

**Instructions:**

- Clearly write down your answers. You will receive no credit or partial credit if your handwriting is not legible
  - Use a 5% significance level (95% confidence level) throughout the exam unless otherwise noted
  - Please make sure to submit your R code.
  - **DUE DATE: APRIL 15, 2021**
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This exam is based on the paper “*The Impact of El Niño-Southern Oscillation on U.S. Food And Agricultural Stock Returns*” by Atems, Maresca, Ma, and McGraw (2020). The paper examines the response of twelve U.S. agricultural stock returns to El Niño-Southern Oscillation (ENSO) shocks using a recursive VAR model. The study finds that for seven of the stock returns, an ENSO shock has positive and significant effects. The effects, however, are shortlived, generally becoming statistically indistinguishable from zero three to six months after the shock. Variance decomposition analyses show that ENSO shocks have little explanatory power for fluctuations in U.S. agricultural stock returns.

In this exam, you will be required to read that paper carefully, and replicate some key results. Specifically, you should replicate Figures 2, 3, 4, 6, and 7; and Tables 3 and 4. The paper provides details of all the data sources. You are responsible for collecting all the data, and writing and executing the **R** routines. The data on the stock prices of the companies studied in the paper were collected from the Center for Research in Security Prices (CRSP). Since you do not have access to CRSP, please use Yahoo! Finance. The monthly premium of the size factor (SMB), the monthly premium of the book-to-market factor (HML), and momentum of the stock market (UMD) may also be difficult to get as you do not have access to WRDS, so I have provided those variables to you in the CSV document (SMB-HML-UMD.csv) on Moodle.