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The relationship between academic consulting and research performance: Evidence from five Spanish universities

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ABSTRACT

This paper investigates the relationship between engagement in consulting activities and the research performance of academic scientists. The study relies on a sample of 2678 individual faculty, from five Spanish universities, who have been recipients of publicly funded grants or have been principal investigators in activities contracted by external agents over the period 1999–2004. By implementing a propensity score matching estimator method, we show that engaging in consulting activities has an overall negative relationship with the average number of ISI-publications. However, the effect of consulting on the scientific productivity of academic scientists depends on the scientific fields and the intensity of engagement in consulting activities. Academic consulting is found to be negatively correlated with the number of publications in the fields of 'Natural and Exact Sciences' and 'Engineering', but not in the case of 'Social Sciences and Humanities'. When the intensity of consulting activity is taken into account at the discipline level, we find that engaging in consulting activities is negatively correlated with scientific productivity only for high levels of involvement in consulting activities, but not for moderate ones.

1. Introduction

The engagement of scientists in knowledge and technology transfer activities is a topic that has attracted an increasing amount of interest in the last years, both among scholars and policy makers. Governments worldwide have been calling for greater interaction between universities and industry, under the rationale that this interaction is instrumental to foster technological development and economic achievements (DIUS, 2008; Dutrenit and Arza, 2010; OECD, 2003) and to strengthen the co-evolution between scientific contributions and commercial opportunities (Rosenberg and Nelson, 1994; Veugelers and Cassiman, 2005). At the same time, sceptics have raised concerns about a possible negative impact that universities' involvement in technology transfer can have on the production and advancement of scientific knowledge production (Krimsky, 2003).

Studies looking at the impact of universities' involvement in knowledge and technology transfer on scientific productivity have focused on a limited set of mechanisms of technology transfer, mostly including patents and academic spin-offs (Agrawal and Henderson, 2002; Azoulay et al., 2009; Toole and Czarnitzki, 2010), and to a lesser extent research collaborations (Gulbrandsen and Smeby, 2005; Lee and Bozeman, 2005). The impact on scientific production of the overall external engagement activities by scientists might be underestimated as a result of neglecting other forms of university–industry knowledge and technology transfer, encompassing consulting, R&D contracts, personnel exchange or joint student supervision, which have received less attention in the literature (D'Este and Patel, 2007; Schartinger et al., 2002).

Moving from these premises, this paper focuses on one of these less traceable and often informal mechanisms of external engagement by scientists, represented by academic consulting. In our view the current lack of systematic analysis of academic consulting is particularly unfortunate because academic consulting is a comparatively more frequent phenomenon than other means of engagement in knowledge transfer activities by academic scientists (i.e. patents, spin-offs or joint research collaborations); it is often a critical channel through which university research impacts on industrial R&D (Arvanitis et al., 2008; Bekkers and Bodas Freitas, 2008; Cohen et al., 2002); and it is also appreciable as a stream of income for university in general, and for academic scientists in particular (Perkmann and Walsh, 2008).

Drawing upon the above discussion, this study investigates the relationship between engagement in consulting activities and the

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research performance of academic scientists. To investigate this, we rely on a sample of 2678 individual faculty, from the five universities of the Valencian higher education system, who have been recipients of publicly funded grants or have been principal investigators in R&D contracts over the period 1999–2004.

Our findings show that engaging in consulting activities is negatively correlated with the average number of ISI-publications in the subsequent period. However, the effect of consulting on the scientific productivity of academic scientists varies across different scientific fields and for different levels of intensity in consulting activities. Academic consulting is found to be negatively related to scientific productivity in the fields of Natural and Exact Sciences and Engineering, but not in the cases of Medical Sciences and Social Sciences and Humanities. When the intensity of consulting activity is taken into account (within each of these disciplines), engaging in consulting activities is negatively related to scientific productivity only for high levels of involvement in consulting activities, but not for low or moderate levels.

The paper is structured as follows. Section 2 reviews the relevant literature and puts forward the main research questions of this study; Section 3 describes the data used in the analysis, while Section 4 provides an explanation of the methodology. Section 5 presents the results and Section 6 concludes.

2. Literature background

This section provides a brief overview of the literature that investigates the relationship between knowledge transfer activities and scientific performance, and it discusses the conflicting arguments regarding the impact of academic consulting on scientific productivity.

2.1. Knowledge transfer activities and scientific productivity: an overview

The impact of knowledge transfer activities on research performance has become a key area of concern for both scholars and policy makers interested in assessing the social and economic impact of the engagement of university scientists with non-academic communities. Despite the increasing amount of empirical evidence regarding the impact on research productivity of academic entrepreneurial behaviour and knowledge transfer activities, the extant literature remains quite inconclusive, providing mixed findings which reflect different views in an ongoing open debate.

At one end of the spectrum there are advocates of universities' involvement in technology transfer who welcome scientists' engagement in knowledge transfer activities, arguing that closer contacts between industrial and academic research will bring benefits to both industrialists and academic researchers. The underlying rationale for this argument is that interaction with the private sector provides scientists with important learning and financial opportunities, thus inducing a complementary effect between research and interaction with industry. In particular, involvement in knowledge transfer provides a setting in which academic researchers might identify new and relevant research topics, take advantage of competences and infrastructure available in firms and benefit from financial pay-offs of successful commercialization of research outputs (Breschi et al., 2007; Buenstorf, 2009; Van-Looy et al., 2006).

On the other hand, sceptics hold that the increasing incentives for academic patenting and licensing that have occurred over the last two decades (Mowery et al., 2002) has raised several concerns about the potentially negative effects that the commercialization of scientific discoveries could have on the conduct of academic researchers. In particular, it has been argued that financial incentives from patenting and licensing could shift the orientation of scientists away from basic and towards applied research, and could also undermine their commitment to the norms of open science, thereby leading to undesirable behaviours, such as data withholding, secrecy and publication delays (Blumenthal et al., 1996; Krimsky, 2003; Link and Scott, 2003).

From an empirical point of view, there are several contributions that have addressed this issue drawing mostly upon data on academic patenting and engagement in spin-off activities, reaching conflicting conclusions. Fabrizio and Di Minin (2008), Stephan et al. (2007) and Azoulay et al. (2009) have found a statistically positive effect of researchers' patenting on publication counts. Findings by Breschi et al. (2007, 2008) reveal that academic inventors tend to publish more and produce higher quality papers than their non-patenting colleagues, and increase further their productivity after patenting. The beneficial effect of patenting on publication rates last longer for serial inventors, that is, academic inventors with more than one patent.

There are also findings in support of negative effects, portraying a tradeoff between patenting and the progress of academic science. Surveys of academic scientists have suggested that patenting skews scientists' research agendas toward commercial priorities, causes delay in the public dissemination of research findings and crowds out efforts devoted to research (Blumenthal et al., 1996; Campbell et al., 2002; Krimsky, 2003). The main argument in this case is centred on the idea that research and entrepreneurial activities are competing for researcher's limited time and thus a substitution effect is in place between time dedicated to develop new research ideas and time spent in commercializing these ideas. In line with this argument, Calderini et al. (2009) find evidence of a substitution effect between patenting and publishing when publications in basic sciences are taken into account. Buenstorf (2009) in a study based on academic spin-offs finds that, in the long run, founding a spin-off may be detrimental to the quantity and quality of a researcher's output. In the same vein, Toole and Czarnitzki (2010) highlight the existence of a significant decrease in the research performance of US academic scientists when they start working on commercialization through the creation of for-profit firms; while Hottenrott and Thorwarth (2011) find a negative and significant relationship between the amount of industry funding and the quantity and quality of research carried out.

Finally, some studies have suggested the existence of a curvilinear relationship between the extent of engagement in knowledge transfer activities and research productivity. For instance, Crespi et al. (2011) suggest that academic patenting is complementary to publishing at least up to a certain level of patenting output after which there is evidence of a substitution effect. While, looking at softer forms of engagement such as research collaboration and contract research with industry, Manjarrés-Henríquez et al. (2009) and Larsen (2011) find that complementarities with research productivity exist only for moderate levels of knowledge transfer engagement.

2.2. Scientists' engagement in consulting activities and scientific productivity

Studies looking at the relationship between academic consulting and research performance are rare when compared to the attention placed on other forms of knowledge transfer activities such as patenting, spin-off activities or joint-research partnerships. This is unfortunate because academic consulting is a channel of knowledge transfer that deserves thoughtful consideration on its own right for at least the following three reasons.

First, academic consulting is a widespread phenomenon. Compared to other means of engagement in knowledge transfer activities by academic scientists, such as patents and spin-offs, consulting exhibits a much higher prevalence among university researchers. Indeed, involvement in consulting is not the prerogative of academics in certain scientific disciplines, but an activity that is prevalent across many scientific fields (Bird and Allen, 1989; D'Este and Patel, 2007; Landry et al., 2010; Louis et al., 1989). Even though the figures on the proportion of academic scientists involved in consulting differ across studies, ranging from 18% (Bozeman and Gaughan, 2007), to 31% (Gulbrandsen and Smeby, 2005) or 38% (D'Este and Perkmann, 2011), academic