Question #1 of 92

Question ID: 1472205

Alexis Popov, CFA, wants to estimate how sales have grown from one quarter to the next on average. The most direct way for Popov to estimate this would be:

A) a linear trend model.

B) an AR(1) model with a seasonal lag.

C) an AR(1) model.

Explanation

If the goal is to simply estimate the dollar change from one period to the next, the most direct way is to estimate $x_t = b_0 + b_1 \times (\text{Trend}) + e_t$, where Trend is simply 1, 2, 3, ...T. The model predicts a change by the value b_1 from one period to the next.

(Module 2.5, LOS 2.o)

Question #2 of 92

Question ID: 1472134

The regression results from fitting an AR(1) model to the first-differences in enrollment growth rates at a large university includes a Durbin-Watson statistic of 1.58. The number of quarterly observations in the time series is 60. At 5% significance, the critical values for the Durbin-Watson statistic are $d_l = 1.55$ and $d_u = 1.62$. Which of the following is the *most* accurate interpretation of the DW statistic for the model?

A) The Durbin-Watson statistic cannot be used with AR(1) models.

B) Since $d_l < DW < d_u$, the results of the DW test are inconclusive.

C) Since $DW > d_l$, the null hypothesis of no serial correlation is rejected.

Explanation

The Durbin-Watson statistic is not useful when testing for serial correlation in an autoregressive model where one of the independent variables is a lagged value of the dependent variable. The existence of serial correlation in an AR model is determined by examining the autocorrelations of the residuals.

(Module 2.2, LOS 2.e)

Question #3 of 92

Question ID: 1472126

The model $x_t = b_0 + b_1 x_{t-1} + b_2 x_{t-2} + b_3 x_{t-3} + b_4 x_{t-4} + \varepsilon_t$ is:

A) a moving average model, MA(4).

B) an autoregressive model, AR(4).

C) an autoregressive conditional heteroskedastic model, ARCH.

Explanation

This is an autoregressive model (i.e., lagged dependent variable as independent variables) of order p=4 (that is, 4 lags).

(Module 2.2, LOS 2.d)

Question #4 of 92

Question ID: 1815383

The table below shows the autocorrelations of the lagged residuals for quarterly theater ticket sales that were estimated using the AR(1) model: $\ln(sales_t) = b_0 + b_1(\ln sales_{t-1}) + e_t$. Assuming the critical *t*-statistic at 5% significance is 2.0, which of the following is the *most likely* conclusion about the appropriateness of the model? The time series:

Lagged Autocorrelations of the Log of Quarterly Theater Ticket Sales			
Lag	**Autocorrelation**	**Standard Error**	**t-Statistic**
1	−0.0738	0.1667	−0.44271
2	−0.1047	0.1667	−0.62807
3	−0.0252	0.1667	−0.15117
4	0.5528	0.1667	3.31614

A) would be more appropriately described with an MA(4) model.

B) contains ARCH (1) errors.

C) contains seasonality.

Explanation

The time series contains seasonality as indicated by the strong and significant autocorrelation of the lag-4 residual.

(Module 2.4, LOS 2.l)

Question #5 of 92

Question ID: 1472185

Which of the following is a seasonally adjusted model?

A) $Sales_t = b_0 + b_1 Sales_{t-1} + b_2 Sales_{t-2} + \varepsilon_t$.

B) $(Sales_t - Sales_{t-1}) = b_0 + b_1 (Sales_{t-1} - Sales_{t-2}) + b_2 (Sales_{t-4} - Sales_{t-5}) + \varepsilon_t$.

C) $Sales_t = b_1 Sales_{t-1} + \varepsilon_t$.

Explanation

This model is a seasonal AR with first differencing.

(Module 2.4, LOS 2.l)

Question #6 of 92

Question ID: 1472136

An analyst modeled the time series of annual earnings per share in the specialty department store industry as an AR(3) process. Upon examination of the residuals from this model, she found that there is a significant autocorrelation for the residuals of this model. This indicates that she needs to:

A) revise the model to include at least another lag of the dependent variable.

B) switch models to a moving average model.

C) alter the model to an ARCH model.

Explanation

She should estimate an AR(4) model, and then re-examine the autocorrelations of the residuals.

(Module 2.2, LOS 2.e)

Question #7 of 92

Question ID: 1472154

Barry Phillips, CFA, has estimated an AR(1) relationship ($x_t = b_0 + b_1 \times x_{t-1} + e_t$) and got the following result: $x_{t+1} = 0.5 + 1.0x_t + e_t$. Phillips should:

A) not first difference the data because $b_0 = 0.5 < 1$.

B) not first difference the data because $b_1 - b_0 = 1.0 - 0.5 = 0.5 < 1$.

C) first difference the data because $b_1 = 1$.

Explanation

The condition $b_1 = 1$ means that the series has a unit root and is not stationary. The correct way to transform the data in such an instance is to first difference the data.

(Module 2.3, LOS 2.j)

Question #8 of 92

Question ID: 1472120

Which of the following is *NOT* a requirement for a series to be covariance stationary? The:

A) time series must have a positive trend.

B) covariance of the time series with itself (lead or lag) must be constant.

C) expected value of the time series is constant over time.

Explanation

For a time series to be covariance stationary: 1) the series must have an expected value that is constant and finite in all periods, 2) the series must have a variance that is constant and finite in all periods, and 3) the covariance of the time series with itself for a fixed number of periods in the past or future must be constant and finite in all periods.

(Module 2.2, LOS 2.c)

Question #9 of 92

Question ID: 1472163

An AR(1) autoregressive time series model:

A) can be used to test for a unit root, which exists if the slope coefficient is less than one. ✗

B) cannot be used to test for a unit root. ✗

C) can be used to test for a unit root, which exists if the slope coefficient equals one. ✓

Explanation

If you estimate the following model $x_t = b_0 + b_1 \times x_{t-1} + e_t$ and get $b_1 = 1$, then the process has a unit root and is nonstationary.

(Module 2.3, LOS 2.k)

Question #10 of 92

Question ID: 1472188

Which of the following statements regarding seasonality is *least* accurate?

A) Not correcting for seasonality when, in fact, seasonality exists in the time series results in a violation of an assumption of linear regression. ✗

B) The presence of seasonality makes it impossible to forecast using a time-series model. ✓

C) A time series that is first differenced can be adjusted for seasonality by incorporating the first-differenced value for the previous year's corresponding period. ✗

Explanation

The goal of a time series model is to identify factors that can be predicted. Seasonality in a time series refers to patterns that repeat at regular intervals. When a time series exhibits seasonality, seasonal lags should be included in the model in order to increase its predictive ability.

(Module 2.4, LOS 2.l)

Question #11 of 92

Question ID: 1472146

The primary concern when deciding upon a time series sample period is which of the following factors?

A) The length of the sample time period.

B) Current underlying economic and market conditions.

C) The total number of observations.

Explanation

There will always be a tradeoff between the increase statistical reliability of a longer time period and the increased stability of estimated regression coefficients with shorter time periods. Therefore, the underlying economic environment should be the deciding factor when selecting a time series sample period.

(Module 2.2, LOS 2.h)

Question #12 of 92

Question ID: 1790129

Consider the following estimated model:

$$(Sales_t - Sales_{t-1}) = 30 + 1.25 (Sales_{t-1} - Sales_{t-2}) + 1.1 (Sales_{t-4} - Sales_{t-5})\ t=1,2,..\ T$$

and Sales for the periods 1999.1 through 2000.2:

t	Period	Sales
T	2000.2	$2,000
T-1	2000.1	$1,800
T-2	1999.4	$1,500
T-3	1999.3	$1,400
T-4	1999.2	$1,900
T-5	1999.1	$1,700

The forecasted Sales amount for 2000.3 is *closest* to:

A) $2,270.00.

B) $2,625.00.

C) $1,730.00.

Explanation

Note that since we are forecasting 2000.3, the numbering of the "t" column has changed.

Change in sales = $30 + 1.25 ($2,000-1,800) + 1.1 ($1,400-1,900)

Change in sales = $30 + 250 - 550 = -$270

Sales = $2,000 – 270 = $1,730

(Module 2.5, LOS 2.n)