

INCENTIVES AND CREATIVITY: EVIDENCE FROM THE ACADEMIC LIFE SCIENCES: RAND Journal of Economics (2011)

The question: How does the flexibility of scientific funding contracts affect the creativity and productivity of academic researchers? This paper studies the pace, impact, and direction of research produced under two prominent life science funding models in the US. In a traditional R01 grant from the National Institutes of Health, grantees have short time windows to deliver research and face highly structured conditions for additional funding with low tolerance for failure. In contrast, a grant from the Howard Hughes Medical Center has a much longer time window, encourages exploratory and risky research, and allows for more failure. HHMI intends to fund "people, not projects" which is in direct contrast to the NIH R01 grants that tend to fund projects that are more certain to succeed and closely build upon existing research. Does the less restrictive HHMI funding model encourage higher impact and more creative research?

The results: Scientists funded through the HHMI publish 39% more papers than comparable NIH-funded researchers. They are also almost twice as likely to publish high-impact research that ranks in the top 1% of cited articles. But HHMI investigators tend to take on more risky projects. They have 35% more articles that underperform their pre-appointment citation average. They are also more likely to produce research that is creative and takes a larger step in intellectual space from the existing literature. The papers of HHMI scholars are more likely to use new keywords that are different from their previous work and are cited by a broader set of journals than their control counterparts.

The lessons: HHMI-supported scientists have fewer restrictions on their research program and therefore have more flexibility to explore experimental and uncertain research directions. More flexibility allows scientists to take bigger swings with each project. They hit more home runs but also strike out more often. A flexible funding system that invests in people instead of projects has potential to increase the overall productivity of scientists and allow them to make larger innovative steps. These findings suggest that research contracts should not punish occasional failure but should provide incentives to do risky and creative work.

The research approach: HHMI grant receipt is not a randomly assigned treatment. Therefore, a simple comparison of outcomes between the HHMI grantees and the average scientist may conflate a causal effect of an HHMI grant with underlying differences in the investigators that are selected for treatment. Therefore, the authors use a matching strategy to find scientists that are comparable on observable measures of productivity. The primary matching criteria is the receipt of high-profile early career research prizes. The winners of these prizes are likely to be equally highly productive in their early careers whether they are funded by the NIH or HHMI. An additional method used is a difference-in-difference specification that compares changes in productivity before and after grant receipt. This approach controls for level differences in productivity between treatment and control groups.