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CSE 6242 Final Project Team 071

Vehicle recall event have meaningful implications for stakeholders and investors of the automobile industry, but current studies produce conflicting results

We aim to determine whether recalls have an impact on stock price and volatility, and whether insider trading plays a role

Approach & Experiments

A **Do Recalls affect Stock Price?**

B **Do Recalls affect Stock Volatility?**

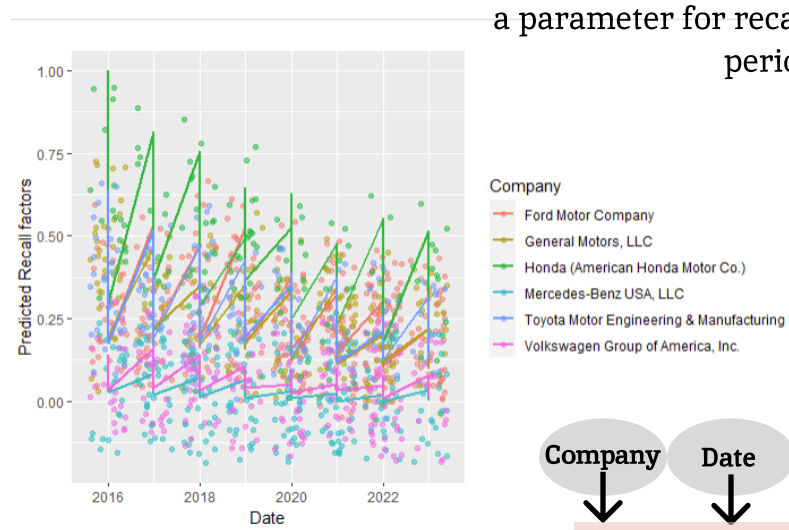
C **Is Recall Announcements' impact smoothed out by early insider trading?**

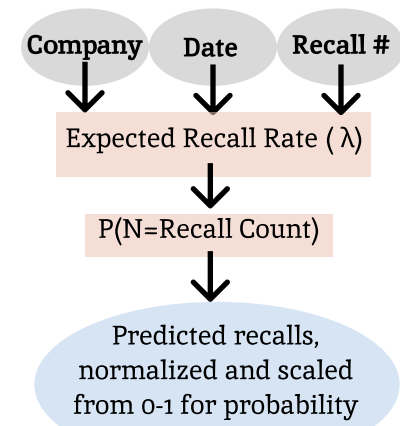
- Using 7 different technical indicators for stock price prediction
- Studying 6 different companies across 3 Int. Markets (Ford, Volkswagen, Honda, Toyota, GM, Mercedes
- Constructing two different models with and without recall indicators

Recall Probability Method

Probability Mass function (PMF):

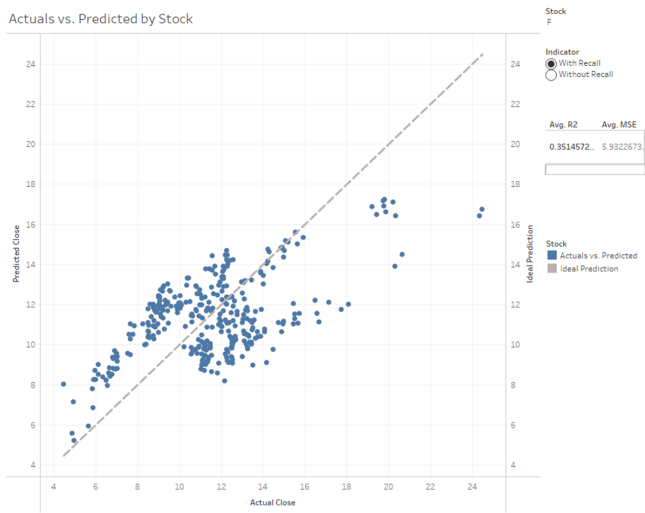
$P(X = x) = (e^{-\lambda} \lambda x)/x!$, where λ is a parameter for recalls over a period of time





A Recalls & Price?

- Built 2 regression models
  - Baseline with 7 technical indicators
  - 7 indicators plus the recall indicator
- Assessed impact on the predictive accuracy (R2) and performed statistical tests (F-statistic and p-value) to determine the significance of including the recall indicator

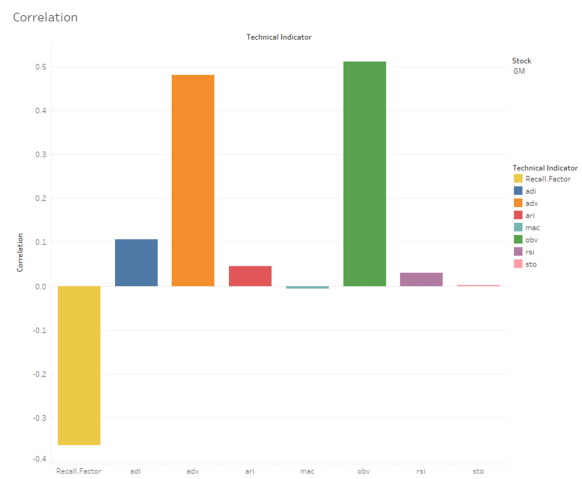


- Including the recall indicator improved predictive power of all but 2 models
- Other factors (market sentiment, brand perception) might reduce influence

Recalls have a statistically significant impact on stock prices

B Recalls & Volatility?

- Calculated Pearson correlation coefficients between the 8 indicators for each stock and their respective 30-day rolling standard deviation
- Evaluated correlation coefficients based on absolute and relative values
- Compared recall correlation coefficients with those of the 7 baseline indicators

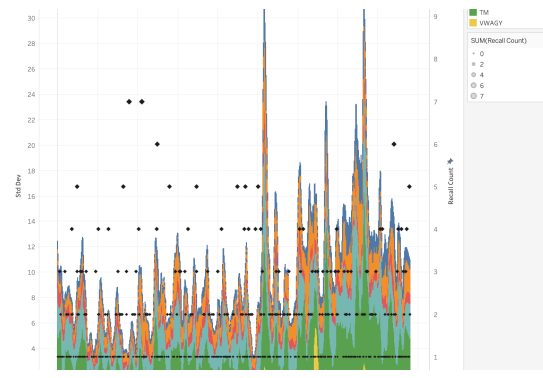


- The recall factor has a negative correlation with volatility (5 of 6)
- Reduced variance may moderate the influence of lower returns during periods of high recall probability

Recalls reduce the variance of stock returns

C Insider Trading?

- Predicted 30-day rolling standard deviation for the next 30 day period
- We used the pmdarima.auto_arima() function to do a stepwise search to find the best possible parameters p, d and q



- AIC of the six models negative: [-8000, -2000]: strong models!
- ARIMA model was consistent with and without recall data, indicating there was no insider trading

Insider trading is not a factor in stock's response to recalls