

M.A SEM III
MICRO ECONOMICS ANALYSIS

A Stackelberg Oligopoly

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- Stackelberg duopoly, also called Stackelberg competition, is a model of *imperfect competition* based on a non-cooperative game. It was developed in 1934 by Heinrich Stackelberg in his “Market Structure and Equilibrium” and represented a breaking point in the study of *market structure*, particularly the analysis of *duopolies*, since it was a model based on different starting assumptions and gave different conclusions to those of the *Cournot’s* and *Bertrand’s duopoly models*.

- It is assumed, by von Stackelberg, that one duopolist is sufficiently sophisticated to recognise that his competitor acts on the Cournot assumption.
- This recognition allows the sophisticated duopolist to determine the reaction curve of his rival and incorporate it in his own profit function, which he then proceeds to maximise like a monopolist.

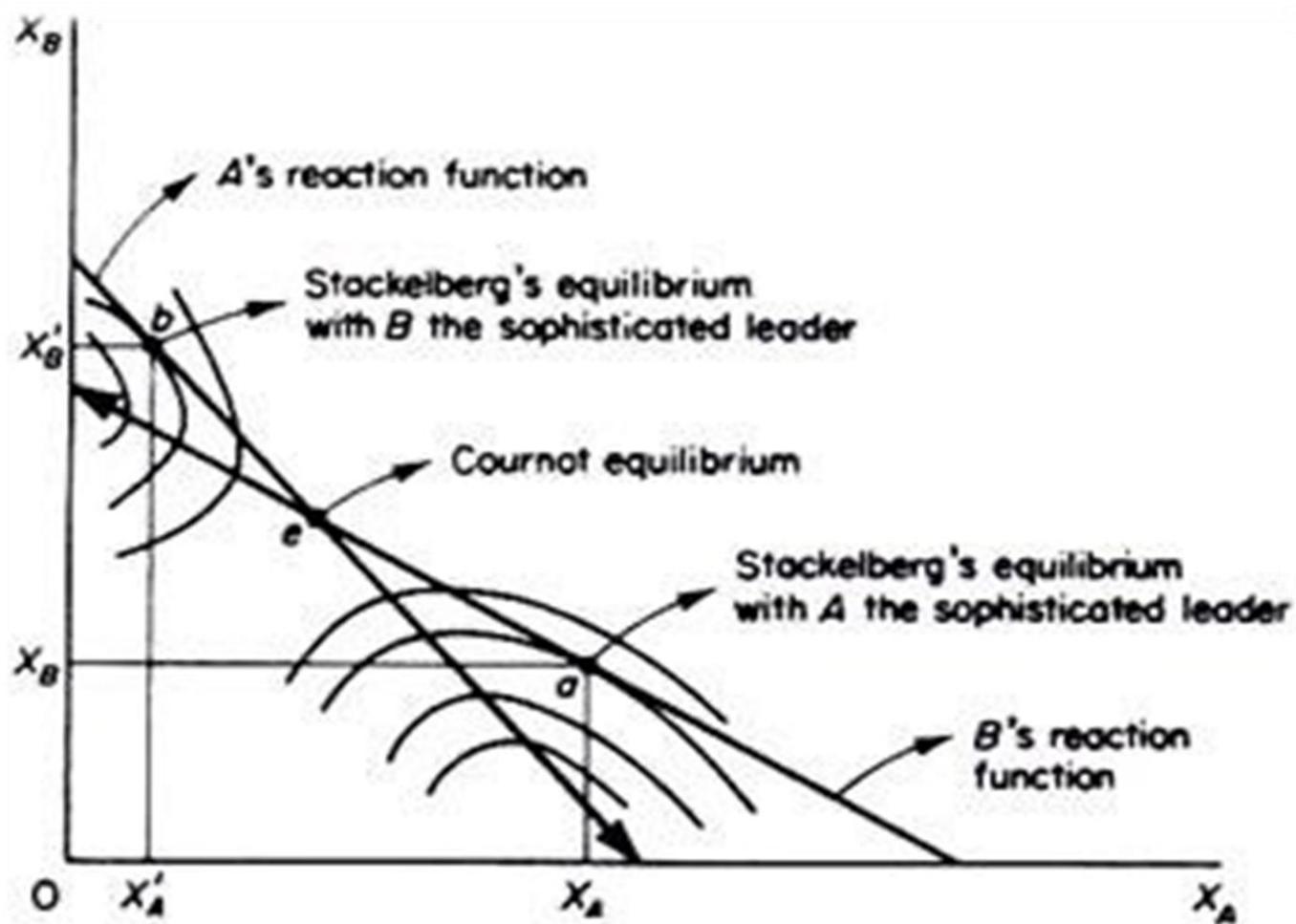


Figure 9.20

- Assume that the isoprofit curves and the reaction functions of the duopolists are those depicted in figure.
- If firm A is the sophisticated oligopolist, it will assume that its rival will act on the basis of its own reaction curve. This recognition will permit firm A to choose to set its own output at the level which maximizes its own profit. This is point a (in figure 9.20) which lies on the lowest possible isoprofit curve of A, denoting the maximum profit A can achieve given B's reaction curve.

- Firm A, acting as a monopolist (by incorporating B's reaction curve in his profit-maximizing computations) will produce X_A , and firm B will react by producing X_B according to its reaction curve. The sophisticated oligopolist becomes in effect the leader, while the naive rival who acts on the Cournot assumption becomes the follower.

- Clearly sophistication is reward-ing for A because he reaches an isoprofit curve closer to his axis than if he behaved with the same naivete as his rival. The naive follower is worse off as compared with the Cournot equilibrium, since with this level of output he reaches an isoprofit curve further away from his axis.

- If firm B is the sophisticated oligopolist, it will choose to produce X'_B , corresponding to point b on X's reaction curve, because this is the largest profit that B can achieve given his isoprofit map and A's reaction curve. Firm B will now be the leader while firm A becomes the follower. B has a higher profit and the naive firm A has a lower profit as compared with the Cournot equilibrium.

- In summary, if only one firm is sophisticated, it will emerge as the leader, and a stable equilibrium will emerge, since the naive firm will act as a follower.
- However, if both firms are sophisticated, then both will want to act as leaders, because this action yields a greater profit to them. In this case the market situation becomes unstable. The situation is known as Stackelberg's disequilibrium and the effect will either be a price war until one of the firms surrenders and agrees to act as follower, or a collusion is reached, with both firms abandoning their naive reaction functions and moving to a point closer to (or on) the Edge-worth contract curve with both of them attaining higher profits. If the final equilibrium lies on the Edge-worth contract curve the industry profits (joint profits) are maximised

- It shows clearly that naive behaviour does not pay. The rivals should recognise their interdependence. By recognizing the other's reactions each duopolist can reach a higher level of profit for himself. If both firms start recognising their mutual interdependence, each starts worrying about the rival's profits and the rival's reactions. If each ignores the other, a price war will be inevitable, as a result of which both will be worse off.

- The model shows that a bargaining procedure and a collusive agreement becomes advantageous to both duopolists. With such a collusive agreement the duopolists may reach a point on the Edgeworth contract curve, thus attaining joint profit maximisation.

- It should be noted that Stackelberg's model of sophisticated behaviour is not applicable in a market in which the firms behave on Bertrand's assumption. In a Cournot-type market the sophisticated firm 'bluffs' the rival, by producing a level of output larger than the one that would be produced in the Cournot equilibrium and the naive rival, sticking to his Cournot behavioural reaction pattern, will be misled and produce less than in the Cournot equilibrium.