Debre Markos University

Institute of Technology

School of Mechanical and Industrial Engineering

Industrial Management and Engineering Economics

Individual Assignment I submitted on 25/07/2012 E.C

1. Gozamen farmer's cooperative union flour factory is compiling the monthly productivity report for its Board of Directors. From the following data, calculate (a) labor productivity, (b) machine productivity, (c) the multifactor productivity and (d) the total productivity of dollars spent on labor, machine, materials, and energy. The average labor rate is $10 an hour, and the average machine usage rate is $5 an hour.

Units produced cost	$15,000
Labor hours	1,100
Machine hours	600
Cost of materials	$3,600
Cost of energy	$1,200

2. Mary Hernandez has invested in a stock mutual fund and she is considering liquidating and investing in a bond fund. She would like to forecast the price of the stock fund for the next month before making a decision. She has collected the following data on the average price of the fund during the past 11 months.

Month	Fund Price
1	165
2	162
3	164
4	172
5	175
6	161
7	167
8	175
9	169
10	175
11	160

a) Using a four-month moving average, forecast the fund price for month 12.

b) Using a four-month weighted moving average forecast the fund price for month 12.

c) Compute an exponentially smoothed forecast using $\alpha = 0.35$ and forecast the fund price for month 12.

d) Compare the forecasts in (a), (b), and (c) using MAD and indicate the most accurate.

3. Two different forecasting techniques (F1 and F2) were used to forecast power needed (demand) for debremarkos district power substations. Actual power needed (demand) and the two sets of forecasts for the past 8 periods were as follows:

Period	Actual Demand (MW)	Forecasted/Predicted demand (MW)	
		F1	F2
1	111	109	108
2	118	112	111
3	113	113	115
4	117	115	114
5	112	117	115
6	115	119	113
7	123	121	114
8	121	123	117

a. Compute MAD for each set of forecasts. Based on your results, which forecast appears to be more accurate? Explain.

b. Compute the MSE for each set of forecasts. Based on your results, which forecast appears to be more accurate?

c. In practice, either MAD or MSE would be employed to compute forecast errors. What factors might lead a manager to choose one rather than the other?

d. Compute MAPE for each data set. Which forecast appears to be more accurate?