THE THERMOSTAT TRADING STRATEGY

We actually traded a strategy very similar to Thermostat. We named this system based on its ability to switch gears and trade in the two modes of the market, congestion and trend. This system sprung from our observations on the success of particular systems on particular market sectors. We thought that one system that also possessed a dual nature could be created to capitalize on the market's two modes. We created a function to help determine the market's mode. Based on the output of this function, the Thermostat switches from a trend-following mode to a short-term swing mode.

The trend-following mode uses a trend following mechanism similar to the one found in the Bollinger Bandit. The short-term swing system is an open range breakout that incorporates pattern recognition. The function that causes the system to switch its approach is the same function that we described in Chapter 4, the ChoppyMarketIndex. If you have forgotten this function, here is a brief review. This function compares the distance the market wanders and the actual distance the market traveled (Abs(Close − Close[29])/(Highest(High,30) − Lowest(Low,30))*100). The function generates values from 0 to 100. The larger the value, the less congested the current market is.

If the ChoppyMarketIndex function returns a value of less than 20, then the system goes into the short-term swing mode. Basically, the market is demonstrating a swinging motion and the system tries to catch the swings and pull out a small profit. Thermostat tries to accomplish this feat by buying/selling on small market impulses. If the impulse is large enough, then the system jumps on and tries to ride the market out for the next few days. Through in-depth analysis of short-term swings, we have discovered that there exist certain days when it is better to buy than sell and vice versa. These days can be determined by a simple visual pattern. If today's closing price is greater than the average of yesterday's high, low, and close (also known as the key of the day), then we feel tomorrow's market action will probably be bearish. However, if today's closing price is less than the average of yesterday's high, low, and close, then today's market will probably behave in a bullish manner. We classify these days as sell easier and buy easier days, respectively. We know that we can't predict the market, and this is the reason we use the term, *easier*. Even though today may be a buy easier day, we can still sell and vice versa. We just make it easier to buy on buy easier days and sell on sell easier days. A position is triggered when the market moves a certain range from the open price.

If today is a buy easier day then:

```
Initiate a long position at the open price + 50% of the ten-day average true
   range.
Initiate a short position at the open price − 100% of the ten-day average
   true range.
```

If today is a sell easier day then:

```
Initiate a short position at the open price — 50% of the ten-day average true
    range.
Initiate a long position at the open price + 100% of the ten-day average true
    range.
```

Sometimes the market will have a false impulse in the opposite direction of the short-term swing. These types of impulses can whipsaw you in and out of the market and only make money for your broker. We try to prevent this by comparing our calculated buy stop with the three-day moving average of the low prices. If our calculated buy stop is less than the three-day moving average, we then move the buy stop up to the average calculation. If our sell stop is greater than the three-day moving average of the high prices, we then move a sell stop down to the three-day average. The system is in the market 100 percent of the time, when we are in choppy mode. Our short-term strategy of Thermostat is: If we have a move, we will be ready for it. It seems rather complicated, but once we get it programmed we can forget about the complexity.

   If the ChoppyMarketIndex function returns a value greater than or equal to 20, then the system goes into the long-term trend-following mode. Our function has basically informed us that the market is moving in a general direction, without a bunch of noise. One of the best trend following approaches that we have seen is the same approach that we used in the Bollinger Bandit. A long position is initiated when the market breaks through the upper Bollinger Band and initiates a short position when the market breaks through the lower Bollinger Band. In the case of the trend-following component of Thermostat, we used two standard deviations in our calculation, instead of the 1.25 we used in the Bollinger Bandit. If we have a long position, then we liquidate if the price moves back to the moving average and vice versa. We use the same 50-day moving average as we did before.

   Many times, you will have a position on when the market switches modes. If we switch from trending to congestion, we simply use the short-term entry method to get out of our trend mode position. However, if the market switches from congestion to trending and we have a position on, we then use a three-average true-range protective stop. This type of stop is utilized because the 50-day moving average exit that we used in trend mode is not congruent with our short-term entry technique. When designing trading systems, your entry and exit techniques must have similar time horizons. You wouldn't use two-day low trailing stop on a long position that was initiated by the crossing of a 75-day moving average. If we are long, we calculate the average true range for the past ten days and multiply this calculation by three and subtract the result from our entry price. If we are short, we again calculate the average true range for the past ten days and multiply this calculation by three but then add the result to

our entry price. Once we exit the positions that were initiated in choppy mode, we begin using the trend-following system to initiate any new signals.

Thermostat Pseudocode

Determine current market mode by using the ChoppyMarketIndex function. If the ChoppyMarketIndex function returns a value of less than 20, then use the short-term swing approach.

```
atr10 = AverageTrueRange(10)
keyOfDay = (High + Low + Close)/3
buyEasierDay = 0
sellEasierDay = 0
if(Close > keyOfDay) then sellEasierDay = 1
if(Close<=keyOfDay) then buyEasierDay = 1
avg3Hi = Average(High,3)
avg3Lo = Average(Low,3)
if(buyEasierDay = 1) then
     longEntryPoint = Open + atr10 * 0.5
     shortEntryPoint = Open - atr10 * 0.75
if(sellEasierDay = 1) then
     longEntryPoint = Open + atr10 * 0.75
     shortEntryPoint = Open - atr10 * 0.5
longEntryPoint = MaxList(longEntryPoint,avg3Lo)
shortEntryPoint = MinList(shortEntryPoint,avg3Hi)
Initiate a long position of today's market action >= longEntryPoint
Initiate a short position of today's market action <= shortEntryPoint
```

If the ChoppyMarketIndex function returns a value greater than or equal to 20, then use the long-term trend following approach.

If you have a short position that was initiated by the short-term swing approach then

```
shortLiqPoint = entryPrice + 3 * atr10
Liquidate short position if today's market action
   >= shortLiqPoint
```

If you have a long position that was initiated by the short-term swing approach then

```
longLiqPoint = entryPrice - 3 * atr10
Liquidate long position if today's market action
   <= longLiqPoint
upBand = Average(Close,50) + StdDev(Close,50) * 2.00
dnBand = Average(Close,50) - StdDev(Close,50) * 2.00
avg50 = Average(Close,50)
Initiate a long position if today's market action >= upBand
```

```
        Initiate a short position if today's market action <= dnBand
        Liquidate long position if today's market action <= avg50
        Liquidate short position if today's market action >= avg50
```

Thermostat Program

```
{Thermostat by George Pruitt
Two systems in one. If the ChoppyMarketIndex is less than 20 then we are in a
swing mode. If it is greater than or equal to 20 then we are in a trend mode.
Swing system is an open range breakout incorporating a buy easier/sell easier
concept. The trend following system is based on bollinger bands and is
similar to the Bollinger Bandit program.}

Inputs: bollingerLengths(50),trendLiqLength(50),numStdDevs(2),
swingPrcnt1(0.50),swingPrcnt2(0.75),atrLength(10),
swingTrendSwitch(20);
Vars:cmiVal(0),buyEasierDay(0),sellEasierDay(0),trendLokBuy(0),
trendLokSell(0),keyOfDay(0),swingBuyPt(0),swingSellPt(0),
trendBuyPt(0),trendSellPt(0),swingProtStop(0);

cmiVal = ChoppyMarketIndex(30);
buyEasierDay = 0;
sellEasierDay = 0;

trendLokBuy = Average(Low,3);
trendLokSell= Average(High,3);

keyOfDay = (High + Low + Close)/3;
if(Close > keyOfDay) then sellEasierDay = 1;
if(Close <= keyOfDay) then buyEasierDay = 1;

if(buyEasierDay = 1) then
begin
      swingBuyPt = Open of tomorrow + swingPrcnt1*AvgTrueRange(atrLength);
      swingSellPt = Open of tomorrow - swingPrcnt2*AvgTrueRange(atrLength);
end;
if(sellEasierDay = 1) then
begin
      swingBuyPt = Open of tomorrow + swingPrcnt2*AvgTrueRange(atrLength);
      swingSellPt = Open of tomorrow - swingPrcnt1*AvgTrueRange(atrLength);
end;

swingBuyPt = MaxList(swingBuyPt,trendLokBuy);
swingSellPt = MinList(swingSellPt,trendLokSell);

trendBuyPt = BollingerBand(Close,bollingerLengths,numStdDevs);
trendSellPt = BollingerBand(Close,bollingerLengths,- numStdDevs);
```

```
if(cmiVal < swingTrendSwitch)then
begin
      if (MarketPosition <> 1) then Buy("SwingBuy") next bar at swingBuyPt
          stop;
      if(MarketPosition <> -1) then SellShort("SwingSell") next bar at
          swingSellPt stop;
end
else
begin
      swingProtStop = 3*AvgTrueRange(atrLength);
      Buy("TrendBuy") next bar at trendBuyPt stop;
      SellShort("TrendSell") next bar at trendSellPt stop;
      Sell from Entry("TrendBuy") next bar at Average(Close,trendLiqLength)
          stop;
      BuyToCover from Entry("TrendSell") next bar at
          Average(Close,trendLiqLength) stop;
      Sell from Entry("SwingBuy") next bar at EntryPrice - swingProtStop
          stop;
      BuyToCover from Entry("SwingSell") next bar at EntryPrice +
          swingProtStop stop;
end;
```

The Thermostat program demonstrates how to:

- Invoke the ChoppyMarketIndex function. This function simply needs the number of bars in the calculation to be passed to it.
- Properly use an if-then-else control structure.
- Tie an exit strategy to a specific entry strategy using the *from entry* keywords.
- Calculate the key of the day. Also known as the day trader's pivot point.
- Use the next day's opening price in the calculation of our buy/sell orders.

Thermostat trading performance is summarized in Table 6.3.

A visual example of how this system enters and exits trades is shown in Figure 6.3.

Thermostat Summary

This program performed admirably in most of the markets. The synthesis of the two different approaches seemed like the way to go in the interest-bearing markets, Treasury bonds, and Treasury notes. Again, we were able to demonstrate an approach with one set of parameters for all markets. If there is only one thing you take away with you from this book, it should be the knowledge

Table 6.3
Thermostat Performance

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

Markets	Total Net Profit	Max. DrawDown	# of Trades	% Wins	Max. Cons. Losers
British Pound	$ 24,518.75	$ (59,500.00)	260	35.00%	14
Crude Oil	$ 37,172.50	$ (15,927.50)	242	34.71%	10
Corn	$ 15,987.50	$ (5,900.00)	243	37.04%	9
Copper	$ (6,087.50)	$ (18,325.00)	205	31.71%	9
Cotton	$ 2,490.00	$ (22,707.50)	311	32.48%	11
Deutsch Mark	$ 60,362.50	$ (20,200.00)	226	34.96%	8
Euro Currency	$ 24,687.50	$ (12,600.00)	33	54.55%	5
Euro Dollar	$ 37,255.00	$ (9,320.00)	235	33.62%	14
Heating Oil	$ 13,448.13	$ (34,497.29)	279	32.62%	15
Japanese Yen	$ 121,250.00	$ (23,400.00)	189	36.51%	7
Live Cattle	$ 3,572.50	$ (23,887.50)	290	32.76%	15
Natural Gas	$ 83,272.50	$ (18,272.50)	152	36.84%	7
Soybeans	$ 35,331.25	$ (61,325.00)	319	28.84%	15
Swiss Franc	$ 124,887.50	$ (13,250.00)	206	44.66%	7
Treasury Note	$ 101,075.00	$ (11,621.88)	231	40.26%	11
U.S. Bonds	$ 103,081.25	$ (13,562.50)	268	41.79%	9
Wheat	$ (21,231.25)	$ (23,218.75)	331	28.10%	14
Total	$ 761,073.13		4020		

that market principles are generally universal. Thermostat falls in the category of intermediate term trend follower; it generates around 15 to 20 trades per year. Due to its ability to trade a shorter time horizon, Thermostat would probably be a good candidate to trade in concert with a longer-term approach. If you look at the trade-by-trade analysis, you probably won't see many trades labeled as TrendBuy or TrendSell. This may lead you to believe that the system was mostly in the choppy trading mode. You would be wrong. In fact, the system was considerably more in the trending mode (as defined as a Choppy-MarketIndex reading above 20). Many times after a trade is initiated in the choppy or swing mode, the overall market mode switches to trending and stays in that mode for an extended period of time. If the market changes mode and doesn't trend in the direction of the trade, it eventually is stopped out. If the market does trend in the direction of the trade, then the position is held until
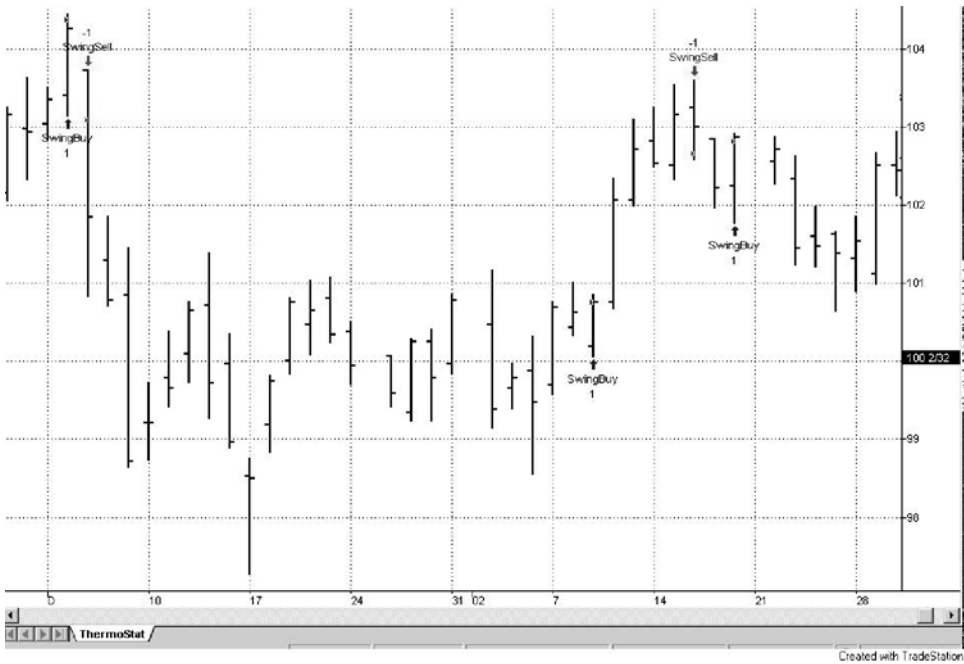
Figure 6.3   Thermostat Trades

the market either ends the trend or changes mode. Either way, the trade actually turns out to be a trend trade instead of a choppy or swing trade. If there is a large profit, then the Swing Buy/Sell gets the credit. In other words, the system performance is generated by both systems, even though it doesn't look like it.