Learning from Failure: The Role of Disclosure on Innovation

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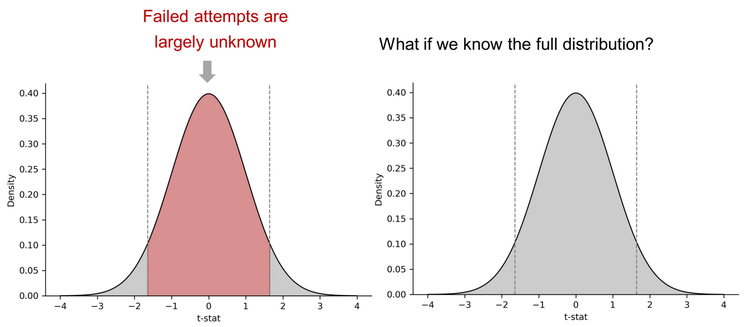
Introduction

What can we learn from failure?

Little is known empirically, due to limited failure disclose



Failure disclosure is

Privately Costly

Proprietary cost of disclosure +
Negative signal of failure

Socially Beneficial

Knowledge sharing improve innovation efficiency

Research question: ***What do we learn from failure? specifically, how failure disclosure shapes innovation?***

Positive

- Improve innovation efficiency
- Reduce uncertainty

Negative

- Proprietary cost of disclosure
- Deterrence effect

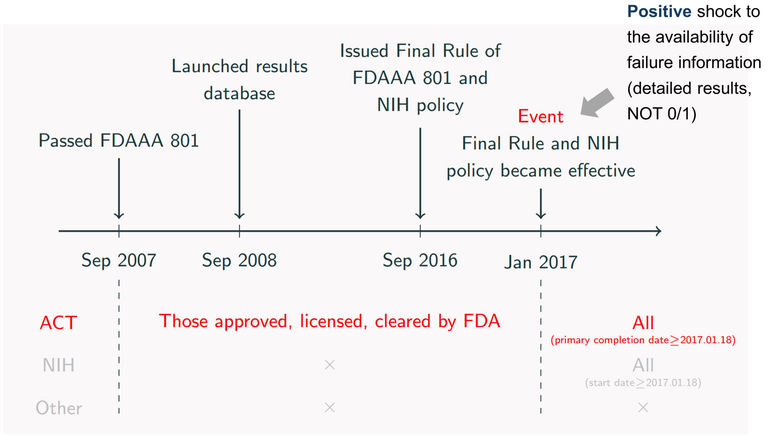
Challenges:

- Failure information are usually unobservable → ***limited data***
- For observable ones, the decision of voluntary disclosure and future innovation may be correlated → ***endogeneity concern***

Research Design

Identification — DiD:

Expansion in the disclosure requirements of clinical trial results



Medical conditions (MeSH)	Treated	Control
Pre-event disclosure level	lower ⬇	higher ⬆
Other characteristics	matched using entropy balance	

Data:

- Clinical trials and their results: ClinicalTrials.gov
- Other avenues for results disclosure: journal publication from PubMed
- Pipeline and approval status: FDA, PharmaProjects, BioMedTracker

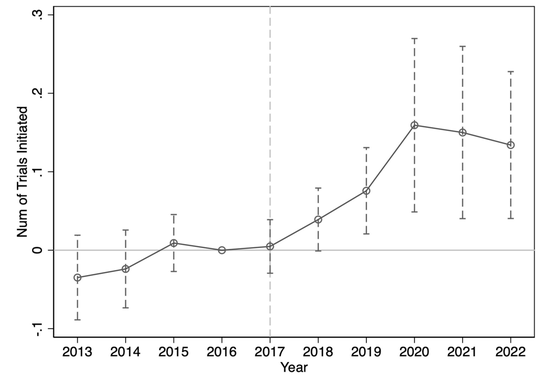
Sample:

- Trial level: 328,177 trials initiated between 2000 and 2022 and with primary completion year on or after 2008, approval rate of ACTs is 3.4%
- MeSH-year level: 921 MeSH over 10 years (2013-2022)
- Sponsor-MeSH-year level: 899,250 obs from 1,175 sponsors

Empirical Results

1. **Positive** effect on innovation (trial initiations)

$$Num\ of\ trials\ initiated_{mt} = \beta_0 + \beta_1 Treat_m \times Post_t + \vec{\gamma} \cdot \vec{V}_{mt} + \phi_m + \tau_t + \epsilon_{mt}$$



- **11.5%** more increase after the policy change
- Effect shows up quicker in early phase trials

2. **Incremental** vs **Radical** innovation

Trials on existing drugs (incremental): **12.0%** ⬆

Trials on new drugs (radical): little change

Mechanism

1. Knowledge spillover

In-house knowledge =	Num of trials initiated: Low 1/2 (1)	High 1/2 (2)	Low 1/4 (3)	High 1/4 (4)
Treat × Post	0.178***	0.008	0.311***	0.008
	(0.060)	(0.066)	(0.069)	(0.073)
Test of coefficient difference between high-knowledge areas and low-knowledge areas				
Difference (p-value)	0.170* (0.056)		0.303*** (0.002)	
Controls	Yes	Yes	Yes	Yes
MeSH FE	Yes	Yes	Yes	Yes
Sponsor × Year FE	Yes	Yes	Yes	Yes
Obs	384,077	336,375	238,661	172,318

Trial sponsors benefit more in medical fields where they had less internal expertise prior to the event

2. Proprietary cost of disclosure

Proprietary cost =	Num of trials initiated (mandated disc.): Low (1)	High (2)	Num of trials initiated (no mandated disc.): Low (3)	High (4)
Treat × Post	0.274**	0.000	-0.000	0.062
	(0.125)	(0.046)	(0.038)	(0.040)
Test of coefficient difference between sponsors with high and low proprietary costs				
Difference (p-value)	0.273** (0.041)		-0.062 (0.260)	
Controls	Yes	Yes	Yes	Yes
MeSH FE	Yes	Yes	Yes	Yes
Sponsor × Year FE	Yes	Yes	Yes	Yes
Obs	60,483	209,290	240,265	571,257

Sponsors with a higher risk of losing informational advantages are less inclined to initiate new trials subject to disclosure requirements

Placebo: No difference in other trials

Main Takeaways

- Failure information is valuable
- Failure information stimulates innovation
- Spillover benefits outweigh proprietary costs

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