

Are bond price predictable?

Saurav Mawandia¹ & Sougandh Kohli¹

¹ Harrisburg University of Science and Technology

Author Note

The authors made the following contributions. Saurav Mawandia: Conceptualization, Writing - Original Draft Preparation, Writing - Review & Editing; Sougandh Kohli: Conceptualization, Writing - Original Draft Preparation, Writing - Review & Editing.

Correspondence concerning this article should be addressed to Saurav Mawandia, 326 Market St, Harrisburg, PA 17101. E-mail: smawandia@my.harrisburgu.edu

Abstract

The capital market plays a crucial role in the development of a country. The overall size of the global bond market as of 2021 is over 128.3tn. In contrast, the overall size of the equities market is 44 trillion as of 2022. However, the bond market is not much transparent compared to stock, and only a few firms try to predict the price of bonds. Different brokers can give different prices for the same bond, making it challenging for anyone to predict the bond's price based on these data. A bond is usually based on the last traded price and indicative bids and asks. Moreover, predicting the price of a bond thus becomes challenging. That is why it is essential to understand the overall market for bonds and consider the prices. For humans, it is tough to keep an eye on the fixed income market and make a decision. That is where Artificial Intelligent systems help us. Machine learning algorithms use the data and find hidden patterns to predict the correct price of a given bond. Given the data related to the fixed income market, news related to the market, and so on, we train an AI algorithm to predict the price of the given bond. It considers the details like rating, last traded price, type, and news around the bond to predict the right price for a trader to trade.

Keywords: keywords

Word count: X

Are bond price predictable?

Introduction

A bond valuation uses a yield to maturity or a zero yield curve using a few points on the par bond or Nelson Siegel parameters. The bond is valued using the settlement date and maturity date using an algorithm that can calculate the time to maturity and each coupon date. Maturity can be in years; if unavailable, a zero maturity date is used. This mode is particularly convenient for price par bonds or price other bonds on issue dates or coupon dates. Using this mode between coupon dates is difficult as the user has to compute the day count and year fraction and provide the maturity as, say, 5.3 years. Traditionally bond price was calculated using YTM(Yield to maturity) or zero yield curve. However, this approach does not predict an accurate price of a bond because it does not consider other parameters such as inflation. We have used the LSTM model to predict trade price based on the last trade price, which can be improved further to consider external factors such as inflation. Long short-term memory (LSTM) is an artificial neural network in artificial intelligence. Unlike standard feedforward neural networks, LSTM has feedback connections. Such a recurrent neural network (RNN) can process not only single data points but also entire data sequences and is also suitable for analyzing time series data.

Methods

We report how we determined our sample size, all data exclusions (if any), all manipulations, and all measures in the study.

Participants

Material

Procedure

Data analysis

We used R (Version 4.1.0; R Core Team, 2021) and the R-packages *papaja* (Version 0.1.0.9999; Aust & Barth, 2020), and *tinylabels* (Version 0.2.3; Barth, 2022) for all our analyses.

Results

Discussion

References

- Aust, F., & Barth, M. (2020). *papaja: Prepare reproducible APA journal articles with R Markdown*. Retrieved from <https://github.com/crsh/papaja>
- Barth, M. (2022). *tinylabls: Lightweight variable labels*. Retrieved from <https://cran.r-project.org/package=tinylabls>
- R Core Team. (2021). *R: A language and environment for statistical computing*. Vienna, Austria: R Foundation for Statistical Computing. Retrieved from <https://www.R-project.org/>