

Unit 8 Discussion Example - Initial Post

A time series model is a forecasting technique that attempts to predict the future values of a variable by using only historical data on that one variable. Here are some examples of variables you can use to forecast. You may use a different source other than the ones listed (be sure to reference the website). There are many other variables you can use, as long as you have values that are recorded at successive intervals of time.

- Currency price: XE (<http://www.xe.com/currencyconverter/>)
- GNP: Trading Economics (<http://www.tradingeconomics.com/united-states/gross-national-product>)
- Average home sales: National Association of Realtors (<http://www.realtor.org/topics/existing-home-sales>)
- College tuition: National Center for Education Statistics (<https://nces.ed.gov/fastfacts/display.asp?id=76>)
- Weather temperature or precipitation: (<http://www.weather.gov/help-past-weather>)
- Stock price: Yahoo Finance (<https://finance.yahoo.com>)

Once you have historical data, address the following:

1. State the variable you are forecasting.
2. Collect data for any time horizon (daily, monthly, yearly). Select at least 8 data values.
3. Use Excel QM to forecast using moving average, weighted moving average and exponential smoothing (see video in Live Binder).
4. Copy/paste the results of each method. Be sure to state the number of periods used in the moving average method, the weights used in the weighted moving average, and the value of alpha used in exponential smoothing.
5. Clearly state the “next period” prediction for each method.

I will use the National Association of Realtors Website (<http://www.realtor.org/topics/existing-home-sales>) and I downloaded the “Single-Family Existing Home Sales and Prices” spreadsheet for Database work.

1. I will look at the (not-seasonally adjusted) **median sale price for the West** column over the past year by month (May 2015 – May 2016). Here is the data:

Year		West
2015	May	325,800
2015	Jun	331,300
2015	Jul	329,300
2015	Aug	322,000
2015	Sep	322,200
2015	Oct	324,200
2015	Nov	321,700
2015	Dec	324,900
2016	Jan	313,400
2016	Feb	312,300
2016	Mar	322,500
2016	Apr	337,800
2016	May	348,100

2&3)

3-Month Moving Average – forecast is \$336,133

Forecasting		Moving averages - 3 period moving average				
Num pds	3					
Data		Forecasts and Error Analysis				
Period	Demand	Forecast	Error	Absolute	Squared	Abs Pct Err
Month 1	\$325,800					
Month 2	\$331,300		331300	331300	1.1E+11	100.00%
Month 3	\$329,300		329300	329300	1.08E+11	100.00%
Month 4	\$322,000	\$328,800	-6800	6800	46240000	02.11%
Month 5	\$322,200	\$327,533	-5333.33	5333.333	28444444	01.66%
Month 6	\$324,200	\$324,500	-300	300	90000	00.09%
Month 7	\$321,700	\$322,800	-1100	1100	1210000	00.34%
Month 8	\$324,900	\$322,700	2200	2200	4840000	00.68%
Month 9	\$313,400	\$323,600	-10200	10200	1.04E+08	03.25%
Month 10	\$312,300	\$320,000	-7700	7700	59290000	02.47%
Month 11	\$322,500	\$316,867	5633.333	5633.333	31734444	01.75%
Month 12	\$337,800	\$316,067	21733.33	21733.33	4.72E+08	06.43%
Month 13	\$348,100	\$324,200	23900	23900	5.71E+08	06.87%
		Total	682633.3	745500	2.2E+11	225.65%
		Average	56886.1	62125	1.8E+10	18.80%
			Bias	MAD	MSE	MAPE
				SE	148161	
Next perio	\$336,133					

3-Month Weighted Moving Average – forecast is \$340,400

Weights are 3 = most recent month, 2 = 1-month prior, 1 = 2-months prior

Forecasting		Weighted moving averages - 3 period moving average					
Data		Forecasts and Error Analysis					
Period	Demand	Weights	Forecast	Error	Absolute	Squared	Abs Pct Err
Month 1	\$325,800	1					
Month 2	\$331,300	2					
Month 3	\$329,300	3					
Month 4	\$322,000		329383.3	-7383.33	7383.333	54513611	02.29%
Month 5	\$322,200		325983.3	-3783.33	3783.333	14313611	01.17%
Month 6	\$324,200		323316.7	883.3333	883.3333	780277.8	00.27%
Month 7	\$321,700		323166.7	-1466.67	1466.667	2151111	00.46%
Month 8	\$324,900		322616.7	2283.333	2283.333	5213611	00.70%
Month 9	\$313,400		323716.7	-10316.7	10316.67	1.06E+08	03.29%
Month 10	\$312,300		318616.7	-6316.67	6316.667	39900278	02.02%
Month 11	\$322,500		314766.7	7733.333	7733.333	59804444	02.40%
Month 12	\$337,800		317583.3	20216.67	20216.67	4.09E+08	05.98%
Month 13	\$348,100		328450	19650	19650	3.86E+08	05.64%
			Total	21500	80033.33	1.08E+09	24.24%
			Average	2150	8003.33	1.1E+08	02.42%
				Bias	MAD	MSE	MAPE
					SE	11607.9	
Next perio	\$340,400						

Exponential Smoothing, alpha = 0.25 – forecast is \$330,413

Forecasting		Exponential smoothing				
Alpha	0.25					
Data		Forecasts and Error Analysis				
Period	Demand	Forecast	Error	Absolute	Squared	Abs Pct Err
Period 1	\$325,800	325800	0	0	0	00.00%
Period 2	\$331,300	325800	5500	5500	30250000	01.66%
Period 3	\$329,300	327175	2125	2125	4515625	00.65%
Period 4	\$322,000	327706.3	-5706.25	5706.25	32561289	01.77%
Period 5	\$322,200	326279.7	-4079.69	4079.688	16643850	01.27%
Period 6	\$324,200	325259.8	-1059.77	1059.766	1123103	00.33%
Period 7	\$321,700	324994.8	-3294.82	3294.824	10855867	01.02%
Period 8	\$324,900	324171.1	728.8818	728.8818	531268.7	00.22%
Period 9	\$313,400	324353.3	-10953.3	10953.34	1.2E+08	03.50%
Period 10	\$312,300	321615	-9315	9315.004	86769299	02.98%
Period 11	\$322,500	319286.3	3213.747	3213.747	10328170	01.00%
Period 12	\$337,800	320089.7	17710.31	17710.31	3.14E+08	05.24%
Period 13	\$348,100	324517.3	23582.73	23582.73	5.56E+08	0.067747006
		Total	18451.8	87269.54	1.18E+09	26.41%
		Average	1419.37	6713.04	9.1E+07	02.03%
			Bias	MAD	MSE	MAPE
				SE	10372	
Next period	\$330,413					