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Optimal technology policy under asymmetric information in a research joint venture

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Abstract

We analyze the optimal technology policy to solve a free-riding problem between the members of an RJV, assuming that Government intervention is subject to an additional adverse selection problem caused by its inability to distinguish the value of the potential innovation. Although subsidies and monitoring may be equivalent policy tools to solve firms' free-riding problem, they imply different social losses if the Government is not able to distinguish perfectly the value of the potential innovation. The advantage of monitoring tools relative to subsidies is proved to depend on which type of information the Government can obtain about firms' R&D performance.

JEL classification: D82; O31; O38

Keywords: RJV; Moral hazard; Adverse selection; Subsidies; Monitoring

1. Introduction

There are strong theoretical reasons and empirical evidence that the social benefit arising from R&D may be greater than the benefit available to the innovator. A variety of strategic and opportunistic reasons may cause a spread between private and social incentives to conduct R&D. One possible source of divergence is the existence of technological spillovers since firms conducting R&D do not take into account the positive effects that their own R&D investments

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may have on the rest of the economy. As a result, the private investment in R&D is lower than the socially optimal.[1] Another reason for the gap between social and private returns to R&D is related to the problems of opportunism and asymmetric information faced by firms in collaborative projects since important inputs of joint research activity cannot be contractible.[2] We will focus on this latter issue. Let us consider a collaborative project requiring the complementary skills of two risk-neutral firms. Research efforts are privately costly and not verifiable, so firms have incentives to free-ride, and the final provision of R&D is lower than the socially optimal (double-sided moral hazard problem).

The difference between private and social returns to R&D investments constitutes one of the main justifications for public intervention. Technology policy makers may use different means aimed to encourage such an investment, including subsidies and monitoring processes. In fact, evidence shows that subsidized cooperative R&D projects have become an important tool of the industrial policy in the United States, Japan and Europe. Some examples of subsidized research corporations in the United States are the Microelectronics and Computer Consortium (MCC), or those sponsored by the Semiconductors Manufacturing Technology (SEMATECH). European governments have begun to sponsor collaborative research using a variety of instruments such as the European Research Coordination Agency (EUREKA), the European Strategic Program for R&D in Information Technology (ESPRIT), or the Base Research in Industrial Technology for Europe (BRITE). Furthermore, Tripsas et al. (1995) point out that 80 percent of the research loans granted by the Japanese Government are devoted to joint projects. Despite the general application of subsidies as a policy tool, some governments may also implement monitoring mechanisms, combining a wider public control with money incentives. Clear examples are the MITI in Japan, where the Government assumes the role of an effective coordinator, or the Società di Ricerca Program in Italy, where a manager is selected to supervise the implementation of individual projects and to coordinate the ongoing efforts of participating firms. Moreover, the Advanced Technology Program (ATP) in the United States combines initial subsidies with monitoring tools, providing guidance in putting together a RJV and making periodical evaluations of firms' R&D performance.

The literature examining R&D subsidies is rather sparse, despite their extensive use as a policy tool. Stenbacka and Tombak (1998) classify the organization of research activity in two types: R&D competition and R&D cooperation. They analyze how cost subsidies affect investment in both types of R&D organization. In particular, they find that with an optimal subsidy policy, RJVs are socially preferred to R&D competition, though the optimal policy may also involve a more costly subsidy program.[3] Unfortunately, a policy relying on subsidies to correct R&D market failures has potentially serious shortcomings. Katz and Ordover (1990) argue that such policies may be subject to severe asymmetric information problems resulting from firms reporting higher R&D expenditures or better potential innovations in order to collect higher subsidies.[4] As a result, some authors turn to monitoring policies as a possible alternative. In particular, Tripsas et al., when studying the Italian Società di Ricerca program, argue that the Government may succeed

[1] For a related literature see, for example, D'Aspremont and Jacquemin (1988), Kamien et al. (1992), or Kesteloot and Veugelers (1995).

[2] See, for example, Choi (1992), or Pérez-Castrillo and Sandonís (1996).

[3] For a related literature see also Spencer and Brander (1983), Pérez-Castrillo and Verdier (1993) and Romano (1989).

[4] Indeed, Brown (1984) found that in response to the Economic Recovery Act of 1981 the increases in R&D expenditures reported with tax purposes greatly exceeded the growth in spending reported in *Business Week's* survey of R&D expenditures.