

This PDF is a selection from a published volume from the National Bureau of Economic Research

Volume Title: The Rate and Direction of Inventive Activity Revisited

Volume Author/Editor: Josh Lerner and Scott Stern, editors

Volume Publisher: University of Chicago Press

Volume ISBN: 0-226-47303-1; 978-0-226-47303-1 (cloth)

Volume URL: <http://www.nber.org/books/lern11-1>

Conference Date: September 30 - October 2, 2010

Publication Date: March 2012

Chapter Title: The Art and Science of Innovation Policy: Introduction

Chapter Authors: Bronwyn H. Hall

Chapter URL: <http://www.nber.org/chapters/c12376>

Chapter pages in book: (p. 665 - 667)

The Art and Science of Innovation Policy

Introduction

Bronwyn H. Hall

In this introduction to the panel discussions, I would like to make a few opening remarks on the topic of the panel. I am very grateful to the organizers for including me on the program, since the book we are honoring has been very important in determining the direction of my career. I first discovered *The Rate and Direction of Inventive Activity* when I was a graduate student at Stanford, after I had been working in the innovation economics field already for about five or six years. Although there is also much of interest in the rest of the volume, Arrow's paper in particular did much to shape my thinking on the relationship between innovation/invention and welfare, and therefore innovation policy. His observations on the financing of inventive activity formed the basis of part of my research program (Hall 2009) and when I began teaching, this paper served as the framework for a course I created at Berkeley in the economics of innovation.

In these opening remarks, I raise two aspects of innovation policy that seem to me important and sometimes understudied. Perhaps our panelists will say more about them.

First, I would like to recall the full title of the 1962 Nelson volume: *The Rate and Direction of Inventive Activity: Economic and Social Factors*. The use of the word social draws attention to the fact that any innovation policy may need to consider noneconomic as well as economic drivers of innovative behavior. Such drivers include the following: (a) the range of motivations of scientists, inventors, and innovators motivations (which can vary, about which see Machlup's article in the Nelson volume); (b) resistance to change

Bronwyn H. Hall is professor in the graduate school at the University of California at Berkeley; professor of economics of technology and innovation at the University of Maastricht, Netherlands; and a research associate of the National Bureau of Economic Research.

on the part of individuals and firms that is not simply due to sunk costs considerations, leading to slower than optimal diffusion of new technologies in some cases; and (c) “culture” or norms. The latter often shows up as societal attitudes toward failure, which have frequently been identified as an important factor in explaining the differing levels of entrepreneurial activity in the United States and Europe (e.g., Reynolds et al. 2000). In addition, we now have considerable evidence that the returns to innovative activity can be very skewed, owing to the extreme uncertainty and serendipity of the innovative process. The large element of chance poses a considerable challenge for *ex ante* project selection as well as *ex post* research evaluation. Those of us who have spent a lot of time trying to answer policymakers’ questions about the returns to R&D are very aware of the desire for a single numeric estimate of this quantity (possibly with a standard error) and the impossibility of delivering such an animal. When the conference organizers entitled this session the “art and science of innovation policy,” I am sure they had observations like these well in mind.

Second, I want to remind us that the breadth of policies that influence innovative activity is very wide, and in some cases, nontargeted policies can be more important than those specifically targeted to innovation. For example, the Science, Technology, and Economic Policy Board of the National Academies was in fact founded and funded initially by a couple of entrepreneurial industrialists whose firms had suffered during the period of high interest rates of the early 1980s, Ralph Landau and George Hatsopoulos (National Research Council 2010). Their concern was not primarily innovation policy, but the effects of macroeconomic policy on entrepreneurial and technology-intensive businesses.

I have recently spent a considerable amount of time on a European Commission expert group panel on “Knowledge for Growth” that addressed itself to a range of policies in this area (European Commission 2009). Key among the problems considered was the perceived underperformance in R&D and innovation in Europe, which has brought home the aforementioned observation forcefully. The expert group (and others who have looked at this problem) identified a scarcity of fast-growing young innovative firms as one explainer of European underperformance in this area. But this finding in turn suggests that policies like labor market and entry regulation (Djankov et al. 2002; Klapper, Laeven, and Rajan 2006), financial market conditions (Gorodnichenko and Schnitzer 2010), and even building codes can be important factors in stimulating or discouraging innovative activity. These arguments suggest that there are limits to the effectiveness of innovation policies that are introduced without consideration of the economic environment as a whole.

With that brief introduction to the topic, I turn now to our panelists, Glenn Hubbard, Dominique Foray, and Manuel Trajtenberg.

References

- Djankov, S., R. La Porta, F. Lopez-de-Silanes, and A. Shleifer. 2002. "The Regulation of Entry." *Quarterly Journal of Economics* 117 (1): 1–37.
- European Commission, DG Research. 2009. "Expert Group 'Knowledge for Growth.'" http://ec.europa.eu/invest-in-research/monitoring/knowledge_en.htm.
- Gorodnichenko, Y., and M. Schnitzer. 2010. "Financial Constraints and Innovation: Why Poor Countries Don't Catch Up." NBER Working Paper no. 15792. Cambridge, MA: National Bureau of Economic Research, March.
- Hall, B. H. 2009. "The Financing of Innovation." *European Investment Bank Papers* 14 (2): 1–23. (Reprinted 2010 in the *Review of Economics and Institutions* 1(1). <http://www.rei.unipg.it/rei>.)
- Klapper, L., L. Laeven, and R. Rajan. 2006. "Entry Regulation As a Barrier to Entrepreneurship." *Journal of Financial Economics* 82 (3): 591–629.
- National Research Council, Board on Science, Technology, and Economic Policy. 2010. "Policy and Global Affairs." <http://sites.nationalacademies.org/pgs/step/index.htm>.
- Reynolds, P. D., M. Hay, W. D. Bygrave, S. M. Camp, and E. Autio. 2000. *Global Entrepreneurship Monitor: 2000 Executive Report*. Kansas City: Kauffman Center for Entrepreneurial Leadership at the Ewing Marion Kauffman Foundation.