

TRADE

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Simple Moving Average (SMA) Explained: Definition and Calculation Formula

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What Is a Simple Moving Average (SMA)?

A simple moving average (SMA) is a tool used in financial analysis to determine the average price of an asset over a set number of periods, typically calculated using closing prices. By smoothing out price fluctuations, the SMA aids investors in identifying potential trends and making informed decisions.

KEY TAKEAWAYS

- A Simple Moving Average (SMA) calculates the average price of an asset, typically closing prices, over a selected number of time periods, smoothing out price volatility and revealing trends.
- The formula for calculating an SMA involves summing the asset's prices over the chosen period and dividing by the number of periods, making it a straightforward tool for identifying price trends.
- SMAs can indicate bullish or bearish market patterns through configurations like the "death cross," where a short-term SMA falls below a long-term SMA, or the "golden cross," signaling potential gains.
- Unlike Exponential Moving Averages (EMAs), which place more weight on recent data, SMAs assign equal weight to all data points, making the former more responsive to recent changes.
- Although SMAs are useful, some critics argue they rely too much on historical data, potentially overlooking the importance of newer information, especially under the efficient market hypothesis which suggests market prices reflect all current information.

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How Simple Moving Averages Work

A simple moving average (SMA) is an arithmetic [moving average](#) calculated by adding recent prices and then dividing that figure by the number of time periods in the calculation average. For example, add the closing prices over several periods and divide the sum by the number of periods. Short-term averages react quickly to price changes, whereas long-term averages respond more slowly. Other types include the [exponential moving average](#) (EMA) and the [weighted moving average](#) (WMA).



Credit: Investopedia / Sabrina Jiang

The formula for SMA is:

$$\text{SMA} = \frac{A_1 + A_2 + \dots + A_n}{n}$$

where:

A_n = the price of an asset at period n

n = the number of total periods

For example, this is how you would calculate the simple moving average of a security with the following closing prices over a 15-day period.

Week One (5 days): 20, 22, 24, 25, 23

Week Two (5 days): 26, 28, 26, 29, 27

Week Three (5 days): 28, 30, 27, 29, 28

$$20 + 22 + 24 + 25 + 23 + 26 + 28 + 26 + 29 + 27 + 28 + 30 + 27 + 29 + 28 = 392$$

$$392 / 15 = 26.13$$

The 15-day SMA for this security is \$26.13.

A 10-day moving average considers only the last 10 [closing prices](#). Each market day, the newest closing price replaces the oldest, updating the average. A 50-day moving average would use 50 days worth of data to compute the average price on a rolling basis.

A simple moving average is customizable because it can be calculated for different numbers of time periods. This is done by adding the closing price of the security for a number of time periods and then dividing this total by the number of time periods, which gives the average price of the security over the time period.

An upward-pointing SMA indicates a price increase, while a downward one signals a decrease. Longer-term moving averages are smoother, while shorter-term ones are more volatile but reflect current data more closely.

IMPORTANT

The 200-day SMA is widely used, but relying on it can be risky. As *The Wall Street Journal* mentions, its popularity means predictions may limit price movements and become self-fulfilling.^[1]

Special Factors to Consider When Using SMAs

Analytical Insights: The Role of SMAs in Trend Analysis

Moving averages help identify current price trends and hint at potential trend changes. SMAs in technical analysis quickly indicate if an asset is on an uptrend or downtrend.

Another use involves comparing two SMAs of different time frames. If a short-term SMA is above a long-term one, an uptrend could occur. Conversely, if the long-term SMA is above the short-term, a downtrend might follow.

Trading Patterns Involving SMAs: Death Cross and Golden Cross

Two popular trading patterns that use simple moving averages include the death cross and a golden cross. A [death cross](#) occurs when the 50-day SMA crosses below the 200-day SMA. This is considered a bearish signal, indicating that further losses are in store. The [golden cross](#) occurs when a short-term SMA breaks above a long-term SMA. Reinforced by high trading volumes, this can signal further gains are in store.

Comparing SMAs and EMAs: Sensitivity and Application

In [contrasting an exponential moving average \(EMA\) and a simple moving average](#) the major difference is the sensitivity each one shows to changes in the data used in its calculation. More specifically, the EMA gives a higher weighting to recent prices, while the SMA assigns an equal weighting to all values.

The two averages are similar because they are interpreted in the same manner and are both commonly used by technical traders to smooth out price

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Limitations and Challenges of Using SMAs

It is unclear whether or not more emphasis should be placed on the most recent days in the time period or on more distant data. Many traders believe that new data will better reflect the current trend the security is moving with. At the same time, other traders feel that privileging certain dates over others will bias the trend. Therefore, the SMA may rely too heavily on outdated data since it treats the [10th or 200th day's impact](#) the same as the first or second day's.

Similarly, the SMA relies wholly on historical data. Many people (including some economists) believe that [markets are efficient](#). This is known as the efficient market hypothesis. It holds that current market prices already reflect all available information. If markets are indeed efficient, using historical data should tell us nothing about the future direction of asset prices. There are some economic and financial thinkers who support this hypothesis, and plenty of others who oppose it.

How Are Simple Moving Averages Used in Technical Analysis?

Traders use simple moving averages (SMAs) to chart the long-term trajectory of a stock or other security, while ignoring the [noise](#) of day-to-day [price movements](#). This allows traders to compare medium- and long-term trends over a larger time horizon. For example, if the 50-day SMA of a security falls below its 200-day SMA, this is usually interpreted as a bearish death cross pattern and a signal of further declines. The opposite pattern, the golden cross, indicates potential for a market rally.

How Do You Calculate a Simple Moving Average?

To calculate a simple moving average, the sum of the prices within a time period is divided by the number of prices. For instance, consider shares of Tesla closed at \$10, \$11, \$12, \$11, \$14 over a five day period. The simple moving average of Tesla's shares for this 5-day period would equal $\$10 + \$11 + \$12 + \$11 + \$14$ divided by 5, which equals \$11.6.

What Is the Difference Between a Simple Moving Average and an Exponential Moving Average?

While a simple moving average gives equal weight to each of the values within a time period, an exponential moving average places greater weight on recent prices. Exponential moving averages are typically seen as a more timely indicator of a price trend, and because of this, many traders prefer using this over a simple moving average. Common short-term exponential moving averages include the 12-day and 26-day. The 50-day and 200-day exponential moving averages are used to indicate long-term trends.