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Freerider behaviour and the public finance of R&D activities in enterprises: the case of the Spanish low interest credits for R&D

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Abstract

This paper analyses the freeriding behaviour in the case of public finance for R&D activities in enterprises. It will start with a brief discussion about the concept of freeriding and its importance to justify public support measures and offers a review of the methods, indicators and results reflected in the evaluation studies.

In the second part of the paper, the impact of the Spanish low interest credits for R&D projects for individual firms will be analysed. A profile of the “freerider firms” will be offered, defined as those supported firms whose innovative efforts do not depend on public aid and probably would or could have carried out the same level of innovative activities without public support. Moreover, the paper presents some evidence that firms with a freerider behaviour show a lower level of goal achievement related to their technical and commercial objectives and consider the learning effects as less important than the other firms. This could suggest, indirectly, that freeriders generate fewer externalities available for the production system as a whole—than the non-freerider firms.

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1. Introduction

The question of the role of governmental intervention in economical and industrial development is the subject of a continuous discussion in modern economic theory. Ever since the beginning of industrialisation, there has been broad support for non-interventionism, laissez-faire (Smith, 1776) and also for an active role for public forces to ensure a fast process of industrialisation, e.g. economic development (Hamilton, 1791; List, 1846). The most well-known theories that analyse the justification of technology policies are: the neo-classical one (based on market failures), the new growth theories¹ and

the evolutionary perspective.² Most of this literature justifies such public intervention but fails to offer clear solutions about the design of these policies or how their effectiveness should be evaluated. Moreover, the conversion of these theoretical arguments into useful measurable indicators is still one of the main problems in the practice of evaluation studies.

This paper analyses the freeriding behaviour of the enterprises that obtained public finance for their R&D activities. Section 2 offers a brief discussion about the concept of freeriding and financial additionality and its importance to justify public support measurements.

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¹ See among others, Romer (1986, 1990), Lucas (1988), Grossman and Helpman (1991), Aghion and Howitt (1992).

² See among others, Rothwell (1983), Kline and Rosenberg (1986), Dosi et al. (1988), Malerba and Orsenigo (1995), Nelson and Winter (1982), Dosi (1984), Hall (1994), Freeman (1994).

The [Section 3](#) offers a review of the methods, indicators and results reflected in the evaluation studies.

In the second part of the paper ([Section 4](#)), the impact of the Spanish low interest credits for R&D projects for individual firms will be analysed. A profile of the “freerider firms” will be offered, defined as those supported firms whose innovative efforts do not depend on public aid and probably would or could have carried out the same innovative activities without public support. Freerider behaviour is frequently analysed however most studies do not offer a broad analysis of the type of firms with a freerider attitude. The main objective of this section therefore, is not to find the exact level of freeriding, but to identify the characteristics of the firms that tend to indulge most frequently in freerider behaviour and to offer some evidence useful for the public authorities to reduce the level of freeriding. Moreover, the paper presents some evidence that freeriding seems to generate a lower level of externalities (based on an indirect indicator: the goal achievement of the technological and commercial objectives) available for the production system as a whole than the non-freerider firms.

2. Freeriding or financial additionality: a theoretical concept

It could be argued that technology policy, like most other policies, could only be justified if it generates a net increase in social welfare. In the real world however the calculation of the net social benefits is almost an impossible task. To these questions there are actually only fragmentary and partial answers because technology policy intervenes in complex systems in which the causal relationships are not clear. A comprehensive theory of the technological change and economic development that includes the role of public interventions—or a macro economic model that includes the role of public policies—still does not exist ([Nelson and Winter, 1982](#); [Nelson, 1984](#); [Dosi et al., 1988](#); [Capron, 1993](#)), and the evaluation of the technology policy as a scientific activity is still a learning process of trial and error. Due to the difficulties in analysing the net growth of social welfare, the justification of technology policy is based on indirect indicators. Most of those studies analyse the impact of public support on some economic variables of the

supported firms (R&D expenditures, productivity of the investments, growth of sales, etc.) without taking into account the impact on the economic system as a whole. The evaluation of the interdependent complex linkages between the innovation process, economic development, social welfare and the role of public intervention is mostly based on several assumptions. Most of the studies are implicitly using the following sequence of arguments.

1. Expenditures in R&D generate a positive effect on economic growth and social welfare.
2. Public intervention generates an additional growth in the investments on R&D.
3. This means that public support will have an additional positive effect on economic growth and social welfare.

There is no reason to doubt the first argument (see among others, [Mansfield, 1968](#); [Griliches, 1984](#); [Fagerberg, 1994](#)). In relation to the second argument, the empirical studies are not totally conclusive about the fact that public finance of R&D generates extra private R&D investments. Some studies indicate that firms are using public funds to substitute their own private investments, while other studies are indicating that public aid generates additional private investments in R&D.³ Anyhow, assuming that the first two arguments are true, the impact on social welfare can still be positive, neutral or negative. Should we assume that technology policy could only be justified if it generates a growth of net social welfare, it could be deduced that the financial additionality seems to be a necessary condition although not sufficient to justify the technology policy. It seems to be *necessary* because

³ For example, [Carmichael \(1981\)](#), [Griliches \(1986\)](#) and [Lichtenberg \(1987\)](#) indicate that public finance for R&D does not generate extra private R&D expenditures. Other studies pointed out, at least partially, a positive effect of public finance on private R&D investments ([Levy and Terlecky, 1983](#); [Scott, 1984](#); [Switzer, 1984](#); [Antonelli, 1989](#); [Busom, 1991, 1992](#); [Hall and Reenen, 2000](#)). Other studies did criticise these conclusions indicating that the presence of the substitute effect is related to differences in the supported sectors or depends on the type of R&D and the market structure ([Link, 1981](#); [Levin and Reiss, 1984](#); [Levy, 1990](#)). Some other studies point out that both forms of R&D funding are complementary ([Griliches, 1979](#); [Mansfield, 1984](#); [Scott, 1984](#)). For an overview of these studies see, among others: [Lichtenberg \(1988\)](#), [Capron \(1992, 1993\)](#), [Urzay \(1999\)](#), [David et al. \(2000\)](#), [Heijs \(2000b, 2001\)](#).

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