CHAPTER 2

LITERATURE SURVEY

2.1 GENERAL

There is quite a large volume of literature on FDI and activities of multinational firms covering a wide range of topics. Most of these studies are based on either growth theories or trades theories or industrial organisation theories. The activities of MNEs that make the direct investment are mainly microeconomic in nature while the impacts of these investments are mostly analysed under macroeconomic framework. Because of the complications in the activities and implications of FDI, a proper classified survey of the earlier literature is quite difficult. This chapter brings out some of the studies related to FDI flows, MNEs activities and their impacts on technology, productivity and growth.

The literature survey is organised as follows. The theoretical literature on FDI is analysed from the framework of both macroeconomics and microeconomics in Section 2.2. This was followed by empirical literature on determinants and impacts of FDI in Section 2.3. Special emphasis is given to the literature on FDI and its role in technological change across countries as well as across firms. Studies that compare various modes of technology transfer are also reviewed to know the importance of FDI in technological progress.
Section 2.4 reviews some of the major empirical studies related to the impact of FDI and technology transfer in India and Section 2.5 concludes the chapter.

2.2 THEORETICAL EXPLANATIONS OF FDI.

There is no completely satisfactory theory that explains the phenomenon of FDI. The main reason is that FDI depends on several factors that come under different branches of economics such as microeconomics of industrial organisation theories, location theories, capital theories, and macroeconomics of international trade and factor movements. Traditionally FDI was treated as a part of international economics. The main factor that links international economics and the FDI (MNEs)\(^1\) is the export of equity capital that occurs when a company starts a foreign subsidiary. This traditional international approach considered FDI along with other forms of international capital flows, as an arbitrageur of equity capital from where its return is low to countries where it is high. This approach links FDI to the general equilibrium theories of international trade, international factor endowments and the distribution of income. But, the theoretical role of the MNE as a capital arbitrageur was neither developed analytically nor tested empirically (Caves, 1996). Alternative microeconomic theories use partial equilibrium models in order to explain FDI. The argument is that MNEs do not satisfy the basic assumptions of general equilibrium analysis because they are most unlikely to operate under perfectly competitive market conditions. Since the assumption of perfect competition has been necessary for the development of the pure general equilibrium theory of international trade, FDI theories cannot be formulated from the conventional trade and investment theories. According to Chen (1983),

\(^1\) The two terms FDI and MNEs are used interchangeably in some places, since FDI is mostly coming through MNEs.
any satisfactory theory of FDI should be able to explain three things. First, the 
theory should explain why it is worthwhile for the firm to invest abroad. 
Second, it should explain the country and industry patterns of FDI. Third, such 
a theory should also be able to explain the two-way flow of FDI between 
countries.

2.2.1 Macroeconomic Theories of FDI (International Economics 
Approach)

The general equilibrium models of FDI are generally built on the 
Hecksher-Ohlin (H-O) theory of comparative advantage. According to this 
theory, the basic determinant of a country’s comparative advantage is its 
relative factor endowment in natural resources, labour and capital that are 
necessary inputs for production. The relative differences in the possession of 
these resources cause differences in costs and prices, thereby giving the 
foundation for trade based on comparative advantage (Meier, 1998). The H-O 
model was used to explain foreign investment as international movements of 
factor of production (capital) due to the changes in the factor endowments of 
the sending and receiving countries (Caves, 1996). Mundell (1957) extended 
the H-O model to show that FDI may take place to overcome the high tariff 
imposed by foreign country on imports of goods, which restricts the free trade 
between countries. His model shows the substitution between trade and foreign 
investment.

The analysis of foreign investment as the international capital flows 
that occur because of the differences in the rate of capital between countries 
was initiated by MacDougall (1960), elaborated and formalised by Kemp
The MacDougall-Kemp model suggests that the reason for foreign investment is the high rate-of-return of capital abroad where capital is scarce and the marginal productivity of capital is, therefore, higher. They assume perfectly competitive market conditions where marginal productivity is the only factor that determines the rate of return to capital. However, this model treats foreign investment solely in terms of financial capital, and does not take into consideration the concept of foreign investment (particularly, FDI) as a package consisting of not only capital but also technology, management and skill.

The traditional theories of capital flows (that comes as a part of earlier trade theories based on comparative advantage analyses), however, could not explain many of the recent development in actual world of commerce that strongly contradicted with many of the assumptions and apparent implications of these theories. All these theories viewed the activities of multinationals as essentially a part of the theory of portfolio capital flows and assumed that capital tends to flow from where it is abundant to where it is scarce. Contrary to these traditional theories of capital flows, there has been clear evidence of foreign investment, especially direct investment largely taking place from capital-rich countries to other capital-rich countries. This fact suggests that models which stress relative factor endowments and relative factor costs need to be augmented in order to explain several inherent distinguishing characteristics of FDI flows. The recent development of ‘new’ international trade and investment theories emphasising those features that appear central to multinationals: economies of scale, imperfect competition, strategic considerations, and technological change and diffusion, many of which the comparative advantage trade theory ruled out (See Barrel and Pain, 1997; and Markusen and Maskus, 2001).
However, the general equilibrium models put forward by the international economic theories are useful for understanding the causes and consequences of MNEs. They have helped to explain the distribution of foreign investments among countries (Caves, 1996).

### 2.2.2 Micro or Industrial Economic Approach (Oligopolistic Models of FDI)

#### 2.2.2.1 Ownership-Advantage Theories

Another development in the literature was to analyse the behavioural patterns of MNEs with the microeconomic or industrial economic approach. The theories under this approach talk about the firm-specific proprietary assets and transaction-cost factors that are very prominent in giving rise to foreign investment (Hymer, 1960; Kindleberger, 1969; and Caves, 1971). Hymer (1960) laid the foundation for this microeconomic explanation of FDI. According to him FDI involves the flow not only of capital but also of technology and entrepreneurship. Hymer was the first to suggest that the most important reason for FDI is maximising the returns from the firm's ownership-specific advantages under oligopolistic market structure. According to his theory, a firm goes for FDI because it requires control of foreign operations to appropriate fully the returns on certain advantages and abilities it possesses. Following Hymer, several studies proved that under oligopoly firms possess certain ownership-specific advantages, which help them to enter into a foreign market and earn profit by setting up subsidiaries instead of exporting and licensing. However, it was Kindleberger (1969) who popularised ownership advantage theory of FDI.
Kindleberger (1969) pointed out four major ways of internationally transferable advantages for a firm while investing abroad. Firstly, the advantages could come from departures from perfect competition in goods market through product differentiation, marketing skills and administered pricing. Secondly, departures from perfect competition in factor markets could bring certain advantages to the firm largely due to its access to patented or ‘proprietary’ knowledge, discrimination in access to capital and skill differences embodied in the firm (particularly its management). Thirdly, the foreign investor might benefit from the internal and external economies of scale, including those arising from vertical integration. Lastly, government intervention, particularly those forms restricting output or entry also help the investing firm. All these advantages enable the foreign entrant to overcome its lack of knowledge of local conditions that the local firms possess.

Caves (1971, 1996) tried to look at the reasons for the MNEs to make use of the ownership advantages through multinational investment rather than sell it at arm’s-length market. Caves considers that the MNEs possess such ownership advantages because of their possession of certain ‘proprietary assets’, that evidently share the necessary conditions to support foreign investment. These proprietary assets are those, which the firms can use but not necessarily sell or contract upon. They include knowledge about how to produce a cheaper or better product at given input prices, or how to produce a given product at a lower cost than competing firms. The firm may have special skills in styling or promoting its product that help the firm to differentiate its product from those of competitors. These assets may be in the form of registered trademark or brand name or the marketing and selling skills of the firm.
2.2.2 Location Theories

The location theories explain FDI in terms of certain location-specific factors, such as availability and cost of input resources, marketing factors, government policies and trade restrictions among others. A firm may invest abroad due to the cheap and abundant inputs available there. Firms always try to reduce transportation costs by locating production near to the market. There are several other advantages in locating production near to the market such as better exploitation of local market (local market can be easily catered for) and trespassing tariff barriers. Moreover, people will have a local or national feeling towards the product where people always have emotional attachment to domestically produced goods than foreign made goods.

The product life cycle theory developed by Vernon (1966) discusses the changes in the location of production of one commodity by a firm growing through monopolistic or oligopolistic behaviour. Vernon distinguishes three stages in the development of a product. In the first stage a new product is innovated and the production takes place at home, and the demand for the new product is only at home. In this stage, the product itself may be quite unstandardised for a time and the final specifications of the product may undergo several changes with production requiring relatively heavy R&D expenditures and highly skilled labour. The price elasticity of demand for the output of individual firms is comparatively low and the suppliers concentrate on the home market because of less competition. In the second stage the 'best' product emerges using the most efficient production process. The demand for the product increases and a certain degree of standardisation takes place. The firm commits to some set of production standards and this commitment helps the firm to achieve economies of scale through mass output. Costs and price
fall, and the product becomes exportable. The firm utilises the strategic competitive advantage to establish foreign subsidiaries to produce overseas. In the third stage, the product becomes standardised and completely uniform and non-differentiated. Production processes are now completely known, and firms compete entirely on prices. The firm now meets competition in the host country from the local firms in that country and will eventually move to the developing countries and set up their subsidiaries to achieve further reductions in costs. The products produced in these subsidiaries are exported back to the home country or other developed countries. In this way, the firm builds up an international integration network.

The product life cycle theory takes into consideration both ownership-specific factors and location-specific factors in explaining FDI. However, the theory fails to explain FDI which is not export substituting, and if the product is non-standardised. Kojima (1978) pointed out that this theory is related to the American type of FDI that concentrate on those industries in which the home country has comparative advantage and the host countries have comparative disadvantages and has neglected the Japanese type of FDI that was considered as more trade-oriented. In addition, the narrowing technology gap between developed countries (especially the United States and the European countries) weakens the critical assumption of the product life cycle theory that the firms face different conditions in their respective home markets.

2.2.2.3 Internalisation Theories

The internalisation theories of FDI, pioneered by Buckley and Casson (1976) and supplemented by Magee (1977) and others, are considered as an extension of the ownership-specific factors. The ownership-specific
factors make a firm outward looking but do not explain why a firm prefers direct investment instead of exporting, and licensing contracts and agreements. According to this theory of FDI, the ownership-specific advantages, in the form of technology and others, alone may not lead to FDI, but FDI can occur when these advantages can be beneficially exploited through internalising them across national boundaries. In the absence of such benefits to be derived from internalisation, a firm may exploit the advantages through export and/or licensing instead of investing directly.

2.2.2.4 Eclectic Theory (OLI – Paradigm)

Dunning (1979, 1981) has taken relentless efforts to synthesis the then existing theories of FDI, which has resulted in the Eclectic Theory of international production. The theory links up the above explained three different specific considerations of international production, i.e., ownership-specific advantages (O), location specific advantages (L) and internalisation (I) advantages, popularly known as OLI paradigm. These three elements combined explain why an MNE chooses the route of FDI over other attractive modes of entry into a foreign country, and why the MNE can give a comparative advantage over domestic firms in the foreign country.

Ownership-specific advantages of firms like superior technology, monopoly power, better resource capacity and usage, managerial and marketing skills, favourable access to the factor and product markets, etc are advantages that their competitors do not possess. These advantages arise from specific internal endowments to the firm. These internal endowments can be the size, technological superiority, access to cheaper inputs, knowledge of markets and administrative experience of the company or it can be the multinationality of
the company itself that extends from the above advantages. Therefore, foreign investment by the firm allows the transfer of other resources than capital, viz., technology, management and organisational and marketing skills. Firms also have certain locational considerations before investing abroad. These include economic and political environment like the macro-economic levels and rates of growth of national income in the host and home country, policies by the host country government, relative cost differences, market size, the quality of a country's physical infrastructure, the level of industrialisation and the size of existing stock of FDI, among others (Meier, 1998). Given the ownership advantages, it is more beneficial for the MNE possessing these advantages to use them itself rather than to sell or license them to foreign firms. The firm realises the benefits from retaining these ownership advantages by internalising them within the organisation, instead of relying on transactions at arm's length in markets.

Dunning (1981) has showed various forms of international operations of a firm when it realises or possesses the above explained advantages. Dunning has succinct the Eclectic theory of FDI in a table as given below.

Table 2.1 An Eclectic Theory of FDI

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Ownership</th>
<th>Internalisation</th>
<th>Foreign location</th>
</tr>
</thead>
<tbody>
<tr>
<td>FDI</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Exports</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Licensing, Contracts, etc.</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

Source: Dunning (1981), Reproduced in Chen (1983)
The table shows that if a firm possess only ownership-specific advantages, it will consider FDI, exporting and licensing as equally viable. If such ownership-specific advantages can be internalised, the firm will prefer FDI and exporting to licensing. Moreover, if the ownership-specific advantages can be profitably internalised across national boundaries because of the location-specific factors of a foreign location, then the firm will definitely prefer FDI to both exporting and licensing.

2.2.3 Literature on Technology, FDI and Economic Growth

The neo-classical trade theory, which is considered as the basis for international investment theories, assumed automatic diffusion of technology. However, the continuing existence of technology gaps between countries over time gave rise to a new trade literature that explains specific comparative advantages through innovations. The new growth theories have incorporated technological change as endogenous (Romer, 1990; Lucas, 1988; Grossman and Helpman, 1991) and recognise knowledge or technology as a factor of production in its own right, along-side capital and labour. The role of technology in determining a country’s international trade and hence competitiveness has been emphasised in the neo-technology theories of trade (Vernon, 1966; Krugman, 1979) and subsequent empirical literature (Hughes, 1986). Recent literature includes studies on tacit and non-codifiable nature of technology (Cantwell, 1991, 1999, Narula, 1993) and technological change through learning by doing or learning by using (Wakelin, 1997). In recent years, there has been a steady growth in the literature dealing with internationalisation of production and transfer of technology by MNEs and their impact on the growth and development of many countries. Recent studies
consider differences in technology as an important motivation for both trade and FDI.

The Technology Gap Approach developed by Posner (1961) and others emphasises the role of technology in the process of economic growth. According to this approach, technologies have different characteristics that affect economic growth differently. Using the technology gap approach, Karake (1990) argues that domestic and foreign capitals have different impacts on economic growth, and hence they should be treated as two different factors of input when using the production function approach to measure their impacts.

The theory of technological competence, developed by Cantwell (1991, 1999), provides a framework for examining the impact of MNEs on host countries. The technological competence theory views the technological superiority of the multinational firms as the major advantage in their international operations. The technological knowledge that MNEs possess “is not an immediately useable intermediate product in its own right, but is rather an input into the collective corporate learning process, by which tacit capacity and hence technology as a whole is generated” (Cantwell, 1999, p.4). Locational and firm-specific factors may influence the technological competitiveness of the firm and, therefore, the degree of technological competence varies between countries just as in between firms. According to this theory, foreign MNEs are more disposed to set up research facilities in countries where local industry has a high technological capability, which will further provide more competitive stimulus to the innovation of local firms. In a country where indigenous firms are weak, the entry of foreign firms may help them to upgrade their production. The technological competence theory argues that, the ownership advantages in the form of technological development is not
sufficient to make a firm competitive enough unless it is able to integrate research activities internationally and increase their technological competence.

The technological competence theory was followed by a technological accumulation approach by Cantwell (1999). According to technological accumulation approach, when technological knowledge is transferred into a foreign location (country), it must be adapted to the specific context of the firm's own tacit capability. This requires further R&D that would add to the existing technology. The expansion of international production thereby brings gains to the firms as a whole, as the experience gained from adapting its technology under new conditions feeds back new ideas for development to the rest of its system. Cantwell considers this as an explanation for the increase in intra-industry FDI in the industrialised countries. Following technological competence theory, if the local firms enjoy a strong technological tradition, the entry of MNEs would provide a competitive stimulus and in turn would encourage the local research-related activity. However, if the local firms have a weaker technology tradition, then it would be displaced by simpler assembly types of production by the foreign MNEs. The hypothesis that a stronger indigenous technological tradition would likely to be associated with beneficial knowledge and hence productivity spillovers between foreign owned and local firms has attracted much attention recently (see studies by Blomstrom, 1989; Kokko, 1994; and Kokko et al., 1996).

2.3 EMPIRICAL LITERATURE

This section surveys recent developments in the empirical literature on various aspects of FDI such as the determinants of FDI and the technology or knowledge transfers thereby, and their impacts on output growth in different
countries. This portion also focuses on the time series and cross-section aspects of FDI and growth, and also discusses the relevance of panel data analysis.

2.3.1 Determinants of FDI

One section of research found that the trade regime of the host country as the most important country-specific determinant of FDI. Bhagwati (1978) has hypothesised that the volume and efficacy of incoming FDI will vary depending on whether a country is following the export promoting (EP) or the import substituting (IS) strategy. Balasubramanyam et al. (1996) examined the role of FDI in the growth process of developing countries with different trade policy regimes in the framework of a new growth theory, testing the hypothesis advanced by Bhagwati. They found positive, statistically significant and higher elasticity of output with respect to FDI in outward-oriented countries with export promotion trade policies than in countries with an inward-orientation, promoting import substitution policies. Hufbauer et al. (1994) examined the factors that determine the geographical distribution of FDI and the effect of such FDI on the trade accounts of home countries. They found that the size and openness of the host economies as important determinants of foreign investment. They also observed that compared to the US or German firms, Japanese firms are more conservative in the pattern of investment and new Japanese investments tend to follow established locations. Kinoshita (1998) found that availability of cheap labour is not necessarily an important factor for Japanese FDI in Asia. Low labour cost and sufficient infrastructure encourage small firms to invest in a certain country, while for large firms, market size of the host country and strategic considerations (like whether
competitors invested in the country or not) are most important for their locational decisions.

Blomström et al. (1994) found that MNE affiliates tend to import more technologies to countries and industries where the educational level of the local labour force is higher, where local competition is tougher, and where the government imposes fewer formal requirements on the affiliates’ operations. They found a significant positive association between the technology imports of MNE affiliates and the local competitors’ investment and output growth. Their study suggested that the government policies in developing countries should be aimed to create a competitive climate and improved labour quality in order to promote inflows of modern technology. Blomström and Kokko (1996) found that the affiliates’ technology imports are positively related to the income level of the host country and the competitive pressure in the host country. Their study showed a negative relation between technology transfer by MNE affiliates and the level of market distortions and various other performance requirements in the host countries. Kumar (1997) in an empirical study found that the availability of technological resources and infrastructure and host country market size as the important factors determining the location of overseas R&D activity of MNEs. He observed that more innovative activities of MNEs were confined to industrialised countries, while the R&D activity that they have undertaken in developing countries were more of an adaptive nature.

De Mello (1997) observed that there are certain country specific FDI incentives such as fiscal incentives (tax rebates and exemptions), financial incentives (subsidised loans and grants), and non-financial incentives (like basic infrastructure provision), that may motivate foreign firms to invest in such
countries. Another important factor he pointed out is the absorptive capacity of the host country. The size and the growth prospects of the host and home markets, the general macroeconomic performance, such as inflation, and the fiscal and monetary policies of the host and home countries are also important determining factors of FDI. Recent case studies have supported the importance of demand variables, such as market size, economies of scale, and relative factor prices, as possible determinants of FDI. Studies by Blomström and Persson (1983) and Kokko (1994) demonstrated that productivity spillovers are least likely to occur in industries where the technology gap between MNE affiliates and local firms is the largest and the concentration of foreign firms is highest. However, Kokko et al. (1996) found that if the technology gap between foreign and domestic production is very small, the impact of FDI on labour productivity in such plants would also depend on plant size, the share of management personal to total employment, the share of foreign production in total output and intellectual property payments per worker.

2.3.2 FDI and Growth

Opening up of the economy through trade and investment liberalisation can facilitate technological transfer and development by providing access to new technologies embodied in capital goods. Coe and Helpman (1995) showed that international R&D spillovers are greater for economies that are more open to foreign trade. Narula and Wakelin (1995) tried to bring the role of trade and FDI on a country’s international competitiveness within a common framework based on a neo-Schumpeterian approach. The neo Schumpeterian approach regards technology as playing a central role in competitiveness, and stresses the importance of absolute differences in
technology in influencing export performance of a country. The study showed that the country specific determinants are clearly the most important factors in explaining the competitiveness of developing countries, but the model is not so effective in the case of industrialised countries. This indicates that factors other than country level determinants play an important part in the competitiveness of the industrialised countries, and which request studies on the role of firm-specific factors in influencing trade performance.

Borensztein et al. (1998) highlighted the roles of both the introduction of more advanced technology and the requirement of absorptive capacity in the host country as determinants of economic growth. They found that FDI is in fact an important vehicle for the transfer of technology, contributing to growth in larger measure than domestic investment. Moreover, they observed that there is a strong complementary effect between FDI and human capital, that is, the contribution of FDI to economic growth is enhanced by its interaction with the level of human capital in the host economy. However, the results showed that FDI would be more productive than domestic investment only when the host country has a minimum threshold stock of human capital. The study showed that the main channel through which FDI contributes to economic growth is by stimulating technological progress rather than by increasing total capital accumulation in the host economy. Bosshardt and Vishwasrao (1999), using data on technical collaboration agreements between domestic and foreign firms in India, assessed the effect of economic liberalisation on technology transfer in particular industries. They have used the transaction cost approach, which suggests that foreign investment and arms-length technology sales are influenced by location considerations and ownership of certain proprietary technological know-how.
Investigating on the differences in the productivity between domestic and foreign owned firms in the UK motor vehicle and parts industry, Griffith (1999) found that foreign owned establishments have higher output and value added per worker compared to domestic firms. Estimating production functions using panel data set at the plant level, the study shows that these differences in output and value added are largely because of the different levels of factor usage by foreign firms and domestic firms. The foreign firms use higher levels of capital and intermediate inputs and also pay their workers higher wages that may reflect differences in skill levels. Griffith’s study shows that the reason for higher output per worker in foreign owned establishments is not because that they are operating on a higher technological frontier than domestic owned establishments as the recent literature suggest, but rather they are operating at a point along the technological frontier using more intermediate and capital inputs.

Blomström and Persson (1983), using industry level data, found that domestic labour productivity is positively influenced by foreign presence in an industry, measured by the foreign share of industry employment. Studying a panel of 159 locally-owned Uruguayan manufacturing plants Kokko et al. (1996) found that FDI has a positive impact on labour productivity and growth in the Uruguayan manufacturing industry. The impact of FDI on domestic labour productivity is shown to depend positively on the capacity utilisation and capital intensity of the plant. Okamoto and Sjöholm (1999) examined the differences in productivity growth between domestic and foreign plants in a developing country – Indonesian manufacturing sector. The study found that entry of foreign firms with relatively high productivity levels explains most of the productivity growth in Indonesian manufacturing industry during 1990-95.
In addition, they found that the contribution of foreign plants to aggregate TFP growth exceeds their output shares. But the performance differs substantially between sectors.

2.3.3 FDI and Technology Transfer

There are two main opposing arguments in the literature on foreign investment and technology transfer. One argument is about the 'appropriateness' of MNE technology. The technologies from the capital-rich countries are too advanced and capital-intensive and hardly of any use in improving techniques of low capital-intensity in less developed countries (Lapan and Bardhan, 1973). This supports the hypothesis that the benefits from FDI to host country/firms are negatively related to the complexity of MNE technology or the size of the technology gap between affiliates and local firms. The other line of argument is that for effective technology transfer to take place, a certain level of technology gap is necessary. This may prevent the local firms to copy MNE technology or movement of trained labour force from MNE affiliates, that may induce the MNEs to bring in advanced technologies to the host country. Therefore, it has been hypothesised that benefits from technology transfer grow with the size of the technology gap (Findlay, 1978; Wang and Blomström, 1992). De Mello (1997) also supported the argument that the technological gap between the technological followers and leaders should be sizeable enough to motivate knowledge transfers and spillovers.

Djankov and Hoekman (1998) investigated the relative importance of foreign investment as a channel of technology transfer in the Czech Republic during the initial post-reform period (1992-96). They found that although firm
level total factor productivity (hereafter TFP) growth is substantially higher in firms with foreign partnerships, once common macroeconomic influences and industry effects are controlled for, foreign investment does not have a statistically significant positive impact on firm performance. They argued that this was due to selection bias: foreign investments tend to flow to firms of above average size, initial profitability and initial labour productivity. Estimation results after adjusting for this bias suggested that firms without foreign partners have been successful in acquiring and employing new knowledge independently through arms-length trade.

De Mello (1999) estimated the impact of FDI and knowledge transfers (through FDI) on capital accumulation, output and TFP growth in the recipient economy, and found that the growth-FDI nexus is sensitive to country-specific factors that are unobservable in time series analysis. The study suggested that if FDI is growth-enhancing in the long-run, via both knowledge transfer and the accumulation of capital stocks embodying newer technologies, then this impact is likely to be lower in technological leaders than laggards. The degree of substitutability between capital stocks embodying old (domestic) and new (foreign) technologies seems to be higher in technologically advanced economies rather than developing economies. Alternatively, the study argued that the degree of complementarity between old and new technologies found in developing countries, after country-specific effects were accounted for, suggested that those economies may: (i) be less efficient in the use of the new technologies embodied in foreign capital; (ii) have difficulty to assimilate capital and technology-intensive improvements; or (iii) the foreign technology may not be much more modern or productive than the ones existing in the recipient economy. The study concluded that although FDI is expected to boost
long-run growth in the recipient economy via technological upgrading and knowledge spillovers, it is shown that the extent to which FDI is growth-enhancing depends on the degree of complementarity and substitution between FDI and domestic investment.

2.3.4 FDI and Technology Spillovers (Diffusion)

Spillovers (or external effects) as a possible consequences of FDI was first introduced by MacDougall (1960) while analysing the general welfare effects of foreign investment. The early analysis showed that FDI might improve allocative efficiency by reducing monopolistic distortions and induce higher technical efficiency through increased competitive pressure or some demonstration effects among the local firms. This could be by the introduction of new know-how or new technologies by the foreign firms (MNEs) and through workers who were trained in MNEs but later take employment in local firms. Mansfield (1974) pointed out that the spillovers (or diffusion) of the new technological know-how is a slow process. He signals at various factors that determines the rate of diffusion, such as average profitability of the innovation, the number of firms in the industry, their average size, and the amount spend on R&D. Following Mansfield, Findlay (1978) also reminded that the rate at which new technology is diffused as a function of many other facts such as educational level of domestic labour force, the market structure, patent laws and the terms of royalties and licensing arrangements, among others.

Buckley and Casson (1976) tried to look at the impact of spillovers (or diffusion of technology) through workers on the MNEs investment. According to them, the threat of diffusion of technological know-how through workers
depends upon whether the knowledge and skills they acquire from the MNEs are individual-specific or team-specific. The team-specific assets are inseparable from the firm, and cannot be acquired easily by other firms. On the other hand, if the knowledge is individual-specific, then there is high possibility of the diffusion of technology through workers' migration. Chen (1983) in a study of technology transfer to Hong Kong concluded that 'the major contribution of foreign firms in Hong Kong manufacturing is not so much in the production of new techniques and products, but in the training of workers at various levels' (p.61).

The possibility of technology transfer through training of local employees is well explained by Blomström and Kokko (1996):

"The transfer of technology from MNE parents to affiliates is not only embodied in machinery, equipments, patent rights, and expatriate managers and technicians, but is also realised through the training of the affiliates' local employees. Types of training range from on-the-job training to seminars and more formal schooling to overseas education, perhaps at the parent company, depending on the skills needed. The variance skills gained while working for an affiliate may spill over as the employee move to other firms, or set up their own business."

There are a number of industry-specific case studies to estimate the scope for spillovers due to FDI. Empirical case studies show apparently contradictory findings about spillovers from FDI on host country firms. Case studies of manufacturing industries in several countries found that foreign
firms' presence has a positive impact on the productivity of local firms, showing significant technology spillovers. Examining the impact of foreign presence on labour productivity in local firms in a production function framework, Caves (1971) for Australia, and Blomström and Persson (1983) for Mexico, found significant intra-industry spillovers at aggregate level due to FDI. Aitken and Harrison (1999), using plant-level data for Venezuelan manufacturing between 1976 and 1989 to test the impact of foreign presence on total factor productivity growth, concluded that domestic firms are highly productive in sectors with a larger foreign share. However, they suggested that the positive impact of FDI accrued mainly to the domestic firms located close to the MNE affiliates, and the effects seem to vary between industries.

However, there are also case studies that have not found any apparent spillovers from the presence of foreign firms. Haddad and Harrison (1993) testing the spillover hypothesis for Moroccan manufacturing during the period between 1985-89, found no significant effects of foreign presence on the rate of productivity growth of local firms, supporting the conclusion that technology spillovers do not take place in all industries. They found that foreign presence forces local firms to become more productive in sectors where best-practice technology lies within their capability, but that there are no significant transfers of modern technology. Kokko (1994) investigated how spillovers are related to the complexity of MNE technology and the technology gap between host country firms and MNE affiliates in Mexican manufacturing industry during 1970. The study showed that large productivity gaps and large foreign shares together make up significant obstacles to spillovers. In such industries where large productivity gaps and large market shares for foreign firms along with differentiated products and/or significant economies of scale, foreign affiliates
usually crowd out the local competitors from the market. These differences between foreign and local firms may prompt MNE affiliates to operate in 'enclaves', where technologies, products and plant sizes are very different from those used by local firms. Djankov and Hoekman (1998) also observed that there is a strong and statistically significant negative spillover effects on other firms in the industry associated with foreign investment in a sector. (This finding is consistent with the results found by Aitken and Harrison (1999) for Venezuela and Haddad and Harrison (1993) for Morocco). This negative effect of foreign investment on local firms in the same industry is complemented by a positive effect associated with imports of goods. The study supported the hypothesis that firms without a foreign investment relationship benefited from imports to improve their performance and illustrated the importance of arms-length trade as a mechanism of technology transfer. Blomström and Kokko (1998), examining data for Mexican manufacturing and Uruguayan manufacturing, found no signs of spillovers in industries where the foreign affiliates have much higher productivity and larger market shares than local firms. On the other hand, in industries without these 'enclave' characteristics, there appears to be a positive relation between foreign presence and local productivity.

Spillovers can take place when the local firms benefit from MNE affiliates either through backward linkages or through forward linkages. Backward linkages arise from the MNE affiliates’ relationship with suppliers, while forward linkages come from contacts with customers. In an empirical study Lall (1980) examined two Indian truck manufacturers, one MNE (fully subsidiary) and one joint venture, and found significant backward linkages between these firms and their local suppliers. He observed that 'MNEs might contribute to raise the productivity and efficiency in the local suppliers by
helping them to set up production facilities; providing technical assistance to increase the quality of products or to facilitate innovations; provide or assist them in purchasing raw materials and intermediates; and, providing training and management and organisational helps’. Aitken and Harrison (1999), who examined Venezuelan manufacturing in the period 1976-89, could not find any significant backward linkages between MNE affiliates and local firms. They concluded that the effect of foreign investment on the productivity of upstream local firms is generally negative. Foreign firms largely depend on imported inputs and demand less domestic inputs, which means that local suppliers firms are not able to benefit from potential economies of scale. However, they agreed that these results might be influenced by the selection of the sample, which includes local firms that have not been fortunate enough to establish linkages with foreign firms.

There are much less evidence of forward linkages than of backward linkages. Aitken and Harrison (1999) concluded that spillovers from forward linkages seem to be important in most industries. Some of the host country characteristics that may influence the extent of linkages and thereby the extent of spillovers- are market size, local content regulations, and the size and technological capability of local firms. Moreover, linkages are likely to increase over time as the skill level of local entrepreneurs grew, and informations are more easily available.

2.4 STUDIES IN INDIA

There have been many debates about whether foreign technology purchase and in-house R&D activities of firms are complements or substitutes. India’s economic policies of 1970s were aimed at promoting in-house R&D and
many restrictions were imposed on foreign technology purchase. Although such a restrictive regime would suggest a relationship of substitution between these two modes of technology development, empirical studies on India could not make a decisive conclusion about the exact nature of the relationship between these two. Studies have shown that the relationship between technology purchase and in-house R&D is complex and not always amenable to generalisations (Desai, 1988; Lall, 1987; Basant, 1997; Basant and Fikkert, 1996; Kathuria, 2001).

A study by Lall (1987) on 145 Indian firms in two sectors, engineering and chemicals, showed that foreign ownership has a positive and consistently significant effect on the R&D performances of firms in engineering sector. However, in chemical sector it had a negative and only occasionally significant sign. The study found significant differences between the relative technological performance of foreign and local firms in India. Kumar (1987) examined separately the differential influence of the two parallel modes of technology acquisition, i.e., FDI and licensing, on the R&D activities of 43 Indian manufacturing industries. The study results suggested that foreign ownership has a depressing effect on the levels of local R&D spending. The MNE-affiliates in India fulfill their R&D requirements from their parent firms instead of undertaking any R&D activities by themselves. Therefore, technology imports through FDI and local R&D are more substitutes in nature. However, in the case of technology imports through licensing the study results showed that this had stimulated the local R&D, supporting a complementarity between technology imported through licensing and indigenous R&D. Basant (1997) has analysed the nature of relationship between foreign technology purchase and in-house R&D for a panel of more than 900 Indian manufacturing
firms and found a substitution relationship between foreign technology licensing and firm's own development of such technology. His study also showed that there is a positive spillover effect from foreign and domestic technology on a firm's R&D spending, supporting the hypothesis that firms need to perform R&D in order to utilise and assimilate the technological efforts of others. Other two factors that stimulate the R&D efforts of firms are found as firm size and foreign equity. As firm size increases, the likelihood of firms licensing technology as well as doing R&D improves. Foreign equity participation encourages the firm to be technologically active, i.e., to take up more R&D activities and also increases the chances of licensing foreign technology.

Using panel data for Indian manufacturing firms for the period 1974-75 to 1981-82, Basant and Fikkert (1996) tried to estimate the impact of firm's own R&D, technology purchase expenditures, and foreign and domestic spillovers on productivity of firms. The results indicated high private rates of return to expenditures on both technology purchase and R&D, although the former had a more significant effect than the latter. Furthermore, the rate to technology purchase exceeds that of R&D by 44 per cent in a most general specification of the model. The study results also suggested that there is a potential loss due to India's restrictions on technology purchase in the scientific industry group. Consequently, Indian firms are at a greatest disadvantage compared to the rest of the world in innovating in this group of industries, which employ more sophisticated technology. Thus, India's restrictions on technology licensing agreements imposed substantial costs on the Indian economy. However, the high returns to technology purchase in this study confirm the earlier findings of Basant (1997) that R&D and technology
purchase are substitutes for one another in the production of knowledge, supporting the restrictions on technology purchase to stimulate domestic R&D.

Using a unique panel data set on 485 Indian firms, Evenson and Joseph (1997) analysed the factors influencing a firm’s decision to license foreign technology and also the factors that influence the decision to collaborate. The study found that the firm specific factors like the size, imports, profit and foreign control induce firms to go for foreign collaborations, while market concentration has a negative effect. The study results suggested that the Indian firms consider foreign collaborations as a means of increasing their competitive strategy. Using data for the first two years of liberalisation (1991-92 to 1993-94), Subrahamanian et al. (1996) found no clear empirical evidence of any complementary relationship between technology import (especially through FDI) and domestic technological efforts. In fact, Indian firms with non-equity forms of collaboration with MNEs have performed better than FDI-firms, in terms of strengthening domestic capacities for R&D, innovations, production and expanding markets, in some areas.

Kathuria (2001) in a study using techniques from stochastic production function and panel data for 368 medium and large-sized Indian manufacturing firms found positive technology spillovers from the presence of foreign owned firms. But the nature and type of spillovers vary between industries to which the firm’s belong. The study results indicated significant positive spillovers for the domestic firms belonging to the ‘scientific’ subgroup provided the firms themselves possess significant R&D capabilities. The presence of foreign firm itself forces the ‘non-scientific’ local firms to be more productive by inducing greater competition. This study confirmed the
conclusion of most of the previous studies for India, that knowledge spillovers and R&D are complementary in the Indian case. However, this is true only in the 'scientific' group of firms. In another study Kathuria (2002) found that economic liberalisation has improved the productivity of Indian manufacturing industry, especially of the foreign-owned firms. The study results showed clear evidence of spillovers for local firms irrespective of whether they belong to 'scientific' or 'non-scientific' subgroups, if they had significant technological (R&D) capabilities. However, for 'non-scientific' local firms the entry of foreign firms had a negative effect on their productive efficiency.

2.5 CONCLUSION

The mechanism through which foreign investment decisions are formed is a complex one because both microeconomic – firm and industry attribute – and macroeconomic conditions – source and host country characteristics – are dependent on each other. This chapter discussed about the two main streams of literature on FDI. One is very broad-based macroeconomic approach, while the other more firm or industry based industrial organisation (microeconomic) approach. Both these approaches can be further grouped into two – one looking at the factors that determine FDI and the other the impact of FDI on productivity and growth.

The macroeconomic approach that looks into the determinants of FDI mainly deals with the location choices of FDI along with host country characteristics that affects firms' investment decisions. The major host country characteristics that facilitate locational specific advantages are the low costs of production, market size and political factors in the host country. Studies also
found that availability of cheap labour, growth potential of the host country market, and favourable policies toward foreign investment are the main incentives for FDI. The industrial organisation approach of the determinants of FDI seeks to pinpoint the characteristics of investing firms and the industries in which these firms belong. According to this approach, FDI takes place because firms seek to exploit firm-specific advantages or technological superiority by expanding operations abroad.

Along with the theoretical developments, empirical research was also taking place to analyse the determinants and impacts of FDI. These studies found that major determinants of FDI are the outward orientation, the market size, technological resources and infrastructure, availability of cheap and skilled labour and the absorptive capacity of the host country, among others as the most important determinants of FDI. However, there are contrasting findings about the impact of FDI on host country and host country firms. Most of the studies found that FDI increases the productivity of host country firms through technology transfer and spillovers. However, a number of studies have reported that the productivity impacts of technology transfer and spillovers from foreign investment are insignificant or negative. These studies have indicated that the absorptive capacity of domestic firms through proper R&D investment is a necessary condition for positive spillovers from foreign investment.