

4.7: Forecast Accuracy Measures

In this section, we will calculate forecast accuracy measures such as **Mean Absolute Deviation (MAD)**, **Mean Squared Error (MSE)**, and **Mean Absolute Percentage Error (MAPE)**. We will explain the calculations using the next example.

✓ Example 4.7.1

The following actual demand and forecast values are given for the past four periods. We want to calculate MAD, MSE and MAPE for this forecast to see how well it is doing.

Note that Abs (e_t) refers to the absolute value of the error in period t (e_t).

Period	Actual Demand	Forecast	e_t	Abs (e_t)	e_t^2	[Abs (e_t) / D_t] x 100%
1	63	68				
2	59	65				
3	54	61				
4	65	59				

Solution

Here are what need to do:

Step 1: Calculate the error as $e_t = D_t - F_t$ (the difference between the actual demand and the forecast) for any period t and enter the values in the table above.

Step 2: Calculate the absolute value of the errors calculated in step 1 [i.e., Abs (e_t)], and enter the values in the table above.

Step 3: Calculate the squared error (i.e., e_t^2) for each period and enter the values in the table above.

Step 4: Calculate [Abs (e_t) / D_t] x 100% for each period and enter the value under its column in the table above.

Period	Actual Demand	Forecast	e_t	Abs (e_t)	e_t^2	[Abs (e_t) / D_t] x 100%
1	63	68	-5	5	25	7.94%
2	59	65	-6	6	36	10.17%
3	54	61	-7	7	49	12.96%
4	65	59	6	6	36	9.23%

Calculations for Accuracy Measures:

MAD = The average of what we calculated in step 2 (i.e., the average of all the absolute error values)

$$= (5 + 6 + 7 + 6) / 4 = 24 / 4 = \mathbf{6}$$

MSE = The average of what we calculated in step 3 (i.e., the average of all the squared error values)

$$= (25 + 36 + 49 + 36) / 4 = 146/4 = \mathbf{36.5}$$

MAPE = The average of what we calculated in step 4

$$= (7.94\% + 10.17\% + 12.96\% + 9.23\%) / 4 = 40.3/4 = \mathbf{10.075\%}$$

Here is a video on Mean Absolute Deviation using EXCEL

<https://www.linkedin.com/learning/search?keywords=mean%20absolute%20deviation%20&u=2169170>

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