NOTES

Credit may be more forthcoming to incumbents who want to integrate vertically than to entrants who want to set up integrated complexes.

Most studies assume Cournot behaviour because of the robustness of the results and this assumption is compatible with the conditions in the petrochemical industry.

Firms have to operate at a certain minimum economic scale for efficiency even though the stipulation of MES is no longer part of government policy.

We assume that $q$ can be produced with capacity $F$ and at $q$, the marginal cost, $mc = C + F$ i.e. the firm expands. In the subsequent analysis it becomes clear that we have considered and $\xi$ in the neighbourhood of $q$, such that for $\xi < q$, full capacity is reached.

The above definition of marginal cost is in contrast to Dixit’s model [1979] where

$$mc = C$$

for $q < q$

$$= v + s$$

for $q > q$ giving rise to a $Z'$ shaped marginal cost curve.

Ware [1984] argues that when the instrument of strategic commitment takes the form of sunk costs, which both the incumbent and the entrant have to bear, as in Dixit’s paper, a three-stage model rather than the two-stage model is required. Rather than to extend the entry game to three periods, perhaps the inverted ‘T’ marginal cost curve represents sunk costs adequately. Given the essentially asymmetric nature of the entry game where the incumbent has the first mover advantage, he incurs only variable costs in the second period.

This shift from MR₁ to MR₂ can be on account of any positive shock that affect demand conditions. In the petrochemical industry, it could be due to increased demand in downstream industries which tends to substitute synthetic petrochemical based products for natural products that either in short supply or qualitatively inferior.
From the quadratic, we have:

$$\phi = Bq^* - (A - C) q^* + \frac{(A - C)^2 - F}{4B}$$

$$\frac{\partial \phi}{\partial q^*} = 2Bq^* - (A - C)$$

We have two values of $q^*$ such that:

$$q^* = \hat{q} = \pm \sqrt{\frac{(A - C) \pm \sqrt{BF}}{2B}}$$

where $q^* > 0$ i.e. both roots are positive.

Substituting $q^* = \hat{q}$ in (1) we get

$$\frac{\partial \phi}{\partial q^*} = 2B \left\{ \frac{(A - C) + 2\sqrt{BF}}{2B} - (A - C) \right\}$$

$$\frac{\partial \phi}{\partial q^*} = 2B \left\{ \frac{(A - C) - 2\sqrt{BF}}{2B} - (A - C) \right\}$$

Therefore,

$$\frac{\partial \phi}{\partial q^*} = 2 \sqrt{BF} > 0 \quad \text{and} \quad \frac{\partial \phi}{\partial q^*} = -2 \sqrt{BF} < 0$$

where $\hat{q} < \hat{q}_L$.

The entry of $F_1$ into the input market is possible even if excess capacities exist in the input market since $F_1$ makes profits in both the input and product markets.