

## R&D cooperation and strategic decision-making in oligopoly: An experimental economics approach

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Received: 7 November 2005 / Accepted: 10 November 2005  
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In the thesis we examine a number of research questions directly or indirectly motivated by the game-theoretic literature on R&D cooperation and technological spillovers.

In the first part of the thesis we provide an overview of the huge game-theoretic literature on R&D cooperation and technological spillovers and argue that space is left for empirical researchers to evaluate whether the models' assumptions and predictions hold true. Important questions that remain largely unanswered by theoretical models concern 1) the effect of technological spillovers on the tendency of firms to cooperate in R&D, and 2) the effect of R&D cooperation on the likelihood of tacit product market collusion.

Recently, the first question has been studied in a number of econometric analyses based on innovation and R&D survey data and one can conclude that the findings are ambiguous. To our knowledge the second question has not been dealt with by econometricians. In parts two and four of the thesis we respectively report on duopoly laboratory experiments aimed at answering these questions. The main advantage of the experimental economics methodology is that it enables one to question the behavioural assumptions of theory.

We find that the tendency to explicitly cooperate in R&D does not depend on the level of spillovers, while, more importantly, the tendency to implicitly cooperate in R&D is higher when spillovers are high than when these are non-existing. With respect to the second question we find that R&D cooperation does facilitate tacit product market collusion.

The aim of part three is to provide possible explanations for the finding that there is more (implicit) R&D cooperation with high spillovers. It is striking that this finding conforms in a way with previous findings of related oligopoly experiments that are also typical examples of social dilemma games. Overall, it seems to be the case that implicit cooperation is easier in games of strategic complements with positive externalities than in games of strategic substitutes with negative externalities. It is an empirically relevant question whether the higher cooperation is due to the strategic-complements-characteristic, or to the positive externalities, or to both.

In part three we report on a laboratory experiment aimed at disentangling the effects of the type of strategic interaction (strategic substitutes versus complements) and the sign of externalities on the tendency to (tacitly) cooperate in social dilemma games. We find that the sign of the externalities does not have a significant influence on the tendency to cooperate. Yet, in games of strategic complements the tendency to cooperate is significantly higher

than in games of strategic substitutes. We argue that this may be due to a different mechanic that works in both types of games making decisions in games of strategic substitutes more asymmetric and less stable.

**Keywords** R&D cooperation · Duopoly · Experiments · Price collusion · Strategic substitutes and complements

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