


How to Calculate MACD in Excel

9 (<http://investexcel.net/how-to-calculate-macd-in-excel/#comments>) 



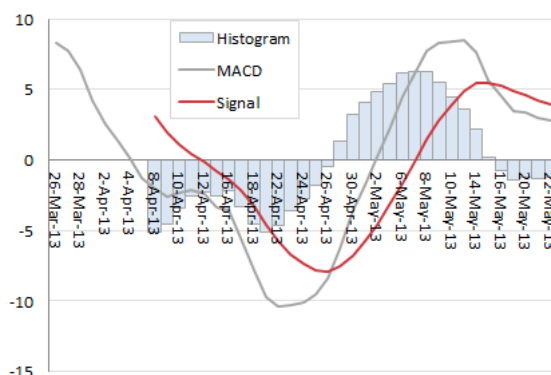
Learn how to calculate and plot MACD in Excel, and start making better trading decisions.

The Moving Average Convergence Divergence (or MACD) indicator is a powerful momentum-based trading indicator.

This article is the first of a two-part series. This part offers a step-by-step guide to calculating and charting MACD in Excel. The second part explores how market technicians use MACD to make better trading decisions (<http://investexcel.net/make-winning-trades-macd/>).

An MACD chart consists of three elements. The first is the difference between the 12-day and 26-day exponential moving average (EMA) of the closing price; this is the MACD line. The second is the EMA of the difference; this is the signal line. The third is simply the MACD minus the signal, and is known as the histogram.

The chart below, for example, is the MACD and signal line for Apple between two dates.



(<http://investexcel.net/wp-content/uploads/2013/08/MACD-AAPL.png>)

A buy signal is generated when a rising MACD crosses over the the signal line (i.e. when the histogram goes from negative to positive). A sell signal, however, is generated when a falling MACD crosses over the signal line (i.e. when the histogram goes from positive negative). Other nuances will be explored in the next article in this series.

Developed by Gerald Appel in the 1970s, MACD is now widely used by traders to generate forecast price trends, and generate buy and sell signals.

In the following step-by-step guide, we'll calculate the MACD of Apple, giving you all the tools you need to recreate the chart above. You can download the complete spreadsheet at the bottom of this article.

Step 1: Get historical daily close prices

You can get historical stock quotes using this bulk stock data downloader spreadsheet (<http://investexcel.net/multiple-stock-quote-downloader-for-excel/>).

For the worked example below, we use daily close prices for Apple (ticker: AAPL) from 19th Feb 2013 to 22nd May 2013; dates are in Column A and prices in Column C.

	A	B
4	Date	Close
5	2/19/2013	459.99
6	2/20/2013	448.85
7	2/21/2013	446.06
8	2/22/2013	450.81
9	2/25/2013	442.8
10	2/26/2013	448.97
11	2/27/2013	444.57
12	2/28/2013	441.4
13	3/1/2013	430.47
14	3/4/2013	420.05
15	3/5/2013	431.14
16	3/6/2013	425.66
17	3/7/2013	430.58

(<http://investexcel.net/wp-content/uploads/2013/08/Historical-Data.png>)

Step 2. 12-day EMA of the close prices

The first value is simply a trailing 12-day average, calculated with Excel's =AVERAGE() function. All other values are given by this formula.

$$EMA_n = \text{Closing Price}_n \frac{2}{\text{Time Period} + 1} + EMA_{n-1} \left(1 - \frac{2}{\text{Time Period} + 1}\right)$$

(<http://investexcel.net/wp-content/uploads/2013/08/EMA1.png>) where Time Period is 12, n refers to today, and n-1 refers to yesterday. Essentially, today's EMA is a function of today's closing price and yesterday's EMA.

The screengrab below illustrates what the spreadsheet should look like, and how the formulas are entered.

	A	B	C	D	E	F	G
4	Date	Close	12 Day EMA	26 Day EMA	MACD	Signal	
5	2/19/2013	459.99					
6	2/20/2013	448.85					
7	2/21/2013	446.06					
8	2/22/2013	450.81					
9	2/25/2013	442.8					
10	2/26/2013	448.97					
11	2/27/2013	444.57					
12	2/28/2013	441.4					
13	3/1/2013	430.47					
14	3/4/2013	420.05					
15	3/5/2013	431.14					
16	3/6/2013	425.66	440.8975				
17	3/7/2013	430.58	439.3101923				
18	3/8/2013	431.72	438.1424704				
19	3/11/2013	437.87	438.1005519				
20	3/12/2013	428.43	436.6127747				
21	3/13/2013	428.35	435.3415786				

(<http://investexcel.net/wp-content/uploads/2013/08/12-day-EMA1.png>)

Step 3. 26-day EMA of the close prices

Again, the first value is simply an average of the last 26 day's closing prices, with all other values given by the above formula (with the Time Period equal to 26)

	B	C	D	E	F	G	H
25	454.49	441.5917311					
26	452.08	443.2053109					
27	452.73	444.6706477					
28	461.91	447.3228558					
29	463.58	449.8239549					
30	461.14	451.5648849	443.2896154				
31	452.08	451.6441334	443.940755				
32	442.66	450.261959	443.8458842				
33	428.91	446.9770422	442.7395225				
34	429.79	444.3328819	441.7802986				
35	431.99	442.433977	441.0550913				

(<http://investexcel.net/wp-content/uploads/2013/08/26-day-EMA.png>)

Step 4. Calculate the MACD

The MACD is simply the 12 day EMA minus the 26 day EMA.

	C	D	E	F
27	444.6706477			
28	447.3228558			
29	449.8239549			
30	451.5648849	443.2896154	8.27527	
31	451.6441334	443.940755	7.703378	
32	450.261959	443.8458842	6.416075	
33	446.9770422	442.7395225	4.23752	
34	444.3328819	441.7802986	2.552583	
35	442.433977	441.0550913	1.378886	

(<http://investexcel.net/wp-content/uploads/2013/08/MACD.png>) **Step 5. The signal line**

This is a 9-day EMA of the MACD. The first value is simply a 9-day trailing average. All other values are given by this equation, where the time period is 9.

$$signal_n = MACD_n \frac{2}{Time\ Period + 1} + signal_{n-1} \left(1 - \frac{2}{Time\ Period + 1}\right)$$

(<http://investexcel.net/wp-content/uploads/2013/08/signal-macd.png>) This is what the signal calculation should look like in Excel.

	D	E	F	G	H	I	J
36	440.0673067	0.102981					
37	438.8178766	-1.2584					
38	437.8839598	-2.07056	3.037526				
39	437.0762591	-2.62184	1.905652				
40	436.9735732	-2.32907	1.058708				
41	436.777753	-2.18163	0.41064				
42	436.2608824	-2.40263	-0.15201				
43	435.0452615	-3.34212	-0.79003				

(<http://investexcel.net/wp-content/uploads/2013/08/macd-signal.png>)

You now have all the data you need! With Excel's charting tools, you can now plot the 12- and 26-day EMA, MACD and signal data.

You can cross-check the results against those produced by Yahoo Finance; both this spreadsheet and Yahoo Finance should give the same MACD.

Download Excel Spreadsheet to Plot MACD (<http://investexcel.net/wp-content/uploads/2013/08/MACD-Tutorial1.zip>)



9 thoughts on "How to Calculate MACD in Excel"

john says:

August 25, 2013 at 12:25 am (<http://investexcel.net/how-to-calculate-macd-in-excel/#comment-13728>)

Excellent looking spreadsheet. I also referenced your other work to get real time price data (My application is forex) constantly updated. My question is, Now how do you combine these two ideas so that when a new price point is added/ updated, it automatically calculates the newest MACD (and associated EMA's)?

[Reply \(http://investexcel.net/how-to-calculate-macd-in-excel/?replytocom=13728#respond\)](http://investexcel.net/how-to-calculate-macd-in-excel/?replytocom=13728#respond)

Ben says:

December 8, 2014 at 6:33 am (<http://investexcel.net/how-to-calculate-macd-in-excel/#comment-45488>)

Hi Samir, many thanks for this excellent spreadsheet. I would like to second John's request – albeit for equity prices and not forex. Ty in advance!

[Reply \(http://investexcel.net/how-to-calculate-macd-in-excel/?replytocom=45488#respond\)](http://investexcel.net/how-to-calculate-macd-in-excel/?replytocom=45488#respond)

Cynthia says:

December 9, 2014 at 8:11 pm (<http://investexcel.net/how-to-calculate-macd-in-excel/#comment-45502>)

Please tell me how to use the chart function in Excel to make my chart look like the one in this article.

[Reply \(http://investexcel.net/how-to-calculate-macd-in-excel/?replytocom=45502#respond\)](http://investexcel.net/how-to-calculate-macd-in-excel/?replytocom=45502#respond)

Samir Khan (<http://investexcel.net/>) says:

December 9, 2014 at 9:26 pm (<http://investexcel.net/how-to-calculate-macd-in-excel/#comment-45503>)

Experiment and explore. It's not difficult if you're motivated.

[Reply \(http://investexcel.net/how-to-calculate-macd-in-excel/?replytocom=45503#respond\)](http://investexcel.net/how-to-calculate-macd-in-excel/?replytocom=45503#respond)

Mike says:

February 4, 2015 at 3:29 am (<http://investexcel.net/how-to-calculate-macd-in-excel/#comment-46080>)

Hi Samir,

I've tried using your tutorial and the bulk downloading spreadsheet. When I open your tutorial the numbers all look like they are supposed to but when I type in the formula or even cut and paste the numbers all become identical. I looked at the calculations in the cells and they are the same as you had in the tutorial sheet. What could I be doing wrong?

[Reply \(http://investexcel.net/how-to-calculate-macd-in-excel/?replytocom=46080#respond\)](http://investexcel.net/how-to-calculate-macd-in-excel/?replytocom=46080#respond)

JohnnyCash says:

March 15, 2015 at 2:02 am (<http://investexcel.net/how-to-calculate-macd-in-excel/#comment-46194>)

Press F9

[Reply \(http://investexcel.net/how-to-calculate-macd-in-excel/?replytocom=46194#respond\)](http://investexcel.net/how-to-calculate-macd-in-excel/?replytocom=46194#respond)

Hil says:

May 23, 2015 at 1:15 pm (<http://investexcel.net/how-to-calculate-macd-in-excel/#comment-46383>)

I tried using the same spreadsheet against live closing price data. On comparing the final values of MACD and Signal the results are different when computed by yahoo finance or morning star (<http://quote.morningstar.com/Stock/chart.aspx?t=AAON>) (<http://quote.morningstar.com/Stock/chart.aspx?t=AAON>)
For Example for a stock = AAON and date = 5/20/15 when using your spreadsheet we get a MACD = -0.111 and Signal = -0.144
With sites like Yahoo/morning star MACD = -0.08 AND Signal = -0.11

Please clarify

[Reply \(http://investexcel.net/how-to-calculate-macd-in-excel/?replytocom=46383#respond\)](http://investexcel.net/how-to-calculate-macd-in-excel/?replytocom=46383#respond)

Riz says:

June 24, 2015 at 6:45 pm (<http://investexcel.net/how-to-calculate-macd-in-excel/#comment-46441>)

I checked the results against Yahoo for Microsoft, and it doesn't match up. This spreadsheet and Yahoo are different. Something isn't right.

[Reply \(http://investexcel.net/how-to-calculate-macd-in-excel/?replytocom=46441#respond\)](http://investexcel.net/how-to-calculate-macd-in-excel/?replytocom=46441#respond)

Neil says:

August 26, 2015 at 9:36 am (<http://investexcel.net/how-to-calculate-macd-in-excel/#comment-46546>)

Hello Samir thank you for sharing the information. I'm curious now as to the formula for calculating the weekly MACD. I have two questions i guess. What is the formula for calculating weekly prices? Is the above formula suitable for calculating the weekly MACD? I've not been able to find a solution as yet and wondered if you were able to clarify. Many thanks in advance.

[Reply \(http://investexcel.net/how-to-calculate-macd-in-excel/?replytocom=46546#respond\)](http://investexcel.net/how-to-calculate-macd-in-excel/?replytocom=46546#respond)

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What is 10 + 9 ?

IMPORTANT! To be able to proceed, you need to solve the following simple math (so we know that you are a human) :-)



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