

**Comments on Bronwyn
Hall's
"Returns to Public R&D
Investments in Chemical
Science: Empirical Evidence"**

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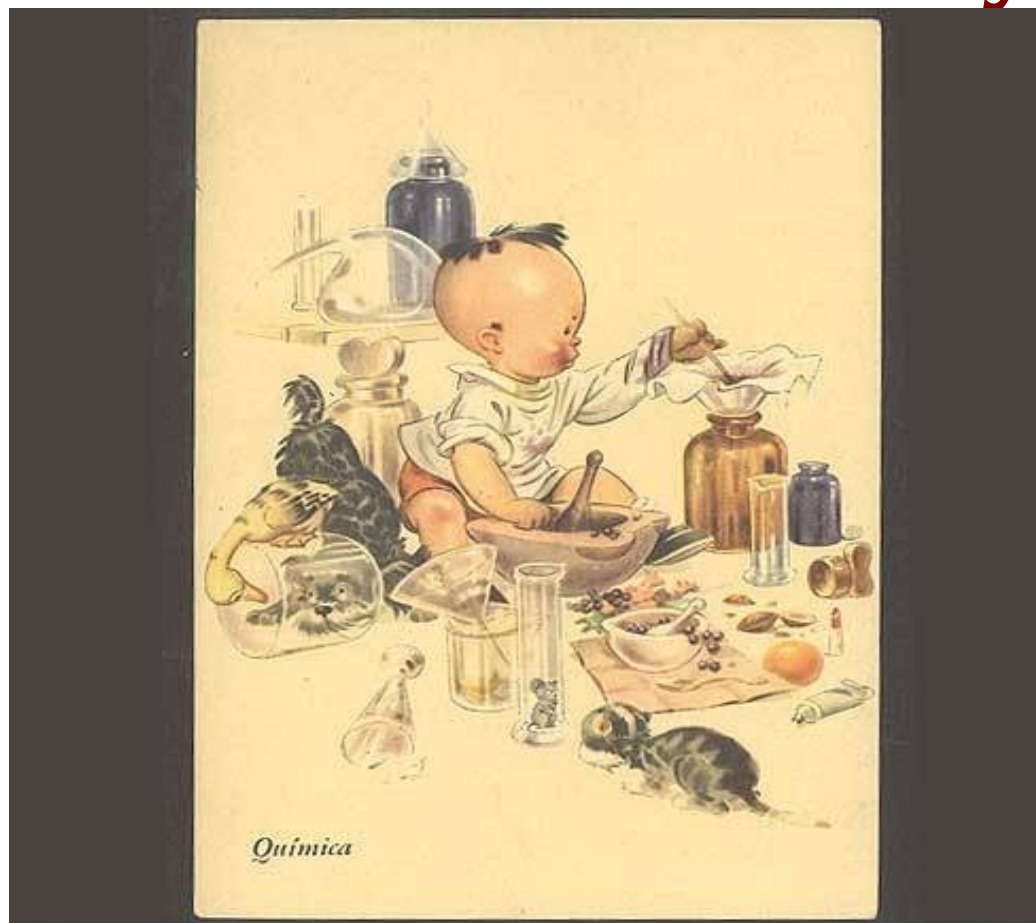
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Outline of My Comments

- My knowledge about chemistry
- Some conceptual issues
- An alternative approach
- An example
- Thank you



It's Been a While Since I Studied Chemistry



Some Conceptual Issues

- Public \$R&D investments in chemical sciences
 - To universities
 - To firms
 - To national laboratories
- What should be the “influenced” economic unit of analysis?
 - Firms in the chemical sciences?
 - Others in the public or private sector?



A Possible Approach to Learning More

- Identify where publicly-funded chemical R&D is being conducted (e.g., basic research that is taking place in national laboratories)
- Identify which industries, and firms therein, benefit from this research



A Possible Approach to Learning More (cont.)

- Perform evaluation of the spillover benefits from the publicly-funded research, and collect relevant data using interview and survey data



Interview-Based, Survey-Based Research

- Not the “favored” research approach of most economists, but many here have had experience:
 - Hall, Link, Scott – *REStat*, 2003
 - Cohen, Nelson, Walsh – *Mgt Sci*, 2002
 - Murray – *ICC*, 2007
- We have learned much from such data collection efforts.



As an Aside

MEMORANDUM FROM THE EXECUTIVE OFFICE OF THE PRESIDENT

Office of Management and Budget

October 7, 2009

Subject: Increased Emphasis on Program Evaluations

Rigorous ... program evaluations can be a key resource in **determining whether government programs are achieving their intended outcomes** ... and at the lowest possible cost. Evaluations ... can help the Administration determine how to spend taxpayer dollars effectively and efficiently ...



An Example

DOE currently spends ~\$7 million/yr. at its Combustion Research Facility in Livermore, CA, much of which goes to laser and optical diagnostics related to diesel engines.

- Diagnostics use spectroscopic methods to learn about the chemistry of combustion.
- What are the returns to these public R&D investments in chemical sciences?



An Example (cont.)

- Preliminary estimates from a DOE evaluation study show diesel engine manufacturers are building more fuel efficient engines as a result of this basic publicly-funded research in chemistry.
- The more fuel efficient engines reduce diesel consumption and emissions →

$$B_{\text{Society}}/C_{\text{DOE}} \sim 60\text{-to-}1.$$



Thank you.



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