



# **Measuring the Effects of Research Financing: The Case of the Sloan Research Fellows**

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# Mr. Sloan

Headed General Motors from 1923 to 1956



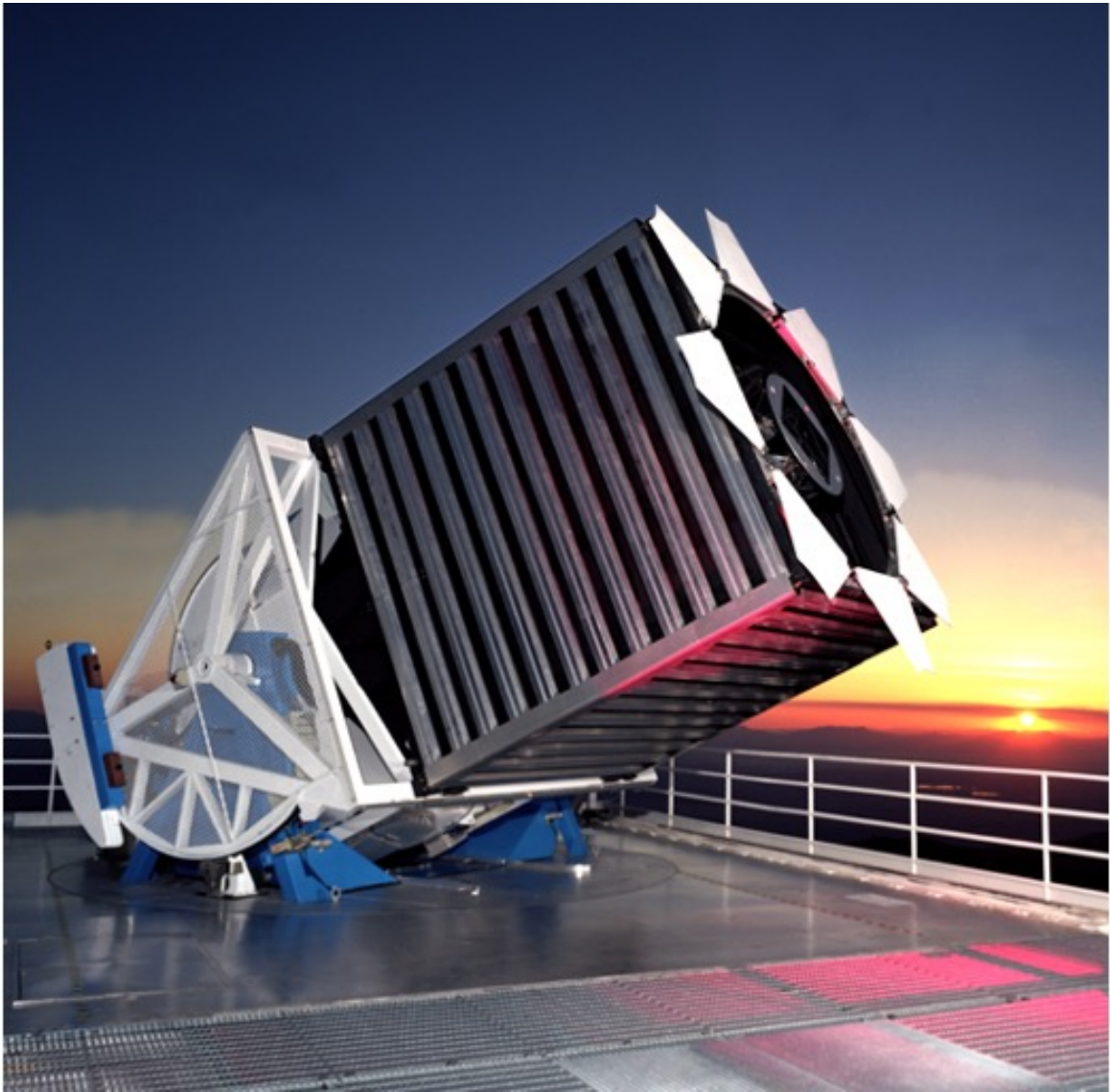
## Mission Statement

The Alfred P. Sloan Foundation makes grants primarily to support original research and education related to **science, technology, engineering, mathematics, and economics**. The Foundation believes that these fields—and the scholars and practitioners who work in them—are chief drivers of the nation's health and prosperity. The Foundation also believes that a **reasoned, systematic understanding of the forces of nature and society**, when applied inventively and wisely, can lead to a better world for all.



# Sloan Highlights

## Public Goods Business



WIKIPEDIA  
*The Free Encyclopedia*



BROOKINGS

THE CONVERSATION





# Sloan Research Fellowships

One of the oldest of its kind in the U.S.

- For early career faculty (pre-tenure).
- Started by Mr. Sloan in Chemistry, Physics, and Mathematics.
- Now Economics, Computer Science, Neuroscience, Earth Systems, too.
- 128 selected by small and recently diversified, committees for each field.
- Based on "promise" as a person rather than on a project.



# Program Assessment

## Reviewing the Sloan Research Fellowships

- Does the program operate well and according to plan?
- Is it having the intended effects?
- How could it be even better?
- What if you have 10% more to spend, say? Or 10% less?

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# Current Assessment Practice

Data, by itself, can only answer the first question

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## 52 Nobel Prizes!



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# Yay, But What Does This Mean?

Does it even answer any of our questions??

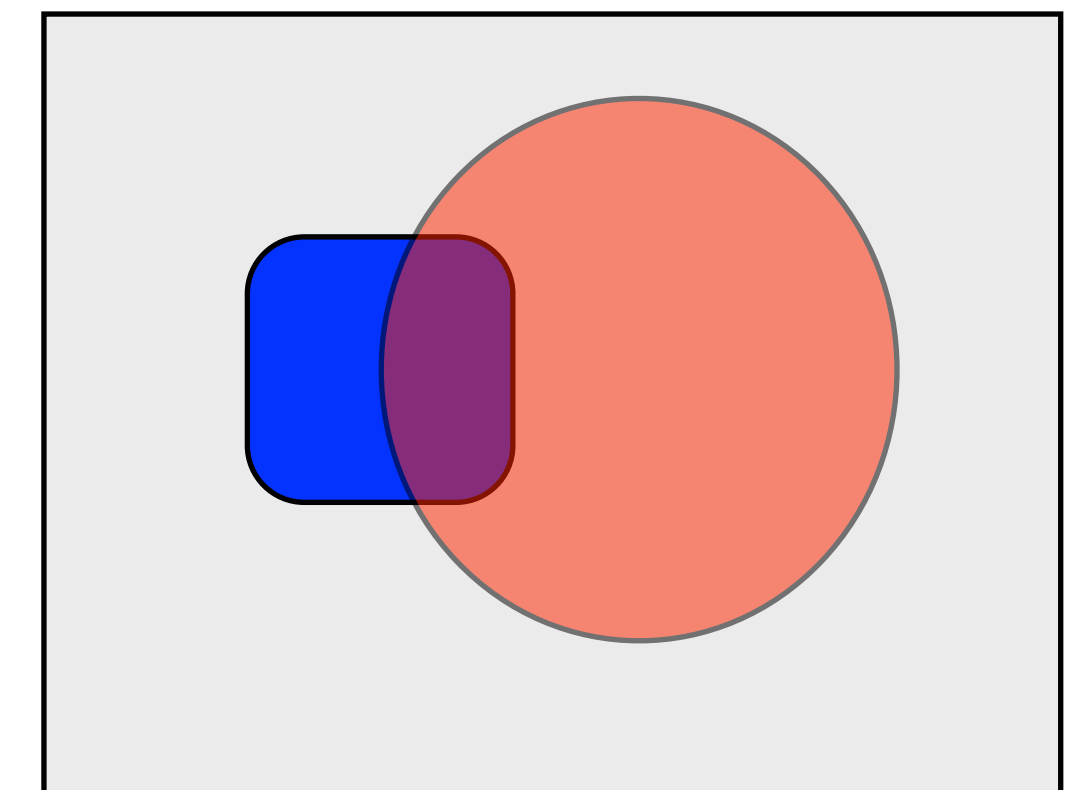
## 52 Nobel Prizes!



- Winning a few each year suggests that  $Pr(SRF | NOB)$  is large.

- Where  $Pr(A | B) = \frac{Pr(A \& B)}{Pr(B)}$  is the probability of *A given B*.

- Shouldn't  $Pr(NO B | SRF)$  be more interesting?  
Note: it is a different number requiring other data.



# Pet Theories

Guess what *Management Focus Magazine* recommended based on a survey showing  $Pr(DOG | CEO) = 80\%$  ?

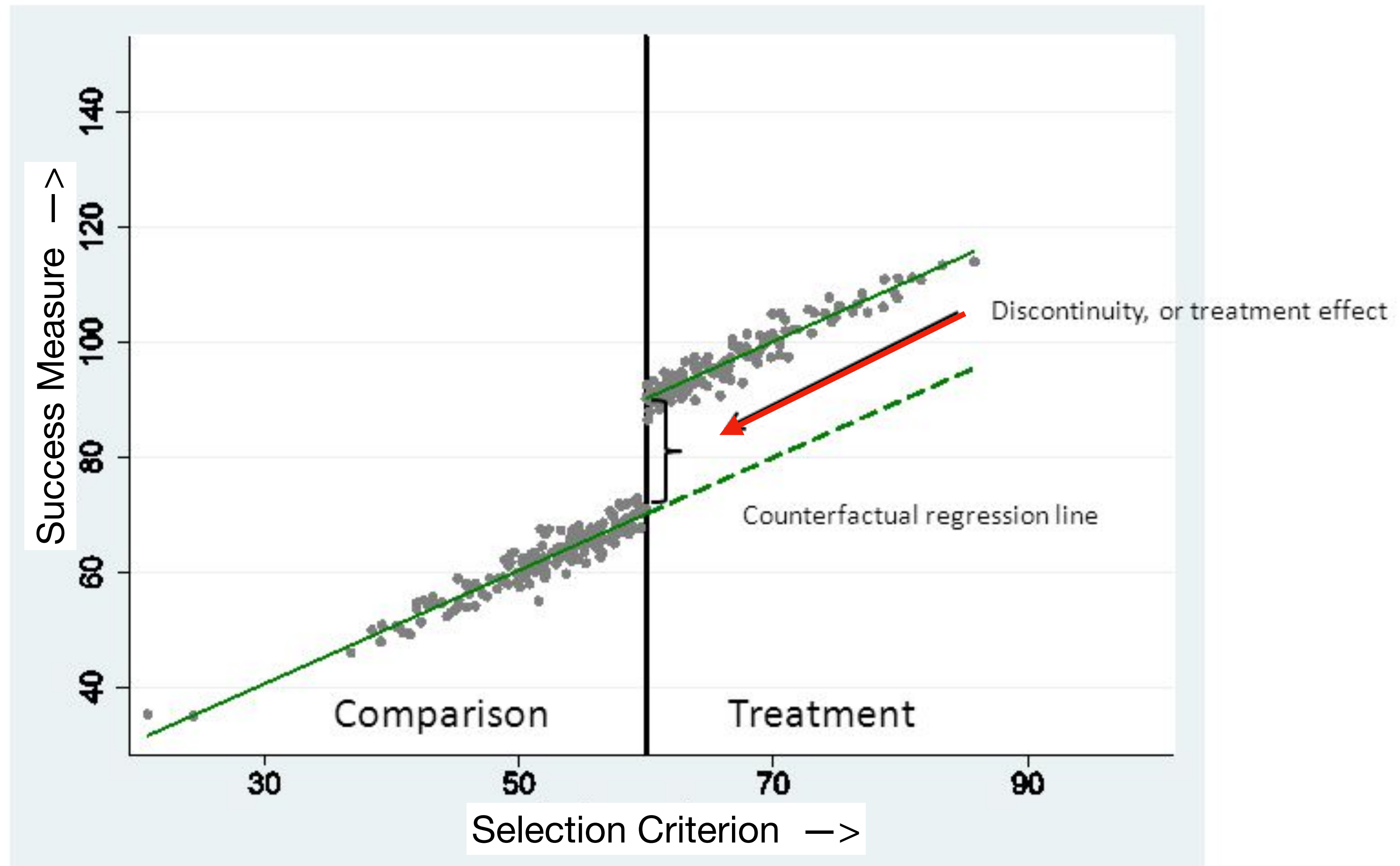


- Even if you compute  $Pr(NOB | SRF)$ , still need a comparison.
- $Pr(NOB | AppliedButNoSRF)$  requires data on all who applied!
- Suppose the latter prob is smaller. Does that establish causation?
- No: the control and treatment groups here exhibit “selection bias.”
- I.e., the Nobelists might have done just as well without an SRF...



# Regression Discontinuity Design (RDD)

RCT alternative when the threshold criteria is set independent of the data.



Mind  
The  
Gap  
at the  
Cut  
Off

# Take Away Lessons

About measuring the *causal* effects of research financing



- You may need data you would not think to collect.
- Rates matter: pay attention to numerators *and* denominators.
- Observations are, by themselves, not enough to establish causality.
- Need treatment and control groups, but that still might not suffice.
- Work with professionals *early* to formulate hypotheses and to design appropriate interventions, data collection, and statistical tests.  
Sloan may be able to help with that...