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Japanese and United Kingdom Foreign Direct Investments in Indian Manufacturing Sector – A Firm Level Comparative Analysis of Differential Impact on Productivity Growth

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ABSTRACT

This paper brings out the differential effect of the impact of foreign direct investment (FDI) from different source countries on the Total Factor Productivity Growth in a developing country. The study explores the effects of Japanese and United Kingdom foreign direct investments (FDI) on total factor productivity growth (TFPG) within the firms in the Automobile, Electrical, and Chemical industries during the post-liberalization era in the Indian economy. It involves sector-specific, firm-level comparisons of TFPG, efficiency changes, and technological advancements among Japanese-affiliated, U.K.-affiliated, and domestic firms during the specific timeframe chosen for the research work. To estimate TFPG, a modified Cobb-Douglas Production frontier is utilized. The Malmquist indices are employed to disaggregate TFPG into productivity changes due to shifts in efficiency and technology. These elements are compared across the three groups of firms within each industry during the specific time frame from 2014-15 to 2019-2020.

The findings from this empirical study conducted on the Indian manufacturing sector reveal that efficiency growth predominantly drives TFPG in Japanese firms, whereas technological advancement is the primary driver in the firms affiliated to United Kingdom. Significantly, the study notes that during the post-liberalization period, domestic firms in two of the sectors chosen for this research study have achieved both efficiency growth as well as technological progress, thus indicating a definite shift to higher productivity levels. The empirical findings of this study reiterate the significance of studying the differential effect of FDI from different source countries and the varying effects they have within the host economy.

Key Words: FDI, Japan, UK, Productivity Growth, Manufacturing Sector, Comparative study.

1. INTRODUCTION

Foreign direct investment (FDI) is pivotal for economic development, driving growth in domestic markets. Developing countries, in particular, have experienced significant growth from FDI inflows, prompting policy changes to attract more foreign investments. India adopted this strategy with its 1991 economic reforms, opening its economy to foreign investors. FDI enhances technological standards, creates employment opportunities, boosts efficiency, increases productivity, and elevates competitiveness in the domestic economy. The impact of FDI, however, varies significantly depending on the source country, influenced by differing technological efficiencies, motivations, and managerial capabilities shaped by each country's fiscal and economic conditions.

Despite FDI's recognized importance, research on its differential impacts from various source countries on productivity growth is limited. This study addresses this gap by comparing the
effects of FDI from different countries on the total factor productivity growth (TFPG) in India's manufacturing sector. It aims to provide insights into how FDI from diverse sources influences domestic firms' efficiency and technological progress.

2. FDI - THE INDIAN SCENARIO

In the early 1990s, India faced a severe balance of payments crisis, exacerbated by political instability. Export markets struggled, and the country's credit ratings declined. During this economic turmoil, Finance Minister Dr. Manmohan Singh, with guidance from the IMF and World Bank, implemented macro-economic stabilization measures and structural policy adjustments, leading to the adoption of the Liberalisation, Privatisation, and Globalisation (LPG) policy. The Indian Government established the Foreign Investment Promotion Board (FIPB) to attract foreign investors by creating liberal foreign policies and streamlining investment processes through a single-window system.

FDI was formally introduced in 1991 through the Foreign Exchange Management Act (FEMA) issued by the Reserve Bank of India (RBI). Despite bureaucratic challenges, India is globally recognized as an attractive destination for foreign investment, offering significant market growth potential and profitable revenue prospects across various sectors.

2.1. NEED FOR FDI IN THE INDIAN ECONOMY

As a developing economy, India requires substantial capital resources to promote economic growth. The country faces significant challenges, especially in sectors like infrastructure, health, and education, which need major technical and

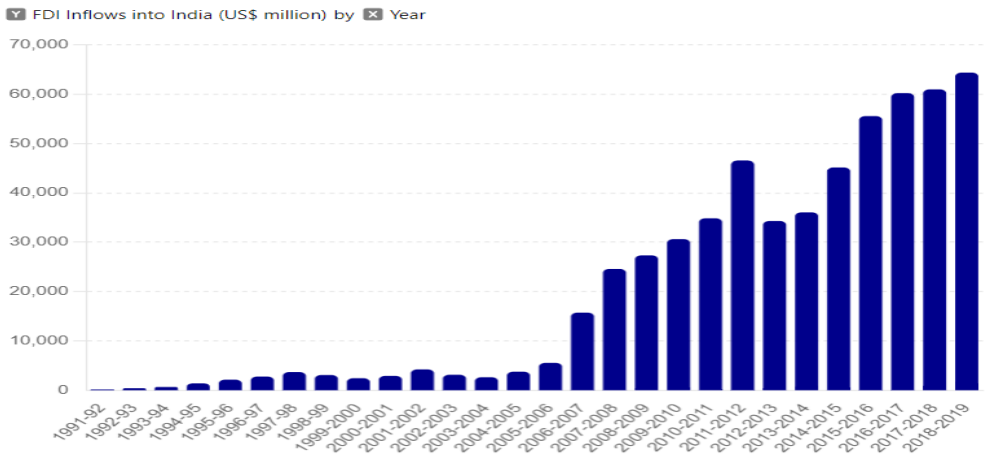
technological upgrades to compete globally. A considerable portion of the Indian population struggles with unemployment, and FDI can help generate employment opportunities. Significant capital inflows are essential for India to address these ongoing economic challenges and drive overall economic development.

3. TRENDS IN FDI INFLOWS INTO THE INDIAN ECONOMY

Following the 1991 economic reforms, FDI inflows have become crucial to India's economic growth. These reforms, aimed primarily at trade and industrial sectors, were driven by the need to boost FDI. The steady increase in FDI is seen as a key indicator of India's economic progress, with liberalization playing a pivotal role in attracting more foreign investments.

The following graph show the FDI inflows into the Indian economy after the economic reforms undertaken by the Indian government.

Graph 3G:1 - Inflows of overall Foreign Direct Investment into India: 1991-2019 (In USD million)



Source: Compiled from Economic Survey, Government of India handbook and SIA Newsletter (Various FDI factsheets)

The above graph illustrates a clear and steady rise in overall FDI inflows into the Indian economy over the last two decades. Various countries contribute to these inflows, with the table detailing the share of each country in the cumulative FDI inflows during this period.

The following table gives us the information regarding the top 10 countries investing in the Indian economy along with their respective amount of investments. It also provides the ranking and their percentage share in FDI equity inflows in the last decade.

Table 3T: 1 - Top 10 Investing countries in India April 2000 – March 2019 (In USD Millions)

Rank	Country	Amount of Investment	% Share in FDI equity inflows
1	Mauritius	127,578	34
2	Singapore	66,771	18
3	Japan	27,286	7
4	UK	25,438	7
5	Netherlands	23,482	6
6	U.S.A.	22,417	6
7	Germany	10,845	3
8	Cyprus	9,573	3
9	France	6,237	2
10	U.A.E	5,754	2

Source: Department of Industrial Policy and Promotion Fact Sheet, June – 2019.

From the above table, we observe the volume of investments from different countries investing in India and the cumulative ranking in terms of FDI inflows for each. FDI inflows into the Indian economy have diverse effects and impacts. These foreign investments originate
from various countries, each with distinct characteristics. The motivations for entering the Indian market differ, as do the levels of technological efficiency and operational performance. FDI from different source countries exhibits varying degrees of entrepreneurial and managerial capabilities, influenced by the fiscal, economic, commercial, and investment conditions in their respective home countries. Consequently, the impact of FDI on the domestic economy is likely to be varied and differential.
However, there is a noticeable scarcity of research studies that have examined and compared the impacts of FDI from different source countries. This research work aims to fill this gap by exploring and analysing the differential effects of FDI from various countries on the Indian economy.

3.1. SECTOR-WISE INFLOWS INTO THE INDIAN ECONOMY

The sector which receives the maximum volume of foreign direct investments has got the potential to have a significant effect on the domestic economy. The following table shows us the trends in the sector-wise FDI inflows into the Indian economy between the time period of 2016-17 – 2019-20.

Table 3T.2 - Sector-Wise FDI Inflows to India (2016-17 – 2019-20) (In USD Millions)

Communication Services	1,256	1,075	2,638	5,876
Manufacturing	6,381	9,613	8,439	11,972
Retail & Wholesale Trade	1,139	2,551	3,998	2,771
Financial Services	1,026	3,075	3,547	3,732
Computer Services	934	2,154	4,319	1,937
Business services	521	680	3,031	2,684
Electricity and other energy Generation, Distribution & Transmission	1,284	1,284	1,364	1,722
Construction	1,276	1,640	4,141	1,564
Transport	311	482	1,363	891
Miscellaneous Services	941	586	1,022	1,816

Source: Department of Industrial Policy and Promotion Fact Sheet, June – 2019

From the above table, we observe that between the years of 2016-17 – 2019-20, while the investment in all the sectors have steadily increased, the sector that received the highest volume of foreign investment is the manufacturing sector and this trend of increasing volume of investment has been consistent throughout the period of the research study. In the year 2019-20, the manufacturing sector in the India economy received a total of USD 11, 972 Millions. As this sector received the maximum volume of foreign investments, it has been chosen for the research study.

4. TOTAL FACTOR PRODUCTIVITY GROWTH

4.1 INTRODUCTION AND SIGNIFICANCE

Total factor productivity (TFP), also known as “The Solow residual” is based on the work of Nobel prize-winning economist Robert Solow, whose growth model defined productivity growth as rising output with constant capital and labor. It tells you whether an economy is growing because of increases in capital or labor, or because those inputs are being used more efficiently.The Solow residual is the portion of an economy’s output growth that cannot be attributed to the accumulation of capital and labor, the factors of production. It represents output growth that happens beyond the simple growth of inputs. As such, the Solow residual is often described as a measure of productivity growth due to technological innovation. The Solow residual is also referred to as total factor productivity (TFP).
Total factor productivity measures residual growth in total output of a firm, industry or national economy that cannot be explained by the accumulation of traditional inputs such as labor and capital.

4.2. RELATIONSHIP BETWEEN FDI AND TFPG

Foreign Direct Investment is the most sought-after type of investment as it leads to a direct increase in the resources that most significantly leads to the improvement in the technical standards, efficiency and technical development of the host

economy thereby influencing the competitiveness and technical efficiency of the domestic firms. Through the infusing of new types of capital in the domestic industry and also by upgrading the average skills and the level of overall efficiency, it is said that FDI causes a positive influence on the Total Factor Productivity Growth (TFPG).

The entry of FDI firms into an industry has also been found to increase competition and productivity, by forcing domestic firms to increase their efficiency in order to remain competitive, and/or by forcing unproductive firms to exit the market **(Blomström, 1986)**

5. IMPACT OF FDI ON PRODUCTIVITY GROWTH : A REVIEW OF EARLIER STUDIES

Research on the direct impact of Foreign Direct Investment (FDI) highlights its potential to deliver a mix of tangible and intangible wealth-creating assets. These assets, associated with the resources and attributes of FDI, become directly available for productive activities in the host countries. The presence of FDI often leads to externalities and spillovers that enhance the resource base and production capabilities in developing economies. Moreover, FDI typically elevates the average productivity and skill levels within an industry, as multinational corporations (MNCs) bring higher efficiency levels due to their ownership and internalization advantages **[Caves (1974), Dunning (1980)].**
Another significant impact of FDI on productivity growth is access to advanced technology, particularly through the import of capital goods. This technology transfer occurs as foreign affiliates receive the latest innovations from their parent companies, which maintain their

competitive edge by equipping affiliates with cutting-edge technology while selling or licensing older technology to other firms. For developing countries, FDI can be a crucial conduit for acquiring the latest or relatively recent technology.
Empirical evidence on the impact of FDI is mixed. Studies like those by **Caves (1996), Globerman (1979), Blomstrom and Wolf (1994)**, and **Djankov and Hoekman (2000)** find that FDI generally has a positive or mildly positive effect on productivity levels. Conversely, other studies by **Haddad and Harrison (1993), Kokko (1994), Kokko et al., (1996)** and **Aitken and Harrison (1997)**, and suggest that foreign firms can negatively affect the productivity performance of domestically owned firms. Together, these studies indicate that the impact of FDI is specific to the industry, firm, and host economy.

In the context of the Indian economy, **Kathuria (2000, 2001)** and **Goldar et al., (2002)** have explored the impact of FDI on productivity growth. Goldar's study, covering the period from 1987-88 to 1989-90, does not find a strong positive effect of technology acquisition via FDI on Total Factor Productivity Growth (TFPG). Kathuria's research, however, identifies positive spillovers from the presence of foreign-owned firms, with the nature and extent of these spillovers varying across industries and depending on the R&D capabilities of the firms. Nonetheless, there is a lack of studies that disaggregate the impact of FDI from different sources to make comparative assessments. This paper aims to fill that gap by highlighting differences in the productivity growth of foreign affiliates from various source countries and their impact on the TFPG of firms.

6. IS THE SOURCE OF FDI IMPORTANT ?

The source country of Foreign Direct Investment (FDI) plays a crucial role in determining the overall impact of the investment on the host country's economy. This importance can be attributed to several factors:

6.1. TECHNOLOGICAL AND MANAGERIAL EXPERTISE:

Different countries are known for their strengths in various industries and technologies. For instance, FDI from countries with advanced technological capabilities, such as Japan or Germany, often brings cutting-edge technology and superior managerial practices to the host country. This can lead to significant productivity improvements and technological advancements in the host economy **[Dunning (1995), Ravenhill (1999)].**

6.2. BUSINESS PRACTICES AND CORPORATE GOVERNANCE:

The source country's business practices and corporate governance standards can influence the operations of the foreign affiliates. For example, FDI from countries with strong corporate governance practices may introduce better management practices, enhance transparency, and improve overall business efficiency in the host country **[Frankel (1991), Siddharthan (1998)].**

6.3. CULTURAL AND INSTITUTIONAL COMPATIBILITY:

The compatibility between the source and host countries in terms of culture, business practices, and institutional frameworks can affect the success of the FDI. Investments from countries with similar business cultures and institutional environments may face fewer integration challenges, leading to smoother operations and higher productivity **[Iqbal (1997), Kumar (2001)].**

6.4. INVESTMENT MOTIVES AND STRATEGIES:

The strategic motives behind FDI can vary depending on the source country. Some countries might invest with a focus on market expansion, while others might be more interested in resource acquisition or cost reduction. Understanding these motives helps in assessing how the FDI will impact the host country's economic landscape **[Scroath, Hu and Chen (1993), Dunning (1994)].**

6.5. ECONOMIC AND POLITICAL RELATIONSHIPS:

The broader economic and political relationship between the source and host countries can influence the stability and benefits of FDI. Strong bilateral ties can result in more stable and sustained investments, providing long-term benefits to the host country **[Panda (1994), Eiteman and Stonehill (1994)].**

6.6. INDUSTRY - SPECIFIC EXPERTISE:

Different source countries may have specific expertise in particular industries. FDI from these countries can significantly boost the development and competitive advantage of those industries within the host country **(Banga 2005)**

In summary, the source country of FDI is important because it affects the quality, type, and potential benefits of the investment. By considering the source country, policymakers and business leaders in the host country can better understand and leverage the advantages brought by FDI, ensuring that the investments align with their economic development goals and contribute positively to their growth.

7. SELECTION OF COUNTRIES FOR THE RESEARCH STUDY

For analysing the differential impact of FDI from different source countries, this study focuses on Japan and the United Kingdom.

7.1. INDIA AND JAPAN:

India and Japan share a "Special Strategic and Global Partnership," based on a long history of spiritual affinity and cultural ties, including a shared Buddhist heritage dating back to the 6th century BC. The Shichifukujin, or the seven lucky gods of Japan, originate from Hindu traditions. The Japan-India Association, established in 1903, is Japan's oldest international friendship organization. Post-World War II, Japan gradually built trade and investment relationships with India. Japan is a significant investor, being the largest recipient of Japanese aid and holding a 7% share in FDI equity inflows into India during this study.

7.2. INDIA AND UNITED KINGDOM:

FDI became prominent in India post-1991 economic reforms, but its roots trace back to the British East India Company in the 1600s. During colonial times, British investments were substantial yet exploitative, focusing on sectors like mining. Despite this, the UK has remained a key foreign investor. Numerous bilateral trade agreements have been established, such as the Joint Economic and Trade Committee (JETCO) inaugurated in 2005 to boost mutual investments and strengthen economic ties. The UK held a 7% share in FDI equity inflows into India during this study.

8. TRENDS IN FDI INFLOWS FROM JAPAN AND UK – A COMPARATIVE ANALYSIS

India's relationships with both Japan and the United Kingdom are marked by deep historical and cultural connections—Japan through spiritual ties and the UK through its colonial past. Both countries are major investors in India, with significant bilateral agreements enhancing trade and investment. The volume of FDI inflows from Japan and the UK are almost identical, underscoring their strategic economic importance to India.

The following table gives us the data regarding the total volume of FDI inflows from Japan and UK into the Indian economy for one decade from 2009-2019

Table 8T.1 - FDI inflows from Japan and UK : 2009-2019 (In USD million)

Year (April-March)	FDI Inflows from Japan	FDI Inflows from UK
2009 - 2010	12235	5501
2010 - 2011	14089	36428
2011 - 2012	12243	5797
2012 - 2013	10580	20426
2013 - 2014	12752	8769
2014 - 2015	17275	5938
2015 - 2016	31588	9953
2016 - 2017	10516	5473
2017 - 2018	20556	9352
2018 - 2019	132834	107637

Source: RBI bulletin May, 2019 (Table no. 34 – Foreign Direct Investment Inflows)

Tables 3T.1 and 8T.1 illustrate that the cumulative FDI from Japan and the UK are closely matched in the amounts invested in the Indian economy, as shown in annexures A.1, A.2, and A.4. Both countries have a long history of investing in India, more so than other countries. Annexure A.1 reveals that the manufacturing sector in India receives the highest FDI inflows. It also shows that Japan and the UK predominantly invest in this sector. Given the similarities between these two countries and their significant historical investment in India's manufacturing sector, they were selected for this research. This study aims to highlight the differing impacts of Japanese and UK FDI on the Total Factor Productivity Growth (TFPG) in India's manufacturing sector.

The following table gives us the sector-wise distribution of outstanding FDI in India for both UK and Japan.
An examination of the sector-wise distribution of outstanding FDI from the different source countries of UK and Japan for the year 2016 reveals significant differences in the industrial allocation of FDI in the Indian manufacturing sector. Comparing the shares of foreign direct investments from the UK and Japan, we find that in 2016, 51% of Japanese FDI was concentrated in the transport equipment industry, while the share of UK FDI in this industry was only around 5%. Conversely, around 30% of UK FDI was focused on the chemical industry, whereas Japanese FDI in this sector was just 9%. In the electrical industry, approximately 15% of UK FDI and 13% of Japanese FDI were invested.

Table 8T.2 - Sector-Wise Distribution of Outstanding FDI in India by Source Country as of March 2016 (%)

Industry	JAPAN	UK
Plantation	0.01	0.06
Mining	0.02	0.02
Petroleum	0.02	1.2
Manufacturing of which:	99.95	98.72
Food & beverages	2.54	3.96
Textiles	0.45	0.35
Transport equipment	51.12	4.78
Machinery & Tools	1.38	13.78
Metal & Metal products	0.97	1.92
Electrical goods	12.92	14.85
Chemicals & Allied	8.31	28.58
Others	11.29	23.69
Trading	2.56	0.87
Construction	0.65	0.48
Transport	0.08	0.08
Utilities	0	0.35
Financial	5.86	1.48
Others	1.82	3.55
Total	**100**	**100**

Source: RBI Bulletin 2019

Given the above industrial sector-wise distribution, it can be stated that while both Japanese and UK FDI are concentrated in the manufacturing sector, comparisons of the operations of these firms can only be made in a few industries where they are both present simultaneously and invest more in comparison to the other sectors of their respective investments.

9. DATA AND VARIABLES

9.1. DATA RESOURCES

For the purpose of estimation of the TFPG rates at the level of the manufacturing firms in the Indian economy, the corporate database of Capitaline, which is an Indian based information services firm. It is a product of Capital Markets Ltd. This database provides panel data on more than 35, 000 Indian listed and unlisted companies, that are listed on an Indian stock exchange. This database provides extensive financial and non-financial information on Indian companies and the major reason for using this database for the purpose of this research work is that this is the only database that provides the source of foreign equity ownership in the Indian firms.

The data from Capitaline has been previously used for the purpose of comparison of the market values of Japanese and non-Japanese firms by **Nagaishi (2003).** This very same database has been used by **Rashmi Banga (2005)** in her research analysis of US based FDI and Japanese based FDI in India and their differential impact in the Indian economy.
The data from Capitaline has also been supplemented with data taken from various publications and issues of National Accounts Statistics, Annual Survey of Industries (ASI) and a few publications of the Ministry of Industries and Commerce. Hence, the following are the major sources of data for the analysis of TFPG:

- Capitaline
- National Accounts Statistics.
- Annual Survey of Industries (ASI)
- Ministry of Industries and Commerce.

The analysis for this study is based on the data of 302 firms for the years 2014-15 to 2019-20 in the following three broad industrial categories:

- Automobile industry (Includes auto and auto-ancillary units)
- Electrical industry (Includes electrical and electronic equipment)
- Pharmaceutical industry (Includes chemicals-both organic and inorganic & personal care)

Table 9T.1 shows the industrial distribution of Japanese and UK FDI in these three different industrial categories as found in the dataset from Capitaline database. The inflows of FDI is estimated as a proportion of foreign equity to total equity that has been invested in the industrial category. It is observed that the major share of the total equity invested by Japanese and UK firms is in these three industrial categories. It is also noticed that UK FDI focuses heavily on the pharmaceutical industry while the Japanese FDI focuses on automobile industry.

Table 9T.1 - Distribution of Japanese Equity and UK Equity as a Proportion of Total Equity Invested in Indian Manufacturing Industries in the Period 2014-15 to 2019-2020

Specific Industry	UK Equity	Japanese Equity
Automobile	15.24	54.51
Pharmaceutical	33.42	5.08
Electrical	13.59	19.17
Total	62.25	78.76
Others	37.75	21.24
Total	100	100

Source: Researcher's estimations based on Capitaline dataset.
Notes: 1. Proportion of foreign equity to total equity invested in an industry represents FDI.
2. Automobile industry includes auto and auto ancillary; electrical industry includes electrical and electronic equipment; Pharmaceutical industry includes chemicals (organic and Inorganic) and personal care items.

9.2. VARIABLES AND CONSTRUCTION OF VARIABLES

9.2.1. CONSTRUCTION OF VARIABLES

This research work examines the differential impact of Japanese and UK FDI on the TFPG of the Indian manufacturing firms. As it is mentioned earlier in this chapter, the proportion of actual equity invested by the foreign firm to total equity invested in the same industry has been taken as a measure of FDI in that industry. The data on foreign equity has been sourced from Capitaline datasets.

All the variables that have been used for the estimation of the panel data for productivity are measured at the constant prices of 2014-15. The deflation of output and the subsequent inputs has been done with the help of suitably constructed deflators.

A major advancement in the construction of the input and output variables for this study is that in the earlier studies that estimated production function for the manufacturing sector for the Indian firms, wholesale price indices were used for the purpose of deflating the series on output and inputs of the manufacturing firms in order to come to the constant prices. However, in this study, we have made use of the actual prices of the major inputs and outputs of the manufacturing firms for the purpose of arriving at the indices for deflating output and inputs of the firms.

For the purpose of this analytical study, two different sets of variables have been used.

They are as follows:

1. Variables for the estimation of production function for deriving productivity estimates.
2. Variables used in regression analysis for examining the variations in the growth rate of productivity.

9.2.2. VARIABLES FOR ESTIMATION OF PRODUCTION FUNCTION

The various variables that were used for the estimation of Total Factor Productivity Growth (TFPG) are as follows:

- Output
- Intermediate inputs
- Labor
- Capital series
- Fuel and power

The process through which each of the above variables is arrived at for their usage in the estimation of the TFPG of the Indian manufacturing firms as explained in detail in the following:

OUTPUT
The dataset from the Capitaline database includes information on the primary outputs of manufacturing firms and their respective prices. To create weighted output indices, the prices of two major outputs were used. The total value, calculated by multiplying price and quantity, used as the weights.

INTERMEDIATE INPUTS
The Capitaline database offers detailed information on the key inputs utilized by manufacturing firms, including their respective prices. The total raw materials consumed by the selected manufacturing firms have been adjusted using a weighted input price series, constructed from the actual input prices. The total cost of the inputs is as the weighs.

LABOUR
The Capitaline database offers datasets on the total employee costs of firms. This data is supplemented with information from the Annual Survey of Industries (ASI). A data series on the number of employees has been constructed using the total wage rates in the corresponding industries.

CAPITAL SERIES
The methodology for estimating capital follows Srivastava (1996), with additional disaggregation of deflators for different capital series. Capital stock comprises Plants and Machinery, Land and Building, and other Fixed Assets. Two separate capital series were created:
1. Capital series for Plants, Machinery, and other fixed assets
2. Capital series for Land and Building

Each series is deflated individually to estimate the capital stock for the base year, 2014-15, for each firm. Gross capital formation data for plants, machinery, and construction at current and constant prices was used to derive an implicit deflator. This deflator helps estimate the capital stock for 2014-15. Since the base year's asset mix is valued at historic cost, the current year's capital at replacement cost is determined by revaluing the base year capital. Implicit deflators for the past 15 years (for plants and machinery) and the past 25 years or the firm's incorporation date (for construction) were constructed. A revaluation factor (as used by Srivastava) was applied to these series to obtain the capital stock at replacement costs at current prices. These values were then deflated to get the real-term capital stock for the base year. Using the perpetual inventory method, investment for subsequent years (Gross fixed assets t - Gross fixed assets t-1) was added to the existing capital stock at each time period, resulting in the capital stock series for the firms.

FUEL AND POWER
Energy is a crucial input for the production processes of firms. The Capitaline database offers data on the expenditure of various firms on fuel and power. To deflate this expenditure, weighted price indices are constructed. Wholesale price indices for electricity for industrial purposes and furnace oil are sourced from various CMIE publications. The weights used in constructing these indices are based on the expenditure of manufacturing firms on oil and power energy resources.

9.2.3. VARIABLES USED IN REGRESSION ANALYSIS
Industrial productivity growth is known to be dependent on certain industry specific variables like capital intensity in the industry, research and development, the various regulations pertaining to government policies relating to the industry and also on the outward orientation of the industry. For the purpose of estimating and analyzing the growth of productivity of the various firms that were chosen for this research work, it becomes imperative to take into account these variables and control these variables. For the purpose of control of these variables, industry dummies have been established for these industry- specific effects.
The growth rate of productivity of these firms is highly dependent on various variables that are specific to the firms. Factors like the size of the firms, age of the firms, R&D intensity of the firms etc. does tend to affect productivity growth to a large extent. To control for firms-specific variables, the following variables are taken into account.

Variables specific to the firm:
- Size of the firm i.e., log of sales of the firm **($SIZE_F$)**
- Age of the firm, i.e., date of inception of the firm **(AGE_F)**
- R&D Intensity of the firm i.e., R&D expenditure/sales **($R\&D_F$)**
- Export Intensity of the firm **(EXI_F)**
- Capital-Labor ratio of the firm **(K_F/L_F)**
- Import of disembodied technology by the firm, i.e., Royalty and Technical fees paid by the firm **(IMPDISTF)**

- Import of embodied technology, i.e., capital goods by the firm **(IMPEMBTF)**
- Japanese Equity as a proportion of total equity invested in the firm **(JAPEQF)**
- UK Equity as a proportion of total equity invested in the firm **(UKEQF)**

9.2.4. REASONS FOR THE SELECTION OF THESE SPECIFIC VARIABLES AND THEIR RELATIONSHIP TO TFPG

Amongst the various factors that leads to higher productivity and efficiency of the firms, competitive pressure can be said as the most significant factor because competition amongst the firms forces them to operate at a higher level of efficiency through the improvements on various fronts like technical and technological improvements and making well planned and optimal use of the various factors that are involved in the process of production. This in turn contributes to increased imports of embodied technology along with increased imports of disembodied technology. For the purpose of improved performance along with advancement in output as well as sales, the firms tend to invest in higher research and development thus contributing to increase in the expenditure pattern on research and development.

All these above variables are expected to have a beneficial impact on the technical efficiency and advancement of these firms and therefore we control for these variables.

Apart from these variables, there are other variables that are specific to the firm that tend to have an impact on the technical efficiency of the firm. These variables are the size of the firm, the age of the firm, the extent of foreign equity that is present in the firm along with the firm's export intensity.

The size of the firm and its impact on the technical efficiency of the firm is vague in nature. Firms that are larger in size may tend to have a higher technical efficiency in comparison to that of smaller firms mainly due to the presence of economies of scale. However, organizational complications combined with imperfections, defects and difficulties in the labor market might put the large firms at a disadvantage in their achievement of their most advantageous technical efficiency.

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Increase in the capital intensity of the firms may also result in increase in the process of production along with the growth in productivity in a gradual manner. For the purpose of this study, we have used the proportion of capital labor ratio as a measure of capital accumulation within the firms.

9.3. DATA ANALYSIS AND ESTIMATION

Both parametric and non-parametric approaches have been used for the purpose of arriving at the estimates for this study. These estimates are undertaken at three different and separate stages. They are as follows:

9.3.1. FIRST STAGE OF ESTIMATION

In this stage, the approach of "time variant firm specific" technical efficiency approach has been used in order to estimate TFPG. This methodology of estimation of TFPG has been introduced for the very first time by **Cornwell, Schmidt and Sickles (1990**). Later on, this has been made use of by **Srivastava (1996), Kathuria (2000)** and **Banga (2005)** in their research studies where they made use of "time variant firm specific" technical efficiency approach for estimating TFPG in their respective research studies.

Four different inputs-based Cobb-Douglas production function has been estimated for the three industries that were chosen for this study in which the Average TFPG is compared in the firms that were Japanese affiliated, UK affiliated and domestic firms in India.

9.3.2. SECOND STAGE OF ESTIMATION

The second stage of estimation makes use of the estimates calculated at the first stage. The impact of the affiliation of the firms with Japan and UK on TFPG is examined by using the seven-year averages for all the 302 firms that were chosen for this study. The averages were taken and made use of in order to smoothen out the demand fluctuations year-to-year.

9.3.3. THIRD STAGE OF ESTIMATION

In the final stage of estimation, the approach of Data Envelopment Analysis (DEA) has been made use of in order to investigate the source of TFPG in a firm.

10. METHODOLOGY

This section of data analysis is divided into two different sections as follows:

- 10.1. "Time variant firm-specific" technical efficiency approach
- 10.2. Analysis of data through Data Envelopment Analysis (DEA)

10.1 "TIME VARIANT FIRM-SPECIFIC" TECHNICAL EFFICIENCY APPROACH

We estimate a four-input production function i.e., with output Y and inputs as material inputs M, labor L, capital K and Energy E. The production function can be written as:

$$Y_{it} = F_t (L_{it}, K_{it}, M_{it}, E_{it})$$

Typically, the model to be estimated is Cobb-Douglas representation of technology relating factor inputs and output for a given industry, i.e.,

$$Y_{it} = A\, e^{h(i,t)}\, f_t (L^{\alpha}_{it}, K^{\beta}_{it}, M^{\gamma}_{it}, E_{it})$$

Where i index firm and t index time periods. The Hicks-neutral productivity factor,
$A\, e^{h(i,t)}$ is allowed to be different across firms and over time. It is further assumed that h(.) can be parametrised as,

$$h(i,t) = u(i) + \lambda(t) + v_{it}$$

In discrete time framework, annual productivity growth is measured as □ □(t). The regression of the residuals on time and time squared is first done and then the predicted values of the residuals in the period t-1 are subtracted from those of period t to get the estimates of productivity growth of the firms.
After arriving at the TFPG of firms we estimate the following model:

$$TFPG_{it} = \text{constant} + \beta_1 JAPEQ_{Fit} + \beta_2 UKEQ_{Fit} + \beta_3 SIZE_{it} + \beta_4 EXI_{Fit} + \beta_5 K_F/L_{F\,it} + \beta_6 R\&D_{it}$$
$$(+) \qquad\qquad (+) \qquad (+) \qquad (+)$$
$$\beta_7 AGE_{Fit} + \beta_8 IMPDIST_{Tit} + \beta_9 IMPEMBT_{Fit} + \beta_{10} DUMMY(AUTO) + \beta_{11} DUMMY(Electrical)$$
$$(+) \qquad\qquad (+) \qquad\qquad (+)$$

Where i index firm and t index time.

10.2 ANALYSIS OF DATA THROUGH THE USAGE OF DATA ENVELOPMENT ANALYSIS (DEA)

For the purpose of the comparison of the TFPG and its various components is the UK affiliated firms, Japanese affiliated firms as well as the domestic firms, a non-parametric approach has been used. A deterministic production frontier has been constructed with a linear programming technique. This method is known as Data Envelopment Analysis (DEA). The uniqueness of this method is that it evaluates peer set entities performance called decision-making units (DMUs).
Through the usage of panel data, DEA has been used to arrive at input-or-output based Malmquist indices for the purpose of measuring the change in productivity for each firm over a period of time and further decompose this into two different changes:

- Technological change
- Technical efficiency change

Fare et al (1994) specifies an output-based Malmquist productivity index as:

$$m_o (y_{t+1}, x_{t+1}, y_t, x_t) = \left[\frac{d^t_0 (x_{t+1}, y_{t+1})}{d^t_0 (x_t, y_t)} \times \frac{d^{t+1}_o (x_{t+1}, y_{t+1})}{d^t_0 (x_t, y_t)} \right]^{1/2}$$

This represents the productivity of the production point (x_{t+1}, y_{t+1}) relative to the production point (x_t, y_t). A value greater than one will indicate positive TFP growth from period t to period t+1. This index is the geometric mean of two output-based Malmquist TFP indices. One index uses period t technology and the other period t+1 technology.
By making use of the panel data for 302 firms for the time period of 2014-15 to 2019- 2020, DEA is used to explain the various constituents of the growth of TFP growth which means that it shows to what extent of TFP growth can be explained due to the change in technology (which has been caused by the frontier shift) and change in technical efficiency (defined as the distance from the efficiency frontier which is derived from some efficient units for each firm and for each individual year). The average over the years is also reported.
The decomposition of TFP change into these two separate components makes it possible to understand whether the firms have improved their productivity levels through a more efficient use of existing technology or has any technical progress took place.

11. EMPIRICAL FINDINGS OF THE STUDY

The empirical results of this study are presented in two different categories. They are:
11.1. Empirical results using "Time-variant firm specific" Technical Efficiency Approach.
11.2. Empirical results using Data Envelopment Analysis (DEA).

11.1. EMPIRICAL FINDINGS - TIME VARIANT FIRM SPECIFIC TECHNICAL EFFICIENCY APPROACH

Through the usage of the "time-variant firm specific" technical efficiency approach, Table 1T.2 makes a comparison of the average annual total factor productivity growth rates of the following firms:

- Japanese-affiliated firms
- UK-affiliated firms
- Domestic firms

For the above three types of firms, along with their annual averages, other characteristics belonging to these firms in the specific selected manufacturing firms during the time frame of 2014-2015 to 2019-2020 have also been compared. The total number of firms that were considered for this study are 302 firms: out of which 51 are Japanese-affiliated firms, 91 are UK-affiliated firms and 160 firms are domestic firms.

The following is the output from the "Time-variant firm specific" technical efficiency approach:

Table 11T. 1- Comparison of Average TFPG and some Industrial Characteristics of Japanese, UK and Domestic firms: 2014-15 to 2019-2020

	Domestic firms		**UK Firms**		**Japanese Firms**	
	Mean	□	Mean	□	Mean	□
1. TFPG	0.68	0.03	0.38	0.39	0.89	0.02
2. R&D intensity	0.39	0.001	0.09	0.002	0.28	0.003
3. Import of disembodied technology/ total sales	0.88	0.003	0.38	0.001	0.68	0.001
4.Import of embodied technology/ totalsales	0.59	0.01	0.69	0.03	0.52	0.01
No. of firms	160		91		51	

Note: The figures reported are in percentages.

To examine the impact of foreign equity from different sources on TFPG of a firm least square estimations are undertaken and the following results are arrived at:

$$\mathbf{TFPG = 0.02 + 0.08\ JAPEQ_F^{***} + 0.02\ UKEQ_F + 0.01\ SIZE_F - 0.59\ EXI_F + 0.07\ K_F/L_F + 0.008\ R\&D_F^{***}}$$
$$\mathbf{(0.82)\ (2.25)\ (0.65)\quad (1.02)\quad (-1.49)\quad (1.29)\quad (2.48)}$$
$$\mathbf{-0.01\ AGE_F + 2.76\ IMPDIST_F^{***} + 5.12\ IMPEMBT_F + 0.11\ DUMMY^{**}_{(AUTO)} + 0.03\ DUMMY_{(ELECT)}}$$
$$\mathbf{(-1.54)\quad (2.88)\quad (1.02)\quad (1.81)\quad (0.89)}$$

*indicates significant at 10%;****** indicates significant at 5%;******* indicates significant at 1%. Figures in the parenthesis are the t-ratios.

Adj R Squared = 0.25, N = 302, White Statistic = 1.96

The empirical results and conclusions drawn from this analysis are as follows:

- The highest growth in Total Factor Productivity Growth (TFPG) has been observed in Japanese-affiliated firms. Additionally, the average TFPG of domestic firms is higher compared to UK-affiliated firms. This indicates that foreign-affiliated firms do not necessarily operate uniformly, even within the same domestic industry.
- Research & Development (R&D) intensities are significantly higher in Japanese-affiliated firms than in UK-affiliated firms. Interestingly, the highest increase in R&D intensity has been noted in domestic firms, suggesting that these firms are making substantial efforts to catch up with the operational and productivity levels of foreign firms within the same industry.
- The comparison from the data reveals that foreign equity, when disaggregated by its source, has a varying impact on a firm's TFPG.
- Japanese equity presence within firms is associated with a higher growth rate of productivity, after controlling for various firm-specific factors. In contrast, UK equity does not significantly impact productivity growth rates.
- Both R&D activities and disembodied technology imports contribute to higher productivity growth rates in firms.
- Although the age and export intensity of firms show negative signs, these results are not statistically significant enough to be impactful.
- There is a greater presence of Japanese-affiliated firms in the automobile industry compared to UK-affiliated firms.

➢ The empirical findings indicate that the affiliation of domestic firms with foreign firms from different countries of origin leads to differential impacts on the TFPG of the firm.

11.2. EMPIRICAL FINDINGS USING DATA ENVELOPMENT ANALYSIS

The growth rate in total factor productivity occurs not only due to technological progress but also due to a positive shift in the production function along with improvements in the efficiency of the firm. In an endeavor to examine the various reasons for the differential impact in the growth rate of productivity with regard to the source country of affiliation of the firms, we analyze the extent of growth rate of efficiency and the technological progress in these firms. For this purpose, Malmquist indices which are output oriented are estimated and these indices are further disaggregated into two different aspects namely, technical efficiency indices and technological change indices. Within the same industry, the factors of average efficiency change, change in total factor productivity and technical change are compared for the Japanese-affiliated, UK-affiliated and domestic firms in the time period of 2014-15 to 2019-2020.
The following is the output from the Data Envelopment Analysis approach:

Table 11T. 2: Average Total Factor Productivity Change, Efficiency Change and Technological Change in Japanese-affiliated, U.K. affiliated & Domestic Firms (2014-15 to 2019-20)

IND	Number of Firms	FIRMS	EFFCH	TECHCH	TFPCH
Automobile	43	DOM	0.994	1.031	1.003
			(0.04)	(0.05)	(0.04)
	23	JAP	1.035	0.976	1.025
			(1.32)	(0.28)	(1.57)
	20	UK	0.997	1.018	0.988
			(0.15)	(0.09)	(0.06)
Electrical	67	DOM	1.013	1.018	1.023
			(0.14)	(0.13)	(0.13)
	21	JAP	1.031	0.993	1.007
			(0.12)	(0.12)	(0.06)
	42	UK	0.996	1.017	1.006
			(0.12)	(0.011)	(0.08)
Pharmaceuticals	50	DOM	1.078	1.041	1.052
			(0.83)	(0.26)	(0.35)
	7	JAP	0.987	1.014	1.009
			(0.09)	(0.08)	(0.08)
	29	UK	0.981	1.011	1.014
			(0.09)	(0.08)	(0.09)

Note : Figures in parenthesis are the standard deviations. TFP change is decomposed into efficiency change, technology change.

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11.2.1. EMPIRICAL FINDINGS – AUTOMOBILE SECTOR

➢ Comparative analysis indicates that Japanese-affiliated firms exhibit a higher average change in TFP within the automobile industry compared to domestic firms.
➢ UK-affiliated firms show a decline in TFP.
➢ Domestic firms have experienced positive average TFP changes across the three industries studied, with notable improvements in the pharmaceutical and electrical industries, but minimal change in the automobile industry.
➢ The positive changes in domestic firms' TFP are primarily due to technological progress.
➢ Japanese-affiliated firms' TFP gains are mainly attributed to improved efficiency levels.
➢ UK-affiliated firms, similar to domestic firms, show technical progress but a decline in efficiency levels.

11.2.2. EMPIRICAL FINDINGS – ELECTRICAL SECTOR

➢ Domestic firms in the electrical industry have shown high average TFP.
➢ Both UK-affiliated and Japanese-affiliated firms have experienced similar TFP growth.
➢ The productivity growth in UK-affiliated firms is driven by technological advancements, while Japanese-affiliated firms' growth is due to increased efficiency levels.

11.2.3. EMPIRICAL FINDINGS – PHARMACEUTICAL SECTOR

- Domestic firms in the pharmaceutical industry have seen positive changes in both technological progress and efficiency levels, with efficiency improvements being more pronounced.
- Japanese firms have experienced technological progress but a decline in average efficiency growth.
- UK-affiliated firms show a decline in marginal average efficiency growth, but positive technological progress has resulted in a higher TFP compared to Japanese-affiliated firms.

11.2.4 GENERAL EMPIRICAL FINDINGS

- Japanese-affiliated firms' TFPG across all three industries is mainly due to increased efficiency, while UK-affiliated firms' TFPG is driven by technological advancements.
- Japanese firms benefit from efficient organizational and management practices inherent to Japanese business culture, contributing to higher productivity. Research by **Womack et al. (1991)** highlights the competitive strength of Japanese manufacturing firms due to these management systems.

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- The Japanese production model's strength lies in human-related dimensions of engineering technologies, workplace practices, and efficient corporate culture, rather than in-house R&D and technology imports, as seen in UK firms **(Ozawa 1994).**
- These operational methodologies suggest that Japanese-affiliated firms are likely to achieve higher efficiency levels, whereas UK-affiliated firms will see greater technological advancements.
- Overall, affiliation with foreign firms from different source countries results in varied impacts on productivity growth and its components.

12. CUMULATIVE INFERENCES FROM THE EMPIRICAL FINDINGS

This study investigates the distinct effects of Japanese and UK FDI on the total factor productivity growth of firms within India's manufacturing sector. It delves into the reasons why firms affiliated with foreign companies from different source countries exhibit varying impacts on productivity growth rates. For an in-depth analysis, firm-level data from 2014-15 to 2019-20 was scrutinized across three industries:

- Automobile sector (including auto and auto-ancillary units)
- Electrical sector (encompassing electrical and electronic equipment)
- Pharmaceutical sector (covering both organic and inorganic chemicals, as well as personal care products)

This research employs both non-deterministic and deterministic production frontier estimates to draw conclusions on the differential impacts of UK and Japanese FDI on TFPG. The findings from the "time-varying firm-specific" technical efficiency approach indicate that firms with Japanese affiliations exhibit a higher average productivity growth rate compared to domestic firms and those affiliated with the UK. Additionally, domestic firms in the selected sectors show a greater productivity growth rate than UK-affiliated firms in India.

Using the DEA approach, Malmquist indices were calculated to assess changes in efficiency growth and technological progress among Japanese-affiliated, UK-affiliated, and domestic firms within each industry. The analysis reveals that UK-affiliated firms heavily rely on technological advancements to achieve productivity growth, while Japanese-affiliated firms primarily gain productivity through efficiency improvements.

Another significant finding of this study is that domestic firms have notably improved both efficiency and technological growth, particularly in the pharmaceutical and electrical industries. These results indicate that FDI positively impacts domestic firms in India's manufacturing sector, enabling them to reach the higher productivity levels of their foreign-affiliated counterparts within the same industries.

13. CONCLUSION

The primary conclusion of this research highlights the significant influence that the "source country" of FDI exerts on the economic impact within the host country. Specifically examining the Indian manufacturing sector, the study evaluates FDI from Japan and the UK, revealing distinct differences in their effects on the productivity growth in the context of the .

Indian manufacturing firms. It is evident that FDI from the UK and Japan impacts this aspect differentially.

These variations likely stem from intrinsic differences in the nature, composition, and motivations of FDI from different source countries. For instance, FDI from the UK typically involves larger firms compared to the smaller firms associated with Japanese FDI in the manufacturing sector. Consequently, these inherent differences contribute to varying levels of technical and technological gaps, as well as disparities in productivity growth rates between domestic manufacturing firms and those affiliated with the UK and Japan.

This research emphasizes that the source of FDI significantly affects the nature and impact of FDI inflows in the host economy, influencing the overall FDI experience. The findings offer valuable insights into how different sources of FDI can have varied effects on the host country. Conducting more such studies will equip the host country with crucial

information on the expected impact of specific FDI sources which in turn would be highly beneficial for bilateral negotiations.

Although deriving policy recommendations from this study alone is challenging, it is clear that there is a lack of research focusing on the differential impact of FDI from various source countries. Future research in this area will provide policymakers with critical insights, enabling them to shape economic policies to achieve desired impacts from inviting specific FDI inflows into the domestic economy.

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ANNEXURES

ANNEXURE - A.1

FOREIGN DIRECT INVESTMENT FLOWS TO INDIA: COUNTRY-WISE AND INDUSTRY-WISE (US$ million)					
Source/ Industry	**2013-14**	**2014-15**	**2015-16**	**2016-17**	**2017-18 P**
1	**2**	**3**	**4**	**5**	**6**
Total FDI	16,054	24,748	36,068	36,317	37,366
Country-Wise Inflows					
Mauritius	3,695	5,878	7,452	13,383	13,415
Singapore	4,415	5,137	12,479	6,529	9,273
Netherlands	1,157	2,154	2,330	3,234	2,677
USA	617	1,981	4,124	2,138	1,973
Japan	1,795	2,019	1,818	4,237	1,313
Cayman Islands	25	72	440	49	1,140
Germany	650	942	927	845	1,095
Hong Kong	85	325	344	134	1,044
United Kingdom	111	1,891	842	1,301	716
Switzerland	356	292	195	502	506
UAE	239	327	961	645	408
France	229	347	392	487	403
China	121	505	461	198	350
Italy	185	167	279	364	308
South Korea	189	138	241	466	293
Cyprus	546	737	488	282	290
Canada	11	153	52	32	274
Others	1,626	1,682	2,243	1,490	1,889

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ANNEXURE - A.2

FOREIGN DIRECT INVESTMENT FLOWS TO INDIA: SECTOR-WISE INFLOWS (US$ million)					
Communication Services	1,256	1,075	2,638	5,876	8,809
Manufacturing	6,381	9,613	8,439	11,972	7,066
Retail & Wholesale Trade	1,139	2,551	3,998	2,771	4,478
Financial Services	1,026	3,075	3,547	3,732	4,070
Computer Services	934	2,154	4,319	1,937	3,173
Business services	521	680	3,031	2,684	3,005
Electricity and other energy Generation, Distribution & Transmission	1,284	1,284	1,364	1,722	1,870
Construction	1,276	1,640	4,141	1,564	1,281
Transport	311	482	1,363	891	1,267
Miscellaneous Services	941	586	1,022	1,816	835
Restaurants and Hotels	361	686	889	430	452
Real Estate Activities	201	202	112	105	405
Education, Research & Development	107	131	394	205	347
Mining	24	129	596	141	82
Trading	0	228	0	0	0
Others	293	232	215	470	226
P: Provisional.					
Note: Includes FDI through SIA/FIPB and RBI routes only.					
Source: RBI.					

ANNEXURE - A.3

Sector-wise attracting Highest Foreign Direct Investment Equity Inflow Amount in rupees Crores (Amount in US$ million)

S. No.	Sector	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	Cumulative Inflow (2010-19)	Percentage of total inflow in terms of US$
1.	Services Sector**	15503 (3,296)	24656 (5,216)	26306 (4,833)	13294 (2,225)	27,369 (4,443)	45,415 (6,889)	58,214 (8,684)	43249 (6709)	63909 (9158)	3,17,915 (51,453)	26%
2.	Computer Software andHardware	3,551 (780)	3,804 (796)	2,656 (486)	6,896 (1,126)	14,162 (2,296)	38,352 (5,904)	24,605 (3,652)	39670 (6153)	45297 (6415)	1,78,993 (27,608)	14%
3.	Telecommunications (Radio, paging, cellular mobile, basic telephone services.)	7,542 (1,665)	9,012 (1,997)	1,654 (304)	7,987 (1,307)	17,372 (2,895)	8,637 (1,324)	37,435 (5,564)	39748 (6212)	18337 (2668)	1,47,726 (23,936)	12%
4.	AutomobileIndustry	5,864 (1,299)	4,347 (923)	8,384 (1,537)	9,027 (1,517)	16,760 (2,726)	16,437 (2,527)	10,824 (1,609)	13461 (2090)	18309 (2623)	1,03,413 (16,851)	9%
5.	Chemicals (other than fertilisers)	10,612 (2354)	18,422 (4,041)	1,596 (292)	4,378 (878)	4,658 (707)	9,664 (1,474)	9,397 (1,393)	8425 (1308)	13685 (1981)	80,837 (14,428)	7%
6.	Trading	-	-	-	8191 (1343)	16,760 (2726)	16437 (2,527)	10,824 (1,609)	13461 (2090)	14,641 (2156)	80,314 (12,451)	7%
7.	Drugs & Pharmaceuticals	961 (209)	14,605 (3,232)	6,011 (1,123)	7,191 (1,297)	9,052 (1,498)	4,975 (754)	5,723 (857)	5723 (857)	1842 (266)	56,962 (10,246)	5%
8.	Construction Development Township, housing, Built-up Infrastructure.	7,552 (1,655)	15,236 (3,141)	7248 (1,332)	7508 (1,226)	4,652 (769)	727 (113)	703 (105)	3472 (540)	1503 (213)	48,601 (9,094)	5%
9.	Hotel & Tourism	1,405 (308)	4,754 (993)	17,777 (3,259)	2,949 (486)	4,740 (777)	8,761 (1,333)	-			41,791 (7,464)	4%
10..	Power	5,796 (1,272)	7,678 (1,652)	2,923 (536)	6519 (1,066)	4,296 (707)	5,662 (869)	7,473 (1,113)	10473 (1621)	7330 (1106)	58,512 (9,942)	5%
11.	Metallurgical Industries	5,023 (1,098)	8,348 (1,786)	7,878 (1,466)	3,436 (568)	2,196 (359)	2,982 (456)	9,647 (1,440)	17571 (2730)	15927 (2258)	73,008 (12,161)	6%

Note: -"**Service sector includes financial banking, Insurance, Non – Financial banking, outsourcing R&D, Courier, tech, testing and analysis."

1. "Cumulative Sector wise Foreign Direct Investor equity inflow (From April 2010to March 2019)."
2. Foreign Direct Investment sectoral data has been revalidated reconciled in line with the RBI, which reflects minor changes in the Foreign Direct Investment figure (Increase/ Decrease) as compared to the earlier published sectoral data.

ANNEXURE - A. 4

Country-wise Foreign Direct Investment Equity Inflow Amount in rupees Crores (Amount in US$ million)

Rank	Country	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	Cumulati ve Inflow (apr.11to mar.19)	Percentage of total inflow in terms of US$
1	Mauritius	31,855 (6987)	46,710 (9,942)	51,654 (9,497)	29,360 (4,859)	55,172 (9,030)	54,706 (8,355)	1,05,587 (15,728)	1,02,492 (15,941)	57,139 (8,084)	5,34,675 (88,423)	33
2	Singapore	7,730 (1705)	24,712 (5,257)	12,594 (2,308)	35,625 (5.958)	41,350 (6,742)	89,510 (13,692)	58,376 (8,711)	78,542 (12,180)	1,12,362 (16,228)	4,60,801 (72,781)	27
3	Netherlands	7,063 (1,562)	6,698 (1,409)	10,054 (1,856)	13,920 (2,270)	20,960 (3,436)	17,275 (2,643)	22,633 (3,367)	18,048 (2,800)	27,036 (3,870)	1,43,687 (23,213)	9

4	Japan	12,235 (2,711)	14,089 (2972)	12,243 (2,237)	10,580 (1,178)	12,752 (2,084)	17,275 (2,614)	31,588 (4,709)	10,516 (1633)	20,556 (2,965)	1,32,834 (20,392)	8
5	U.K.	5,501 (1,213)	36,428 (7,874)	5,797 (1,080)	20,426 (3,215)	8,769 (1,447)	5,938 (898)	9,953 (1,483)	5,473 (847)	9,352 (1,351)	1,07,637 (18,195)	7
6	U.S.A.	5,353 (1,213)	5347 (1,115)	3,033 (557)	4,807 (806)	11,150 (1,824)	27,695 (4,192)	15,957 (2,379)	13,505 (2,095)	22,335 (3,139)	1,09,182 (17,320)	6
7	Germany	908 (200)	7,452 (1,622)	4,684 (860)	6093 (1,038)	6,904 (1,125)	6,361 (986)	7,175 (1,069)	7,245 (1,124)	6,187 (886)	53,009 (8,910)	4
8	Cyprus	4,171 (913)	7,722 (1,587)	2,658 (490)	3,401 (557)	3634 (598)	3,317 (508)	4050 (604)	2680 (417)	2,134 (296)	33,767 (5,970)	2
9	France	3,349 (734)	3,110 (663)	3,487 (646)	1,842 (305)	3,881 (635)	3,937 (598)	4,112 (614)	3297 (511)	2,890 (406)	29,905 (5,112)	2
10	UAE	1,569 (341)	1,728 (353)	987 (180)	1,562 (255)	2251 (367)	6528 (985)	4539 (675)	6767 (1050)	6356 (898)	32,287 (5,104)	2
Total Foreign Direct Investment inflow from All Countries		**97,320 (21,383)**	**1,65,146 (35,121)**	**1,21,907 (22,423)**	**1,47,518 (24,299)**	**1,89,107 (30,931)**	**2,62,322 (40,001)**	**2,91,696 (43,478)**	**2,88,889 (44,857)**	**3,09,867 (44,366)**	**16,37,784 (2,65,420)**	

Note: -

1. Includes Inflow under NRI Schemes RBI.
2. Cumulative Country – wise FDI equity Inflows (From April, 2010 to March, 2019).
3. Percentage(%) worked out in US $ terms & FDI Inflow received through FIFB/SIA+RBI'S Automatic Route +Acquisition of existing share only.

BIBLIOGRAPHY

1. **Adamou, Adamos & Sasidharan, Subash. (2007)**, "The Impact of R&D and FDI on Firm Growth in Emerging - Developing Countries: Evidence from Indian Manufacturing Industries", SSRN Electronic Journal. 10.2139/ssrn.987024.
2. **Aitken B. and Harrison A. (1997),** "Do Domestic Firms Benefit from FDI? Evidence from Venezuela", American Economic Review, Vol. 89, Issue 3, pp 605-618.
3. **Bajpai N. and Sachs J. D. (2006),** "Foreign Direct Investment in India: Issues and Problems", Harvard Institute of International Development, Development Discussion Paper No. 759.
4. **Banga R. (2005),** "Technology Upgrading Strategies and Level of Technology Adoption in Japanese and US Firms in Indian Manufacturing", https://link.springer.com/chapter/10.1057/9780230554887_7.
5. **Bhaumik S, Estrin S. and Meyer K. (2007),** "Determinants of Employment Growth at MNEs: Evidence from Egypt, India, South Africa and Vietnam", Comparative Economic Studies, Vol. 49, pp 61-80.
6. **Blalock G. and Gertler P. (2004),** "Firm Capabilities and Technology Adoption: Evidence from Foreign Direct Investment in Indonesia", http://blalock.dyson.cornell.edu/wp/blalock_firmcap_062104.pdf. e
7. **Bahmol, R. Nelson and E. Wolff (Eds.),** Convergence of Productivity: Cross National Studies and Historical Evidence, New York, Oxford University Press, pp 243-259.
8. **Burange L. G, Thakur P. and Kelkar H. K. (2017),** "Foreign Direct Investment and Intra-Industry Trade in India's Manufacturing Sector: A Causal Relationship", Foreign Trade Review, Vol. 52, Issue 4, pp 203-218.
9. **Caves R. E. (1974),** "Causes of Direct Investment: Foreign Firms Shares in Canadian and United Kingdom Manufacturing Industries", Review of Economics and Statistics, Vol. 56, Issue 8, pp 207-293.
10. **Caves R. E. (1996),** "Multinational Enterprise and Economic Analysis", Cambridge University Press, Cambridge.
11. **Cornwell C, Schmidt P. and Sickles R. C. (1990),** "Production Frontier with Cross-Section and Time-Series Variation in Efficiency Level", Journal of Econometrics, Vol. 46, No. 1-2, pp 317-332.
12. **Djankov S. and Hoekman B. (2000),** "Foreign Investment and Productivity Growth in Czech Enterprises", The World Bank Economic Review, Vol. 14, No. 1, pp 49-64.
13. **Dunning J. H. (1980),** "Towards an Eclectic Theory of International Production: Some Empirical Tests", Journal of International Business Studies, Vol. 11, Issue 1, pp 9-31.
14. **Dunning J. H. (1994),** "The Governance of Japanese and US Manufacturing Affiliates in the UK: Some Country-Specific Differences", in Kogut B, editors, Country Competitiveness, Oxford University Press, Oxford.
15. **Dunning J. H. (1995),** "The Strategy of Japanese and US Manufacturing Investment in Europe", in Mason M. and Encarnation D, editors, Does Ownership Matter? Japanese Multinationals in Europe, Clarendon Press, Oxford.

16. **Eiteman D. and Stonehill A. (1994),** "Multinational Business Finance, Ready, Mass", Addison Wesley.
17. Encarnation D. J. (1999), "Japanese Multinationals in Asia: Regional Operations in Comparative Perspective", Oxford University Press, New York.
18. **Fare R.S, S. Grosskopf and C.A.K. Lovell (1994),** "Production Frontiers", Cambridge University Press.
19. **Frankel J. A. (1991),** "The Japanese Cost of Finance: A Survey, Financial Management, Vol. 20, Issue 1, Spring, pp 95-127.
20. **Globerman S. (1979),** "Foreign Direct Investment and Spillover Efficiency Benefits in Canadian Manufacturing Industries", Canadian Journal of Economics, Vol. 12, pp 42-56.
21. **Goldar B. N. (1995),** "Technology Acquisition and Productivity Growth: A Study of Industrial Firms in India", Working Paper Series, Institute of Economic Growth, Delhi University Enclave, September.
22. **Goldar B. and Kumari A. (2002),** "Import Liberalisation and Productivity Growth in Indian Manufacturing Industries in the 1990s", Working Paper Series No. E/219/2002, Institute of Economic Growth, India.
23. **Iqbal B. A. (1997),** "Japanese Foreign Direct Investment in South Asia: A Case of India", Mittal Publications, New Delhi.
24. **Johnson A. (2006),** "The Effects of FDI Inflows on Host Country Economic Growth", Working Paper Series in Economics and Institutions of Innovation 58, Royal Institute of Technology, CESIS - Centre of Excellence for Science and Innovation Studies.
25. **Kathuria V. (2000),** "Productivity Spillovers from Technology Transfer to Indian Manufacturing Firms", Journal of International Development, Vol. 12, Issue 3, pp 343-369.
26. **Kathuria V. (2001),** "Foreign Firms, Technology Transfer and Knowledge Spillovers to Indian Manufacturing Firms: A Stochastic Frontier Analysis", Applied Economics, Vol. 33, pp 625-642.
27. **Kojima K. (1978),** "Direct Foreign Investment: A Japanese Model of Multinational Business Operations", Croom Helm, London.
28. **Kojima K. (1985),** "Japanese and American Investment in Asia: A Comparative Analysis", Hitotsubashi Journal of Economics, Vol. 26, pp 1-35.
29. **Kojima K. and T. Ozawa (1973),** "A Macroeconomic Approach to Foreign Direct Investment", Hitotsubashi Journal of Economics, Vol. 14, pp 1-21.
30. **Kokko A. (1994),** "Technology, Market Characteristics and Spillovers", Journal of Development Economics, Vol. 43, pp 279-293.
31. **Kokko A, Tansini R. and Zejan M. C. (1996),** "Local Technological Capability and Productivity Spillovers from FDI in the Uruguayan Manufacturing Sector", Journal of Development Studies, Vol. 32, Issue 4, April, pp 602-611.
32. **Kumar N. (2001),** "Flying Geese Theory and Japanese Foreign Direct Investments in South Asia: Trends, Explanations and Future Prospects", Journal of International Economic Studies, Vol. 15, pp 179-192.
33. **Nagaishi M. and Tomoya Matsumoto, (2003),** "Market Values of Japanese Affiliates in India: An Industry-specific Analysis", Paper presented in Seventh International Conference on Global Business and Economic Development, Bangkok, January 8-11.
34. **Okuda S. (1994),** "Taiwan's Trade and FDI Policies and Their Effect on Productivity Growth", The Developing Economies, Vol. 32, pp 423-443.
35. **Ozawa T. (1994),** "Japanese MNCs as Potential Partners in Eastern Europe's Economic Reconstruction", in P. J. Buckley and P. N. Ghauri, editors, The Economics of Change in East and Central Europe, London, San Diego, Tokyo, Academic Press, Harcourt Brace & Company, pp 203-219.
36. **Panda R. (1994),** "Japan and the Third World: Political and Economic Interactions, 1980s-1990s", Lancer Books.
37. **Ravenhill J. (1999),** "Japanese and US Subsidiaries in East Asia: Host Economy Effects", in D. J. Encarnation, editors, Japanese Multinationals in Asia: Regional Operations in Comparative Perspective, Oxford University Press, New York
38. **Schroath F. W, Hu M. Y. and Chen H. (1993),** "Country-Of-Origin Effects of Foreign Investments in the People's Republic of China", Journal of International Business Studies, Second Quarter, pp 277-290.
39. **Siddharthan N. S. (1998),** "Differential Behaviour of the Japanese Affiliates in the Indian Automobile Sector", Japan and the World Economy, Vol. 10, pp 97-109.
40. **Siddharthan (1999),** "Technology Transfer, WTO and Emerging Issues", Paper presented at the National Seminar on Economy, Society and Polity in South Asia: Retrospect and Prospects at the Dawn 0f the Next Millennium, November 16-17, 1999, at the Institute of Economic Growth. India.
41. **Srivastava V. (1996),** "Liberalisation, Productivity and Competition: A Panel Study of Indian Manufacturing", Oxford University Press, Delhi.
42. **Sinha M, Modak A. and Sengupta P. P. (2018),** "Foreign Direct Investment and Indian Industries: A Dynamic Panel Study", International Journal of Pure and Applied Mathematics, Vol. 118, Issue 18, pp 1279-1291. www.ijpam.eu.
43. **Srivastava V. (1996),** "Liberalisation, Productivity and Competition: A Panel Study of Indian Manufacturing", Delhi: Oxford University Press.

44. **Teece D. J. (1981),** "The Market for Know-How and the Efficient International Transfer of Technology", The ANNALS of the American Academy of Political and Social Science, Vol. 458(1), pp 81-96.
45. **Womack James P, Daniel T. Jones and Daniel Roos (1991),** "The Machine That Changed the World: The Story of Lean Production - How Japan's Secret Weapon in the Global Auto Wars Will Revolutionize Western Industry", Harper Collins, New York.
46. **Zhang K. H. and Markusen J. R. (1999),** "Vertical Multinationals and Host-Country Characteristics", Journal of Development Economics, Vol. 59, pp. 233-252.