Systematic Disagreement between Human and Machine Predictions

(extracted slides)

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@SIG-FiN

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*This is the joint work with TOKYO SHOKO RESEARCH, LTD. (TSR). Usual disclaimer is applied.

Background

- Prediction for various micro (esp., firm-level) outcomes
  - Exit (e.g., default), growth, malpractice, etc.
    - Better prediction ⇒ Better decision
    - Machine learning-based approach (ML)
  - "ML ≻ Human" on average
    - I.e., they could **disagree**

Our research question

- Any **systematic pattern** in the **disagreement**?

⇔ Useful for at least two reasons…

I. **Nature of human error** (when "ML ≻ Human")

- Firm attributes
- Individual attributes
- Organization attributes

Our research question (cont'd)

- Any **systematic pattern** in the **disagreement**?

⇔ Useful for at least two reasons…

II. **Complementing ML** (when "Human $\succ$ ML")

- Can it really be the case?

- If yes, identify the condition

What we are doing

A) Construct a ML-based prediction model

B) Measure the disagreement b/w ML & Human

C) Identify the determinants of the "*proxy*"

D) Counterfactual exercise

What we are ***NOT*** doing

A) Inventing a new algorithm

B) Studying other than enterprises

C) Studying other than credit rating

D) Causal impact of the introduction of ML score

Contribution

- As far as we know, no extant studies have explicitly identified **the determinants of human-ML disagreement**

- This is mainly because…
  - Data limitation on human prediction
  - Data limitation on the attributes of targets & “human”
  - Selection label problem

⇒ Ours Help to understand the **nature of human error** and also shed light on the **role of humans** in the digital age

Key takeaways

- On average, "ML $\succ$ Human" is the case

- Furthermore, "ML $\succ$ Human $\succ$ Predicted human"

- Still, "Human $\succ$ ML" could be the case when…
  - **i.** **Firm**:
  - **ii.** **Analyst**:
  - **iii.** **Team**:
    - ※ Confirmed by human prediction based on **"soft info"**

Thank you and comments are welcome!

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