Quantifying Synergies in Pharmaceutical Development

Investigating Mergers and Acquisitions in the Pharmaceutical Industry

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Project overview

- Large mergers and acquisitions (M&As) in the pharmaceutical industry in recent years
  - E.g. Bristol-Myers Squibb purchased Celgene for $74 billion USD and AbbVie acquired Allergan for $63 billion USD in 2019
- Little antitrust scrutiny
  - This raises economic concerns about market power regarding pricing and innovation

Significance

- Why so little scrutiny? Presumably, economists would say that there are efficiencies (e.g. R&D drug production becomes more efficient) in letting these companies merge
- Limited evidence of these efficiencies in part because they are difficult to measure
- This evidence will be a guide to antitrust policy regarding M&A in pharma

Project Aims

- Do M&As between pharmaceutical companies improve the process of drug development?
  - Do they increase the chances of drug development projects succeeding?
  - Do they reduce the time that it takes to launch a new drug?

Summer Project Aims

- Key issue: There are many different data sources available to track M&As over time that may not necessarily be accurate
- Goal: Carefully document the M&As from these data sources to get a high-quality profile of the landscape of the pharmaceutical industry

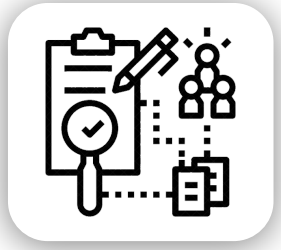
Methods

Cross-referencing external sources like press releases, news articles, and existing datasets to create an accurate dataset of verified M&As in the pharmaceutical industry

Step 1

Cortellis Dataset

Step 2



Cross-reference

Step 3

Data Classification

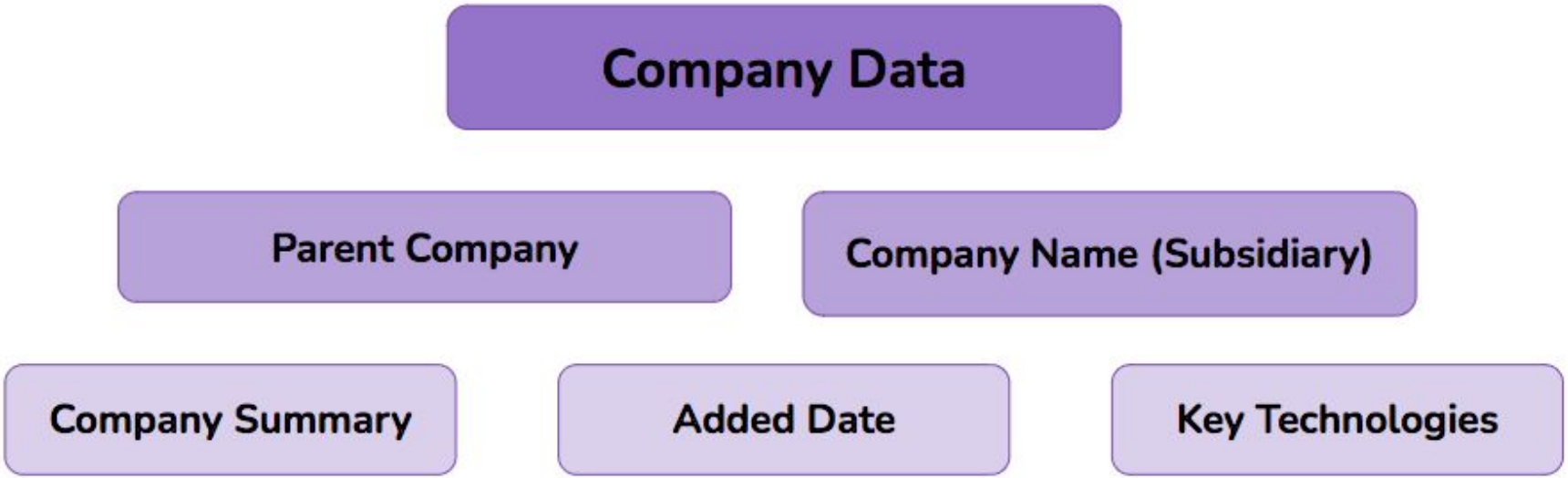
Step 4

Dataset Creation

Jovan

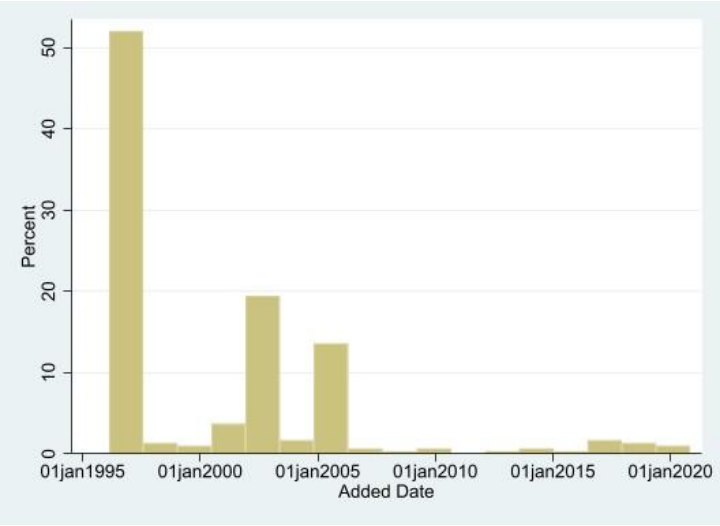
- Specialized in Company Data from Cortellis, a private data firm that specializes in the pharmaceutical industry
- Company Data provides details about parent companies and their subsidiaries, but not when/if they were merged
  - n = 120,000 companies
    - Pfizer
    - Novartis

Cortellis Company Data Overview

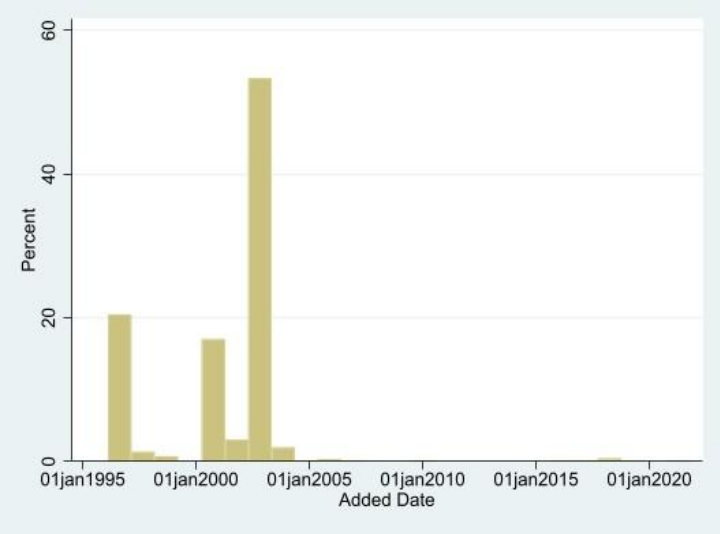


Percentage of Added Companies Across Time By Firm

Novartis AG

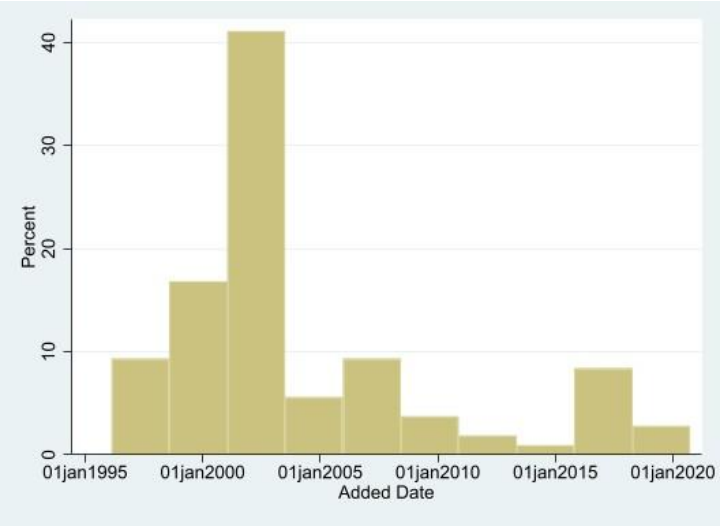


Pfizer

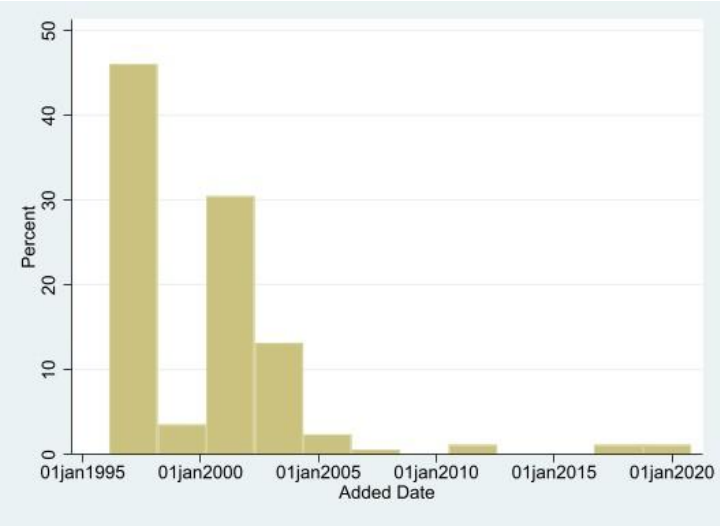


Percentage of Added Companies Across Time By Firm

AbbVie



Abbott Laboratories



Limitations with Cortellis Company Data

- Not all subsidiaries located within Company Data could be found during cross-reference
- Added Date of subsidiaries in Company Data are inconsistent with cross-referenced sources
    - Large discrepancy in data from late 1990s and early 2000s
    - More consistent in recent dates
- Potentially missing data from the last decade

Kidanewold

- Creating a database of verified mergers, acquisitions, and commercial licensing of large pharmaceutical companies in the US as well as in the world
- Using Cross-referencing approach to build a dataset by looking at sources like advertisements, press releases, news articles, and existing datasets to confirm the existence and details of the mergers, acquisitions and commercialization licensing in the drug industry

Cortellis Deals Data Overview

Deals Title

Domestic/Foreign

Principal Company

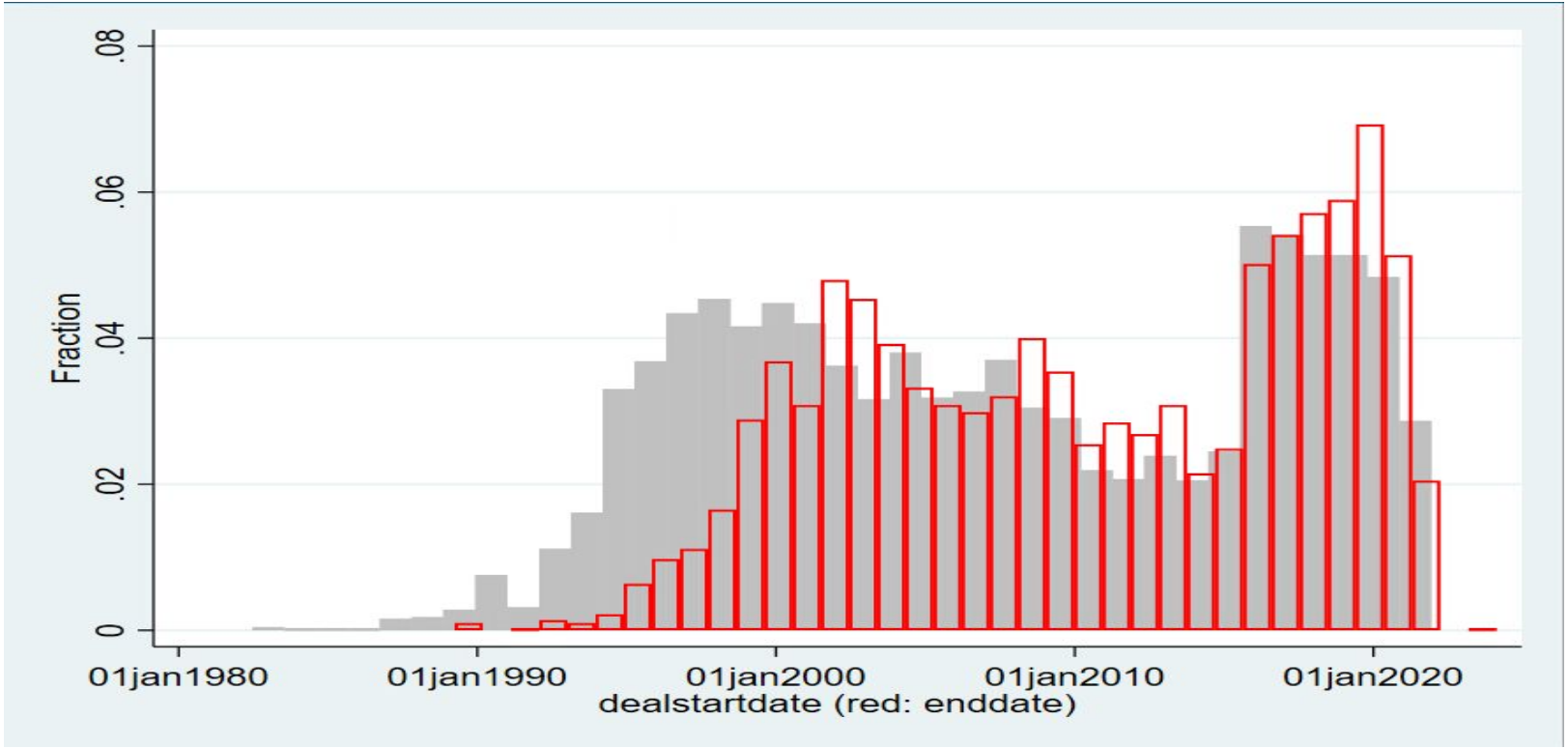
Partner Company

Agreement Type

Deal Start Date

Deal Close Date

Deal Start Date and Deal End Date



Agreement Types for Deals Data

Agreement Type	Freq	Percent
Company - joint venture	706	1%
Company - m&a	1221	2%
drug - asset divestment	1220	2%
drug - authorized generic	452	1%
drug - commercialization license	5254	6%
drug - crada	380	0%
drug - development services	4555	6%
drug - development /commercialization	14239	18%
drug - discovery/design	1968	2%
drug - early research/development	12168	15%
drug - funding	14779	18%
drug - manufacturing/supply	5128	6%
drug - screening/evaluation	1256	2%
patent - asset divestmnet	119	0%
patent - exclusive divestment	1941	2%
patent - litigation settlement	327	0%
patent - non-exclusive rights	512	1%
technology - asset divestment	326	0%
technology - delivery/formulation	1764	2%
technology - other proprietary	12094	15%
technology - target validation	435	1%
Total	80844	100%

Future Directions

- Continuing the creation of a database of all of the M&As that occurred in the last 30 years
- Project will leverage our work on manually checking these M&As to validate the quality of the database
- Use the database to run simulation exercises to ask how has large mergers that have occurred affected drug development success and speed
- Write a paper to submit to economic journals

Lessons Learned

- Advanced our fundamental understanding of the landscape of the pharmaceutical industry, particularly M&As, in the United States via exploratory data analysis
- Gained experience in statistical software like Stata that is frequently used by health economists
- Learned about careers in academia and and the process of applying and going through graduate school

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