

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 cite your reference). There are many other variables you can use, as long as you have values that are recorded at successive intervals of time. See the CA Starter video in the [LiveBinder](#).

- 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-homesales>)
- 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. **Apply quantitative forecasting methods in time-series modeling.**

- a State the variable you are forecasting.
- b Collect data for any time horizon (daily, monthly, yearly). Select at least 8 data values.
- c **Compute moving average and weighted moving average in a time-series model.**
 - i Use the Excel Workbooks for this module to forecast the next period's value using moving average, and weighted moving average (see video in [LiveBinder](#)).
 - ii Copy/paste the results of each method into your word document.
 - iii Be sure to state the number of periods used in the moving average method and the weights used in the weighted moving average. Clearly state the "next period" prediction for each method.
 - iv Determine which of the two forecasts should be chosen and give the rationale for the decision.
- d **Identify variables for a regression model.**
 - i Determine which variable from the time series forecast would be an appropriate dependent variable (X) and tell why.
 - ii Determine which variable from the time series forecast would be an appropriate independent variable (Y) and tell why.
- e **Develop a simple linear regression model.**
 - i Use the regression function found in Data Analysis located in Microsoft Excel to determine the linear regression model.
 - ii Based upon the values given, what is the valid dependent variable range?

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

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

Number of Periods						MAD	MSE	MAPE		
						8003.33333	107794666.66667	2.42405%		
Data									Formulas	
Period number	data	weight	Indicates which cells in column to the right need a formula	Weighted moving average forecast	error	absolute value of error	squared error	percentage error	Number of weighted periods	Formula to copy
1	325800	1								
2	331300	2							1	325800.00000
3	329300	3							2	329466.66667
4	322000		Formula Needed -->	329383.33333	-7383.33333	7383.33333	54513611.11111	2.29%	3	329383.33333
5	322200		Formula Needed -->	325983.33333	-3783.33333	3783.33333	14313611.11111	1.17%	4	329383.33333
6	324200		Formula Needed -->	323316.66667	883.33333	883.33333	780277.77778	0.27%	5	329383.33333
7	321700		Formula Needed -->	323166.66667	-1466.66667	1466.66667	2151111.11111	0.46%	6	329383.33333
8	324900		Formula Needed -->	322616.66667	2283.33333	2283.33333	5213611.11111	0.70%	7	329383.33333
9	313400		Formula Needed -->	323716.66667	-10316.66667	10316.66667	106433611.11111	3.29%	8	329383.33333
10	312300		Formula Needed -->	318616.66667	-6316.66667	6316.66667	39900277.77778	2.02%	9	329383.33333
11	322500		Formula Needed -->	314766.66667	7733.33333	7733.33333	59804444.44444	2.40%	10	329383.33333
12	337800		Formula Needed -->	317583.33333	20216.66667	20216.66667	408713611.11111	5.98%	11	329383.33333
13	348100		Formula Needed -->	328450.00000	19650.00000	19650.00000	386122500.00000	5.64%	12	329383.33333
14			Formula Needed -->	340400.00000						
15										

di. The dependent variable would be west.

dii. The independent variable would be the month and year combination.

ei. The regression equation is west= 469.34 (month) + 322558.42. The month is the number of the month of the data gathered.

SUMMARY OUTPUT									
Regression Statistics									
Multiple R	0.197493349								
R Square	0.039003623								
Adjusted R Square	-0.048359684								
Standard Error	9705.728507								
Observations	13								
ANOVA									
	df	SS	MS	F	Significance F				
Regression	1	42056406	42056406	0.446453	0.517799				
Residual	11	1.04E+09	94201166						
Total	12	1.08E+09							
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%	
Intercept	322558.4206	5558.268	58.03219	4.91E-15	310324.8	334792.1	310324.8	334792.1	
Month and	469.3392425	702.4233	0.668171	0.517799	-1076.68	2015.363	-1076.68	2015.363	

eii. This equation would only be valid during the time period given.

