Probabilities and Statistics Project

Report written by:   
 -Achille Mascia   
 -Aymeric Moulin  
 -Alexandra Tardif aft2119

For our report, we selected 10 stocks in the American automotive industry. We want to give clients an overview on relations between the automotive stocks and the evolution of the market. First, we decided to plot log-returns of the different stocks and to do some statistical analysis on the data. Then, we compared those log-returns to the markets one, to find if there exist a correlation between the market evolution and the automotive industry evolution.

# Data Set

Our data set consists of the daily opening and closing stock prices of the 6 most influential automotive industries in the United States and 3 index stocks. We decided to focus on automotive industries which are part of the American Stock Exchange, to make sur of the consistence of our data set. Also, we selected the data sets of crude oil, S&P500 and Dow Jones in order to be able to make our statistical test. The stocks and the companies chosen are:

-Toyota  
-Ford  
-General Motors  
-Honda Motors   
-Tesla  
-Fiat Chrystler  
-S&P 500  
-Dow Jones  
-Crude Oil

# Project Objectives

We chose to focus on the automotive American financial market, to get to clients a larger view on the evolution of the market. In fact, the automotive industry market is known to be very unpredictable, as we have seen with the 1930’s crisis. However, it is a flourishing market, where a lot of investors constantly try to maximize their profit, not regarding the great risks they are taking. Recently, the American automotive market has marked an impressive growth, as it has completed its 7th growth year, a record for this market. The objective of this report is to help investors decide where and when to invest their money. To assist the decision making, we investigated some questions on our data set.

First of all, we will do comparisons between the different log-returns of the different automotive industries, in order to help the client to have a quick view on the industry. We expect to show to the clients the tendency of the different stocks, to help them make up their mind. Then, we will try to determine if there exists relations between prices among the different years using statistical tests. To do so, we are going to plot the log-returns of tomorrow in function of the log-returns of today.

Furthermore, we want to test statistically if there exists a relation between the evolution of the market (through S&P 500 and Dow Jones), in order to know when clients need to invest, compared to the evolution of the market. This can be a good indicator to be certain of the time clients should start investing.

Finally, we want to determine if a relation is possible between the automotive industry market and the evolution of crude oil prices among the years. Then, we might see a sort of tendency between the evolution of crude oil and the evolution of this market, so that it could give an indication, for investors, to have an idea about the right time to invest, according to the crude oil exchange.

# Analysis

Test: return du mois par rapport au mois précédent. P-value + intervalle de confiance  
Test : relation entre SP500 et automobile : test de corrélation (Pearson)  
Test : relation entre pétrole et automobile : test de Pearson

Mettre un onglet en plus : log return avec test statistics