The Effect of Clinical Trial Deaths on Innovation

PRIMO Presentation, Summer 2022

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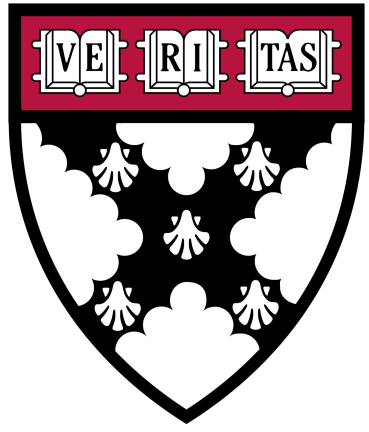


Work done under the guidance of Professor Kyle Myers

Jesse Gelsinger Case

Guiding Question

Does the market overreact to deaths in gene therapy clinical trials?

Methodology — Data Collection

Take clinical trial data and therapies, and create classes to compare them to gene therapy

- ClinicalTrials.gov
- PubMed.gov
- MeSH data

With these classes, create an innovation index combining the following:

- Academic publication counts (research interest)
- Media publication counts (media interest)
- VC investments/startups (investor interest)

Methodology II — Synthetic Control

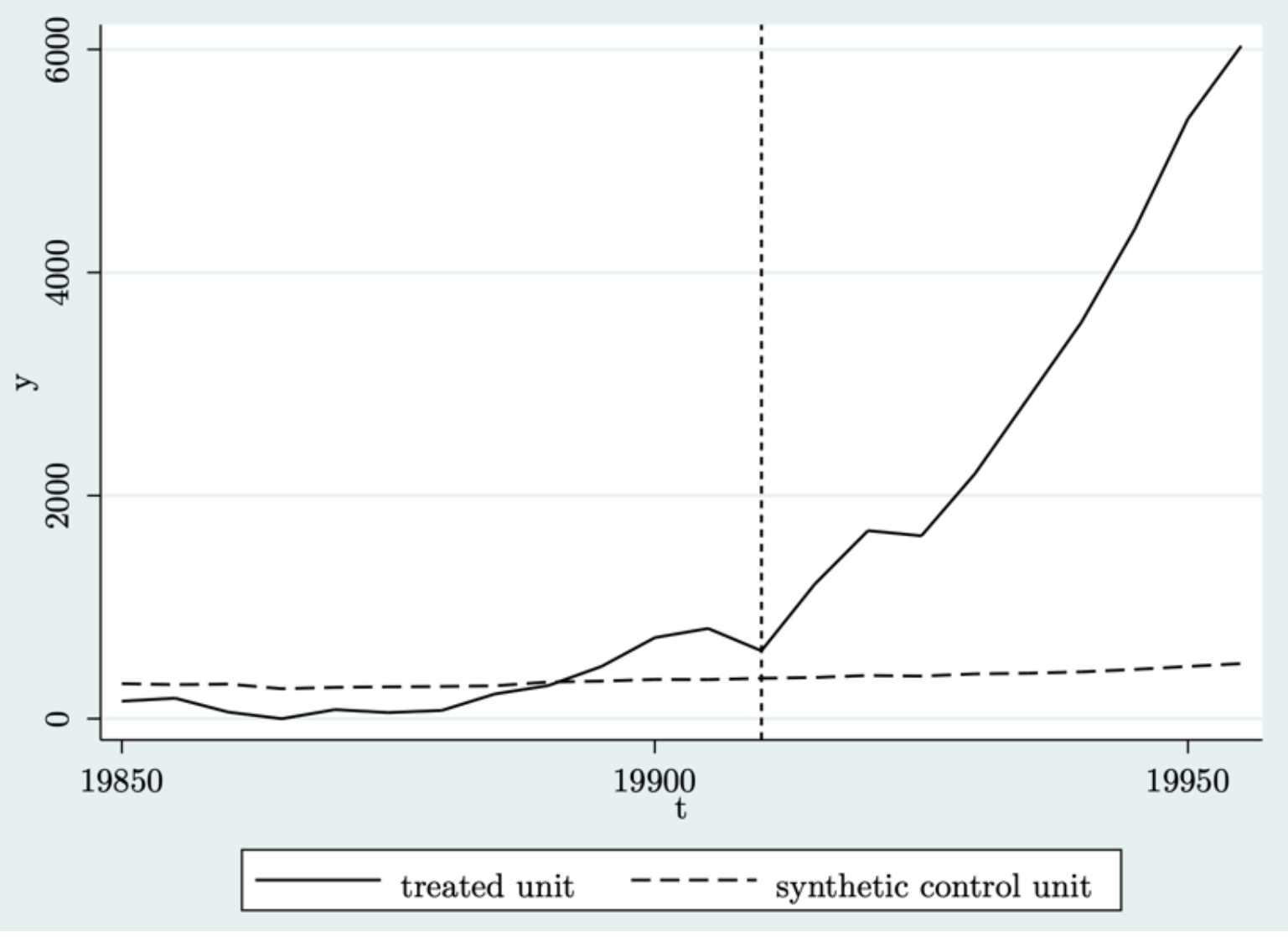
Taking all this data, we then craft a time series panel data set and run a synthetic control regression.

What is synthetic control and why did we implement it?

- Nothing is "quite like" gene therapy
- Divide our data into pre/post-treatment (i.e., Jesse Gelsinger's death)
- Create a "control" that looks identical to genetic therapy curve pre-treatment by weighting and summing all the other therapy curves
- Look at the difference in curves post-treatment

Methodology III — Synthetic Control Cont.

Here is one such graph we produced using Stata:



Methodology IV — Synthetic Control Mechanics

The model synthetic control works with is

$$Y_{ct} = \alpha_{ct} D_{ct} + Y_{ct}^{N}$$

where Y_{ct} is the observed outcome, $\alpha_{ct} D_{ct}$ is a time-dependent treatment effect, and Y_{ct}^{N} is a time-dependent treatment counterfactual.

The real estimation occurs when we want to find α_{ct}, which is estimated as

$$\hat{\alpha}_{1t} = Y_{1t} - \sum_{c \geq 2}^{N} w_c Y_{ct}$$

where 1 refers to, in this case, genetic therapy.

Thank you for listening! And thank you for an amazing summer!

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