

A Study on News Sentiment and Stock Return

Introduction

This is the second report in a series of research that study the use of alternative data in financial market investment. In part one, we have looked at how MYEG's share price moved with its news sentiment in the forms of charts. In this second report, we will examine the relationship between news sentiment and stock return. Does a company's stock return correlate with its news sentiment? If yes (a positive relationship is hypothesized), can we develop a model to predict stock return using news sentiment?

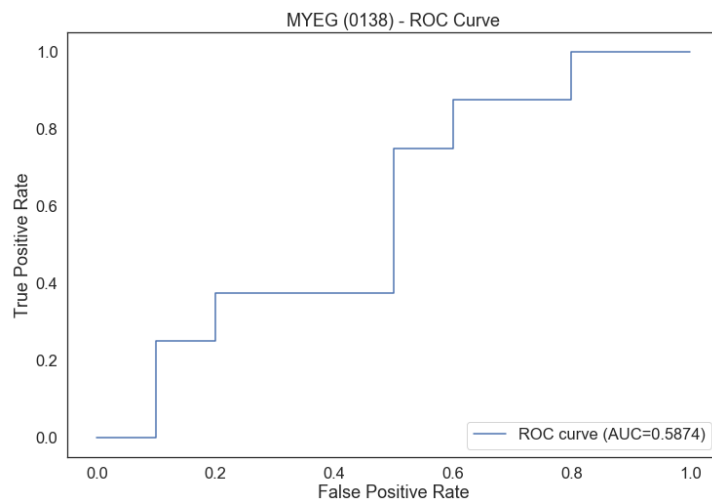
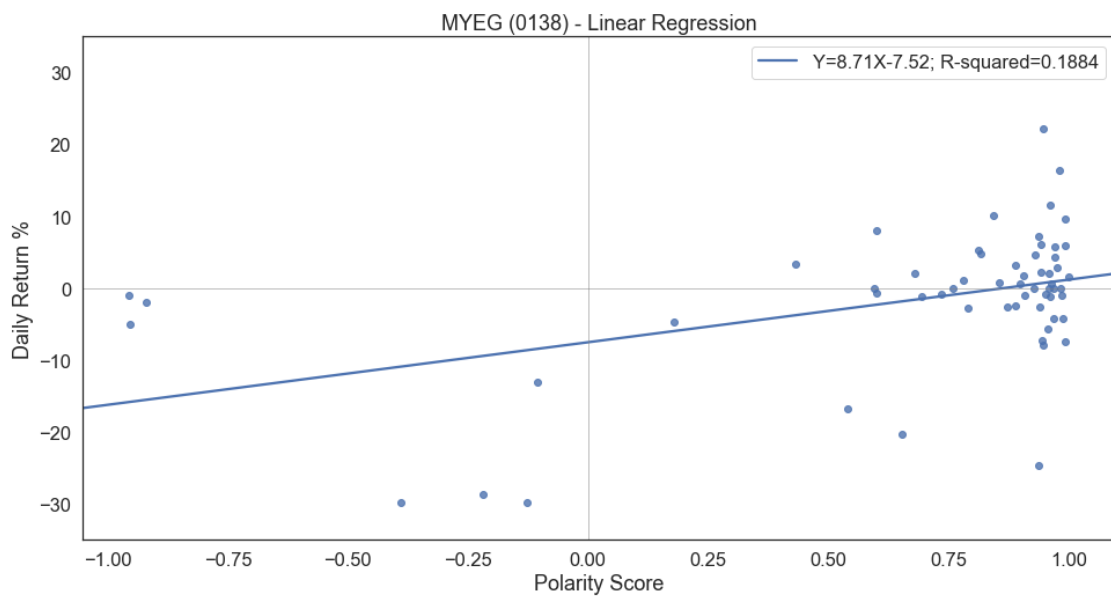
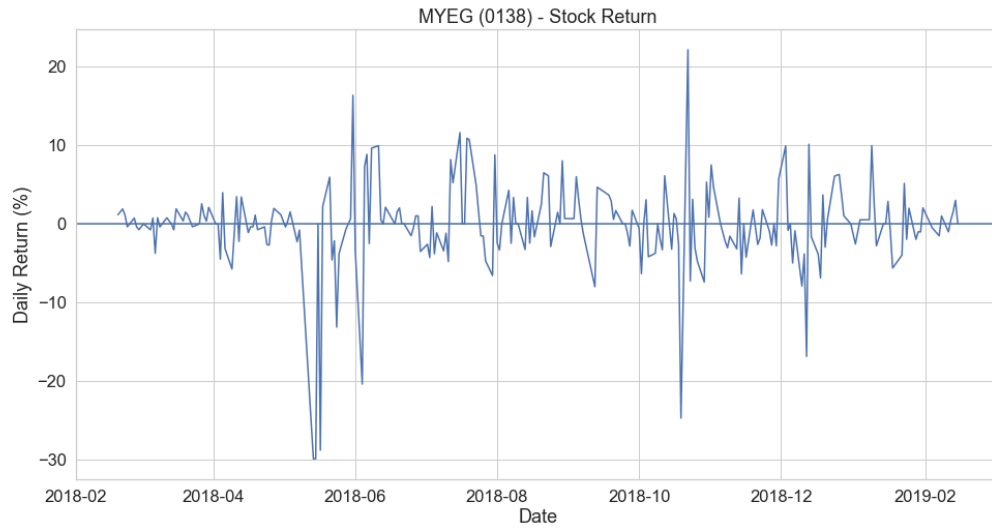
Methodology

My EG Services Bhd (MYEG) (Stock code: 0138) is chosen as the subject company. For stock return, the daily return is used which is calculated by comparing the previous day's closing price with the current closing price and converting the difference into a percentage value. The daily return was calculated for a period of one year from Feb 2018 to Feb 2019. To calculate correlation, only the daily returns for trading days where there were polarity scores were used. Then, a linear regression model was fitted using daily polarity score as feature (X) and daily return as target (Y).

For prediction, the data was split into train (70%) and test set (30%) where the train set was used for model development and the test set for model evaluation. The daily return (target to predict) was transformed into a categorical variable with two classes i.e. positive return and negative return. A logistic regression model was developed as a classifier to classify between positive and negative return using polarity score. Due to imbalanced classes in this dataset where the positive class significantly outnumbered negative class by 53:7, accuracy alone is not the most appropriate measure to evaluate the performance of the classifier, other metrics such as precision, recall and AUC-ROC were also used.

Findings

- For the 60 trading days where there were news sentiment recorded, the daily return ranges from +22.12% to -29.84% which are very close to the $\pm 30\%$ daily threshold limit set by Bursa Malaysia. The mean daily return is -1.43% with standard deviation of 9.86%, which shows that MYEG is a volatile stock with big swing in prices.
- The Pearson correlation coefficient calculated is 0.4340 which shows that there is a moderate positive relationship between polarity score and stock return. This means that when the news sentiment is positive, the stock return is likely to be positive and vice versa, which confirms our initial hypothesis.
- The linear regression model fitted has a R-squared of just 0.1884 which means that polarity score only explains about 18.84% of the variability of stock return. This indicates that our single variable model does not fit the data very well, there are likely other variables that better explain the variation in stock return.
- The logistic regression model developed to predict stock return has a test set accuracy of 44%, precision of 38% and recall of 38%. The mean accuracy using 5-fold cross validation is 55%, which is barely distinguishable from chance. The AUC-ROC only performed marginally better at 0.5874 or 58.74%. Overall, the performance of the classifier is considered poor. Thus, it indicates that polarity score or news sentiment is not a good predictor of stock return for MYEG.
- Nevertheless, the limitations of this research in the forms of small sample size and short study time frame mean that drawing any conclusive findings would be difficult. As a matter of fact, the intention of this research is not to draw any conclusion, but rather to showcase what's possible with the use of news sentiment, or alternative data in general, in financial market investment.
- Lastly, this research could be replicated to other stocks or be improvised by collecting larger sample size over longer time frame to generate insights that could be beneficial to investors in pursuit of alpha.



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