

What?

Bollinger bands were developed by John Bollinger in the 1980s. Bollinger bands consist of an upper and lower band, defining an envelope of usual trading. If a stock price moves outside of this envelope, this triggers an investment decision. The upper band is calculated as K standard deviations above the stock's moving average. The lower band is K standard deviations below the moving average. By construction, the center of this envelope is the original moving average. Bollinger bands mimic the idea that random variables tend to stay within plus or minus two standard deviations from their mean. To this insight, Bollinger bands add that the financial data might not be stationary, so that the means and standard deviations are updated on a continual basis.

The usual trading system using Bollinger bands is to sell when the price reaches its upper band, as a reversion back to the mean is expected. A contrarian Bollinger trading system reverses this logic: buy when the price has crossed its upper band.

Method

While many web sites offer free technical analysis tools, we will be using Stata.

The `tftools bollingerbands` command calculates the Bollinger bands for a single time-series variable. The size of the window for the standard deviation and simple moving average can be specified by the user. The command creates three new variables: `middle_band`, `upper_band` and `lower_band`. The data must first be `tsset`.

Syntax and options

`tftools bollingerbands [if] [in], symbol(variable) generate(newvar) [period(string) sdevs(string)]`

- `symbol(variable)` is the variable that the Bollinger band calculation is based upon (usually the stock symbol that contains the daily prices).
- `generate(newvar)` is the new variable prefix for the calculated Bollinger band values.
- `period(string)` is the window for which standard deviation and simple moving average are calculated. The default is 20.
- `sdevs(string)` is the factor that is multiplied by the standard deviation. The default is 2.

Example

```
net install http://researchbbtn.com/stata/210/tftools.pkg, force
freduse SP500, clear
drop if SP500==.
drop date
rename daten date
gen obs=_n
tsset obs
tftools bollingerbands if year(date)>2015, symbol(SP500) generate(SP500_BB)
twoway (line SP500 date) (line SP500_BB_upper_band date, lwidth(thick)) ///
      (line SP500_BB_lower_band date, lwidth(thick)) if year(date)>2015
```

Figure 1: Daily S&P-500 index and Bollinger bands (2 standard deviations)

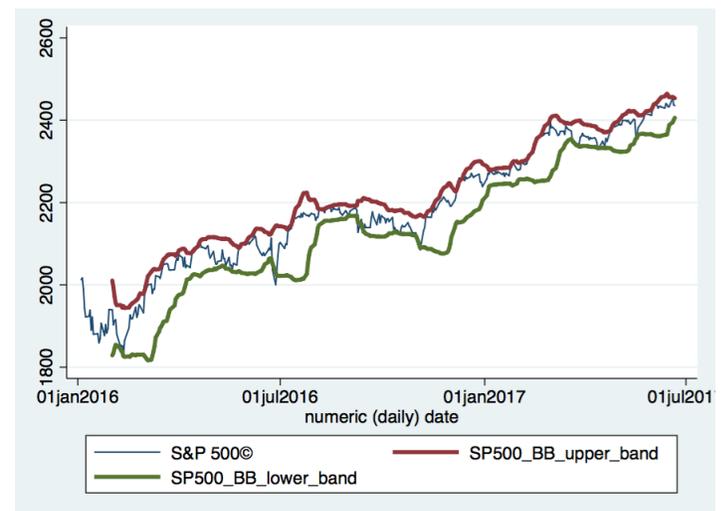


Figure 1 shows the daily S&P-500 index along with the upper and lower Bollinger bands using the default two standard deviations. It is usually interpreted as support and resistance levels. As the index breaks above the upper band (resistance line) then a downward move would be expected. As the index break below the lower band (support line) then an upward move would be expected.

Example

```
freduse SP500, clear
drop if SP500==.
drop date
rename daten date
gen obs=_n
tsset obs
tftools bollingerbands if year(date)>2015, symbol(SP500) generate(SP500_BB) sdevs(4)
twoway (line SP500 date) (line SP500_BB_upper_band date, lwidth(thick)) ///
      (line SP500_BB_lower_band date, lwidth(thick)) if year(date)>2015
```

Figure 2: Daily S&P-500 index and Bollinger bands (4 standard deviations)

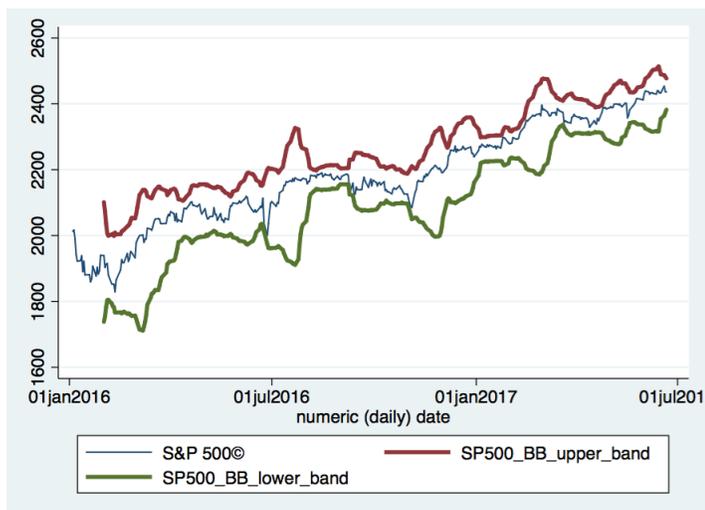


Figure 2 shows the same Bollinger bands as the Figure 1 however with four standard deviations (instead of the two). While with the two standard deviations the index line frequently breaks above and below the resistance and support lines, buy and sell signals are more rare—and presumably stronger—if a stock breaks through these much wider bands.