Applying Levine's Topfinder/Bottomfinder

Applying MIDAS To Daily And Weekly Charts

In this second part of this series we go one step further by adding deeper insight into price action.

by Andrew Coles and David Hawkins

So far, we have explored what technical analyst Paul Levine called the scientific aspect of the *market interpretation/data analysis system* (MIDAS) — that is, the quantitative laws that give rise to MIDAS and the curves of Levine's indicator, the *topfinder/bottomfinder* (TB-F). In this article, we will examine what Levine called the engineering aspect of MIDAS — the practical trading rules on which the system is based.

This first section on the application of TB-F to daily and weekly charts is largely the contribution of David Hawkins. Hawkins will expound on the rules governing the application of TB-F as recommended by Levine using StockShare (v2). As a result of Hawkins's input, this program now has MIDAS and TB-F plugins for its end-of-day platform.

Like the original WinMidas, MIDAS curves and the *D* component of the TB-F algorithm are calculated automatically in StockShare by the user selecting the curves and dragging them with a mouse.

It should be emphasized too that David Hawkins is more conservative than Andrew Coles in demanding the completion of half of an accelerated move before attempting

to fit a TB-F curve. This is reflected in the TB-F plugin in StockShare (v2). No such limitation exists in the eSignal version.

PRELUDE: EQUIVOLUME

First of all, let us introduce (or reintroduce) you to the Equivolume style of technical charting devised by Richard Arms Jr. This charting form combines price and volume in one chart pane so that times of heavy trading volume are emphasized while light volume periods are deemphasized. Hawkins uses this chart style because the *x*-axis is proportional to cumulative volume and not time; as a result, MIDAS and TB-F curves will often plot more smoothly. In addition, Equivolume charting allows full use of Arms's other volume analysis techniques, which are supportive of the MIDAS framework. (See sidebar "Equivolume Charting" on page 56.)

It is entirely up to you whether you'll use slightly smoother curves like this, or prefer traditional candlestick charting the way Coles does, because of the alternative benefits this brings at the expense of smoother curves.

TB-F ALGORITHM ON THE CHARTS

Figure 1 is a weekly chart of OIL, the iPath S&P Crude Oil Total Return Index exchange traded note (ETN), with time along the *x*-axis. The green MIDAS curves are in a sevenfold hierarchy of support, while the red MIDAS curves track the even more dramatic fall. The curves in this chart are much less smooth than their counterparts in Equivolume charts with cumulative volume along the *x*-axis, as can be seen when comparing Figure 1 with Figure 2. Equivolume also provides a fairly clear impression of how much trading volume is being used up in a way that parallels the internal consumption of volume in the MIDAS methodology.

Is the TB-F indicator best regarded as an entry or an exit indicator?

FIGURE 1: WEEKLY CHART OF OIL, THE IPATH S&P CRUDE OIL TOTAL RETURN. With time along the *x*-axis, MIDAS (and TB-F) curves appear less smooth than their counterparts in Equivolume charts.

FIGURE 2: WEEKLY CHART OF OIL, THE IPATH S&P CRUDE OIL TOTAL RETURN. Here, MIDAS and TB-F curves plot more smoothly in virtue of cumulative volume in the *x*-axis instead of time.

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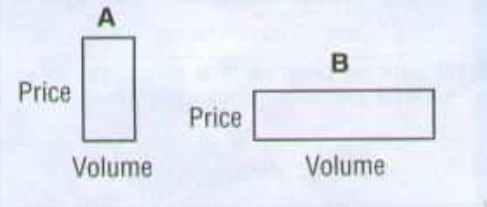
EQUIVOLUME CHARTING

Equivolume charting is a method of charting developed by Richard Arms based on the principle that the market is a function of volume, not time, and so gives more emphasis to volume than traditional bar charts.

Equivolume charts put volume rather than time on the horizontal axis and depict each day as a box. The bottom and top of the box represent the low and high for the day, while the width is the volume of shares or contracts traded during that day. The shape of the box generated is thus a visual representation of the relationship between price range and volume. Tall, thin rectangles represent large movement on comparatively light volume, while short wide boxes represent small price movement compared to the volume.—Editor



Equivolume box A illustrates low volume and easy price movement while box B shows heavy volume with little price movement.

TB-F ALGORITHM IN RELATION TO ORIGINAL MIDAS FORMULA

The basic equation for the MIDAS indicator is as follows:

$$\text{MIDAS} = \frac{[y(x_i) - y(x_i - d_{ij})]}{d_{ij}}$$

where:

x_i = cumulative volume on bar

y_i = cumulative average price ((H+L)*0.5) * volume on bar

d_{ij} = cumulative volume difference between bars i and $j = x_i - x_j$

Here is the equation for the TB-F indicator:

$$\text{Topfinder / Bottomfinder} = \frac{[y(x_i) - y(x_i - e_{ij})]}{e_{ij}} \; ;$$

$$e = d_{ij} * \left(1 - \frac{d_{ij}}{D}\right)$$

where again:

x_i = cumulative volume on bar

y_i = cumulative average price ((H+L)*0.5) * volume on bar

d_{ij} = cumulative volume difference between bars i and $j = x_i - x_j$

—A.C.

PROGRAMMING MIDAS AND I-MIDAS IN METASTOCK

Code 1: This code is for MIDAS to plot on the daily charts in MetaStock in the way originally conceived by Paul Levine. Users will be requested to input a year, month, and day corresponding to an appropriate swing high or low.

```
{User defined input}
sm:=Input("starting month",1,12,1);
sd:=Input("starting day of month",1,31,1);
sy:=Input("starting year",1980,2100,2000);
start:= sd=DayOfMonth() AND sm=Month() AND sy=Year();
{mid price}
pv:=MP()*V;
{Midas calculation}
denom:= If(Cum(V)-
ValueWhen(1,start,Cum(V))=0,1,Cum(V)-
ValueWhen(1,start,Cum(V)));
If(BarsSince(start),(Cum(pv)-ValueWhen(1,start,Cum(pv)))/
denom,MP())
```

Code 2: This code is for I-MIDAS to plot on any intraday chart in MetaStock Pro. Users will also be requested to input the hour and minute. Speed can be an issue when a number of M curves are plotted in MetaStock and MetaStock Pro. This is an area currently being worked on by the author.

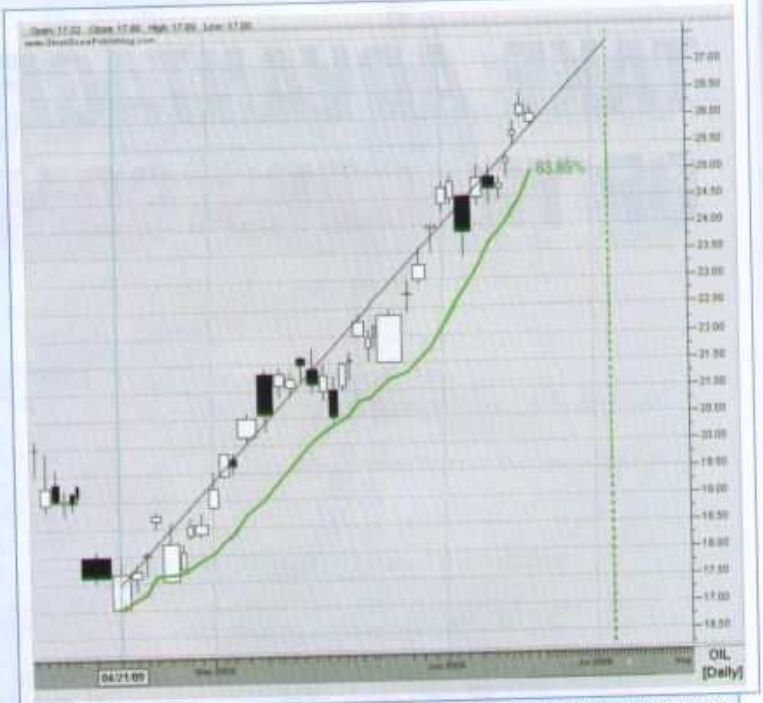
```
{User defined input}
sm:=Input("starting month",1,12,1);
sd:=Input("starting day of month",1,31,1);
sy:=Input("starting year",1980,2100,2000);
sh:=Input("hour", 1,24,1);
se:=Input("minute",0,60,0);
start:= sd=DayOfMonth() AND sm=Month() AND sy=Year()
  AND sh=Hour() AND se=Minute();
{mid price}
pv:=MP()*V;
{Midas calculation}
denom:= If(Cum(V)-
ValueWhen(1,start,Cum(V))=0,1,Cum(V)-
  ValueWhen(1,start,Cum(V)));
If(BarsSince(start),(Cum(pv)-ValueWhen(1,start,Cum(pv)))/
  denom,MP())
```

—A.C.

USING LINEAR REGRESSION TO OBTAIN A PRICE TARGET

Recall that when using a charting system such as Equivolume, the horizontal (x) axis measures cumulative volume and not time. Therefore, if, say, you know that 80% of cumulative volume has been used up in the move, you can manually insert a vertical line on the chart that shows where, in cumulative volume terms, the trend will end. To make this a little more precise, you can then extend a linear regression line from the current price action to this vertical line. Where the two intersect is the approximate end of the trend, not only in precise cumulative volume terms but also in terms of a roughly approximate linear extrapolation from current price behavior.

In sidebar Figure 2, you see the weekly chart of OIL, the iPath S&P Crude Oil Total Return Index. Here D is 84% complete, so the vertical dotted line locates the horizontal position of the expiration of the TB-F curve at a 100% expiration of D. The black line is the linear regression fit to the closing prices, which is then extended into the future to the point where it intersects the dotted vertical line at a price of 27.3. Here, we have an approximate price extrapolation as well as a firm cumulative volume prediction.



SIDEBAR FIGURE 2: WEEKLY CHART OF OIL, THE IPATH S&P CRUDE OIL TOTAL RETURN INDEX. The vertical line is whatever amount of cumulative volume has already been used up in the move plus the remainder. For example, if D is 100 units and 70% of these units have been used up, the vertical line represents a projection forward of 30% or 30 units. A linear regression line is then extended forward from the current price activity to intersect the vertical line. Where they cross is a rough and ready price target in relation to the accurate cumulative volume prediction.

Moving on, let's take our first look at the TB-F algorithm. Figure 3 is the same OIL, this time with the MIDAS curves stripped away. Figure 3 shows a green TB-F curve fitted to the first two significant pullbacks straddling the "TF1" label. When this cumulative volume (the "fuel" for the move) is burned out, TB-F comes to a stop and the market temporarily halts before moving on.

Does this mean that this particular TB-F curve's signal is premature? No, for two reasons. First, on the very next bar following the completion of TB-F, price pulled back to the dotted green line labeled S6, one of the green MIDAS curves on Figure 2. Second, the slope of the subsequent trend became shallower and the trading volume much greater, indicating that the nature of the trading had significantly changed from that of the uptrend to that the first TB-F tracked.

We have started with Figure 3 to drive home an important lesson concerning the TB-F indicator. What the TB-F algorithm does is:

FIGURE 3: WEEKLY CHART OF OIL, THE IPATH S&P CRUDE OIL TOTAL RETURN INDEX. A TB-F curveis fitted to the two pullbacks straddling TF1. On expiration of *D*, price pulls back briefly to the most proximate MIDAS support curve.

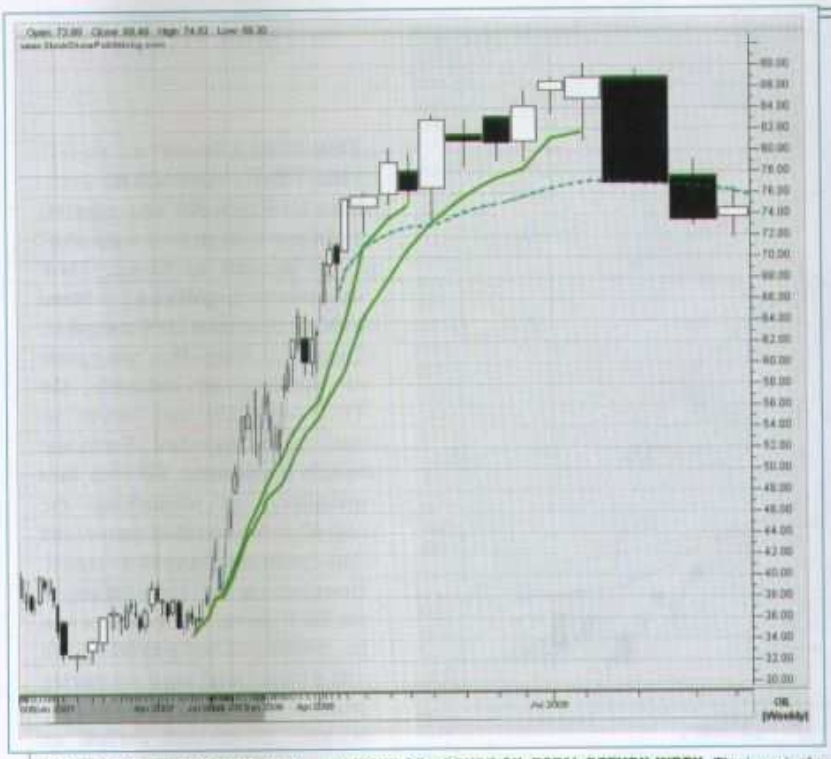


FIGURE 4: WEEKLY CHART OF OIL, THE IPATH S&p CRUDE OIL TOTAL RETURN INDEX. The launch of a second TB-F, this time fitted to the pullback to the S6 MIDAS curve, produced another accurate indication of where price was going to react.

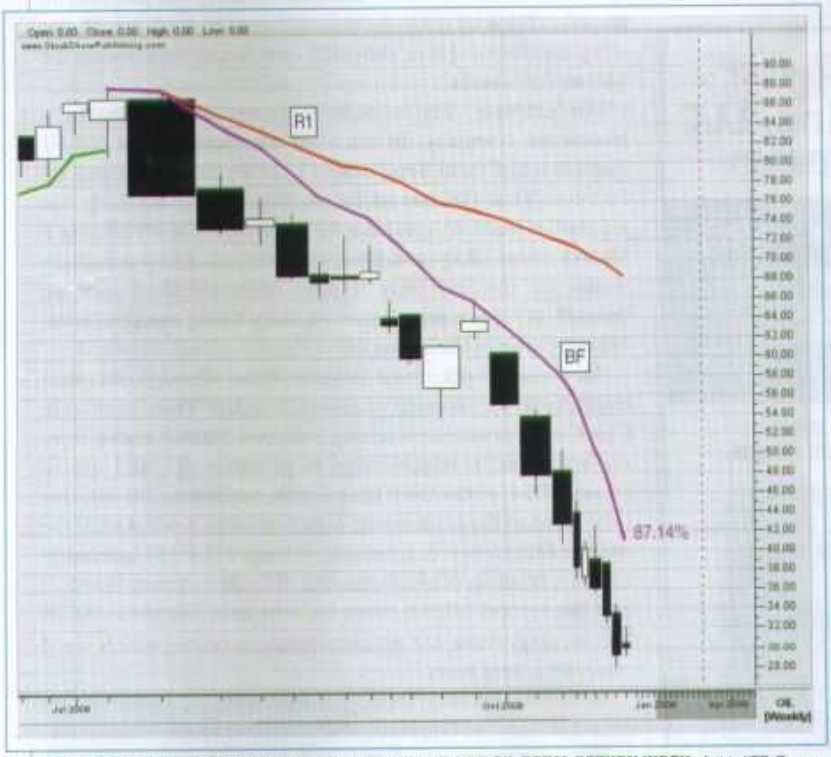


FIGURE 5: WEEKLY CHART OF OIL, THE IPATH S&P CRUDE OIL TOTAL RETURN INDEX. A third TB-F curve is launched on the bar on which TB-F2 terminated. The fitting to the small pullback suggests that the current downtrend is 87% complete. A vertical line helps establish this point visually.

a. Identify an accelerated price move

b. Identify where it ends, *and*

c. Imply that where it ends will result in some form of price response, especially a pullback to the nearest MIDAS curve. What it does not do, however, is spell out in any forecasting detail precisely what price will do. No technical forecasting indicator can ever do that.

Let's continue this lesson by looking at Figure 4, which moves on in time to the actual end of the trend. When TB-F1 expired and price pulled back to the S6 MIDAS curve, we launched another TB-F curve, TB-F2, from the same starting point as TB-F, but this time fitting it to the low of the bar, which found support on S6. When this second TB-F expires, price again pulls back to S6 but breaks down through it, beginning a steep downtrend. Again, a detailed prediction was not possible, only that on expiry of *D*, price would react in some way. (In our next article, Coles will discuss how to use TB-F with price and time filters, which give a clearer hint of how price is likely to react on the termination of a TB-F curve.)

Moving on with the lesson and now analyzing the downtrend, we see from Figure 5 that the displacement of price from the nearest MIDAS resistance curve invites us to launch a TB-F curve. A third (pink) TB-F curve is now launched in Figure 5 from the termination bar of the second TB-F curve, this time fitted to a pullback further into the trend's progression. This trend is still in progress.

Note we have StockShare (v2) telling us how much cumulative volume (87.14%) has been used up. This means that the horizontal distance (along the *x*-axis) from the curve's launch to the present time represents 87% of the "fuel" in D. Thus, we manually place the dotted vertical line at the horizontal position for the projected end. In the sidebar "Using linear regression to obtain a price target" (see page 58), we will indicate how to use a simple linear regression line to obtain an approximate price target.

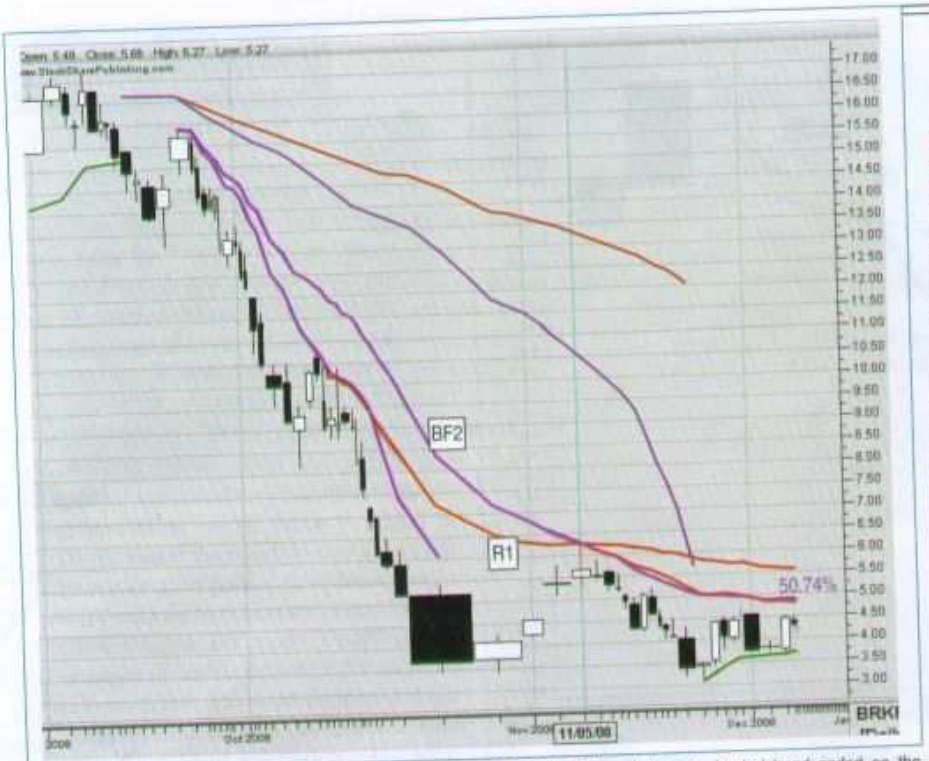


FIGURE 6: BRUKER CORP. (BRKR), A BIOSCIENCE COMPANY. Although the accelerated trend ended on the termination of TB-F1, it failed to penetrate the MIDAS R1 curve. As a result, there was no long entry. Further, the current value of *D* at 50% done and the active resistance roles of the second MIDAS and TB-F curves means that a long position is out of the question.

THE BEST USE OF THE TB-F INDICATOR

Is the TB-F indicator best regarded as an entry or an exit indicator? First, in order to fit the TB-F indicator to a pullback, a trend needs to be at least 20% complete. Therefore, from the viewpoint of launching an indicator, the TB-F algorithm can never be used as an entry tool. From the launch perspective, TB-F is best understood as identifying the end of an accelerated move and thus producing an exit signal. However, on the termination of the TB-F curve, the indicator can be understood as providing an initial basis for taking a contrarian position. We say "initial basis" because, as stressed earlier, an exhausted TB-F curve does not tell you what price is going to do next. Therefore, a trader wishing to initiate a contrarian position on the exhaustion of a TB-F curve will need to look for further entry conditions. He or she can do that just as well within the MIDAS framework.

For example, Figure 6 is of Bruker Corp. (BRKR), a bioscience company. In the chart we can see that TB-F1 was launched from September 19, 2008, and terminated on October 30 at the end of the accelerated move. Here was a putative place to initiate a long contrarian trade. Using a MIDAS curve (R1) as a filter, however, an entry condition would be justified only if price subsequently broke up through it, with a price target on entry being the next level MIDAS curve in the hierarchy.

As it turned out, price failed to break through R1, thus resulting in the absence of any trade setup. This resulted in Coles and Hawkins launching a second MIDAS curve from the swing high, which failed to penetrate R1 and also a second TB-F curve from the same launch bar as TB-F1, this time fitted to the same swing high from which we started the second MIDAS curve. As of this writing, TB-F2 is indicating that we're only 50.74% through this downtrend. TB-F 2 and the second MIDAS curve are also resisting price. As of this writing, there are no circumstances under which we'd consider a long entry.

Before completing this section, we want to provide one more lesson before the emphasis shifts to the intraday discussion. It is a consequence of the fractal nature of MIDAS that "nested" TB-F curves can be created on the same accelerated trend, especially when the trend increases or decreases its velocity as the trend develops. In Figure 7, we have three nested TB-F curves on the daily chart of the Standard & Poor's 500, all starting from July 18, 2006. The first two

TB-Fs terminated as price pulled back in multiweek corrections to longer-term TB-F curves fueled with more cumulative volume; the longest curve expired as price tumbled out of the current trend.

In the third and final part of this series, we will look at how to apply the MIDAS to intraday charts.

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SUGGESTED READING

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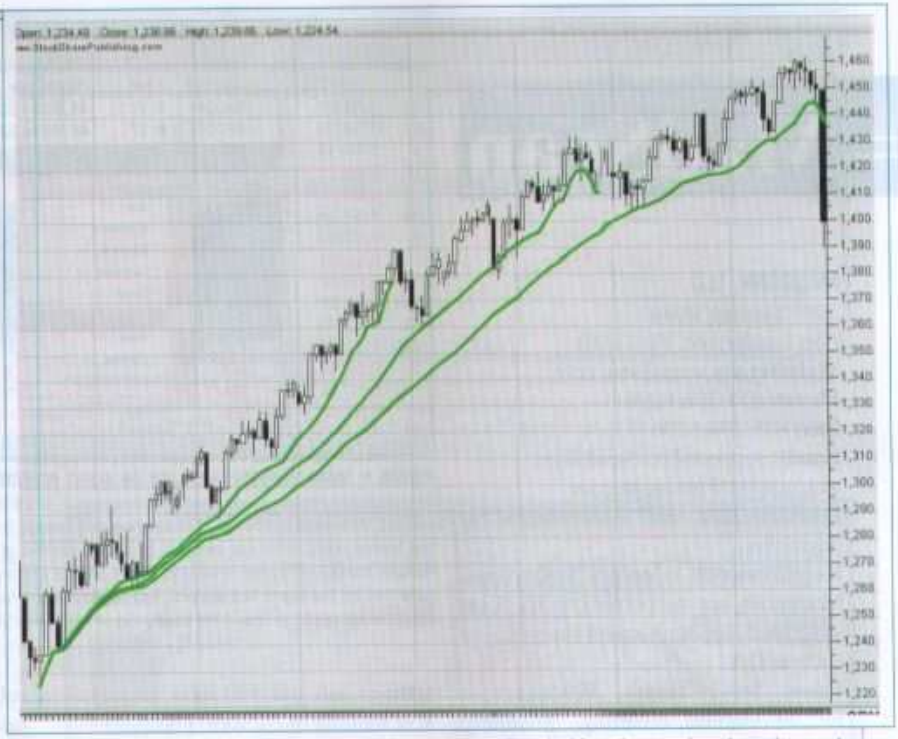

FIGURE 7: DAILY CHART OF S&P 500. Nested TB-F curves can be launched from the same bar when price merely reacts to shorter curves by temporarily pulling back, sometimes to a curve with a higher amount of cumulative volume, before the trend continues.