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Interpreting Market Risks with Deep Learning Method

Jujun Huang

Binghamton Univeristy, jhuang83@binghamton.edu

**It is an on-going project, and I am still working on it.
This file only provide a brief introduction on this project.**

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Recommended Citation

Huang, Jujun, "Interpreting Market Risks with Deep Learning Method" (2024). *ICIS 2024 TREOS*. 149.
https://aisel.aisnet.org/treos_icis2024/149

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Interpreting Market Risks with Deep Learning Method

Jujun Huang, jhuang83@binghamton.edu

It is mandatory for financial institutes and large firms to disclose market risks in 10-K reports.¹ Previous studies find that this information is relevant to bankruptcy (Rawte, Gupta, & Zaki, 2018), corporate governance (Al-Hadi, Al-Yahyaee, Hussain, & Taylor, 2019), and trading volume (Linsmeier, Thornton, Venkatachalam, & Welker, 2002). Conversely, during earnings calls, as firms only voluntarily disclose information related to firm performance (Matsumoto, Pronk, & Roelofsen, 2011), there arise interesting questions regarding market risk disclosures in earnings calls: (1) how to identify market risk content in earnings calls, because there lack of standard languages to describe market risks, and (2) under what circumstances managers are inclined to discuss market risks? Are such disclosures driven by major changes in market risks, used as the scapegoat for subpar firm performance, or just tools to manipulate investors' expectations?

This project aims to make several significant contributions to the field. Firstly, it introduces an innovative approach to analyzing managers' expectations management by using "market risk" as a novel anchor. Unlike previous studies that focused on the content of earnings calls and forecast guidance (Cohen, Lou, & Malloy, 2020; Das, Kim, & Patro, 2011), this project examines how managers manipulate market expectations through external factors by language, specifically market risks. This perspective offers fresh insights into managers' behavior and firm performance. Secondly, the project employs deep learning technology to bridge the gap between written and spoken language in the finance domain. This analysis requires innovative techniques to interpret the extended meanings behind spoken language (in presentation portions of earnings calls), aligning it with the written word (in 10-K document) for a more comprehensive understanding of financial communications.

The preliminary results show a promising commitment to these contributions, utilizing both Chat-GPT and the BERT model for sentence identification. A 'Market Risk Rate' is calculated based on the proportion of sentences addressing market risk, while 'Market Risk Change' measures the similarity between consecutive disclosures in 10-K reports. Building on these, the 'Motivation' metric is developed to assess managers' intent behind market risk discussions. The main regression analysis reveals a negative correlation between standardized unexpected earnings (SUE) and Motivation, suggesting that managers discuss market risks less after positive financial outcomes. However, further segmentation by SUE levels uncovers a more complex pattern: managers in high-SUE quarters tend to increase market risk discussions, while those in low-SUE quarters reduce emphasis. This nuanced behavior highlights the strategic use of market risk communication in shaping investor expectations.

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¹ SEC require two types of organization to disclose their market risk in 10-k: (1) banks and thrift institute and (2) nonfinancial companies with market capitalizations of more than \$2.5 billion (SEC, 1997).