CHAPTER 1
INTRODUCTION

The relevance of 'firm size' in explaining exports of manufactured goods can be derived directly from the recent developments in the theory of international trade in imperfect market framework. The analysis of international trade under imperfect competition is closely inter-linked with industrial organizational issues such as increasing returns to scale, market power, R&D and innovation, nature of demand, product differentiation etc. Several of these issues can conceptually be cast in terms of firm size for the purpose of examining exports at industry or firm level. The significance of the firm size factor in explaining exports depends on the type of imperfect market conditions (or market structure) that is sought to be characterized in the analysis.

If one observes India's industrial structure, market imperfections like economic duality, oligopolistic conditions, product and factor market segmentation, highly skewed income distribution and discriminatory industrial policies of the government can readily be discerned. In many industries, coexistence of very large (oligopolistic) and small firms (within the specific industries), operating under dissimilar supply and demand side conditions and playing differential role in exports may be observed.  

1 Krugman (1987).
2 Patibandla (1988b).
There are even specific and elaborate industrial policies based on the issue of 'firm size' (MRTP and SSI policies). Thus, given the existing conditions, the examination of India's exports of manufactures with 'firm size' dimension as the fulcrum of analysis becomes germane.

The analysis of trade under imperfect competition, on the basis of special models, has its origins in the inadequacy of the Heckscher-Ohlin theory of comparative advantage in explaining trade between developed countries which have similar relative factor endowments and trade mostly in similar, though differentiated products. As a consequence, most of the models of imperfect competition have been formulated with reference to international trade between developed countries. For example, Linder's (1961) seminal contribution to trade theory based on technological innovation and representative demand arguments was conceived with an eye on the American economy. Similarly the type of market imperfections embodied in other (intra-industry trade) models generally are those that are prevalent in the developed countries.

The type of market imperfections, prevalent in developing countries like India are not only of a different nature but are also possibly more complex. As briefly

3 For example, Lancaster (1980) in his model of trade in imperfect competition framework characterizes the market structure of 'perfect monopolistic competition'. In his words, the characterization is closely representative of the market conditions in the technologically advanced countries.

4 According to Rodrik (1988), '.....the new trade theory has developed against the backdrop of trade conflicts among developed countries, and between the United States and Japan, in particular. Market imperfections of the sort analyzed in this context would appear to be, if anything,
exogeneity of technological change (imported mostly from the developed countries), highly skewed income distribution, and product and factor market segmentation are some of the differential characteristics commonly found in developing countries like India.

In this thesis, the type of market imperfections that are characterized, while analyzing firm size and exports, are the ones that are perceived as prevalent and specific (or more relevant) to the Indian economy and industry.

Secondly, the inclusion of firm size as an explanatory variable in empirical studies is by no means new. There are a number of studies which empirically examine exports of manufactures in imperfect market framework, across industries and across firms within an industry. Most of these studies take 'firm size' as one of several determinants of exports at the industry or firm level. The arguments for the inclusion of firm size are based on the issues like scale economies, and market power etc.

In the present analysis, obviously, firm size dimension is the locus. Therefore, the determinants of exports are analyzed through the firm size dimension both from the demand and supply sides, rather than taking firm size as only one of the determinants of exports, by comparing firms within an industry.

more serious in the developing countries. Yet the new insights have still to penetrate the vast literature on trade policy in developing countries.'

5 Glejser et al. (1982), Aquier (1980), Hirch et al. (1974) etc and in India's case Lall et al. (1981) and Siddharthan (1986) etc. The studies will be reviewed in Chapter II.
The objective of this enquiry is to search for the causes behind the export behaviour of different size groups of firms within a specific industry. So the basic question the analysis aims to answer is why different size groups of firms tend to behave in an identifiable fashion vis-a-vis exports, which, in turn, should lead to the identification of the type of market imperfections or the dominant economic factors governing the export behaviour of the size groups.

Given the complexity of real phenomena, any empirical research might not be able to test a specific trade theory in a consistent and complete fashion. So far, according to Deardorff (1984), "... considerable progress has been made, especially in the last few years, with refinements of the theories to improve their empirical relevance. But it remains true nonetheless that no unambiguously correct and conclusive test of any trade theory has been formulated and applied. Instead there have been piecemeal improvements in the empirical applications of trade theories. Together these have given us a body of evidence that, though it proves little, is highly suggestive and has fostered a consensus as to what the economic factors are that contribute most to the understanding of international trade." 6 The general methodology applied in most empirical studies is to test a set of hypotheses with piece-meal theoretical basis and derive approximate generalizations.

6 pp 468.
In the present case, the possible hypotheses are derived on the basis of the conditions prevailing in the existing Indian industrial structure. For analytical generalizations, i.e., in abstracting from the existing specific conditions, each of the different strategic size groups in an industry can be taken to exist in and represent certain broad distinguishable conditions particular to that group along with a subset of conditions common to each other. On this basis, certain generalizations and predictions based on the generalized observations can be made regarding the export behaviour of the distinct size groups.

The theoretical bases for the possible hypotheses are derived both from the theories of comparative advantage and from some of the special models of imperfect competition. The relevance of the concept of comparative advantage to a firm level analysis of the present type, under a given characterization of the imperfect market structure of an industry, could be in terms of the comparative efficiency of different size groups in realizing the country's comparative advantage in relative factor endowments and certain technological characteristics. The comparative efficiency differences could be caused by product and factor market imperfections. The significance of the issues raised by the trade theories of imperfect competition, like scale economies, market power, demand

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7 The concept of strategic size groups is taken from Porter (1979).
factors, and product differentiation etc depend on the type of imperfect market structure that is characterized. In the process, certain concepts and themes as have been used in general and also special, theories have to be appropriately recast in accordance with the perspectives and boundaries of the present problem.

Implicit in the previous observations, is the view that there can be no generalized theory of international trade in imperfect market framework, since market imperfections could be of numerous type. The results in most of the special models depend on the type of market structure that is imposed and the nature of the demand and supply side conditions that are abstracted. In Chapter II, some of the special trade theoretic models of imperfect competition and a few empirical studies are reviewed in order to derive issues and themes, which are relevant to the present problem at hand.

In Chapter III, the existing conditions of India's industrial structure are described and are characterized in the form of certain "stylized facts". The ideas and themes derived from Chapter II are applied to the characterization of the existing Indian market conditions, in terms of their possible relevance, in order to derive testable hypotheses. To considerable extent, of the description of the existing phenomena and some of the possible hypotheses are based on a diagnosis of information collected from a firm level field study conducted for a sample of firms. Thus the "stylized facts" are rooted on a relatively firm empirical base and
embody both quantitative and qualitative characteristics. The analytical framework and the conceptual issues are derived from four broad interlinked themes:

1) Domestic Market structure;
2) Scale economies;
3) Technological activity and Efficiency; and
4) Overseas investment and Exports.

The basic condition (or assumption) under which the issues are derived from the above four themes, based on Linder's (1961) argument, is that firms are set up to cater to the domestic market first and exports are a later outcome as an offshoot of or reaction to the domestic activity. Thus market structure of the industry in consideration is the central theme. Under a specifically stylized imperfect market structure for an industry, different size firms with different levels of domestic market power will necessarily have very different market strategies. An important component of such strategies is the market segmentation between exports and domestic sales, in terms of price, quality, entry factors, which in turn, could determine the relative profitability of exports versus domestic sales. Secondly, different size groups of firms within an industry may face differential domestic market pressures. This, in turn, may determine the comparative efficiency differences across the size groups in realizing the supply side potential advantages governed by the domestic factor endowments and certain technological factors.
The specific sector that has been selected for the study is the engineering industry. The basic characterization of the market structure of the industry is what is referred to as a "long-tailed" market structure. In such structure, a few large firms at the top ladder take the major share of the market while a large number of small and medium firms share the rest.

In an industry with a long-tailed market structure, the large firms at the top ladder may tend to behave like oligopoly firms, while the large number of small firms may face highly competitive conditions.

Under the theme of scale economies, the sub-themes relate to economies of scale, both external and internal to a firm, and static and dynamic economies of specialization. The issues revolve around the relationship between firm size and the economies of scale and in turn exports, under the existing market structure, and demand and supply side conditions.

The theme of technological activity and efficiency consists of three inter-related themes: 1) firm level technological adaptation behaviour and its relation to firm size and, in turn, exports; 2) firm level technical efficiency and its relation to firm size and exports; and 3) firm level allocative efficiency and its relation to size and in turn exports. These aspects

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8 This can be observed in terms of Stackelberg's (1934) leader and follower firms approach.

9 It is important to take into notice that the word "competitive conditions" is used more in terms of managerial economics rather than the strict neo-classical definition of "perfect competition".
capture the relationship between firm size and exports governed by the supply side factors like domestic factor endowments and technological conditions and also the firm level organizational factors.

The Empirical Methodology.

In Chapter IV and V, where the equations are specified for empirical examination, the hypotheses are explicitly stated. The methodology followed is not purely in terms of testing the hypotheses but also searching for the underlying economic factors behind an observed outcome. In the process, some of the equations could be subject to minor technical modifications in order to be more appropriate to the process of searching for explanations. Some of the arguments put forward in Chapter III, may not be captured explicitly due to data limitations and measurement problems. But these arguments can be used to derive possible explanations of the outcomes. Secondly some of the measured variables are taken to be proxy representatives of the economic factors due to the limitations in the firm level data.

In Chapter IV the direct relationship between firm size and exports is empirically established, which lends credence to the significance of the market structure issues like domestic market power through firm size variable. The explicit effects of some of the variables, which operate through the size variable, are examined. Apart from this, the relationship of some of the supply side factors, like relative factor
intensities, on firm level exports through the firm size dimension is established.

The results are estimated for a set of sample firms both at the aggregate level classification of the engineering industry and also at the disaggregate level classification of sub-industries. Comparison of the results obtained at the aggregate and disaggregate industry levels is made to derive possible generalizations and to underscore the robustness of the findings.

In Chapter V, some of the supply side arguments on the basis of technical and allocative efficiency measures are empirically examined, in order to understand their effect on exports through the firm size variable. The 'measured' technical efficiency variable captures the firm level technical efficiency differences caused by differences in technology levels (gaps) between size group of firms apart from organizational factors. Under the given market structure different size group of firms may adopt different production methods or technologies at differing levels of efficiency in transforming inputs into outputs. The efficiency differences could be a result of the nature of the domestic market structure pressures and its effects on choices and strategies. This, in turn, would result in differences in the ability of different size group of firms to realize the country's relative (Ricardian type of comparative advantage due to technological differences) advantage in the indigenous technological
features. These possibilities are observed through the technical efficiency dimension.

Domestic factor market distortions result in the deviation of the private factor prices from their shadow (or opportunity cost) prices. If the factor markets are highly segmented, large and small firms may pay different prices for the factors of production. The firms which pay factor prices which are closer to their shadow prices and realize higher systematic allocative efficiency on the basis of the relative shadow factor prices should be able to realize the domestic comparative advantage in the factor endowments. These issues are examined, empirically, through the allocative efficiency aspects.

The engineering industry that is taken for empirical examination, is based on the Standard Industrial Trade Classification (SITC). It includes three broad groups: 1) Machinery and Transport equipment industries, 2) Metal manufactures and 3) Scientific instruments. Empirical analysis of a sample of firms belonging to the aggregate industry as a whole as well as to the three sub-group industries is carried out. The sub-group industries are: i) Hand, small and cutting tools; ii) Diesel engines and parts; and iii) Steel tubes and pipes. The choice of the three industries is based on the technological feasibility for the existence of large and small firms in producing the final products in these industries.

The field study, on the basis of a detailed questionnaire, covered a sample of 132 firms, belonging
to the three sub-group industries with major emphasis on the Hand, small and cutting tools industry. Out of the 132 firms, 24 are large and the rest are small and medium firms. Out of the total number, information for 80 small and medium firms was collected through mailed questionnaires. For the rest, direct interviews were undertaken.

10 Definition of large and small and medium firms is rigoursly made in Chapter III.