

Examination of using AI-based ESG-scores to predict stock prices

To reliably predict stock prices is the dream of every investor. Many different methods, with varying success, have been tried in the quest to achieve this holy grail. One method that have been popularised in recent decades is machine learning, i.e., using the power of a computer to try and find relationships between various sets of data, and the movement of stock prices. One such dataset could be the quantified ESG (Environmental, Social and Governance) performance of the relevant company.

In the period of 2020-2021, the ESG-scores provided by Sanctify Financial Technologies improved the stock prediction quality of several machine learning models. The best results were achieved when employing a Random Forest (a machine learning method) predictor and using moving averages of the ESG-scores. A trading strategy based on the predictions of this method generated returns of 60.5% during 2020-2021, compared to 42.6% for the OMXS30GI stock index.

Sanctify is a financial technology start-up based in Lund. The company generates numerical ESG-scores for a very large number of companies by using machine learning analysis on large amounts of media, such as newspapers and internet blogs. These scores can then be used by investors to create a more ESG aligned investment strategy. This thesis explores the possibility of using these scores to predict stock prices. It also explores if an investment strategy based on these predictions can achieve higher risk-adjusted returns than the OMXS30GI stock index. Excess returns are stock returns divided by the volatility of the stock returns. So in essence, we explore if the ESG-scores can lead to more return per unit of risk we are taking.

The above-mentioned results show that, yes, there is a case for incorporating ESG-scores in your investment decisions. Furthermore, the thesis concludes that the risk-adjusted returns were higher compared to the reference index. These take-aways should convince investors of the relevance that ESG has on the prices of stock in the Swedish investment landscape. If a listed company is perceived to perform well on various ESG metrics, retail and institutional investors are more likely to want to invest in the stock, and in turn, the price increases. Examples of companies with high ESG metrics could be a car manufacturer that successfully shifts sales to electric vehicles, or a service company with very satisfied employees and a positive effect on the larger community.

To achieve the results of the thesis, three machine learning methods were tested. In addition, five different sets of data inputs were created. Four of these sets contained different sets of data derived from Sanctify ESG-scores, while the fifth set did not contain any ESG related data. 15 models were then created, one for each combination of machine learning model and input data set. The results of all models were studied and compared after using their prediction to simulate stock trading. Conclusion could then be drawn regarding the performance of the different input data sets, and in extension, the usefulness of the Sanctify ESG-scores.