

## Research Performance and Resource Allocation

Diana Hicks & Sylvan Katz

School of Public Policy  
Georgia Institute of Technology  
Atlanta, GA, 30307

SPRU  
The Freeman Centre,  
University of Sussex,  
Brighton, East Sussex, BN1 9QE

Department of Mathematics and Statistics,  
University of Saskatchewan,  
Saskatoon, SK Canada S7N 5E6

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In this paper we analyze an unacknowledged tension in decision making about the distribution of resources for research and innovation. There is tension because while decision makers accept that there is inequality in research performance, and that resources should be distributed according to merit, the resulting inequality in the allocation of public money seems so extreme that it violates deeply held principles of equity in a democratic society. We will pursue this argument by considering how resources and performance are distributed. Specifically we will examine the properties of probability distributions – power law and normal – and the felt experience of “living within” these distributions.

The argument proceeds as follows. The paper begins by discussing the distinctions commonly made between probability distributions and then proposes a metaphorical classification of the shape of distributions. There follows a review of the empirical evidence that a power law distribution characterizes research performance. Next, equity in the merit-based distribution of resources is discussed and recent results from experimental economics are brought to bear on the question of the felt experience of resource distribution. This is used to argue that the normal distribution of resources will feel more comfortable than the power law distribution of resources both to those distributing resources and to those receiving resources. Unfortunately, we find that in research the comfortable distribution of resources creates an incentive structure that may suppress excellence.

We believe there is a fundamental tension in between equity and excellence that can suppress incentives for excellence in innovation when equity is a concern in distributing resources. Although using merit based evaluation as a criterion for research funding

would seem likely to resolve this tension, we argue here that this is not the case. Merit based decision making alone is insufficient because of inequity aversion, a fundamental tendency of people to avoid extremely unequal distributions. The distribution of performance in innovation is extremely unequal, and no decision maker with the power to establish a distribution of public money among recipients would dare to match that level of inequality. In fact, decision makers are likely unaware of the issue, as they no doubt operate with distributional assumptions of normality that guide our everyday intuitions.

Further research is needed to ascertain how best to resolve the tension, though innovative funding mechanisms such as prizes hold promise. Second, avoiding a system in which one decision maker or decision making committee makes a comprehensive allocation of resources may help. The U.S. exemplifies this situation in that the total Federal research support received by any state, university or department is allocated through many competitive decisions each of comparatively minor consequence. It is possible that many small, inequity averse, merit based decisions may accumulate into a distribution that provides innovators with appropriate incentives. However, further research is needed to confirm this point.