



Opening the ivory tower's door: An analysis of the determinants of the formation of U.S. university spin-off companies

Albert N. Link^{a,*}, John T. Scott^{b,1}

^a *Department of Economics, University of North Carolina at Greensboro, Greensboro, NC 27412, USA*

^b *Department of Economics, Dartmouth College, Hanover, NH 03755, USA*

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Abstract

This paper presents findings from an analysis of the determinants of the formation of university spin-off companies within the university's research park. We find that university spin-off companies are a greater proportion of the companies in older parks and in parks that are associated with richer university research environments. We also find that university spin-off companies are a larger proportion of companies in parks that are geographically closer to their university and in parks that have a biotechnology focus.

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1. Introduction

Since the passage of the Bayh–Dole Act in 1980 in the United States, technology transfer activities at universities have taken center stage. The extant literature has focused on patenting activities as a general trend and as a university-specific response to the Act (Nelson, 2001; Hall, 2005; Mowery and Sampat, 2005), and on the establishment and operations of university technology transfer offices (Siegel et al., 2003). One technology transfer activity that has received lit-

tle attention, either in the United States or in other industrialized countries, is the formation of university spin-off companies on university research parks.² This is surprising because technology transfer has become a dominant strategy in U.S. universities over the past 25 years.³ To emphasize further the economic importance of technology transfer associated with new firms located in parks, the Science Park Administration Act

* Corresponding author. Tel.: +1 336 334 5146.

E-mail addresses: al.link@uncg.edu (A.N. Link), john.t.scott@dartmouth.edu (J.T. Scott).

¹ Tel.: +1 603 646 2941.

² A second area that has received little attention, and however, is beyond the scope of this paper, is the impact of university spin-off companies on both the revenue growth of the university and the economic growth of the region.

³ Deuker (1997) makes a case that the development of biomedical technologies was the genesis of technology transfer activity in U.S. universities.

of 2004, S.2737, decrees that high technology clustering “. . . is in the best interest of the Nation . . .” (U.S. Congress, 2004).

In the United States, the preponderance of related research has been case-based, focusing almost exclusively on spin-off activity in high technology cluster areas such as Silicon Valley, Route 128 around Boston, and Research Triangle Park (Kennedy, 2000; Lee et al., 2000; Link, 1995, 2002; Link and Scott, 2003a; Roberts, 1991; Saxenian, 1994).⁴ This paper departs from the case-based approach and investigates, in a systematic yet exploratory manner, characteristics associated with university differences in the formation of spin-off companies, specifically university-based companies that locate in the university’s research park.

Our specific focus on university research parks is important because they contribute critically to the U.S. national innovation system. Parks enhance knowledge spillovers between universities and tenant firms, and parks enhance regional economic growth and make markets more competitive (Link, 2002).

In Section 2, we posit a model of the determinants of the formation of university spin-off companies. The data used to estimate the model are described and the estimates are presented in Section 3. The paper concludes with summary observations in Section 4 along with a call for future work on this previously neglected topic.

Spin-off companies are found to be concentrated more in older parks and in parks that are associated with richer university research environments. We also find that spin-off companies are concentrated more in parks that are geographically closer to their university and in parks that have a biotechnology focus.

2. A Model of spin-off company formation in university research parks

We proffer the following definition of a university research park:⁵

⁴ See also the excellent reviews of the literature in Clarysse et al. (2005), Degroof and Roberts (2004), and Johansson et al. (in press).

⁵ This is the definition that will be used by the National Science Board in its forthcoming *Science and Engineering Indicators*, 2006. This section draws directly from Link and Scott (in press); therein is a more detailed explanation of the development of this definition.

A university research park is a cluster of technology-based organizations that locate on or near a university campus in order to benefit from the university’s knowledge base and ongoing research. The university not only transfers knowledge but expects to develop knowledge more effectively given the association with the tenants in the research park.

Generally, if the park is on or adjacent to a university campus, the university owns the park land and either oversees, or at least advises on, aspects of the activities that take place in the park as well as on the strategic direction of the park’s growth. When the park is located off campus, it is often the case that the park land is owned by a private venture – and sold or leased to tenants – but the university has typically contributed financial capital to its formation and/or intellectual capital to its operation; therefore, there are elements of an administrative relationship between the university and such research parks.

Universities are motivated to develop a research park by the possibility of financial gain associated with technology transfer, the opportunity to have faculty and students interact at the applied level with technology-based organizations, and by their responsibility of contributing to a regional-based economic development effort. Research organizations are motivated to locate in a research park to gain access to faculty, students, and research equipment, and to foster research synergies.

Based on the definition above, the population of 81 currently active research parks, as defined in the National Science Foundation database on university research parks, through 2002 is shown in Fig. 1.⁶ Notable in the figure are the following parks: Stanford Research Park (established in 1951), Cornell Business & Technology Park (established in 1952), and the Research Triangle Park of North Carolina (established in 1959). Also notable in the figure is the increase in park formation that began in the late-1970s and accelerated in the early 1980s in response to the increase in

⁶ The genesis for the construction of this database came from recommendations at the National Science Foundation-sponsored Research Park Indicators Workshop, convened at the University of North Carolina at Greensboro in November 2002. Based on the findings from the workshop, the National Science Foundation set forth an initiative for Link to develop a national database on university research parks.

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