Artificial Intelligence and High-Skilled Work: Evidence from Analysts

(by Grennan and Michaely)

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The Impact of AI Through the Lens of Security Analysts

A richly-detailed portrait of the impact of AI on security analysts:

- Different from large-scale studies
  - E.g., Babina et al. (2021) | Acemoglu et al. (2021) | Brynjolfsson et al. (2018)

- Results are aligned with our general understanding
  - The impact of AI is about re-bundling tasks of analysts
  - Both substitution and complementarity exist

- The richness of the details is instructive
  - How to think about the conceptual framework for the impact of AI?
  - How to measure relevant components when considering the impact of AI?

- What adds complexity in this context?
  - the middle rather than the extremes of the suitability for ML spectrum
  - input structure (public vs private info)
  - competition in the industry (other research teams, fintech platforms, etc.)

A Million Moving Parts

Social Media

Seeking Alpha

Crowd Sourcing

estimize

Indie AI prediction

Smart Score
OUTPERFORM
1 2 3 4 5 6 7 8 9 10

10

Equity Research Teams
[Tasks]

Heart of Science - measurement

Proxies for AI intensity:

1. {firm} Social media posts: data abundance
2. {firm} Bot-downloads of filings: computational ease
3. {research team} AI/data acquisition

The impact on task rebundling:

1. Easy-to-measure vs. hard-to-measure
2. Prediction vs. other activities

The impact on analyst career:

1. Coverages
2. Quit/leave

My comments:

1. Interpretation of social media posts
2. Alternative measures of AI
3. Heterogenous impact of AI:
    - AI-boosted vs. human-intensive research teams
    - The role of change in skill-mix demand

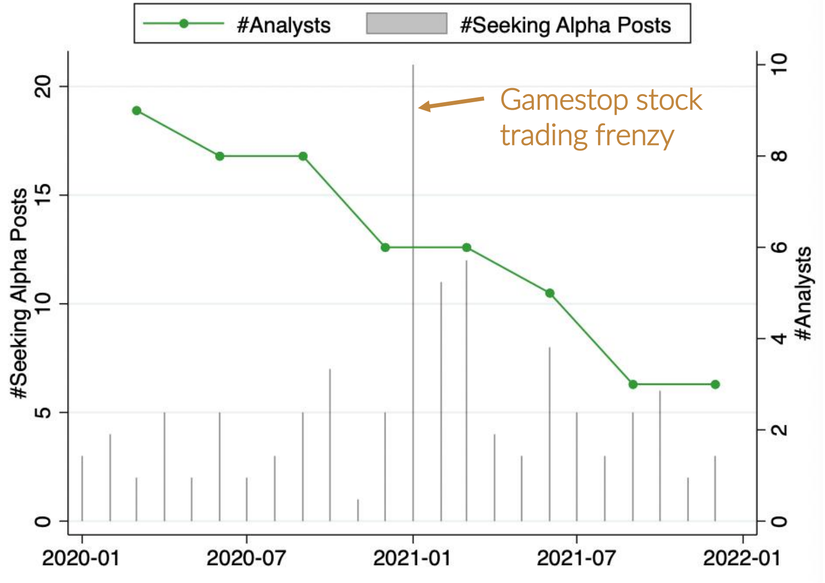
Interpretation of Social Media Posts

This paper:

- Data abundance: social media posts
- Instrumented with USA Today headline length

What else social media posts could capture?

- Retail popularity
  - Social media posts ↑ ⇒ retail popularity ↑ ⇒ sentiment > fundamental ⇒ analyst coverage ↓
  - Instrument may not help: shorter headline can drive both retail popularity ↑ and social media posts ↑



GameStop: Jan 2021 frenzy
- seeking alpha posts increase
- analyst coverage drops

Interpretation of Social Media Posts

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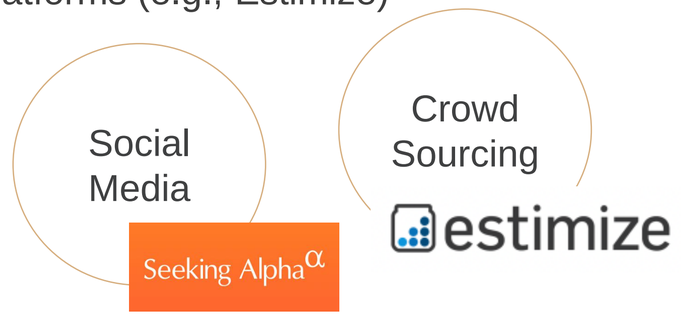
What else social media posts could capture?

- Retail popularity
- Non-AI predictions
  - Social media posts themselves involve prediction and recommendation
  - Social media posts could correlate with other crowdsourcing platforms (e.g., Estimize)
  - Literature: competition from FinTech
    - Grennan and Michaely (2021)
    - Jame, Markov and Wolfe (2022)
  - What does the documented effect capture?
    - Impact of AI?
    - Impact of competition from non-AI predictions?



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What else social media posts could capture?

- Retail popularity
- Non-AI predictions

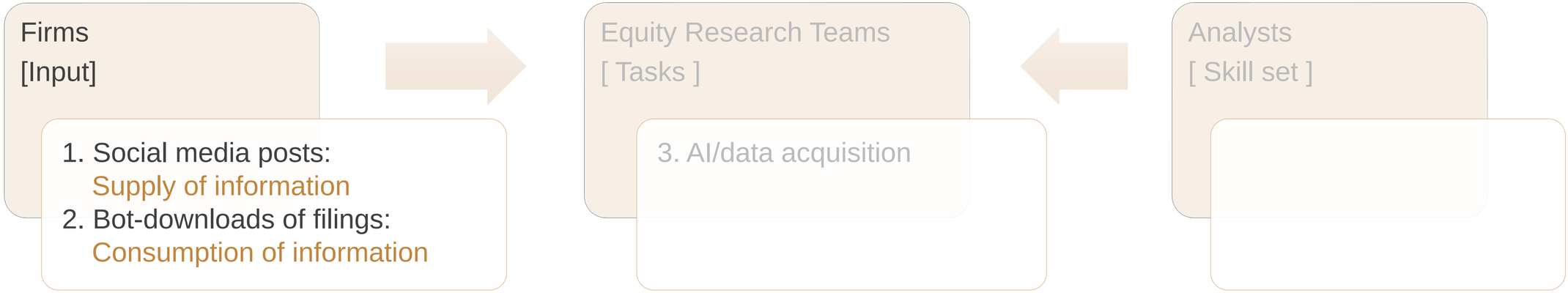
Both can lead to the decrease of analyst coverage, but through channels different from AI

- Reduce the value of fundamental predictions
- Competition from other forms of predictions

Suggestion:

- Alternative way to measure AI
- Explore hypotheses that are more AI specific

Alternative way to measure AI



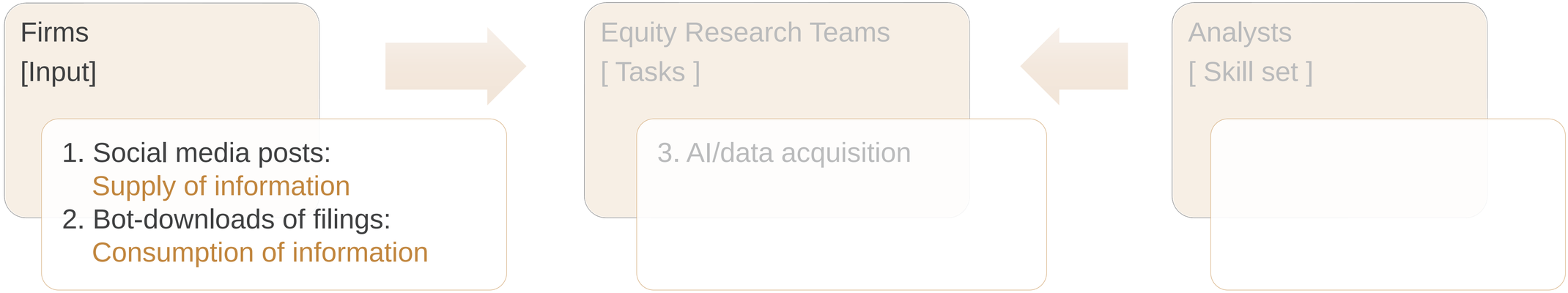
Information is only the input of AI

- In general, How AI affects analysts depends on how AI affects the cost and quality of prediction
  - The amount of information may reduce the cost of prediction
  - But not necessarily increase the quality of prediction (e.g., low signal to noise ratio, short history, etc.)

Information can also be the input of other “traditional” (non-AI) prediction methods

The impact of information supply & consumption on task re-bundling and analyst career choice may not be straightforward

Alternative way to measure AI



Suggestion:

An alternative way is to measure a benchmark improvement that can be brought by AI

i.e., benchmark improvement of AI-generated forecasts relative to the consensus

- Apply standard ML algorithm to easily accessible public information;
- Directly use readily available AI-generated forecasts: smart score, etc.

Heterogeneous Impact of AI

AI-powered vs. Human-driven teams

Data may be the “new oil”, but it still needs to be fueled by the “engine” – AI

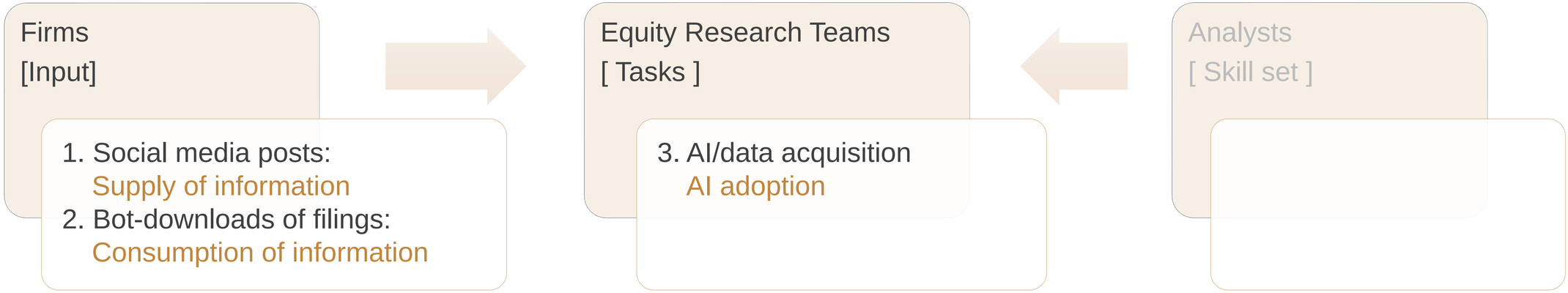
Currently these three proxies are used in parallel in the paper

The impact of data (input) on task re-bundling and analyst coverage may vary with how research teams utilize AI

- AI-powered research teams
- Human-driven research teams

Heterogeneous Impact of AI

AI-powered vs. Human-driven teams



Analyst-level displacement and stock coverage will depend on analyst's skill on AI

	Task re-bundling (research team level)
AI-powered	More complementarity - More efforts on hard-to-measure component - More communication with clients/management
Human-driven	Less complementarity

Heterogeneous Impact of AI

The Role of Skill-mix Demand

Analysts

[Skill mix]

- Data analytical skill:
  - Non-AI related
  - AI-related
- “Soft” skill
  - Industry expertise
  - Make info accessible
  - Communication

Measure skill-mix using LinkedIn “Skills” record data (Rock, 2022):

Analyst A:
Automotive | Business Strategy | Financial Analysis | Financial Modeling | Economics | Investment Advisory | Investment Banking | Equities | Commercial Rated Pilot | Instrument Rated Pilot

Analyst B:
Equities | Financial Modeling | Hedge Funds | Capital Markets | Valuation | Equity Research | Financial Analysis | Investments | Portfolio Management | Asset Management | Fixed Income

Analyst C:
Bayesian Statistics | Machine Learning | Research | Data Analysis | Python | Public Speaking | Leadership

Analyst D:
Medicine | Computational Biology | Machine Learning | Python | R | Statistical Inference | Multivariate Statistics | Deep Learning | Natural Language Processing (NLP)

Heterogeneous Impact of AI

The Role of Skill-mix Demand

Analysts

[Skill mix]

- Data analytical skill:
  - Non-AI related
  - AI-related
- “Soft” skill
  - Industry expertise
  - Make info accessible
  - Communication

AI will change the demand for analysts’ skill-mix:

- Stocks suitable for AI:
  - demand AI related skills
  - substitute for non-AI related skills
  - complement “soft” skills

How AI affects analyst coverage / quitting decision may also depend on analysts’ skill-mix:

- Covered stock suitability for AI ↑ ⇒
  - Analysts’ skill-mix dominated by non-AI skill will be more likely to be displaced or shift coverage to stocks not suitable for Ai

SUMMARY

Cutting-edge topic; Amazingly granular data; Compelling evidence

“For every complex problem, there is an answer that is clear, simple and wrong.” --- H. L. Mencken

Embrace complexity without losing clarity:

- What else social media posts could capture?
- Are there other ways to measure AI?
- Heterogenous impact of AI
    - AI-powered vs. human-intensive research teams
    - Analysts with AI skills vs. analysts without