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COMPUTING A CONSISTENT CONJECTURAL EQUILIBRIUM IN A MIXED OLIGOPOLY

The interest in mixed oligopolies is high because of their importance to the economies of Europe (Germany, England and others), Canada and Japan (there exists an analysis of "herd behavior" by private firms in many branches of the economy in Japan.) There are examples of mixed oligopolies in the United States such as the packaging and overnight-delivery industries. Mixed oligopolies are also common in the East European and former Soviet Union transitional economies, in which competition among public and private firms existed or still exists in many industries such as banking, house loan, life insurance, airline, telecommunication, natural gas, electric power, automobile, steel, education, hospital, health care, broadcasting, railways and overnight-delivery. Safe exchange of information concerning the agents' intentions and/or conjectures is crucial for the robust functioning of agents in such models.

Conjectural variations equilibrium (CVE) has been introduced in 1920-1930 as another possible solution concept in static games. According to this concept, agents behave as follows: each agent chooses her most favorable action taking into account that every rival's strategy is a *conjectured function* of her own strategy.

The *consistency* (or, sometimes, "rationality") of the equilibrium is defined as the coincidence between the *conjectural best response* of each agent with the *conjectured reaction function* of the same. This coincidence can be defined using various degrees of strength.

In this paper, we extend the results obtained by Bulavsky in [1] to a mixed oligopoly model. In the same manner, we consider a conjectural variations oligopoly model, in which the degree of influence on the whole situation by each agent is modeled by some special parameters (influence coefficients). However, in contrast to other models examined in the literature, here we follow the ideology of Bulavsky [1] selecting the market price p, rather than the producers' outputs, as an observable variable.

Namely, we first define two concepts of equilibrium: exterior and interior, and establish the existence and uniqueness results for both kinds. Moreover, the continuous dependence of the exterior equilibrium production volumes upon the conjectures (influence coefficients) is demonstrated. Finally, a consistency criterion for the conjectures is introduced, and a numerically efficient procedure for evaluation the conjectures' consistency is deduced. Based upon that, the existence theorem for the interior (that is, consistent) equilibrium is proved, and applications to simple model of electricity market is provided. It is interesting to notice that similar consistency criterion was deduced independently by Liu et al. [2] but only for standard (non-mixed) oligopoly.

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References

1. Булавский В.А. Структура спроса и равновесие в олигополии. // Экономика и Математические Методы. – ЦЭМИ РАН, 1997. – Т. 33. – С. 112-124.
2. Liu Youfei, Ni Y.X, Wu F.F, Cai Bin. Existence and uniqueness of consistent conjectural variation equilibrium in electricity markets // International Journal of Electrical Power and Energy Systems, 2007. – V.29. – P. 455-461.