



Uva Wellassa University, Sri Lanka
End Semester Examination – June 2010
EMG 242-3 Statistics for Management

Part C: Essay Question

Answer All Questions

Time: One (1.00) hour and 30 minutes

Total marks: 50

1. A financial analyst is interested in computing the turnover rates, in percent, for shares of oil-related stocks versus other stocks, such as GE and IBM. She selected 32 oil-related stocks and 49 other stocks. The mean turnover rate of oil-related stocks is 31.4 percent and the standard deviation 5.1 percent. For the other stocks, the mean rate was computed to be 34.9 percent and the standard deviation 6.7 percent. The financial analyst is interested in testing whether there is significant difference in the turnover rates of the two types of stock.
 - a) Is this a one-tailed or a two-tailed test?
 - b) Using the 0.01 level of significance, what is the decision rule?
 - c) Determine the value of the test statistic, and arrive at a decision regarding H_0 .
Explain the meaning of your decision

(10 marks)

2.

- I. Consider the following events that have occurred for a particular time series. Which part of the model decomposition (trend, seasonal or irregular) should the following be assigned to in the model decomposition?
 - a) Increase in sales of clothes shop due to an unusually cold winter.
 - b) Increase in sales of clothes shop in the run up to Christmas.
 - c) Fall in sales of clothes shop due to an economic recession.
- II. The quarterly sales (in Rs. millions) of a department store chain were recorded for the year 2007-2009. These data are shown below.

Year	Sales			
	Quarter 1	Quarter 2	Quarter 3	Quarter 4
2007	33	22	27	31
2008	25	36	44	29
2009	41	33	52	45

- a) Plot the data. Is there any evidence for existence of a trend and a seasonal variation?
- b) Calculate the centered moving averages; hence estimate the seasonal indices for each quarter.
- c) Calculate the deseasonalized values and fit a straight line to the deseasonalized data.
- d) Forecast the quarterly sales for next year 2010.

(22 marks)

3.

- I. State why a Laspeyres price index is typically more convenient to calculate than its corresponding Paasche price index.

Suppose that a country is divided into a number of administrative provinces. Using data from the table below

- II. Calculate the Laspeyres, Paasche and Fisher price indices for Southern province, using Central province as a base province.

Commodity	Central province		Southern province	
	Price (in Rs.)	Quantity (in million)	Price (in Rs.)	Quantity (in million)
Plain chocolate	70	100	55	20
Milk chocolate	40	100	30	40
White chocolate	45	50	38	10

- III. Explain why Laspeyres price index numbers are usually greater than their Paasche equivalents.

(18 marks)

Useful Formula

1. The Laspeyres price index at time t , with base period 0 , can be expressed as:

$$i. \text{Laspeyres' Price Index} = \frac{\sum p_n q_0}{\sum p_0 \cdot q_0}$$

2. The corresponding expression for the Paasche price index can be expressed as:

$$ii. \text{Paasche' s Price Index} = \frac{\sum p_n \cdot q_n}{\sum p_0 \cdot q_n}$$

Where; p_n & p_0 are the price relative of period 'n' and based period '0' respectively,
 q_n & q_0 are the quantity relative of period 'n' and based period '0' respectively

3. Coefficients in the linear regression line

$$\beta_1 = \frac{(\sum_{i=1}^n x_i y_i - n \bar{x} \bar{y})}{(\sum_{i=1}^n x_i^2 - n \bar{x}^2)}$$

$$\beta_0 = \bar{y} - \beta_1 \bar{x}$$