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A model for the strategic management of innovation and R&D at pharmaceutical firms through the analysis of clinical trials

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1 Introduction

Managing the portfolio of innovative drugs is a complex task in pharmaceutical laboratories. The complexity stems from the need to consider several strategic issues that affect the internal and external R&D decisions. In light of this, the management of innovation risk in a portfolio of promising drugs should be based not only on the strategic decisions that affect the firm's internal and external R&D but also on those taken by competitors. We assume that firms can manage their R&D resources in two ways. In this sense, drugs can be developed based on internal R&D efforts and/or announced financial transactions (FTs) (Gascón et al., 2017).

2 Objectives

Our research objective is to develop a model for analysing, in pharmaceutical firms with portfolios of clinical trials (CTs, i.e. new drugs in the pipeline that may succeed or fail), the most appropriate strategic decision, taking into account the firm's position with respect to the innovative drugs and that of the competitors.

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3 Methods

We depart from Puente et al. (2018). We now combine real options with fuzzy techniques with the aim of quantifying the flexibility of pharmaceutical firms when strategically reorienting their CTs towards diseases in different research phases. From this perspective, we contribute to the relevant literature; see e.g. Carlsson et al. (2007), Lo Nigro et al. (2016), and Guo et al. (2018).

We consider CTs at each phase in the pipeline. Then, we measure firm's flexibility in two dimensions. We measure: (1) the internal expenditure in R&D adjusted for the number and type of CTs in our sample period; and (2) the announced FTs to acquire or sell certain drugs (or laboratory R&D divisions). The former captures the firms' internal potential to be innovative over time and manage their innovation risk; the latter captures their ability to rearrange the portfolio of new drugs by externally acquiring (and/or selling) new knowledge while keeping greater control of innovation than in cooperation arrangements. Later, we use these estimates to make recommendations on the strategic options that are more valuable to them. First, the real options approach to project evaluation aims to correct the deficiencies of traditional methods by recognising that managerial flexibility can bring significant value to projects, especially in R&D. Second, fuzzy techniques in the context of innovation risks in this industry provide: agility in the construction of the decision support system; fast interpretation of the results; and ease for performing a sensitivity analysis of the potential behaviours.

4 Results and conclusion

We develop an evaluation model for managing strategically portfolios of new promising drugs at pharmaceutical firms. This provides decision makers with a tool to identify the most valuable options from their current portfolio of potential drugs in the pipeline. To illustrate its application, we have considered a sample of 37 pharmaceutical firms. We refer interested readers to Gascón et al. (2017) for a description of the sample firms and CTs that we are using in this work.

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