



# Public financing of cooperative R & D projects in Spain: the Concerted Projects under the National R & D Plan

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## Abstract

This work will analyse the factors which influence decision-making within the Spanish public sector on the financing of precompetitive research projects developed by firms in collaboration with universities and public research organisms. With this objective in mind, an econometric model is proposed that explains simultaneously the concession of aid on behalf of the public sector and the amount of such aid. The estimates carried out indicate, among other results, that the destination of the budgeted funds explains a large part of the public financing received. However, all the evidence would seem to indicate that the funding has not been awarded either in order to significantly favour those firms which most need it, nor to give incentive to high levels of cooperation. © 2001 Elsevier Science B.V. All rights reserved.

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## 1. Introduction

The collaboration in R & D activities between firms and public research centres (PRCs) constitutes a strategic element towards innovation in the productive sector and towards the achievement of a better planning and exploitation of the resources set aside for research in the public sector. In this sense it is not surprising that there is a wide range of literature which analyses the factors and difficulties which determine the cooperation in R & D between private

and public sector.<sup>1</sup> In parallel, governments of different countries place special interest in the design of adequate aid which expedites and promotes this type of collaboration.

In this work an instrument of technological policy existent in Spain, known as the Concerted Projects under the National R & D Plan, will be analysed.

<sup>1</sup> The study of the ways in which relationships between the two collectives materialise has been covered in various works (Gibbons and Johnston, 1974; Link and Rees, 1990; Bailetti and Callahan, 1992; Senker and Faulkner, 1992; Bonacorsi and Piccaluga, 1994; Faulkner and Senker, 1994; Ham and Mowery, 1998). In others, the barriers which can make the establishment of relations between the two worlds difficult have been studied (Dean, 1981; Azároff, 1982; Fowler 1984; Höglund and Persson, 1987; Van Dierdonk et al., 1990; Sheen, 1992; Lee, 1996).

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This is a national initiative put into practice in 1988 that pursues two types of objectives: to foment R&D activities in firm and to encourage cooperation between the latter and public research centres. The aid consists of the concession of interest-free loans to precompetitive research projects developed by businesses which, in most cases, must include the participation of a research team from universities and/or public research organisms.

These projects have been the object of various studies which have covered different aspects of interest.<sup>2</sup> However, none has analysed jointly the decisions on the part of the firm and of the administration involved in the financing of a concerted project (cooperative project), and the study of the determinants of the amount to be received.

The objective of this work is to identify and to analyse the factors which determine the financing approved for each project. The method used consists of the estimation of an econometric model with self-selection which explains the amount of the loan approved according to the characteristics of the firm, the project and the role of the organism managing the aid.

The first aspect to be examined in depth will be to what extent the financing received is related to the project budget and whether the intensity with which the projects are funded varies according to the destination of the allocated budget: acquisition of equipment, remuneration of researchers, etc.; or according to the place where funds are spent: firm or PRCs. The work also seeks to establish the degree of incidence which other characteristics of the project, such as its length or the thematic area (National Programme) in which it is registered, have in the financing received and, above all, whether the attributes of the firm affect the size of the loan significantly. Another element which must be included is whether the public action has tended to favour the integration into the system of science and technology, since this is one of the objectives of the Concerted Projects.

This paper is part of a broader research project on public action in the Concerted Projects in several

fields. One line of research in which work is being carried out is the study of the effects of public funding of R&D on performance. According to the article of Arora et al. (1998) the aim of this research is to determine whether or not those firms which have received aid have obtained better research results than the rest (for example, more patents or more indirect results such as higher sales or an increase in staff numbers in the firm) and whether the way in which the aid has been shared out has allowed these results to be as wide-reaching as possible.

The paper will be arranged as follows. A view of Spanish science and technology policy is offered and the figures which are most relevant to the concerted projects are presented in Section 2. In Section 3, an econometric model is formulated to explain the financing given to concerted projects. In Section 4 the variables used are described and, in Section 5, different specifications of the model will be presented in an attempt to answer the questions raised earlier. Lastly, concluding remarks on the implications for the design of science and technology policy will be offered.

## **2. Spanish science and technology policy: concerted projects**

The two main lines of action of Spanish science and technology policy are the National Plan for Scientific Research and Technological Development (National R&D Plan) and the actions by the Ministry of Industry and Energy (MINER). In addition to these are international actions (joint programmes with European or Latin American countries, etc.), regional ones from the different autonomous communities and even some of those established by the central administration itself, such as for example the tax shield on R&D activities undertaken by firms.

The National R&D Plan was adopted in 1988 and, since then, sets the priorities for action, programmes the resources available and integrates action in the field of R&D of the productive sectors, research organisms and universities. The economic efforts of the National Plan are materialised in the provision of the National R&D Fund. They are aimed largely at the fomentation of basic scientific

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<sup>2</sup> Fontela et al., 1992; González Ayuso et al., 1993; Modrego, 1995; Molero and Buesa, 1997; Acosta and Modrego, 1997, 1998.

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