AMEFA – **Assignment 2 - 2022**

Clearly state which question you are answering in chronological order (Q2.1, Q2.2, etc).

Firstly, before conducting the lab assignment read the lecture and lab notes for each relevant section. For the assignments, unless the significance level is given in the question, use the significance level in the documentation that the question is based on. If it is defined on what significance level that you should test on – use 5%. Before you start to solve this assignment, I must also instruct you to read the instructions in the overview document (+part01). Here it says that you should submit this assignment both as a hard copy and by e-mail (and also other information). Every group member’s name and birthday (personal number, or at least the six first digits, e.g. 900101) should be included in the report + e-mail.

I have tried to limit this exercise so that it will not consume too much of your time.

Best wishes

/Pär

**Q2.1 – Vector Autoregressive Models – Granger Causality Tests**

**Q2.1.1:**  
Repeat the lab exercise that you conducted for the VAR model and the Granger causality test (+Part 11 - AMEFA - Multiequation Time-Series Models (VAR, Granger, TYDL).docx).

However, notice that you should apply a **new data set** (thus not ZIPF – (1971-2006).wf1). Instead download the file: “**AMEFA-2022-Q2.1.wf1**”

For this exercise test at **10%** significance level.

You do not have to redo the unit root tests in this lab. Therefore, start at Question 1 (Determine the optimal lag-length for the bivariate VAR model)!

**Q2.1.2 (extra mandatory question):**

What would be the conclusion if we would test at 5% significance level? You only need to repeat the final Granger causality regression.

**Q2.1.3 (extra mandatory question):**

Open the file: “Toda Yamamoto - Grade inflation.docx”, which is based on “Toda Yamamoto - Grade Inflation.wf1”. Repeat this exercise using the file “Toda Yamamoto - Grade Inflation**2**.wf1”.

**Q2.2 – Nonstationarity**

Download the file: **AMEFA-2022-Q2.2** from PingPong. **This data set is similar to the data we used in class, but this time I have changed some values so that you will fairly similar, but still different results.**

When solving this exercise, you must mechanically follow the document: “+Part 09 - The Elder and Kennedy unit root model selection strategy (Nonstationarity).docx”. Choose Case 1, 2, or 3, and follow the instructions under “Summary of Strategy X using EViews” for each strategy.

Elder & Kennedy (E&K, 2001) have defined six types of time-series processes from a Augmented Dickey-Fuller test. We call these processes: process 1,..., process 6. However, processes (2) and (5) can be ruled out since these are unlikely processes that most likely will not be found in economic data.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | | | | |
|  |  |  |  |  |  |
| Process (1) | Process (2) | Process (3) | Process (4) | Process (5) | Process (6) |
| ρ=1,  α=0,  β=0 | ρ<1,  α=0,  β=0 | ρ=1,  α≠0,  β=0 | ρ<1,  α≠0,  β=0 | ρ=1,  α≠0,  β≠0 | ρ<1,  α≠0,  β≠0 |
| Unit root,  no intercept,  no time trend | No unit root,  no intercept,  no time trend | Unit root,  intercept,  no time trend | No unit root,  intercept,  no time trend | Unit root,  intercept,  time trend | No unit root,  intercept,  time trend |
| Pure unit root process = Pure random walk | Stationary around zero equilibrium | Unit root with drift = Random walk with drift | Stationary around non-zero equilibrium | Accelerating stochastic drift | Stationary around a deterministic trend = Trend stationary process |
| Possible process | **Unlikely process** | Possible process | Possible process | **Unlikely process** | Possible process |

In the file we use, I have simulated the 4 different processes. Therefore, we know the true data generating process (DGP). **Now, (despite that I have changed some values) you should test to see if Elder & Kennedy’s conclude pro1 for pro1, pro3 for pro3, pro4 for pro4, pro6 for pro6.** Pro2 and pro 5 are excluded since these processes are unrealistic.

A fundamental feature of the Elder & Kennedy strategy is that we utilize prior knowledge about the variables. For instance, we use “Case 1”, for variables that grow/decline in the long run:

Case 1: GDP, consumption, and investments grows in the long run.

and we use “Case 2” for variables that do not grow/decline in the long run:

Case 2: Rates, such as interest, inflation, and unemployment rates, do not grow in the long run. Furthermore, detrended or differenced variables are not expected to grow over time.

and we use

Case 3: is used when we have no prior knowledge about the examined variable.  
 **Assumptions and prior knowledge:***(Use Schwarz-Bayes criteria with a high number of maximum lags in this example, e.g. 37 lags…)*

***Assume that the variable Pro3*** *is the GDP of an industrialized country. Therefore, apply* ***Case 1****.****Assume that the variable Pro4***  *is a “rate-variable” (such as e.g. the interest rate). Therefore, apply* ***Case 2****.*

***Assume that the variable Pro6*** *is a consumption variable in an industrialized country. Therefore, apply* ***Case 1****.*

***Assume that the variable Pro1*** *is a variable that we have no information about, we have no prior knowledge about its growth status. Consequently, we have to use* ***Case 3*** *(Growth status unknown).*

**You may present your answers in this order, with the following headlines:**

**Q2.2.1 – PRO3**

**Q2.2.2 – PRO4**

**Q2.2.3 – PRO6**

**Q2.2.4 – PRO1**

**Q2.3 – Panel Data Analysis**

Download the file: **AMEFA-2022-Q2.3 (new).wf1**

I have collected the relevant files in the folder called Assignment 2. In this folder you will find some prg, pdf, and wf1-files that we will use in this exercise.

Follow the commands and syntax in “**panel gujarati exercise 2022 (eviews commands).prg**”. In this document I replicate the result in the attached PDF-document. The data is found in “AMEFA-2022-Q2.3 (old).wf1” (which you may use to practice and replicate the results in the PDF). However, your task is to do the same thing for “**AMEFA-2022-Q2.3 (new).wf1”**, not the old file.

Your task is simply to use the commands in the \*.PRG-file to repeat the models and the tests in the above **Panel Gujarati Exercise 2022 (text).PDF**-file (which is a Gujarati exercise). According of the school’s layers I am allowed to send you up to 15 pages from a textbook in academia, so this should be legal (it is from version 4 of Gujarati’s book – Basic econometrics).

You basically almost have all the answers (so this is obviously not be very complicated), I just want to see that you have used EViews to complete these models and tests. Paste the full EViews regression outputs into a word document and type down the most important comments and relevant conclusions (even if this is already typed down in the Gujarati-file). You can start by looking at the \*.PRG-file where I have typed down some commands that you should execute. **When you present your answers, clearly write the number of the equation beside the outputs (e.g. (16.3.1))**. After most panel models we conduct a normality test for the residuals – so obviously you should also run these tests and give the main conclusions.

In the end of the PRG-file I also cover a Hausman test, that you also should conduct (despite that this is not conducted in the Gujarati file). You can use the headline “**Hausman**“ for this answer.

Obviously, you will pass this part of the assignment if you just make a serious attempt – but for your own good – try to understand what you are doing. For this reason, make sure that you do not only mechanically run the commands without trying to understand what we really are modeling and testing.

If there is anyone without any ambitions in your life – who just wants to pass without understanding anything, you can still pass this assignment. However, those of you (=most of you) with ambitions can use this exercise to really teach yourself something that is actually is beneficial for your future. Panel data analysis may be the most commonly used family of statistical models used in applied econometrics. Read the text and discuss the conclusions within your group. You will be tested on the exam/empirical research report, and this exercise is good for preparing you for the exam IF you also read the text in the PDF-file (simultaneously as running the commands).

**Also, if you want to, you can also conduct the other panel tests that we conducted during the lab lecture, but this is optional. See the teaching notes where we e.g. use the following instructions (for some of the above models):**

**“View>Fixed/RandomEffectsTesting>RedundantFixedEffects–Likelihood Ratio”, “View>Fixed/RandomEffects>Cross-section effects”, “View>Residual Diagnostics>Histogram-Normality Test”.**

**Q2.4 – Conditional heteroscedasticity**

The majority of *“+Part 12 - Labs for Modeling Volatility (GARCH) - AMEFA2022.doc”* is already covered. However, despite of this, **please replicate all of it.**

**Q2.5 +++Optional (not necessary assignment) Q2.5 – ARDL Bounds Test – Cointegration**

Follow the instructions of: **“+++Optional reading - ARDL Bounds test for cointegration (for I(0) or and I(1), not I(2)).docx**”. Especially the content as from page 23, but this is totally optional and will not be included on the exam. However, the content may be useful for future studies, the master thesis, and regarding what is considered useful knowledge in this research field.