THE BOLLINGER BANDIT TRADING STRATEGY

Standard deviation is a number that indicates how much on average each of the values in the distribution deviates from the mean (or center) of the distribution. Bollinger Bands, created by John Bollinger in the 1960s, is an indicator that uses this statistical measure to determine support and resistance levels. This indicator consists of three lines and is very simple to derive; the middle line is a simple moving average of the underlying price data and the two outside bands are equal to the moving average plus or minus one standard deviation. Based on theory, two standard deviations equates to a 95 percent confidence level. In other words, 95 percent of the time the values used in our sampling fell within two standard deviations of the average. Initially, Bollinger Bands were used to determine the boundaries of market movements. If a market moved to the upper band or lower band, then there was a good chance that the market would move back to its average. We have carried out numerous tests on this hypothesis and seemed to always come back with failure. Instead of using the upper band as a resistance point, we discovered, as others have, that it worked much better as a breakout indicator. The same goes for the lower band. The Bollinger Bandit uses one standard deviation above the 50-day moving average as a potential long entry and one standard deviation below the 50-day moving average as a potential short entry. This system is a first cousin of King Keltner. They are similar in that they are longer-term channel breakout systems. However, this is where the similarities end. Instead of simply liquidating a position when the market moved back to the moving average, we concocted a little twist to this exit technique. From observing the trades on the King Keltner, we discovered that we gave back a good portion of the larger profits waiting to exit the market at the moving average. So, for the Bollinger Bandit, we incorporated a more aggressive trailing stop mechanism. When a position is initiated, the protective stop is set at the 50-day moving average. Every day that we are in a position, we decrement the number of days for our moving average calculation by one. The longer that we are in a trade, the easier it is to exit the market with a profit. We keep decrementing the number of days in our moving average calculation until we reach ten. From that point on, we do not decrement. There is one more element to our exit technique: the moving average must be below the upper band if we are long and above the lower band if we are short. We added this element to prevent the system from going back into the same trade that we just liquidated. If we hadn't used this additional condition and we were long and the moving average was above the upper band, the long entry criteria would still be set up and a long trade would be initiated.

   Previously, we stated that the upper band and lower band were potential buy/sell entries. Potential is the key word. One more test must be passed before we initiate a position; the close of today must be greater than the close of 30 days ago for a long position and the close of today must be less than the

close of 30 days ago for a short position. This additional requirement is a trend filter. We only want to go long in an uptrend and short in a downtrend.

The Bollinger Bandit requires four tools: (1) Bollinger Bands, (2) a moving average of closing prices, (3) a rate of change calculation, and (4) a counter. This system is longer term in nature, so we will use 50 days in our calculations.

Bollinger Bandit Pseudocode

```
LiqDay is initially set to 50
upBand = Average(Close,50) + StdDev(Close,50) *1.25
dnBand = Average(Close,50) - StdDev(Close,50) *1.25
rocCalc = Close of today - Close of thirty days ago

        Set liqLength to 50
        If rocCalc is positive, a long position will be initiated when
            today's market action >= upBand
        If rocCalc is negative, a short position will be initiated when
            today's market action <= dnBand
        liqPoint = Average(Close, 50)
        If liqPoint is above the upBand, we will liquidate a long position if
            today's market action <= liqPoint
        If liqPoint is below the dnBand, we will liquidate a short position
            if today's market action >= liqPoint
        If we are not stopped out today, then liqLength = liqLength - 1
        If we are stopped out today, then reset liqLength to fifty
```

Bollinger Bandit Program

```
{Bollinger Bandit by George Pruitt—program uses Bollinger Bands and Rate of
change to determine entry points. A trailing stop that is proportional with
the amount of time a trade is on is used as the exit technique.}

Inputs: bollingerLengths(50),liqLength(50),rocCalcLength(30);
Vars: upBand(0),dnBand(0),liqDays(50),rocCalc(0);
upBand = BollingerBand(Close,bollingerLengths,1.25);
dnBand = BollingerBand(Close,bollingerLengths,-1.25);

rocCalc = Close - Close[rocCalcLength-1]; {remember to subtract 1}
if(MarketPosition <> 1 and rocCalc > 0) then Buy("BanditBuy")tomorrow upBand
   stop;
if(MarketPosition <>-1 and rocCalc < 0) then SellShort("BanditSell") tomorrow
   dnBand stop;

if(MarketPosition = 0) then liqDays = liqLength;
if(MarketPosition <> 0) then
begin
        liqDays = liqDays - 1;
        liqDays = MaxList(liqDays,10);
```

```
end;
if(MarketPosition = 1 and Average(Close,liqDays) < upBand) then
      Sell("Long Liq") tomorrow Average(Close,liqDays) stop;
if(MarketPosition = -1 and Average(Close,liqDays) > dnBand) then
      BuyToCover("Short Liq") tomorrow Average(Close,liqDays) stop;
```

The Bollinger Bandit program demonstrates how to:

- Invoke the Bollinger Band function. This function call is less than intuitive and must be passed three parameters: (1) price series, (2) number of elements in the sample used in the calculation for the standard deviation, and (3) number of deviations above/below moving average. You must use a negative sign in the last parameter to get the band to fall under the moving average.
- Invoke the MaxList function. This function returns the largest value in a list.
- Do a simple rate of change calculation.
- Create and manage a counter variable, liqLength.

Bollinger Bandit trading performance is summarized in Table 6.2.

Table 6.2
Bollinger Bandit Performance

System Name: Bollinger Bandit   Commission/Slippage = $75
Tested 1982 – 3/19/2002

| Markets	Total Net Profit	Max. DrawDown	# of Trades	% Wins	Max. Cons. Losers
British Pound	$ 38,750.00	$ (43,612.50)	194	33.51%	20
Crude Oil	$ 47,242.50	$ (17,522.50)	170	41.76%	8
Corn	$ (5,112.50)	$ (12,937.50)	213	29.58%	13
Copper	$ 2,300.00	$ (9,587.50)	138	36.23%	12
Cotton	$ 26,695.00	$ (12,437.50)	220	32.73%	8
Deutsch Mark	$ 51,075.00	$ (13,812.50)	186	41.40%	6
Euro Currency	$ 8,737.50	$ (9,012.50)	29	44.83%	7
Euro Dollar	$ 31,927.50	$ (6,622.50)	196	35.71%	19
Heating Oil	$ 16,883.14	$ (18,378.89)	201	38.81%	10
Japanese Yen	$ 121,937.50	$ (21,462.50)	180	37.22%	8
Live Cattle	$ (16,867.50)	$ (25,411.50)	224	26.79%	18
Natural Gas	$ 85,897.50	$ (21,737.50)	113	44.25%	6
Soybeans	$ (15,925.00)	$ (40,862.50)	215	31.16%	15
Swiss Franc	$ 76,312.50	$ (9,987.50)	188	40.96%	5
Treasury Note	$ 39,625.00	$ (11,487.50)	202	38.12%	9
U.S. Bonds	$ 48,381.25	$ (15,343.75)	204	36.27%	6
Wheat	$ (20,037.50)	$ (21,931.25)	219	29.68%	11
Total	$ 537,821.89		3092		
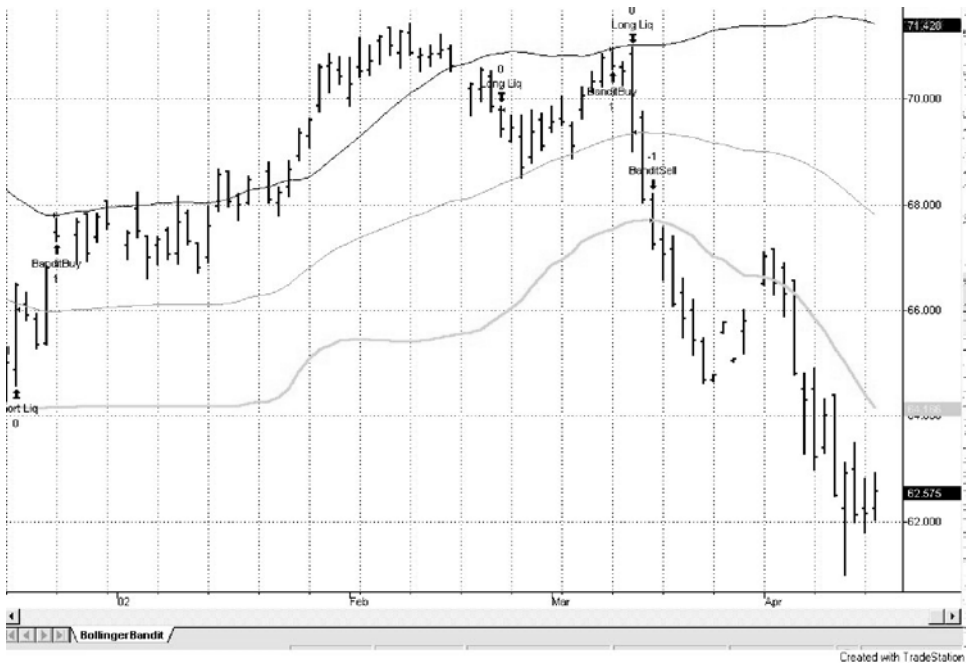
Figure 6.2   Bollinger Bandit Trades

A visual example of how this system enters and exits trades is shown in Figure 6.2.

Bollinger Bandit Summary

Overall trading performance was positive. You can see the similarities between the Bollinger and Keltner-based systems. The same markets that made good money in one system made good money in the other. These systems would not work well together due to their high level of correlation. This system did exceptionally well in the Japanese Yen and Natural Gas. Through further investigation, we discovered that our trailing stop mechanism only marginally increased profit and decreased draw down. Nonetheless, the concept probably adds a higher comfort level when a trade is initiated. We know that our risk should diminish the farther we get into a trade. This is due to the fact that a shorter-term moving average follows closer to the actual market than a longer-term average.