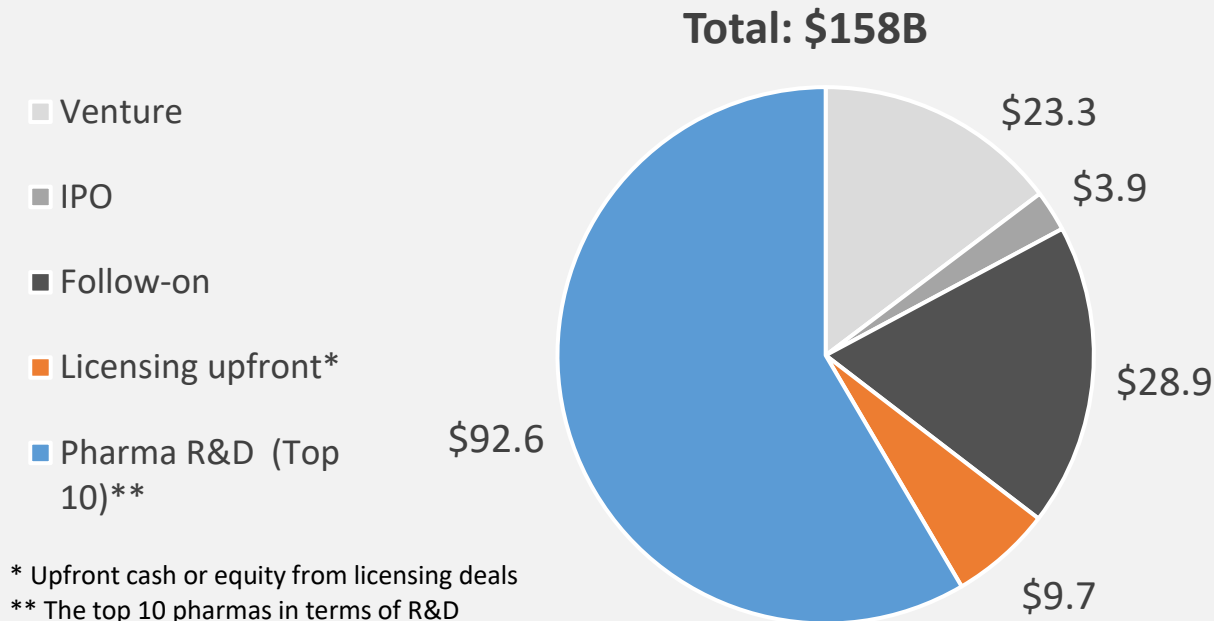


# Second Order Effects of Government Policy on Private Capital Formation in Biopharma

Josh Bilenker, M.D.

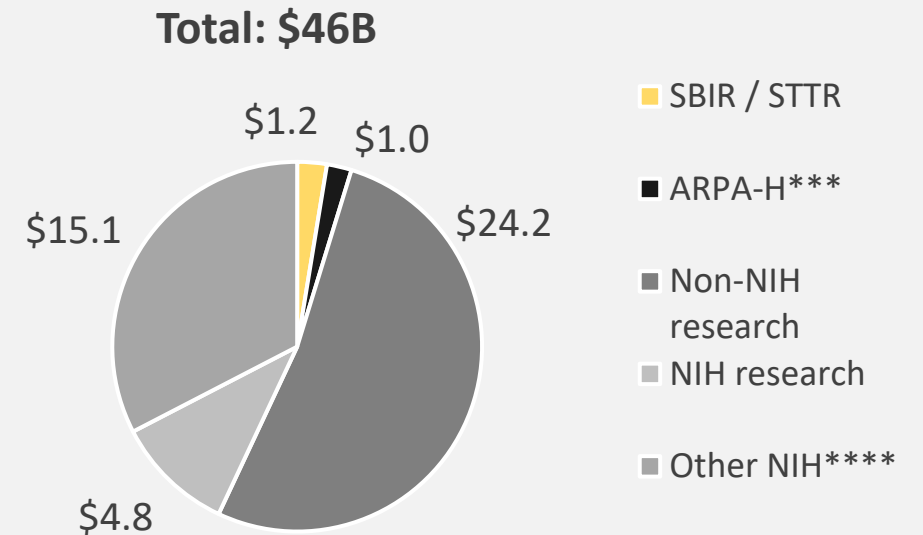
# Private Capital is ~3X Public Research Funding and Used for Products >> Knowledge

## Biopharma Financing and R&D Funding in 2022(\$B)



\* Upfront cash or equity from licensing deals  
\*\* The top 10 pharmas in terms of R&D expenditure in 2022 were Roche, Merck, Pfizer, AZ, BMS, Novartis, Eli Lilly, Sanofi, AbbVie, and Gilead

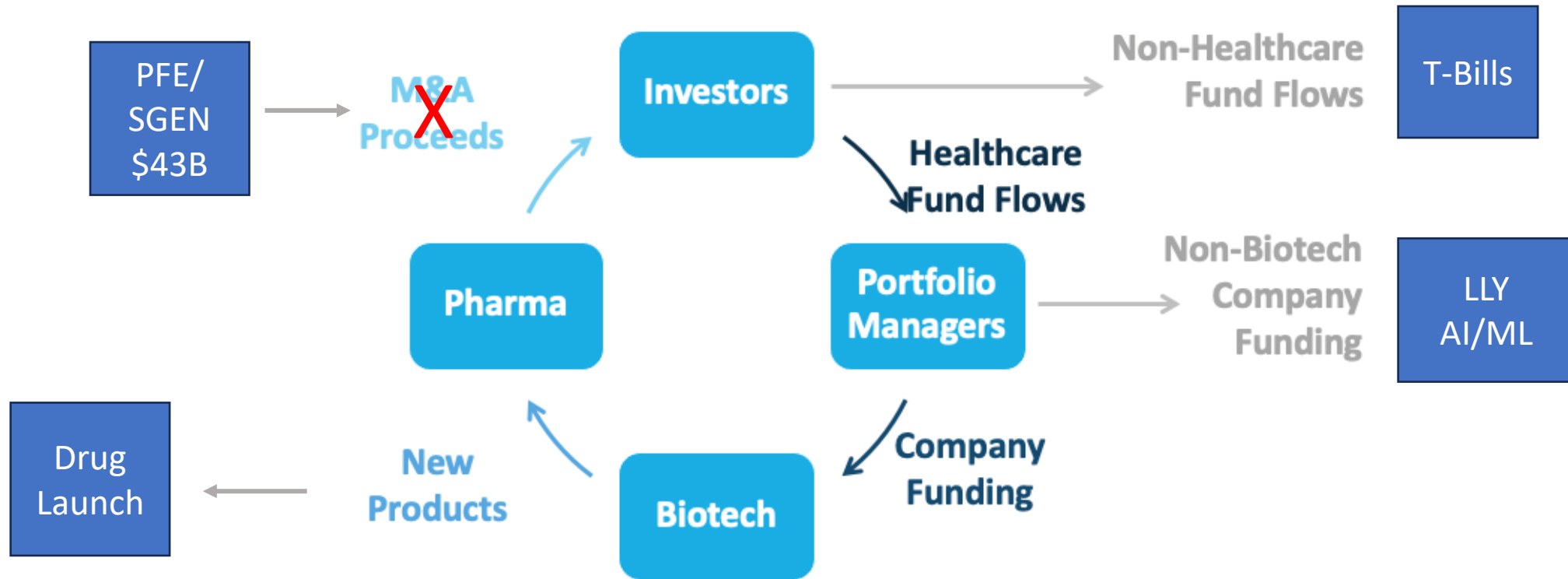
## NIH and ARPA-H Funding Distribution in 2022 (\$B)



\*\*\* Increased to \$1.5B in 2023  
\*\*\*\* Includes spend on research centers, non-research project research, R&D contracts, training and other items

Source: Dealforma and JP Morgan (data as of 6/30/23); Company filings (data as of FY 2022); NIH data through 2022

# FTC Policy Change? Limiting M&A Would Pressure Company Valuations and Reduce Investment In Emerging Co's

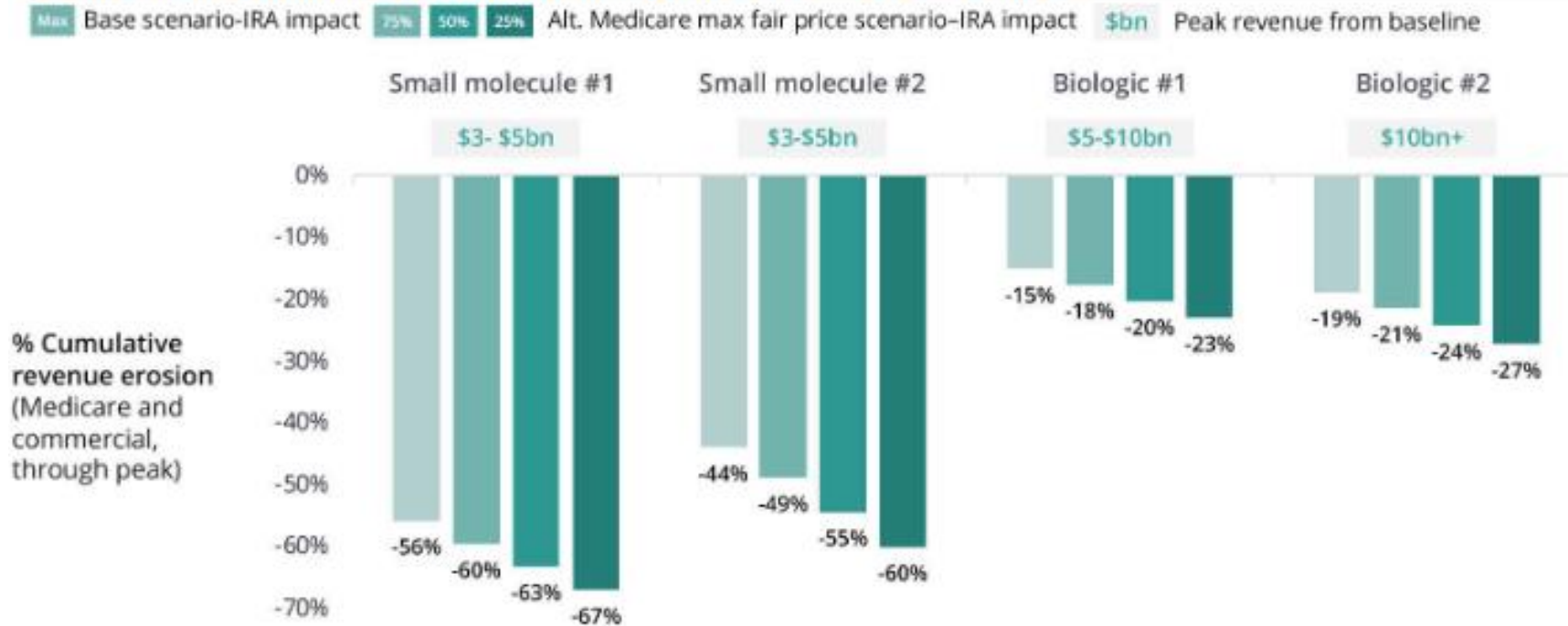


- \$8B Illumina acquisition of Grail closed at risk in 2021
  - \$27B Amgen acquisition of Horizon settles with FTC in 2023 (PULSE coalition)
- Risk appears to be fading because FTC keeps losing in court

# IRA Price Setting Effects on Cumulative Revenue

FIGURE 1:

## ZS IRA impact model—revenue erosion (Large products, U.S. only)



Source: ZS Analysis, Evaluate Pharma (accessed Sept. 8, 2022), Bloomberg (accessed Sept. 8, 2022).

→ Remember, large pharma pegs R&D spending to revenue (e.g., 20%)

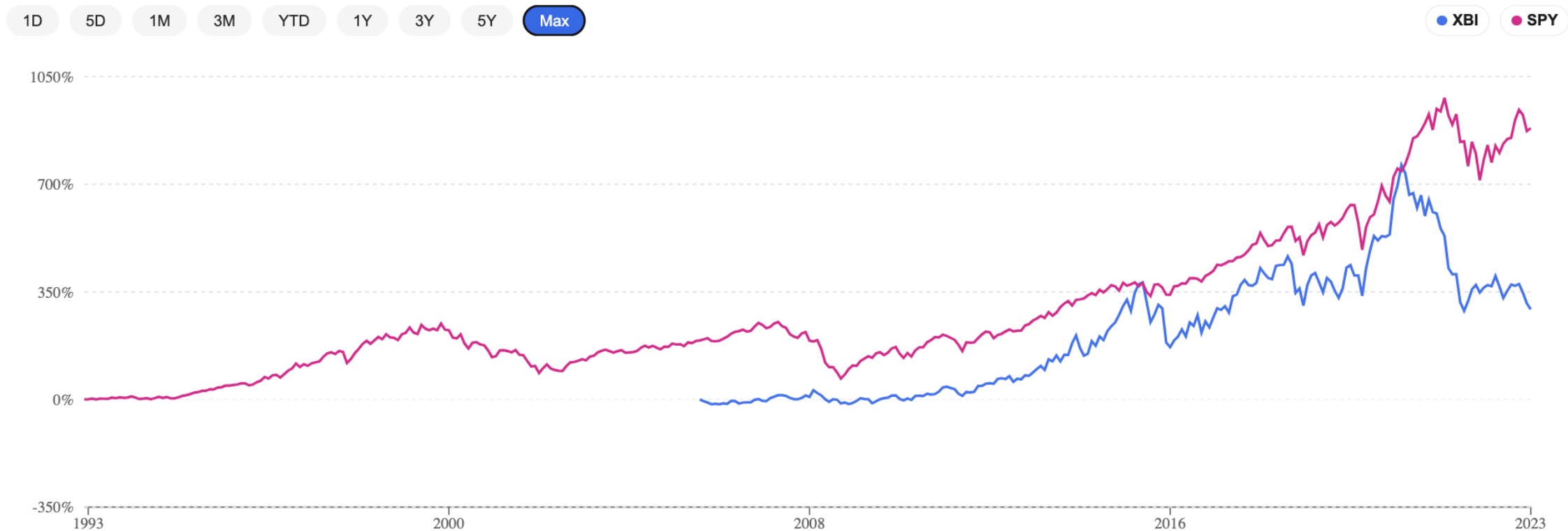
# March-In Rights (Bayh-Dole Act)

*U.S. Code, Title 35, Part II, Chapter 18, Section 203*

- Goal: incentivize invention from federally funded intellectual property so that it can be made available to the public on “reasonable terms”
- Some say “reasonable terms” = “low drug prices”
- So far, NIH has rejected several petitions, but risk remains
  - Fabryzyme (Genzyme) 2010
  - Norvir (AbbVie) 2013
  - Xtandi (Pfizer) 2023

→ A low but non-zero risk when working with federally-funded academic labs

# The Biotech Index Has Underperformed the S&P



# Uncertainties

- Will R&D dollars rotate out of cancer and rare disease to highly prevalent diseases affecting non-Medicare populations, such as autoimmune disease and obesity?
- Will increasing budget deficits lead to more severe future versions of IRA?
- Will IRA hold up to legal challenges on constitutionality?
- Will executive branch agencies become less predictable in the future?
- If the US adopted European pricing benchmarks, would private capital flee entirely?
- Are high interest rates the only factor keeping away generalist investors?