

Title: Cost-reduction innovation under mixed economy

Discussion Paper No. 2015-68

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

1. The paper remarks that "the degree of the public ownership stimulates the innovation of two firms." Is this finding specific to any particular industry sector as per the finding?

Reply: As presented in the remarks of Proposition 2 in the paper, we argue that the degree of the public ownership stimulates the innovation of two firms. This finding is interesting and surprising since it differs from standard Cournot settings. As mentioned by another referee, 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, as well as innovation. Several possible reasons arise for explanation. First, regardless of the degree of the public ownership, both firms aim to reduce their marginal production costs. More innovation investment does help to improve productivity and achieve this objective. Especially, as the (semi-) public firm becomes more aggressive with an increase of τ , the private one has to invest more in innovation to enhance its productivity and reduce its production costs. Otherwise, it may quit production under the pressure of competition. As a result, not only the (semi-) public firm but also the private one invest more and produce more than before. Second, the chosen objective of the (semi-) public firm is comprised of two parts, namely its profits and consumer surplus. Obvious, more innovation of both firms brings about more consumer surplus. Therefore, as the (semi-) public firm concerns more about consumer surplus when τ increases, it is willing to enhance the total innovation investment of the market but not only itself. That is, with a larger τ , investing more in innovation is beneficial to both firms. As a result, the degree of the public ownership stimulates the innovation of the two producers.

Based on the theoretical analysis given above, this finding is specific to some particular industries, especially those sectors depending heavily on basic research. Some industries, like telecommunication, integrated circuit, and semiconductor, rely on basic R&D activities heavily. As is known, unlike application research, basic research costs much with strong technology spillover effect and high risk of failure. Therefore, basic research is regarded as public goods. That is why most private firms prefer to invest in application research but not basic research (Nelson, 1959). Instead, (semi-) public firms are willing to carry out basic R&D activities since their objective is to maximize social welfare. Significantly, the willingness of (semi-) public firms to invest in basic research becomes greater with a relative higher degree of public ownership. Moreover, basic research implemented by (semi-) public firms is also beneficial to private firms because of technology spillover effect. As a result, it is unsurprising that the degree of the public ownership stimulates the innovation of both firms in these industries.

REFERENCE

Nelson, R.R. (1959). The Simple Economics of Basic Scientific Research. *Journal of Political Economy*, 67 (3) , 297-306.