Chapter I

Introduction

The Project

This study is an attempt to analyse the changes in market structure and performance in Indian manufacturing. Change in market structure is captured by examining the extent and changes in competition along with its main hindrance, entry barriers. Performance is analysed in terms of total factor productivity growth. The analysis encompassing the period 1973/74 to 1998/99 comprises of a time-series analysis at the industry level supplemented by an examination of a panel of firms. The firm level analysis is intended to examine the effect of the recent changes in policy regime.

Competition is measured by examining its dual, market power. Mark-up is used to measure the extent of market power with lower mark-ups indicating the possibility of higher levels of competition. An econometric model is used to estimate the level of mark-up and to test for a shift in the variable. Entry barriers are often identified as a major hindrance to the competitive process facilitating the maintenance of high mark-ups. An attempt is made to identify the major type of barriers falling under the classification of institutional barriers like licenses and barriers strategically erected by the firms. Quantification of these barriers is attempted for the first time in the Indian context, and used here to test whether the dilution and dismantling of institutional barriers have made market barriers more pronounced.

Performance analysis is done by examining the total factor productivity growth (TFPG) as the enhancement of productivity to fuel industrial growth has received considerable attention in the package of economic reforms. A departure from the existing measures of TFPG, the conventional growth accounting and econometric estimation of production functions, using the Domar aggregation method is made to arrive the estimates at the aggregate manufacturing level. The results are used to evaluate the presumed links between open policy regimes and productivity growth.
The theoretical discussion begins with an overview of the recent developments in industrial economics. The broad paradigms and the treatment of the concepts of competition, entry barriers and productivity growth are discussed as a prelude to the analysis to follow. The methodology followed in the analysis is mainly one of 'consilience of induction', a strategy of coordinating or weaving together a wide range of disparate results from many different sources. As the study period includes the 'reform era' an attempt is made to capture the changes in the variables after the implementation of the economic reforms. Preceding this the major changes in the economic policy are highlighted with a discussion of the economic consequences of these changes.

The importance and relevance of the present study stems from three main sources. First, even though many studies have examined these variables in the context of industrial sector either it has usually been part of a large macro-econometric models of the entire economy or disaggregate, sector specific studies covering a small fraction of the industrial sector. No study has attempted to provide a comprehensive picture of the manufacturing sector analysing its structure, conduct and performance in light of the major changes that have been underway. Second, most of these studies were conducted in a quasi-closed economy framework. With the opening up of the economy accompanied by internal liberalisation, the relevance of these studies is limited to a great extent. Third, different studies have reported different (contradicting) outcomes in terms of the three variable of interest here. This raises fresh interest in the issues concerned.

A note on the database may be made at this stage. As the study period is from 1973/74 to 1998/99, the question of comparability of data has been paid particular attention. This has been done by the preparation of a complete set of Factory Sector data of the Annual Survey of industries (ASI). While notable previous studies have been confined to segments of the Factory Sector, we cover the entire Factory Sector. Construction of variables especially both the input and output variables for measuring total factor productivity growth and to the tracing of entry have been paid special attention. An attempt is also made to supplement the information of the ASI with firm level data provided by the Centre for Monitoring the Indian Economy (CMIE).
As a caveat, limitations exist regarding the use of concentration and market shares, as the study draws from existing studies. Even though, the capital variable has been constructed with utmost care it does not provide allowances for ageing, obsolescence, retirement and depreciation. Although a true measure of capital should reflect all these, limitation with regard to data prevents us from venturing into these issues. A more disaggregate analysis, say at the 3-digit level could have made the study more comprehensive. However, the comparability of data and non-availability of appropriate price indices are constraints to such an analysis. The study is specific in nature confining itself mostly to the methodological issues in measurement of the variables of analysis and does not venture to discuss the causation between competition, entry barriers and productivity growth.

The Perspective

This study being empirical, focusing mainly on the measurement issues aimed at arriving reasonable measures of market power, height of entry barriers and productivity growth does not rely on any single theoretical tenet. On the contrary an attempt is made to draw from the existing theoretical constructs and to that extent it is eclectic in nature. The measurement of each variable is guided by a separate strand of theory. Thus the study does not strive to construct the archetypical ‘uniform coherent framework’. This is due to the multiplicity of agents interacting in the Indian industrial scenario, characterised by ‘dualism’, which forces empirical research efforts to fill the empty boxes of some the mainstream theories escape the brief compass of conceptual grids meshed from a family of theoretical postulates. Moreover, banking on a general theoretical frame often runs the risk of being only tangential to the original postulate with adaptations often ending up as simple generalisations¹.

In order to capture the essential features of the theoretical framework used in the analysis we map out the developments in the branch of industrial organisation. This is intended not to be an exercise in the history of economic theory, but partly as mnemonic and

¹ An example often cited in this context is the study by Hazari(1966). It is considered only to have tangential connection with the Mason-Bain-Scherer scheme of structure-conduct-performance paradigm as noted by Mookherjee(1999).
partly to distinguish advances in empirical analysis from the theoretical developments, which occupied the centre stage due the extensive use of game theory. Broadly we can trace four waves in the development of industrial organisation before reaching the present status. The first wave in the 1930s and forties inspired by the works of the Harvard School is characterised by a large number of detailed case studies. The second phase pioneered by Bain and mainly empirical in nature departed to cross section studies and contained no formal theory as is evident from the works of 1950s and 1960s. The third phase is marked by a search for theoretical underpinnings for the empirical studies as formal theories began to take shape in industrial organisation. This can be discerned from the plethora of formal theoretical models of oligopoly behaviour, which came up in this phase. The fourth wave of works often termed as the 'empirical renaissance' in industrial economics\(^2\) saw a revival of empirical works but this time more grounded in theory than before. We examine in brief these distinct phases in order to delineate the features of each of these different phases in an attempt to situate the current study in relation to the literature. In the process we also trespass to a related development in macroeconomics, which uses the empirical results from the industrial sector, that is, the incorporation of the role of imperfections especially in the product markets into macroeconomic analysis.

Various postulates on market structure and the behaviour firms has come up ever since Industrial Organisation\(^3\) as a separate field of inquiry in economics, with well defined scope and boundaries, came into being in the late 1930s from the work of Edward Chamberlin and Edward Mason of the Harvard School. The Harvard School's contribution was mainly detailed case studies of particular industries focusing on pricing policies with relatively little use of formal economic theory or econometric techniques. These case studies were an offshoot of the scepticism regarding the ability of price theory to explain important aspects of industrial behaviour and were expected to contribute to the formulation of useful Anti Trust policies. However, this fashion of individual case

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\(^2\) As is noted by Bresnahan and Schmalensee (1987).

\(^3\) Following Schmalensee (1982), throughout the course of discussion the term industrial organisation is used in line with the US convention instead of the English tradition of the use of industrial economics.
studies did not last long as the conclusions arrived were often stretched to simple generalisations without much of formal theory or rigorous empirics. This later on led to the second current of studies which abandoned the case study approach, partly due to the easier access to data and computers, and moved on to cross-section analysis.

It is in the early 1950s the pioneering works of Bain (1951, 1956) changed the focus of empirical research and revealed the power of statistical research of industry-level cross-section data. Thus the emphasis shifted from single industry studies to inter-industry, cross section analysis treating “much of the rich detail as random noise, and to evaluate hypothesis of an inter-firm or inter-industry nature”\(^4\). The ‘rich detail’ was replaced by a standard regression equation, which normally specified profitability as a linear function of concentration ratio and other variables to yield simple generalisations again with less of formal theory\(^5\). Thus details so important for individual case studies were replaced by considerations of sample size, which promised a rapid and ‘objective’ development of general relations.

At this stage we can notice a shift away from the Harvard School’s original approach as noted by Comanor (1971). To quote “Despite the original prescription of Edward Mason, practitioners in this area have moved away from an early reliance on case studies and toward the use of econometric methods of analysis. To a large extent, therefore, a review of econometric studies of industrial organisation is a review of much of the content of the field.”\(^6\) This shift away from case studies to cross section regressions in turn provided the foundations for some econometric studies on individual industries\(^7\). The return to industry-specific studies in a sense revealed the difficulty of drawing firm conclusions about causation from cross section regressions. Here the microeconomic theory was expected to play an important role, that is, identifying and explaining the

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\(^5\) The empirical works in this phase have been surveyed at length in Weiss (1971) concentrating mainly on econometric studies.

\(^6\) Comanor (1971, pp.403-4)

\(^7\) This was anticipated by Weiss as can is seen in his 1971 survey. He opines, “perhaps the right next step is back to industry study, but this time with regression in hand” (Weiss 1971,p.398).
causal factors and the precise channels of causation. This led to the third wave studies basically the developments on the theoretical front.

Proliferation of theoretical models is well traced by Schmalensee (1982), he notes "the first Masonian wave of case studies were explicitly part of an inductive enterprise distrustful of received theory. One also finds very little explicit theorising in the cross-section literature; a priori arguments are typically limited to verbal justifications for the inclusion or exclusion of particular variables on the right hand side of a single linear equation. In the 1960s, however, students in good graduate programs were learning that one had to have a formal structural model, not just a list of plausible candidate independent variables, in order to do serious econometrics." Microeconomic theory was brought in to form these structural models. This led to the emergence of what later came to be called as "the pure theory of industrial organisation". The attempt was to construct formal models to do justice to 'the rich detail' of particular industries or to facilitate the analysis of real-world markets without being tied to a particular set of facts.

The theoretical models of analysis were based mainly on the recent developments in the theory of non-cooperative games. This new literature came to be referred to as the New Industrial Organisation and the departure from the conventional methods of industrial organisation was noticed from seventies. The hallmark of this approach is well summarised in Schmalensee (1982), to quote "This new industrial organisation of the 1970s differ from that of both classical industry studies and cross-section regression-runners in a number of aspects. First, more attention is paid to the rich detail of particular markets. Careful industry-specific econometric work and the new institutional economics of Williamson and others are making important contributions. Second, despite this focus on the particular, formal microeconomic theory is used intensively and its power is appreciated. If nothing else, formal modelling serves as a check on the tendency of verbal argument to make any imaginable form of conduct sound plausible in small numbers situation, the same sort of check provided by close examination of actual conduct. Both

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8 Schmalensee (1982, p.255)
9 Schmalensee (1987) notes that the burst of theoretical activity began by Michael Spence and others in the early 1970s.
checks are easily bypassed in the cross-section econometric approach. Third, in applying and adapting models as appropriate the investigator goes beyond mechanical use of textbook polar case analysis of competition and monopoly. Just as industrial organisation economists began to become econometricians in the 1960s, many began to become theorists in the 1970s. Finally, the systematic search for simple generalisations of the sort that Mason hoped to find in case studies, the same sort that cross-section regressions seek, is essentially abandoned. This is not inconsistent with the emphasis on development of tractable, and thus simple, formal models, because these are taken to be tools useful for understanding "the rich detail" of reality".

Most of the theoretical works dealt with markets with few sellers essentially oligopolistic in nature concentrating mainly on the rivalry between the few firms and the strategies for entry deterrence. Oligopolistic interaction was modelled in terms of the strategic use of pricing, early mover advantages, product differentiation and the use of scale economies to protect monopoly power. The theoretical works, which continues even today, were more pronounced in the seventies and early eighties as less empirical work was done during the seventies. Most of these theoretical developments later on formed the basis for the revival of empirical studies, which forms the fourth phase of development of industrial organisation.

The surge in the empirical studies in the eighties termed as the empirical renaissance extensively used micro economic theory, replaced anecdotes with systematic statistical analysis and extended the analysis to larger industrial groups or closely related industries. In at least three respects these studies mark a departure from the existing tradition mainly due to the dissatisfaction over both the cross section regression and the case study approach. First, these works employed new sources of data or data constructed in new ways. This was motivated by the widespread perception that there exist various possibilities in empirical analysis due to the development of new tools and approaches. Second is the tendency to exploit advances in economic theory and econometric method.

10 Schmalensee 1982, pp.255-256
11 See Spence (1977,1979) and Dixit (1979) for examples of some of the early studies.
Quite often the rich set of hypotheses that came up due to the theoretical developments were tested with sophisticated techniques to understand imperfectly competitive markets. Third is the return back to firm as a unit of observation, this is more emphasised in industry studies with the treatment of firms as separate observations. Thus, explicit structural models are constructed in these studies and structural parameters are estimated and structural hypotheses tested using latest econometric techniques.

The empirical studies which are prevalent now too, are in lineage of the above-mentioned tradition. Before we turn to this current trend we sum up the outcome of these four phases in terms of the emergence of paradigms of analysis, modified versions or variants of which are still in vogue. These two paradigms are the structure-conduct-performance paradigm (SCPP) and the new empirical industrial organisation (NEIO). We discuss these in some detail.

The dominant framework till the late 1970s, when the contributions to industrial organisation literature were mainly empirical, was inspired by the theoretical tenet that "the organisation and structure of the market determine conduct and performance". Thus a firm's performance was explained in terms of the firm's conduct in the market, which in turn was concerned to be dependent on the organisation and structure of the market, which was largely taken as exogenous. Until recently this structure-conduct-performance paradigm (SCPP) was the dominant paradigm in the literature. To expand a little more in the SCPP "market structure is important because the structure determines the behaviour of the firms in the industry and the behaviour in turn determines the quality of the industry's performance" (Caves 1967:16).

In this scheme market structure comprised of the organisational characteristics of a market. Bain distinguishes four aspects of market structure namely, degree of seller concentration, degree of buyer concentration, degree of product differentiation and the conditions of entry. The variables identified to assess the structure of the market were

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13 From a review of the relevant literature it emerges that the SCPP is the outcome of the tradition of Mason, developed further by Bain, Clark, Caves and analytically refined for rigorous empirical studies by Scherer.
market concentration (concentration ratios and Herfindahl index), product differentiation, barriers to entry, vertical integration, cost conditions, scale economies, number of buyers and product diversification. These were treated as exogenous. The practice of choosing the decision variables at the control of the firm is generally referred to as the behaviour or conduct of the firms. These decision variables include methods and scale of production, advertising, research and development activities, pricing strategies and collusion among firms. The performance of the system, the outcome of the interaction of the conduct variables and the given structure, was gauged by indicators such as efficiency, both technical and allocative (the divergence of price from marginal cost), profitability, technical progress and growth.

The approach crucially depended on the hypothesis of unidirectional causation from structure to conduct variables. It predicted the choices of prices and other conduct variables given the concentration and other structure variables. Cross industry studies were the route used to operationalise the approach using the ubiquitous regression of market concentration measures on profits or margins with the assumption that profit-margins expanded with concentration. The notion of a simple causal relationship was later augmented, as it was evident that the industrial relationship was not so simple as postulated. Thus in this interactive framework structure and conduct are both determined in part by underlying demand conditions and technology. Structure affected conduct and vice versa and performance in turn feeds back on technology and structure.

The methodology, strongly empirical in flavour, often ended up drawing general propositions from empirical observations. The often-arrived conclusion in terms of possible governmental intervention designed to influence performance via anti trust policies was however challenged by the Chicago School\(^{14}\). Their view on the contrary was that the main source of anticompetitive behaviour was the result of government interference in the market place. The position advocated in terms of the role of the government was to stand back and let the market forces work to bring about desirable

\(^{14}\) Chicago in this context denotes a school of thought rather than a geographic location. The views of this school have been discussed at length in Reder (1982).
market performance. The approach of Chicago School was fundamentally theoretical."15 They departed from the traditional SCPP views as the SCPP approach considered imperfect competition as the most appropriate lens to view industry behaviour; Chicago School considered models of perfect competition having substantial explanatory power.

Even though both these strands of literature converged on the existence of monopoly power, the Chicago tradition maintained the view that private monopoly power was temporary without the support of the government. Technology and freedom of entry was considered to be the determining factors for market structure with freedom of entry guaranteeing optimal conduct and performance. The basic competitive model minus the assumption of complete and perfect knowledge was the framework for analysis with the premise that there existed short run departures from the competitive model and in the long run such departures cannot persist unless government blocks entry. This resulted in very little primary empirical work on the kinds of market structure and firm conduct and empirical research focused mainly on criticising the research in structure conduct performance paradigm.

The dissatisfaction over the cross section empirical approach began to be articulated in a number of criticisms, including those on the comparability of different industries and the suitability of various measures of the variables used in the analysis. From a methodological point of view the important critique was on the unidirectional causality from the structure variables to the conduct variables in the traditional SCPP and for the Chicago School, the role of government. Moreover the classical SCP approach could not dwell much into the motivations of economic agents, the actions and information and the way the actions interacted to produce outcomes.16 This in turn is reflected in the failure of these models using SCPP to explain clearly the anticompetitive practices such as limit pricing or predatory pricing. On the antitrust policy front where most of these work seems to have argued for effective governmental interventions, empirical

15 Here it should be noted that under the influence of Stigler the Chicago school made use of the tools of Marshallian price theory, which traditional SCP approach suspected. See Stigler (1968).

16 Mookherjee (1999).
considerations of which seems to have been overlooked especially with the definitions of market in measuring concentration.

As a response to the criticisms to SCPP and the Chicago school's version of it, there came up an approach, which relied mainly on game theoretic models stressing that many of the structure variables are jointly determined with the conduct variables. The development of this as noted above can be traced to the third phase of the evolution of industrial organisation. The theoretical content comprises of extension of conventional microeconomic models of perfect competition and pure monopoly with explicit role for technology, details of market interaction and incorporation of imperfect information. Moreover, the usefulness of theory which forces one to pay attention to the micro details which influence the outcomes was used to demonstrate the limitation of SCP approach\textsuperscript{17}.

The main feature of this approach, known as 'The New Industrial Organisation', as noted by Bonanno and Brandolini (1990) "is that industrial structure is no longer taken to be the exogenous determinant of the firm's conduct and performance but an element which itself is in need of explanation. The basic assumption is that of non-co-operative behaviour by firms and the approach is to take nothing as given beyond the fundamental conditions of consumers' preferences and technology"\textsuperscript{18}. The new approach abandons the aim of the SCP paradigm of finding a general theoretical framework capable of yielding simple generalisations and enabling one to extract the essential common features from different industries. With the use of non-co-operative games it demonstrated that firms and agents make sequential rational decisions over time considering the consequences of the actions of their rivals. Thus the static models were replaced with the dynamic ones with new equilibrium concepts like subgame-perfect, sequential and trembling-hand-perfect. In this scheme differential and asymmetric information were also modelled explicitly.

\textsuperscript{17} Schmalensee and Fisher noting that most the variables are unobservable challenge this.
\textsuperscript{18} Bonanno and Brandolini (1990, p.4)
The empirical literature, which comprises mainly of econometric studies, termed as the New Empirical Industrial Organisation, is clearly different from the SCPP. The NIEO is motivated by the dissatisfaction over the three maintained hypothesis of the SCPP, they are:

(a) Economic price-cost margins, that is, a measure of performance could be directly observed in accounting data.

(b) The cross section variations in industry structure could be captured by a small number of observable measures.

(c) Empirical work should be aimed at estimating the reduced form relationship between structure and performance.

The NEIO is not caught in the grid lock over the question whether high accounting profits are to be interpreted as a sign of good or bad performance as in the case of SCPP where the empirical studies often suffered from serious simultaneous equation bias.

The methodology of the new approach was however, debated because the translation of the theory, which forces one to pay attention to various micro details, into empirical implementation was often hampered as the micro details highlighted by the theory are often unobservable to the external parties. Thus opinions are divided on the use of game theory. The micro details such as information, sequencing of moves and other strategic variables which can influence the ultimate outcome often revealed the naivety of the earlier approaches. This also enabled one to have a rich classification of a variety of models of interaction analogous to survival strategies in evolutionary biology. The use of game theory has been defended as the interpretations of the traditional problems using this theory was supposed to have brought a unified methodology to the field.\textsuperscript{19} The ability to illuminate both situations of conflict and co-operation was to its advantage.

\textsuperscript{19} Tirole (1988)
The extensive use of game theory in the new approach is defended by Fundenberg and Tirole (1987). To quote, "Game theory has had a deep impact on the theory of industrial organisation, in a similar (but less controversial) way as the rational expectations revolution in macro economics. The reason it has been embraced by majority of researchers in the field is that it imposes some discipline on theoretical thinking. It forces economists to closely specify the strategic variables, their timing, and the information structure faced by firms. As is often the case in economics, the researcher learns as much from constructing the model (the 'extensive form') as from solving it because in constructing the model one is led to examine its realism. (Is the timing of entry plausible? Which variables are costly to change in the short-run? Can firms observe their rivals' prices, capacities, or technologies in the industry under consideration? etc.)"\(^{20}\). However, as noted by Del Monte (1992) "this is the obvious merit of any mathematical model in economics: it is an expedient way of detecting errors in some mental operations. However, such an approach has been criticised (Georgescu Roegen 1971) on the basis that it can work negatively: if the model does not reveal an error, it does not mean that the argument or the arithmetical calculations are wholly correct\(^{21}\).

An important problem encountered while using the game theoretic approach is the issue of multiple equilibria. Most of the non-trivial game has many and at times infinitely many different equilibrium points. The issue of non-availability of a theory selecting a single equilibrium point\(^{22}\) as the solution to the game makes testing theories difficult. The suspicion about the usefulness of game-theoretic approach is summarised by Schmalensee (1990). He observed that "Unfortunately .... the impression that has emerged from a decade's extensive use of game-theoretic approach is 'Any thing can happen!' The diversity and growth of theoretical literature provides a good deal of support for the conjecture that almost any remotely plausible pattern of conduct – anything that has ever been alleged with a straight face in an anti trust case, say – can appear in equilibrium in an apparently plausible game-theoretic model. Policy

\(^{20}\) Fundenberg and Tirole (1987, p.176)

\(^{21}\) Del Monte (1992, p.2).

\(^{22}\) Even though some authors like Harsanyi and Selten have tried to offer rational criteria for selecting one equilibrium point the issue is far from settled.
implications are in some sense even more varied, since efficient policy in many models depends on details of parameter values and functional forms\textsuperscript{23}.

In recent times the use of game-theoretic modelling has been explored at length by Sutton\textsuperscript{24}. Sutton defends the use of game theory on two counts: (a) as the analysis is focused on situations where there are only a few firms, if the reactions are to be modelled then one has to consider others' reactions as well. As game theory by definition is the study of agents whose maximisation problems depends upon the actions and strategies of other agents, he considers it as the appropriate analytical tool. (b) Invoking the Friedmanite view that the only test of a theory is the accuracy of its prediction\textsuperscript{25}, Sutton argues game theory has been successful as the empirical results are consistent with the predictions of theoretical game models. Sutton's approach in a way combines some of the old approaches with the game-theoretic approach to derive bounds with minimal assumptions about the rational behaviour of firms. The boundary for industry structure is derived by theoretical reasoning rather than establishing empirically.

In the context of this study it is important to examine the relevance of these approaches in the Indian milieu. From a policy point of view the SCP paradigm is of considerable value in the Indian scenario and for this reason it has been the most widely used\textsuperscript{26}. The insights have been central to monopoly and restrictive trade practices. As the theory assigns importance to non-convexities arising out of fixed costs or learning- by- doing its application finds appeal in the Indian context. However with the opening up of the economy and the introduction of a more liberal policy regime the chain of causation as neatly marked out in SCPP might not hold good. Conduct is no longer exogenous so do the structure as firms have more manoeuvrability with the strategies to maintain the

\textsuperscript{23} Schmalensee (1990, pp.140-1).


\textsuperscript{25} This became a well-known debate on the general principles of economics as the counter view held that there are two dimensions to the development of scientific knowledge, forecasting and explanations. A model could yield good forecasts and weak explanations and vice versa challenged Friedman's view.

status-quo in the market. Thus the straightforward application of SCPP might fail to capture the nuances of Indian industry in a liberal regime. This applies to the Chicago School’s version as well, because the market shares of the top firms are not always an indication of their efficiency and might to be due to the immature industrial structure exhibiting considerable market imperfections. Often competition is devoid of the characteristics attributed to it in the context of mature developed economies and embraces new forms of rivalry. On the other hand the game-theoretic models which failed to explain the behaviour of firms until recently as entry was restricted provides some useful clues in the changed scenario. But the application of this is often hampered for two reasons (a) on the non-availability of the information needed for precise theoretical postulations and (b) the rationality of agents that would legitimise the profit maximisation hypothesis are often driven by some exogenous structural features. Thus application of these broad theoretical postulates in toto without suitable modifications might fail to capture the Indian conditions, however, it should be noted that some of the basic premises of all of the above-discussed tenets are applicable.

A closely related strand of literature, which assumes relevance in the Indian context, is the development of the incorporation of the role of imperfections in macroeconomics. The role of the industrial sector in macro economic fluctuations has long been recognised. The analysis has been centred around the issues of growth, especially in two sector models, and the role of industrial sector in employment generation and inflation. In building the micro foundations of these macro models often it was convenient to assume that the markets are competitive. However, in the eighties there emerged a new agenda for research in macroeconomics, which explicitly introduced the role of imperfections. The role of imperfections assumed importance in answering the question as to what are

27 In reviewing the developments in macro economics in the twentieth century Blanchard (2000) identifies three phases, pre-1940 a period of exploration, from 1940 to 1980 a period of consolidation and since 1980 a new period of exploration. He argues that the second phase is plagued by the casual treatment of imperfections, which lead to a crises in the late 1970s and became the subject matter in the eighties.

28 For a treatment of the advantages of a model based on imperfect competition for macro economic theory and practice see Solow (1998)
the major shocks that affect output and their propagation mechanism, which formed the body of a larger business cycle literature.

The research on imperfections in the product market\textsuperscript{29} is primarily driven by three main factors. Firstly, from an efficiency point of view, imperfections lead to different efficiency and welfare characteristics. Secondly, it introduces new sources of shocks in the economy which can leave lasting consequences on the output and thirdly, new propagation mechanisms of these shocks could originate upsetting the overall macroeconomic equilibrium. Thus studies on market structure become crucial in understanding all these three issues. The studies in the context by Hall\textsuperscript{30}, which break away from the classical cross-sectional analysis and examine time series variation in individual industries reveal the implications of market structure for macroeconomics. The most important being that when the price exceeds marginal cost the measure of total factor productivity growth, which assumes equality of price to marginal cost, involves a bias. This motivates our examination of total factor productivity growth apart from it being a measure of performance.

In this study we analyse the structure and performance of Indian industry in the tradition of SCP\textsuperscript{2}, however, departing in the one-way chain of causation running from structure to conduct to performance. To elaborate, the posited relation that the ‘structure is explained by the various barriers to entry whose nature is taken to be exogenously given’ according to us does not explain the market structure in the Indian context. The notion that market structure is ‘given’ could be realistic until recently due to the fact that entry was regulated. As entry was limited the incumbent firms enjoyed protection under which the conduct variables like advertising and research and development did not assume importance. On lines with the game-theoretic models we consider the possibility of a reverse link from conduct or performance to structure. This prompts us to infer about the structure by examining the performance indicators like mark-up. By examining the extent

\textsuperscript{29} Even though Chamberlain (1933) discusses monopolistic competition, its implication for the economy as a whole was left unaddressed.

\textsuperscript{30} See Hall (1986,1988).
of mark-up, drawing insights from micro economic theory, we are able to understand the extent of imperfections in the market.

The analysis of entry barriers is used to explain the existence of the oligopolistic market structure as the incumbent firms adopt various entry blocking strategies to maintain their market power. The height of entry barriers is measured to throw light on these strategies which otherwise are unobservable. This measure of the height of barriers is an amalgam of the conduct variables leading us to posit a reverse causation, that is, the structure is shaped by the conduct variables. Moreover we depart from the SCPP tradition on two counts (a) the approach of regressing concentration on price cost margin is abandoned, as concentration itself is the outcome of the various entry barriers erected by the firms, and (b) the approach of running cross section regressions and drawing generalisations is replaced by time series analysis at the aggregate and disaggregate level. The attempt is to empirically implement the game-theoretic approach and test some of the propositions using regression, a major tool borrowed from the SCPP. Thus we adopt an approach combining the theoretical postulates from NIO and the empirical flavour of SCPP to examine the imperfections in market. As the above three approaches are combined we consider our approach eclectic in nature.

As the period of our study includes the era of reforms we provide a brief discussion of the policy regimes in India and their subsequent changes. This in turn helps to facilitate further discussion and evaluation of the results.

**Policy regimes in India**

This section provides an overview of the industrial and trade policies pursued in Indian economy. The objective here is to provide an overview of the policy regime under which the industry operates and the major changes in it in order to establish the era of the initiation of the liberalised policies and thus substantiate the choice of the period of analysis. An exhaustive account of the specific policy measures is deliberately avoided.

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31 To this extent our approach is in line with the methodology in the era of empirical renaissance discussed at length earlier.
concentrating only on the highlights\textsuperscript{32}. A discussion of industrial policy and its changes is first taken up followed by the trade policy.

Manufacturing activity in India had all thorough out been subjected to state intervention and regulation right from the time of British rule. As a product of the exigencies of the Second World War these regulations were further tightened. But while many countries speedily dismantled these after the war, others like India, not only continued with them but also reinforced and made them all pervasive. Some of the important legislations passed in during the British era were a precursor of the later regime often called as the ‘licence-permitraj\textsuperscript{33}. The government thus directly intervened and decided on where and how a new industrial unit could be set up or old ones expanded. The development model followed after Independence intended to promote the evolution of a socialistic pattern of society placed the public sector at the commanding heights of the economy and the private sector was required to function within the limits set by the industrial policies of the state.

The strategy of industrialisation as envisaged by the planners was articulated in a series of industrial policy resolutions/statements enunciuated from time to time. The first of these being the Industrial Policy Resolution (IPR) of 1948 followed by one in 1956, 1977 and 1980. Apart from the minor changes in the policy such as in 1973 and 1990 there were not major departures from the IPR 1956 in the Industrial Policy Statement of 1980\textsuperscript{34}. Two major changes can be noted in the policy framework till the 1980s, they are, first, the major departure between IPR 1948 and 1956 towards a strategy in favour of heavy industries under the influence of the Mahalanobis model underlying the Second Five

\textsuperscript{32} For a detailed account of the policies pursued and its changes see Inoue (1994) and Satyanarayana (1996).

\textsuperscript{33} For example the Essential Supplies (Temporary Power) Act of 1946 was often mentioned as the predecessor of the Industries Development and Regulation Act of 1951 and the rules made thereafter.

\textsuperscript{34} A plethora of studies have examined the policy framework under which the industrial sector operated till the liberalisation of the economy and its implications on industrial performance measured by various indicators. These studies can be classified in two sets, (a) those which have argued that the intervention is not effective as the implementation had been flawed for example Patnaik(1981) and (b) those which have advocated for the dismantling of these controls as these controls have acted as constraints for industrial growth like Bhagwati and Desai(1970).
Year Plan. And second, the shift to small-scale industries and rural industrialisation in 1977.

Translation of the policies into action was carried out via the planning process, fortified by legislation, regulation and controls. The regulation aspect was carried out by the Industries Development and Regulation Act of 1951, the Monopolies and Restrictive Trade Practices Act of 1969, the Foreign Exchange Regulation Act of 1973, Control of Capital Issues, export and import controls and commodity controls. These regulations covered practically all aspects of the functioning of industry and led to the formation of an industrial system in which public sector was dominant with a highly regulated and controlled private sector. The industrial policy resolution of 1956 provided an overwhelmingly important role for the public sector. Industries were classified into three sets, one set exclusively reserved for the state which were considered of strategic importance, another set of industries in which the private sector was allowed but within the overall framework of the social and economic policy of the state and a third category which was left for the private sector. Most of the policy changes that followed were limited to additions and deletions from the list of these three via amendments from time to time.

A review of the policies till 1980 reveals the following aspects of regulation, which can be characterised as an attitude of both being restrictive and permissive. In order to achieve a socialist pattern of society the public sector was assigned the important role in industrial development along with effectively curbing concentration of wealth in a few monopolists. Thus spheres of activity were earmarked for the public and private sectors and both entry and capacity expansion were controlled by way of licenses and other requirements. With a view to husbanding the limited foreign exchange available imports, were regulated and limited. This fitted into the overall principle of import substituting industrialisation along with the arguments of protecting the infant industries. Thus trade was largely restricted along with the flow of foreign capital and technical collaborations. As export pessimism was the prevailing view exporters were not offered much incentives. There was an explicit recognition of the role small and medium industries and to foster their growth exclusive segments were reserved for them.
Regarding trade policy, the desire to provide protection to domestic industry from foreign competition has been the overriding principle behind trade policy until 1970s. During this period the focus of trade policy was on regulating the utilisation of scarce foreign exchange through quota restrictions. This implied licensing for all categories of imports. The system of import licensing basically caters to capital goods and intermediate goods since imports of consumer goods have been largely banned all along. Based on the criteria of 'essentiality' and 'indigenous non-availability' of the proposed import two categories of import licences, the 'actual user' (AU) licenses for the import of intermediates and raw materials and capital goods (CG) for the import of capital goods were prevalent. According to Bhagwati and Desai (1970) this twin criteria imparted considerable inflexibility to the pattern of utilisation of imports. In order to lessen the anti-export bias imposed by this import policy, some alleviating policy measures were adopted during late 1960s. These include the implementation of the import entitlement scheme and the Registered Exporters Policy (REP), which provided special import licenses to exporters. In addition to these some duty drawbacks and tax concessions were also available to exporters. But a complex system of excise and corporate taxes distorted the incentives.

Many of the anomalies of the policy regime were brought to light by a number of official committees. In 1969 Industrial Licensing Policy Enquiry Committee, pointed out the shortcomings of the licensing policy, such as, the inability to stop the practice of preemption of capacity by large houses and thereby accentuating the concentration of economic power. This resulted in the passing of the MRTP Act of 1969. Further, the early seventies witnessed a period soon after a spate of nationalisation including 14 commercial banks and the setting up of Secretariat for Industrial Approvals (SIA) with the objective of simplifying and expediting industrial approvals along with the passing of the Foreign Exchange Regulation Act of 1973 bringing about changes in the policy governing foreign investments which had remained by and large unchanged since 1949.

35 The Dangli Committee later on found that still there was bureaucratic delay.
In the late 1970s and early 1980s, recommendations of various committees like the Alexander Committee (1978) and Tandon Committee (1980) led to an attempt to simplify the procedures. This can be viewed partly as the offshoot of the sluggish industrial growth during a decade beginning from mid-1960s\textsuperscript{36} and a slow movement away from the strategy of import substitution. Thus we can notice easing of trade restrictions and the raw material imports were made easier and since 1978 certain categories of raw materials and capital goods could be imported against Open General License (OGL), which implies that they are subjected to tariffs but not to quantitative restrictions.

**Policy changes:** The decade starting from 1980 onwards witnessed a shift towards a more liberal policy regime intended towards liberalising investment procedures and streamlining industrial policies to ensure timely completion of projects. The thrust of the policies were directed towards achieving optimum capacity utilisation, maximise production, productivity and employment generation, promotion of export oriented industries and correction for regional imbalances through the equitable spread of investments. Thus re-endorsement\textsuperscript{37} of licenses was introduced to enhance capacity utilisation.

As the view that industrial licensing system promoted inefficiency and resulted in a high cost economy gained momentum there was a move to ease the restrictions on industrial licensing, along with steps for modernisation. This was accelerated by the fact that there prevailed a practice of pre-emption of capacity and non-conversion of licenses into physical investments. Broad-banding\textsuperscript{38} was the first major step towards easing entry

\textsuperscript{36} The debate on industrial growth from mid-1960 occupied important space in the literature till the later half of 1980. See Nayyar (1994).

\textsuperscript{37} Under this scheme, the capacity indicated in a license could be re-endorsed, that is, can be raised, with reference to the highest production achieved during any of the previous five years, plus one third thereof, provided that was more than the licensed capacity plus 25 percent. This scheme introduced in 1982 was liberalised in 1984/85 and further in April 1988.

\textsuperscript{38} Broad-banding was the bringing together some specified industries for the purpose of licensing and future development and expansion, whose design and production facilities were common. The objective was to simplify and relax industrial licensing policy to permit units falling within a broad band to produce any item covered under the generic description of the industry and not a specific product or item.
restrictions and the list of industries which could avail this facility was amended from time to time. Further relaxations with regard to industrial licensing with the raising of investment limit for obtaining licenses, delicensing of imports, reducing the number of industries in the special list for which licensing was mandatory, increasing the period of validity of letters of intent were undertaken in 1988 along with the introduction of minimum economic scale to tackle the issue of uneconomic size and increasing the limit of asset size for the MRTP scrutiny.

In an attempt to inject an element of stability into the policy regime there was a switch over to the announcement of trade policy every three years instead of every year. In the import-export policy of 1985 an increasing number of capital goods, intermediate and raw materials were added to the open general license lists. Tariffs on an average increased steadily though this was accompanied by an increase in the number of products subject to reduced duties under exemption. In general this trade policy focussed on the liberalisation of import of capital goods with a view of facilitating the process of technological upgrading of Indian Industry particularly for exports.

On the export front the duty drawback scheme which compensates exporters for import duties and the cash compensatory scheme, which compensates for various domestic taxes were ‘streamlined’. The scheme for subsidising the use of domestically produced raw materials -- the International Price Reimbursement Scheme for steel -- was extended to basic steel products and alloy steels in 1986 and a proposal to extend the scheme to other raw materials such as aluminium and copper was also announced. The flexible exchange rate policy after 1985 was also intended to have a positive impact on exports during this period.

In the import-export policy of 1988 liberalised access to machinery and equipment for selected export industries was extended to more industries like electronics, tea and silk. Moreover, for the first time some selected capital goods for exporting industries were allowed to be imported without clearance from the indigenous availability angle.
As an aftermath of the stabilisation programme a new export-import policy for five years was announced in 1992. The aim of this policy was to impart transparency and simplicity to the procedures. The main thrust of the policy is to promote and sustain export growth. Besides the existing export promotion capital goods (EPCG) scheme at 15% customs duty another window at zero customs duty EPCG scheme has been introduced with an export obligation. Second-hand capital goods were also permitted to be imported under the zero customs duty EPCG scheme.

The amendments incorporated in the trade policy in 1995-96 introduced a new pass book scheme made available to export, trading, star trading, super star trading houses and manufacturer exporters. Besides this a new scheme for special value-based advance licences (VBAL) for the export of ready-made garments was also introduced. This entitles the exporter to import fabrics required for making the garments on a duty-free basis. As an alternative to the abolished International Price Reimbursement Scheme (IPRS) a Special Engineering Products Export (replenishment of Iron and Steel intermediates) Scheme (EPRS) has been introduced for the export of engineering products.

Regarding imports, seventeen more items were deleted from the negative list of imports and actual user condition on the import of components, parts and spares of consumer durables were removed. Further, the list of free OGL of consumer goods was expanded from 45 to 75 items. These were intended to enhance the opportunities of the domestic sector to draw full advantage of the economic activity generated by the economic reforms.

Thus it can be noted that the policy environment underwent drastic changes from the eighties. This gained momentum in the early nineties partly due to the sheer force of circumstances and the offshoot of the economic crisis. A further impetus for the new policies was provided in the next generation of reforms. On the whole the changes in these policies were pronounced in the following five areas (a) industrial licensing (b) foreign investment, (c) foreign technology agreements, (d) public sector policy and (e) MRTP act. There was total departure from the earlier regulatory policies with respect to
(a), (b), (c) and (e) and with respect to the public sector policy the major policy change was regarding disinvestments of shares and withdrawal of budgetary support to financial requirements. Provisions for mergers, amalgamations and take-overs were also eased along with an upward revision of the threshold limits of assets of MRTP companies. These changes, it was hoped, would bring about a higher industrial growth via increasing productivity and competition.

It is for assessing the influence of these policy reforms we examine the period 1970 to 1990. This provides sufficiently longer time series to make comparisons between pre-reform and post reform era. A review of the policies point to 1985 as the cut off year for the analysis. Recent studies too point to this. According to Srivastava (1995) " Even though the reforms initiated in 1985 were a continuation of a process of gradual reform begun in the mid-1970s four features of this package distinguish it from previous attempts to reform.

(1) The scope of the reform was considerably wider than anything that had been attempted before, covering almost the entire industrial sector.

(2) There was a recognition of the need for industrial policy reform, to complement liberalisation in the foreign trade regime.

(3) There was a move away from discretionary and quantitative controls towards the use of fiscal instruments.

(4) There was an attempt at introducing some stability into the policy environment by spelling out a long-term fiscal policy and medium term (3 year) import-export policy.

It is for these reasons that we suggest that 1985 marks a watershed in the process of economic reforms in India". Thus two cut-off years can be identified to evaluate the changes in the policy from 1985 and 1991.
The policy changes and its bearing on the manufacturing sector

The reforms in trade and industrial policies have ushered in a new environment for Indian industry and provide enhanced opportunities to the domestic producers to derive maximum benefit by increased competition. In this section we provide some broad indicators of the industrial performance since the change in the policy regime. This enables us to understand the broad nature of the changes in industrial sector.

Output Growth: By now it has been widely accepted that in the decade 1980 Indian manufacturing sector witnessed an era of renewed output growth. Between 1980/81 to 1989/90 manufacturing output grew at annual trend rate of 7.3% which is markedly higher than the rate of approximately 4% between 1965-66 to 1979-1980\(^{39}\).

Table 1.1: Growth of Manufacturing Output

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td>4.97</td>
<td>6.28</td>
<td>2.16</td>
<td>4.63</td>
</tr>
<tr>
<td>Beverages &amp; Tobacco</td>
<td>2.37</td>
<td>-0.78</td>
<td>6.63</td>
<td>2.46</td>
</tr>
<tr>
<td>Cotton Textiles</td>
<td>2.29</td>
<td>2.92</td>
<td>5.66</td>
<td>3.48</td>
</tr>
<tr>
<td>Jute Textiles</td>
<td>0.37</td>
<td>1.17</td>
<td>-1.61</td>
<td>0.09</td>
</tr>
<tr>
<td>Textile pdts</td>
<td>2.79</td>
<td>1.98</td>
<td>-6.05</td>
<td>-0.02</td>
</tr>
<tr>
<td>Wood &amp; Wood pdts</td>
<td>18.98</td>
<td>-0.66</td>
<td>1.43</td>
<td>6.95</td>
</tr>
<tr>
<td>Paper &amp; Paper pdts</td>
<td>8.52</td>
<td>5.96</td>
<td>6.82</td>
<td>7.12</td>
</tr>
<tr>
<td>Leather &amp; Leather pdts</td>
<td>12.74</td>
<td>2.88</td>
<td>2.17</td>
<td>6.20</td>
</tr>
<tr>
<td>Rubber, Plastic &amp; Petroleum</td>
<td>9.10</td>
<td>2.67</td>
<td>1.50</td>
<td>4.63</td>
</tr>
<tr>
<td>Chemicals</td>
<td>9.15</td>
<td>10.62</td>
<td>6.60</td>
<td>8.95</td>
</tr>
<tr>
<td>Non-Metallic mineral pdts</td>
<td>9.73</td>
<td>4.36</td>
<td>4.88</td>
<td>6.43</td>
</tr>
<tr>
<td>Basic Metals &amp; Alloys</td>
<td>3.47</td>
<td>6.37</td>
<td>6.15</td>
<td>5.27</td>
</tr>
<tr>
<td>Metal pdts except Machinery</td>
<td>3.21</td>
<td>4.56</td>
<td>1.87</td>
<td>3.31</td>
</tr>
<tr>
<td>Non-Electrical Machinery</td>
<td>5.48</td>
<td>7.65</td>
<td>2.31</td>
<td>5.35</td>
</tr>
<tr>
<td>Electrical Machinery</td>
<td>15.54</td>
<td>23.45</td>
<td>2.79</td>
<td>14.72</td>
</tr>
<tr>
<td>Transport Equipment</td>
<td>6.35</td>
<td>7.26</td>
<td>5.50</td>
<td>6.44</td>
</tr>
<tr>
<td>Other Manuf. Industries</td>
<td>12.46</td>
<td>17.54</td>
<td>-4.67</td>
<td>9.38</td>
</tr>
</tbody>
</table>

Note: Annual averages calculated from various issues of the Economic Survey

\(^{39}\) See Kelkar and Kumar (1990) and Nagaraj (1990) for extensive discussions in this regard.
Sectoral growth rates, as seen in Table 1.1, during the Eighties provide evidence regarding the re-allocation, of resources that takes place during the period. Based on the index of industrial production, the fastest growing sectors (2 digit) during this period are electrical machinery, chemicals, non-metallic mineral products and leather and leather products. This is in sharp contrast to the period of the 1950s and 60s, when the fastest growing sectors were metal based and heavy machinery sectors. Some authors argue that capital goods and intermediate goods sectors suffered a setback due to the competition from imports. Ghosh and Singh (1988) argue that there was a deceleration in growth of the domestic capital goods and machine tools sectors after 1976-77 due to more liberal import policies and that the liberalisation of 1985 hit the domestic capital goods sector rather hard. Chandrasekhar (1992) is also of the view that the reduction of import duties on project imports led to the slow rates of growth in the machinery and machine tool sectors during 1986-87, prompting the upward revision of duties during the subsequent year. However, as is evident from Table 1.1 our results are contradictory to this.

**Employment:** Employment data reported in Table 1.2 reveal that overall employment in the factory sector registered a slower growth in the period 1981-91. While employment in the factory sector grew at an annual compound growth rate of 3% during the period 1961-1981 it declined to 1.6% in 1981-91. In absolute terms, the employment has increased from 71.11 lakh persons in 1981 to 83.18 lakh persons in 1991, but it can be noticed that in the mid-eighties employment in absolute terms declined especially in 1984. Notably, the groups like beverages and tobacco, textiles, paper and paper products registered drastic fall in the growth rate of employment in contrast to leather and non-metallic minerals. The absolute fall in employment in traditional industries like food products, cotton textiles, jute textiles, wood products, paper products and transport equipments is explained by the fact that a number of manufacturing units in these industry groups became sick and were closed down during this period. The available data on sickness indicate that sickness is more prominent in textiles, jute and paper products (see Gupta, 1992). Further-more, the existing units have had to employ modern labour-replacing and capital-augmenting technology so as to achieve efficiency and economy in their scales of operations.
Exports and Imports: As is evident from the review of the policies a defining character of these reforms is the increasing openness of the economy. Openness measured in terms of total trade (exports plus imports) as percentage of GDP as portrayed in figure 1.1 increased from around 15 percent in 1980 to nearly 25 percent in 1995. We analyse the growth in imports and exports for a closer scrutiny. As mentioned earlier the rate of growth of capital goods and intermediate goods imports was high during the first half of the eighties. While the overall imports registered an average growth of 4.2% for the period 1980-81 to 1985-86 the capital goods imports grew at 9.1% per annum and intermediate goods at 6.1% per annum. An analysis of the commodity composition of imports reveals that machinery and transport equipment, which accounted for 25% of India's total imports in early 1970s, regained its share after a decline in mid seventies.

Table 1.2: Growth of Manufacturing Employment

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td>0.20</td>
<td>-5.54</td>
<td>2.87</td>
<td>3.27</td>
</tr>
<tr>
<td>Beverages &amp; Tobacco</td>
<td>3.86</td>
<td>1.87</td>
<td>7.29</td>
<td>2.42</td>
</tr>
<tr>
<td>Cotton Textiles</td>
<td>-1.69</td>
<td>-4.59</td>
<td>1.46</td>
<td>0.98</td>
</tr>
<tr>
<td>Jute Textiles</td>
<td>3.91</td>
<td>3.95</td>
<td>2.66</td>
<td>5.13</td>
</tr>
<tr>
<td>Textile pdts</td>
<td>1.04</td>
<td>-2.76</td>
<td>1.06</td>
<td>6.94</td>
</tr>
<tr>
<td>Wood &amp; Wood pdts</td>
<td>9.04</td>
<td>2.81</td>
<td>9.10</td>
<td>15.20</td>
</tr>
<tr>
<td>Paper &amp; Paper pdts</td>
<td>-0.28</td>
<td>-1.29</td>
<td>2.15</td>
<td>2.62</td>
</tr>
<tr>
<td>Leather &amp; Leather pdts</td>
<td>1.97</td>
<td>0.59</td>
<td>0.72</td>
<td>4.60</td>
</tr>
<tr>
<td>Rubber, Plastic &amp; Petroleum</td>
<td>5.89</td>
<td>4.37</td>
<td>7.79</td>
<td>5.51</td>
</tr>
<tr>
<td>Chemicals</td>
<td>13.80</td>
<td>1.80</td>
<td>32.81</td>
<td>6.79</td>
</tr>
<tr>
<td>Non-Metallic mineral pdts</td>
<td>-0.56</td>
<td>1.95</td>
<td>9.25</td>
<td>5.63</td>
</tr>
<tr>
<td>Basic Metals &amp; Alloys</td>
<td>2.15</td>
<td>3.92</td>
<td>0.29</td>
<td>2.26</td>
</tr>
<tr>
<td>Metal pdts except Machinery</td>
<td>1.79</td>
<td>0.79</td>
<td>0.91</td>
<td>3.68</td>
</tr>
<tr>
<td>Non-Electrical Machinery</td>
<td>2.60</td>
<td>-0.38</td>
<td>1.00</td>
<td>4.18</td>
</tr>
<tr>
<td>Electrical Machinery</td>
<td>2.56</td>
<td>1.92</td>
<td>1.51</td>
<td>4.22</td>
</tr>
<tr>
<td>Transport Equipment</td>
<td>1.77</td>
<td>-0.32</td>
<td>0.15</td>
<td>5.49</td>
</tr>
<tr>
<td>Other Manuf. Industries</td>
<td>5.16</td>
<td>0.87</td>
<td>1.87</td>
<td>9.75</td>
</tr>
</tbody>
</table>

Source: Annual averages computed from various issues of ASI.
The higher share of mineral fuels, lubricants and related minerals in the imports are explained by the inclusion of petroleum imports in this category. While the share of chemicals remained steady throughout the period, iron and steel which accounted for 9% of total imports in 1970-71 accounted for only 5.4% in 1990-91. Thus, it can be discerned that despite the liberalisation measures the import structure has not undergone major changes. This is due to the fact that the ratio of taxes on imports to the value of total imports, which is a proxy for the general level of protection of domestic economic activity, has gone up from 29.7 in 1974 to 51.9 in 1987 compensating for the reduction in tariffs.

Exports during the eighties grew at an average annual rate of 6.4% with the growth rate in post 1985 period being significantly higher than the earlier period. Manufacturing exports grew at an average rate of 7.9% per annum, which is higher than the average growth rate of output for the sector. The average growth rate of chemicals exports (16.7%) was also faster than the growth of output in the sector. A characteristic feature of the eighties is that engineering goods exports, traditionally an important component of the export sector, was stagnant especially in the first half of eighties. Leather exports, another major component of the export basket, grew faster in the first half of the eighties and slowed down in the latter half but grew at an average rate of 6.9% per year during the
period 1980-81 to 1990-91. A change in the commodity composition of export is reflected in the percentage share of commodities in total export as revealed in Table 1.4. It can be seen that chemicals, leather and leather manufactures, pearls and precious stones and apparel and clothing accounted for higher share in the eighties replacing traditional export items like jute manufacturing and textile yarn and thread.

**Table 1.3. Commodity Composition of India's Exports**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Agriculture &amp; allied pdts</td>
<td>30.65</td>
<td>27.70</td>
<td>19.41</td>
<td>19.88</td>
</tr>
<tr>
<td>2 Ores &amp; Minerals</td>
<td>6.17</td>
<td>7.21</td>
<td>4.60</td>
<td>2.88</td>
</tr>
<tr>
<td>3 Manufactured Goods</td>
<td>55.83</td>
<td>58.50</td>
<td>72.91</td>
<td>75.43</td>
</tr>
<tr>
<td>3.1 Textile fabric &amp; manuf.</td>
<td>13.90</td>
<td>16.48</td>
<td>20.99</td>
<td>22.71</td>
</tr>
<tr>
<td>3.1.1 Cotton yarn, fabrics, made-ups etc.</td>
<td>6.08</td>
<td>5.27</td>
<td>6.45</td>
<td>8.10</td>
</tr>
<tr>
<td>3.1.2 Readymade garments</td>
<td>8.20</td>
<td>9.79</td>
<td>12.32</td>
<td>11.56</td>
</tr>
<tr>
<td>3.2 Coir yarn manufactures</td>
<td>0.25</td>
<td>0.31</td>
<td>0.15</td>
<td>0.20</td>
</tr>
<tr>
<td>3.3 Jute manufactures</td>
<td>4.92</td>
<td>2.40</td>
<td>0.92</td>
<td>0.58</td>
</tr>
<tr>
<td>3.4 Leather &amp; Leather manufactures</td>
<td>5.81</td>
<td>7.07</td>
<td>7.99</td>
<td>5.44</td>
</tr>
<tr>
<td>3.5 Handicrafts</td>
<td>14.19</td>
<td>17.26</td>
<td>18.94</td>
<td>19.28</td>
</tr>
<tr>
<td>3.5.1 Gems &amp; Jewellery</td>
<td>9.21</td>
<td>13.80</td>
<td>16.12</td>
<td>16.59</td>
</tr>
<tr>
<td>3.6 Chemicals &amp; allied pdts</td>
<td>3.35</td>
<td>4.57</td>
<td>6.48</td>
<td>9.26</td>
</tr>
<tr>
<td>3.7 Machinery, transport &amp; metal manuf.</td>
<td>12.32</td>
<td>8.76</td>
<td>11.89</td>
<td>13.71</td>
</tr>
<tr>
<td>4 Total</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>

**Note:** figures in parenthesis indicate the shares in manufacturing.

**Source:** computed from various issues of Economic Survey

The movement of India's share in world exports is not encouraging. In contrast to 1970 when India's share was 0.6% of world exports in 1980 it came down to 0.4%. Though there was a slight improvement in 1991 the trend is not clear. A closer examination reveals that India's share has increased with respect to chemicals exports like dyes and medicinal and pharmaceutical products. Regarding leather exports, though India's share declined in raw leather its share increased in the case of leather manufactures. This could be due to the government policy of encouraging exports of higher value added finished products as stated in the trade policy documents. Thus, it can be concluded that there has been a change in the commodity composition of exports with chemicals, leather manufacturers, pearls and precious stones and apparel and clothing accounting for a higher share in India's total export and thus in world exports as well.
Another objective of the liberalisation programme was to attract foreign investments and thus provide avenues for the use of foreign technology. As shown in Table 1.4 nearly 30% of the investments during 1987 and 1990 were in chemicals and allied products. Other sectors, which attracted foreign investments, were transport equipments, machinery and machine tools and electrical goods. This holds good in the case of number of foreign collaboration as well. The increase in investments in chemicals, a sector, which has been granted numerous concessions as evident from the policies, gives an indication of the phenomenon of polluting industries moving to India from the developed countries where the pollution laws have been made more stringent.

To conclude, an examination of the indicators like output, employment, imports, exports and foreign investments reveals a mixed picture for the industries at the disaggregate level with industries such as chemicals, leather and leather manufactures, textiles and apparels and clothing registering a positive response to liberalisation. However the net effect of
these policy changes have to be analysed to come to grips with a complete picture. So we analyse all the industries at the two-digit level of disaggregation. This would provide a more realistic picture of the effect on competition, barriers and productivity growth.

**Outline of the study**

We begin by examining the behaviour of the price-cost margin at the aggregate level to infer the changing degree of competition in the industrial sector. This is further substantiated by a disaggregated analysis. The core of the analysis is given in three chapters. A brief outline of these is given below.

**Chapter II: Market Power and Competition in the Manufacturing Sector**

The advantages of moving from a second best world to a world of no distortions is well documented and the theory is well established. The reforms in the industrial sector initiated in the eighties and continued in the nineties intend to eliminate the institutional barriers to entry and exit and thereby increase the extent of competition and efficiency in the industrial sector. This chapter examines the change in competition in the industrial sector in light of these reforms. Most of the existing studies make use of measures like the ability of firms to hold price over long run average costs, accounting rates of return on assets, Tobin's q and concentration ratios to capture the extent of competition. These measures depend heavily on accurate estimates of rates of return on capital, capital costs and the replacement cost of capital. The problems regarding the estimation of true measures of capital stock is well documented and the extent of arbitrariness in the calculation of replacement cost and the rates of return on capital are well known. While concentration ratios capture the extent of market power it fails to capture the demand aspects of the product. A measure of performance to capture the extent of competition devoid of these limitations is price cost margin or the mark-up. The present study makes use of this measure.

The best known studies on Indian industry makes use of price cost margin, i.e., the divergence between price and average cost implicitly equating average cost with marginal cost. This study makes use of mark-up i.e., the divergence of price from
marginal cost as a percentage of price to measure competition. The results of the empirical analysis for a period from 1973 to 1998 using the methodology put forth by Hall suggest that on the whole there is no significant decline in mark-ups in the reform era indicating the continued existence of hindrances to the competitive process.

Chapter III: Entry Barriers in Indian Manufacturing

With a deeply held belief that whatever emerges from "economic natural selection" in the way of market outcome is likely to be fairly efficient, economists use the analogy of 'natural selection' while thinking of competitive markets. Entry is the most visible manifestation of this selection process. However, limitations exist in capturing the reactions of the incumbents triggered off by entry using the static models of oligopolistic interactions. The recent developments in industrial organisation theory provide a clue to explain a particular constellation of industry price and quantities observed after entry in a period. This chapter is an attempt to capture the process of entry and its major barriers in Indian manufacturing industries. The methodology followed is mainly one of 'consilence of induction', a strategy of co-ordinating or weaving together a wide range of disparate results from many different sources.

The study identifies two types of barriers in the Indian context, (a) institutionalised barriers like licenses and other restrictions and (b) strategic barriers erected by the firms (such as advertising, and economies of scale). Using data drawn from the CMIE and two alternate methodologies, of Orr and Geroski, the study finds evidence of the existence of considerable barriers to entry even after the dilution of most of the institutionalised barriers.

Chapter IV: Total Factor Productivity Growth in Indian Manufacturing

Explanations of the sources of output growth have often revealed miracles. These miracles often unexplainable by short run variables were termed as the 'measure of our ignorance'. Total factor productivity growth (TFPG), the route for sustained output growth acquired the label as a measure of our ignorance for two reasons (a) due to the complicated measurement problems and (b) for want of satisfactory explanations. This
chapter attempts to measure the extent of TFPG in Indian manufacturing in both the pre and post reform era.

Arriving at estimates of TFPG at the aggregate manufacturing poses problems relating to aggregation and obtaining a correct measure of output at constant prices. Both these sets of issues have been debated in the Indian context resulting in inconclusive set of results. At the theoretical level the problem of how to measure TFP growth at the aggregate level has been solved by the contributions of Domar and Hulten. However, in the Indian context studies still use an approach based on aggregate value added, which is seriously flawed. In this chapter we argue that value added is not the appropriate measure in the Indian context as the assumption of weak reparablety between intermediate input and other primary inputs does not hold good. Using gross output as the appropriate measure and Domar aggregation using estimates from the two-digit level of desegregation, we show that TFPG declines in the eighties and recovers marginally in the nineties.

A summary of the entire project brings this dissertation to a conclusion. The essential conclusion is that in Indian industry there exists market power as pointed out by the high levels of mark-up indicating the low levels of competition. This is partly due to the increase in market barriers erected by the firms ever since the dismantling of the institutionalised barriers like licences. We also find that the productivity growth in the manufacturing sector declined in the eighties. The economic reforms initiated to enhance competition and increase productivity growth does not thus far seem to percolate down to produce any significantly visible positive outcome on the variables examined.