*Report*

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Advanced Methods in Quantitative Finance

For the exercise I used Clayton and Gumbel in Matlab. For the Data I used stock data from twelve S&P 500 companies. Four companies each from the sectors of aeronautic and defense (Boing, Lockheed Martin, Northrop Grumman, General Dynamics), media (CBS, Comcast, Time Warner, Viacom), and oil exploration and equipment (Devon Energy, Occidental Petroleum, Marathon Oil, ConocoPhillips). The data includes the daily stock returns of these twelve companies from January 2006 to December 2015, equaling ten years of data 2517 data points for each firm.

Both Copulae show similar results regarding the correlation of the returns of the companies. Especially the Oil exploration companies have a relatively high level of interconnection with a tau value between 0.4 and 0.5 in the Clayton and 0.5 to 0.6 in the Gumbel. The media companies are also more correlated with enterprises of the same sector with Viacom and CBS having the lowest correlation in the group with 0.36 (Gumbel) or 0.27 (Clayton). In the aerospace and defense sector a similar pattern can be seen with exception of Lockheed Martin which is relatively independent of the other companies with a maximum correlation of about 0.06 in both Copulae.