

Midterm, Financial Econometrics, Econ 40357
University of Notre Dame
Prof. Mark
Monday 28 September 2020

A **review** of the **rules**: Test is open book, open note, open internet, but not open communication with any other people. Any such communication will be considered cheating. Do not cheat! Submit via email, a pdf of your own work by 10 p.m. tonight. Anything coming in after the deadline will lose points.

1. (10 points) Let r_t be the rate of return on the S&P 500 index. How would you test the hypothesis that r_t is normally distributed?
2. (10 points) Let p_t be the log dividend-adjusted price of the Bangkok Chain Hospital Company stock (listed on the Thai stock exchange), where $p_t = p_{t-1} + \epsilon_t$ where ϵ_t is i.i.d. What does stationarity mean in the time-series context, and why is p_t not stationary?
3. (10 points) For the model in question 2, what is the optimal predictor (forecast formula) of the 20 period ahead return $p_{t+20} - p_t$?
4. (10 points) Let $x_t = x_{t-1} + u_t$, describe the evolution of the Yoder family farm's tomato crop. The Yoder farm is located in Lakeville IN. Charles runs the regression

$$p_{t+1} = \beta_0 + \beta_1 x_t + v_{t+1},$$

where p_t is the stock price of the Bangkok Chain Hospital Company, from question 2 above. Charles obtains $\hat{\beta}_1 = 4.35$, t -ratio=6.324. Can Charles conclude that the Yoder's tomato output can predict the future price of the Bangkok Chain's stock price?

5. (10 points) What is Newey-West and why do we use it?

For Questions 6-10, use the Eviews workfile Midterm2020.wf1. `c_old` is the log of consumption of old households (head of household aged 65 and older). Shock is a monetary policy shock constructed from changes in the price of Federal Funds futures within a 30 minute window of the Federal Reserve's press conference following FOMC meetings. Interpret an increase in shock as a surprise **tightening** of monetary policy—that is, an increase in the Federal Funds interest rate. We want to see how old people's consumption respond to a monetary policy shock (tightening).

6. (10 points) Why do we want to analyze log consumption instead of consumption (in levels)?
7. (10 points) We want to run a VAR using old consumption and shock. Should we use `c_old` or Δc_{old} in the VAR? (provide explanation).
8. (10 points) Based on your answer in 7, consider VARs of order 2, 4, 6, and 8. What specification does BIC (Schwarz) choose?
9. (10 points) Run the VAR(p) with your chosen value of p, and generate the impulse response of log consumption of old people to a monetary policy shock. Ask for 16 periods in the impulse response.

(a) Show a screen shot of the VAR specification

- (b) Show a screen shot of the impulse response.
10. (10 points) Generate the impulse response for log consumption of old people to a monetary policy shock at horizons 4,8, and 12 using local projections. Compare your results from 7 and 8. Show a screen shot of the local projection at horizon 12.
11. (10 points extra credit). Consider the VAR(1) for variables y_t and x_t . Writing the system explicitly, we have

$$\begin{aligned}y_t &= ay_{t-1} + bx_{t-1} + \epsilon_{yt} \\x_t &= cy_{t-1} + dx_{t-1} + \epsilon_{xt}\end{aligned}$$

where ϵ_y , and ϵ_{xt} are zero-meaned, serially uncorrelated shocks but contemporaneously correlated with covarianc $\sigma_{xy} = E(\epsilon_{yt}\epsilon_{xt}) \neq 0$. What is the optimal predictor (forecasting formula) for y_{t+2} , conditional on information known at t .