Referee report on “Cost-reduction innovation under mixed economy”

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The above mentioned paper considers a mixed duopoly where a public (or partially privatised firm) competes with a private firm in a market with product differentiation. Firms have the possibility of investing in cost-reducing innovation in a stage prior to output competition. The public firm (firm A) maximises the weighted average of its own profits plus consumer surplus. The weight allocated to consumer surplus (tau) indicates of the degree of public ownership, with tau being 1 when the firm is fully public and 0 when is fully private. The private firm (firm B) maximises its own profits. The paper adds on to the literature on mixed oligopoly by consider product differentiation in this setting.

The authors show that the level of investment in innovation by both the public and the private firm is increasing in the degree of public ownership of firm A. The same applies to the two firms’ output levels. As a consequence, prices are decreasing in the degree of public ownership of firm A.

I have a few comments to make on the current version of this paper:

• Public firm’s objective function

A large part of the literature on mixed oligopoly (including many of the references cited in the literature review) assumes that the public firm maximises SW; that is, the public firm maximises the sum of producer and consumer surplus. Here, the public firm does not take into account the profits by the other firm. It would be good to check whether the results are robust to those formulations.

• Cost functions

Again, a large part of the literature on mixed oligopoly assumes that the cost functions are quadratic in outputs. Some contributions assume instead that the public firm is ex-ante less efficient than the private firm. Here, the cost functions are linear in output and the authors assume that the marginal cost of production for both firms is the same (see above eq. 10 where ca=cb=c; in fact it would be best to state this when the model is first presented). The reason why quadratic costs are often assumed (or differences in marginal costs) is that they allow to rule out the case of natural monopoly (which would not be interesting for a paper on mixed markets). I wonder whether the degree of product differentiation plays a similar role here. What is the degree of product differentiation that would guarantee that a mixed oligopoly is socially preferable to a single public firm operating in this industry? It would be important to clarify this point and also explain better how the paper fits or differs from the current literature.

• Degree of product differentiation:

Related to the above point, it would be worth emphasizing why introducing product differentiation here matters. My reading of the paper is that the results hold regardless of the degree of product differentiation (please correct me if I am wrong). This should be emphasized.

• Effect on Social Welfare.

Given the results (both investments in innovation and output increasing in the degree of public ownership of firm A), one wonders whether social welfare is also increasing in this parameter. Would the degree of product differentiation affect this result or not?

• Firm size:

In proposition 4, the authors refer to “firm size”. Do they mean equilibrium output level? This needs to be clarified.

• The literature review needs improving.

The literature on mixed oligopoly is quite vast and the review seems a bit ad-hoc. For example, it is not clear to me what the authors mean with literature on “firms’ strategies” vs “other factors” or with “in practice”. A much better effort at placing the paper on the literature is needed.

• The writing needs improving as well.

Some of the words do not seem to be used wrongly and generate confusion. For example, at the top of page 6, it says “apparently” the condition is met if…. Have the authors actually checked this? Also, there are some grammar mistakes. The text needs to be checked thoroughly.

• Proofs of propositions 3 and 4:

It would be best to explicitly include them in the appendix.

• Assumption in page 5:

It would be best to discuss in more detail the combinations of parameters tau and gamma that allow for this assumption to hold.