**The Relative Strength Index (RSI)**

In this issue’s Feature beginning on page 16, we discuss using relative strength analysis to pick exchange-traded funds (ETFs). This is just one example of a relative strength indicator.

Another relative strength measure, the relative strength index (RSI), was developed by J. Welles Wilder in 1978. This widely used momentum indicator is called an oscillator because it moves, or oscillates, between two fixed values based on the price movement of the underlying security or index. However, the RSI is an internal measure of price strength and does not compare price action to an index or other security.

Over shorter periods of time, which is how the RSI is typically used, the relative strength index is often a leading indicator, meaning it can signal price tops and bottoms before they actually happen.

**Calculation**

When calculating the RSI, you must first decide on the period length you wish to analyze. Wilder used 14 periods as the default look-back period when he first developed the RSI, with a period defined as a length of time such a day, a week or a month. However, depending on the software or website you are using, nine or 25 periods might be the default value. The RSI calculation is as follows:

\[
RSI = 100 - \left[ \frac{100}{1 + RS} \right]
\]

Where:

\[
RS = \frac{\text{Average gain on up periods}}{\text{Average loss on down periods}}
\]

The initial calculations for average gain and average loss are simple averages. Losses are expressed as positive values, not negatives:

Initial Average Gain = Sum of gains over last \(n\) periods ÷ \(n\)

Initial Average Loss = Sum of losses over last \(n\) periods ÷ \(n\)

The subsequent calculations are based on prior averages and the current gain or loss:

\[
\text{Average Gain} = \frac{\text{previous average gain} \times (n - 1) + \text{current gain}}{n}
\]

\[
\text{Average Loss} = \frac{\text{previous average loss} \times (n - 1) + \text{current loss}}{n}
\]

**Overbought/Oversold Conditions**

The calculation normalizes the relative strength index, thereby turning it into an oscillator that fluctuates between zero and 100. Using a normalized RSI makes it easier for traders to identify extreme values.

When the RSI rises above 70, an overbought condition potentially exists—signaling that prices are too high and may be susceptible to decline. Likewise, when the RSI dips below 30, an oversold condition potentially exists—prices are considered to be too low and poised for a rally. You can adjust the sensitivity of the indicator to price movements by adjusting the number of periods. Lowering the number of periods increases sensitivity while raising the number of periods lowers sensitivity. Increasing the sensitivity increases the likelihood of the indicator reaching overbought or oversold levels. In addition, the volatility of the underlying security can influence the frequency at which overbought and oversold conditions are reached.

The chart in Figure 1 shows Abbott Laboratories (ABT) with a 14-day RSI. From the chart we see that ABT shares became overbought in early August 2010 and found resistance around $50.80 after rising over 14% in less than two months. Following this peak, ABT shares dipped roughly 5% over the next two weeks before resuming their upward march. This culminated in another overbought situation in mid-October following a 10% rise from the August lows. This time, Abbott shares subsequently...
fell over 14% in a month and a half, resulting in an oversold condition that lasted for nearly four weeks in November. Note that the oversold situation preceded the late-November bottom, from which the share price rebounded to test resistance at the $48.20 – $48.30 level on three occasions. Failing to break through this resistance level on its third attempt, ABT shares dropped roughly 6.5% in a week at the end of February 2011 to arrive at the final oversold condition on the chart.

**Divergences**

Divergences occur between a technical indicator and the security’s price when the direction of the indicator does not confirm the price trend. Figure 2 is an example of bearish divergence—the security records higher highs while the RSI forms lower lows—for Wells Fargo (WFC). As WFC shares recorded a series of higher highs between January and mid-February 2011, the RSI showed weakening momentum. The downturn for WFC shares that began on February 15 confirmed this weakening momentum.

Figure 3 shows a bullish divergence that took place with Cisco Systems (CSCO) in November–December 2010. In early November, CSCO shares saw a strong sell-off as they fell over 20% in less than a week. This strong downward momentum drove the RSI to an oversold condition. Over the next few weeks, CSCO shares continued to record lower lows while the RSI was rebounding. Eventually, the improving momentum in RSI was confirmed when CSCO shares bottomed in early December and began a 17.5% climb over the next two and a half months.

**Conclusion**

Short-term investors have been using the RSI for over 30 years. While no indicator is infallible, the RSI has proven adept at identifying potential turning points in prices.