

Trade on Reversals: RSI and Bollinger Bands

Many researchers in the academic world have shown that momentum portfolios, which consist in buying the best-performing assets and selling the worst-performing assets, can be followed by *reversals* or negative returns immediately after the observation period (usually 12 months for equities). In the FX market, two popular technical indicators that are closely watch by market participants to observe a potential overbought or oversold currency are the Relative Strength Index (RSI) and the Bollinger Bands.

1 Relative Strength Index (RSI)

The RSI was developed by J. Welles Wilder in 1978, and *inform* investors when a particular currency (or other asset) is oversold or overbought based on the past observations. There are several ways of computing the RSI: here is the most simple one that I used in my Excel File.

1.1 A Simple RSI

We first have to select the number of periods, which is usually 14 days for traditional RSI users. We add all upward movements (Ups) and downward movements (Downs) in [closing] price during that time frame, and then compute the ratio of the two variables:

$$RS_t = \frac{Ups}{Downs} \quad (1)$$

We can eventually calculate the [simple] RSI by using the following formula:

$$RSI_t = 100 - \frac{100}{1 + RS_t} \quad (2)$$

We then get a number that stands between 0 and 100 (Note that if we had only negative sessions, the RSI would be equal to 0 and in case of only positive sessions, the RSI should be set at 100 as Downs would be equal to zero).

Then, we have to set our two thresholds to determine when our RSI indicator is signalling an overbought or oversold currency. The most common ones are the 70 for the overbought threshold and the 30 for the oversold. I never use

the RSI on its own to generate a trading signal or strategy, I just look at it as a additional tool. Depending on the macro situation in the markets, I tend to be more careful when the RSI is above 70 or below 30. Unless I have the highest conviction on my trade, my typical reaction would be to reduce my exposition on that specific currency pair.

1.2 The Smoothed Average Gain/Loss Method

Using that methodology, the RS (Relative Strength) variable is computed as the ratio of Smoothed Average Gain to Smoothed Average Loss:

$$RS_t = \frac{\textit{Smoothed_Average_Gain}}{\textit{Smoothed_Average_Loss}} \quad (3)$$

To get the Smoothed Average Gain, we first have to compute the Average Gain and Loss of the time period (14 days):

$$\textit{Average_Gain}_t = \frac{\sum \textit{gains}}{14} \quad (4)$$

We do the same for the Average Loss, taking the absolute value of the results. We can then compute the smoothed Average Gain (and Loss):

$$\textit{Smoothed_Average_Gain} = \textit{Average_Gain}_{t-1} * 13 + \textit{Gain}_t \quad (5)$$

1.3 Chart Analysis with RSI

In Figure 1, the chart on the top represents the USD/EUR daily spot rates over the past two years. On the bottom I plotted the RSI (Smoothed Average Gain) 14 days, with the 30 oversold and 70 overbought lines. As you can see there were a few entry points (3 short position - red arrows and 1 long position - green arrow), however the signals are not frequent and the debate on the exit level is still open. I tried to backtest a few strategies using the RSI only as a signal, but they usually tend to generate poor or even negative returns.



Figure 1: USD/EUR spot rate and RSI

2 Bollinger Bands

2.1 Description

Bollinger Bands were developed by John Bollinger and represent volatility bands to indicate overbought and oversold levels relative to a moving average. The traditional Bollinger Bands are built using a SMA (20 days) and the historical standard deviations (σ_t), and the bands are set at 2 standard deviations:

$$Upper_Band_t = SMA_t(20) + 2 * \sigma_t \quad (6)$$

And

$$Lower_Band_t = SMA_t(20) - 2 * \sigma_t \quad (7)$$

Hence, the user of Bollinger Bands is free to calibrate the 3 parameters (20, 2, -2) in order to potentially detect the best signals.

A crucial point to understand is that widening bands mean high (realized) volatility, while narrowing bands mean low (realized) volatility. There are two ways of trading Bollinger Bands: Reversals or Breakouts.

2.2 Chart Analysis with Bollinger Bands

In periods of ranging market (i.e. low volatility), Bollinger Bands can potentially be used as a reversal signal. Figure 2 represents USD/AUD daily spot rates (Candlesticks), overlaid with the Bollinger Bands indicator (Blue lines are the upper and lower bands). On the left part of the chart (Ranging Markets),



Figure 2: USD/AUD and Bollinger Bands

between July and December 2016, USD/AUD was trading within a 300-pip range around \$0.7550, and each time the exchange rate went above (or below) the upper (or lower) band, it reverted and went back to its *mean* (SMA 20-day, red line).

However, this strategy does not work anymore when volatility starts to rise. In more 'volatile' markets (right part of the chart), traders would have suffer from big losses if they would have kept this mean-reverting strategy.

I use this indicator in periods of quite FX markets, in order to set up my resistance and support levels on each currency pair. As long as nothing major is happening on the macro side, it is a practical indicator for range trading.