Abstract
This research study proposes to measure the volatility (abnormal movement) of stock prices in the passenger airline industry of the United States in the period 2011 to 2017. After coming out of the recession, the financial markets have witnessed a turbulence in crude oil prices. Since jet fuel is highly correlated with crude oil and forms almost 40% of a typical airline’s operating expenses, it is pertinent to study the effect of these fluctuations in oil prices in one of the main components of the transportation sector i.e. the aviation sector. The researcher used the market model proposed by Fama, Fisher, Jensen, and Roll (1969), which eventually led Professor Fama to win the Nobel Prize in economics in 2013. This paper studies the fluctuations by using a 90-day sliding window to measure the sensitivity of the relationship of airline stock returns and the overall markets. The preliminary results of this study show that the airlines considered generally possess a beta greater than 1 primarily due to the volatility in crude oil prices. This extreme volatility proves the whole sector remains prone to fluctuations in input prices.

Introduction
Traditionally, the airline industry is not fancied by investors because of the unpredictable input prices for the industry. One of the main components of the cost structure is jet fuel prices, which are closely correlated with crude oil prices. Stable jet fuel prices imply more predictable profit margins for airlines, which are otherwise scampering for fuel hedging. Major airlines, which have national presence such as American Airlines, United Airlines, Delta Airlines, and Southwest Airlines, are greatly affected by these fluctuations. One way to measure this is by calculating the index of volatility of their stock returns by using the market model.

Method
To complete my research, I looked at the following:
- Downloaded stock prices from Yahoo! Finance
- Calculated stock returns
- Calculated the measure of volatility using the market model, which states that: $R_{it} = \alpha_i + \beta_i R_{mt} + u_{it}$
- Here $R_t = \frac{P_t - P_{t-1} + D_t}{P_{t-1}}$
- $\alpha_i$ is the intercept obtained from the market model
- $\beta_i$ is the slope parameter of the measure of the change in stock returns as a function of market returns obtained from the market model above
- $u_{it}$ is a measure of unexpected stock returns, which are not explained by the parameters of the market model
- And $P_t$ is the stock price of the company on day ‘t’; $P_{t-1}$ is the stock price of the company on day ‘t-1’; $D_t$ is the dividend paid by the company on day ‘t’

Results and Discussion
- Volatility of the beta of airline stocks: Figure 1 shows the fluctuations in crude oil prices. After remaining steady for a period 2011 through end of 2013, oil prices rose until 2017
- $\beta$: From figures 3-6, it can be observed that that the $\beta$ for the stock fluctuated between 0.6 (UAL, 2012) and 2 (UAL, 2017).
- $\beta$ for all these stocks showed a weak positive correlation with time.

Conclusion:
- Airline stocks are volatile. Their $\beta$ is usually greater than 1, which demonstrates their riskiness and potential for reward to an investor. This possibly interested billionaire Mr. Buffet into these stocks.
- Airline stocks are vulnerable to news, because traveling on airlines is influenced by two categories of travelers – the affluent business travelers and the leisure travelers. The latter is deeply affected by business cycles, which may contribute to the values of $\beta > 1$ especially during downturns.