E-commerce Industry Performance During Coronavirus Disease(COVID-19) Pandemic

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Analysis

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        Pearson's product-moment correlation

data:  joined_SHOP$total_cases and joined_SHOP$SHOP.Close
t = 21.841, df = 102, p-value < 2.2e-16
alternative hypothesis: true correlation is not equal to 0
95 percent confidence interval:
 0.8665446 0.9365353
sample estimates:
     cor
0.9076573
```

```
Call:
lm(formula = SHOP.Close ~ total_cases, data = joined_SHOP)

Residuals:
    Min      1Q   Median      3Q      Max
-130.120  -32.446    7.127   34.216  105.316

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept) 4.379e+02  6.545e+00   66.91   <2e-16 ***
total_cases 4.019e-03  1.840e-04   21.84   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 54.74 on 102 degrees of freedom
Multiple R-squared:  0.8238,	Adjusted R-squared:  0.8221
F-statistic:   477 on 1 and 102 DF,  p-value: < 2.2e-16


             Df  Sum Sq Mean Sq F value Pr(>F)
total_cases   1 1429143 1429143     477 <2e-16 ***
Residuals   102  305587    2996
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

There is a very strong positive association between Shopify's stock data and the total confirmed cases in Canada. Using a linear relationship to predict the average of Shopify's stock data for a given total number of cases with a regression line.

GLM Analysis

DATA: COVID-19 daily confirmed new cases in the US, Canada, and China were analyzed with chosen e-commerce companies' stock prices in each country.
- Stocks:
  - 1. China: JD.com, Inc. (JD), Alibaba Group Holding Limited (BABA), Pinduoduo Inc. (PDD)
  - 2. Canada: Shopify Inc. (SHOP)
  - 3. US: Amazon.com, Inc. (AMZN), eBay Inc. (EBAY), Walmart Inc. (WMT)
- Time range: from Dec 31, 2019 to Jun 1, 2020

HYPOTHESIS: whether COVID-19 has an impact on people's shopping habits to online shopping.

Country	Companies	Estimates	Incidence Rate Ratio	P-value
Canada	SHOP	2.906		<0.001
China	JD	0.176	1.19	<0.001
	BABA	0.105	1.11	<0.001
	PDD	-0.416	0.66	<0.001
US	AMZN	43.43		<0.001
	EBAY	-1796.90		<0.001
	WMT	860.70		<0.001

- Generalized Linear Model (Poisson family was used for data in China)
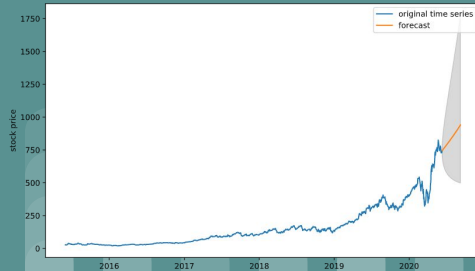- All companies showed a significant impact on COVID-19 pandemic, especially companies in the US
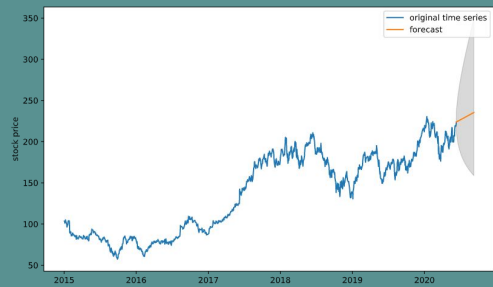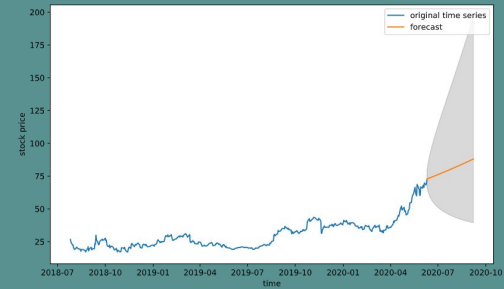
Forecasts

JD

BABA

PDD

AMZN
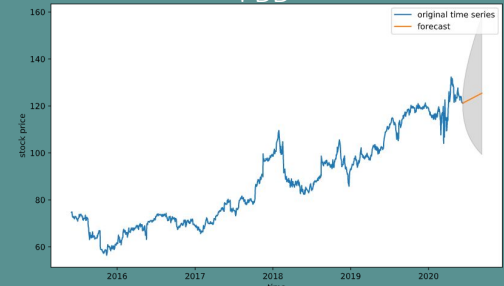

EBAY

WMT
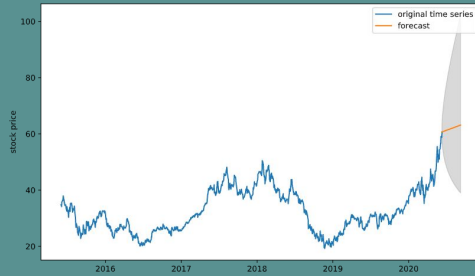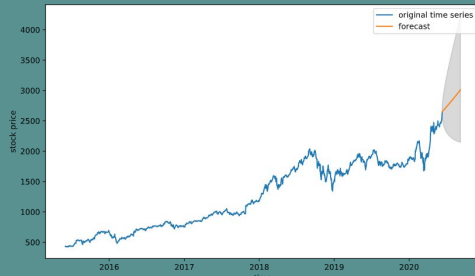
SHOP

In the next 90 days, all companies appear to have upward trends in closing price with a wider upper bound in 95% confidence interval, given the current COVID-19 impact. Presumably, COVID-19 would change people's shopping routine permanently.