

Peer Review

Review of: "The Complexity of Tullock Contests"

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First of all, I would like to thank the creators of Qeios for the opportunity they provide through the platform.

Regarding this article, I find it very interesting, well-written, and rigorous. The value of this article lies in its attempt to answer two central questions in the Tullock contest framework: does a pure-strategy Nash equilibrium exist, and is it easy to compute?

The authors show that the existence and the computational complexity of a pure-strategy Nash equilibrium depend on the parameter r_i , which leads to three distinct cases. This classification provides a clearer understanding of the strategic landscape in Tullock contests.

Unfortunately, I have only read the first half of the article. Therefore, my comments and observations pertain only to this part of the paper.

I would like to offer the authors a few comments and suggestions for consideration:

1 - page 5: The notation x_{-i} is well known in game theory, but it is better to introduce it.

2 - page 5: The utility function (formula (1)) seems to be an expectancy. Is it appropriate to assume risk neutrality on the part of the players?

3 - page 5: The formula (1) may be undefined if all x_i values are equal to zero.

4 - page 6: I do not fully understand the notation $(\Delta f_i / f_i) / (\Delta x_i / x_i)$.

5 - page ...: Delete the ~ symbol in the entire text.

6 - page 13: "... which means the contest has a unique ...", instead of "unique".

7 - page 16: The algorithms bisection and MMD are not given.

Declarations

Potential competing interests: No potential competing interests to declare.