

Stability of the Cournot equilibrium for a Cournot oligopoly model with n competitors

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It was stated by [7] (see also [3] page 237) that the oligopoly model produced under constant marginal costs with a linear demand function is neutrally stable for three competitors and unstable for more than three competitors. As discussed in [6], linear demand functions are very easy to use, but they do not avoid negative supplies and prices, so it is possible to use them only for the study of local behavior. This problem can be solved by using nonlinear demand functions such as piecewise linear functions or other more complex functions, one of which was suggested by [4] for a duopoly and later by [5] for a triopoly using iso-elastic demand functions. These types of demand function were later studied by [1] and [2] for a nonlinear (iso-elastic) demand function and constant marginal costs and it was concluded that this Cournot model for n competitors is neutrally stable if $n = 4$ and is unstable if the number of competitors is greater than five (see also [6]).

The main aim is to consider Cournot points and discuss their stability while the number of players is increasing for the model with an iso-elastic demand function and under the assumption that the firms' costs are identical. The terminology of dynamical systems is used, that is the Cournot point is identified as a fixed one. Finally, it is proved that for identical unit costs the Cournot point is a sink for two or three competitors and a saddle for more than four players.

References

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