evidence from Dynamic Panel Co-Integration. *Procedia Economics and Finance* , 276-290.

Salih Kalayci, G Y (2016). The Effects of Economic Growth and Foreign Direct Investment on Air Transportation: Evidence from Turkey. *International Business Research*, 154-162.

Shib Shankar Jana, T N (2019). Foreign Direct Investment and Economic Growth in India: A Sector-specific Analysis. *Asia-Pacific Journal of Management*, 53-67.

Singh, D (2019). Foreign Direct Investment (FDI) inflows in India. *Journal of General Management Research* , 41-53.

Singh, S (2009). Foreign Direct Investment (FDI) and the Growth of States of India.

Siwage Dharma Negara, L A (2012). Foreign Direct Investment And Firm's Productivity Level. *ASEAN Economic Bulletin*.

Someshu, P (2015). Impact of FDI on Employment Generation in India. *International Journal of scientific research and management*.

Sothan, S (2017). Causality between Foreign Direct Investment and Economic Growth for Cambodia. *Cogent Economics and Finance* , 1-13.

Utsav Masharu, M A (2018). Policy of Foreign Direct Investment Liberalisation in India: Implications for Retail Sector. *International Review of Economics*, 465-487.

Van Thi Cam Ha, M H (2019). Does Foreign Investment Enhance Domestic Manufacturing Frms' Labour Productivity? Evidence from a Quantile Regression Approach. *Economic Change and Restructuring*.

Xiaming Liu, D (2001). The Impact of Foreign Direct Investment on Labour Productivity in the Chinese Electronics Industry. *International Business Review* .

Yoon Jung Choi, J B (2017). Does FDI Really Matter to Economic Growth in India? *Economies*.

Zuzana Brincikova, L D (2014). The Impact of FDI Inflow on Employment in V4 Countries. *European Scientific Journal*.

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