It's In Between

The Middle-High-Low Moving Average

Sure, you know moving averages inside out, but maybe it's time to change things up a bit. Here, we look at how you can apply a moving average to an existing moving average.

by Vitali Apirine

Middle, high, low? It may sound odd, but it's actually not. Just as other types of moving averages do, the middle-high-low moving average (MHL MA) smoothes the price data to form a trend-following indicator. So how is it different from other moving averages? The main difference is that it's based on the *middle* of the high–low range. Also, it can be used in combination with the most popular types of moving averages, such as the simple moving average (SMA) or exponential moving average (EMA). For example, you could use the MHL EMA and EMA together, or the MHL SMA alongside the SMA to generate crossover signals. The pairs of moving averages will have the same length.

Calculating MHL MA

MHL MA is based on the middle of the high–low range (three to 50 periods). Here's how you calculate it:

MHL = (Highest high + lowest low)/2
Lowest low = Lowest low for the lookback period
Highest high = Highest high for the lookback period

An SMA is the average price of a security over a specific number of periods. The EMA reduces lag by applying more weight to recent prices.

In Figure 1 you see an example of the calculation of the MHL SMA(3,10) & SMA(10) as well as the MHL EMA(3, 10) & EMA(10) for the S&P 500 index. I used the closing price to calculate the SMA and EMA. The MHL SMA(3,10) moves as new prices (middle of high–low range) become available and old prices drop off. The MHL EMA(3,10) starts with the MHL SMA value (1924.59) in the first calculation. After the first calculation, the formula takes over. Because the MHL

RUNNING FIGURE: KATTY2016/SHUTTERSTOCK/COLLAGE: CHRISTINE MORRISON

EMA begins with an SMA, its true value will not be realized until bar 20. The value on the spreadsheet may differ from the chart value because of the short lookback period. The Metastock code for MHL MA can be found in the sidebar "Metastock Code For Middle High Low Moving Average MHL (15,50)."

In Figure 2 you see a chart with the 10-day SMA and an MHL SMA(3,10) overlaid on the price chart. To select the parameters for the moving averages, I use a general method:

Proposed number of periods for high–low range for different moving averages	
Number of periods for high–low range	Moving average length
3–15	Shorter or equal to 50
15–50	from 50 to 200

You can, of course, adjust the number of periods for the high–low range to better fit the security you're trading or to correspond with whatever analytical requirements you need to suit.

LENGTHS AND TIMEFRAMES

The length of the MHL moving average depends on your analytical objectives. Short MHL moving averages (5–20 periods) are best suited for short-term trends whereas longer MHL moving averages (20–60 periods) can be used for medium-term trends. A long-term investor may prefer MHL moving averages using a lookback period of 100 or longer.

MHL EMA & EMA vs. MHL SMA & SMA double crossovers

The chart in Figure 3 shows the S&P 500 with a 20-day EMA (green line) & MHL EMA(10,20) (red line) in the top pane. In the bottom pane is the same index with a 20-day SMA (green line) & MHL SMA(10,20) (red line). As you may have expected, the EMA & MHL EMA generated cross signals a little faster than the SMA & MHL SMA.

MHL EMA & EMA vs. EMA double crossovers

A bullish crossover occurs when the moving average crosses above the MHL MA. A bearish crossover occurs when the moving average crosses below the MHL MA.

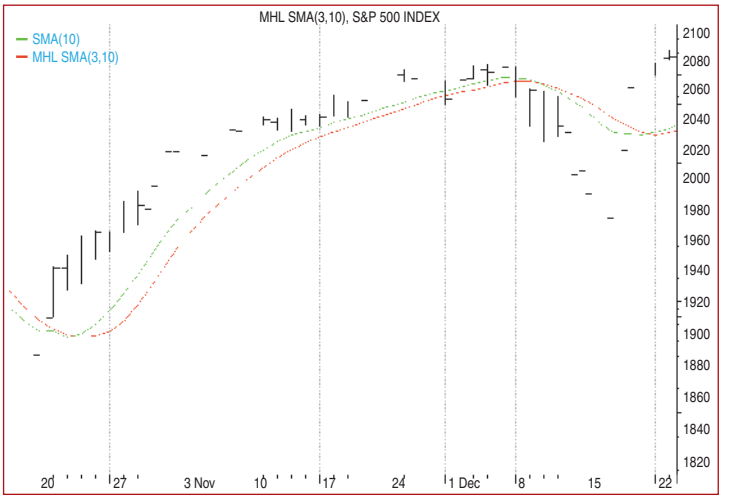
The chart in Figure 4 shows the S&P 500 with a 20-day EMA (green line) & 50-day EMA (red line) in the top window and the same index with a 30-day EMA (green line) & MHL EMA(7,30) (red line) in the bottom window.

You can see from the chart that the crossovers generated by MHL EMA(7,30) & 30-day EMA are faster than those generated from the 20- and 50-day EMAs.

	Date	High	Highest High for 3 days	Low	Lowest Low for 3 days	Middle of high-low range	MHL SMA(3,10)	Close	SMA(10)	Smoothing Constant 2/11	MHL EMA(3,10)	EMA(10
	10/1/2014	1971.44		1941.72				1946.16				
	10/2/2014	1952.32		1926.03				1945.17				
1	10/3/2014	1971.19	1971.44	1948.12	1926.03	1948.73		1967.90				
2	10/6/2014	1977.84	1977.84	1958.43	1926.03	1951.94		1964.82				
3	10/7/2014	1962.36	1977.84	1934.87	1934.87	1956.36		1935.10				
4	10/8/2014	1970.36	1977.84	1925.25	1925.25	1951.55		1968.89				
5	10/9/2014	1967.68	1970.36	1927.56	1925.25	1947.81		1928.21				
6	10/10/2014	1936.98	1970.36	1906.05	1906.05	1938.21		1906.13				
7	10/13/2014	1912.09	1967.68	1874.14	1874.14	1920.91		1874.74				
8	10/14/2014	1898.71	1936.98	1871.79	1871.79	1904.39		1877.70				
9	10/15/2014	1874.18	1912.09	1820.66	1820.66	1866.38		1862.49				
10	10/16/2014	1876.01	1898.71	1835.02	1820.66	1859.69	1924.59	1862.76	1914.87		1924.59	1914.8
11	10/17/2014	1898.16	1898.16	1864.91	1820.66	1859.41	1915.66	1886.76	1906.76	0.18	1912.74	1909.7
12	10/20/2014	1905.03	1905.03	1882.30	1835.02	1870.03	1907.47	1904.01	1900.68	0.18	1904.98	1908.7
13	10/21/2014	1942.45	1942.45	1909.38	1864.91	1903.68	1902.20	1941.28	1901.30	0.18	1904.74	1914.6
14	10/22/2014	1949.31	1949.31	1926.83	1882.30	1915.81	1898.63	1927.11	1897.12	0.18	1906.75	1916.9
15	10/23/2014	1961.95	1961.95	1931.02	1909.38	1935.67	1897.41	1950.82	1899.38	0.18	1912.01	1923.0
16	10/24/2014	1965.27	1965.27	1946.27	1926.83	1946.05	1898.20	1964.58	1905.22	0.18	1918.20	1930.6

MICROSOFT EXCEL

FIGURE 1: CALCULATING THE MIDDLE-HIGH-LOW (MHL) SMA(3,10) & SMA(10) COMBINATION, AND MHL EMA(3,10) & EMA(10) COMBINATION FOR THE S&P 500 INDEX USING A SPREADSHEET. The closing price is used for the calculation of the simple/exponential moving averages. The MHL SMA(3,10) moves as new prices (middle of high–low range) become available and old prices drop off. The MHL EMA(3,10) starts with the MHL simple moving average value (1924.59) in the first calculation. After the first calculation, the normal formula takes over.



METASTOCK

FIGURE 2: 10-DAY SMA & MHL SMA(3,10). Here you see the values plotted on a daily chart of the S&P 500. A short lookback period was used.

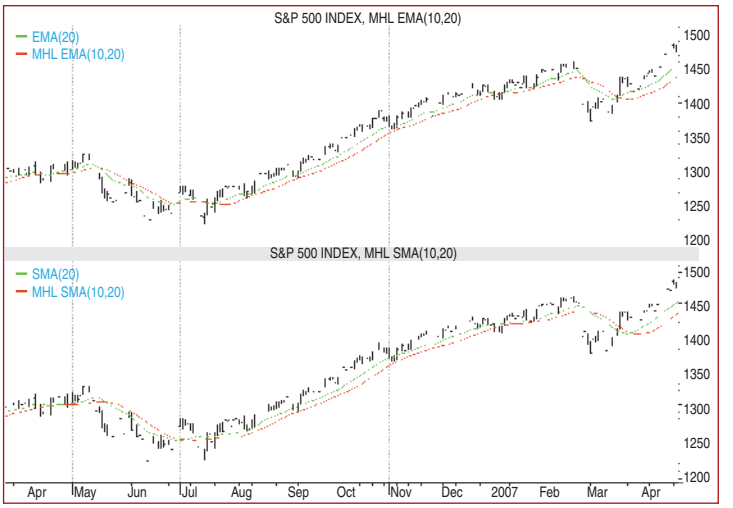


FIGURE 3: MHL EMA & EMA VS. MHL SMA & SMA, DOUBLE CROSSOVERS. In the top window you see a 20-day EMA (green line) & MHL EMA(10,20) (red line) overlaid on a chart of the S&P 500 index. In the bottom window is the same index with a 20-day SMA (green line) & MHL SMA(10,20) (red line). The EMA & MHL EMA combination generated crossover signals a little faster than the SMA & MHL SMA combination did.

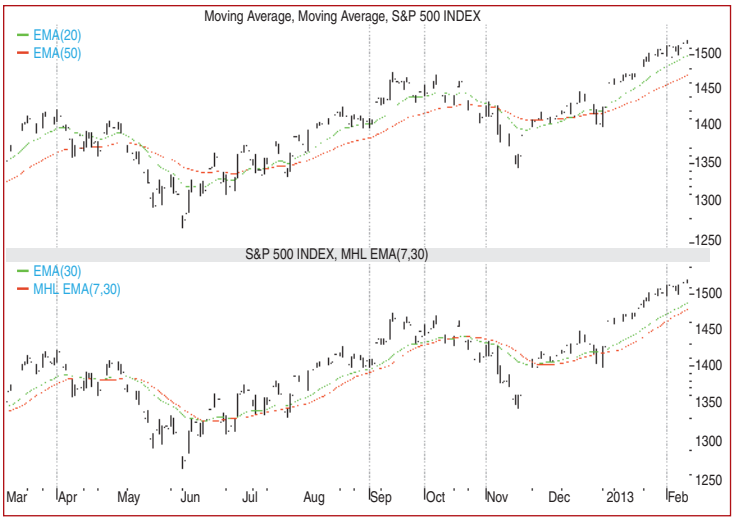


FIGURE 4: MHL EMA & EMA CROSSOVERS. Here you see the S&P 500 with a 20-day EMA (green line) & 50-day EMA (red line) in the top window and the same index with a 30-day EMA (green line) & MHL EMA(7,30) (red line) in the bottom window. The crossovers generated by the MHL EMA(7,30) & 30-day EMA combination are faster than those generated from the 20- & 50-day EMAs.

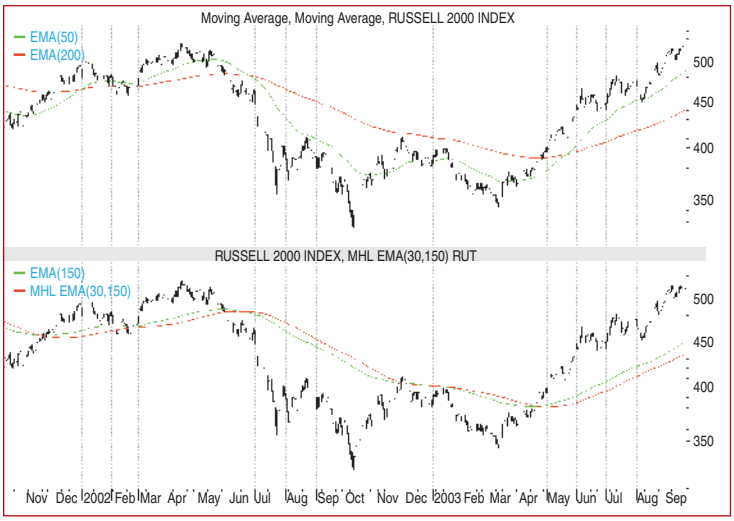


FIGURE 5: EMA DOUBLE CROSSOVERS. Here you see a chart of the Russell 2000 index with a 50-day EMA (green line) & 200-day EMA (red line) in the top window, and in the bottom window a chart of the same index with a 150-day EMA (green line) & MHL EMA(30,150) (red line). Note that the crossovers in the bottom window occur earlier than the ones in the top window.

You can increase the number of periods for the high–low range to widen the spread between the MHL EMA and EMA, but bear in mind that doing so will increase the lag.

In Figure 5 you see a chart of the Russell 2000 index with a 50-day EMA (green line) & 200-day EMA (red line) in the top window and in the bottom window is a chart of the same index with a 150-day EMA (green line) & MHL EMA(30,150) (red line). Notice that the crossovers in the bottom window occur earlier than the ones in the top window.

Other useful MHL EMA & EMA double crossovers

On the daily chart of the Dow Jones Industrial Average (DJIA) in Figure 6 you see an EMA(50) (green line) & MHL EMA(15,50) (red line) & SMA(200) (black line). The 50-day EMA is above the rising 200-day SMA. From looking at the chart you see that double crossovers of EMA(50) & MHL(15,50) work better when in the direction of the trend (see red/green arrows). But what about when price movement is in a trading range?

The double crossover combined with other charting tools can be effective in identifying the beginning or end of a trend.

The daily chart of the Russell 2000 in Figure 7 shows an EMA(100) (green line) & MHL EMA(35,100) (red line). Here you see how you can combine double crossovers with chart patterns when prices are moving within a trading range (see June–September 2010). The double crossover combined with the breakout from a double-bottom chart pattern was effective in identifying the beginning of a trend.

TREND IDENTIFICATION

The chart of the S&P 500 in Figure 8 has a 200-day EMA (green line) and MHL EMA(50,200) (red line) overlaid on it. Double crossovers and rising long-term moving averages reflect a long-term uptrend. Conversely, double crossovers and falling long-term moving averages reflect a long-term downtrend. Crossovers are prone to whipsaws. Notice that the 200-day EMA broke above the MHL EMA(50,200) during the bounce in spring 2008 in that bear market. Then there was another whipsaw during the second half of 2011 when a correction was taking place in the S&P 500 during the last bull market. The MHL EMA(50,200) moved above the 200-day EMA at that time.

TRADE THE TREND

Just like other moving averages, the MHL MA is a trend-following indicator and will not be effective when prices are moving in a trading range. The moving averages used for the double crossovers must have the same parameters. The number of periods for high–low range can be increased to make the spread between MHL moving average and moving average wider, but it makes lag bigger. When you combine the MHL EMA & EMA pair with other indicators, you could get some effective trading signals. Try different combinations and see which one works for you.

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METASTOCK CODE FOR MIDDLE-HIGH-LOW MOVING AVERAGE—MHL MA(15,50)

```
HH:=Security(".DJI",H);
LL:=Security(".DJI",L);
MHL:=(HHV(HH,15)+LLV(LL,15))/2;
Mov(MHL,50,S); {MHL SMA}
Mov(MHL,50,E); {MHL EMA}
```

strength index to trading. He may be reached at vitapirine@mediacombb.net.

FURTHER READING

Apirine, Vitali [2015]. "Average Percentage True Range," *Technical Analysis of* STOCKS & COMMODITIES, Volume 33: November.

_____ [2015]. "The Money Flow Oscillator," *Technical Analysis of* STOCKS & COMMODITIES, Volume 33: October.

_____ [2015]. "The Slow Relative Strength Index," *Technical Analysis of* STOCKS & COMMODITIES, Volume 33: April.

_____ [2015]. "The Slow Volume Strength Index," *Technical Analysis of* STOCKS & COMMODITIES, Volume 33: June.

‡MetaStock, ‡Microsoft Excel

†See Traders' Glossary for definition

‡See Editorial Resource Index

*See our **Traders' Tips** section beginning on page 48 for commentary on implementation of Apirine's technique in various technical analysis programs. Accompanying program code can be found in the Traders' Tips area at Traders.com.*

FIGURE 6: USING DIFFERENT MOVING AVERAGE PARAMETERS. On this daily chart of the Dow Jones Industrial Average, the 50-day EMA is above the rising 200-day SMA. From looking at the chart you see that double crossovers of the EMA(50) & MHL(15,50) work better when in the direction of the trend (see red/green arrows).

FIGURE 7: DOUBLE CROSSOVERS IN TRADING RANGES. On this daily chart of the Russell 2000, you see an EMA(100) (green line) & MHL EMA(35,100) (red line). The double crossover combined with the breakout from a double-bottom chart pattern was effective in identifying the beginning of a trend.

FIGURE 8: DOUBLE CROSSOVERS IN LONG-TERM TRENDS. During the 2008 bear market, the 200-day EMA broke above the MHL EMA(50,200) during the bounce in spring 2008. There was another whipsaw in the second half of 2011 when the S&P 500 was going through a correction. The MHL EMA(50,200) moved above the 200-day EMA at that time.