

## **Answer to the referee report 2**

The examples of historically detected collusions show that the cartel members could substantially differ in size. For example, the district heating pipe cartel detected by the European Commission in 1995 consisted of (ten) firms with quite different market shares, e.g., ABB - 40%, Logstor Ror - 20%, Pan-Isovit - 12%, Ke-Kelit Kunststoffwerk - 2%.<sup>1</sup> Clearly that could be potentially a source of asymmetric behavior.

Some justification for the existence of Stackelberg behavior in the context of cartels has been provided, for example, by Shaffer (1995), who considers a theoretical model of such competition. A typical textbook case of a leader-follower relationship among suppliers is the oil market, where OPEC producers play the role of the leading cartel, and the non-OPEC suppliers are the followers (the question remains whether it is quantity leadership or price leadership).

In addition to the above mentioned paper by Shaffer (1995), a leader-follower relationship of the Stackelberg type in the context of cartels has been theoretically considered in the price-leadership models discussed, for example, by d'Aspremont et al. (1983), or by Donsimoni et al. (1986).

Based on the previous literature (d'Aspremont and Jacquemin, 1988), it can be concluded that in the case of Cournot competition, firms engaged in the R&D cooperation prefer to form a cartel in the product market as well as. In the response to the referee report 1, we show that no matter the level of spillovers, the firms prefer to form a full industry cartel rather than to compete on research, and on production in the Cournot style. Thus, it is a qualitatively different situation in comparison to the possibility of Stackelberg competition analyzed in our work. Hence, our paper provides further insight into the issue of cooperation in R&D and in the final product market by considering a possibility for another form of competition.

Clearly, our model is not complex, but despite its simplicity, it allows to capture some interesting relationships. We agree with the referee's suggestion that "it could be nice to show the results analytically". Unfortunately, it is quite tedious to obtain a more general results. However, the numerical analysis illustrates the main points of the entire problem, so, in our opinion, the effort to deal with various conditions on parameters do not provide much

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<sup>1</sup> Commission Decision, Case IV/35.691/E-4.

additional understanding of the analyzed problem. Anyhow, we should still make some more attempts to find an analytical solution.

Also, we agree with the referee that the division of profits in the cartel could be shared unevenly. Following the referee's idea that the leader may be entitled to a bigger share of the profit, the key conclusions of the paper are not changed.

And the last technical comment. As far as we understand, the continental European tradition was to use decimal commas instead of decimal points that dominate the American writings. However, it is probably true that American style became more of a global standard, and maybe we should try to comply with it.

## References

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