Computer Homework 3
Market Model, Abnormal Return and Event Study

Excerpt CNBC
https://www.cnbc.com/2018/04/27/t-mobile-sprint-merger-near-value-at-26-billion.html

Sprint and T-Mobile agree to $26.5 billion, and John Legere will be chief, sources say
Alex Sherman | @sherman4949
Published 4:34 PM ET Fri, 27 April 2018

T-Mobile has signed a merger agreemengt Sprint that will value Sprint at about $26.5 billion, people familiar with the matter told CNBC, and will place T-Mobile's chief in the top job.

The all-stock deal will be announced on Sunday, said the people, who asked not to be named because the negotiations are private. The transaction values Sprint at 0.10256 per T-Mobile share, or $6.62 a share based on T-Mobile's Friday closing price of $64.52, said the people.

……..

A deal announcement doesn't mean a merger will actually happen. Combining the third- and fourth-largest wireless U.S. providers in a market with only four participants — Verizon, AT&T, T-Mobile and Sprint — could be a hard sell for U.S. regulators. AT&T attempted to buy T-Mobile in 2011, only to have regulators block it on anti-competitive grounds.

Please use the approach in our class to analyze the cumulative abnormal returns (CARs) of T-Mobile, Sprint, Verizon, and AT&T. The attached Excel file contains the historical price data of T-Mobile, Sprint, Verizon, AT&T, and S&P500 index levels.

1. (35%) Compute daily simple returns, $r_t = (P_t - P_{t-1}) / P_{t-1}$, of T-Mobile, Sprint, Verizon, AT&T and S&P500 index (^GSPC) levels. Please use market model ($r_{it} = \alpha_i + \beta_i r_{mt} + \varepsilon_{it}$ where r_{it} is firm's daily return and r_{mt} is daily market return) to estimate the alpha and beta coefficients of T-Mobile, Sprint, Verizon, and AT&T before announcement. The estimation period (estimating market model parameters) begins 126 trading days before the initial announcement (2018/4/27) and ends 21 trading days (2018/3/28) before the announcement. Report your regression results.

2. (15%) Compute the abnormal return on each day. Report the abnormal returns from (-20) to +20 days relative to announcement date.

3. (35%) Please compute the cumulative abnormal returns (CARs) from -20 to +20 days relative to announcement date (i.e., 20 trading days before announcement to 20 days after the announcement) and plot them on a time chart.

4. (15%) Briefly explain your findings.