Summary of <From Transcripts to Insights: Uncovering Corporate Risks Using Generative AI>

Zeli Chen

April 7, 2024

1. What are the research questions?

- Whether and how AI tools (GPT-based) proxies are effective at measuring firm-level risks?

2. Why are the research questions interesting?

- This study aims to bridge the gap between generative AI technology and risk assessment methodologies by examining the potential of large language models (LLMs) to detect and analyze these critical aspects of corporate risk.

3. What is the paper's contribution?

- Probe the economic usefulness of AI-powered large language models in risk assessment.
  - **Previous papers** show generative LLMs have much potential for assisting investors in analyzing complex, unstructured information(Bernard et al., 2023; Lopez-Lira and Tang, 2023; Jha et al., 2023; Eisfeldt et al., 2023; Kim et al., 2023; Chen et al., 2023).
  - **This study** shows that AI tools are effective at distilling disclosures to extract information about diverse risk categories.
- Contribute to the literature that uses corporate disclosures to construct firm-level measures of risk exposure.
  - **Existing studies** rely on topic-based bigram dictionaries
  - **This study** complement and build by adopting AI-based technology to analyze risks.
- Contribute by establishing the value of general AI for understanding complex topics like risk.
  - **Previous studies** focus on the information discussed in the processed document.
  - **This study** shows that LLMs successfully leverage their general knowledge to derive insights about corporate risks from a given context.

4. What hypotheses are tested in the paper?

- ***Hypothesis1*** GPT-based measures possess significant information content and outperform the existing risk measures in predicting (abnormal) firm-level volatility and firms' choices such as investment and innovation.
- ***Hypothesis2*** AI-generated measures of emerging risks are reflected in asset pricing, indicating their relevance and information to investors.

These hypotheses follow from and answer the research question.

5. Sample

- Quarterly earnings call transcripts from Capital IQ S&P Global Transcript database
- US firms' transcripts available between January 2018 and March 2023.
- Select reasons:
  - generating risk summaries and assessments for each risk metric is costly and time-consuming;
  - a considerable part of the sample is outside of GPT's training window;
  - this time period is characterized by significant changes in political, climate and AI uncertainty.

6. Dependent and independent variables

- ***Dependent variables1 (Implied Volatility):*** the implied volatility derived from the 90-day at-the-money options measured as of the end of each fiscal quarter.
- ***Dependent variables2 (Abnormal Volatility):*** The ratio of Post-call-RMSE and Pre-call-RMSE minus 1, where the RMSE is the root mean squared errors from the market model residuals. The Pre-interval is [-257,-6] while the Post-interval is [+6,+28].
- ***Independent variables:***

$$RiskSum_{it} = \frac{\sum_{l=1}^{K_{it}} \text{len}(\mathbf{S}(c_{it}^{l}))}{\text{len}(c_{it})}$$
$$RiskAssess_{it} = \frac{\sum_{l=1}^{K_{it}} \text{len}(\mathbf{A}(c_{it}^{l}))}{\text{len}(c_{it})}$$

where S and A correspond to the GPT-based function, cit is earnings call transcript for a company i in quarter t divided into Kit chunks.

- Some variables are used from previous studies(Engle, 2004, Loughran and McDonald (2014))

7. Regression/prediction model specification

- Using OLS with fixed effect while controls some typical firm variables, which is specific.

8. What difficulties arise in drawing inferences from the empirical work?

- GPT outcomes can be sensitive to prompt quality, and prompt engineering becomes an important starting point. Unless provided with relevant context, GPT may generate incorrect evaluations or provide random answers.

9. Describe at least one publishable and feasible extension of this research.

- Some other data may identify other risk(like ESG with social responsibility report)
- Explore which industries are more vulnerable to political, climate, AI-related risks(or other risk) and how these risks are reflected in prices.