

Mohamed Khider University

*Faculty of Economics, Commerce
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Department of Commerce*

*Specialty: Finance & International Trade
Timing 1H30
Academic year 2024/2025*

Time Series Analysis Module Final Exam

Full name.....Group.....Exam Score.....

Question 1 (5.75 Pts): Choose the correct answer for the following questions

- 1. You recorded the annual sales revenue of a company from 1990 to 2023. The type of data you obtained is:**
a) Panel data b) Cross-sectional data c) Time series data d) Pooled data
- 2. Which of the following best describes seasonality in a time series?**
a) long-term upward or downward trend in the data.
b) Fluctuations in the data that occur at regular intervals due to factors such as holidays or weather conditions.
c) Random variations that cannot be predicted.
d) Sudden and unexpected changes in the data due to external shocks.
- 3. Which of the following best defines a trend in a time series?**
a) Repeating patterns or cycles that occur over a specific period, such as weekly or monthly.
b) Long-term movement or direction in the data, either upward or downward, over a period of time.
c) Irregular and unpredictable variations in the data caused by external shocks.
d) Fluctuations that result from seasonal factors such as holidays or weather conditions.
- 4. What measure is primarily used to assess the asymmetry of a data distribution?**
a) Variance b) Standard deviation c) Skewness d) Kurtosis.
- 5. A distribution with a kurtosis value greater than 3 is described as:**
a) Mesokurtic b) Platykurtic c) Leptokurtic d) Normokurtic
- 6. The skewness of a normal distribution is:**
a) 0 b) 1 c) 2 d) 3

7. Which of the following are true regarding heteroskedasticity in a regression model?
- Heteroskedasticity means that the variance of the residuals is constant across different levels of the independent variable.
 - Heteroskedasticity violates one of the key assumptions of the linear regression model.
 - Heteroskedasticity can be detected using statistical tests like the Breusch-Pagan test.
8. The Breusch-Pagan test is used to test the validity of null hypothesis that.....
- There is heteroskedasticity in the data.
 - The errors are normally distributed.
 - There is homoskedasticity in the data.
 - There is no autocorrelation in the residuals.
9. Which of the following diagnostic tests is commonly used to detect Multicollinearity in regression analysis?
- Durbin-Watson test.
 - Ramsey RESET test.
 - Breusch-Pagan test
 - Variance Inflation Factor
10. Which of the following statements best describes the concept of Granger causality?
- Variable X is the cause of variable Y if changes in X and Y occur simultaneously.
 - Variable Y is the cause of variable X if changes in X occur after changes in Y.
 - Variable X is the cause of variable Y if changes in X occur after changes in Y.
 - Variable X is the cause of variable Y if changes in Y help to predict the change in X.

Question 2 (14.25 Pts)

- I. Suppose you have conducted an Augmented Dickey-Fuller (ADF) test. After running the test, you obtain the following results table:

Null Hypothesis: UNEMPLOYMENT has a unit root Exogenous: Constant Lag Length: 1 (Automatic - based on SIC, maxlag=8)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.035789	0.0425
Test critical values:		
1% level	-3.661661	
5% level	-2.960411	
10% level	-2.619160	

Based on the results in this table answer the following questions:

- What is the calculated t-statistic value for the ADF test?.....
- The purpose of ADF is to test the.....
- The test is conducted at first difference?
 - True
 - false
- What action should be taken regarding the null hypothesis based on the provided results?
 - Reject the null hypothesis.
 - Fail to reject the null hypothesis
 - There is insufficient evidence to make a decision

Explanation

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II. Suppose you have conducted a Johansen cointegration test, after running the test, you obtain the following results

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.532442	34.46649	29.79707	0.0135
At most 1	0.238561	10.89927	15.49471	0.2178
At most 2	0.076001	2.450367	3.841465	0.1175

Based on the given results, answer the following questions:

1. Formulate the null hypotheses for this test (trace test)

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2. What action should be taken regarding the null hypotheses ?

- a) fail to reject the null hypotheses at 5% level of significance
- b) accept the null hypothesis at 5% level of significance
- c) Reject the null hypothesis at 5% level of significance

Explanation

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3. What conclusion could you make about the number of cointegration relationship?

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III. You have conducted a linear regression analysis using OLS method, you obtained the following results.

Dependent Variable: ECONOMIC_GROWTH				
Method: Least Squares				
Date: 05/23/24 Time: 16:23				
Sample: 2009 2019				
Included observations: 11				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXCHANGE_RATE	0.186727	0.086735	2.152839	0.0635
MONEY_SUPPLY	0.347471	0.063953	5.433218	0.0006
C	0.340655	0.280126	1.216079	0.2586
R-squared	0.983455	Mean dependent var		5.981818
Adjusted R-squared	0.979319	S.D. dependent var		1.972723
S.E. of regression	0.283693	Akaike info criterion		0.545153
Sum squared resid	0.643854	Schwarz criterion		0.653670
Log likelihood	0.001660	Hannan-Quinn criter.		0.476748
F-statistic	237.7714	Durbin-Watson stat		2.588086
Prob(F-statistic)	0.000000			

Based on the given results in the table, answer the following questions:

1. You have conducted this linear regression to find the impact of.....
and..... on

2. Write the linear regression equation that representing the relationship between the variables under study

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3. Formulate the hypotheses of the study?

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**4. Test the hypotheses of the study using the p-value, what conclusion can be drawn about the relationship between the variables under the study based on the regression results?
Note that the significance level is 5%**

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5. Interpret the R-squared value provided in the table (explain what it suggests about the relationship between the variables)

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6. The p-value related to the F-statistic indicates that

- a) There is no evidence to reject the null hypothesis.
- b) There is strong evidence that at least one of the regression coefficients is significantly different from zero.
- c) The regression model explains none of the variability in the response variable.
- d) The intercept of the regression model is significantly different from zero.

Wishing you all the best on your exam!