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Volatility-Based Envelopes (VBE)

The VBE is an indicator that aims at containing price action within adaptive envelopes in such a way that, statistically, only a predetermined, limited and quantifiable portion of the price action would be able to pass (but not sustain) outside the containing envelopes. In that respect, the VBE attempts to identify when prices are relatively overbought or oversold.

The envelopes are calculated off the standard deviation of historical price returns instead of the historical price action. The standard deviation is added to and subtracted from a SMA of the price returns. Then, the outcome is added to/and subtracted from today's closing value on a percentage basis and not over a lagged SMA of the price action. The result is a raw version of the VBE. The raw boundaries of the VBE are then smoothed out by weighted moving averages (WMA). The WMAs are shifted or centered backwards in accordance to their inherent lag time.

The missing data points on the averages (as a result of the centering technique) are then estimated (or forecasted) using their correlation with other centered-WMAs of lesser span/lag and hence, lesser missing data points. As a result, a dynamic adaptation to the envelopes' boundaries can be achieved, while avoiding the inherent lag effect of the MA of prices.

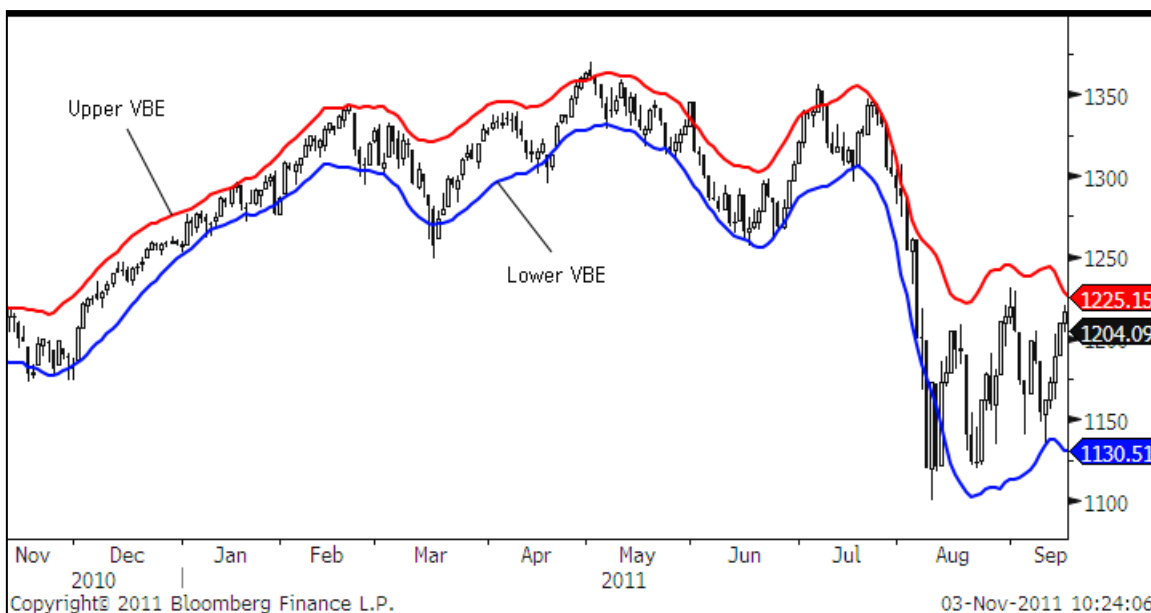


Figure 1 – S&P 500 Index – Candlestick chart – Daily closing values – Normal scale

Figure 1 shows the S&P 500 index and the VBE. In this example, the plotted VBE are 21-period CWMA, set at two standard deviations away from the price action. The 21-period CWMA will miss (lag from) the most recent closing values of the S&P 500 Index by approximately 5-periods. Thus, we will correlate the returns of the 21-period CWMA with the returns of a 17-period CWMA, in which the latter average lags by 4-periods. Using the correlation coefficient of both averages, we estimate the first missing data point on the 21-period CWMA. The procedure is repeated several times with other CWMA of lesser spans vs. the 21-period CWMA until all the remaining missing values of the 21-period CWMA are estimated.

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Important notes:

Since the most recent values/portion of the VBE are estimates, these values are perpetually being replaced by real VBE values as the bars or candle lines unfold going forward. This causes the estimated values/portion of the VBE to change frequently especially over shorter term interval charts as they are being substituted by real VBE values while the prices progress forward. For example, a price excursion from either boundary of the estimated portion of the VBE in real-time may turn out not to be one, as the estimated values are shortly replaced by actual VBE values. For that reason, we have placed a few guidelines that would ensure – *to a large degree* – that the VBE estimates would successfully represent the actual VBE values.

- As we increase the CMA period, the CMA lag increases and thus, the number of estimated VBE values increase. This will increase the probability that the VBE estimates will deviate from the actual VBE values which are attained later as the price data (bars) unfold. Accordingly, it is highly recommended not to exceed the CMA parameter by more than 21 periods. The estimated VBE values in this case will be 5 values.
- On the other hand, employing very small CMA values will cause the VBE to lose its smoothness feature. Thus, it is recommended not to reduce the CMA parameter to less than 5 periods.
- Ideally, we recommend using a 13-period CMA as it strikes a balance between the VBE smoothness and the reliability of the VBE estimates.

Below are some more essential guidelines to be followed when using the VBE:

- Spot the most recent turning phase of the VBE (crest or trough) while it is occurring. The turning phase must be associated with a price excursion. The VBE will guarantee to a high degree that any price excursions are unsustainable regardless of the trend.
- If a price excursion occurred at a low, wait for the price to return back inside the VBE range, and then initiate a long position (or buy-back an old short position).
- If a price excursion occurred at a high, wait for the price to return back inside the VBE range, and then short, sell or reduce your position.
- The greater the number of bar closes (excursions) outside either VBE boundaries (specifically, the estimated portion), the more the confirmation ensuring that the VBE estimates would successfully imply that a price excursion from the actual VBE values will be attained.

Needless to say, the appropriate trading strategy applied will depend on the direction of the overriding trend direction.

The VBE primarily, aims at resolving the limitations attained from using fixed-width centered envelopes, but can also be used in applications related to the works of Hurst and B. Millard on cycle analysis in order to identify the potential turning points of specific cycles.

An article introducing this indicator was first published in the 2012 issue of the International federation of Technical Analysts (IFTA) Journal and authored by Mohamed El Saïd.

