

Title: Cost-reduction innovation under mixed economy

Discussion Paper No. 2015-68

Thank you for your detailed and helpful comments. We would improve and clarify the manuscript accordingly. The followings are our replies and ways to reflect your comments.

1. In its current form, the study appears to be a simple calculation exercise. The results on innovation and prices and quantities are rather intuitive, since the semi-public firm also accounts the consumer surplus into its objective function. The study seems to lack interesting or surprising results and/or a better understanding of the mechanics that drive these results. A potentially interesting result might be the one reported in Proposition 4. I would suggest to further emphasize this result and to use this result to better motivate the introduction and contribution of this study.

Reply: This paper contributes to the existed literature by analyzing the effects of the public ownership on the cost-reduction innovative investment and outputs. Product substitutability is introduced in the innovation model under mixed economy, which is neglect by other literature.

With specific assumptions, the findings of this paper are differentiated with other literature. For example, as presented in Proposition 2 in the paper, the equilibrium output and innovation of both firms increase with the degree of public ownership. The findings differ from the general cases under standard Cournot settings and thus interesting and surprising. In a Cournot setting, if a firm becomes more aggressive (in this case the (semi) public firm when τ increases), the output of this firm increases and the output of the competitor decreases. We explain this logic with three possible reasons. First, regardless of the degree of the public ownership, both firms aim to reduce their marginal production costs. Second, the chosen objective of the (semi-) public firm is comprised of two parts, namely its profits and consumer surplus. Third, in some industries depending on basic research heavily, like telecommunication and

semiconductor, most private firms prefer to invest in application research but not basic research because of low expected return.

Furthermore, as suggested by the referee, we would further emphasize on the results of Proposition 4. A further extension of the results does help to make a better understanding of the mechanisms.

2. The model makes strong assumptions on the functional form of the inverse demand and the investment cost function. It might be worthwhile to at least discuss these assumptions.

Reply: We would discuss these assumptions in a revised version as suggested. In fact, as shown in the paper, the assumptions of the inverse demand and the investment cost function are consistent with the existed literature. Meanwhile, we make some adjustment of the assumptions that differ from the standard settings. For instance, the standard assumption in the literature of mixed oligopolies is that the public firm maximizes social welfare without concerning profits. We argue that this standard assumption should be modified for the following reason. In our opinion, even a complete public firm still need to take profits into consideration besides social welfare. For instance, the evaluation of Economic Value Added (EVA) is applied in some countries like China to assess the profitability of public firms, including complete public ones. As a result, the objective of most public firms is integrated by profits and social welfare, while complete public ones give more weight to social welfare than semi-public ones. That is why the settings in our manuscript depart from the traditional papers.

3. The writing of the paper needs to be improved for several reasons:

- The introduction is not well motivated and leaves the reader wondering what research question the study concentrates on, and why mixed oligopolies are interesting to explore.
- The paper is often imprecise, and appears to be superficial. I list just a few examples

from the introduction:

1) On page 2, you mention “Some papers focus on the effects of mixed oligopolies on firms’ strategies and the others highlight the effects of other factors on the mixed oligopoly.” It is unclear what firms’ strategies you are referring to. I would suggest to be more precise by mentioning the impact on innovation or market structure. Moreover, it is not clear what you mean by “other factors”. That could be everything and leaves the reader in the dark. Moreover, the phrase suggests that the topic of mixed oligopolies is not novel, since it might be one of the “other factors” that other studies already explored.

2) On page 2, you mention “Barcena-Ruiz (2007) discussed the endogenous timing under mixed oligopoly”. The question arises, endogenous timing on what, on innovation, entry, quantity setting? Being more precise allows the reader to better understand how this and other references relate to the main objective of your study.

3) Based on the cited studies and the way they reported, it is difficult to understand the main contribution of your study to the current literature. I suggest to also mention the results of the cited studies. That helps the reader to better understand the context.

Reply: First, we would try to reorganize the introduction and highlight the research topic and question at the beginning of the paper. Specifically, the paper highlights the innovation strategies of mixed duopoly with a (semi-) public firm and another private firm, and the effects of mixed oligopoly on innovation are captured. We establish the model under mixed oligopolies, which is interesting and necessary for the reason that mixed oligopolies have significant effects on the economy of developing countries in practice.

Second, we would make the presentation to be more precise as recommended. More specifically, firms’ strategies in the paper refer to pricing strategy, production strategy and innovation strategy and so on, which are further presented in the last paragraph of page 2. Also, the impact of mixed oligopolies on innovation and market structure would be added in the revision. Meanwhile, “other factors” mentioned in the paper include firms’ endogenous objectives, uncertain demand and political manipulation. Likewise, we have already presented these factors on page 3. Notice

that mixed oligopolies is not included in the “other factors”, since it is a dependent variable instead of independent variable in the model of related papers.

Third, Barcena-Ruiz (2007) discussed the endogenous timing on price under mixed oligopoly. To avoid the problem of imprecise, we would check the manuscript and make corrections.

Fourth, the results of the cited studies would be reported in a revised version as suggested.

4. I believe that this paper is better published as a short note which summarizes the main results on 5-10 pages, probably stressing Prop 4 further and to better motivate the contribution. Alternatively, the paper could gain more value by adding an empirical part to it.

Reply: We would extend Prop 4 for further analysis to better motivate the contribution. Especially, the mechanism of the influence would be added as a major concern in the paper. In addition, it is possible to extend to empirical analysis in the further research, while the current form of the paper is not that appropriate to add an empirical part directly.