Impact of R&D subsidies on employment

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Abstract

This paper analyses how public R&D subsidies impacts on job creation and wages in companies. To our knowledge, no previous studies distinguished the effect of this policy tool taken into account the multi-scalar nature of government intervention. Technological innovation Panel for the period 2004-2007 is used. Potential endogenous bias in the concession of public subsidies are considered and tackled using non-parametric matching estimators. In general, our results show that R&D subsidies at national and regional have a positive influence on both the wages and number of employees devoted to R&D activities. In the case of R&D funds from European Union, results show that public funds affect positively remuneration of R&D employees, especially in the case of those with university degrees.

KEY WORDS: Public subsidies, R&D, employment, multi-scalar science and technology policy, propensity score matching.

EXTENDED ABSTRACT

Governments in industrialized countries implement a broad mix of innovation in order to correct market failures. According to this perspective, public intervention is justified to prevent an underinvestment in R&D from social point of view. However, the ultimate end of this policy lies beyond a mere increase in private R&D expenditure, seeking an increase in growth, productivity, employment and welfare (Ali-Yrkkö, 2005).

Despite to be a priority goal in innovation policy, little attention has been paid to the impact of R&D subsidies on employment. The main objective of this work is to analyze the connection between R&D subsidies and employment. Following Golsbee (1999), an special point to analyze is the effect of subsidies on wages and the number of employees. In addition three educational levels are considered: doctoral, University-graduate level, and non-university level.

An important characteristic in innovation systems today, is the coexistence of multi-scalar government interventions. Motivation behind these interventions could differ from one level to other, and in consistency with this, impact from regional, national and supra-national level could be different. These different levels of interventions are taken into account.

Data

PITEC: Panel on innovation technology. Spanish CIS performed with annual frequency. Period: 2004-2007. Number of firms and observations: Unbalanced panel. 12808 firms. 48737 observations.

Methodology and preliminary results.

Empirical literature on subsidy evaluation remarks the importance to control for endogeneity and selectivity bias. Concession of public funds are influenced by two decisions. On the one hand, the firm's decision to apply for R&D subsidies, on the other hand, the public agency decision on concession of public funds. It is possibly to observe only those firms that applied for a subsidy and obtained it. This fact implies a selectivity bias to be controlled.

The second issue is the endogeneity problem. Our dependent variable (number of employees, wages) could be related with the reception of public funds. This causality between dependent and independent variables leads to endogeneity.

Empirical literature employs sample selection models (Busom, 2000; Wallsten, 2000) or non-parametric matching estimators (Almus and Czarnitzki 2003; Blanes and Busom 2004; Czarnitzki 2006; Czarnitzki and Licht 2006; Duguet 2004; Garcia-Quevedo and Afcha 2008; Gonzalez and Pazó 2008; Herrera and Heijs 2007; Herrera and Nieto 2008; Hussinger 2008; Lach 2002) to challenge with this problem.

A third econometric strategy to be assessed in order to take advantage from panel structure of the data is Dynamic Panel Data. Arellano bond estimators allow for this type of model the use of lags of the dependent variable as instruments in order to control for endogeneity.

Preliminary estimation reports in general, that R&D subsidies at national and regional have a positive influence on both the wages and number of employees devoted to R&D activities. In the case of R&D funds from European Union, results show that public funds affect positively remuneration of R&D employees, especially in the case of those with university degrees