CONCLUSIONS

This study has been an attempt to examine the policy implications of liberalisation in the Indian petrochemical industry. While liberalisation policies have eroded or reduced artificial entry barriers, the accentuation of natural entry barriers perpetuates an oligopolistic industrial structure. Therefore the benefits of competition that ought to be forthcoming through liberalisation policies do not materialise. The following are some of the important observations that the study brings out.

Liberalisation policies were initiated to increase competition in Indian industry. They essentially remove what we have termed artificial entry barriers in order to encourage entry and thereby increase competition. There is a clear demarcation between domestic liberalisation and trade liberalisation in the Indian petrochemical industry. Domestic liberalisation policies were initiated in the early 1980s and has been systematic in bringing down restrictions and controls on the entry of new firms and the expansion of incumbent firms. Domestic liberalisation commenced with the policies of broadbanding, reendorsement of capacity, prescribing a minimum efficient scale of operation and opening up the public sector; and culminated in the NILP [1991] where all petrochemicals (apart from those that were deemed hazardous) were delicensed. On the other hand, trade liberalisation has been ad hoc and hesitant. It was only in 1993 that the Rakesh Mohan Committee sought to systematise trade liberalisation and drew up a graduated framework for tariff reduction. These recommendations are yet to be implemented.

Domestic liberalisation policies have ostensibly brought down artificial entry barriers in the petrochemical industry. But the existence of natural barriers has been detrimental to the building up of competitive structures in the industry. Characteristics intrinsic to the nature of the petrochemical industry such as scale economies, high fixed costs (a portion of
which is sunk) and the lumpy nature of investment have enabled incumbent firms to take advantage of domestic liberalisation and perpetuate their dominant power. The entry deterring nature of firm behaviour in the post liberalisation phase was illustrated with the help of models set within the framework of the new industrial organisation.

The models are two-period models that assume Cournot competition between firms. In the first period the incumbent firm is assumed to be a monopolist and is a first-mover. The potential entrant enters in the second period and the two firms operate as duopolists. These models enabled us to investigate the conditions under which the entrant could be deterred and make conjectures about the entry deterring possibilities of the firm's strategies. The strategies of holding excess capacities (as evidenced by the conditions set out in Model 1) and vertical integration (in Model 2) were possible due to domestic liberalisation policies.

In the pre-liberalisation period, the licensed capacities of petrochemical firms were far below efficient scales. Early liberalisation policies stipulated a minimum efficient scale of operation to enable firms to take advantage of scale economies and be efficient. Later with delicensing, although a MES was not stipulated, firms would have to operate at scales that would be efficient. First mover firms who expanded capacities (to take advantage of scale economies) would build excess capacities which would deter the entry of new firms. The fact that the incumbent had incurred sunk costs to create excess capacities showed a will to defend dominant market power.

Model 1 established a number of strategies by which an incumbent firm could deter entry by holding excess capacities. While the intrinsic characteristics of scale economies and the lumpy nature of the investment automatically create excess capacities that are 'innocent' entry barriers, the incumbent can also deliberately expand (and hold excess capacities) in order to deter entry.
Delicusing also enabled incumbent firms to vertically integrate. The act of vertical integration not only enabled the integrating firms to take advantage of transaction costs, assure a market for his products (or inputs) but also precluded entry (both in the input as well as product market). The incumbent firm could thereby accentuate his dominant market power.

Model 2 illustrated how entry can be deterred in both the product and input market through vertical integration. An incumbent's entry into a neighbouring product i.e. vertical integration cannot be prevented because he is already assured profits in his original market. Nor can excess capacity prevent vertical integration since the firm is seeking an assured market for his product (by forward integration) or an assured source of inputs (by backward integration). Vertical integration can however prevent fresh entry. In addition, the vertically integrated firm automatically raises the cost of entry — if entry has to be effective, the entrant will have to compete with the incumbent as an integrated firm thus raising the cost of entry.

Models 1 and 2 illustrated how firm strategies of holding excess capacities and vertical integration could deter entry and accentuate the dominant market power of incumbents. Although domestic liberalisation policies eroded artificial entry barriers, it was clear that these policies enabled firms to erect natural entry barriers and act in a manner that would deter fresh entry. Firm strategies of expansion (and thus creating excess capacities) and vertical integration were facilitated by domestic liberalisation policies. Such behaviour did not lead to a competitive industrial structure (which was the aim of liberalisation). On the other hand, the industry continued in exhibit high levels of concentration.

Any policy intervention to build a competitive industrial structure in the Indian petrochemical industry would have to nullify or reduce the advantages of incumbency without jeopardising efficiency. One policy option would be to grant subsidies to the entrant to offset sunk costs and make entry
profitable. In effect, the government attempts to create a contestable market. However, such subsidies not only create distortions in the economy, but also encourages the entry of inefficient sizes firms. Moreover, resource constraints would hamper such a policy.

The second policy option would be to frame a pricing policy that influences demand patterns such that incumbents do not have an incentive to expand and deter entry. However, there are too many difficulties in calculating administrative prices for a large number of petrochemicals; and such prices do not reflect the changing conditions of the market.

A third alternative would be to restrict the capacity expansion of firms beyond MES - in effect forcing the entry of new firms and market sharing. However, in cases where MES is large and a single firm can cater to the entire market, the problem of domination still has to be checked. And, restricting capacities implies a reversal of liberalisation policy akin to licensing. However, such a policy does not curb the vertical integration of incumbent firms which has been shown to be entry deterring.

"The technology in the petrochemical industry supports vertical integration from the manufacture of feedstocks to downstream petrochemicals. Policy options available to restrict the advantages that an integrated firm enjoys are limited. The MRTP Act could be activated to investigate cases where vertically integrated firms price their products in order to deter entry and thereby limit competition. Such practices are, however, extremely difficult to prove.

The dominance of incumbent firms could to an extent, be controlled by restricting the upstream petrochemicals to the public sector. In this case, public sector enterprises do not have an incentive to expand in order to deter entry. Private firms producing downstream petrochemicals integrate backwards beyond a point and the incumbency advantages of vertical
integration are thereby reduced. However, an inefficient public sector can jeopardise the entire petrochemical industry. In this situation, trade policy gains significance as a means of ensuring competitive structures. The implications of trade liberalisation is outlined in Model 3 which is set in the new IO but with the added dimension of trade.

Model 3 illustrated how free trade would lead to increased concentration: when the number of firms in the industry is greater than what scale economies permit, some firms would have to exit. Domestic firms would therefore need a tariff to enable them to operate at efficient scales. However if tariffs were prohibitively high, trade would have no role to play and domestic firms would be concentrated and oligopolistic on account of domestic liberalisation. It therefore becomes important to draw up an optimal tariff policy where tariffs would be linked to scale economies for the manufacture of the product. Tariffs should be higher for products with high scale economies such as feedstocks and progressively lower for downstream petrochemicals. The recommendation that stems from Model 3 are in fact contrary to what the Rakesh Mohan Committee has recommended. The tariff structure they recommend stipulates that upstream petrochemicals should have nil or low tariffs and that tariffs should be higher for downstream petrochemicals. Our results show that as economies of scale are higher in upstream petrochemicals, tariffs should be correspondingly higher than for downstream petrochemicals where scale economies are lower.

Our study has examined the consequences of liberalisation in the petrochemical industry in India. While liberalisation policies were designed in order to increase the level of competition in an industry, the outcomes are linked to industrial structure, and firm behaviour. The causal links between liberalisation policies and competition are therefore not simple. Our case study of the petrochemical industry in India illustrated how domestic liberalisation policies can fact accentuate the market power of incumbent firms and perpetuate an oligopolistic industrial structure. And given the structure of the
petrochemical industry there is no simple link between the
decrease in tariffs (i.e. trade liberalisation) and competition
either. Tariffs are necessary and should be designed in a manner
to curb the advantages incumbent firms enjoy in an oligopolistic
situation.