

“The Economics of Science”
Paula Stephan (1996)

The Question(s): What do economists and other social scientists know about scientists and the pursuit of scientific knowledge? This paper provides a synthesis of scholarship around three key themes. First, what is the reward structure of scientific discovery and what are its consequences? Second, what do we know about scientific labor markets and the production of scientific knowledge? Third, what is the relationship between science and economic growth?

The Lessons:

First, the reward structure of science is centered on priority of discovery (recognition of being the first to communicate an advance). This winner-take-all feature of science has several consequences. A positive feature of this system is that it encourages both maximum effort and the timely disclosure of results. However, it is possible that excessive attention will be paid to a handful of the most prestigious scientific goals at the expense of other pursuits. Moreover, the fetishization of firsts means that a small subset of elite researchers often accrues the majority of recognition and resources. A focus on priority may also inefficiently distort the choice of research tasks. In an effort to be first, scientists may devote time and resources to trying to monopolize a line of research, or they may choose to work on projects with fewer scientific competitors even if the results are less socially beneficial.

Second, while social scientists have reasonably good data about where scientists work (i.e. industry vs. academia) and an understanding of the market for new entrants into scientific careers, they have consistently failed to provide reliable forecasts of the future supply of scientific talent. Social scientists have generally established that for individual scientists, productivity, salary, and receptivity to new ideas all peak early and decline over an individual’s career. However, current models fail to explain a substantial portion of what drives the production of knowledge. This is likely because research output is the result of a complex interplay of time, motivation, and inputs (both material and cognitive).

Finally, scholars largely agree that innovation is critical to economic growth. Research activity by one entity seems to ‘spillover’ to other organizations. Private research and development by firms is correlated with research and development by firms in the same geographic area, and research by universities seems to generate spillovers for industry. However, these spillovers can occur with substantial lags (sometimes on the order of years). These spillover benefits of research and innovation happen endogenously, as a consequence of knowledge having a public quality (being imperfectly appropriable by any one organization).