The Shift of People's Shopping Habit During Coronavirus Disease (COVID-19) Pandemic

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Introduction

Due to the current world-wide Coronavius pandemic, the impacts on the change in people's shopping habits were manifest. Indeed, such an epidemic has shifted the amount of people's shopping routines to more convenient online shopping, supporting the rise of the e-commerce industry. With the help of the internet, the e-commerce industry becomes a fast-developing area, notably under the Coronavirus pandemic. Thus, in this analysis, the current and further impacts of Coronavirus on people's shopping habits from the stock perspective are examined since the enterprise market data is not public. The hypothesis of this analysis was whether the COVID-19 pandemic had an impact on people's shopping habits.

Analysis

Daily stocks of six representative companies from three different countries, Canada, China and the US, were chosen to analyze daily new cases of coronavirus in the country of each company. After examining normality tests, the data do not satisfy assumptions for simple linear regression, so the generalized linear model was chosen. For pandemic data in China, we used the Poisson family after model comparison. From the analysis, all companies showed a statistically significant impact on COVID-19 pandemic, especially companies in Canada and the US. For example, every one-unit increase in the daily new cases in Canada will increase 2.906 units of the Shopify stock.

Forecast

Forecasting each companies' stock closing prices in 90 days by using the past five years closing price time series is a method to see their future performances, provided that the current circumstances of COVID-19 pandemic. Since the stock prices are mostly nonstationary, the Autoregressive Integrated Moving Average (ARIMA) model is used to forecast each companies' stock closing prices. The order of (p = 1, d = 1, q = 0) gives the smallest Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC). The stock time series from 2015-06-01 to 2020-03-01 are used as training data, and the time series from 2020-03-01 to 2020-06-10 are used for testing. Plots generated in the source Python code have shown the validation for this model. Therefore the ARIMA(1, 1, 0) model is used for forecasting purposes. According to all the forecasting plots, all companies that are analyzed appear to have upward trends with wider upper 95% confidence intervals in forecasts in the next 90 days. Even though the new cases in these three countries have decreased recently, it still shows slightly better performance than now for each company in the future forecasts.

Conclusion

As Shopify Inc. took over the Royal Bank of Canada as the most valuable company in Canada during COVID-19 pandemic[1], online shoppers boosted the online shopping industry. COVID-19 may have already changed more people's shopping habits as one of the social impacts. Fiscal policies, monetary policies, markets, and some other factors could affect the stock market due to its complexity. This forecast only gives an idea of how the e-commerce industry performs in the stock market in the near future, which reflects that, to some degree, online shopping would become more popular in the future as a further impact of COVID-19.

[1] From "Shopify Takes Displaces RBC to Become Canada's Most Valuable Company" by Ian Vandaelle, *BNN Bloomberg,* May 6, 2020. (https://www.bnnbloomberg.ca/shopify-displaces-rbc-to-become-canada-s-most-valuable-company-1.1432436)