The road not taken: competition and the R&D portfolio*

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Abstract:

Economists have long studied how the level of investment in innovation changes as the intensity of competition in the market changes. This paper starts with the observation that studying solely the level of investment in innovation is insufficient and even potentially misleading. Looking only at the levels of investment ignores an important aspect of the decision to invest in innovation — namely in which specific R&D projects to invest. Knowing how firms choose R&D projects is important because it enables us to make the distinction between the duplication and the variety of research projects. Duplication and variety of research projects will in general react differently to the changes in market structure and will have different implications for the ex post social welfare. This paper delivers a framework in which it is possible to study both the R&D duplication and variety explicitly.

This paper develops a model where firms choose their R&D projects from a set of heterogeneous research projects. An object characterizing both the variety of research and the amount of duplication in research may be called the R&D portfolio. I provide a

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simple characterization of the equilibrium market R&D portfolio, which is then used to examine the effects of the change in market fundamentals on the R&D portfolio.

It is shown that, while the effect of an increase in competition on the total level of investment in innovation is ambiguous, the increase in competition increases the variety of approaches to innovation and so it increases the probability that an innovation is discovered. The policy recommendation drawn from this conclusion is that competition authorities should take into account the effect on the investment in innovation when reviewing merger cases.

Comparing the market portfolio with the socially optimal portfolio, it is shown that the market will tend to underinvest in drastic innovation. This underinvestment will be more severe if the potential benefit from the innovation is higher and if the overall intensity of competition in the industry is lower. This suggests that R&D subsidies should be targeted at high cost and high potential benefit projects (the so-called blue sky projects) especially in the industries with few firms and low intensity of competition.