Multinational Companies in Indian Pharmaceutical Industry

An Analysis of Performance during the Liberalised Regime

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Dissertation submitted in partial fulfillment of the requirements for the degree of Master of Philosophy in Applied Economics of the Jawaharlal Nehru University

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I hereby affirm that the work for the dissertation, *Multinational Companies in Indian Pharmaceutical Industry: An Analysis of Performance during the Liberalised Regime,* being submitted as part of the requirements of the M Phil Programme in Applied Economics of the Jawaharlal Nehru University, was carried out entirely by myself and has not formed part of any other Programme and not submitted to any other institution/University for the award of any Degree or Programme of Study.

June 28, 2002

Reji K Joseph

Certified that this study is the bona fide work of Reji K Joseph, carried out under our supervision at the Centre for Development Studies.

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Abstract of the Dissertation

MULTINATIONAL COMPANIES IN INDIAN PHARMACEUTICAL INDUSTRY AN ANALYSIS OF PERFORMANCE DURING THE LIBERALISED REGIME

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Pharmaceutical industry attracted relatively more controls during the pre-liberalisation regime due to its importance in the health needs of the population and also due to the dominance of MNCs. The major objective of the study is to analyse some dimensions of performance of pharmaceutical industry in general and multinational companies in particular during the post-liberalisation phase. The study begins by tracing evolution of modern pharmaceutical industry and the emerging trends during liberalisation period. The analysis has two aspects. One is the overall dimension of the impact of MNCs in terms of equity holding, mergers and takeovers, concentration and the other performance indicators of exports, imports, production, research and development, etc. The other is the profitability performance of MNCs in a comparative framework. An attempt is also made to understand the impact of intellectual property rights in the future scenario of the industry.

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CHAPTER 1

An Overview of the Problem

1.1 Introduction

Pharmaceutical Industry has attracted the attention of policy makers from time to time due to its overwhelming importance to the health needs of the country and was studied intensively by scholars owing to its unique characteristics. These studies have basically two dimensions. Firstly, the basic structure and characteristics of the pharmaceutical industry compared to other industries demonstrates some inherent advantages in terms of size, Research and Development (hereafter R& D), advertisement and profitability. Secondly, it has been in the limelight of policy interventions because of its crucial role in ensuring the health needs of the people. The present study focuses on the first dimension of the existing studies. It would be of interest to see how these structure and characteristics of the pharmaceutical industry are varying across different firms. In such a context, multinational companies (hereafter MNCs) assume more significance, as they are known for their R&D capabilities, advertisement and other product differentiating strategies and larger size[1]. Moreover, MNCs are found to be in large numbers in pharmaceutical industry. The liberalisation measures initiated during nineties is expected to bring major changes in the performance of MNCs. This is because of the fact that they were under the controlled regime during the pre-liberalisation period. The MNCs therefore, are free to adopt strategies to maximize their interests. The present study aims to analyse the performance of MNCs in pharmaceutical industry, in terms of certain indicators against the scenario of economic liberalisation. We shall start with the nature of pharmaceutical industry.

1.2 Nature of Pharmaceutical Industry

The pharmaceutical industry is highly ***research-intensive***. The nature of the industry is such that the products become obsolete very fast as bacteria and virus develop resistance power to the drugs. This necessitates employment of technology for improving the quality of existing products as well as to develop new drugs for the survival of any firm in this market. There exists wide disparity in the pattern of investment on R&D across different markets. While the developed nations allocate around 12 percent of the turnover on R&D, developing countries like India spend only less than 2 percent of turnover on R&D.

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[1] The existing studies present the same view (Singh, 1985; Lall, 1980; Hathi Committee, 1975).

Another important characteristic of pharmaceutical industry is its ***promotion intensive*** nature. The products in the drug market is classified into two, on the basis of the decision making power of the consumers: Ethical drugs for which prescription by a doctor is needed and the Over The Counter drugs (hereafter OTC) where the consumers themselves can make the decision. The OTC drugs constitute only a small proportion of the total market. The promotional activities are aimed at influencing the doctor's decision making. The promotional activities even assume so much importance that it is many times higher than R&D expenditure in many instances[2]. There is a marked difference in the prices of same drug marketed under brand names and generic names. The promotional activities are aimed at creating lasting brand preferences among the prescribers[3].

In pharmaceutical industry, the ***price competition is less intensive*** than other forms of competition. The inelastic demand for drugs is a factor that amounts to less intensive price competition in pharmaceutical industry. Medicines are a necessity and consumption of it is determined by the requirements imposed by disease incidence. Hence an increase in price as such will not drive away consumers from the market nor will a reduction in price attract many (Reekie, 1975). This renders big difference in the price of different brands of the same drug[4].

Moreover, pharmaceutical industry is considered as a ***highly profitable industry***. A higher profitability when compared to other industries is observed in the case of many pharmaceutical markets. The U.S pharmaceutical industry earned 21 percent of the capital employed as compared to 13 percent for all manufacturing in 1966[5]. Whereas a study in U.K of 110 drug companies showed a return of 26 percent on the capital employed as compared to 12.6 percent for all manufacturing in 1966-67. The profitability of pharmaceutical industry in India has also been higher than the profitability of all other industries. While the profitability

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[2] In 1984 Hoechst spent 175 percent of R&D on promotional activities, Pfizer 170 percent, Glaxo 125 percent and Smith Kline 171 percent. The promotional expenditure of some MNCs in India was around 23 percent of turn over in 1977 (Narayana, 1984).

[3] A survey conducted among physicians in United Kingdom shows that they regard the medical representatives as the best single source of information (Schwartzman, 1976). Similarly a study in Switzerland has found that there is a close relationship between drugs that are heavily promoted and that are heavily prescribed. Another study conducted in Brazil, has concluded that the source of information of medical profession directly or indirectly linked to the promotional measures of the individual firms (United Nations Centre on Transnational Corporation, 1984).

[4] To cite an example, in 1990 Ibuprofen (400 Mg X 10 numbers) cost different prices for different brands. The cost of Alfam, a brand from Albert David was Rs.12, Ibutlamer by Indoco Rs. 9.06 and Emblam by Mark Rs. 4.84.

[5] In United States between 1960 and 1991 pharmaceutical industry ranked first or second in 24 years out of 32 on Fortune Magazine's annual tabulation of median after tax profit returns on stockholders equity (Scherer, 1993).

(net profit as percentage of total capital employed) of pharmaceutical industry was 36.3 percent in 1965-66, it was 15.9 percent considering all the industries. The profitability was 14 percent for pharmaceutical industry in 1977-78 and 5.9 percent for all the industries (Singh, 1985).

Pharmaceutical industry is characterized by a ***highly concentrated structure***. Pharmaceutical industry exhibits a concentrated structure in production, exports and R&D. In the world production of drugs, it is concentrated in a few countries[6]. In India, in 1976, 10 large size firms constituted 39 percent of total market share (Singh, 1985). These characteristics of the pharmaceutical industry are strongly related to the market structure.

1.3 Market Structure of Pharmaceutical Industry

The structure of a market refers to characteristics such as seller concentration, barriers to entry on new firms and conditions of demand. Seller concentration may be defined as the number of sellers in the market. Seller concentration can have significant impact on market in terms of product composition and nature of competition among leading firms. In a typical oligopoly situation the dominant sellers will be reluctant to provoke retaliation by cutting prices; instead they compete primarily through product differentiation and promotional activities.

Seller concentration is closely related to barriers to entry of new firms. In the pharmaceutical industry, most common barriers to entry are patents, product differentiation and economies of scale. Patent renders legitimised monopoly power to the original inventor. Product differentiation indicates that physical and quality difference (drug/therapeutic specific differentiation) among products or it may be created in the minds of buyers by advertising even when actual differences are minor or nil. The degree of product differentiation is measured by the cross elasticity of demand and supply, for the competing products. A low elasticity of demand between products indicate that buyers prefer a particular brand and will not switch to other brands in large number, even when there is a small difference in prices. On the demand side, products are differentiated when the buyers are relatively uninformed about

[6] According to the Report of United Nations Centre on Transnational Corporations (1984) 80 percent of world output is concentrated in U.S.A, England, Japan, Germany and France in 1977. According to Narayana (1984) one percent of the firms in the world (100 out of 10000) contributed 90 percent of world exports in 1977. R&D expenditure is also highly concentrated among large firms. The Kefauver Committee (in United States, 1961) found that in the US four largest firms accounted for 40 percent of the total R&D in the country. In UK the Sainsbury Committee found that four largest firms accounted for 70 percent of the total R&D (Lall,1980).

the merits of other products. On the other hand, a low elasticity of supply implies that producers / rival firms are unable to easily imitate those products which are successfully supplied by the established firms (rival firms are unable to eliminate buyer preferences).

Economies of scale refer to the need for a new firm to reach a large enough size to enable them to achieve the lowest production costs. In pharmaceutical industry economies of scale pertain to R&D and promotion[7] activities. Any investment in R&D is very risky. Large firms have an advantage in taking the risk as their per unit cost of R&D will be lower compared to a smaller firms.

The conditions of demand in the pharmaceutical market imply two aspects; demand in the ethical drug market and demand in the OTC drug market. Demand for ethical pharmaceuticals are highly price inelastic.

These nature and structure of pharmaceutical industry provide an inherent advantage to the large firms especially MNCs. This is due to the fact that, as we said earlier these firms are technologically advanced, financially viable and have better managerial and marketing techniques.

1.4 Problem of the Study

There have been a good number of studies in India on the pharmaceutical industry. Most of these studies had been done in the period of seventies and eighties. These were the periods when the government had been making vigorous attempts to regulate the pharmaceutical market. These studies have brought out the extent of domination enjoyed by the MNCs in Indian market and higher profitability of the industry as such. These studies have also brought out the nature of R&D in the industry and difference between the MNCs and domestic firms in R&D as well as in export, import, production, etc. Studies have been carried out in the nineties (in the context of liberalisation) covering aspects like the possible impact of new patent regime on Indian Pharmaceutical industry (Aggrawal and Saibaba, 2001; Prasad, 1999), the impact of liberalisation policies in pharmaceutical industry (Gupta, 1996; Srinivasan, 1999), trends in the prices of drugs (Gupta, 1996; Rane, 1992,1996,1997 &1998), etc. However, there has not been any major attempt to study the impact of liberalisation

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[7] In pharmaceutical sector manufacture of active ingredients are normally manufactured in relatively small volumes and in many cases an increase in production requires addition of fermentation vessels of standard size (Lall, 1974a). The pharmaceutical industry may not enjoy economies of scale in production, in this sense.

policies on the performance of pharmaceutical firms. And there has not been any major attempt to identify the factors that determine profitability of pharmaceutical firms. In this study we make an attempt to examine the performance of MNCs in comparison to domestic firms in respect of certain indicators. Thereafter we will be looking factors influencing profitability of pharmaceutical firms and how it is varying for MNCs, in a detailed manner.

1.5 Data Source and Methodology

The data is collected from different sources. Data on production, export, import and R&D for the pharmaceutical industry as a whole is taken from two sources; Organisation of Pharmaceutical Producer's of India[8] (OPPI) and Pillai (1984). OPPI data is available from 1981-82 onwards. Pillai (1984) gives information on these variables except R&D for the period prior to 1981-82. Production, export and import of pharmaceuticals are classified into bulk drugs and formulation. Information on these is provided by OPPI from 1981-82.

The pharmaceutical firms are classified into two, viz. MNCs [9] and domestic firms on the basis of exercise of control. Foreign firms acquire control over Indian firms through equity participation. The level of equity at which control is exercised is a debated issue. RBI has taken 25 percent or above foreign equity holding firms to be foreign firms[10]. Many scholars (Nagesh Kumar, 1994; Fairchild and Kim, 1986) also have taken 25 percent foreign equity as the cut off point to identify MNCs. Sometimes MNCs operate through branches. Branches are parts of foreign firms established in India. We define MNCs as those firms, which are foreign branches or those having foreign equity share above 25 percent. An idea of the prevailing structure of pharmaceutical industry in India is given in appendix.1.1. We have limited our analysis to the organised sector[11], which account for 80 percent of total market.

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[8] Another organisation of pharmaceutical manufacturer's in India -Indian Drug Manufacturer's Association (IDMA) also gives information on production, export and import of pharmaceuticals. The figures provided by IDMA is same as the figures provided by OPPI. Figures given in the Annual Report (1999-00) of Department of Chemicals and Fertilizers on some variables is same as the figures given by OPPI. The limitation of data provided by OPPI is that it covers only the organised sector.

[9] The different terms such as multinational company, Multinational Corporation, multinational enterprises and foreign company indicate the same concept.

[10] The Development Research group (RBI) study under the leadership of K K Subrahmanian (1996) has taken firms having foreign equity above 25 percent to be foreign affiliate.

[11] The organised sector consists of those firms, which are registered under the Industries (Development and Regulation) Act of 1951.

The identification of MNCs is done on the basis of the information on foreign equity given by Bombay Stock Exchange (BSE) Directory and the PROWESS[12]. The study analyses the performance of MNCs in comparison with domestic firms by taking into consideration the indicators like export, import, advertisement and other product differentiating strategies and R&D. The study also analyses the determinants of the profitability of MNCs. We have used a consistent sample of 66 firms in which 19 are MNCs and 47 are domestic firms. In 1991-92, these 66 firms constituted 76 percent of the sales by the organised sector.

The analysis in the pre-liberalisation period is based on the information provided by Hathi Committee Report (1975), Narayana (1984), Singh (1985) and various issues of *Survey on Foreign Collaboration in Indian Industries* published by RBI. These surveys have classified foreign financial collaboration into subsidiaries (above 50 percent foreign equity) and minority capital participation companies. We have taken financial year, starting from 1991-92 as the post- liberalisation period. The liberalisation process received a concrete shape from this year onwards. The analysis of MNCs in the post liberalisation period is based of information provided by PROWESS.

1.6 Chapter Scheme

The study consists of 5 chapters including the introduction. Chapter 2 deals with the evolution of modern pharmaceutical industry in India. This Chapter reviews the origin of allopathic pharmaceutical industry in India and the policy measures taken by the government of India in the post independence period to make the industry self sufficient and self reliant. An analysis of production, export, import and R&D over the years is attempted in this chapter. Chapter 3 discusses in detail the policy changes in the nineties. This chapter enumerates foreign financial and technical collaborations in the pharmaceutical industry in the nineties. An analysis of relative performance of MNCs in terms of export, import, R&D, product differentiation and remittances is made in this chapter. Chapter 4 deals with the analysis of profitability. This chapter reviews the theoretical literature identifying factors determining profitability of pharmaceutical firms. An attempt is also made in this chapter to compare the profitability between MNCs and domestic firms in India, using some econometric techniques. Summary and conclusions are given in Chapter 5.

[12] PROWESS is the electronic database of Centre for Monitoring Indian Economy. The limitation of PROWESS is that it gives information on only listed companies. Inspite of these limitations it is used in numerous empirical studies in recent years. This study also uses the same information provided by PROWESS.

CHAPTER 2

Evolution of Modern Pharmaceutical Industry in India

2.1 Introduction

India is inherited with her own traditions in medical practices. This tradition got enriched with its association with other nations. The search for the markets by the western powers has contributed to acquainting India with other forms of medical practices. Some of these practices became widespread and have overwhelmed the existing practices. This chapter essentially deals with the emergence and establishment of such a medical practice i.e., the allopathic system in India. The era of modern pharmaceutical industry in India begins in the early 19^{th} century with the inception of allopathic medical system. This chapter reviews the evolution of pharmaceutical industry in India in the 20^{th} century and Government of India's policy measures, which have contributed towards further development of pharmaceutical industry in the post- independence period.

2.2 Pre-Independence Period

The history of medical science in India can be traced back to the period of Vedas. Ayurveda, the indigenous form of medical science practice has its roots in Atharvaveda. The classics of Charaka and Sushruta (500-600 A.D) are derived from Vedic period. Ayurveda began to face a set back with the prevalence of Unani system which was introduced by Muslim rulers. In fact the Unani system also, faced a set back when British introduced the allopathic system,

The emergence of modern pharmaceutical industry in India has been pioneered by eminent Indians like Prof. P.C Roy, T.K Gajjar and Rajmitra B.D Amin. Prof. P.C.Roy established the first Indian owned drug firm ***Bengal Chemicals and Pharmaceutical Works*** in 1901 at Calcutta. T.K Gajjar and Rajmitra B.D Amin started ***Alembic Chemical Works*** in Baroda in 1907. These firms faced severe competition from overseas producers as well as the prejudiced views of local people against them. ***Smith, Stainstreet & Co. Ltd,*** one of the earliest pharmaceutical companies to be established with foreign capital in India, started

manufacturing drugs in 1918 (Borkar, 1983). Most of the other foreign pharmaceutical firms at that time imported readymade preparations and sold them in the market (Raman, 1989)[1].

At the early stages of development of the pharmaceutical industry in India, many developments in medical treatment had occurred around the globe. Louis Pasteur's discovery that Pathogenic Bacteria is causing many infectious diseases made many British scientists come over India to study the tropical infectious diseases, which had been taking a heavy toll of their armymen. This situation has led to establishment of four government sponsored pharmaceutical research institutes: ***Haffkine Institute***, Bombay (1899), ***King Institute of Preventive Medicine***, Madras (1904), ***Central Drug Research Institute***, Kasauli (1905) and ***Pasteur Institute***, Conoor (1907).

The pharmaceutical industry in India got a fillip with the inception of First World War. The imports were almost completely cut off during the war period. Hence the demand for allopathic drugs shot up. This has facilitated the recognition that the indigenous development of the industry is inevitable. The local research and development initiatives have been encouraged. As a result, the Indian firms were successful in discovering a few drugs that were of high demand at that time. The new compound urea-stibamine, synthesized by Dr. U. N Brahmachari (developed by local R&D), was highly effective for Kala-azar, a scourge of those days. The most remarkable success was achieved in the manufacture of sera and vaccines in the period thereafter (Hathi Committee Report, 1975). Bengal Immunity was set up in 1919 by some leading physicians and scientists of Bengal like Sir. Nilratan Sirkar, Sir. K K Bose, Dr. P.C Roy and others. This unit undertook the manufacture of sera and other biological products for the first time. The industry was again faced with hurdles when the war was over.

There was a resumption of imports after the end of the war and was a set back to the indigenous industry. Despite of this adverse situation, the industry picked up very slowly. Production of biologicals like sera and vaccines, anaesthetics and a few simple drugs based on coal-tar distillation products such as naphthalene, cresol, etc. had begun. There was a slow growth of the industry till 1939. The contribution of the domestic industry was as low as 13 percent of country's medical requirements in 1939. The World War II once again placed domestic pharmaceutical industry to be in an important position. It was capable of meeting 70

[1] This has also been mentioned in Hathi Committee Report (1975).

percent of the medical requirements of pharmaceutical industry in 1943 (Ministry of Commerce and industry, 1954).

The second world war came as a blessing in disguise to the Indian Pharmaceutical industry. Manufacturing of a number of drugs based on indigenous raw materials had begun. These were mainly in the category of phytochemicals. Progress had also been made in the case of synthetic drugs and biological products. Some units had taken up production of synthetic anti-disentry drug, anti-leprosy drugs and arsenicals. Formulation activity increased considerably based on the imported bulk drugs[2].

The demand for drugs did not mark any decline after the world war. The industry could achieve self-sufficiency on the production of sera and vaccines. After the war, there was a rapid spread of technological revolution in pharmaceuticals in the west. The period between 1940 and 1955 witnessed a remarkable number of discoveries in the pharmaceutical sciences. The age of 'wonder drugs' was set in with the introduction of a number of new drugs such as sulphanamides, pencillin, streptomycin, tetracycline and corticosteroids. This has led to a change in the structure and operation of the firms. Earlier firms were producing the entire range of medicines required by the physicians. Now they have specialised on particular product lines and marketed finished products under brand names (Bagath, 1982). As a result of the introduction of new chemotherapeutic products and anti-biotics, most of the products manufactured by Indian manufactures became obsolete. Hence Indian firms had to stop production of those drugs that were manufactured till then and focus on production of formulations based on imported bulk drugs. At this time the indigenous firms required strong support to make much headway.

2.3 Post Independence Period

India launched a program of planned industrialisation in the post independence period. The philosophy behind this program was the principle of self-reliance. Massive investments in public sector supported by similar investments in private sector laid foundation for this self-reliant growth.

[2] Bulk drugs are the basic chemicals and ingredients, which are necessary for the production of formulations. Formulations are the final product that we consume.

In 1948 a survey was conducted on country's industrial potential in all sectors and subsequently a program of development was evolved. During the first plan period, Indian pharmaceutical industry was self-sufficient in the production of all galenical preparations, most of sera and vaccines, liver extracts, alkaloids like morphine, codeine, etc.[3] But the progress in the production of synthetic drugs and chemo-therapeutic compounds in India, which had become the mainstream products in the drug market in the west, was negligible. A large number of essential drugs and raw materials, penicillin, streptomycin and other antibiotics, sulpha drugs, glandular products and anti-leprosy drugs were imported. Inorder to reduce the dependence on imports for anti-biotics, ***Hindustan Antibiotics Ltd.*** (HAL), a public sector undertaking was set up in Pimpri near Pune. Another Public sector undertaking, the ***Indian Drugs and Pharmaceuticals Ltd.*** (IDPL) was started in 1964. At the same time the private sector was encouraged to enter into the production of new drugs. This tempo was maintained in the subsequent five-year plans. Major developments in the public sector during 3rd plan include establishment of a few more public sector undertakings: ***Synthetic Drugs Project*** in Santhanagar, Andra Pradesh, ***Antibiotic Plant*** in Rishikesh, Uttar Pradesh and ***Phyto-Chemicals Plant***, Kerala. The emphasis on the public sector had been complemented by the liberal attitude towards private capital. We shall look into the main features of the government policies towards the private sector in the post independence period.

2.4 Government Policy towards the Private Sector

2.4.1. Policy towards Foreign Sector

India was badly in need of foreign capital and technology, at the time of independence. Foreign technology and capital had been recognised to be inevitable in the process of industrialisation and attaining self-sufficiency. This recognition led to the adoption of a liberal approach towards the foreign sector. Many foreign companies opened their branches or subsidiaries in India. The major factor that had led to the influx of foreign companies in India, apart from their superior technology were large size of the market and relatively larger demand for drugs, milder drug control measures and absence of local competition. Government's policy of industrialisation by way of import substitution was not made applicable to drug industry in the initial period, because there was no other alternative available to drug technology held by MNCs (Singh, 1985).

[3] For details see Planning Commission, Government of India, First Five Year Plan.

The need for foreign capital was urgently felt in the industries where domestic resources were limited. Industrial Policy Statement of 1948 reads, *it should be recognised that participation of foreign capital and enterprise particularly as regards industrial technique and knowledge will be of value to the rapid industrialisation of the country.* In order to promote the inflow of foreign capital and technology, following assurances were made.

- No discrimination would be made between foreign and Indian undertakings in the application of general industrial policy.
- Reasonable facilities consistent with foreign exchange position, would be given for the remittances of profits
- In the case of nationalisation fair and equitable compensation would be paid.

As regards the nature of foreign participation, the first plan stated that *from the point of view of industrial development, it would be best if foreign investments in the country take the form of equity capital.*

Most of the MNCs established themselves as mere trading concerns (importing finished drugs from abroad and selling it in India) without establishing manufacturing units in India. When the government exerted pressure on MNCs to produce drugs within the country, they started importing bulk drugs and processed formulations on a 'job-work basis' by Indian companies. But these activities did not involve much investment in India (Hathi Committee Report, 1975).

The pharmaceutical industry appeared to be a special case for the policy planners because of the very nature of the industry. It had become highly research intensive (globally) by the end of 1950s. As we observed earlier, there had been a transformation in the structure of Pharmaceutical firms worldwide. The use of brand name also became prevalent during this time. This necessitated a reformative approach in the pharmaceutical industry to develop a strong base for manufacturing drugs and medicines. Hence government permitted the entry of MNCs to set up units in India to make drugs requiring high quality standard. In 1952 the foreign sector accounted for 29.2 percent of total investment in pharmaceutical industry (Ministry of Commerce, 1954). Though private investment was encouraged, it had been strictly regulated to ensure the growth of the industry in the desired direction. Some of these regulations had exclusively been aimed at controlling the MNCs.

2.4.1.1. The FERA 1973

The most important of all regulations to control the MNCs is the Foreign Exchange Regulation Act (FERA) of 1973. It had the objective of diluting the control of MNCs over Indian firms. The FERA act made it necessary for all subsidiaries to bring down their share upto 40 percent.[4] Exceptions were allowed in instances in which foreign firms could prove themselves to be particularly useful to the country in terms of technology they employ or in terms of exports. Those firms which exported minimum of 60 percent of the production was allowed to keep equity level upto 74 percent. Hundred percent equity was allowed in the case of totally export-oriented companies. The FERA 1973 had profound impact on the pattern of equity holding ranges.

Table: 2.1. Pattern of Equity Holding Between 1973-1985

Percentage of Foreign Equity	*Number of Companies*	
	1973	*1985*
100	10	2
50-99	24	12
40-50	15	20
26-40	11	10
Below 26	6	22
Total	66	66

Source: Hathi Committee Report and P.G.K Panikar et.al (1992)[5]

The table 2.1 shows that there has been an interesting shift in the equity holding pattern in the pharmaceutical sector between 1973 and 1985. The number of MNCs (above 40 percent foreign equity holding) has declined from 49 in 1973 to 34 in 1985. The number of firms in the in the category of above 50 percent foreign equity marked a significant decline. Its number fell from 34 to 14. Whereas the category of above 40 percent and below 50 percent foreign equity exhibited an increase in their number.

2.4.2. Policy towards the Private Sector

The Indian firms had been given a preferential treatment in the quest to attain self-sufficiency in drug production. A large number of Indian entrepreneurs entered into the production of formulations, depending on foreign firms, private Indian units or public sector or imports for

[4] Until 1973 the firms which had foreign equity share above 50 percent were considered as MNCs. The FERA of 1973 redefined the concept and the firms with 40 percent or more foreign equity share were begun to be treated as MNCs.

[5] Information for 1973 was collected from Hathi Committee Report (1975) and information for 1985 was collected from P.G.K Panikar et.al (1992).

bulk drugs. The Indian private sector has also been strictly regulated to enable them to maintain quality standards and to make them more competitive. Bhatia committee (1954) found that Indian companies were not engaging in the production of advanced drugs like chemotherapeutic drugs and antibiotics, but concentrating on galenicals. Even in the production of galenicals it was observed that Indian firms had been undermining quality standards in the fray. The committee recommended that no more new licenses be issued for the production of galenicals and withdraw licenses of those undertakings which did not have the required standard in terms of staff and equipment

The regulations in the subsequent years especially in the case of licensing policies, Indian firms had been treated almost equally with MNCs. Government of India had appointed different committees from time to time and have taken various policy measures to ensure the growth of the Indian pharmaceutical industry.

2.4.2.1. Pharmaceutical Enquiry Committees

Among the many committees appointed by the government of India, two of them are highly important; the 1954 committee headed by general Bhatia and the 1975 committee headed by Jaisuklal Hathi. The Bhatia Committee was appointed to study India's increasing dependence on the foreign countries for chemicals and bulk drugs needed for manufacturing of essential drugs. The committee made the following recommendations after a detailed study.

- Indigenous production of drugs starting from the basic stages (from basic chemicals or intermediaries).
- No new foreign concerns should be allowed to set up factories unless they manufacture products, which are not manufactured by others, starting from basic chemicals or intermediaries.
- Discourage agreements that forbid the sales of bulk drugs to other processors. Otherwise Indian firms would not be able to progress beyond the processing capacity.

The committee strongly recommended the abrogation of international patent restriction so as to facilitate the growth of Indian synthetic industry. It was noted that in almost all the cases that the patents were held by foreign firms and either it was not worked in India or its working

was subjected to a number of restrictions and payment on heavy royalties. It also recommended the setting up of an organisation with the aim of monitoring the prices of drugs.

The Government could not pursue policies in the framework of recommendations made by the Bhatia Committee due to its dependence on foreign capital. India's dependence on foreign firms was further increased by 1957-58, when there was a severe foreign exchange crisis. The price controls had begun as early as 1962, when it was made mandatory for manufactures to publish their prices and traders to display them. In 1966, Drug Prices (Display and Control) Order was promulgated under the Essential Commodities Act.

The Hathi Committee report was an extensive and comprehensive study of the Indian pharmaceutical market. Many less developed countries have adopted from the Hathi Committee recommendations and incorporated in their Drug Policies, because it was first of such studies in less developed countries. Bangladesh and Sree Lanka have used the committee recommendations for framing their Drug Policies. The committee's recommendations are aimed at building a strong base for pharmaceutical industry in India, in terms of production, technology and quality. The 1978 Drug Policy and 1979 Drug Price Control Order (DPCO) are largely based on the recommendations of the committee. The Drug Policy and DPCO are discussed later in this chapter. The recommendations of the committee broadly cover the following aspects.

- Promoting indigenous R&D undertakings
- Ending the domination by MNCs, and
- Ensuring availability of essential life saving drugs at a low price

2.4.2.2. Industrial Licensing Policies

Though the pharmaceutical industry was a special case for policy planners, it was placed in the group of industries selected for regulated growth. The firms had to obtain license for the production of drugs. To ensure the growth in the desired direction this industry was brought under the purview of Industries (Development and Regulations) Act 1951. Between 1952 and 1965, firms were given permission letters (no objection) to produce drugs mentioned in that list. In 1965 licensing policies were liberalised so as to meet the shortages developing at that time. In 1966 (after devaluation) the manufactures were permitted to diversify (manufacture new articles) and to expand capacity upto 25 percent without any amendment to the original

licenses. In 1970 the industrial licensing policy also underwent a fundamental change. Measures to curtail the foreign sector expansion had been taken. The policy that allowed diversification upto 25 percent was withdrawn. However government regularised the diversification that had already taken place by way of issuing Carry- On-Business (hereafter COB) licenses. Foreign companies including all companies having more than 50 percent paid up equity capital held abroad were debarred specifically from effecting diversification without industrial license. Those undertakings that had started production of certain 'new articles' on the basis of 1966 policy were allowed to continue, provided they obtain COB licenses. Twelve foreign firms and four Indian firms obtained COB licenses for 215 formulations and 20 bulk drugs. The share of MNCs in Indian pharmaceutical industry had grown to 70 percentages by 1970 (Lall, 1974).

In 1972, government relaxed constraints on MNCs by allowing them to apply to the task force constituted by the ministry of Industrial Development, for expanding capacity upto twice their licensed capacity, for making the maximum utilisation of installed capacity. Inspite of these measures MNCs concentrated on activities in the area of 'low tonnage but high rupee value' bulk drugs.[6] In the case of formulations produced by MNCs, the Over the Counter (hereafter OTC) drugs constituted a significant portion of the turn over. Study in the production pattern of 21 foreign subsidiaries showed that vitamins and tonics, cough syrups, analgesics, antipyretics, tranquilizers and sedatives and anti-hysmatics accounted for 16, 4, 3.2, 3, 7.1 and 4 percent respectively of the total formulations marketed by them (Rangarao, 1975).

The government introduced some liberal modification in the licensing policies with a view of ensuring that no avoidable restrictions are placed on the fullest utilisation of the existing industrial capacities. It was specified that manufacturers would be exempted from licensing to the extent of 5 percent per annum or as maximum of 25 percent in 5-year period ending in 1985, in addition to the registered industrial capacity. This was apart from the normal permissible expansion of 25 percent to the registered capacity. This liberal policy was not made applicable to Monopolistic and Restrictive Trade Practices (hereafter MRTP) companies. The licensing policy was further liberalised in 1982. It was primarily meant towards increasing the production. All firms that wanted to further increase their capacity had to report their best production in the five financial years ending in 1981-82. An extra capacity

[6] While MNCs produced 11.3 percent of total production of bulk drugs, they collected 27 percent of the turn over.

to the extent of best production achieved plus one third thereof was to be re-endorsed if it was higher than the licensed capacity plus 25 percent. This benefited the Indian firms the most as availability of these facilities to foreign forms were subjected to the conditions stipulated in the national drug policy.

2.4.2.3. The MRTP Act of 1969

By 1970 government had implemented many radical measures including bank nationalisation and abolition of Privy Purse. In 1969 the MRTP was enacted. This act sought to check the expansionist tendencies of the large business houses. The threshold limit for describing a unit as monopolistically large was fixed at Rs. 20 crore (Paranjape, 1991) The prior approval of central government became mandatory for the establishment of new undertakings, expansion of new undertakings, merger, amalgamation and take overs and appointment of directors in certain cases.

2.4.2.4. Indian Patent Act 1970

The Indian Patent Act of 1970 had tremendous impact on the Indian pharmaceutical industry. The Act enabled India to move away from product patent system to process patent system. The production of many patented products by local manufacturers had been made possible through this act. It provided only process patents for food, drugs (both bulk drugs and formulations) and chemicals. The duration of patent protection for these categories had been curtailed to 7 years form previous 14 years. The act also made provision for compulsory licensing after 3 years of the patent. The philosophy behind the 1970 Patent Act was to secure the working of inventions on a commercial scale. It also aimed at granting of patents to encourage innovations and not to allow patentees to enjoy a monopoly for the import of the patented product. Thus the monopoly power arising out of patent had been reduced significantly. Indian firms could engage in reverse engineering, working around the process, and enjoyed the benefits of competitively marketing a similar drug at much lower prices, without being in violation of the Indian law. The absence of patent protection led many MNCs to limit their portfolios to patent-expired products or a few selected patented products. The market share of MNCs fell from 75 percent in 1970 to 50 percent in 1982 (Pialaw, 1999).

These policy measures have been successful in reducing the market concentration in Drugs and pharmaceuticals in India. In 1976, 25 percent firms (30 out of 120) in the organised sector

accounted for 71.1[7] percent of market share in terms of sales. The top 10 firms among the 30 constituted 38.6 of the total market. Among the 30 firms 19 are foreign with 45 percent of market share (Singh, 1985). The study by Vijayabaskar (1992) also shows that the concentration in the pharmaceutical industry has been coming down over the years in the pharmaceutical industry in India.

2.4.2.5. The Drug Policy of 1978, 1986 and 1995

The government of India announced the New Drug Policy in March 1978. The main objectives of the 1978 based on the recommendations of the Hathi Committee report. The major objectives of the 1978 Drug Policy are given below.

- To develop self-reliance in drug technology
- To provide leadership role to the public sector
- To foster and encourage the growth of Indian sector
- To make drugs available at reasonable prices.
- To reduce dependence on imports.

The policy made it necessary for all firms producing formulation based on imported bulk drugs or bulk drugs manufactured from penultimate stage that they had to produce indigenously the bulk drug concerned from basic stage from within a period of two years. These firms also had to supply 50 percent of the total production of bulk drugs to non-associated formulators. It restricted value of formulation to be 5 times the value of their total bulk drug production[8]. All these constitute to a situation in which any significant increase in the production of drugs, essentially depends on the increase in the production of bulk drugs. The practice of loan licensing i.e., firm get products manufactured by other firms and sell them under their own name, was also prohibited. It made it imperative for foreign firms with turn over in drugs exceed Rs. 5 crore per year to have R&D facilities. They were required to spend atleast four percent of their sale turnover as recurring expenditure.

The 1978 drug policy has been a milestone in the future development of the drug industry in India. However, it was felt that some effective measures are required to be taken to achieve

[7] Sanjaya Lall quotes this figure for the period 1970-71.
[8] Most MNCs did not comply with this ratio. In 1980-81 the ratio for the foreign sector as a whole was worked out to be approximately 1:12.53. See Pillai (1984).

the objectives of the policy. In 1986, the new drug policy was announced- ***the measures for rationalisation, quality control and growth of drugs and pharmaceutical industry in India.*** The objectives of the 1986 Drug Policy are given below:

- To ensure abundant availability, at a reasonable prices of essential lifesaving and prophylactic drugs of good quality.
- To strengthen the system of quality control over drug production and promoting the rational use of drugs in the country
- To create an environment conducive for the channalisation of new investments into India to encourage cost-effective production with economic size. To strengthen the indigenous capability for the production of drugs.

The 1986 Drug policy has been hailed as a landmark shift in the policy of the government towards the firms and their activities. Infact it can be said that the liberalisation process in the pharmaceutical industry began with 1986 drug policy. But a full-fledged liberalisation program came only in 1991. The major features of the drug policy of 1986 include extension of delicencing, allowing of broadbanding (allowing manufactures to shift production from one product to another falling within the same category without applying afresh for a license) within certain category and reduction in the number of drugs under price control.

The Drug Price Control Order (hereafter DPCO) of 1987 categorised the price-controlled drugs into two; category one and category two. Category one contains the drugs come under the National Health Program and the category second, contains the essential drugs. The first category was allowed a maximum Allowable Post Manufacturing Expenses (hereafter MAPE) of 75 percent and the second category, 100 percent.

The drug policy of 1995 was in tune with the overall liberalisation policies. The policy relaxed the import restrictions and reduced the number of drugs under the control of DPCO. The details of the Drug Policy of 1995 are given in chapter 3. The 1995 policy made a single list of drugs to be price controlled with a uniform MAPE of 100 percent. It also provided exemption from DPCO in respect of a formulation having a New Delivery System (improvement of therapeutic quality of already existing drugs) developed indigenously by concerned formulation unit for a period of 5 years from the date of commencement of commercial

production. The table 2.2. gives a list of drugs and the formulating units exempted from the DPCO 1995.

Table: 2.2. Bulk Drugs exempted from Price Control

Bulk Drug	*Name of the Company*
Ranitidine	Ranbaxy, Globe Organics
Metoclopramide	IPCA Labs, Infar Ltd.
Dextropropoxyphene	Wockhardt ltd.
Salbutamol	Cipla
Ephedrine	Globe Organics
Amoxicillin Sodium	Duphar Interfran
Nalidixic Acid	Ranbaxy
Naproxen	Rallis india Ltd.
Betamethazone Sod. Phos	Glaxo
Timolol Meleate	FDC
Povidine Iodine	Wockhardt

Source: Pia Law (1999)

We have seen the policy guidelines the government of India has been initiating in the pharmaceutical industry in the post independence period. We may now look into the pattern of certain performance indicators over time.

2.5 Pharmaceutical Industry in India - A Macro View

2.5.1. Growth of the Pharmaceutical Market in India

The market for pharmaceuticals consists of drugs produced in India as well as imported drugs form other countries. It is seen from the table 2.3 that the pharmaceutical market in India in the nineties has been growing faster than in the eighties.

Table: 2.3. Growth of Pharmaceutical Market in India

Drug Category	*Average Annual Growth Rate (Current Prices)*	
	1981/82-90/91	*1991/92-99/00*
Formulation	13	18.24
Bulk Drugs	12.66	21.31
Total	12.77	17.47
Percapita Consumption of Drugs[9]	9	12

Source: Growth rate is derived from OPPI and percapita consumption is derived at from OPPI and Census Reports.

[9] Consumption refers only to formulations.

The pharmaceutical market has been growing at 17.47 percent in the nineties compared to 12.77 percent in the eighties. The percapita consumption has also shown an increase from 9 percent to 12 percent in the nineties (see table: 2.3). The pharmaceutical market comprises of market for bulk drugs and formulations. It is interesting to note that in the nineties the bulk drugs has been growing faster than the formulations. This may be contrasted with the average annual growth rate of formulations and bulk drugs in the eighties i.e., the growth rate of both sectors were almost equal. An increase in the export of formulations may cause higher growth in the market for bulk drug, because these are the basic ingredients of formulations.

As we have already noted the pharmaceutical market consists of imports and production of pharmaceutical products. Let us now look into the pattern of production of drugs in India.

Table: 2.4. Growth of Production of Formulation and Bulk Drugs

Drug Category	*Formulation*		*Bulk Drugs*	
Year	1981/82-90/91[10]	1991/92-99/00	1980/81-90/91	1991/92-99/00
Average Annual GR At Current Prices	10.24	17.22	11.91	20.09
Average Annual GR At 1981-82 Prices	4.78	4.80	6.18	7.92

Source: Compiled from Pillai (1984) and OPPI.

It can be seen from table 2.4. that the production of formulation has registered a higher growth in the nineties. There is an average annual growth rate of 17.22 percent in the nineties compared to 10.24 in the eighties. The growth of the production of bulk drugs is significantly higher in the nineties when compared to the eighties. The average annual growth rate for the production of bulk drugs is 20.09 percent in the nineties whereas the same was 11.91 percent for the eighties. At constant prices also nineties record a higher growth in the case of bulk drugs.

2.5.2 Exports and Imports

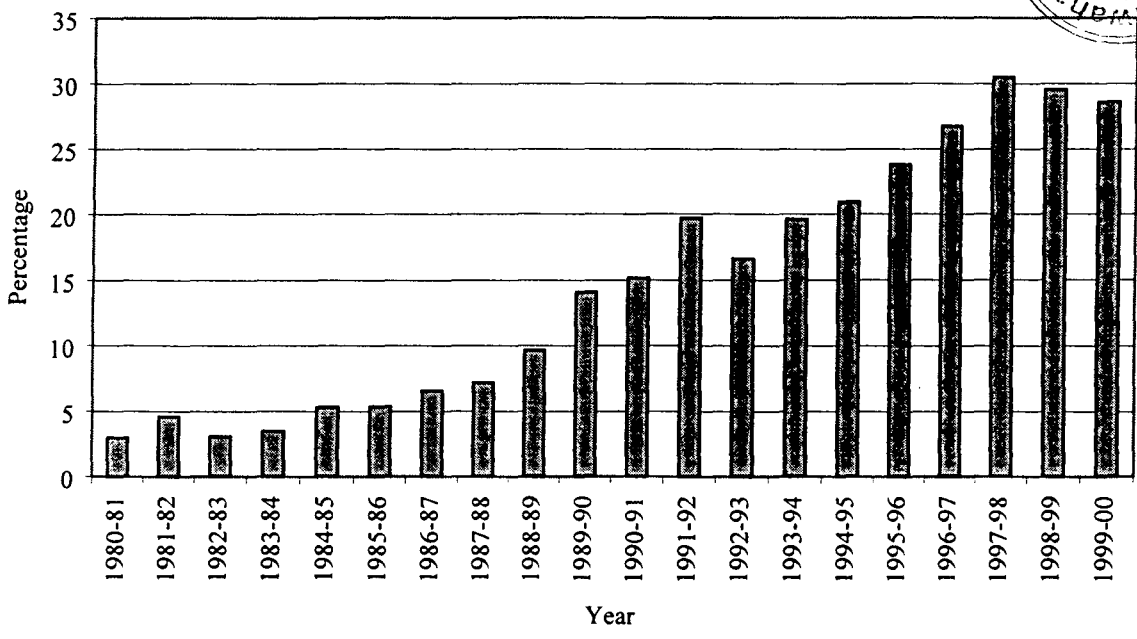
2.5.2.1. Exports

The government had been encouraging export of drugs even before the liberalisation policy was adopted. As mentioned earlier, export was a major criterion used to exempt even foreign

[10] The production of formulations showed a leap in 1988-89. The growth in that year was 34 percent as compared to the average annual growth of 10.24 percent for the all other years in the eighties. This is an extreme case and we have excluded year 1988-89 while calculating the growth of production of formulations in the eighties.

firms from FERA, which had severely been regulated. Export can also be influenced by other policy measures like relaxation of import restrictions of raw materials, abolition of industrial licensing and external factors like the expiry of patents abroad, bulk purchase of drugs by international agencies, policy measures in export markets, etc. The expiry of patents abroad gives room for firms in India to export generic drugs. However, Indian firms are at a relative advantage to supply drugs at competitive price to the international market and in recent years such supplies have boosted the export from India. World Health Organisation in early nineties had offered tenders worth Rs.80 crores for the supply of drugs in Nigeria. Medicines Sans Frontiers (MSF) is the organisation that supplies drug for AIDS in South Africa. Cipla[11] (Indian Firm) supplies the AIDS cocktail to MSF.

Figure: 2.1 Export as Percentage of Sales



Source: OPPI

It is seen from figure: 2.1 that the export performance of the industry has been increasing over the years. It was as low as 3 percent in 1980-81 and increased to 15.8 percent in 1990-91 and further to 31.6 percent in 1997-98. Thereafter, it shows a stagnating trend. Export dependence in the nineties is significantly higher than the eighties.

[11] Cipla supply the cocktail at $350 per person per year. The cocktail consists of 3 drugs; Lamivudine, Stavudine and Nevirapine. These drugs are patented by Glaxo Smithkline, Bristol-Myers Squibb and Boehringer Ingelheim, respectively. Cipla could manufacture these drugs because of the existing process patent system in India. Recently Ranbaxy has offered the same cocktail at $295 per person per year (**Business Line**, March 21,2002).

The exports from India mainly consist of formulations and bulk drugs. The table 2.5. shows the export intensity of formulations and bulk drugs. Export intensity is defined as export as percentage of production.

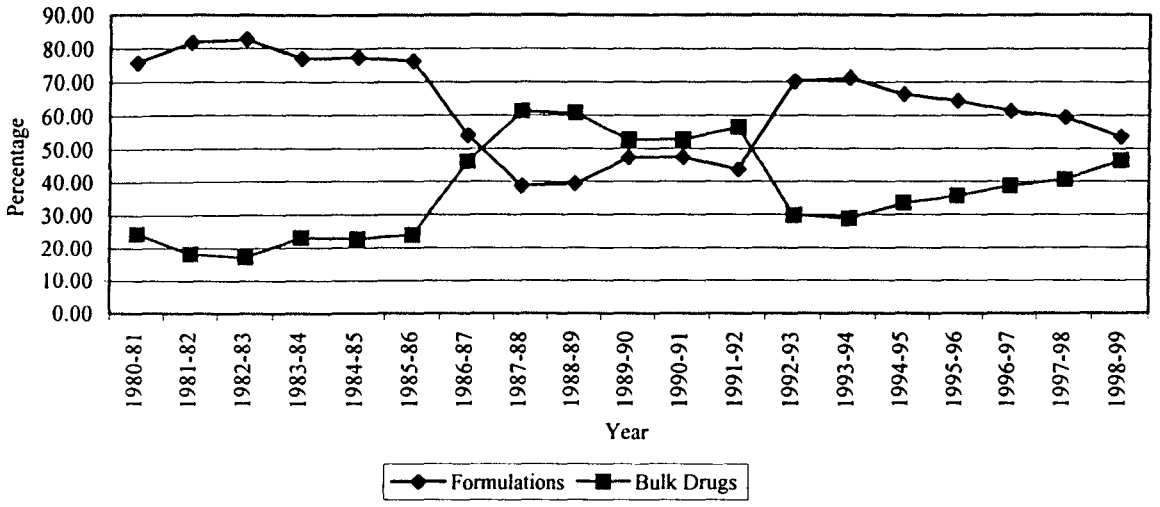
Table: 2.5. Export Intensity of Formulation and Bulk Drugs

Year	*Exports of Formulation as Percentage of Production*	*Export of Bulk Drugs as Percentage of Production*
1980-81	3	5
1981-82	5	5
1982-83	3	3
1983-84	3	5
1984-85	5	8
1985-86	5	8
1986-87	5	19
1987-88	4	29
1988-89	5	44
1989-90	9	55
1990-91	10	57
1991-92	12	80
1992-93	16	36
1993-94	19	40
1994-95	19	50
1995-96	22	62
1996-97	24	72
1997-98	26	83
1998-99	23	88

Source: OPPI

It is seen from table 2.5 that the export intensity has been increasing over the years for both formulations and bulk drugs. The share of formulations has increased notably in the nineties. It has increased from 10 percent in 1990-91 to 23 percent in 1998-99. In the case of bulk drugs, the share has been growing at a tremendous pace. It has increased from 5 percent in 1980-81 to 88 percent in 1998-99. This share showed a leap in 1986-87 (from 8 percent in 85-86 to 19 percent in 86-87). It may be concluded that the Pharmaceutical industry as a whole has become more export intensive in the nineties. However, the export intensity of bulk drugs is much higher comparing to formations. We shall now look into the share of formulation and bulk drugs in total exports.

Figure: 2.2 Relative Share of Formulations and Bulk Drugs in Export of Drugs and Pharmaceuticals



Source: same as figure 2.1.

It is seen from figure: 2.2 that there is no steady pattern of share of formulation and bulk drugs in total export for drugs and pharmaceuticals. The share of export of formulations in total exports which was higher than the export of bulk drugs in the early eighties, has become lower in late eighties and again became higher in early nineties. The formulations constituted 76 percent of total exports and bulk drugs the remaining 24 percent, in 1980-81. The composition of exports has undergone a major change by 1987-88 with bulk drugs constituting 61 percent of exports. In 1992-93 the share of bulk drugs was reduced to 30 percent. And in 1999-00 the share of bulk drugs is increased to 45.6 percent. The fluctuations in the share of formulations and bulk drugs in total exports may be explained more meaningfully by the nature of international drug market than the domestic policy environment. Bulk drugs had been mainly exported to USSR and other developed countries like USA, Germany, England, France, Japan, Italy, Denmark, Netherlands, Switzerland and Australia. The main destinations of exports of formulations had been USSR and developing countries [(Africa, South East Asia and Middle East), (Export-Import Bank, 1991)]. The uncertainty associated to the disintegration of USSR may explain, at least partly why the share of export of formulation declined in late eighties, since USSR had been a major market for the export of formulations. The increase in the share of exports of formulations in the early nineties may be associated with the expiry of certain patented drugs. In 1991, patents for Butorphanol, Carbidopa, Miconozole, Nifedipine and Norgestrel were expired. In 1992, the patents of Becampicillin, Cefalor, Cyclobenzspyrine, Naproxen and Probucol and in 1993 patents for Alprazolam, Atenolol, Dobutamine, Metoprolol, and Nadolol were expired (Exim Bank,

1991). This may partly explain the increase in the share of formulation in exports in the beginning of the nineties. The details list of patent expired drugs in the nineties is given in chapter 3.

2.5.2.2. Imports

The import liberalisation measures in the nineties are mentioned earlier in the beginning of this chapter. Firms could now import any item, irrespective of volume, except a few in the negative list,. Import of formulations is regulated via. restricting the amount allowed for spending to cover selling and distribution expenses, including interest and profit margins. As a result, a low import intensity of formulations is expected. Import intensity is defined as imports as percentage of production.

Table: 2.6. Import Intensity of Formulations and Bulk Drugs in the Import of Drugs and Pharmaceuticals

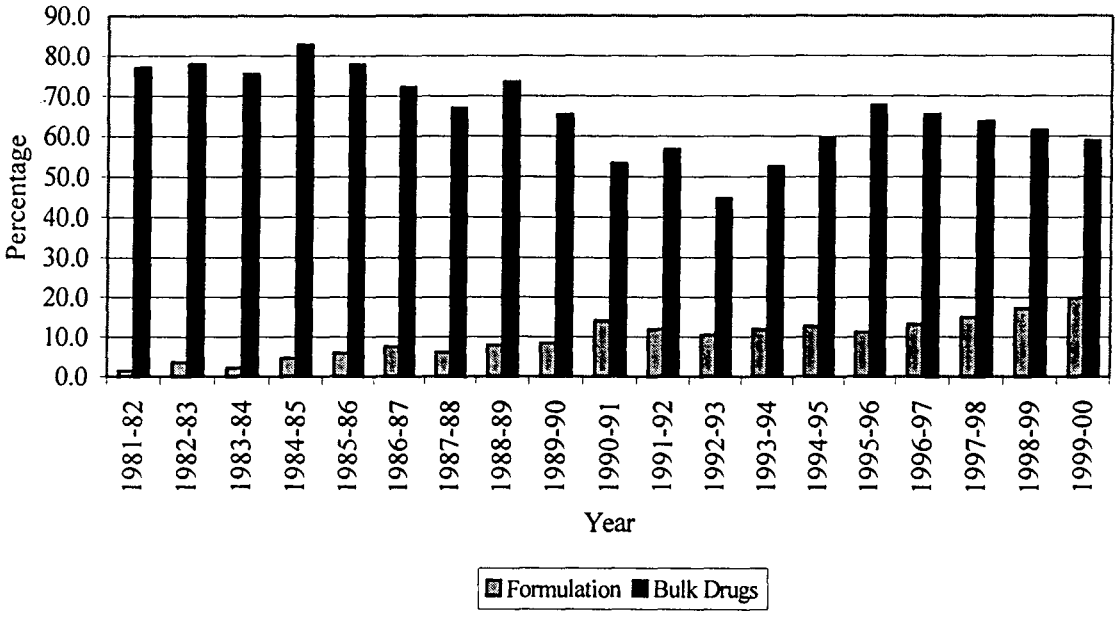
Year	*Import of Formulation as Percentage of Production*	*Import of Bulk Drugs as percentage of Production*
1980-81	1	36
1981-82	0	36
1982-83	0	33
1983-84	0	35
1984-85	1	47
1985-86	1	50
1986-87	1	45
1987-88	1	49
1988-89	1	60
1989-90	2	67
1990-91	2	44
1991-92	2	51
1992-93	2	44
1993-94	2	46
1994-95	2	53
1995-96	3	89
1996-97	3	78
1997-98	4	70
1998-99	4	61
1999-00	4	54

Source: Same as table 2.5

Table 2.6 shows that the import intensity (defined as imports as percentage of production) of formulations is very low. The share of import of formulations in the production of formulations has registered only a slight increase; an increase from 1 percent in 1980-81 to 4 percent in 1999-00. This is what is expected because a high import intensity of formulations, the finished drug products, will not be of much benefit to the economy in terms of value

addition. The share of import of bulk drugs in the production of bulk drugs has been significant in pre and post liberalisation period. The share was 36 percent in 1980-81, 67 percent in 1989-90, 89 percent in 1995-96, the peak point, and 54 percent in 1999-00. The share is generally higher in the nineties compared to eighties. There is a systematic decline in the import intensity of bulk drugs from 1996-97 onwards. Here, the decline is mainly due to the reduction in the imports[12]. We shall now look into the share of imports of bulk drugs and formulation in total imports.

Figure: 2.3 Import of Formulation and Bulk Drugs asPercentage of Total Imports



Source: Same as figure 2.1

The analysis of the share of bulk drugs and formulations in the total imports[13] show that the share of bulk drugs has been declining from 1985-86 and continued till 1992-93. Though there was an increasing trend in the share bulk drugs in total imports from 1993-94, it lasted only upto 1995-96. Generally, the share of bulk drugs in total imports is lower in the nineties when compared to the eighties. Whereas the share of formulation show an increase overtime. It has increased from 1.4 percent in 1981-82 to 14 percent in 1990-91 and to 19.8 percent in 1999-00. The increasing trend in the import of formulation will have some serious

[12] Import intensity defined in terms of production may also register a decline if the production increases faster than the increase in the imports.

[13] Total imports of pharmaceuticals contain bulk drugs, formulation and intermediates, chemicals, solvents and others. Since we have excluded the import of intermediates, chemicals, solvents and others, the share of formulations and bulk drugs in total imports will not add up to 100 per cent.

implications on the future of the industry, if these drugs are not produced in India. Importing of a drug without attempting to produce within may erode the production base of that drug in the long run. An alternative view could be that the inability of India to produce certain drugs might be adjusted by import of those drugs and thus increasing the welfare of people. However, drawing any conclusion on these aspects requires a detailed study of the nature of formulations imported. It may be interesting now, having seen the trends in the production, export and import of drugs, to look into the dependence of the pharmaceutical industry on imports.

2.5.2.3. Dependence on Imports

It is seen from the table 2.7 that India's dependence on imports has been increasing. The increase in the dependence[14] is higher in the nineties. While the dependence increased from 6.5 percent in 1980-81 to 9.72 percent in 1990-91, the increase was from 11.15 percent in 1991-92 to 17.11 percent in 1999-00.

Table: 2.7. Dependence of Indian Drugs and Pharmaceutical Industry

Year	*Total Supply of Drugs (Rs. Crores)*	*Total Import of Drugs (Rs. Crores)*	*Dependence Ratio*
1980-81	1490.48	96.86	6.50
1981-82	1745.2	106.99	6.13
1982-83	2060.02	120.96	5.87
1983-84	2161.57	126.49	5.85
1984-85	2263.83	188.58	8.33
1985-86	2445	223.95	9.16
1986-87	2638.05	229.33	8.69
1987-88	2857.61	255.57	8.94
1988-89	3663.62	363.78	9.93
1989-90	3876.03	480.73	12.40
1990-91	4192.71	407.51	9.72
1991-92	4973.53	554.63	11.15
1992-93	6402.9	627.9	9.81
1993-94	7129.47	751.07	10.53
1994-95	8171.85	984.45	12.05
1995-96	9669.3	1900	19.65
1996-97	10639.7	2050	19.27
1997-98	11595	2257	19.47
1998-99	13525	2458	18.17
1999-00	15811	2705	17.11

Source: Compiled from Organisation of Pharmaceutical Producers of India
Note: Supply and Imports include only Formulations and Bulk Drugs.

[14] Dependence on import is calculated as (Imports / Total supply) x 100. Total supply is equal to [(Production + Imports) – Exports].

2.5.2.4. Trade Balance

Despite the increase in imports the trade balance has been positive throughout the nineties. This increase in exports since 1992 has been phenomenal. The details are given in table 2.8.

Table: 2.8. India's Trade Balance in Pharmaceuticals

Year	*Export of Formulation and Bulk Drugs (Rs. Crores)*	*Import of Formulation and Bulk Drugs (Rs. Crores)*	*Trade Balance (Rs. Crores)*
1980-81	46.38	96.86	-50.48
1981-82	84.79	106.99	-22.2
1982-83	65.94	120.96	-55.02
1983-84	79.92	126.49	-46.57
1984-85	128.75	188.58	-59.83
1985-86	139.95	223.95	-84
1986-87	189.28	229.33	-40.05
1987-88	227.96	255.57	-27.61
1988-89	400.16	363.78	36.38
1989-90	664.7	480.73	183.97
1990-91	784.8	407.51	377.29
1991-92	1,281.10	554.63	726.47
1992-93	1,375.00	627.9	747.1
1993-94	1,841.60	751.07	1090.53
1994-95	2,265.60	984.45	1281.15
1995-96	3,177.70	1900	1277.7
1996-97	4,090.30	2050	2040.3
1997-98	5,353.00	2257	3096
1998-99	5,959.00	2458	3501
1999-00	6,631.00	2705	3926

Source: Same as table 2.5.

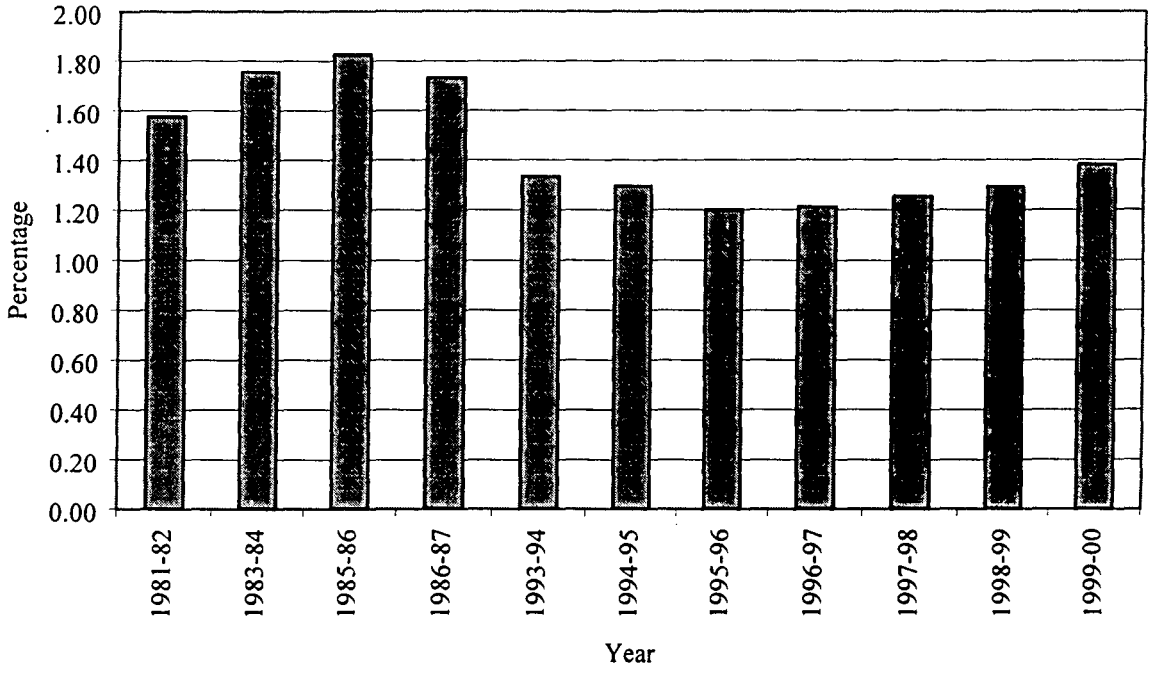
It is observed from table 2.8 that the trade balance became favourable to India only after 1987-88. This is the period following the drug policy of 1986. He drug policy of 1986 had features like delicencing and allowing broadbanding. These would allow expansion of the product profile of firms. It might be a reason that has allowed higher exports. The positive trade balance is attributable to the increase in the export of formulation and bulk drugs. It is seen that the average annual growth rate of formulation was 32.47 percent whereas the bulk drugs' was 21 percent.

2.5.2.6. Research and Development

It is well known that the pharmaceutical industry is a research-intensive industry. The developed countries spend more than 12 percent of the sales on R&D. In India it is very low.

The Hathi committee had found that the R&D expenditure constituted only 1.5 percent of the total sales in 1973. It was recommended that the R&D investment should be atleast 5 percent of the turnover. The Organisation of Pharmaceutical Producers of India (OPPI) data shows that the R&D expenditure is less than 2 percent even now. The figure given below shows it clearly.

Figure: 2.4 R&D Expenditure as Percentage of Sales



Source: Same as figure 2.1

It is to be noted that the allocation of R&D expenditure has not shown any increase in the nineties, infact it has declined. It has been expected that the new patent law would usher in R&D investment. However, it has not yet become a reality in the case of Indian pharmaceutical industry. This part will be discussed in detail in the next chapter.

2.6 Summary

The chapter attempted to analyse the evolution of modern pharmaceutical industry in India. Our review showed that the emergence of modern pharmaceutical industry in India has been due to the efforts of many eminent Indians in the early 20th century. But the domestic sector

could not come to the forefront due its technological backwardness. The government of India in the post-independence period adopted many protectionist policies to help the Indian pharmaceutical sector. However, in the early years of independence, the government had to depend heavily on multinational firms for the necessary technology for building a modern pharmaceutical industry. But later the behaviour of multinational firms had been regulated selectively to reduce the domination and monopoly exercised by the MNCs by means of various policy measures; important among them are FERA 1973 and Indian Patent Act of 1970. The licensing policies enabled the government to deny permission to MNCs for the production of certain drugs so that the Indian firms may be encouraged to invest and develop those drugs indigenously. The licensing policies were also applied to regulate the Indian sector in such a way that they were not given licences to produce outdated or obsolete drugs. The various drug policies provided necessary arm to the government to ensure quality and reasonable prices of drugs.

The government having provided a reasonable period of protection to the pharmaceutical industry has adopted many liberalisation measures. Though liberalisation in pharmaceutical industry began in mid eighties, a full-fledged liberalisation program was initiated in 1991. It is observed that there is a higher growth in the pharmaceutical market in the liberalisation period. The liberalisation policies rendered the industry more trade oriented compared to pre-liberalisation period. The dependence of the industry on imports in the nineties has increased compared to the eighties. However the trade balance showed a positive trend indicating more export intensity. A disappointing factor that emerged in the nineties is the decline in the share of R&D. In the next chapter we shall discuss some dimensions of the impact of MNCs in pharmaceutical industry.

CHAPTER 3

The Emerging Trends in the Relative Performance of MNCs in Indian Pharmaceutical Industry

3.1 Introduction

The behaviour of firms in the industry is influenced by the environment in which they operate. The environment is the combination of variables, which capture the industrial structure, nature of technical knowledge and the policy environment (Basanth, 2000). The economic reforms in the nineties have significantly changed the policy environment in which these firms had been operating and hence are forced to review their strategies. Some of these reform measures are generally applicable to all the industries and some are specific to certain industries. Hence we expect a paradigm shift in the conduct, structure and performance at the industry level.

As already seen pharmaceutical industry consists of two types of firms when defined according to ownership pattern: MNCs and domestic. The nature of pharmaceutical industry being technology intensive and product differentiation intensive, the MNCs may perform better than the domestic firms, in certain respects in the new environment. A liberal policy creates cost-effective conditions and therefore a better performance may be expected from more advantageously placed firms like MNCs. To illustrate, a relatively better performance in exports is expected because they have easy access to foreign markets through net working. They may afford to produce more diversified and more effective drugs because of their superior technology. They are also expected to perform better in product differentiation and R&D activities. These arguments may not hold good always for, if the firm is well established in the market, it needs only a threshold level of investment in advertisement and promotion to maintain the market share. Besides, if the MNCs are receiving technology from parent firms, they may not be spending more in R&D, but on royalty. It is also likely that new innovations of parent firms may not be transferred to subsidiaries operating in India because of the policy regime (in particular patent). We may not be able to verify all the above propositions because of data limitations. To the extent data permits various facets of the performance of the industry may be examined. This chapter analyses the changes in the policy environment in the nineties and its impact on performance of firms belonging to different ownership categories. To start we may begin with the policy reforms pertaining to the pharmaceutical industry.

3.2 Liberalisation in Pharmaceutical Industry: Some Policy Dimensions

The difficulties the Indian economy has been facing became acute by the beginning of nineties. A variety of macroeconomic rigidities induced by industrial, trade, foreign investment policies, etc. had been identified and attempts were made to correct those distortions (Basanth, 2000). The New Economic Policy of 1991 was an attempt to correct those policy induced distortions of the Indian economy. The pharmaceutical industry had also been facing numerous anomalies as a result of the overall industrial policies in the past as well as pharmaceuticals specific policies.

The previous chapter has dealt with the various measures taken by the government to make the industry self-reliant and self-sufficient. Many of these policies seemed to be counterproductive from an economic point of view. Some of the policies, which are general to all industries and some are specific to certain industries, have been alleged to create inefficiencies in the economy. As for the pharmaceutical industry, the Drug Policy of 1978 was a comprehensive policy package to regulate the industry. Self-sufficiency in drug production and self-reliance in drug technology was the core objective of the policy (Jayaraman, 1986; Jain 1994,). This was sought to be achieved through regulating the growth of foreign sector and encouraging Indian sector via. Licensing. The objectives and the provisions of the policy are mentioned in detail in the previous chapter.

The 1978 Drug Policy was a failure from an efficiency point of view for the following reasons;

1. The firms had to obtain licenses for the products they wanted to manufacture. The licensing system operated through bureaucrat's determination of plant capacity, product mix and locality[1]. This has contributed to inefficiencies and lack of competition in terms of the maximization objectives of firms.

   After 1978 Drug Policy, many companies were denied the capacities they had asked for. In 1978 seventeen foreign companies applied for licenses to manufacture 62 bulk drugs. Seven of them were allowed to produce only 10 bulk drugs (Jayaraman, 1986). This may be noted in the background of the shortages of bulk drugs the country was facing. Pfizer had applied for the production of Rifampicin (anti- TB drug). It was not allowed the capacity expansion it had asked for. In 1984 the import of Rifampicin was of 75 tones

[1] The firm had to apply for licences and the concerned authority determined how much the firm should produce and what product it should produce, without taking into account factors like the plant capacity.

costing the exchequer Rs. 16 crores. Similarly Glaxo was denied permission to manufacture Salbutamol (used in the treatment of asthma) while 70 percent of the domestic consumption was met by imports. The government had failed in using the existing capacities without sectoral bias especially in the context of shortfall in the production of several essential drugs.

2. The protection extended to the small-scale industry had led to the spread of large number of small or tiny units. These firms have no tradition or reputation of good manufacturing practices. This has caused the spread of obsolete and expensive drugs.[2]

   Besides these, the provisions of MRTP Act also caused a great amount of inefficiency in the pharmaceutical sector. Large firms (MNCs as well as domestic) which could supply quality drugs at reasonable prices through their advanced technology and economies of scale were denied expansion on grounds of monopoly power. The MRTP law strictly prohibited the expansion of large firms.

The result of these policies had been the shortages in the supply of drugs and poor quality of drugs. Hence a major review of the policies became imminent and the new Drug Policy was announced in 1986.

The basic objective of the 1986 Drug Policy was to ensure availability, quality and reasonable price of drugs. The extension of delicencing, allowing of broadbanding (allowing manufactures to shift production from one product to another falling within the same category without applying afresh for a license) within certain category and reduction in the number of drugs under price control, have been major steps towards a liberalised drug policy regime. But a full-fledged policy reform package was introduced only in 1991.

3.3 Liberalisation Policies in the Nineties

3.3.1. Industrial Licensing

There was a significant change in government policy towards foreign investment with the adoption of industrial policy statement of 1991. The Industrial Licensing Policy Statement of July 1991 reads *the role played by the government to be changed from that of exercising control to one of providing help and guidance by making essential procedures fully transparent and eliminating delays.*

[2] Small firms had been exempted from many regulations. Large firms established a net work of small scale firms so that they could also enjoy the policy adjustments extended to the small scale forms.

As a result the industrial licensing has largely been done away with. The widespread industrial delicencing gave flexibility for firms in terms of investment decisions and deciding plant capacities.

There has been a specific reference to the industrial licensing of the pharmaceutical products. Industrial licensing for all bulk drugs, their intermediates and formulations will be abolished, subject to stipulations laid down from time to time in the Industrial Policy, except in the cases of

(1) Bulk drugs produced by the use of recombinant DNA technology,

(2) Bulk drugs requiring nucleic acids as the active principles, and

(3) Specific cell / tissue targeted formulations.

3.3.2. Trade Reforms

The Industrial Policy of 1991 had as objective of increasing the exports from the country. The policy states *foreign investment and technology collaboration will be welcomed to obtain higher technology, to increase exports and expand the productive base.* The import restrictions were liberalised in 1991. Firms could import any item except for a few in the negative list. It was stipulated that imports including the import of technologies required by pharmaceutical industry for manufacture of bulk drugs as well as formulations will have to be made with foreign exchange at market price.

Inorder to discourage the import of formulations, the Drug Policy of 2002 provides that imported formulations would be allowed to spend only about 50 percent of the landed cost to cover selling and distribution expenses, including interest and profit margins while formulations produced in India was allowed a Maximum Allowable Post Manufacturing Expenses (MAPE) of 100 percent.

3.3.3. Foreign Investment

There had been severe restriction on portfolio and direct foreign investment before the liberalisation period. The controls on technology transfer, licensing and consultancy served as constraints on firms in their decision making in terms of technology, international marketing and strategic alliances. The new economic policy of 1991 marked a significant change to the earlier policy approaches.

As regards the foreign investment it was stipulated in 1991 that foreign investment upto 51 percentage would be allowed freely in the pharmaceutical sector. In 2000, the limit for automatic approval of foreign equity was raised to 74 percent[3].

Investment above 74 percent were to be considered on a selective basis in areas where investment is otherwise is not forthcoming particularly in the manufacture of bulk drugs from their basic stages and their intermediates. A case-by-case consideration had to be extended for the bulk drugs produced by the use of recombinant technology as well as the specific cell or tissue targeted formulations.

The limit for automatic approval foreign investment has been raised to 100 percent in 2001 for the manufacture of drugs and pharmaceuticals which does not involve the use of recombinant DNA technology or tissue / cell targeted formulations. Proposals for manufacture of these items require prior government approval[4].

The same measures had been applied for foreign technology also. Automatic approval for foreign technology agreements is be given in the case of all bulk drugs, their intermediates and formulations except those produced by the use of recombinant DNA technology, for which a special procedure prescribed by the Government would be followed.

3.3.4. Abolition of FERA and MRTP Act

The FERA 1973 had severely curtailed the freedom of foreign investors. Foreign firms had to reduce their holding to below 40 percent unless they could prove themselves to be particularly useful to the country in terms of technology they employ or in terms of exports. They could retain 51 percent equity if (a) 60 percent of their business was in core industry (Appendix 1 industry) and atleast 10 percent of their output was being exported or (b) they had no output in the core sector but were exporting 40 percent or above of their output. But this Act has been relaxed in the early 90s and abolished completely in 1999. After 1993 amendment of the FERA all companies incorporated in India are treated as Indian companies even if they are fully owned by foreign nationals or companies.

Similarly the MRTP Act was amended in1991 and was restructured with focus on curbing monopolistic restrictive and unfair trade practices. On the basis of the Report of the S.V.S

[3] See Ministry of Chemicals and Fertilizers, press note No. 2, 2000 series, www. rajyasabha.nic.in
[4] See Ministry of Chemicals and Fertilizers, press note No. 4, 2001 Series, www. rajyasabha.nic.in

Raghavan Committee (2000) government introduced the Trade Related Competition Bill. The new law does not consider firm's dominance per se inimical to competition. It seeks to regulate agreements that control production, supply, markets, technical developments or in provision of services. All such agreements are considered anti-competitive. Registration of agreements was mandatory for the MRTP Act. But the new law doesn't have any such requirements. The new law has made the merger and acquisition process easier. There is a merger commission to deal with merger deals. This part of the law requires disposal of the case within 90 days. If there is no order it is presumed that the, merger deal has been approved.

3.3.5. Drug Policy of 1995.

The need for a review of 1986 Drug Policy became imminent after 1991. The provisions in the Drug Policy relating to industrial licensing and foreign investment required a review in the light of New Economic Policy of July 1991. The industrial licensing policy of 1991 had abolished licensing except in the cases of those identified drugs and their formulations where there is danger of manufacturing from later stage imported intermediates and the formulations. The policy also made foreign investment upto 51 percent to be liable for automatic approval. Hence a review of the 1986 Drug Policy came in 1995 (January) keeping the objectives of the 1986 policy. The prominent features of the policy are enumerated below.

- The broadbanding was extended to all products, which was limited to specified groups under the 1986 Drug Policy.
- Controls on use of imported bulk drugs have completely abolished.
- Reduced the number of drugs reserved for the public sector to five (Vitamin B1, Vitamin B2, folic acid, tetracycline and oxyteracycline), and
- The number of drugs under price control was reduced to 73 from 167.

In order to encourage R&D in the sector, it was provided that if a new drug which has not been produced elsewhere, if developed through indigenous R&D would be put outside price control for a period of 10 yeas from the period of commercial production in favour of the company which undertook the R&D.

3.4 The Emerging Patterns of Relative Performance

As mentioned earlier the environment in which the firms were operating has changed in the 90s. The individual firms now operate in a comparatively more free environment. It is interesting to observe whether the new environment has made any change in the structure and performance of the industry. In the following sections we are tying to capture the changes to the extent data permits.

3.4.1. Foreign Investment and Technology Inflow

The inflow of foreign investment and transfer of technology into the country takes place mainly through foreign collaborations. Foreign collaboration can be classified into financial and technical. Financial collaboration is through equity participation. The Indian firms having foreign equity collaboration are sub-classified on the grounds of controlling power; multinational companies and domestic companies. Besides, there are foreign branches. These branches are parts of foreign firms, which have a place of business in India[5]. The approvals of foreign collaborations in the post-liberalisation period have also been facilitated through the automatic approval programme of RBI and Secretariat of Industrial Approvals (SIA) and Foreign Investment Promotion Board (FIPB).

Of the total approval of foreign investment involving foreign financial collaboration, the share of pharmaceutical sector has been very low (0.52 percent)[6] in the nineties (1991-1997). This shows that in the nineties the pharmaceutical sector has not been a major area of attraction for foreign investment. However if we consider the actual inflow, it is seen that the pharmaceutical industry has witnessed more realisation of the approved than the rest of the industries. Pharmaceutical industry received 3 percent of the total inflow of foreign capital. While in rest of the industries only 19 percent of the approved foreign investment was realised, 97 percent of the approved investment has come into force in pharmaceutical sector during this period. We did not get relevant data for the pharmaceutical industry in the eighties. Coming to the technology collaboration in the nineties, the industry has received 3.37 percent of the total total technology collaborations[7]. We are presenting below, based of

[5] The branches lost their relevance in the wake of FERA 1973, as they had to reduce their equity share to below 40 percent. However, foreign branches have again come to the limelight with the liberalisation in foreign investment in the nineties.
[6] See answers to questions in Parliament: Question number 262 (1995) and 886 (1997).
[7] See Indian Investment Centre, www.iic.nic.in

PROWESS data source the number of firms engaged in both financial and technology collaborations. However, we did not get information on actual number of collaborations.

Table: 3.1. Foreign Collaboration in Pharmaceutical Industry in India

Year	*Number of Firms Engaged in Financial and Technology Collaboration*			*Total Number (Financial and Technical)*
	Pure Financial	*Technical with Financial Collaboration*	*Pure Technical Collaboration*	
1	2	3	4	5
1991-92	32 (46.37)	32 (46.37)	5 (7.2)	69 (75.84)
1999-00	49 (39.84)	66 (53.65)	8 (6.5)	123 (66.12)

Note: Figures in the brackets are percentage of firms engaged in financial and technical collaborations. Figures in the brackets given in column 5 indicate the percentage of firms engaged in foreign collaboration (financial and technical). The sample for 1991-92 consisted of 91 firms and 1999-00 consisted of 186 firms.

It is seen from the table: 3.1 which is based on PROWESS data base that there is an increase in the number of firms engaged in financial and technical collaborations. Firms those have engaged in pure financial collaboration have increased from 32 in 1991-92 to 49 in 1999-00. Firms those have engaged in technical collaboration are identified by looking into whether they are making remittances under royalty and technology fees. The number of firms those have engaged in technical collaboration (pure as well as mixed with financial collaboration) was 37 in 1991-92 and 74 in 1999-00. These firms constituted around 53.5 percent of the sample in 19991-92 and 60.15 percent in 1999-00. It is interesting to note that the number of firms engaged in the pure technical collaboration also has registered an increase. However, when we look the numbers of firms entered into foreign collaboration as percentage of total number of firms in the sample, it is seen that the there is a decline in the percentage of firms engaging in pure financial and pure technical collaboration. There is an increase in the percentage of firms entering into technical collaborations.

3.4.2. Change in the Equity Holdings

The liberalisation measures in the foreign investment policies initiated changes in the equity holding pattern by granting of automatic approval of upto 51 percent equity (majority ownership). The automatic approval of foreign investment upto 51 percent may attract more investment in minority capital participation companies.

The change in the pattern of foreign investment has it's manifestations in the equity holding pattern of different groups defined by equity ranges. There had been a perceptible change in

the foreign equity holding pattern of firms in the Indian pharmaceutical industry over the years. The following table shows the foreign equity holding pattern in Drugs and Pharmaceuticals.

Table: 3.2. Foreign Equity Holding Pattern in Drugs and pharmaceuticals

	Foreign Equity Groups	*Number of Firms in Pre-liberalisation Period*		*Number of Firms in Liberalisation Period*	
		1975-76	*1985-86*	*1991-92*	*1999-00*
1	Above 50	21 (34.43)	14 (21.2)	12 (26.66)	21 (21.56)
2	40 - 50	10 (16.39)	20 (30.3)	7 (15.55)	6 (5.88)
3	25-40	10 (16.39)	10 (15)	4 (8.88	5 (4.90)
4	Below 25	10 (16.39)	22 (33.33)	22 (48.88)	70 (68.62)
5	Total Number	61	66	45	102

Source: Pillai (1987), Panikar, et al[8] (1992), BSE Directory (1992, 2000) and PROWESS.
Note: Figures given in the brackets are percentage of each category in total.

The number of subsidiaries (Firms with foreign equity above 50 percent) was reduced from 21 in 1975-76 to 14 in 1985-86 and increased to 21 by 1999-00 (Table: 3.2). The number of firms belonging to the group of foreign equity ranges between 40 percent and 50 percent and 25 percent and 40 percent has declined in the nineties comparing to the pre nineties. There has been a significant increase in the number of firms belonging to the below 25 percent equity groups. The number has increased from 22 in 1985-86 to 70 in 1999-00. The analysis of the share of each equity holding group in total, shows that the firms having foreign equity above 40 percent (rows 1&2) accounted for more than 50 percent of total financial collaborations in the pre-liberalisation period. Whereas in the liberalisation period the 4th group, firms having foreign equity below 25 percent has become the dominant group. This group accounted for 49 percent of total financial collaborations in 1991-92 and 68.6 percent in 1999-00. Whereas the share of majority equity holding group has declined within the liberalisation period. It had accounted for 26.6 percent of total financial collaboration companies in 1991-92 and declined to 21.5 percent in 1999-00. When compared to the share of this group in 1985-86, the share has increased in 1991-92, but is same in 1999-00. The share of other two groups i.e., equity holding between 40 and 50 and 25 and 40 has declined in the liberalisation period as compared to the pre liberalisation period. This may indicate that there has been a strategic

[8] Data for 1985-86 is taken from Panikar et al.(1992).

shift from above 40 percent foreign equity in pre liberalisation period to below 25 percent foreign equity group.

3.4.3. Mergers and Acquisitions

Another important dimension has been the merger and takeovers. Merger or amalgamation leads to a combination of two or more companies. Whereas take over or acquisition aims at acquiring controlling power over a company. There are many reasons why firms prefer mergers and take overs to organic growth through greenfield investment: speed and easy access to proprietary assets are the important ones. The proprietary assets are very important for the firms because it takes long time to develop. Proprietary assets are R&D or technical know-how, patents, brand names, possession of local permits or licenses and supplier or distribution networks, etc. Drugs and pharmaceuticals in India is a sector that induced a good number of mergers and takeovers. The pharmaceutical sector accounted for 5.2 percent of total mergers and 8.3 percentage of total acquisitions in all industry between 1991-97 (Basanth, 2000).

There has been consolidation among MNCs in India through mergers. There has been instances of MNCs merging with MNCs: The mergers between Burroughs Wellcome and Glaxo in (1996), Sandoz and Hindustan Ciba Geigy which led to the formation of Novartis in 1996, Biddle Swayer with Glaxo in 1997, Ciba CKD's merger with Novartis in 2001 and Smithkline Beechem and Glaxo India in 2001 are of this kind. There have also been instances in which domestic firms merged with MNCs: The merger of Meghdoot Chemicals with Glaxo in 1998 and Croydon Chemical works with Glaxo in 1999 belong to this category. It has been noted that these merged firms are keeping separate balance sheets, except in the case of Novartis (Sandoz and Hindustan Ciba Geigy).

There have been other instances in which the domestic firms also attempted to consolidate themselves through mergers. There have been 13 such instances in which domestic firms merged with domestic firms. The merger of Sumitra Pharma with Nicholas Piramal (1993), Crossland Research Laboratories with Ranbaxy (1995), Tamilnadu Dadha Pharma, Milmet Laboratories, Gujrat Lyka Organics and Pradeep Drug Company with Sun Pharmaceuticals (1997, 1998, 1999 and 2001 respectively) and Cheminor Drugs with Dr. Reddy's (2000) are the important among these.

Take over has been another mechanism adopted by firms to consolidate their position in the market. There have been two instances where MNCs have taken over MNCs and six instances where domestic firms have taken over domestic firms between 1993 and 2001. The taken over of Boots Pharma by knoll Pharma and Hoechst Marrion Roussel by Aventis Pharma fall under the first category. The taken over of Fortis Health Care by Ranbaxy (2001) and Merind Ltd. by Wockhardt Ltd. (1998) are the important ones fall in the second category. Wander Ltd. (Domestic firm) was taken over by a MNC, Novartis in 1998.

Still another aspect of the restructuring of the pharmaceutical MNCs is the sale and purchase of assets of the firms. The abolition of MRTP Act has facilitated this process. Dupher Interfan has sold it's brand Crocin to Smithkline Beechem in 1996. Novartis has bought the ophthalmic solutions brand of Optrex in 1999. In 1999 Pfizer sold one plant to an Indian firm Cadila health care. Novartis has bought one manufacturing unit of Hoechst Marrion Roussel in 1999. Glaxo India sold it's liver tonic – Livoges to E Merk in 1999. Glaxo India has also sold two brands Multivite FM and Macraberin to Universal Medicare in 2000. The domestic firms have also been pursueing the same kind of strategies. The details of mergers, takeovers and sale of assets are given in appendix: 3.1, 3.2 and 3.3.

3.4.4. Share of MNCs in the Pharmaceutical Market

As already observed in earlier chapters that in India MNCs have been dominant in the pharmaceutical market. The Hathi Committee had found that the MNCs (majority foreign equity holding) in 1973 accounted for more than 50 percent of the turnover by the organised sector[9]. The organised sector accounted for 80 percent of the total market. The study by P.G.K Panikar et.al (1992) showed that the MNCs[10] continued to enjoy a dominant position in the Indian drug market. Their share in total turnover by the organised sector was 56.6 percent in 1986-87. However our analysis for the nineties shows a decline in the market share of MNCs. The following table shows the concentration of MNCs and domestic firms in the Indian pharmaceutical industry in the nineties.

[9] The Hathi committee study of organised sector included public sector companies also. The public sector had contributed 7 percent of the turnover.

[10] They defined MNCs as firms having foreign equity more than 40 percent.

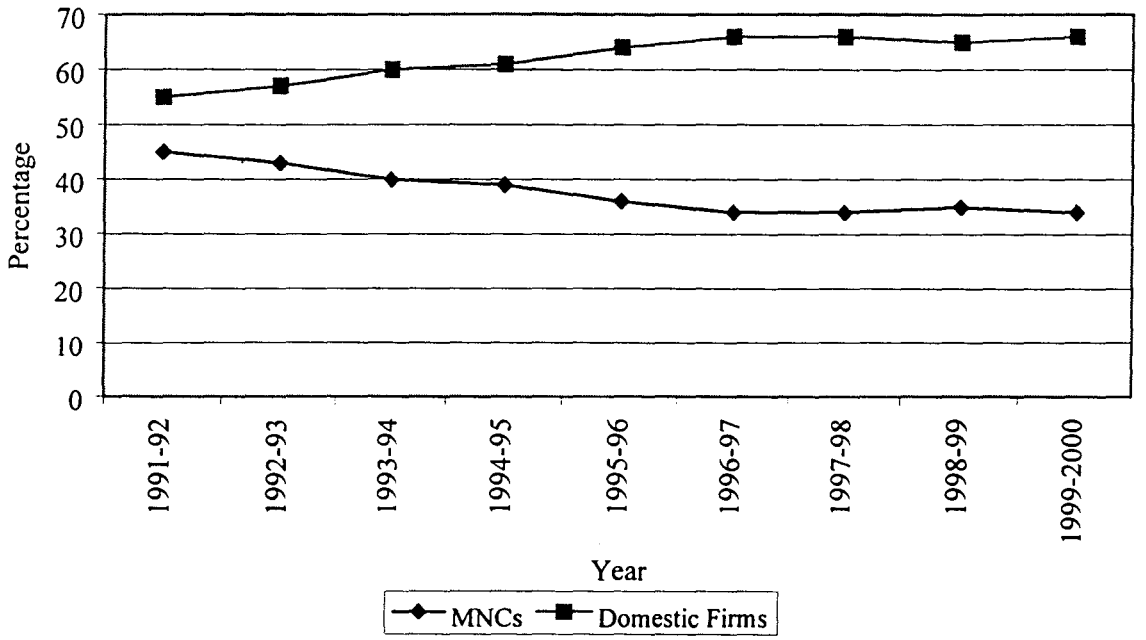
Table: 3.3. Concentration in the Pharmaceutical industry

Year	*Share of top-3 Firms in Total sales*	*Share in Total Sales*		*Share of top-3 MNCs and Domestic Firms in their Sales*	
		MNC	*Domestic*	*MNC*	*Domestic*
1	*2*	*3*	*4*	*5*	*6*
1991-92	24	45	55	47	31
1992-93	24	43	57	46	31
1993-94	23	40	60	45	29
1994-95	23	39	61	45	27
1995-96	23	36	64	47	27
1996-97	20	34	66	42	27
1997-98	22	34	66	45	30
1998-99	21	35	65	44	28
1999-2000	24	34	66	44	35

Source: PROWESS

The market share of MNCs is less in the nineties (col.3) when compared to estimates done by the Hathi Committee and Panikar et al. The share of MNCs has shown a continuos decline in the nineties.

Figure:3.1. Share of MNCs and Domestic firms in total sales



Source: PROWESS

Now the question is why the share of MNCs in the pharmaceutical market is continuously declining in spite of the fact that there is an increase in the collaborations with the foreign firms. The share of MNCs is not increasing because they are not introducing new products into the Indian market. Pharmaceuticals is a market, which is highly sensitive to the quality of drugs. Drugs that offer therapeutic advantages have a higher likeyhood of getting high market

share (Reekie, 1978; 1981). They have not been introducing new products because of the lack of protection for intellectual property. Another possible reason why MNCs are showing a low level of market share is that the pharmaceutical industry consists of a large number of heterogeneous therapeutic sub-markets. A study of pharmaceutical industry as a whole may not capture the heterogeneity existing the sub markets (Reekie 1978;Bergejik and Schut, 1986). The *Voveran* brand of Novartis accounts for 51 percent of market share in the diclofenac market in 2002. Another brand of Novartis, Otrivin accounts for 95 percent of the market for xylometazoline (Hindu, Feb.14. 2002).

The share of top 3 MNCs and domestic firms in the total sales of MNCs and domestic firms do not show much of a change in the post-liberalisation period. The share of sales of top 3 MNCs in total sales by MNCs was 47 percent in 1991-92. It declined to 44 percent by 1999-00. Whereas the share of top 3 domestic firms was 31 percent in 1991-92 and then declined to27 percent in 1994-95 and then increased to 35 percent in 1999-00. The 3-firm concentration shows that there was a decline of concentration till 1996-97 and thereafter shows an increasing trend.

This however, does not mean a decline in the control exercised by MNCs in the pharmaceutical industry in India. Financial collaborations below 25 percent of equity and technical collaborations can provide MNCs the means to control. The question is whether overtime the surplus accumulation and disposal processes have recorded any change? We may take up this question later.

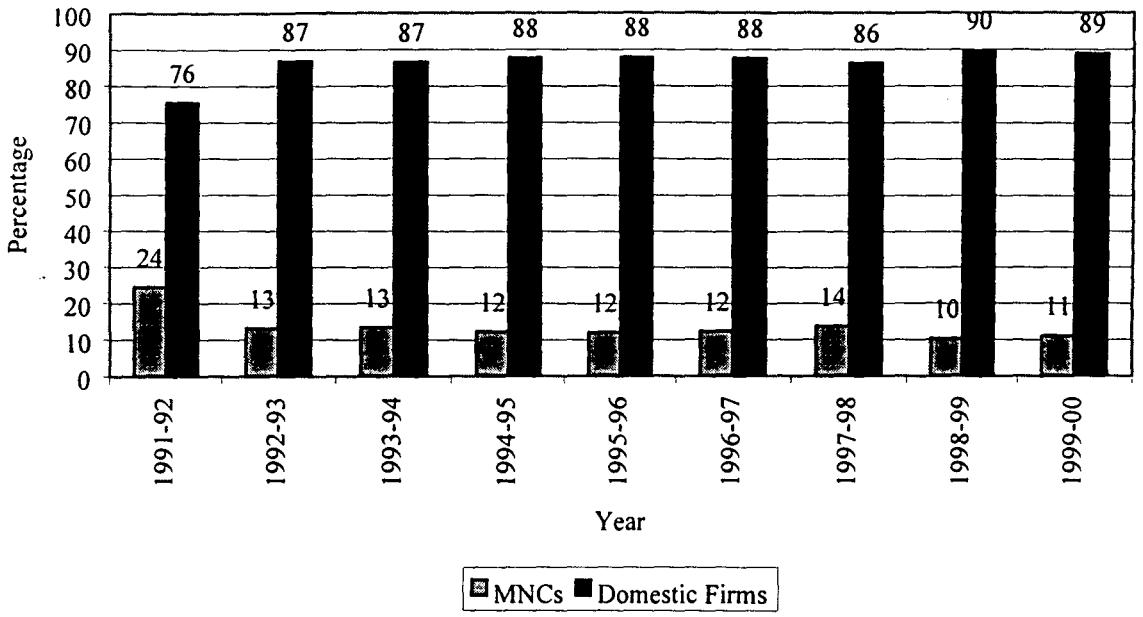
3.5. Relative Performance of MNCs

3.5.1. Exports

The pharmaceutical firms in India have an advantage in the exports due to the advanced status of the industry in India. India is the largest producer of pharmaceuticals among the third world countries (EXIM Bank, 1991). The availability of comparatively cheaper factors of production and the higher level of technological advancement the industry has achieved, gives an added advantage to the pharmaceutical firms in India, for engaging in exporting. Both MNCs and domestic firms engage in export of drugs. The study of EXIM bank (1991) has shown that the share of MNCs in total exports is only 20 percent of the total export by the private sector in1985. Our enquiry based on PROWESS also shows a similar trend in the

nineties. This comparative study is based on 66 firms of which 19 are MNCs and 47 are domestic. This sample represented 78 percents of the sales by the organised sector in 1991-92 and 1995-96. The share of exports of MNCs in comparison to domestic firms is shown in the figure: 3.2.

Figure: 3.2. Exports of MNCs and Domestic Firms as Percentage of Toal Exports



Source: EXIM Bank (1991); PROWESS

The share of Export of MNCs has declined in the nineties from 24 percent in 1991-92 to 11 percent in 1999-00. However, our study of the comparative behavior of MNCs in the exports, show that the share of export of MNCs is lower than the share of domestic firms in the 90s. The low share of export of MNCs is may be due to the restriction put on them by the parent MNCs. They are restricted by their parent companies from operating in the major overseas markets and are allowed to export only to the Eastern Block, African and South Asian countries (EXIM Bank, 1991). The main reason is that the parent company and it's other subsidiaries do not want competition from Indian affiliates in their own domestic and export markets. Patent expiry is an important factor that influences the exports of pharmaceuticals from India. Beecham's expiry of patent on amoxycillin in 1986 and ampicillin in 1987 helped in the expansion of the export market of India (Exim Bank, 1991). There were a number of drugs that became off patent in the 90s. It is expected to encourage export performance of pharmaceutical firms in India, especially the domestic firms. The list drugs those became off patent in the nineties is given below.

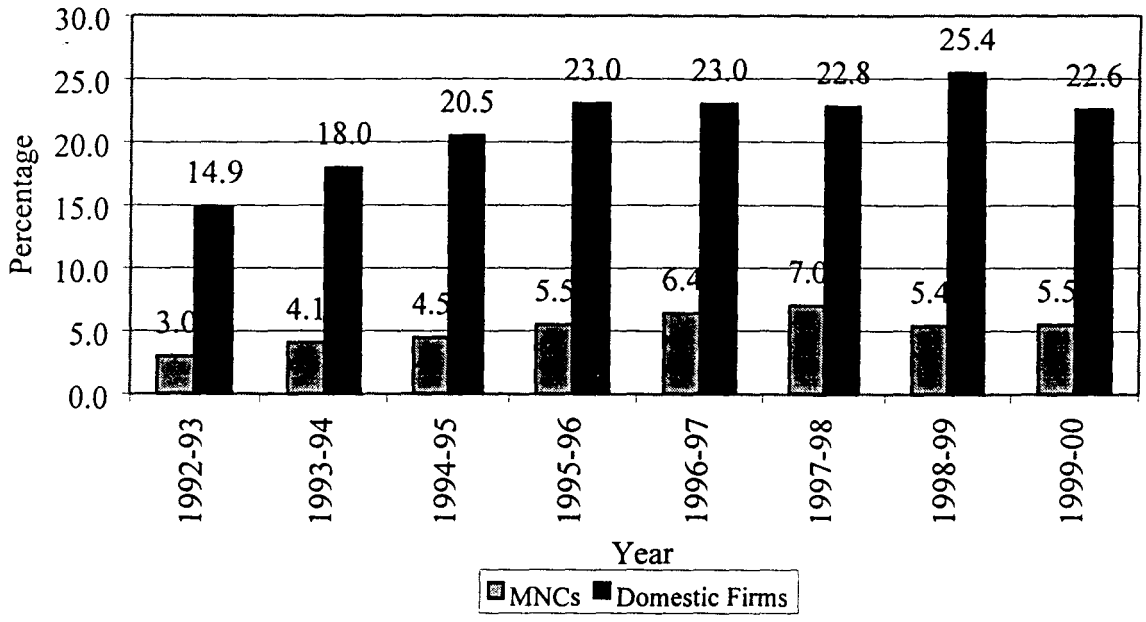
Table: 3.4. List of Drugs became Off- Patent in the Nineties

Year	*Name of the Drug*
1990	Amikacin, Amiloride, Bromcriptine, Diflunisal, Loperamide, Tolmetin and Tretinoin
1991	Butophanol, Carbidopa, Miconozole, Nifedipine and Norgestrel.
1992	Becampicillin, Cefalor, Cyclobenzapyrine, Naproxen and Probucol.
1993	Alprazolam, Atenolol, Dobutamine, Metoprolol, Nadolol.
1994	Cimetidine, Mezlocilin and Torbutaline.
1995	Captropril, Pentazocine and Prazosin.
1996	Amcinonode, Cefamandole, Cefataxime, Moxalactam and Cisplatin.

Source: EXIM Bank, 1991

However, if we express export as percentage of sales we get the following picture.

Figure: 3.3. Exports as Percentage of Sales of MNCs and Domestic Firms



Source: PROWESS

Our analysis based on the PROWESS show that the export dependence defined as the share of exports in sales of MNCs is much lower than the share of exports in sales of the domestic firms.

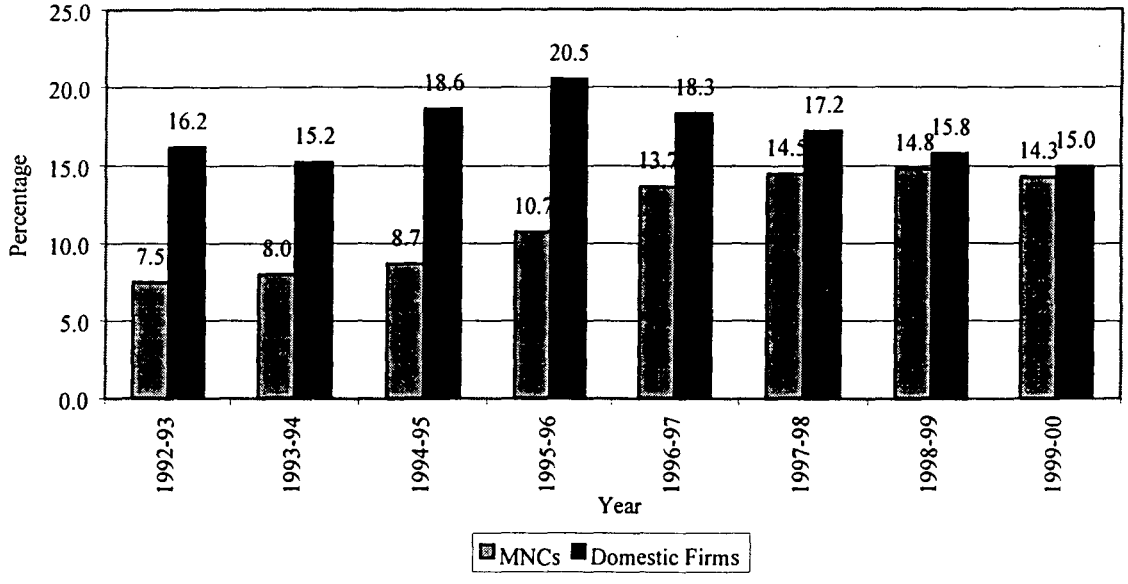
The share of export in sales of MNCs is less than 7 percent of sales in the nineties. The share of export of MNCs in sales was 5.7 percent in 1991-92 whereas the same for the domestic firms was 14.8 percent. The year 1997-98 recorded the highest export to sales ratio for the MNCs i.e., 7 percent. The same for the domestic firms was 22.7 percent in the same year. The share of exports in sales of domestic firms is more than 3 times the share of exports in sales of MNCs.

Inspite of the export potential of MNCs, they are less export oriented than the domestic firms mainly due to the restrictions from their parent firms. The comparative advantages that the country offers in terms of less expensive factors of production do not appear to attract MNCs as far as exports are concerned. As a result, the operations of MNCs are mainly aimed at the domestic market.

3.5.2. Imports

The liberalisation of imports has enhanced the optimisation choices of input use. It is seen from Prowess database that that the share of import of MNCs in their sales have registered a continuos increase in the 90s. MNCs are more dependent on imports than the domestic firms. Import dependence defined as imports as percentage of sales has increased from 7.5 percent in 1992-93 to 14.3 percent in 1999-00. Whereas the share of domestic firms shows a continuous decline after 1995-96. This is shown in figure figure: 3.4.

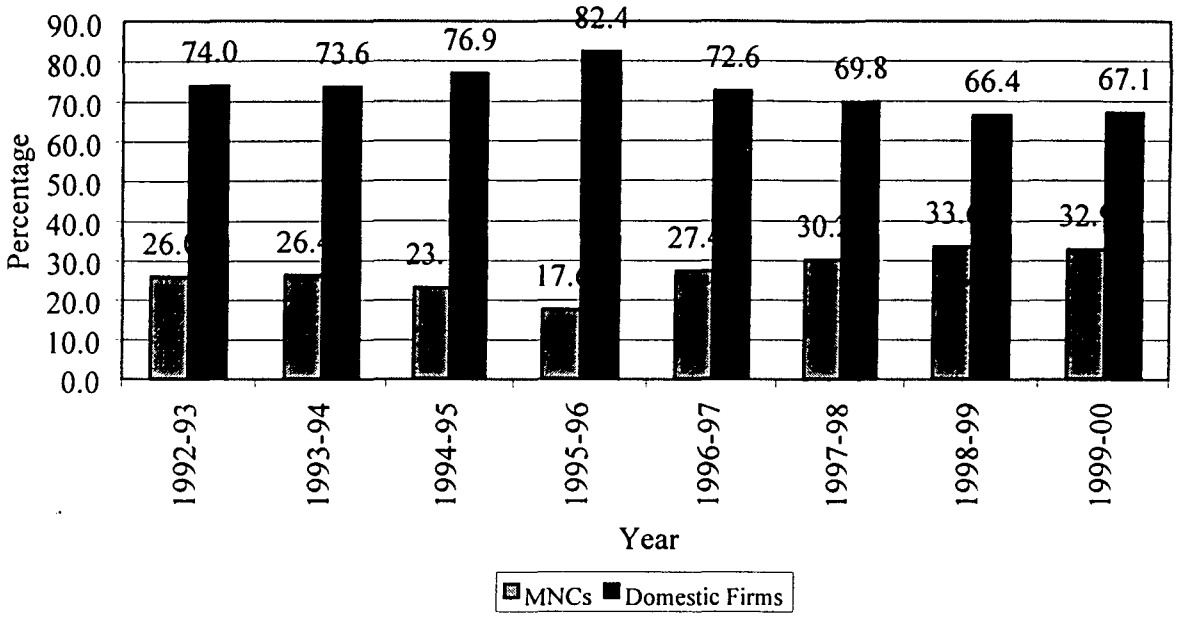
Figure: 3.4. Imports as Percentge of Sales of MNCs and Domestic Firms



Source: PROWESS

Whereas the share of MNCs in total imports show a decline till the mid nineties and then shown an increase. It has declined from 26 percent in 1992-93 to 17.6 percent in 1995-96. Thereafter it increased to 32.9 percent in 1999-00. A corresponding decline in the imports of domestic firms had also taken place in the same period. The imports of domestic firms in total imports declined from 82.4 percent in 1995-96 to 67.1 percent to 1999-00. This is given in figure: 3.5.

Figure: 3.5. Share of MNCs and Domestic Firms in Total Imports



Source: PROWESS

Table: 3.5. Growth of Import of MNCs and Domestic Firms *(Rs.Crores)*

Year	*MNCs*	*Annual Growth Rate (Percentage)*	*Domestic Firms*	*Annual Growth Rate (Percentage)*
1991-92	155.26		439.35	
1992-93	203.96	31.37	580.09	32.03
1993-94	241.09	18.20	670.72	15.62
1994-95	304.99	26.50	1015.70	51.43
1995-96	289.19	-5.18	1350.43	32.96
1996-97	551.92	90.85	1460.59	8.16
1997-98	639.84	15.93	1478.39	1.22
1998-99	720.89	12.67	1426.52	-3.51
1999-00	749.24	3.93	1529.26	7.20
Annual Average Growth		24.28		18.14

Source: PROWESS

The table: 3.5. shows the growth in imports by MNCs and domestic firms. The average annual growth rate of imports of MNCs is higher than the average annual growth rate of imports of domestic firms. The annual growth rate of MNCs does not show a clear pattern and is fluctuating in nature. Whereas in the case of domestic firms there is a sharp decline in the growth of imports from 1996-97 onwards.

A major attempt by the researchers in the past has been to find the incidence of transfer pricing, which is overpricing imports and underprising of exports. We have not examined that aspect due to data limitation.

3.5.3. Remittances of MNCs and Domestic Firms

The remittances under foreign collaboration include payments under (1) dividend (2) royalty (3) technical fees and (4) lump sum payments. Dividend is the payment made for the investment of foreign firms. Royalty is paid for the licences for the production of certain products and technical fee is paid for the transfer of technical know how. MNCs are expected to pay more in terms of royalty and technical fees than the domestic because the MNCs in India (the associates of foreign multinational firms) have higher likelihood of getting licences and technical know how from foreign firms. However, the control on remittances such as royalty, divined and technical fees during pre-liberalisation period was relaxed during post-liberalisation period. The following table gives the information on the remittances of MNCs and domestic firms under the heads of dividend, royalty and technical fees. We have not been able to incorporate the lump sum payments due to data limitations.

Table: 3.6. Remittances of MNCs and Domestic Firms

Year	*Dividend (Rs. Crores)*		*Royalty & Technical Fees (Rs. Crores)*	
	MNCs	*Firms with 24 % or below Foreign Equity Participation*	*MNCs*	*Firms with 24 % or below Foreign Equity Participation*
1991-92	8.0	0.5	0.6	0.1
1999-00	60.4	1.6	27.5	5.1
Average Annual GR	8.06	2.87	55.26	77.46

Source: PROWESS

The dividend payment of MNCs was Rs.8 crores in 1991-92, which has increased to Rs. 60.4 crores by 1999-00. Whereas the dividend payment of firms having less than 25 percent foreign eqity share (domestic firms) was Rs.0.5 crores in 1991-92 and was increased to Rs. 1.6 crores in 1999-00. The dividend payment of MNCs increased at 8.06 percent average annual growth rate in the nineties whereas the dividend payment of domestic firms increased by an average growth rate of 2.87 percent. The royalty and technical fees payment has also been much higher for the MNCs. It constituted Rs. 27.5 crores for MNCs and Rs. 5.1 crores for domestic firms in 1999-00. However, average annual remittances by MNCs during 1975/76 to 79/80 on dividend was only Rs. 3.5 crores and royalty and technical fees was Rs. 0.95 crores (Pillai, 1984). The remittances by MNCs have increased substantially in the nineties, compared to the eighties.

3.5.4. Research and Development

Expenditure on Research and Development (R&D) is a decisive factor that determines the survivability of pharmaceutical firms. The reason, as mentioned in earlier chapters is the high rate of obsolescence of drugs in the pharmaceutical market. Pharmaceutical firms in the developed countries spend around 12 percent of their turn over on R&D. Scherer (1993) has noted that R&D investment in the pharmaceutical industry in the United States is much higher than the R&D investment in most of the industries. Inspite of the importance of R&D in pharmaceutical industry, the investment on it has been observed to be very low in the case of Indian pharmaceutical industry.

The Hathi Committee had found that the R&D in Indian pharmaceutical industry was only 1.1 percent of the total turnover in 1973. The committee found that the R&D of MNCs was very low and many of the MNCs did not even have R&D units in India. The committee recommended that the investment on R&D should be raised to atleast 5 percent of the turnover. Inspite of the encouragement given through policy packages since then, R&D has not shown any substantial increase. Sanjaya Lall (1980) and Panikar, et al (1992) had also found that the R&D initiatives by MNCs are lower than the domestic firms. It has been observed by various committees like Bhatia Committee (1954) and Hathi Committee (1975) that the domestic firms had been engaging in the production of low quality drugs and MNCs had been engaging in selling the products of their parent firms without investing in production in India. The government had taken various measures to ensure higher investment in R&D and the production of good quality drugs from the beginning stage.

The investment by MNCs on R&D continues to be low even in the nineties. The share of MNCs in the nineties is on the average 0.73 percent of sales and the share of domestic firms is in average is 1.56 percent of sales. Details are given in appendix: 3.4. The implementation of TRIPS envisages that pharmaceutical firms will spend more on R&D as protection is guaranteed for intellectual property rights. The following table gives the share of R&D expenditure of prominent MNCs and domestic firms, reported in the PROWESS.

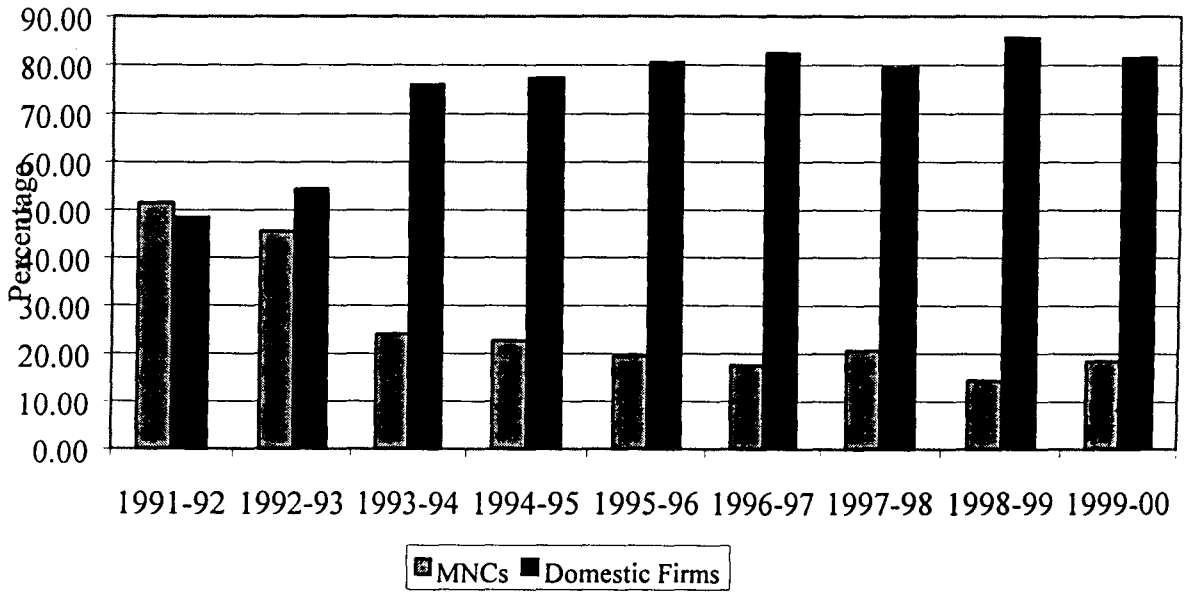
Table: 3.7. R&D Expenditure as Percentage of Sales of Selected Firms

Company	*MNC / Domestic*	*1992-93*	*1995-96*	*1999-00*
Glaxo	MNC	0.61	0.52	0.5
Knoll (Boots)	MNC	1.3	0.36	0.6
Parke Davis	MNC	0.32	0.79	-
Duphar Intefran	MNC	-	0.70	0.73
Smithkline Beechem	MNC	-	1.0	0.74
E.Merk	MNC	0.26	0.005	0.24
Burrougs Wellcome	MNC	0.66	0.69	0.25
Ranbaxy	Domestic	2.7	4.7	2.93
Dr. Reddy's Laboratories	Domestic	2.22	2.4	5.76
Dey's Medicare	Domestic	1.8	2.11	2.49

Source: PROWESS

It is observed that most of the firms spend very low share of turnover on R&D. The MNCs has been spending less than one percent of sales on R&D except for Knoll in 1992-93 and Smithkline Beechem in 1995-96. In the case of domestic firms there has been a continuous increase in the R&D investments of Dr. Reddies and Dey's Medicare. It is interesting to note that the share of R&D of Dr. Reddy's is 5.75 percent in 1999-00. Ranbaxy's share has declined in 1999-00. Dr. Reddy is a firm that focuses on Indian as well as overseas markets. The following figure shows the share of MNCs and domestic firms in total R&D investment.

Figure: 3.6. Share of MNCs and Domestic Firms in Total R&D



Source: PROWESS

It is seen that the share of MNCs and domestic firms in total R&D has been almost equal in 1991-92. Those two groups were having around 50 percent each of total R&D invested. The share of MNCs show a declining trend thereafter and domestic firms an increasing trend. In

the second half of the 90s the share of MNCs in total R&D investment is less than 20 percent. It may be noted that our study is based on consistent sample of 19 MNCs and 47 MNCs. Hence, it is not the increased number of domestic firms that have contributed to the increase in the share of R&D of domestic firms. Infact many of the domestic firms are investing more in R&D in view of the expiry of patents abroad. Unichem and JB Chemicals are a few among them. Once the patent is over, the Indian firms look forward for exporting generics into those markets. Hence a significant proportion of the R&D of the domestic firms is allotted for copying the going to be off patented drugs abroad. The low investment of MNCs in R&D need not render them lagging behind in introduction of new products in the market.. Purchase of technology and acquisition of licences from their parent firms may enable them to have access to R&D investments already undertaken.

3.5.5 Product Differentiation

Product differentiation is the process of differentiating one product from the other products in the market. In pharmaceutical industry, product differentiation also refers to differentiating one drug in the minds of doctors from all other brands. The prominent strategies applied for differentiating brands are advertisement and canvancing of doctors (promotional) through medical representatives, free samples, free literature and special incentives. In India, advertisement is not allowed for the ethical drugs. It is allowed only for over- the- counter (OTC) drugs for which the consumers themselves can make the choice. Since advertisement through print media is not allowed, pharmaceutical firms use packing as a form of advertising. The table given below shows expenditure under different heads on product differentiation as percentage of sales of MNCs and domestic firms.

Table: 3.8. Expenditure on Product Differentiation as percentage of Sales of MNCs and Domestic Firms

Year	*Advertisement*		*Packing*		*Others**		*Total*	
	MNCs	Domestic Firms	MNCs	Domestic firms	MNCs	Domestic Firms	MNCs	Domesti c Firms
1991-92	1.7	0.7	4.9	3.4	5.2	3.9	11.8	7.9
1992-93	1.7	1.0	4.6	3.3	5.6	3.7	11.9	7.9
1993-94	1.8	1.0	4.9	3.5	5.3	4.1	12.0	8.6
1994-95	2.0	1.0	4.9	4.2	6.0	4.0	12.8	9.2
1995-96	1.5	1.0	4.8	4.3	6.2	3.6	12.5	8.9
1996-97	6.7	1.1	4.8	4.0	1.7	3.4	13.2	8.4
1997-98	1.9	1.2	4.3	3.6	6.6	4.3	12.8	9.1
1998-99	2.0	1.1	4.1	3.3	4.8	4.1	10.9	8.6

Source: PROWESS

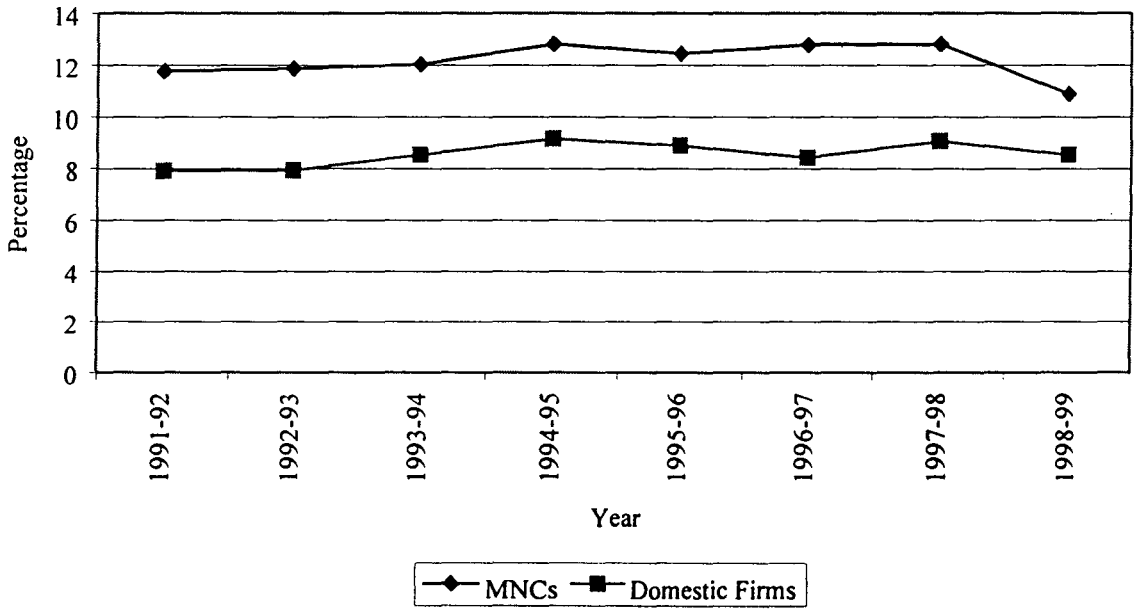
Note: Others include expenditure incurred for medical representatives and commissions given to retail agents.

It is seen from table: 3.8 that both MNCs and domestic firms use packing as a major instrument of advertising. It consisted of above 4 percent of sales of MNCs in the nineties, except for 1999-00. The domestic firms have also been spending more than 3 percent of sales for packing expenses, except for 1999-00. Whereas the expenditure under the head of advertisement is low comparing to the expenditure on packing. The MNCs spent between 1.5 percent to 2.2 percent of sales on advertisement in the nineties except for 1996-97. In that year they spent 6.7 percent of sales for advertisement. Whereas the expenditure of domestic firms on advertisement is less than 1.2 percent of sales in the nineties.

The expenditure on medical representatives and commissions given to retail agents constitute a major proportion of the expenditure on product differentiation. It was 6.2 percent of sales for MNCs and 3.6 percent of sales for domestic firms in 1995-96. The expenditure of MNCs under this head shows a fluctuating trend after this.

It is interesting to note that there was a parallel behaviour (the difference between MNCs and domestic firms was almost constant) of the share of expenditure on product differentiation (total) of MNCs and domestic firms.

Fugure: 3.7 Expenditure on Product Differentiation as Percentage of Sales of MNCs and Domestic Firms



Source: PROWESS

MNCs have been allocating 12 to 13 percent of sales on product differentiation till 1997-98, whereas the domestic firms have been spending 8 to 9 percent. By 1999-00 the share of MNCs declined to the level of nearly 9 percent of sales. This declined id contributed by the decline in the expenditure under packing and medical representatives and commission given to retail agents. The decline in the share of expenditure on product differentiation of MNCs may be partly explained by the economic theory – once a firm has created effective brand loyalty among the consumers it needs to spend only a threshold level of investment on product differentiation. If the MNCs in Indian pharmaceutical market have been successful in creating effective brand loyalty, there seems to be a rational behind the reduction in the share of expenditure on product differentiation by the MNCs. However, this proposition needs to be verified.

3.6 Summary

The chapter attempted to analyse some performance aspects during nineties in particular that of MNCs in pharmaceutical industry operating in India. Aspects like inflow of foreign investment indicated that the share of pharmaceutical industry is only 3 percent of total inflow of foreign capital into all the industries. However, it was found that around 66 percent of firms are engaged in either financial or technical collaborations. We have also examined the change in the pattern of foreign investment in the industry compared to the eighties. The number of firms with above 50 percent foreign equity has increased. However, the number of firms having minority, but above 25 percent foreign equity has declined in the nineties. A notable feature to be reported in this context is that the number of firms having equity share below 25 percent have recorded all time high level. It appears from the analysis that in the liberalisation period, the entry preference of multinationals showed a strategies shift to minority participation below 25 percent foreign equity participation

We have also traced the mergers and take overs in pharmaceutical industry in the nineties. Both MNCs and domestic firms were found to be active in mergers and take overs and consolidation. There were 4 cases where MNCs merged with MNCs and 2 cases where domestic firms merged with MNCs and 12 cases where domestic firms merged with domestic firms. In the case of take overs there were 2 instances where MNCs merged with MNCs and 1 instance where domestic is taken over by an MNC and 6 instances where domestic firms have taken over domestic firms. Due to data limitation we could not trace the total asset and sales involved in mergers and take-overs.

A major aspect we have analysed is the concentration in the pharmaceutical industry. Comparing to this in eighties, nineties have shown a relatively lower market share of MNCs i.e, 34 percent. This however, does not mean that their influence in the industry has declined because the dominance of MNCs being high in minority joint ventures (below 25 percent) and also in technical collaborations.

The study also brought out the poor performance of MNCs in the export market. Inspite of the export potential of the MNCs they were found to be less export oriented. The comparative advantage that the country offers in terms of less expensive factors of production does not appear to attract MNCs as far as exports are concerned.

It appears that relaxation of controls during liberalisation made MNCs more import intensive than domestic firms. The average annual growth rate of imports of MNCs is higher than the domestic firms. When examined the remittance behaviour, it was found that MNCs recorded an increasing trend in the nineties.

The disappointing performance of MNCs was more pronounced in the R&D behaviour. The share of MNCs showed a declining trend. The allocation on R&D by MNCs is only 0.73 percent of their sales. However, the expenditure on product differentiation showed an increasing trend indicating that the strategy of MNCs appears to be sales promotion and product differentiation and not innovation oriented growth. This prompts us to look into the profitability behaviour of MNCs.

CHAPTER 4

An Analysis of Profitability – Performance in Pharmaceutical Industry

4.1 Introduction

The liberalization programme in the 90s, as expected has brought changes to the behavioural pattern / strategies of the pharmaceutical industry as a whole as well as MNCs and domestic firms. These changes in the strategies of firms should have impact on their performance. Profitability is one of the important indicators of performance by which a firm or an industry is evaluated, in the existing literature. This chapter addresses some relevant questions as follows. What are the factors those determine or influence the profitability? How do they vary for MNCs and domestic firms? This chapter begins with a review of the theoretical literature on the determinants of profitability and analyses the profitability of MNCs in comparison to the domestic firms in the Indian pharmaceutical industry in the nineties. The last section deals with an econometric investigation of profitability in the Indian pharmaceutical industry during the nineties.

4.2 Conceptualising Profitability

Profitability in industry is one of the much talked about topics. Conventional price theory predicts that the industries in which output is produced by a few prominent firms may in the long run earn higher rates of return. In otherwords there can be a positive relationship between the seller concentration and the profitability. The first substantial test of the idea that the profitability is determined by those elements of industry, which affect entry into industry was done by Joe Bian in 1956. His work on the impact of seller concentration and barriers to entry on profitability has initiated a wide range of academic discussion on the relationship between the profitability and the structural variables.

Bain studied profitability in 20 US manufacturing industries. He found that the main determinant of profitability is barriers to entry. Advertisement and product differentiation are the two prominent sources of entry barriers. He further found that seller concentration is a necessary but not a sufficient condition for determining profitability. The subsequent study of

Michael Mann (1966) on the impact of seller concentration and barriers to entry on rates of return confirmed Bian's conclusions. He had employed a larger sample[1].

An important extension of the model was attempted by Javad Khalilzadeh-Zhirazi (1974) by including international trade and foreign investment into the already studied structural variables. His dependent variable was price cost margins[2]. The conventional market structure dimensions employed in his regression are (1) seller concentration, (2) Barriers to entry and (3) Rate of growth of demand. The economies of scale and product differentiation are his entry barrier variables. The capital-output ratio, import, export and foreign investment are the other variables he has included as explanatory variables.

Singh and Whittington (1968) have found that there is a positive relationship between the profit rates and size of a firm. They found that the variability in profitability was larger for small firms than large ones in the same sector. They also found some evidence for the persistence of firm profitability: above average forms tend to remain above average. Stekler (1963) had found the same relationship, earlier.

Orr (1974-75) found that firms are attracted by high profit rates and growth in the industry. He /She had come to the conclusion after studying the rate of entry into 71 Canadian manufacturing industries.

These are studies that have been carried out across industries on the issue of determinants of profitability. Profitability in any industry is determined by seller concentration, advertisement, research and development, international trade, productivity (capital-output ratio) and growth in the demand of industries. These will also be the variables those influence the profitability of firms in different industries, though the degree of influence may vary from firm to firm and industry to industry.

There are quite a large number of studies in the pharmaceutical industry beginning from late 1950s and early 1960s. These studies describe the nature of competition in the pharmaceutical industry. An overview of those studies will give us some an idea about the factors those would likely determine the profitability in pharmaceutical market. These studies re mainly carried

[1] Mann's result is based on the study of 30 industries.

[2] According to Javad Khalilzadeh-Zhirazi , price cost margin was the only measure of profitability for the UK industries at the three digit level.

out basing on the U.S and U.K pharmaceutical firms. Lall (1974 b) has observed that the pharmaceutical industry in the less developed countries embodies all the essential features of the pharmaceutical industry in the West. The conclusions emerging form these studies are expected to be applicable to India too.

4.3 Nature of Competition in the Pharmaceutical Industry

The body of the literature of modern pharmaceutical industry began with the investigations of the Kefauver Committee in the US in 1961. The committee's main attack was on the prices and profits on pharmaceutical industry. The costs of 22 major pharmaceutical firms in 1958 were merely 32 percent of sales (US Senate Report, 1961). The on the other hand the response of the industry to this criticism was that high returns on the successful products are needed to compensate the losses from the large number of unsuccessful projects.

A prominent characteristic of pharmaceutical industry is that it has a high reported profitability. This is the case with pharmaceutical industry in most of the countries. In United States between 1960 and 1991 pharmaceutical industry ranked first or second in 24 years out of 32, in Fortune Magazine's annual tabulation of median after tax profit returns on stockholders equity (Scherer, 1993). The profitability of pharmaceutical industry in India has also been higher than the profitability of all industries. While the profitability of pharmaceutical industry was 7.7 percent in 1965-66 it was 4.1 percent for all industry. The profitability was 4.6 percent for pharmaceutical industry in 1977-78 whereas the same figure while considering all the industries was only 2.4 percent (Singh, 1985). Sanyjaya Lall and Panickar (1992) et al have also found the same phenomenon in Indian pharmaceutical industry. Many studies have reported high profitability in this industry and hence there exists a high level of monopoly in pharmaceutical industry (William S. Comonor, 1964; Leonard Schfrin, 1967).

Economic theory can be used in predicting the competitive bahaviour of an industry. Where there are a large number of firms a higher degree of price competition is expected. On the otherhand where there are only a few firms (an oligopoly situation), non-fluctuating price levels can be expected (Reekie, 1975). The existence of a large number of firms in a market enhances the probability that the firms become more competitive. If a large proportion of an industry's output is contributed by a small number of firms, the performance of the industry is

far diverged from he perfect competition. In such situations the dominant firms, may in the long run, earn higher rates of return on investment (H. Michael Mann, 1966).

4.3.1. Price Competition

It is a unique feature of pharmaceutical industry that the price competition is very rare. The reasons for the price competition being less intensive are given below.

The inelastic demand for drugs is a factor that amounts to less intensive price competition in pharmaceutical industry. Medicines are a necessity and consumption of it is determined by the requirements imposed by disease incidence. An increase in price as such will not drive away consumers from the market nor will a reduction in price attract many (Reekie, 1975). Thus, drugs have an inelastic demand.

The inelastic demand for drugs is further complemented by the 'physician effect' in the pharmaceutical market. In pharmaceutical market the consumer and the decision-maker are not the same. The highly technical nature of the products, necessitates that the actual selection of a drug is done by an expert, the physician, who is totally isolated form the source of payment for his selection. The menu of drugs is so vast[3] that it is hardly possible for a physician to be well informed about the available alternatives. Information failure is bound to occur. The combination of physician decision-making, imperfect information and the third party payment make the demand for drugs less price elastic and confer monopoly power for the seller of well accepted brands (Scherer, 1993).

The source of information is an important factor in determining the prices. A study in Switzerland show that there is a close relationship between the drugs that are heavily promoted and that are prescribed. Similarly another study in Brazil show that the main source of information of medical profession are directly or indirectly linked to the promotional activities of private firms (United Nations Centre on Transnational Corporations, 1984). Schwartzman (1976) concludes form the result of a British survey that the majority of physicians regarded detailmen / medical representatives either as very good or fairly good

[3] The period between 1940 and 1955 was a period of revolution in pharmaceutical techniques of drug discovery. The age of wonder drugs was set in with the introduction of a large number of new drugs. Numerous New Chemical Entities (NCE) had been discovered the period thereafter. According to Scherer (1993), since 1940, 1200 NECs have been introduced in the US.

source of information about the existence of new products. The medical representatives were regarded as the best single source of information by more physicians than was any other source. There can be bias in the information provided by medical representatives or other sources supplied by the pharmaceutical companies.

A very important factor that amounts to keeping the price competition very low is the use of brand name for drugs. As we have seen earlier the menu of drugs is so vast that a physician cannot be informed of all the available alternatives. So physicians identify the drug with a specific brand (Statman, 1981) and this is often related to the promotional activities of the pharmaceutical firms. Once the doctor is convinced of the quality of the product, he / she is not willing to change his / her preferred brand, even when cheaper substitutes are available, because of their risk averse nature (Scherer, 1993).

The impact of brand name usage on drug price and profitability is an issue that has been studied in detail. One stream of such study is related to the expiry of patents. It is expected that the price of patent expired brand will decline as generic products form rival firms mount in the market. The first study of this kind was done by Schwartzman (1976) and he reports that the effect of expiry of patents on the market shares and average prices levels are a mixed one. In some cases particularly with regard to the antibiotic market, the market share was maintained through substantial price cuts. In markets other than antibiotics, he found that despite the entry of generics, the price of major products were maintained at pre-existing levels. Statman (1981) studied pricing behaviour of 12 brand drugs before and after the expiry of patents. His empirical study of price response and market share changes indicated little change in either. On average the market share fell to 96 percent of it's initial level. Only one of the twelve brand names price fell significantly following the patent expiration. There is a very low generic price elasticity of brand name demand. As to the reasons why price competition is low in pharmaceutical industry Statman has observed that the original brand being able to maintain high market share not because of price reductions. But that physicians have come to identify the drug with a specific brand name so the original seller maintain it's market share even after the expiry of patents.

A few important studies on this have come in the context of the U.S' Wax Man - Hatch Act of 1984. The Act reduced the testing requirements for approval of new generic brands of existing chemical entities. The Act had also stipulated that the innovator must provide data to firms,

which wish to market the drug as a generic post-patent. Thus the effective time between patent expiry and generic entry has been reduced to zero (Matraves, 1999). Grabowski and Vernon (1992) had studied the effect of generic entry on prices of 18 drugs between 1983 and 1987. They found that branded drugs price rose relative to generic prices subsequent to generic entry[4]. Wanger and Duffy (1988) on the price changes of top selling generics and braned drugs showed that there has been substantial price increase for the branded products accompanied by the generic entry. Whereas the prices of the generics declined as additional generic entry took place.

Scherer (1993) attributes two reasons for the higher price of branded drugs. One, there is reputational advantage for the original drug. Second, the lack of knowledge of consumers. Consumers purchasing the drug do not have sufficient knowledge to evaluate the alternatives and risks of substituting away from prescribed brand name drug. How the reputational advantage of brand can be overcome? Bond and Lean (1977) found in their study that the important and long lived advantages enjoyed by pioneering brands of prescription drugs can be overcome by new entrants only if they offer distinct therapeutic benefits, not just lower prices. Reekie (1978) observes that there is a direct relationship between therapeutic improvement and the prices of new products. Sellers, who have not been able to achieve substantial quality advantages, relied more on price competition to enter a therapeutic market. Products that embody higher quality on the otherhand are more distant from the competitive pressures.

We have seen form the above mentioned studies that the price competition is very low in pharmaceutical industry. This is an industry where brand loyalty is highly prevalent. The established firms, which enjoy the reputation of producing good quality products, may be able to charge higher prices and thus acquire higher profits. The MNCs are a category, which can charge higher prices because of their reputational advantage for high quality products.

4.3.2 Non-Price Competition

When price competition is less intensive, firms endeavor to maintain the market share by means of non-price competition measures. The most important non-price competition

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[4] The price branded drugs increased by an average of 7 percent one year subsequent to generic entry and 11 percent two years following the generic entry.

mechanism in the pharmaceutical industry is product innovation, product differentiation, and product diversification. These measures will strengthen the monopoly positions of the dominant firms and likelihood of this is higher when the product is marketed under brand name.

4.3.2.1 Competition through Innovation

Pharmaceutical industry is a research-intensive industry. The nature of the industry induces the firms to engage in innovatory competition-the competition which counts-as Schumpeter would put it. The products in the pharmaceutical market become obsolete very fast (NPPA, 1986; Chowdhari, 1984). Though the demand for ethical pharmaceuticals is generally price insensitive, is highly sensitive to quality difference. This will be especially so if the quality difference (real or assumed) is embodied in a new product resulting from a certain element of R&D effort (Reekie, 1975).

Cooper (1966) who studied the monopoly in the sub-markets (therapeutic markets) found that the domination in any sub-market by any product is a short run phenomenon. He concludes that product innovation is a necessary condition for a firm to maintain it's dominant position in a sub-market[5]. High rate of product differentiation and obsolescence is found regardless of the magnitude of price cost margins (Comonor, 1986). In 1960, 44 percent of the total pharmaceutical sales were for products introduced within the previous 5 years in the U.S. Moreover there were substantial shifts in the market share within individual therapeutic sub markets (Comanor 1964, p. 376-77). Later studies also have shown the same result. Cocks (1975) found that pharmaceutical industry ranked high among the industries with instability in market shares. Moreover the changes in the overall market shares among firms were closely related to the number of new chemical entities introduced.

4.3.2.2 Innovation and Size of the Firm

Kefauver Committee investigations found that the research and development were large in pharmaceutical comparing to other industries. To the question that whether the pharmaceutical R&D is heavily concentrated among large firms the early studies by Comanor (1967) and Mansfield (1968) found that the increase in the size of firms among

[5] Among the total 90 sub-markets he studied, in 33 sub-markets (37 Percent) the product leadership was changed in the period of three and half years. In 29 sub-markets (32 percent) the sub-market leadership was lost by the original leading firms. ,In 10 sub-markets (11 percent) more than one change in class leadership occurred.

pharmaceuticals is associated with less proportionate increase in research spending. These findings were confirmed by Grabowski (1968). But Schwartzman's (1976) analysis brings out entirely opposite result that firm size is significantly positively related to the research and development. A possible explanation for the different conclusions is that the relationship between the size and research and development has changed over time. The study by Steven Wiggins (1981) brings out the importance of studies at sub-market (therapeutic categories) levels. He finds that the research spending by therapeutic category is strongly influenced by the total size of the therapeutic market.

4.3.2.3.Innovation and Profits

The Kefauver Committee had found that pharmaceutical industry is an extremely profitable industry. One study carried out immediately after the publishing of the Senate report (Steele, 1962) restated the arguments and conclusions of the Committee report. This conclusion has been criticized for having taken the direct cost alone as appropriate index of marginal cost. The constant development of new drugs is a major activity in this industry and no firm can maintain for a long time a high volume of sales with an unchanged menu of products. Major drug firms produce and distribute a large number of products and the margins realized for individual products may not be typical of a firm as a whole[6](Comanor, 1986).

The time required for recouping the investment in R&D in a new product is an important factor. Grabowski and Vernon (1982) found that for the average new chemical entity introduced between 1970 and 1976, 19 years was needed to breakeven at a 10 percent interest rate, but only 12 years at an 8 percent rate.

A more important analysis of R&D spending moves beyond the relationship between R&D and size. Grabowski and Vernon (1981) had attempted to explore the relationship between R&D spending and profits. They found that profits are clearly affected by the firm's R&D efforts.

It is clear that there is a positive relationship between the rate innovation and market share of a firm. The firm that innovates more is able to retain a higher market share. The firms, which had been spending fairly large shares on R&D, are likely to occupy fairly large market share.

[6] For some major pharmaceutical firms three products constituted 70 to 80 percent of the sales (William S. Comanor, 1986. pp. 1182, 83).

Some firms may develop R&D indigenously whereas some other firms may import R&D through royalty payments. Larger the size, larger the chances of engaging in risky R&D.

4.3.3. Product Differentiation

Product differentiation is the process that makes one product different from among similar products in the market. Production differentiation reflects two sets of factors; (a) Characteristics of firms within the market and (b) policies of the firms with respect to advertising, product design and marketing (Comanor and Wilson, 1967). The characteristics of the firm within the market imply the difference in the quality of the product. In pharmaceutical market, this aspect of product differentiation is embodied in the following measures; (i) different brand names for the same drug (ii) different dosage forms and (iii) combination of existing drugs. The most common form of product differentiation in the developing countries is the combination of existing drugs (Panickar, et al 1992). The difference in quality can be either real or assumed. The study by Abe (1995) on the price and advertisement strategies of a national firm in Italy found that the firm could charge a higher price because of the perception of the consumers of the superior quality of the product.

The degree of product differentiation is measured by the cross elasticity of demand and supply, for the competing products. A low elasticity of demand between products indicate that buyers prefer a particular brand and will not switch to other brands, in large number, even when there is a small difference in prices. On the demand side products are differentiated when the buyers are relatively uninformed about the merits of other products. On the otherhand, a low elasticity of supply implies that producers / rival firms are unable to easily imitate those products which are successfully supplied by the established firms (rival firms are unable to eliminate buyer preferences).

4.3.3.1 Advertisement and Promotion

Advertisement is an important means in differentiating the products. Bain (1956) had found that the advertisement is the most important source of product differentiation. The advertisement in the pharmaceutical market is carried out through different channels. In ethical drugs market the advertisement in the mass media is prohibited. Advertisement is carried out by the medical representatives and through the medical magazines. Advertisement in the case of Over-the-Counter (OTC) drugs is done through, including the mass media.

Firms consider advertisement as an activity that should be conducted at some minimum absolute level irrespective of the size of the firm. Larger firms have the advantage of spreading the advertisement cost over a large number of units of output and thereby make per unit cost on advertisement very low (Reekie, 1975).

Bain found that new entrants are forced to sell their products below the established brands or incur heavy promotional costs. This is the reason why the prices of unbranded products are especially very low.

Kefauver committee found that the largest 22 drug firms reported selling outlays of 24.8 percent but research outlays of only 6.3 percent. This disparity has been acknowledged in later works. Hugh Walker (1971) argues that the outlays on advertising and promotion by the large pharmaceutical firms led to achievement of market power

Weston (1982) finds that in the pharmaceutical industry promotion and marketing outlays are about 20 percent of the sales and are about twice the size of R&D outlays in relation to sales. In India, in 1984 the leading pharmaceutical firms spent 175 percent of R&D on promotional activities (Narayana, 1984). Schwartzman (1976) finds that more innovative firms spend larger sums on promotion than others. He also finds that firms with high levels of promotional expenditures are also firms that have introduced large number of new products. Lester Telser (1975) studied the relationship between promotional intensity and innovation. He used innovation as the dependent variable. He finds that promotional intensity strongly related to innovation. Leffler(1981) estimated a similar regression equation across different therapeutic categories using selling efforts as dependant variable and new products introduced as explanatory variables. He had observed a significant positive effect of the latter variable on selling efforts. Bond and Lean (1977) examined detailed data on selling costs of two specific therapeutic markets. And they found that physicians respond more favorably to promotion of brands that are first to offer and promote some new therapeutic advantage than to the promotion of brands that merely duplicate the existing therapies. The relationship between promotion and sales depends critically on both products' position in innovative race as well as therapeutic characteristics.

4.3.4. Product Diversification

The pharmaceutical firms face higher threat than firms in other industry, of being overtaken technologically by the rival firms or new entrants. In such an insecure situation firms endeavor to maintain their market share through engaging more intensely in product differentiating, price reductions, innovations and diversification.

Product differentiating activities can increase market share of product only if the product is having some therapeutic advantages, because pharmaceutical market is highly sensitive to quality of the products. This is the case with price reducing strategies also. R&D efforts inorder to keep abreast of the technological change is a surer method of maintaining market share. It will be of advantage only if the R&D is successful in producing products in advance of rival firms. Because the pioneering brands have a distinct advantage in pharmaceutical market. None of these strategies guarantee an assured level of profits or market share.

Product diversification[7] is a strategy that indeed reduces the likelihood that the firm can be wholly technologically and hence commercially overtaken by rivals. The hypothesis is that the more diversified the firm, the more stable is it's market share (Reekie, 1972). His study on the British pharmaceutical firms confirms the hypothesis that firms with relatively stable market share are those firms that are more diversified. Reekie (1975) cites the example of Pfizer to explain the importance of product diversification. The American Pfizer company a dominant player in the anti-biotic sector due to it's drug 'Terramycin' in the 1950s. In 1953, 96 percent of the sales of ethical drugs were in anti-biotic field. Later on Pfizer began to face competition from Beecham's semi-synthetic pencillin 'Penbritin' and other products such as Imperacin' and the market share of the firm fell considerably. There on the company had products in diabetic, tranquilizer and anti-depressive sub-markets. In 1966, Pfizer's share from anti-biotics was reduced to 68 percent comparing to 96 percent in 1953.

The above discussion gives us some idea about the possible determinant of profitability in pharmaceutical industry. The structural variables those influence the profitability are seller concentration, product differentiation, R&D activities and size of firms. Other important variables those influence profitability are exports and efficiency (capital-output ratio). The following is an analysis of profitability of MNCs in comparison to domestic firms in the 90s.

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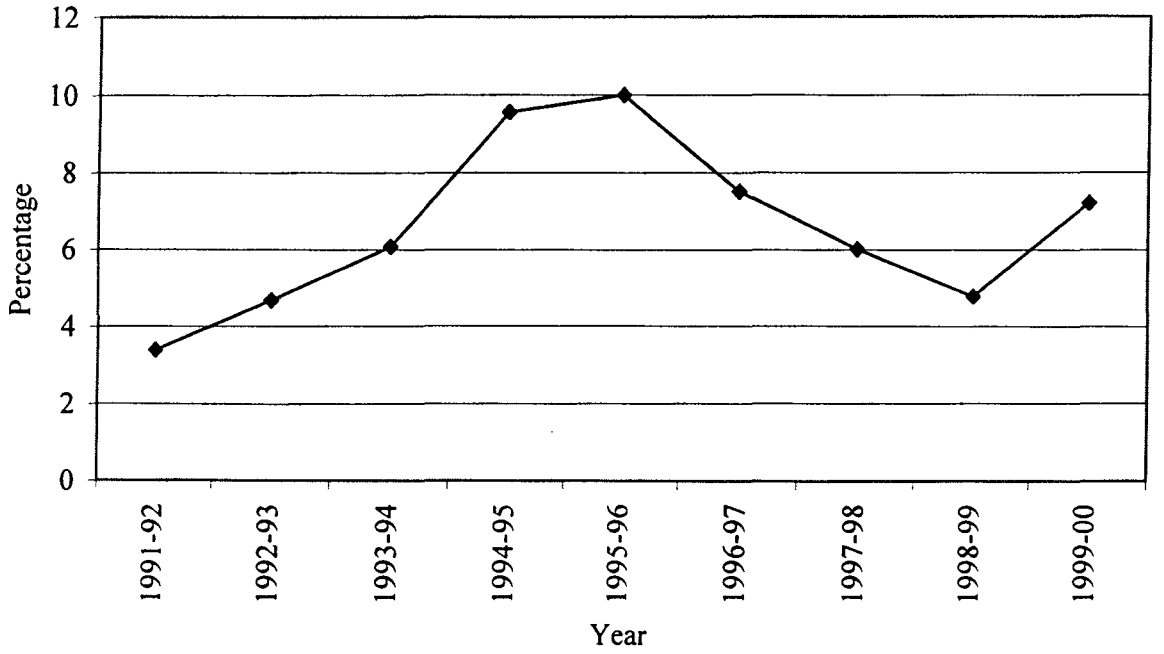
[7] Firms spread their operations within the industry between various therapeutic sub-markets.

4.4 Analysis of Profitability

The liberalization program is expected to bring more competitive forces into the economy. The same is expected in the case of pharmaceutical industry, too. The reason why one expects more competition in the pharmaceutical industry in the 90s is explained in chapter 3. Given the nature of industry, MNCs are expected to perform better than the domestic firms because of their technological, managerial and product differentiating advantages. If the liberalization process has made pharmaceutical industry more competitive, the seller concentration and profitability is expected to decline. The 3-firm concentration analysis in the previous chapter show that the concentration has been declining in the 90s for the industry as a whole and for MNCs and domestic firms. Hence the profitability for the industry as a whole and for MNCs and domestic firms should also be declining in the 90s. Profitability for the industry as a whole is shown in figure 4.1.

Figure: 4.1 Net Profit as Percentage of Net Sales



Source: PROWESS

The profitability shows an increasing trend till 1995-96 and then declines. This shows that concentration is not an appropriate measure to represent the competition in pharmaceutical industry. This is because of the existence of therapeutic markets in the pharmaceutical market. The pharmaceutical market is divided into different sub-markets because of the heterogeneous nature of drugs, with respect to certain therapeutic classes. These sub-markets have a highly

concentrated market structure, which is not reflected, in the pharmaceutical market as a whole (Reekie, 1975). The following graph shows the trend in the profitability of MNCs and domestic firms, in the nineties.

4.5 Determinants of Profitability: An Econometric Investigation

This section deals with an econometric analysis of profitability in the Indian Pharmaceutical industry during the nineties. To explain the variation in profitability across firms in the pharmaceutical industry we have selected five explanatory variables viz. product differentiation, expenditure on research and development, exports, import of technology and output-capital ratio. Explanations for identification of these variables as determinants of profitability in pharmaceutical industry follows from the detail discussions in the earlier sections. In this analysis we address two questions specifically: (a) whether the profitabilities of MNCs and domestic firms are different in the Indian pharmasuetical industry and (b) whether the impact of each of these selected explanatory variables on profitability differes between MNCs and domestic firms.

It was observed in Figure 1 that there was an increasing trend in profitability till 1995-96 and then there was a declining trend which reached its lowest level in 1998-99 and again, started to increase there after. To get answers to the said questions, an attempt is made to compare the performance of MNCs and domestic firms in the Indian manufacturing industry at three specific time points ie., 1992-93,1995-96 and 1998-99.These time points are selected on the basis of Figure 1. To maintain consistency in the observed sample we have selected those firms information of which are reported at all the three time points in PROWESS. This has constrained our sample size to 66 of which ,19 firms belongs to the category of MNCs .

The following specification is used for estimation:

$$Y = \beta_1 + \beta_2 D + \beta_3 x_1 + \beta_4 x_2 + \beta_5 x_3 + \beta_6 x_4 + \beta_7 x_5 + \beta_8 Dx_1 + \beta_9 Dx_2 + \beta_{10} Dx_3 + \beta_{11} Dx_4 + \beta_{12} Dx_5$$

Where,

Y = Profitability (Net Profit/Sales)

D = Dummy (0 = Domestic Firms,1 = MNCs)

X_1 = Product Differentiation (Product Differentiation/Sales). Expenditure onproduct differentiation includes expenditure on packing, advertisement, medical representatives and retail agents.

X_2 = Research and Development (Research and Development/Sales)

X_3 = Exports (Exports/Sales)

X_4 = Import of Technology (Import of Technology/Sales)

X_5 = Output – Capital Ratio (Output/Capital)

The above specification is largely incorporated from the studies of Joe Bain (19956) and Khalizadesh-Shirazi (1976), on determinants of profitability across industries. Bian found the relationship between profitability and adverstisment and produt differenstiation, using single techniques of weighted averages and ratios. In our analysis, we have clubbed together expenditure on advertisment, packing and marketing as product differentsiation as a single variable, the reasons of that are given in the previous chapter. We find from the theoretical review in the previous sections that the product differntiation, exports and capital output ratio are relevant variables for our study. Khalizadesh-Shirazi had employed dummy variables for product differentiation, due to data limitations. The data on product differentiation provided by United Kingdom Census of Production, the data source he used, was a pooled one for many industries. He had taken those industries with expenditure on product differentiation above 1% of sales as high-moderately differentiated category and those industries with expenditure on product differentiation below 1% of sales to be low-undifferentiated category. He had taken the capital output ratio as capital as percentage of output, and exports as percentage of output. In our analysis, we have used output-capital ratio. The difference it makes is in terms of sign. We expect a positive sign.

The inclusion of R&D and import of technology into our model is on the reasoning based on the nature of the industry. Pharmaceutical industry, being a research intensive industry, investment in R&D should impact on profitability. Firms may try to acquire technology apart from R&D, through purchase of know-hows and technology embedded capital goods. Import of technology may also be a crucial determinant of profitability. Estimated results are reported in Table 4.1.

Table: 4.1. Estimated Regression Results

	1992-93	*1995-96*	*1998-99*
Intercept	0.055 (3.180)*	0.053 (2.398)*	-0.026 (-1.130)
Intercept dummy	-0.088 (-1.718)**	-0.064 (-1.367)	0.023 (0.378)
Product Differentiation	-0.195 (-1.309)	-0.222 (-1.212)	0.109 (0.868)
Research and Development	0.085 (0.089)	1.585 (2.895)*	1.543 (3.598)*
Export	0.031 (0.636)	0.021 (0.373)	0.208 (4.068)*
Import of technology	0.033 (1.539)	0.488 (1.878)***	-2.268 (-1.323)
Output-Capital Raito	-0.001 (-0.468)	Omitted	0.005 (0.936)
Dummy-Product Differentiation	0.383 (1.649)***	0.782 (2.401)*	-0.055 (-0.243)
Dummy- Research and Development	1.011 (0.635)	2.709 (0.898)	-0.473 (-0.280)
Dummy-Export	-0.267 (-0.879)	-0.540 (-0.835)	-0.409 (-1.057)
Dummy-Import of Technology	3.456 (2.160)**	-3.056 (-1.131)	5.652 (2.113)*
Dummy- Output Capital Ratio	0.018 (2.124)**	Omitted	0.007 (0.705)
R^2	0.266	0.297	0.422
Adjusted R^2	0.107	0.184	0.303

Note: (i) Figures in brackets are t-values
(ii) Omitted variable: The variable output-capital ratio was omitted because of the zero correlation.
(iii) * indicates significant at 1 % level
(iv) ** indicates significant at 5 % level
(v) *** indicates significant at 10 % level

This table shows that intercept dummy appears to be significant in the equation for 1992-93. It implies that average profitability differs significantly between MNCs and domestic firms, holding constant the effect of all the explanatory variables. However, similar results are not observed for the other two time points, viz., 1995-96 and 1998-99. For the 1992-93 equation, dummies for product differentiation, import of technology and output capital ratio are also significant. Therefore, an unit increase in the ratio of expenditure on product differentiation to sales has differential impact on profitability of MNCs vis-à-vis domestic firms. Similar interpretations are applicable for the other two explanatory variables too viz., import of technology and output capital ratio. From the estimated results of 1995-96, it is evident that expenditure on R&D and import of technology have significant effect on profitability. Moreover, an unit increase in product differentiation has differential impact on the profitability of MNCs vis-à-vis domestic firms. Similar finding was observed in 1992-93. But

this result does not hold good for 1998-99. From the estimated equation for 1998-99 it appears that, import of technology has significant differential impact on the profitability of MNCs vis-à-vis domestic firms. Estimated results of 1998-99 further indicate that one unit increase in R&D expenditure will increase the profitability of firms in the Pharmaceutical industry. Similar effect is observed with respect to exports too. From the correlation matrix, as reported in Tables 4.2, 4.3 & 4.4, it is evident that none of the correlation coefficients between the explanatory variables is high. It might be considered as an indication that there is no serious problem of multi-collinearity.

Table: 4.2. Correlation Matrix 1992-93

	Profitability	*Product Differentiation*	*Research and Development*	*Export*	*Import*	*Output-Capital Ratio*
Profitability	1.000	0.045	0.207	-0.071	0.162	0.024
Product Differentiation	0.045	1.000	0.097	-0.286	0.121	-0.068
Research and Development	0.207	0.097	1.000	-0.072	0.238	0.036
Export	-0.071	-0.286	-0.072	1.000	0.096	-0.017
Import	0.162	0.121	0.238	0.096	1.000	-0.16
Output-Capital Ratio	0.024	-0.068	0.036	-0.017	-0.16	1.000

Table: 4.3. Correlation Matrix 1995-96

	Profitability	*Product Differentiation*	*Research and Development*	*Export*	*Import*	*Output-Capital Ratio*
Profitability	1.000	.118	.016	.393	.234	0.000
Product Differentiation	.118	1.000	-.343	.059	.045	-.119
Research and Development	.016	-.343	1.000	-.066	.154	0.080
Export	.393	.059	-.066	1.000	.083	-.072
Import	.234	.045	.154	.083	1.000	-.188
Output-Capital Ratio	0.000	-.119	0.080	-.072	-.188	1.000

Table: 4.4. Correlation Matrix 1998-99

	Profitability	*Product Differentiation*	*Research and Development*	*Export*	*Import*	*Output-Capital Ratio*
Profitability	1.000	.042	.354	.327	.139	.063
Product Differentiation	.042	1.000	-.120	-.283	.012	.247
Research and Development	.354	-.120	1.000	.094	.174	-.175
Export	.327	-.283	.094	1.000	-.047	-.263
Import	.139	.012	.174	-.047	1.000	.114
Output-Capital Ratio	.063	.247	-.175	-.263	.114	1.000

From the above discussion, therefore, it is evident that the effect of the different explanatory variables on profitability are different at the three time points, viz., 1992-93, 1995-96 and 1998-99. Comparing the above findings, one might expect that increasing expenditure on R&D would have a positive impact on profitability. Increasing expenditures on import of

technology and produxct differentiation, on the other hand, is likely to increase the profitability of MNCs at a higher rate than that of the domestic firms. Low values of both the R^2 and adjusted R^2 , however, indicate that some other major explanatory variables are influencing the profitability of Indian pharmaceutical industry during the 90s. Due to the non-availability of relevant data, we could not include some important explanatory variables in our analysis. One such major explanatory variable is product diversification.

Table 4.5. Product Diversification of MNCs and Domestic Firms

Company	*Status*	*1992*	*1998*	*% Change*
Glaxo	MNCs	15	18	20
Pfizer	MNCs	11	13	18
Ranbaxy	Domestic	16	17	6.3
Cipla	Domestic	25	38	52
Nicholas Piramal	Domestic	19	30	58

Product diversifictaion in pharmaceutical industry refers to the process of extending the prduct profiles to different therapeutic categories. The table gives information on the product divesification of a few top MNCs and domestic firms. The information is c based on the classifiacaton given in MIMS (Monthly Index of Medical Specialities). From table 5 it is obsrved that Glaxo, produces 15 different categories of drugs in 1992 and the range of drugs was increased to 18 in 1998. Out of the five reported companies , we find that diversification was highest for Cipla. In terms of percentage change in diversification of drugs produced, on the other hand Nicholas Piramal comes at the top. Among top pharmaceutical firms dometic firms tend to diersify more than the MNCs as is evident from the table. We have not been able to include this variable in our econometric analysis as an explanatory variable due to the difficulty in collection of data in a short period of time. Another possible reason for the low R^2 value could be that the overall analysis of the industry does not give a real picture in the case of pharmaceutical industry. Reekie (1975) and Bergeijk and Schut (1986) observes that there exists a large number of highly concentrated therapeutic sub markets in pharmaceutical industry. An analysis of the industry as a whole does not reflect the heterogenous nature of the sub markets.

4.6 Summary

The chapter attempted to analyse the factors that are influencing the performance, particaularly the profitability of both MNCs and domestic firms in the pharmaceutical

industry. Regarding the influence of various factors such as seller concentration, entry barriers and size of the firms on profitability, the existing literature provide comprehencive view of all industries. We have seen that the price competition is less in pharmaceutical industry due to its unique features like inelastic diemand for drugs, brand loyalty and information gap. The non price competition, however, seems to be more pronounced as an alternative strategy of competition. Product innovation, product differentiation and product diversifiacation are the most important non-price competition mechanisms. Interestingly, the notion that the liberlalisation induced competitivemness will drive down the seller concentration and thereby the profitability, has not happened in this case. It is obvious from the fact that till mid nineties profitability was increasing wheras the seller concentration was declining. This could be attributed to the heterogenity of different therapeutic sub-markets in the pharmaceutical sector. The sub-markets are highly concentrated but is not refleted in the overall analysis.

We carried out our analysis to see whether there is any differences in the profitability of MNCs and domestic firms and also is there any differential impact of the explanatory variables on the profitability of these two. From the existing literature we have identified the factors such as prodict differentiation, expenditure on R&D, export of drugs, import of technology and capital output ratio as the explanatorty variables. Three time periods viz. 1992-93, 1995-96 and 1998-99 were selected for the analysis. The analysis reveal the fact that there was marked differences in the profitability of MNCs and domestic firms for the year 1992-93. This finding, however, does not hold good for the rest of the period of analysis. From the analsysis it is also observed that the effect of different explanatory variables on profitability are different at three time points. The variables such as product differentiation, import of technology and capital output ratio were seems to be significant diuring 1992-93 for all the firms. These three variables had a differential impact on the profitability of MNCs. Whereas the expenditure on R&D , import of technology and product differentiation are found to be significant during 1995-96 and expeniture on product differentiation had a differential impact on profitability of MNCs. In 1998-99 exports of drugs and expenditure of R&D has been influencing the profitability of all the firms. The import of technology was found to be significant only for MNCs. Thus we may conclude that the impact factors influencing profitability vary across different firms and across different years. On the whole an unit increase in expenditure on product differentiation, import of technology and R&D have a differential impact on the MNCs.

CHAPTER 5

Summary and Conclusions

The main objective of the study was to analyse some dimensions of the performance of the MNCs in pharmaceutical sector during the liberalisation period in comparison with the domestic firms. Apart from this objective, the study also attempted to analyse the factors that are influencing the profitability and how it varies across MNCs and domestic firms. For the purpose of analysis we have considered the period since 1991-92 as the period of liberalisation. In this chapter we shall attempt to summarise the major findings of the study.

Chapter 2 attempted to analyse the evolution of modern pharmaceutical industry in India. Though many Indians had made efforts from the beginning of the 20th century, it could not come to the forefront for a long time due to technological backwardness. Our review showed that the emergence of modern pharmaceutical industry in India has been due to the efforts of many eminent Indians in the early 20th century. However, in the post-independence period, the government of India made all necessary measures to facilitate the growth and establishment of the domestic sector. The Indian Patent Act of 1970 and FERA of 1973 were important policy means to protect the domestic sector from foreign sector. The licensing policies also enabled the government to extend support to the domestic sector by way of denying permission to MNCs for the production of certain drugs and thus the Indian firms are encouraged to invest and develop those drugs indigenously. The licensing policies were also a major policy measure in the hands of government to regulate the domestic sector in such a way that they were not given licences to produce outdated or obsolete drugs. The various drug policies facilitated government's attempt to ensure quality and reasonable prices of drugs though the outcome of such policy measures were far from satisfaction.

The government having provided a reasonable period of protection to the pharmaceutical industry has adopted many liberalisation measures. The beginning of a full-fledged liberalisation program was incepted in 1991. In the liberalisation period, when compared to the pre-liberalisaiotn period it is observed that (1) there is a higher growth in the pharmaceutical market (2) the industry has become more trade oriented (3) dependence of the industry on imports has increased, and (4) expenditure on research and development has declined. However, the trade balance showed a positive trend indicating more export intensity.

Chapter 3 attempted to analyse some aspects relating to performance during the nineties in particular, that of MNCs in pharmaceutical industry operating in India. Export, import, product differentiation and R&D were the variables taken as performance indicators. The chapter has also looked into the pattern of foreign collaboration and equity holding pattern in Indian pharmaceutical industry. The inflow of foreign investment indicated that the share of pharmaceutical industry is very low when compared to the total inflow of foreign capital into all the industries. However, it was found that around 66 percent of firms are engaged in either financial or technical collaborations. Interestingly, it was noted that the pharmaceutical firms are more interested in entering into financial cum technical collaborations. The analysis of foreign equity holding pattern brought out a notable feature that the number of firms having equity share below 25 percent have recorded all time high level. It appears from the analysis that in the liberalisation period, the entry preference of multinationals showed a strategies shift to minority participation below 25 per cent foreign equity participation

In chapter 3 we had traced the mergers and takeovers in pharmaceutical industry in the nineties. Both MNCs and domestic firms were found to be active in mergers and takeovers and consolidation. Another aspect that was studied in this chapter is the concentration in the pharmaceutical industry. Comparing to this in eighties, nineties have shown a relatively lower market share of MNCs. This however, does not mean that their influence in the industry has declined because the dominance of MNCs being high in minority joint ventures (below 25 percent).

The analysis of performance based on the earlier mentioned variables showed the following trends. (1) the export of MNCs is much lower than the domestic firms (2) MNCs have become import intensive (3) R&D investment by MNCs is abysmally low (4) expenditure on product differentiation is higher than the domestic firms. The strategy for growth of MNCs appears to be based sales promotion and product differentiation and not on innovation.

In Chapter 4, an attept is made to identify the factors that are influencing profitability of pharmaceutical firms and to analyse how the impact of these variables vary across MNCs and domestic firms. From the existing literature, we have identified variables such as product differentaition, export, import of technology, R&D and capital output-ratio as explanatory variables. It was found that the impact of these variables is not consistent over time. However, it was found that all the variables except product differentiation and capital output ratio are significantly influencing the profitability of pharmaceutical firms. MNCs had an additional advantage from product differentiation and import of technology.

Some of the observations of the study call for detailed research. It was observed that the 3-firm concentration ratio in the pharmaceutical industry has been declining in the nineties. This may imply there is a higher degree of competition. We expect profitability to come down when competition increases. The profitability of pharmaceutical industry shows a continual increase till mid nineties. This contradiction could be attributed to the heterogenity of different therapeutic sub-markets in the pharmaceutical sector. The sub-markets are highly concentrated but is not refleted in the overall analysis[1].

We may conclude by making a brief review of the current discussion on the impacts of Trade Related Intellectual Property Rights (TRIPS) on the pharmaceutical industry. Major changes can be expected in Indian pharmaceutical industry after 2005 when TRIPS implements fully. India will have to introduce product patent for pharmaceutical products. The current discussion on the TRIPS and pharmaceutical industry is centered around the issues of drug prices, research and development and transfer of technology.

There are two views coming up on the drug prices. One view is that there will be a sharp increase in the prices of drugs after 2005 and the other view is countering this i.e., the prices need not increase sharply. The first view is based on the nature of product patent regime that the patent holder is the sole authority, which decides the production and distribution of the product. As there is no competitor, the patent holder can charge very high prices. The implementation of TRIPS, immediately may affect only a very small proportion of drugs in India because the TRIPS agreement provides status quo of the product produced till then. In the long run the price of drugs may rise sharply as the old drugs become ineffective due to the disease causing bacteria or viruses develop resistance to the drugs, thereby forcing people to switch to the new more expensive drugs. The later view is based on the low purchasing power of people in India. On the other hand it is argued that the firm that charges a high price may find a very low demand for their products. In this scenario, a firm driven by profit motive will not charge heavy prices.

TRIPS may encourage pharmaceutical industry in the developing countries especially India to invest more on drugs on diseases specific to these regions, such as tropical diseases. This may take some time to become visible. Inspite of the fact that, diseases like malaria, sleeping sickness, tuberculosis etc. kill more than two million people every year in the developing

[1] The brand Otrivin supplied by Novartis had a market share in the dicofenac market in 2001, in The Hindu , Feb.14, 2002. The same phenomena is reported by other studies also (Reekie,1975 ; Bergeijk and Schut, 1986).

countries, no major R&D initiative had been done in the development of drugs for the treatment of these diseases. The drugs used for these diseases are developed thirty years ago (Pradeep Aggarwal and Sai Baba, 2001). The question that arises is that inspite of these facts, why the comparatively more developed Indian pharmaceutical firms did not discover any new drug for the treatment of these diseases? The answer may be the profit motive; lack of patent protection in India makes it unprofitable to engage in such risky business. Change in the patent may encourage many Indian firms to undertake R&D on diseases common to developing countries rather than merely reproducing the drugs invented in the developed countries. The comparatively cheaper drugs supplied by Indian firms may find easy access in the developing countries.

It is assumed that introduction of product patent system may bring latest technology into the country. This need not be so. The Articles 28 and 31of Dunkel Draft, which deals with the working of patents equates imports as tantamount to working of the patent in the country. If this is the case the transfer of technology will not take place in a big way.

Given these problems and probabilities what are the options available at the discretion of the government? The concerns that the product patent regime mandated by TRIPS will make even life saving drugs particularly for disease of the developing world unaffordable to its vast population has been attended seriously. The 1994 TRIPS agreement provides some escape clauses for the member countries.

The Escape Clauses under TRIPS

1.Compulsory Licenses

A compulsory license allows the use of the invention by a person who has been authorized by a competent authority. The various grounds under which the compulsory licenses are granted are;

- Emergency and extreme urgency
- Anti-competitive practices
- Public non-commercial use
- Protection of environment, and
- Public interest.

As and when the conditions, which led to the issue of compulsory licenses, are no longer applicable, the licensees could be revoked. When faced with any of the above mentioned conditions, the national government may permit any firm to produce the needed drug.

2.Parallel Imports

Parallel imports are goods imported into a country without licenses for their intellectual property rights. Parallel imports allow a country to ensure access to the cheapest product from other countries. In pharmaceuticals there exists wide disparity in the price levels of drugs. However the exercise of this provision essentially depends on the ability of the political regime to withstand pressures from strong pharmaceutical lobbies.[2]

These are provisions available to all the member countries. Recently there have been moves to ensure the concern of the developing countries in the implementation of TRIPS in pharmaceuticals.

Doha Declaration

The product patent system which prevented governments and patients in many of the developing countries to the access to lower priced generic versions. The increasing criticism on the high treatment costs and with patented drugs for AIDS and Anthrax in the developing countries has forced the Ministerial Meeting of TRIPS in 2001 at Doha to declare that the restrictive clauses under the TRIPS agreement on drug patent will not override the public health concerns. The declaration has endorsed more emphatically the need for TRIPS to address the public health concerns of the developing and least developed countries especially for the HIV/AIDS, Tuberculosis, Malaria and other epidemics. The limitation of the declaration is that it has not defined what is an epidemic. It might give room for differing interpretations.

The DOHA has reaffirmed compulsory licensing and parallel imports mechanisms in ensuring the health concerns. The technical capability to produce the drug is a necessary condition for the working of compulsory licensing. Another option is the parallel imports; importing from the cheapest source in the world, so as to ensure the availability of the needed drug at the lowest possible cost. The exercise of these provisions essentially depends on the ability to with stand the pressures of the large MNCs and pressures from other countries. Much depends on the strategy that the government may adopt by exploiting the escape clauses in TRIPS. However, in the long run the pharmaceutical industry's strength will depend on its innovative thrust. The industry has to invest liberally on R&D ventures and government has to facilitate

[2] In the US, the Congress approved a Bill in July 2000, where by allowing parallel imports of cheaper patents protected drugs. President vetoed it due to pressures from the powerful pharmaceutical industry.

the conditions for such investments. As we have already observed in our study, the Indian sector is gaining ground in some respects mainly due to it's R&D thrust as a strategy to develop low cost drugs by exploiting the advantages specific to the Indian situations. To gain ground internally and internationally and face increasing challenges posed by competitors this strategy has to be pursued vigorously.

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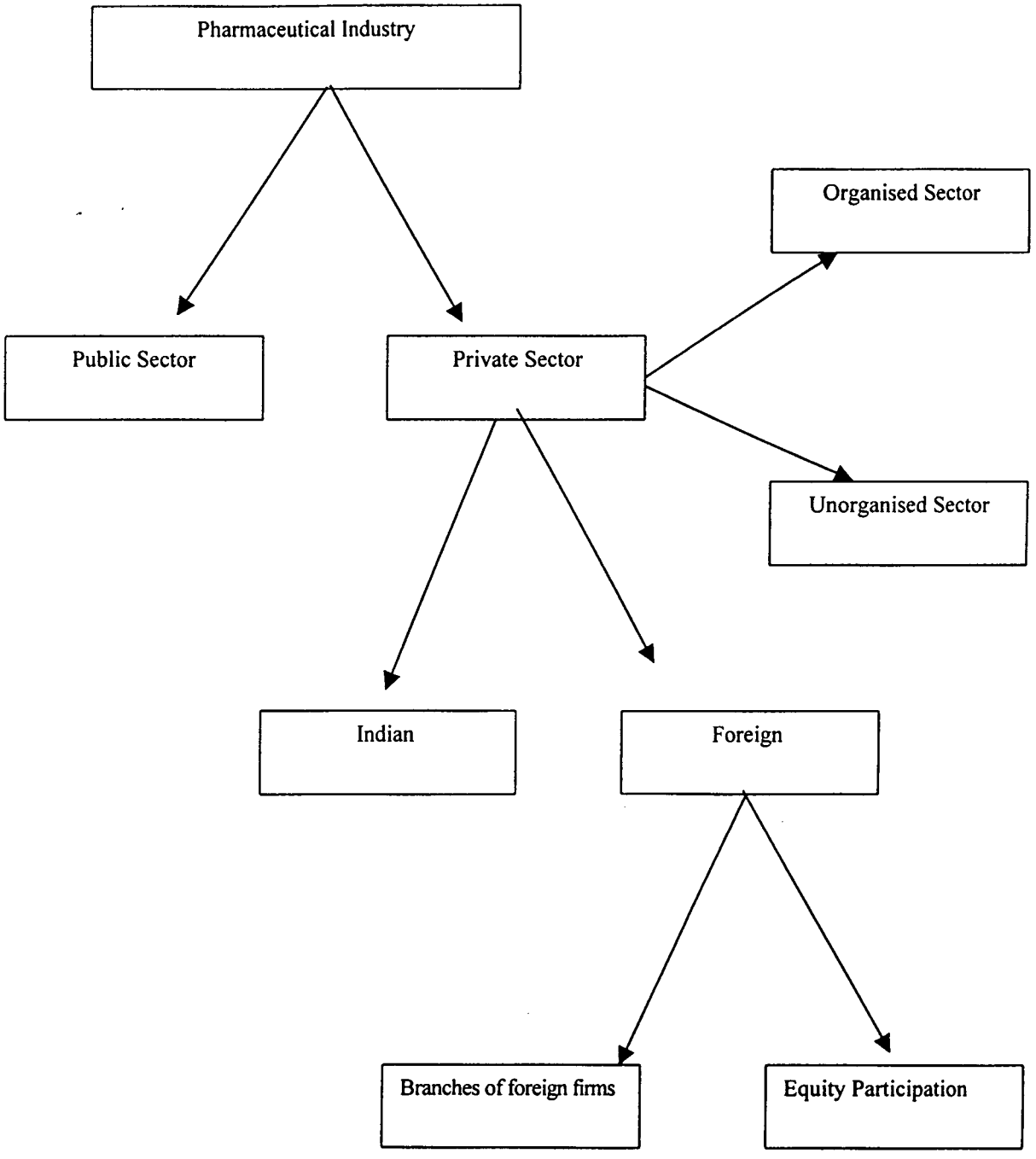
APPENDIX

Appendix 1.1

Structure of Pharmaceutical Industry in India



Appendix: 3.1. Mergers

Year	*Merged Entity*	*Merged With*
1993	Standard Organics-I	SOL pharmaceuticals-I
1995	Sumitra Pharma-I	Nicholas Piramal India-I
1996	Rupal Chemical Industries-I	AartiDrugs-I
1996	Sandoz and Hindustan Ciba Geigy merged and formed Novartis M	
1996	Sumitra Pharma-I	Nicholas Piramal India-I
1997	Biddle Swayer-M	Glaxo India-M
1997	Crossland Research Laboratories -I	Ranbaxy Laboratories-I
1997	Tamilnadu Dadha Pharma-I	Sun Pharmaceutical Industies-I
1998	Meghdoot Chemicals-I	Glaxo India M
1998	Milmet Laboratories-I	Sun Pharmaceutical Industies-I
1999	Croydon Chemical Works_I	Glaxo India-M
1999	Remed Laborotories India-I	Strides Pharmaceuticals-I
1999	Gujrat Lyka Organics-I	Sun Pharmaceutical Industies-I
2000	Cheminor Drugs-I	Dr.Reddy's Laboratories-I
2001	Smithkline Beechem Pharmaceuticals-M	Glaxo India-M
2001	Super Pharma-I	Nicholas Piramal India-I
2001	Ciba Ckd Biochem-M	Novartis India-M
2001	Prdeep drug Co.-I	Sun Pharmaceutical Inds-I

Source: CMIE, Monthly Review on Indian Economy, various issues and Beena P.L (2000,2001,2002)
Note: I = Domestic, M=MNC.

Appendix: 3.2.Take Overs

Year	*Taken Over Entity*	*Taken Over By*
1994	India Infusion Pharmaceuticals-I	Torrent Pharmaceuticals-I
1997	Boots Pharma-M	Knoll Pharma-M
1997	Boehringer Mannheim-I	Nicholas Piramal -I
1998	Wander Ltd. -I	Novartis -M
1998	Merind Ltd.-I	Wockhardt Ltd-I
1999	Fine Drugs and Chemicals-I	Vorin Laboratories-I
1999	Core Healthcare-I	Wockhardt-I
2001	Hoechst Marion Roussel-M	Aventis Pharma-M
2001	Fortis Healthcare-I	Ranbaxy Laboratories-I

Source: Same as appendix 3.1
Note: I = Domestic, M=MNC.

Appendix: 3.3. Sale of Assets

Year	*Asset Sold By*	*Assets Bought*	*Nature of Asset*
1996	Duphar-Interfan	Smithkline Beecham	Crocin
1999	American Remedies	Samnar Speciality Chemicals	Bulk drug plant
1999	Pfizer	Cadila Healthcare Ltd	Plant
1999	Hoechst Marion Roussel	Novartis India	Manufacturing Unit
1999	Eli Lilly Ranbaxy	Nicholas Piramal India	Pharma brands
1999	Ranbaxy Laboratories	Galderman S A, France	
2000	Eli Lilly	Nicholas Piramal India	Brands- Mucokef, Zidime, Keroxime.
2000	Hoechst Marion Roussel	Nicholas Piramal India	Brands- Omnatax, Hacmaccel
2000	Ranbaxy Laboratories	Nicholas Piramal India	Brands- Lovir
2000	Ajantha Pharma	Orchid Chemicals and Pharmaceuticals	Bulk drug unit in Maharashtra
2000	Duphar-Interfan	Duphar Pharma India Ltd.	Pharma business
2000	Unique Pharmaceutical Laboratories	J.B Chemicals and Pharmaceuticals Ltd	Pharma division
2000	Ifiunic Pharmaceuticals	J.B Chemicals and Pharmaceuticals Ltd	Pharma division
2000	Recon	Zydus Cadila (Cadila Healthcare)	Formulation Business
2000	Lyka	Glenmark Pharmaceuticals	Sensur Balm, Alex Cough Syrup and Flucort Ointment
2000	Baxter Healthcare (US based)	Unichem Laboratories	Marketing and distribution rights of Patrobulin
2000	Bayer India	Bayer Pharmaceuticals	Pharmaceutical Business
2000	Glaxo India	Universal Medicare	Brands- Multivite FM, Macraberin
2000	Glaxo India	U.S Vitamins	Brands- Anovate, Derobin
2000	Dai-Ichi Karkaria	Dr.Reddy's Laboratories	Brands- Dinoripe Gel, Deviprost, P.G Tab
2000	Glaxo India	E Mrk (India)	Liver tonic-Livogen
2001	Darshak	Alembic	Bulk drug manufacturing unit
2001	Asta Medica AG	Cadila Healthcare	5 brands
2001	Torrent Pharmaceuticals	Allergen India	Brand-Glucomol

Source: Same as appendix 3.1

Appendix. 3.4 Share of R&D in sales of MNCs and Domestic firms

Year	*MNCs*	*Domestic Firms*
1991-92	0.26	0.2
1992-93	0.8	0.72
1993-94	0.71	1.53
1994-95	0.76	1.66
1995-96	0.86	2.02
1996-97	0.92	2.2
1997-98	0.87	1.73
1998-99	0.75	2.43
1999-00	0.67	1.53
Average for '90s.	0.73	1.56

Source: OPPI