Financial Econometrics - Homework 4

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1 Guidelines

- Deadline: Before May 31, 2019 by email to rombouts@essec.edu, oscarjoel.leonsandoval@essec.edu.
- If you use R, integrate your solutions into R-Markdown allowing you to embed the answers and code in one pdf file. if you use Python, make a Jypyter notebook file.
- Work in groups of 2.
- Explain the code making comments in each step of it.
- Professional presentation and visualisations are part of the evaluation.

2 Twitter sentiment index, index market returns and Granger causality

Financial markets react to news in various ways. The question here is if or how Tweets actually impact a broad stock market index. The May 7, 2019 Wall Steet Journal article "Stocks Sink as Trade Tensions Mount" writes for example: "The market will be pretty volatile in the next week or two reacting to headlines and comments and tweets." In order to investigate if this is historically true, you will need to create a Twitter sentiment time

series, study its dynamic properties, and relate it to the stock market. The way you construct your sentiment time series is deliberately left to you.

QUESTIONS:

1. Extract from Twitter, daily tweets from people you might think influence the US stock market, e.g. Donald Trump. Try to go back five years in the past.

2. Do the necessary cleaning of the tweets and create a daily sentiment index time series. Explaing your approach (number of tweets, number of words per tweets, etc).

3. Study the properties of the sentiment index time series, descriptive statistics, ACF, and develop/estimate a time series model for it (AR, MA, ARMA).

4. For the same period as your sentiment time series, download S&P 500 daily closing prices and transform the series into log returns. Make time series plots and compare with the sentiment series.

5. Test for Granger causality between the two time series.

3 EXTRA FOR THE FAST (for fame only)

Try to come up with a general Twitter based financial sentiment volatility time series.