POM Lab Portfolio

Brejia Blocker

MGNT 3185, MTWRF 12:00p.m.-01:00p.m.

Table of Contents

Table of Contents

Computer Lab Assignment #1- Forecasting

Brejia Blocker

MGNT 3185, MTWRF 12:00p.m.-01:00p.m.

Explanatory Paragraph

Using the Management Scientist and the data set below, a 3-month Simple Moving Average forecast and an Exponential Smoothing forecast with an alpha or (.32) was compared. The mean square error of the simple moving average forecast is 296.11 and the exponential smoothing forecast 329.81. Given these results, the forecasting technique that was more superior was Exponential Smoothing. The superior forecasting technique is determined by the higher value of forecasting for period 9 when the outcomes are being compared.

FORECASTING WITH MOVING AVERAGES
****

THE MOVING AVERAGE USES 3 TIME PERIODS

TIME PERIOD	TIME SERIES VALUE	FORECAST	FORECAST ERROR
1	771		
2	798		
3	794		
4	780	787.67	-7.67
5	762	790.67	-28.67
6	772	778.67	-6.67
7	760	771.33	-11.33
8	744	764.67	-20.67

THE MEAN SQUARE ERROR 296.11

THE FORECAST FOR PERIOD 9 758.67

FORECASTING WITH EXPONENTIAL SMOOTHING
****

THE SMOOTHING CONSTANT IS 0.32

TIME PERIOD	TIME SERIES VALUE	FORECAST	FORECAST ERROR
1	771		
2	798	771.00	27.00
3	794	779.64	14.36
4	780	784.24	-4.24
5	762	782.88	-20.88
6	772	776.20	-4.20
7	760	774.85	-14.85
8	744	770.10	-26.10

THE MEAN SQUARE ERROR 329.81

THE FORECAST FOR PERIOD 9 761.75

Computer Lab Assignment #2- Forecasting

Brejia Blocker

MGNT 3185, MTWRF 12:00p.m.-01:00p.m.

Explanatory Paragraph

Using the Management Scientist, a linear trend model was developed for 10 time periods. The roller blade sales over this period of time consisted a trend equation of T= 143.8 + 1.945(t). The variable T is the trend value of the time series in period (t). The meaning of the first number after the equal sign is the slope of the equation. If little (t) is equal to 18, the value of big T for this trend model would be 178.81. The forecast for period 20 is 182.70. Given these results, the weekly sales of roller blades could certainly be analyzed.

FORECASTING WITH LINEAR TREND
****

THE LINEAR TREND EQUATION:

$$T = 143.8 + 1.945\ t$$

where T = trend value of the time series in period t

TIME PERIOD	TIME SERIES VALUE	FORECAST	FORECAST ERROR
1	147	145.75	1.26
2	148	147.69	0.31
3	151	149.64	1.36
4	147	151.58	-4.58
5	155	153.53	1.47
6	158	155.47	2.53
7	155	157.42	-2.42
8	157	159.36	-2.36
9	160	161.31	-1.31
10	167	163.25	3.75

THE MEAN SQUARE ERROR	6.03
THE FORECAST FOR PERIOD 11	165.20
THE FORECAST FOR PERIOD 12	167.14
THE FORECAST FOR PERIOD 13	169.09
THE FORECAST FOR PERIOD 14	171.03
THE FORECAST FOR PERIOD 15	172.98
THE FORECAST FOR PERIOD 16	174.92
THE FORECAST FOR PERIOD 17	176.87
THE FORECAST FOR PERIOD 18	178.81
THE FORECAST FOR PERIOD 19	180.76
THE FORECAST FOR PERIOD 20	182.70

Computer Lab Assignment #3- Forecasting

Brejia Blocker

MGNT 3185, MTWRF 12:00p.m.-01:00p.m.

Explanatory Paragraph

$\hat{Y} = 4.517 + 1.627$ Tourists

Using the Statistical Package for the Social Sciences (SPSS) software, a regression analysis was conducted to determine whether bus and trolley ridership is tied to the number of tourists visiting the city on an annual basis. Findings indicated that the results of the regression model were addressed. The Omnibus F-Test was given and was proven successful according to the significance level of .000. The coefficient of determination (R squared) resulted to .821 which indicates that 82.1 percent of tourist can be determine by the ridership. The coefficient of correlation (r) equals .906, which makes the model very strong. Tourists are the significant predictor. If there were no tourist at all, the predicted ridership would not be demanded. If 11 million people visited the city, the predicted ridership would be a value of 1064.917.

```
SAVE OUTFILE='C:\Users\bblocker\Documents\lab3.sav'
  /COMPRESSED.
DATASET ACTIVATE DataSet0.

SAVE OUTFILE='C:\Users\bblocker\Documents\lab3.savVV.sav'
  /COMPRESSED.
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA COLLIN TOL
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT ridership
  /METHOD=ENTER tourist.
```

Regression

```
[DataSet0] C:\Users\bblocker\Documents\lab3.savVV.sav
```

Descriptive Statistics

	Mean	Std. Deviation	N
ridership y	22.4167	9.83924	12
number of tourist x	11.0000	5.47723	12

Correlations

		ridership y	number of tourist x
Pearson Correlation	ridership y	1.000	.906
	number of tourist x	.906	1.000
Sig. (1-tailed)	ridership y	.	.000
	number of tourist x	.000	.
N	ridership y	12	12
	number of tourist x	12	12

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	number of tourist x[b]	.	Enter

a. Dependent Variable: ridership y

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.906[a]	.821	.803	4.37117

a. Predictors: (Constant), number of tourist x

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	873.845	1	873.845	45.734	.000[b]
	Residual	191.071	10	19.107		
	Total	1064.917	11			

a. Dependent Variable: ridership y

b. Predictors: (Constant), number of tourist x

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.517	2.932		1.540	.155
	number of tourist x	1.627	.241	.906	6.763	.000

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	number of tourist x	1.000	1.000

a. Dependent Variable: ridership y

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	number of tourist x
1	1	1.903	1.000	.05	.05
	2	.097	4.421	.95	.95

a. Dependent Variable: ridership y

Computer Lab Assignment #4- Decision Analysis

Brejia Blocker

MGNT 3185, MTWRF 12:00p.m.-01:00p.m.

Explanatory Paragraph

Using the Management Scientist, a decision analysis was conducted regarding whether or not to construct a new plant. According to the optimistic approach, the firm should construct a large plant. For the conservative, the firm should do nothing. From the regret approach, the firm should construct a large plant. Based on the analysis, the best outcome of the decision approaches is the optimistic approach with a payoff of $300,000 because it is the most favorable. This approach implies that the firm should construct a large plant. If the firm should do nothing, profit will still be retained but building a large plant accumulated the most profit expected. Given these results, the outcome for the expected value of perfect information resulted in 68, 000.

DECISION ANALYSIS
****

YOU HAVE INPUT THE FOLLOWING PAYOFF TABLE:
****

	STATES OF NATURE	
DECISION	1	2
********	******	******
1	300000	-170000
2	100000	-21500
3	0	0

DECISION ANALYSIS
****

YOU HAVE INPUT THE FOLLOWING PAYOFF TABLE:
****

	STATES OF NATURE	
DECISION	1	2
********	******	******
1	300000	-170000
2	100000	-21500
3	0	0
PROBABILITIES OF STATES	0.600	0.400

DECISION RECOMMENDATION
****

USING THE OPTIMISTIC CRITERION

DECISION ALTERNATIVE	CRITERION VALUE	RECOMMENDED DECISION
1	300,000.00	YES
2	100,000.00	
3	0.00	

DECISION RECOMMENDATION
****

USING THE CONSERVATIVE CRITERION

DECISION ALTERNATIVE	CRITERION VALUE	RECOMMENDED DECISION
1	-170,000.0	
2	-21,500.00	
3	0.00	YES

DECISION RECOMMENDATION
****

USING THE MINIMAX REGRET CRITERION

DECISION ALTERNATIVE	CRITERION VALUE	RECOMMENDED DECISION
1	170,000.00	YES
2	200,000.00	
3	300,000.00	

Computer Lab Assignment #5- Decision Analysis

Brejia Blocker

MGNT 3185, MTWRF 12:00p.m.-01:00p.m.

Explanatory Paragraph

Using the Management Scientist, a decision analysis was constructed regarding how to handle increased workload in the agency. The estimated costs for various options and caseloads were given. The director has identified three acceptable alternatives to help make the best decision. One alternative is to reassign present staff members, the second is to hire and train two new workers, and the third is to redesign current practices so that workers can readily collect the information with little additional effort. Based on the analysis, the optimistic approach is the best decision to make because it has the lowest cost. The cost under the optimistic approach is $42,000.00. The cost under the conservative approach is $60,000.00. Given these results, it is recommended that the agency should redesign the collection of the company.

DECISION ANALYSIS
****

YOU HAVE INPUT THE FOLLOWING PAYOFF TABLE:
****

	STATES OF NATURE		
DECISION	1	2	3
********	******	******	******
1	50	70	75
2	60	60	50
3	42	94	93

DECISION RECOMMENDATION
****

USING THE OPTIMISTIC CRITERION

DECISION ALTERNATIVE	CRITERION VALUE	RECOMMENDED DECISION
1	50.00	
2	50.00	
3	42.00	YES

DECISION RECOMMENDATION
****

USING THE CONSERVATIVE CRITERION

DECISION ALTERNATIVE	CRITERION VALUE	RECOMMENDED DECISION
1	75.00	
2	60.00	YES
3	94.00	

DECISION RECOMMENDATION
****

USING THE MINIMAX REGRET CRITERION

DECISION ALTERNATIVE	CRITERION VALUE	RECOMMENDED DECISION
1	24.00	
2	43.00	
3	18.00	YES

DECISION RECOMMENDATION
****

USING THE EXPECTED VALUE CRITERION

DECISION ALTERNATIVE	CRITERION VALUE	RECOMMENDED DECISION
1	112,000.00	YES
2	51,400.00	
3	0.00	

EXPECTED VALUE OF PERFECT INFORMATION IS 68,000.00

Computer Lab Assignment #6- Linear Programming

Brejia Blocker

MGNT 3185, MTWRF 12:00p.m.-01:00p.m.

Explanatory Paragraph

Using the Management Scientist, a Linear Programming Model was constructed regarding the optimal solution to producing a standard and deluxe golf bag for Par, Inc. There were four constraints concerning the distributor's investigation. The maximization objective function equals to 10 standard golf bags plus 9 deluxe golf bags. For the first constraint, the department that is cutting and dyeing 7/10 standard bags plus 1 deluxe bag should have a result of less than or equal to 630 bags. Sewing ½ standard bags plus 5/6 deluxe bags would equal to or display less than 600 bags for constraint two. In Constraint three, the department is finishing one standard bag plus 2/3 deluxe bags which should equate to 708 or less than that value. For the fourth constraint, the department that inspects and package the bags produced 1/10 standard bags and ¼ deluxe bags which should result in less than or equal to 135 bags. The non-negativity constraint of standard and deluxe golf bags should equal or be greater than zero. Given these results, the parameters of the standard golf bag option equaled 6.3000, which is the lower limit and 13.5014 which is the upper limit. The parameters of the deluxe golf bag option are 6.6660, which is the lower limit and 14.2857 which is the upper limit.

LINEAR PROGRAMMING PROBLEM

MAX 10X1+9X2

S.T.

1) .7000X1+1X2<630
2) .5000X1+.8333X2<600
3) 1X1+.6667X2<708
4) .1000X1+.2500X2<135

OPTIMAL SOLUTION

Objective Function Value = 7667.9417

Variable	Value	Reduced Costs
X1	539.9842	0.0000
X2	252.0110	0.0000

Constraint	Slack/Surplus	Dual Prices
1	0.0000	4.3746
2	120.0071	0.0000
3	0.0000	6.9378
4	17.9988	0.0000

OBJECTIVE COEFFICIENT RANGES

Variable	Lower Limit	Current Value	Upper Limit
X1	6.3000	10.0000	13.4993
X2	6.6670	9.0000	14.2857

RIGHT HAND SIDE RANGES

Constraint	Lower Limit	Current Value	Upper Limit
1	495.6000	630.0000	682.3589
2	479.9929	600.0000	No Upper Limit
3	580.0140	708.0000	900.0000
4	117.0012	135.0000	No Upper Limit

Computer Lab Assignment #7- Inventory Management

Brejia Blocker

MGNT 3185, MTWRF 12:00p.m.-01:00p.m.

Explanatory Paragraph

Using the Management Scientist, an inventory model and an economic order quantity analysis of 8800 cases of soft drink was conducted regarding TyTy Beverage Company's soft drink product. Findings indicated that the outcome for economic order quantity resulted in the value of 663.32 units, reorder point resulted in 211.20 units, cycle time resulted in 18.84 units and the annual ordering cost resulted in $291.86. Every time an order is placed, there should be a purchase of 13.27 units per order. Given these results, this will minimize holding costs.

INVENTORY MODEL
****

ECONOMIC ORDER QUANTITY
****

YOU HAVE INPUT THE FOLLOWING DATA:
****

ANNUAL DEMAND = 8800 UNITS PER YEAR

ORDERING COST = $22 PER ORDER

INVENTORY HOLDING COST:
A. ANNUAL INVENTORY CARRYING CHARGE = 22.0%
B. COST PER UNIT = $ 4 PER UNIT

WORKING DAYS PER YEAR = 250 DAYS

LEAD TIME FOR A NEW ORDER = 6 DAYS

INVENTORY POLICY
****

OPTIMAL ORDER QUANTITY	663.32
ANNUAL INVENTORY HOLDING COST	$291.86
ANNUAL ORDERING COST	$291.86
TOTAL ANNUAL COST	$583.73
MAXIMUM INVENTORY LEVEL	663.32
AVERAGE INVENTORY LEVEL	331.66
REORDER POINT	211.20
NUMBER OF ORDERS PER YEAR	13.27
CYCLE TIME (DAYS)	18.84

Computer Lab Assignment #8- Inventory Management

Brejia Blocker

MGNT 3185, MTWRF 12:00p.m.-01:00p.m.

Explanatory Paragraph

Using the Management Scientist, an inventory model was conducted regarding the incentives that a supplier has provided. The data shows that the economic order quantity equals 2,500. The total annual cost equals 31,229.70, which is the sum of the annual ordering and holding cost. The average inventory level is half of the optimal quantity and its total is 1,250. The cycle time is 96.15. When inventory drops to 130 the company should re-order more products. Given these results, the company operates 250 days out the year, the company orders about 2.60 times per year.

INVENTORY MODEL
****

ECONOMIC ORDER QUANTITY WITH QUANTITY DISCOUNTS
****

YOU HAVE INPUT THE FOLLOWING DATA:
****

QUANTITY DISCOUNT INFORMATION

CATEGORY	UNIT COST	MINIMUM QUANTITY
1	$5.00	999
2	$4.82	2499
3	$4.60	2500

ANNUAL DEMAND = 6500 UNITS PER YEAR

ORDERING COST = $47 PER ORDER

ANNUAL INVENTORY CARRYING CHARGE = 21

WORKING DAYS PER YEAR = 250 DAYS

LEAD TIME FOR A NEW ORDER = 5 DAYS

INVENTORY POLICY
****

OPTIMAL ORDER QUANTITY	2,500.00
ANNUAL INVENTORY HOLDING COST	$1,207.50
ANNUAL ORDERING COST	$122.20
ANNUAL PURCHASE COST	$29,900.00
TOTAL ANNUAL COST	$31,229.70
MAXIMUM INVENTORY LEVEL	2,500.00
AVERAGE INVENTORY LEVEL	1,250.00
REORDER POINT	130.00
NUMBER OF ORDERS PER YEAR	2.60
CYCLE TIME (DAYS)	96.15