Università Commerciale
Luigi Bocconi

MSc. Finance/CLEFIN
2017/2018 Edition

FINANCIAL ECONOMETRICS AND EMPIRICAL FINANCE - MODULE 2

Mock Question 3 (total 17 points, out of 50 from 3 questions)

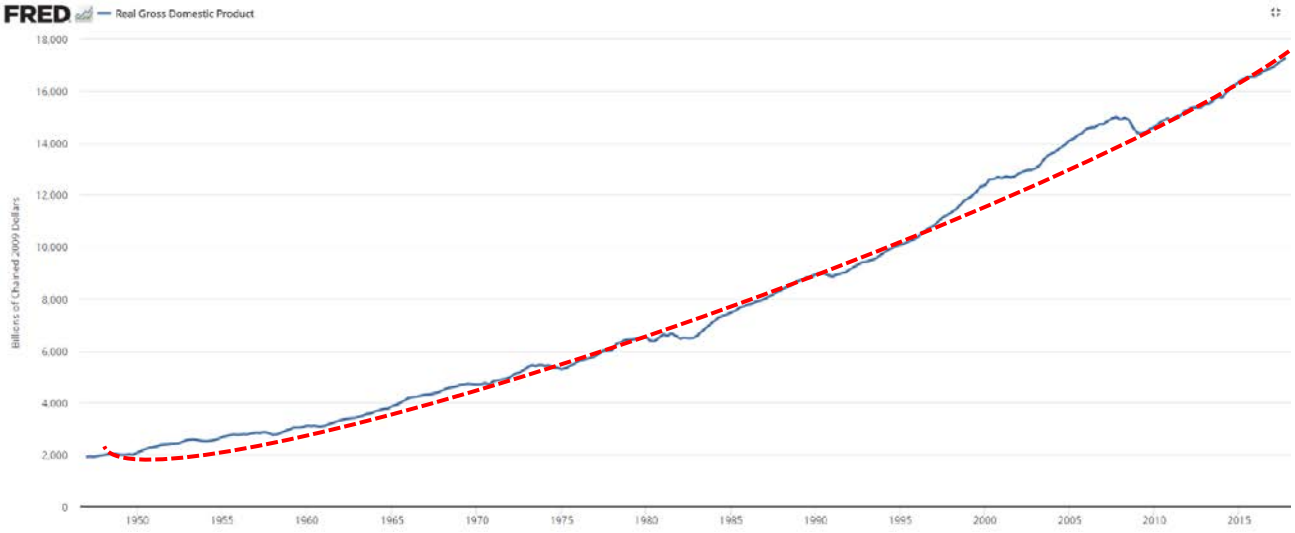
Time Advised: 24 minutes (for this question)

Question 3.A (13 points)

Define a stochastic trend and indicate what is the relationship between a stochastic trend and a random walk, with and without drift, for the special case of a I(1) process. For this case, comment on (or show, as you deem most appropriate) the stationarity or lack thereof of a random walk and explain why this may represent a problem in empirical work. Indicate how would you proceed to make a I(d) time series, $\{y_t\}$, with $d \geq 2$, stationary. Would the choice of considering $\{y_t - y_{t-d}\}$ instead of $\{y_t\}$ be an appropriate one? Make sure to carefully explain your answers.

Question 3.B (2.5 points)

An analyst at Charles Thomas and Associates has just downloaded the following series of data on the quarterly US real GDP (in constant dollars, expressed as 2009 billions).



He has proposed to make this series stationary by first fitting (by simple OLS) a quadratic function of time (shown as a dashed red line in the picture) and then replace the time series of real GDP with the OLS residuals from such a quadratic trend regression. What are the risks that the analysts is exposing himself and his firm to by adopting this simple procedure?

Question 3.C (1.5 points)

You know that a time series $\{y_t\}$ was originally suspected to be I(d) with $d \geq 1$. A fellow quant analyst, Ms. Maria Delas, has then transformed it by differentiating it three times, in the attempt to make it stationary and delivered the series to you. Upon your own analysis, you determine that the series contains now 2 unit roots in its MA component (i.e., the residuals need to be differentiated twice for them to be "well-behaved", that we may have called invertible). What do you know about the d characterizing the original series?