From Transcripts to Insights: Uncovering Corporate Risks Using Generative AI

ChatGPT generates measures of corporations' exposure to risks that outperform existing measures in predicting firm-level stock market volatility and firms' choices such as investment and innovation.

If not properly anticipated, changes like government regulations, technological advancements, and climate change can mean financial ruin for corporations, who, as a result, invest significant resources in risk management. In this paper, the authors test whether recent advances in generative artificial intelligence can help companies and investors detect and analyze corporate risk.

Traditionally, researchers analyzing text-based corporate disclosures (such as conference call transcripts or annual reports) have evaluated risk by counting the presence of risk-related bigrams (a combination of two words) mentioned in the vicinity of certain topics of interest. Artificial intelligence (AI) has revolutionized this approach. Large language models such as ChatGPT can understand complex relationships within a text, incorporate the context within which relevant topics are discussed, and even make inferences using its pre-trained general knowledge.

The authors use ChatGPT to develop measures of firm-level risk exposure based on risk-related information that they extract from the earnings conference call transcripts of US firms spanning January 2018 to March 2023. They focus on political

Figure 1 · AI Risk Measures Increase Over Time Reflecting Heightened Significance of Technologies
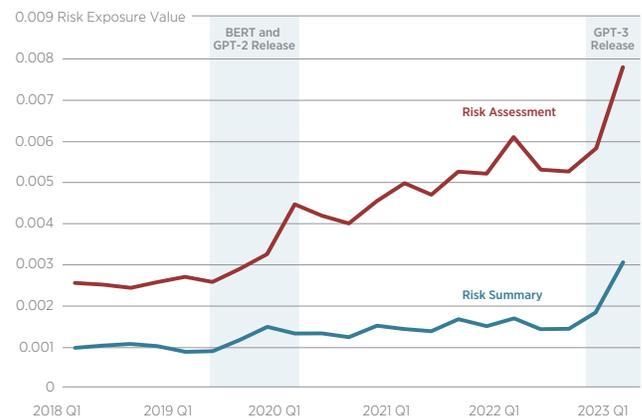
Note: This figure shows the authors' two AI-related risk exposure measures over time.

risk, climate-related risk, and AI-related risk, and prompt ChatGPT to produce generate two types of output: risk summaries, which use solely the contents of the transcripts and avoid making judgments, and risk assessments, which integrate the transcripts' context with their general knowledge and make judgments.

The authors convert ChatGPT's written summaries and assessments to quantitative measures by

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computing the ratio of the length of the risk summaries (assessments) to the length of the full transcripts, interpreting higher ratios as greater risk exposure. Finally, they evaluate how their measures compare to existing risk measures (those based on traditional approaches to text analysis) in predicting stock market volatility and related economic outcomes. The authors find the following:

- For transcripts in the authors' main sample period (those dating between 2018 and 2021), ChatGPT's measures of climate risk and political risk are strongly predictive of companies' stock price volatility, more so than measures generated by traditional text analysis.

- Political and climate risk assessments perform better than political and climate risk summaries, suggesting the value of AI-generated insights.

- These findings hold even for call transcripts that date after September 2021, which represents the period outside of ChatGPT's training window, suggesting that these results are not influenced by ChatGPT's knowledge "cutoff."

- The authors' measures of AI risk are not predictive of companies' stock market volatility during the authors' main sample period (from 2018 to 2021). This result is not unexpected given the recency of AI-related disruptions, and the authors show that their AI-related risk proxy becomes significant in explaining volatility in 2022 and 2023.

- As firms face mounting political and climate risks, their levels of investment tend to decline. This is consistent with the idea that riskier companies experience higher financing costs and are less likely to make investments. By contrast, AI risk exhibits a positive, albeit insignificant, relationship with investment that only becomes significant during the 2022-2023 period. The authors further show that financially restrained companies reduce investments when they face AI risk while others tend to increase their investment.

- Firms further adjust their behavior in response to the specific risks they are facing. They increase lobbying activity in response to political risk, green patent filings in response to climate risk, and AI-related patent filings in response to rising AI risk.

- Lastly, trading strategies based on GPT-generated risk factors consistently outperform their its benchmark indices by around 5% each year.

This research shows that generative artificial intelligence can help users obtain valuable insights about firm-level risks at a relatively low cost. It also highlights the value of artificial intelligence for interpreting unstructured disclosure texts on complex topics, like corporate risks. Moving forward, this approach may become the norm for generating useful, systematic insights from complex corporate disclosures.

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