Project Progress Presentation-Group 3

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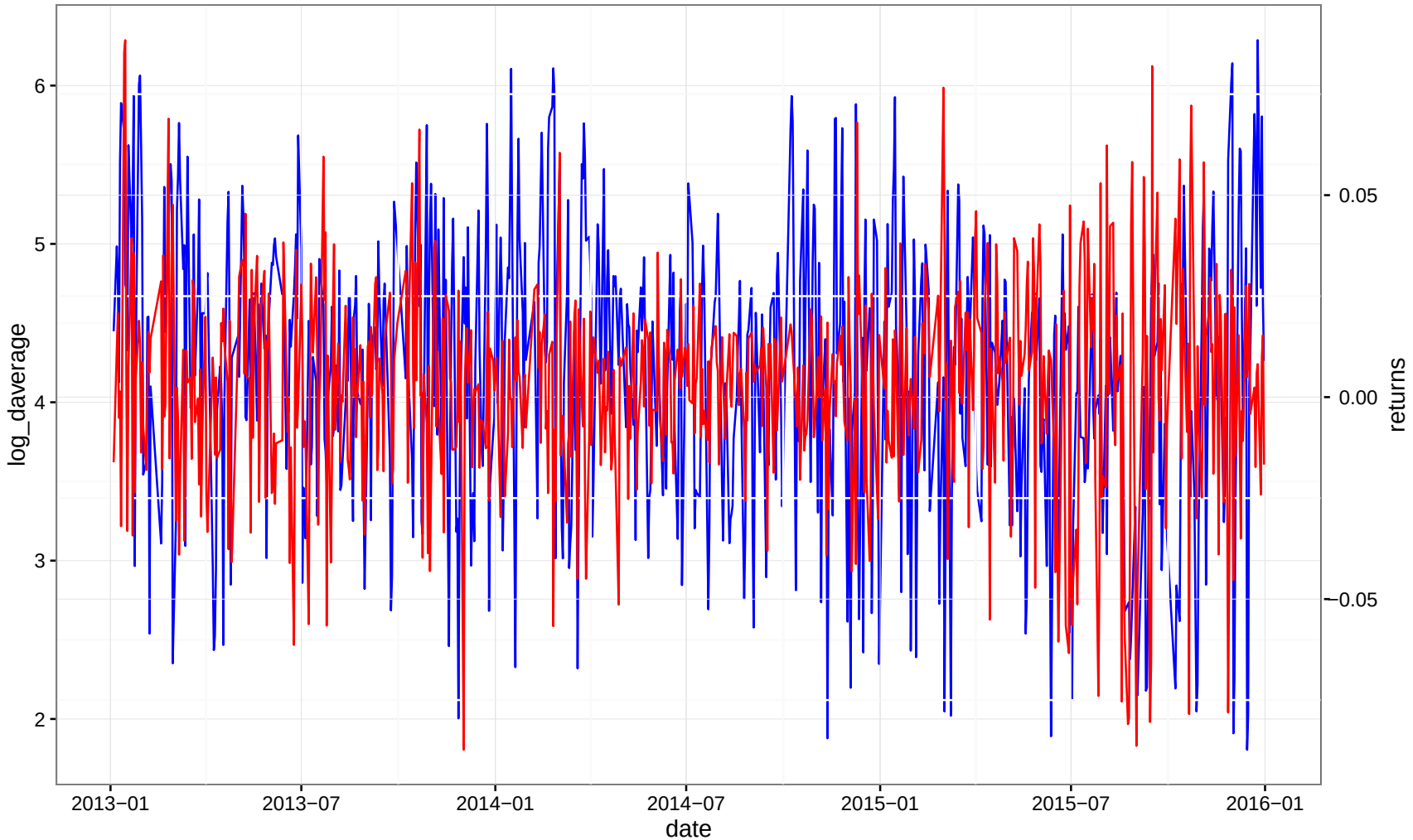
Introduction

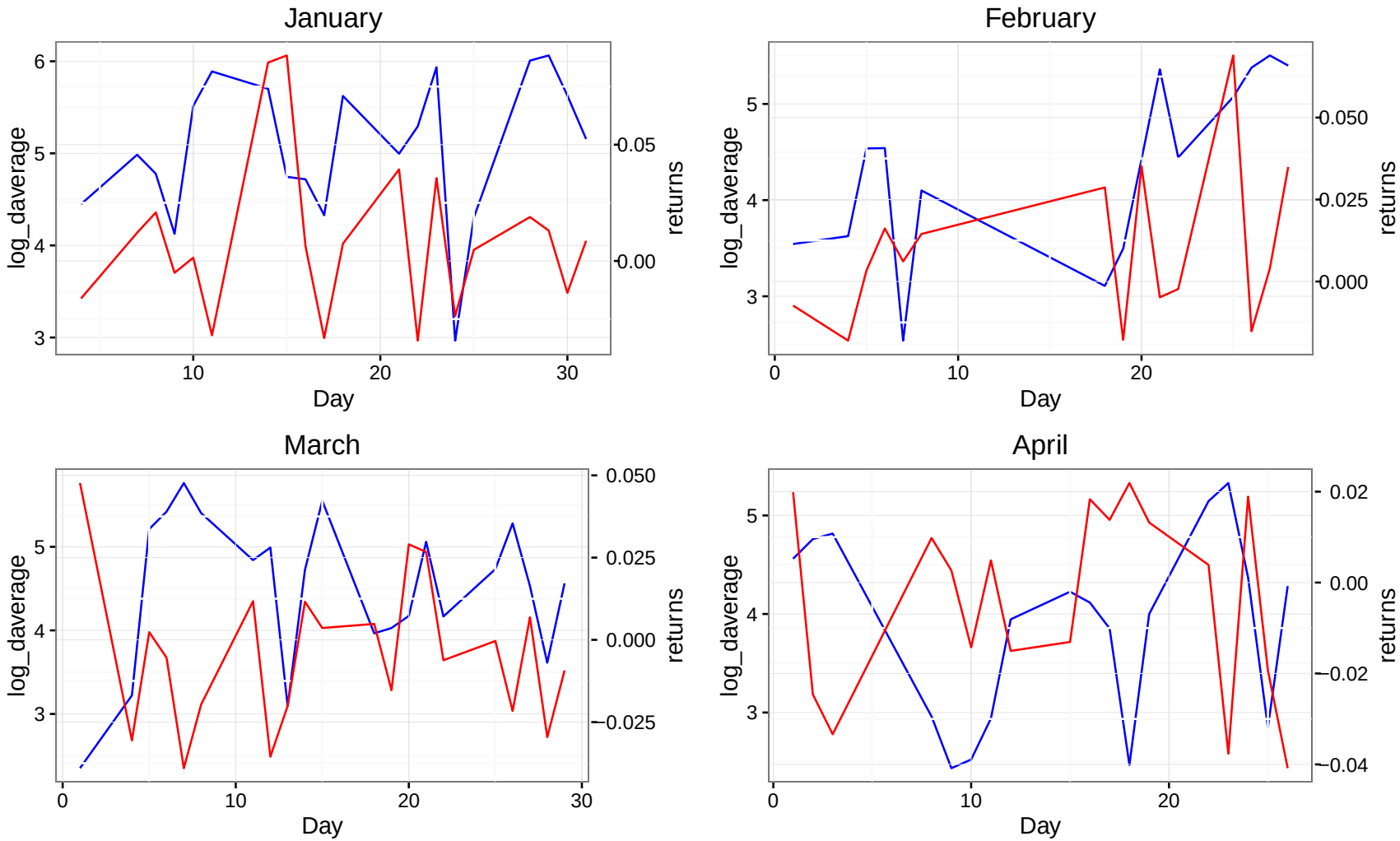
Since 2013, shares in environment-related companies has been gaining momentum on Chinese stock market. The China Security Index Company created a **PM2.5-related industrial average** for continuous attention on the high-tech environmental companies' stock such like air quality instrumentation, filter presses, and separators. And the government issues specific policies which are beneficial to high-tech environmental companies.

Thus, we are keenly interested in how the air quality affects the stock of those companies.

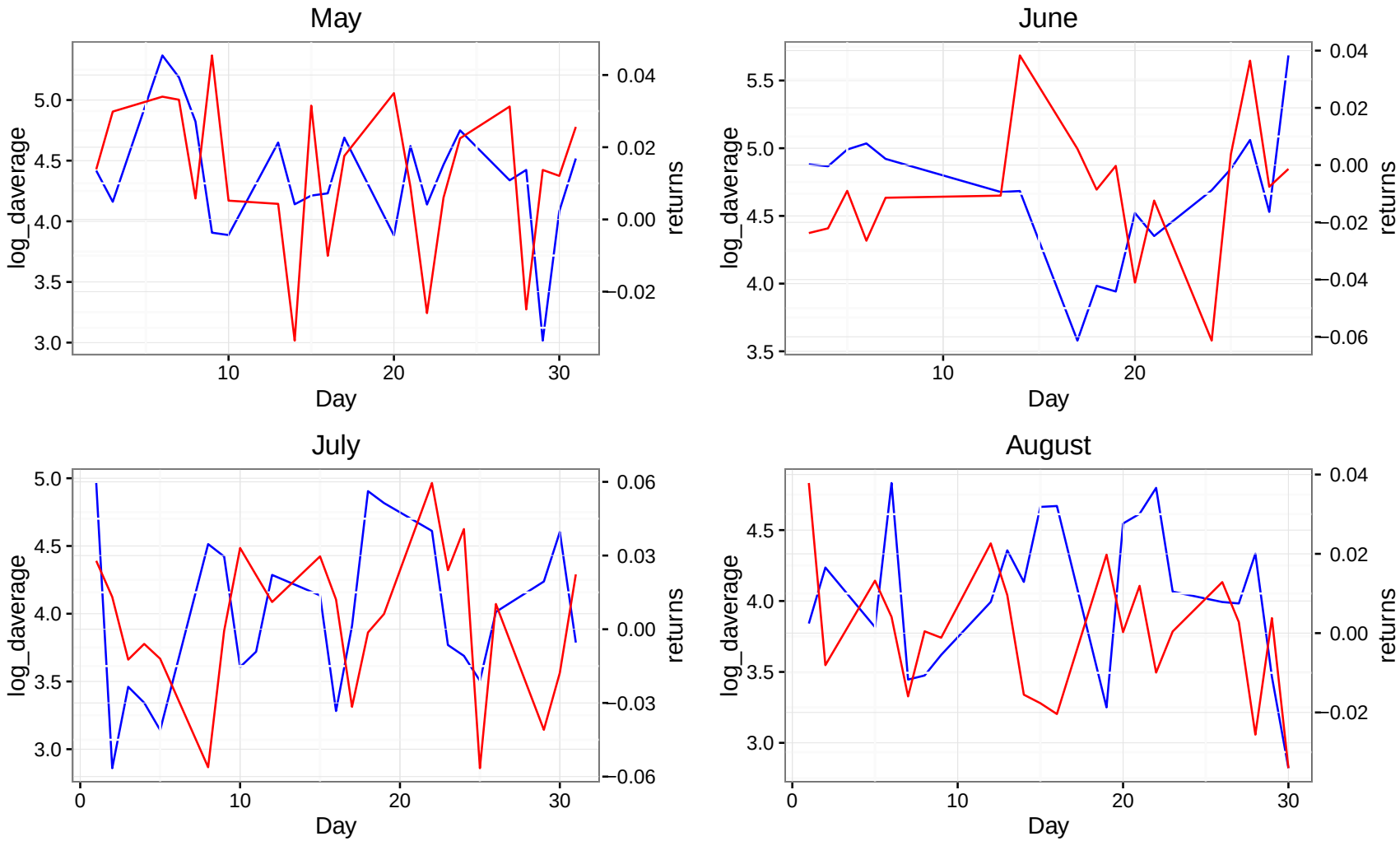
Time-series Plot (blue: log_daverage; red: returns)



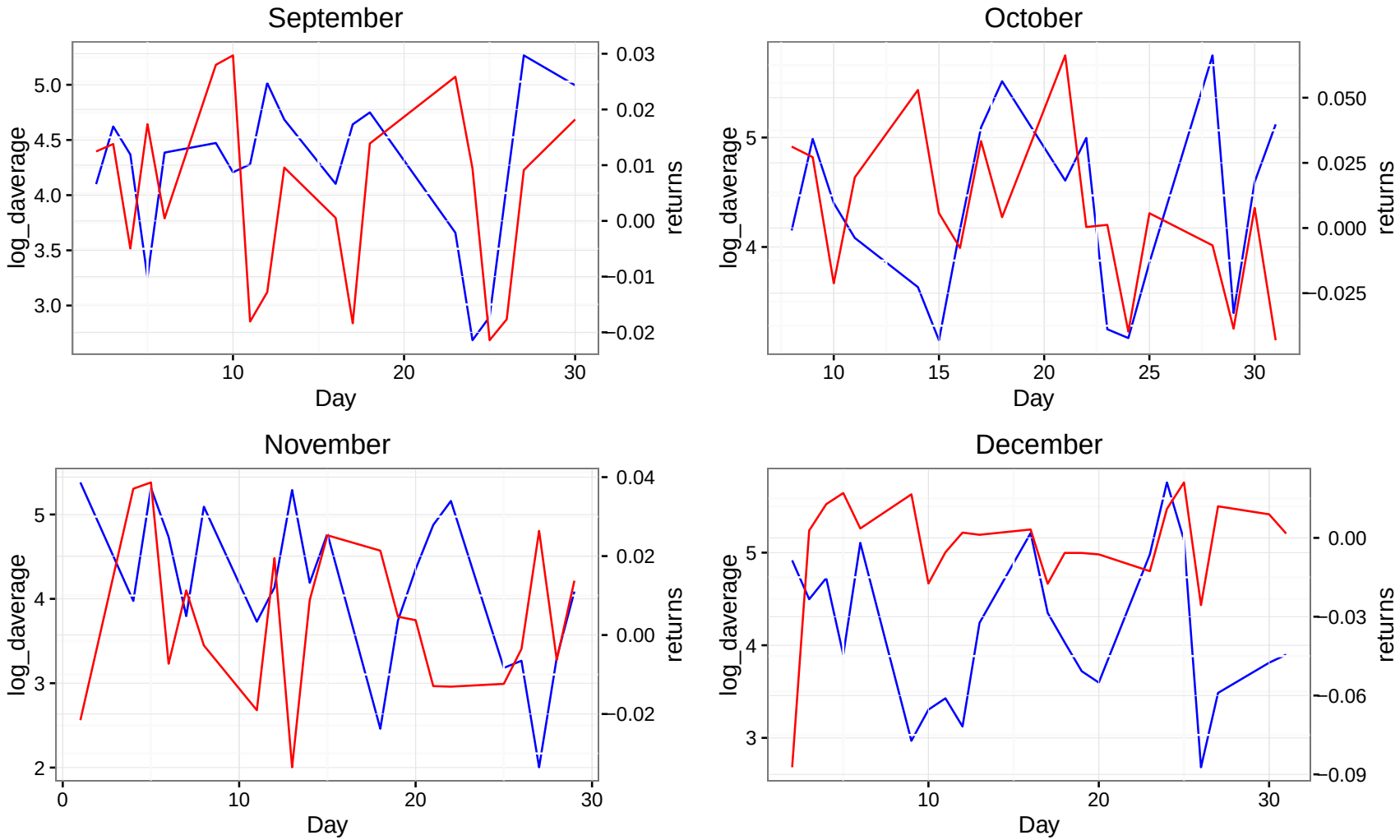
Time-series Plot for Year 2013 (January-April)



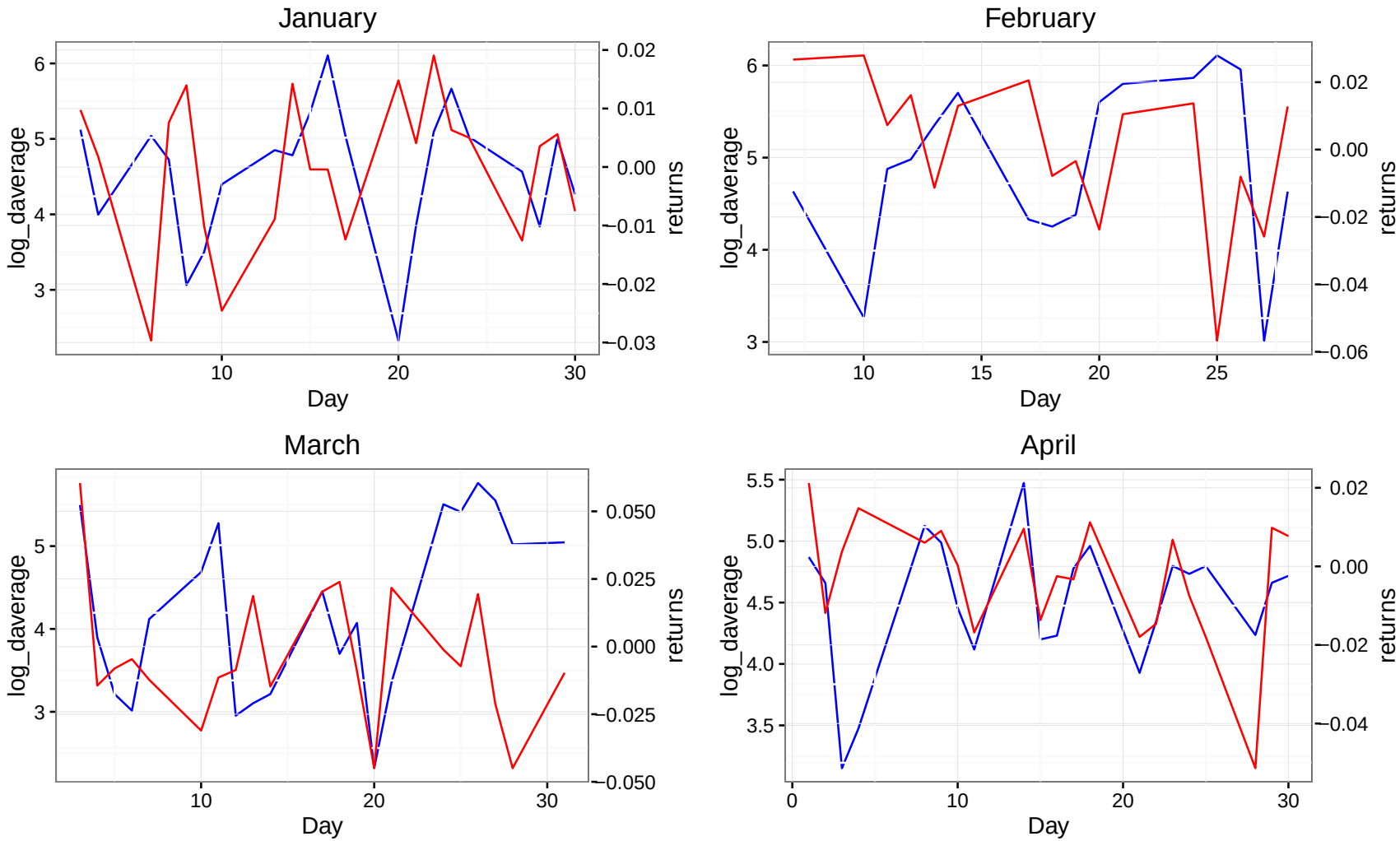
Time-series Plot for Year 2013 (May-August)



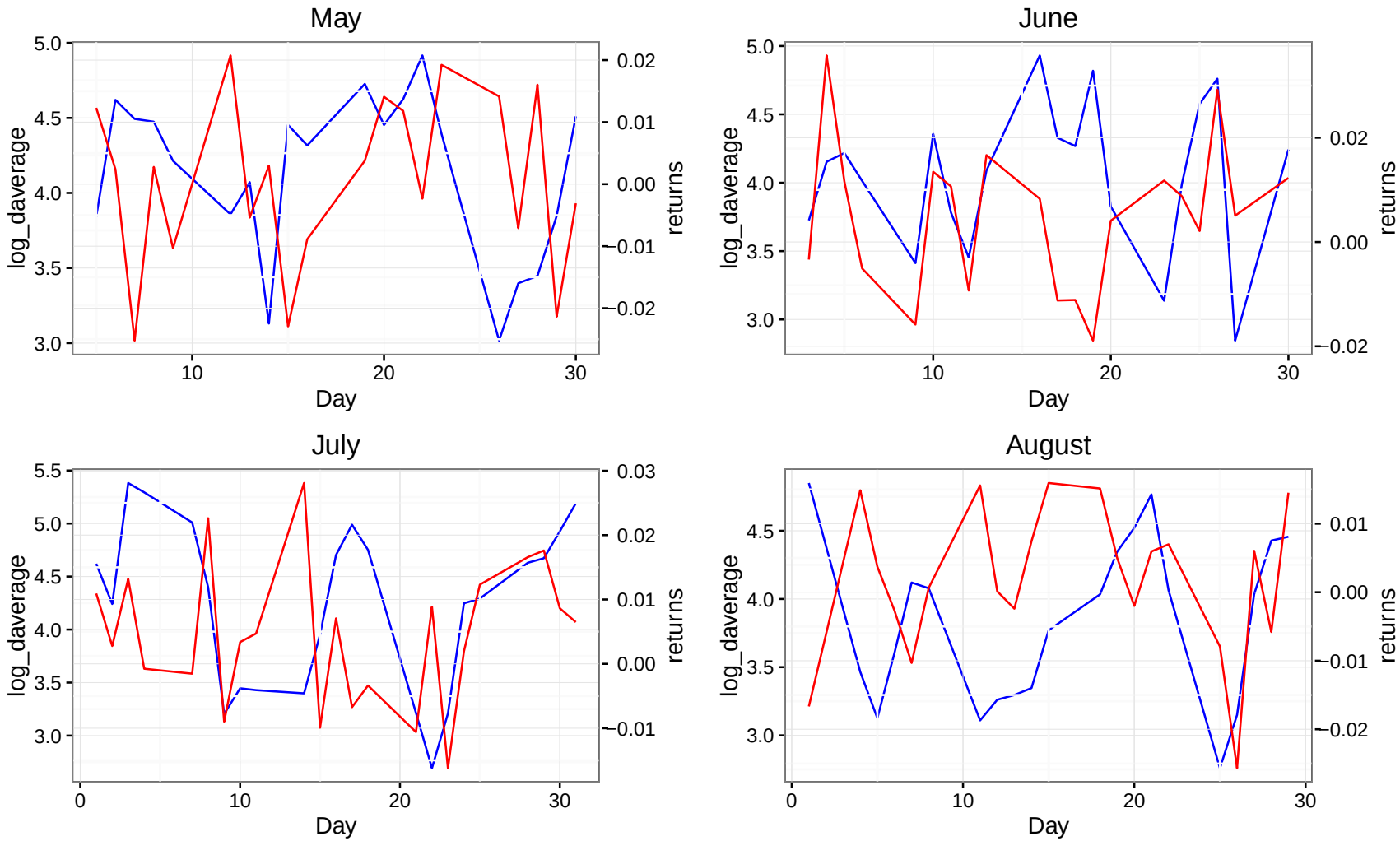
Time-series Plot for Year 2013 (September-December)



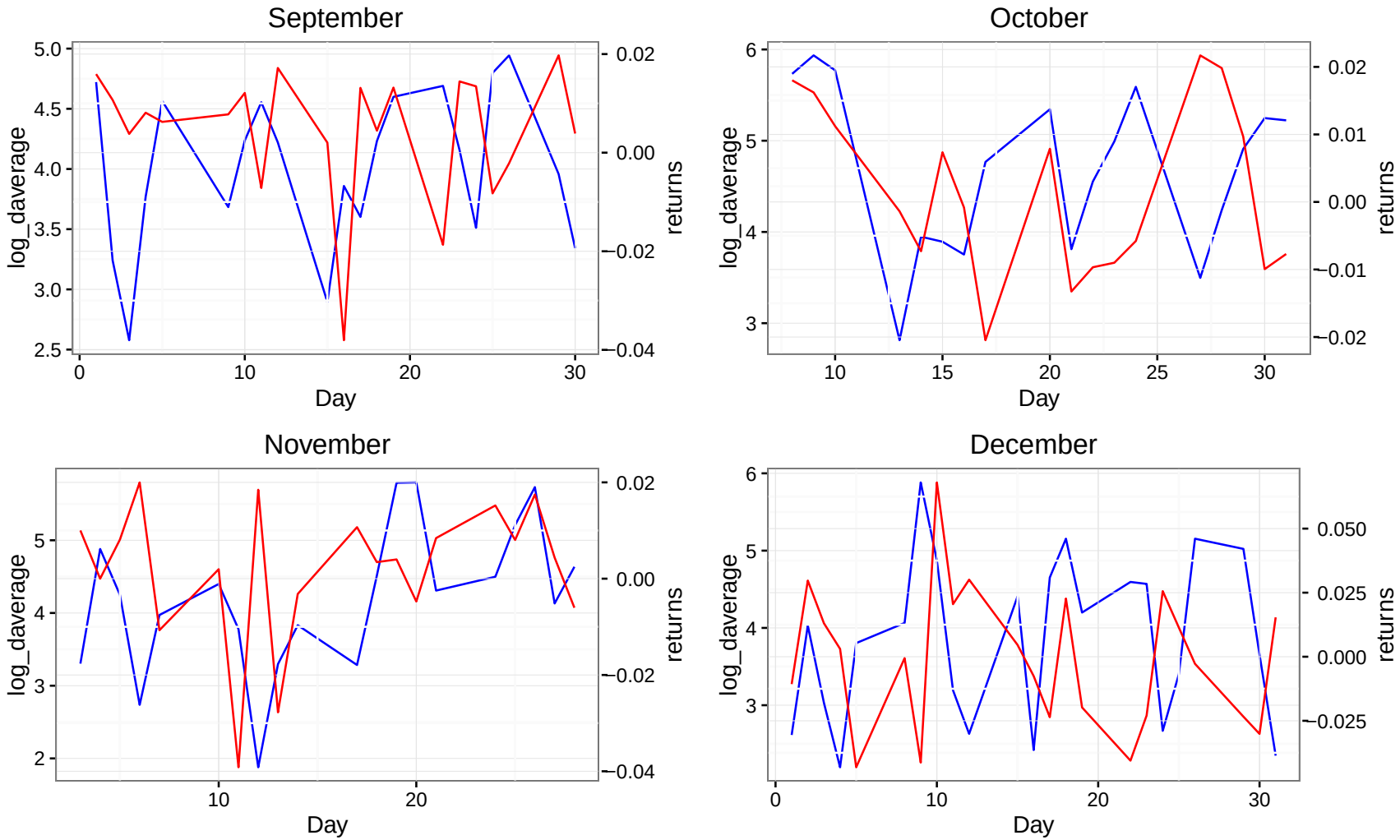
Time-series Plot for Year 2014 (January-April)



Time-series Plot for Year 2014 (May-August)



Time-series Plot for Year 2014 (September-December)



VAR model and basic steps

The vector autoregression (VAR) is an econometric model used to capture the linear interdependencies among multiple time series. Here is a VAR(1) model in two variables.

$$\begin{pmatrix} y_{1,t} \\ y_{2,t} \end{pmatrix} = \begin{pmatrix} c_1 \\ c_2 \end{pmatrix} + \begin{pmatrix} a_{1,1} & a_{1,2} \\ a_{2,1} & a_{2,2} \end{pmatrix} \begin{pmatrix} y_{1,t-1} \\ y_{2,t-1} \end{pmatrix} + \begin{pmatrix} \epsilon_{1,t} \\ \epsilon_{2,t} \end{pmatrix}$$

A time series X is said to Granger-cause Y if it can be shown, usually through a series of t-tests and F-tests on lagged values of X (and with lagged values of Y also included), that those X values provide statistically significant information about future values of Y.

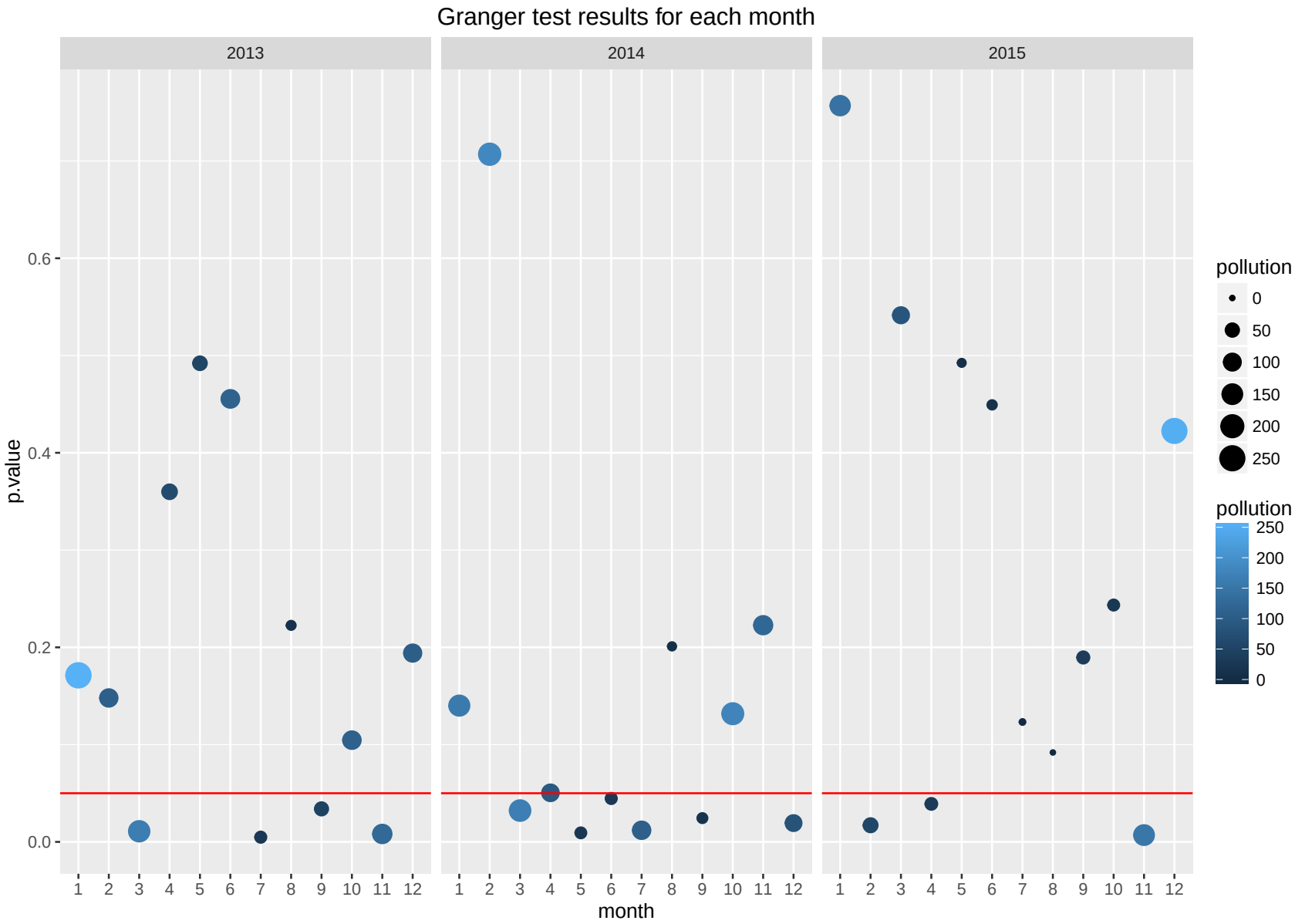
Here are the basic steps:

- ADF test
- Lag selection (AIC)
- Granger causality test

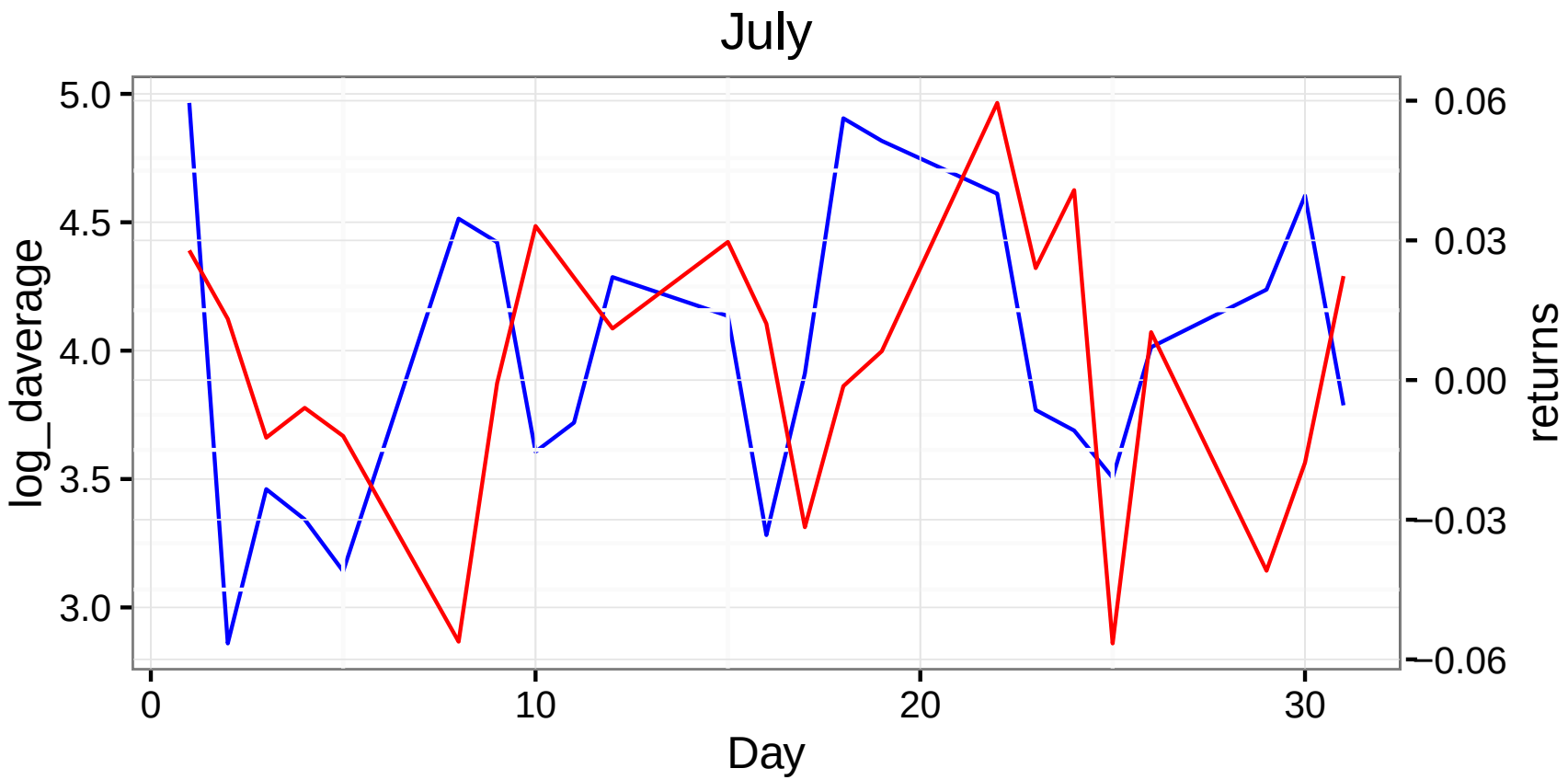
Test Result based on annual data

Year	ADFtest	Lag	Granger
2013	stationary	1	significant
2014	stationary	2	not significant
2015	stationary	3	not significant

Monthly Granger test



July 2013


July
log_daverage
5.0
4.5
4.0
3.5
3.0
returns
0.06
0.03
0.00
−0.03
−0.06
0
10
20
30
Day