ELSEVIER

Journal of Economic Behavior & Organization
Vol. 66 (2008) 558–581

JOURNAL OF
Economic Behavior
& Organization

www.elsevier.com/locate/econbase

Money, fame and the allocation of talent: Brain drain and the institution of science

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Received 26 August 2005; accepted 29 June 2006
Available online 11 February 2007

Abstract

The earning structure in science is flatter than in the private sector, which could cause a brain drain toward the latter. This paper studies the allocation of talent between both sectors when agents value money and fame. Assuming that the intrinsic performance is a less noisy signal of talent in science than in the private sector, we show that a good institution of science mitigates the brain drain and that introducing extra monetary incentives through the market might induce excessive diversion from pure to applied research. We finally show the optimality of a relatively flat earning structure in science.

JEL Classification: D82; H21; H41; J24

Keywords: Fame; Science; Brain drain; Incentives; Asymmetric information

> "The purest treasure mortal times afford is spotless reputation; that away, men are but gilded loam or painted clay."—William Shakespeare in Richard II.

1. Introduction

Inducing talented people to become scientists is a national priority for all countries since a nation's economic future is closely linked to its scientific capacity in today's knowledge-based

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0167-2681/$ – see front matter
doi:10.1016/j.jebo.2006.06.012

economy. However, the private incentive for a talented agent to choose a scientific career may not be well aligned with the social incentive because she has many other attractive alternatives. For instance, in the US, bright young people with college degrees can pursue graduate studies in one of the major professional fields such as medicine, law and business. Compared to advanced study in science, these fields promise a much shorter period in school and substantially more lucrative job prospects.[2] This might generate a brain drain from the science sector to the private sector. Currently, both in the US and in Europe, there are concerns about a shortage of scientists and engineers.[3]

This paper studies the allocation of talent between the science sector and the private sector in an economy in which each agent makes an occupational choice between becoming a scientist and becoming a professional. We make a departure from the conventional assumption that only monetary payoffs matter and assume that each agent values fame as well. We use a rather narrow definition of fame as the amount of peer recognition that an agent receives as a function of her performance and study the allocation of talent by focusing on the difference between the two sectors in terms of the mapping from talent to performance.

A fundamental difference between the two sectors is that agents in the private sector can more or less appropriate their contribution to the society through profits while scientists (in pure science) cannot because of the public good nature of science. This difference in turn generates another important difference in terms of allocation of fame; the market provides an objective measure of each agent's performance (i.e. her profit) and accordingly distributes fame while the science sector, in order to have an objective measure of each scientist's performance, needs an institution that certifies the scientific contribution of each work. According to the sociologists of science such as Merton (1957, 1973), science is a social institution that defines originality as a supreme value and allocates fame and recognition according to priority so that the augmenting of knowledge and the augmenting of personal fame go hand in hand.[4] This incentive role of peer recognition for scientists is also recognized by Paul Samuelson who said "In the long run, the economic scholar works for the only coin worth having—our own applause" (Merton, 1968, p. 341).

We build a simple model in which each agent has private information about her level of talent and her intrinsic preference between the two occupations (professional and scientist) and the government builds a public science sector. An agent can be either talented or not while her occupational preference has support wide enough that there is a positive fraction of both talented and not-talented agents in each sector. We focus on the refereeing and publication process of the institution of science and define the quality of the institution as the quality of the mapping from intrinsic outcomes of scientific work to perceived outcomes. The perceived outcome of each scientist is observed by the government and her peers: the former provides monetary rewards and the latter provide non-monetary rewards (i.e. peer recognition) depending on the perceived

[2] Butz et al. (2003) compare an estimate of annualized earnings for PhDs with earnings of professional degree holders in US such as MDs, DDSs, DVMs, JDs, and MBAs and find that professional degree holders earn more at nearly every age and considerably more over an entire life career.

[3] For instance, the New York Times (May 5, 2004) reports that "The Unites States faces a major shortage of scientists because too few Americans are entering technical fields and because international competition is heating up for bright foreigners who once filled the gap", referring to the report of National Science Board (2004). Concerning Europe, see the recent report of the European Commission (2003).

[4] According to Merton (1957), the institution of science has developed a priority-based system for allocating (honorific) rewards. Heading the list of recognition is eponymy, the practice of affixing the name of the scientist to all or part of what she has found, as with the Copernican system, Hooke's law and so on. Other rewards include prizes, medals, and memberships in honorary academies. Last, publication and citation constitute rewards available to most scientists.