PREDICTIVE ANALYTICS ISM-E1003

Homework 3, due date 26.03. at 10:00

What is the correct answer? Correct answer 4 points.

1. Which of the following are characteristics of vector autoregressive (VAR) models?

(i) They are typically a-theoretical and data driven

(ii) They can easily lead to overfitting

(iii) All variables on the right hand side of the equation are pre-determined

(iv) Their interpretation is often difficult from a theoretical perspective.

(a) (i), (ii), (iii), and (iv)

(b) (i), (ii), and (iv) only

(c) (i) and (ii) only

(d) (i) and (iv) only.

2. Which of the following could be viewed as a disadvantage of the vector autoregressive (VAR) approach to modelling?

(a) We do not need to specify which variables are endogenous and which are exogenous

(b) Standard form VARs can be estimated equation-by-equation using OLS

(c) VARs often contain a large number of terms

(d) VARs can be expressed using a very compact notation.

3. Consider the following bivariate VAR(2):



Which of the following coefficient significances are required to be able to say that *y*1 Granger-causes *y*2 but not the other way around?

1. *α*13 and *α*14 significant; *α*21 and *α*22 not significant
2. *α*21 and *α*22 significant; *α*13 and *α*14 not significant
3. *α*21 and *α*23 significant; *α*11 and *α*13 not significant
4. *α*11 and *α*13 significant; *α*21 and *α*23 not significant.

4. Comparing the information criteria approach with the likelihood ratio test approach to determining the optimal VAR lag length, which one of the following statements is true?

1. The choice of stiffness of penalty term will not affect the model choice
2. The validity of information criteria relies upon normal residuals
3. Conducting a likelihood ratio test could lead to a sub-optimal model selection
4. An application of the univariate information criteria to each equation will give identical results to the application of a multivariate version of the criteria to all of the equations jointly.

5. A variable *x* is defined as ­­\_\_\_\_\_\_\_\_ if its value is determined outside of the equation or system of equations. What is the blank?

(a) Endogenous

(b) Exogenous

(c) Homogeneous

(d) Heterogeneous.

6. Which of these statements is true about vector autoregressive models?

(I) They allow the value of a variable to depend on more than just its own lags

(II) All variables are endogenous

(III) The researcher does not need to specify which variables are endogenous or exogenous

(IV) All variables are exogenous

(a) I only

(b) I and II only

(c) I, II, and III only

(d) I, II, III, and IV.

7. Which of these is an approach used to determine the appropriate lag lengths of VAR models?

(a) Graphically plotting the time series of the data

(b) Selecting the number of lags that maximises the information criteria

(c) Selecting the number of lags that minimises the information criteria

(d) None of the above.

8. Impulse responses:

(a) Trace out the responsiveness of the dependent variables in the VAR to shocks to each of the variables

(b) Are a different term for variance decompositions

(c) Trace out the responsiveness of the residuals in the VAR to shocks to each of the variables

(d) Give the proportion of the movements in the dependent variables that are due to their own shocks versus shocks to other variables.

9. Variance decompositions

(a) Trace out the responsiveness of the dependent variables in the VAR to shocks to each of the variables

(b) Will always give the same conclusions as impulse responses

(c) Trace out the responsiveness of the residuals in the VAR to shocks to each of the variables

(d) Give the proportion of the movements in the dependent variables that are due to their own shocks versus shocks to other variables.

10. Assuming that you have a VAR model with 2 variables (A and B) including many lags, how can you test whether A cause Granger-causes changes in B?

(a) By observing if the differences in correlation between A and B are statistically significant

(b) Impose restrictions that all the coefficients of the lags of A are equal to 0 in the equation for B of the VAR model and test the joint hypothesis within the F-test framework

(c) Impose restrictions that all the coefficients of the lags of B are equal to 0 in the equation for A of the VAR model and test the joint hypothesis within the F-test framework

(d) None of the above.