A conversation with Bhaven Sampat on 05/02/13

Participants

- Bhaven Sampat —Associate Professor, Columbia University, Department of Health Policy and Management
- Holden Karnofsky — Co-Executive Director, GiveWell

Note: This set of notes was compiled by GiveWell and gives an overview of the major points made by Bhaven Sampat.

Summary

Bhaven Sampat is a Professor at the Department of Public Health at Columbia University. GiveWell spoke with him to learn about the research on the historical track record of basic biomedical research leading to products that improve health outcomes. The main subjects of the conversation were:

- The history of lobbying for National Institutes of Health (NIH) funding
- Research on returns to investment in biomedical research
- Quantitative vs. qualitative research in the social sciences
- Context for funding academics to work on specific research projects

Lobbying for National Institutes of Health (NIH) funding

- There are ~200 universities and medical schools that publish editorials and contact Congresspeople when there's a proposal to cut the NIH budget. Because these universities and hospitals are prominent, and because many congressional districts have at least one such institution, they have been fairly successful in preventing the NIH budget from being cut.

- The NIH budget was gradually doubled between 1997 and 2002.This came to pass as follows. The NIH was feeling pressed on account of disease groups having successfully lobbied for parts of the NIH budget to be allocated to specific diseases, reducing the amount of discretionary funding that the NIH had available. The NIH convened disease groups and scientific interest groups to make a big push to increase the budget. This included both formal lobbying and informal persuasion. The disease groups were interested in cooperating with each other, because they felt that if the NIH budget was doubled, that would increase the funding available for research on all diseases.

- The National Science Foundation (NSF) has much less lobbying for funding than the NIH does, in part, because it is easier to get support for research on

a particular disease than it is to get support for basic research.

- Professor Sampat wrote an article about the relative success that the NIH has had in securing funding: *Mission-oriented biomedical research at the NIH*, published in *Research Policy*.

Returns to investment in research

- Much of the research on the returns to research does not focus on publicly funded research, and tends to look at returns to research as a "residual" between total output and output that can be accounted for in other ways.

- Edwin Mansfield did research asking biomedical firms how many of their products could have been developed without basic research. He may have used this information to try to calculate a rate of return on basic research. The data that he used was from the 1970's and 1980's.

- Wesley M. Cohen, Richard R. Nelson and John P. Walsh wrote *Protecting Their Intellectual Assets: Appropriability Conditions and Why U.S. Manufacturing Firms Patent (or Not)*, which is a study of the impact of publicly funded research in biomedicine and other fields, using the Carnegie Mellon Survey (CMS) on research and development.

- Aaron Kesselheim (Harvard Medical School) has been interviewing clinicians, asking them what the biggest breakthrough drugs are in their areas of specialty, and has used this to identify the top drugs in 10-15 areas. He's particularly interested in the role of the public sector.

- Comment by GiveWell: We're interested in understanding what the future returns on biomedical research would be at the margin, as opposed to the average returns on past biomedical research.

  Kevin M. Murphy and Robert H. Topel wrote *The Value of Health and Longevity*, which is a study of what the value of a given percentage reduction in cancer mortality would be.

  Comment by GiveWell: We're interested looking at
  a) The value of reducing the burden of a disease by a certain amount
  b) The realistic range of returns to investment in research on the disease
  c) How much is being spent today on the disease

  and combining these to estimate the marginal return on investment into research on the disease. Of the three, we think that it will be relatively easy to answer (a) using the $/DALY framework. It seems difficult to answer the other two, but you could try to by interviewing scientists, although there's a potential issue of scientists overstating the potential gains, or understating the amount of current funding, in order to get more funding for their fields.

- Comment by GiveWell: We've heard that it takes 30 years for basic research to lead to the release of a new drug, because there's a lot of translational research, and it takes time for clinical trials to be done and for the Food and Drug Administration to approve drug candidates. We saw a figure of 3 years in a literature review that we read, which doesn't seem to get at the true amount of time that it takes.

  Research has found that historically, it's taken between 10-17 years for basic research to result in health improvements. Professor Sampat is writing a paper about basic research being used in drug development, using bibliometric methods, and has found that the lag appears to be 10-11 years, but that there's a lot of uncertainty.

Qualitative methods vs. quantitative methods

Qualitative research in social sciences refers to the use of interviews, surveys with written answers and case studies to investigate social science phenomena. This contrasts with *quantitative methods*, which refers to the use of numerical data to investigate social science phenomena.

Economists generally use quantitative methods much more than qualitative methods. Some exceptions to this may be found among economists who study innovation, entrepreneurship and productivity. Sociologists use qualitative methods more than economists do.

Quantitative research on returns to investment in biomedical research

Professor Sampat has been using *bibliometric methods* to study the returns on investment in biomedical research to the development of healthcare products. This involves looking at patents of hundreds of health products, the papers that they cite, the papers that those papers cite, and where the funding from the papers came from.

Case studies of returns to investment in biomedical research

Comment from GiveWell: What about a historian's approach of talking to the people who developed a drug? I wonder if the publication record might not pick up on the key factors that made the development possible.

There have been relatively few detailed case studies using qualitative methods.

There's a risk of qualitative studies selecting for unrepresentative cases where basic research had an unusually large impact on health outcomes. It's important that

qualitative studies be well designed so as to reduce this risk. There's also an issue of interviewees not always correctly remembering what lead to a scientific breakthrough.

Once case studies are done, one can juxtapose the case studies with the quantitative analysis that used a large sample size, and compare and contrast their results to inform future research.

Some difficulties with quantifying the impact of basic research

Some difficulties with quantifying the impact of basic research on the development of health interventions in a given subfield are:

- Sometimes a breakthrough in one area has applications in another.
- Diseases are ill-defined categories.
- Some research that's officially done under one heading is actually research on something else.
- It's not always clear at what time funding for a given project was crucial to its success.

Professor Sampat has been studying cross-fertilization in biomedical research. Learning more about this could help address the above difficulties.

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