3-1977

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Lowell B. Catlett

Iowa State University

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Charting Analysis for Commodity Futures

Abstract
Trying to ascertain what commodity futures' prices are doing and will be doing at some time in the future has been the subject of much research and debate for many years. Two distinct factions have emerged from the controversy, the fundamentalists and the technicians. The fundamentalists rely heavily upon supply and demand analysis to determine commodity futures price movements. They try to weigh the mechanisms affecting the supply and demand relationship and determine which relationship has the stronger force. That is, if the supply level for a commodity is projected to be up slightly (a downward pressure on price) but the export demand level has increased (a positive affect on price) with domestic demand levels relatively constant, what will the price movement in futures contracts for that commodity look like?

Disciplines
Applied Statistics | Economic Theory | Institutional and Historical | Statistical Models

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Charting Analysis for Commodity Futures

by

Lowell B. Catlett

No. 49

March 1977
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Introduction

Trying to ascertain what commodity futures' prices are doing and will be doing at some time in the future has been the subject of much research and debate for many years. Two distinct factions have emerged from the controversy, the fundamentalists and the technicians. The fundamentalists rely heavily upon supply and demand analysis to determine commodity futures price movements. They try to weigh the mechanisms affecting the supply and demand relationship and determine which relationship has the stronger force. That is, if the supply level for a commodity is projected to be up slightly (a downward pressure on price) but the export demand level has increased (a positive affect on price) with domestic demand levels relatively constant, what will the price movement in futures contracts for that commodity look like? At the same time, other demand and supply level shifters must be considered (income levels, population, input costs, weather, consumers' and farmers' expectations, and market liquidity). Trying to simultaneously consider these and other factors is almost impossible without sophisticated statistical and econometric techniques. Even with these tools, however, the problem of specifying the model and getting proper data are often difficult and costly. Consequently, these difficulties have pushed forward alternate methods of trying to analyze commodity futures price movements. Technical or charting analysis is the foremost of these methods.

Charting price movements has been done for several decades, but only since the beginning of the twentieth century have these price movements been technically analyzed. The originator of the idea was Charles Dow in his famous Dow Theory for securities (3). The theory was basically used
as an economic condition indicator by detecting trends and movements in securities prices. The principle of the theory is that price movements consist of three trends—minor, intermediate, and major. Major trends prevail when intermediate trends continue in the same direction. That is, a major downtrend (uptrend) would hold as long as intermediate term highs and lows were lower (higher) than the preceding term highs and lows (Figures 1, 2). Minor trends are just the nervous jumps in the market that generally don't last for longer than two or three days. Due to the popularity and accuracy of the Dow Theory, technical refinements and adjustments have been made in charting analysis. Although charting analysis originated with securities, the basic principles can be applied to commodity futures prices.

In reality, most commodity traders rely upon fundamental analysis as well as charting. Relatively few traders are either pure fundamentalists or technicians. A trader who relies fundamentally on traditional supply and demand analysis may find charting useful when no clear price movement is observed. Likewise, technicians may find reports on acreage, estimated yields, and agricultural exports useful in confirming or rejecting certain formations. Since most traders use charting analysis in some way, it is beneficial to study the elementary formations of charting.

Feduniak (3) points out three differences between commodity and security price moves that may alter their technical interpretations: (1) Stocks are limited in number while commodity futures' contracts are theoretically unlimited, (2) Commodity futures have expiration dates and stocks usually have unlimited durations, and (3) Daily price move limits exist for commodity futures but stocks can fluctuate to any level.
Figure 1. Underlined areas represent intermediate lows forming the stair-step Dow theory for trend detection.

Figure 2. Intermediate highs and lows must both be progressive in the direction of the trend. Notice the lows in an uptrend must be higher at each stage. Likewise, the highs must be higher as the price move continues.

(Source: (3))
The most widely used charting method is the bar chart, which uses a bar (line) to connect a day's high and low prices with a flag to indicate the closing or settling price, as illustrated in Figure 3.

Figure 3. Bar for each day's trading reveals the range of prices plus the close.

Thus, each bar represents one day's trading and consecutive days' bars form the price movement or chart (Figure 4).

Figure 4. Bar chart showing the movement of prices over a period of several weeks.

The problem involves being able to "read" such a chart. Will the price continue in the same direction? Will it reverse? Will it remain stable, if so, how long? When will the trend change directions? The answer to these and many more questions is what charting analysis attempts to find.
Trends

Trendlines

The original Dow Theory involved detecting a price trend (direction). Indeed, the basic philosophy of most traders concerns "getting on the right side of a price move." That is, they try to follow the trend. Currently, the most widely used method to view trends is the trendline. In a bear (bull) market a trendline is connected with at least three highs (lows) to form a sloping line. The rule of thumb is that when prices break the trendline it is a signal to watch for a reversal in price moves (Figure 5). On a downtrend the trendline will generally be violated which is followed by trading falling below the trendline. Then, a second breaking of the trendline will occur to form a new uptrend (Figure 6). On uptrends, however, this two-stage sequence is often not observed. Once the uptrendline is violated, a reversal usually follows. Possible reasons for this involve the concepts of volume and open interest to be discussed in a later section.

Figure 5. Trendlines showing upward price trend connecting at least three (in this chart four) lows to verify the line. (Source: (3))
Figure 6. Trendline is violated and trading drops below again before the final breakout occurs.

The difficulty of the concept of the trendline is the line itself. There is nothing magic about a sloping line. In contrast, the Dow Theory has no lines at all (Figure 1). The reason a trendline is used more often than the Dow Theory is because the trendline establishes a definite criteria for trend detection which is markedly absent from the Dow Theory. The trendline is by far the most used charting information, but its effectiveness is largely due to individual interpretation.

Volume and Open Interest

Volume means the actual number of contracts traded, while open interest refers to the number of open contracts outstanding, i.e., new contracts. Although the two, in a sense, measure the same thing, the difference arises when old contracts are closed out or hedges lifted. This is one of the possible explanations for the two stage effect in reversing a down trendline (Figure 6). The first time the trendline is broken, volume increases but open interest decreases. This is mainly because the old short contracts are being offset, thereby increasing volume but decreasing open interest since no new contracts have been made. Then, on the second rally, volume and open interest both increase. Most of the old shorts have offset and a wave of new longs take
over the market in an effort to get on the right side of the price move.

Volume Rules

The following four rules are general conditions for volume in relation to price moves. (1) In a major price advance (bull), volume increases on rallies and declines on reactions (Figure 7).

![Figure 7. Rallies are areas where a minor trend upward occurs with reactions being minor downtrends.](image)

Volume increases on rallies because the rally is in the same direction as the price move thus adding support or strength to the move. Reactions cause volume to decrease because it is a move counter to the major move therefore weakening the major price move and adding uncertainty. (2) In major price declines, however, volume increases on price weakness and declines on rallies for the reasons opposite to (1), as illustrated in Figure 8.

![Figure 8. In major downtrends, weakness areas are minor downtrends.](image)
(3) As prices decline towards a major bottom, volume becomes reduced and then expands very sharply as prices make a major bottom (Figure 9).

Volume declines toward a major bottom because of uncertainty about when the trend will reverse and because the move is nearing completion. When the major bottom develops, however, volume increases as traders try to close out of their existing positions and get on the right side of the new price move. (4) When prices are rising toward a major top, volume decreases near the top and then increases as the top is formed (see Figure 10). Essentially, the same reasons stated in (3) also apply for tops.

Open Interest Rules

Open interest provides information about which side of a price move traders are on or moving toward. The following four rules apply to
(1) When prices *increase* and open interest *increases*, the market is technically strong. New bulls are in the market and willing to pay higher prices (bidding up prices).

(2) When prices *decrease* and open interest *decreases*, the market is technically strong. Longs are selling to shorts who believe prices are as low as they will go and a reversal is in order.

(3) If prices *increase* and open interest *decreases*, the market is technically weak. Shorts are now covering from old longs causing prices to increase and open interest to decrease.

(4) If prices *decrease* and open interest *increases* the market is technically weak. New bears are in the market aggressively.

Generally, when prices and open interest move in the same direction, the market is technically strong (bull or bullish signs) but when they move in opposite directions the market is technically weak (bear or bearish signs).

Volume and open interest are used to confirm a trend direction. The acknowledged rule is that both volume and open interest should tend to increase when prices are moving in the direction of the primary trend. However, Feduniak points out some notable exceptions to this rule.

**Exceptions to Volume and Open Interest Rules**

*Volume* --

(1) High volume often indicates substantial moves, but frequently occurs toward the end of the major trends.

(2) Extremely great volume is considered a sign of an impending trend reversal.

(3) Since the public prefers being long, there is more volume on advances than declines.

*Open Interest* --

(1) Large open interest often causes volatile price actions; however, declining long liquidation and short covering rallies often cause volatile price actions and these are both characterized by declining open interest.

(2) Open interest follows seasonal patterns and therefore an adjustment factor must be used.

(3) Commodity trading has increased over the years; therefore, volume and open interest have grown.
Numbers (2) and (3) of the Open Interest exceptions cannot be emphasized enough. To effectively use volume and open interest to confirm trend moves, the data need to be seasonally adjusted and adjusted for natural growth in the number of new traders. Both require substantial historical data.

Flags and Pennants

A flag in charting terminology is a parallelogram while a pennant is a triangle. (Figure 11).

![Figure 11. Geometric formations for flags and pennants.]

They both need a "mast" and whether the mast is formed from one day's trend or two or three is immaterial.

![Figure 12. Mast for flags or pennants. Masts that consist of several days tradings must have each day's range different.]

Both flags and pennants (psychological pauses) occur after rapid price moves and indicate that another similar move will likely follow. As such, they are often considered half way points in a price move as measured from the decisive break away from the previous formation (Figures 13 and 14).
They slope in the direction opposite the preceding fast move and generally do not last for more than 1 1/2 to 2 weeks. Pennants are formed when each day's trading range gets smaller until a small triangle is visible. Flags occur when each day's trading range stays about the same after the mast is formed. Volume decreases during the formation of a flag or pennant mainly because they are considered to be a rest stop for the price move. Flags and pennants are one of the more reliable formations to indicate a continuing trend, having a success rate of about 70%.

Figure 13. Flag serving as a half way point in a price move.

Figure 14. Formation consisting of both a pennant and downward flag with the flag serving as the half-way point.
Triangles

Triangle formations can indicate either a continuing trend or a reversal. Most of the time, however, they signal a continued trend. They are primarily formed by the intersection of intermediate trendlines (Figures 15 and 16), with the direction of the continued move in the direction of the steeper of the two trendlines.

Figure 15. Descending triangle with breakout on the downside. (Source: (3))

Figure 16. Symmetric triangle with breakout on the upside. Caution should be used in reading symmetric triangles because of their unreliability.

Thus, we have three types of triangles: ascending, descending, and symmetric. With ascending triangles, the breakout is on the upside and with descending triangle it is on the downside. Symmetric triangles may breakout in either direction, therefore are very unreliable. In confirming a triangle
formation, volume usually decreases at the apex and increases after the breakout. (Figure 17).

Figure 17. Volume decreases toward breakout and then increases afterwards.

Many chartists use the rule that the breakout will move as a minimum the distance opposite the apex (Figure 18).

Figure 18. Price move following breakout should move the distance opposite the apex, as a minimum.

Triangles are considered to be fairly reliable if only a few oscillations occur before the breakout occurs.
Gaps

With the exception of trendlines, gaps are the most used and misused charting formation. A gap is simply an area where no trading occurred. This makes them by far the easiest formation to spot and accounts, in part, for their popularity. Advocates believe that the ability of the market to "jump" indicates strength. Opponents generally acknowledge this, but add that had the information which caused the strength been known during trading, perhaps the "jump" would not have occurred. This controversy forces a more critical analysis of gaps. Interpreting gap formations should be tempered with understanding this controversy.

Four basic categories exist for gaps: common, breakaway, runaway, and exhaustion.

(1) **Common Gaps (Figure 19)** — Blank areas exist between two consecutive days' trading ranges. Trading occurred in this range in the immediate past; consequently, they basically have no meaning.

(2) **Breakaway Gaps (Figure 19)** — These gaps occur after areas of congestion where price jump. The area jumped will not be an area where trading occurred previously (at least not within several weeks).

(3) **Runaway Gaps (Figure 20)** — Runaway gaps occur during substantial price moves and serve as half-way marks for the move.

(4) **Exhaustion Gaps (Figure 21)** — These gaps indicate the final stages of a move and a trend reversal. They require knowledge of volume and open interest. Generally, the market will open with a wide gap but go nowhere (high volume usually accompanies exhaustion gaps).
Figure 19. Common gaps occurring inside trading ranges with a breakaway gap, which indicates the price move upward.

Figure 20. Runaway gaps during a major uptrend. Each gap indicates a 'half-way' point in the move.

Figure 21. The final stage of the uptrend is marked by an exhaustion gap.
Support and Resistance

The whole of charting undoubtedly has psychological overtones and nowhere in charting does it have deeper roots than in the concept of support and resistance. Because of this, support and resistance are considered by most chartists to be profoundly important. The idea behind support and resistance is simply this: previous price levels (highs, lows, and bands called "congestion areas") have importance in future moves. Three fundamental beliefs are ingrained in the idea. (1) Most traders who hold losing positions would liquidate if given a chance to get out where they got in the market. If a trader went long but the market moved against him (declined) briefly and then rebounded back at or near where he originally traded, he would offset and provide a "resistance" level to keep prices from rebounding further. Areas of congestion in Figure 22 are probable examples of this phenomenon.

Figure 22. Congestion area showing the resistance level until breakout. The resistance level turned to support after the breakout.
(2) **Traders like to add to profitable positions at or near previously traded areas.** This proposition accounts for the idea of "support". If a trader liquidated a profitable position, but the profit move continued, he may be reluctant to get back in at higher, more uncertain levels. But if the market rebounded back to an area where he got out previously, he is more likely to get back in the market. Thus, the idea of old levels providing "support" (Figure 23).

![Silver July 1973 New York Chart](image)

**Figure 23.** Support area occurring near the end as prices moved above line, which now serves as the level of support for future prices.

(3) **Previous levels (highs and lows) are psychological benchmarks.**

If the market could not move past these points in the past what additional forces can now propel it beyond? A "resistance" level is created (Figure 24).
Reversals

All traders would like to know when a particular price move has completed its course, reverses and starts a new move. The closer the trader can approximate the actual time of reversal, the longer the price move. Because this approximation often involves a lot of guessing, charting methods have evolved to try to predict when the reversal will occur.

Key Reversal Days

Two types of key reversal days exist, upside and downside. A downside key reversal day happens when prices register a new high during the day, but close sharply (Figure 25). Likewise, an upside key reversal day is when prices register a new low during the day and close sharply higher (Figure 25). Sometimes a key reversal week occurs (both downside and upside).
The definition and results are the same as for days except the time frame is five days instead of one.

Key reversal days usually occur when major news (fact or rumor) forces prices higher (lower) but the market reverses, due to sheer exhaustion. Sometimes, this reversal is rapid or many times only gradual, but a reversal nevertheless.

Key reversals are very reliable and occur on heavy volume days.

Figure 25. Two key reversal days. The first signals the major trend reversal while the second confirms the intermediate reversal.
Island Reversals

Island reversals are set apart by gaps on both sides. It is easy to spot and is a fairly reliable predictor of price reversals (Figure 26). Island reversals differ from key reversals by longer periods of trading and the presence of gaps (although an island reversal can consist of a single days' trading). Heavy volume usually accompanies the formation.

Figure 26. Island reversal consisting of four days and bordered correctly with gaps.

Figure 27. One day island reversal that marked a major price reversal.

(Source: (3))
Elliot Wave

The Elliot Wave formation was derived from R.N. Elliott and is also called the "Rule of Five" (8). The theory specifies that major bull and bear price moves occur in five waves -- three with the trend and two counter to it (small minor moves are possible within these intermediate moves). When the five waves have been completed, a reversal is in order (Figure 28).

![Figure 28. The five waves of the Elliot wave. After the fifth wave (5) a major uptrend should follow.](Source: (8))

The major criticism of the formation is that it can often only be applied in hindsight. Nevertheless, enough importance has been placed on the formation that an entire book has been devoted to its explanations (see bibliography).
Head and Shoulders

The head and shoulders is a complicated formation but nonetheless very popular; so popular, in fact, that many chartists feel it has become its own victim. Figures 29 and 30 show the two types of head and shoulders.

Figure 29. Classic head-and-shoulders. Breakout was rapid due to lower right shoulder.

Figure 30. Inverted head-and-shoulders with prices moving upward after penetration of the neckline.

The head and shoulders is really just a series of three intermediate advances and three declines with the second advance longer than the first and third, on a normal head and shoulders. For an inverted head and shoulders, the second decline is greater than the first and third. The key to the head and shoulders is the neckline, which is drawn by connecting the lows (highs) of the two "shoulders". The formation really becomes a head and shoulders only if the neckline is penetrated. Otherwise, it is
merely intermediate price moves. After the neckline is violated, a short rally often occurs. The rule is that price moves after the neckline violation will be at least the vertical distance from the head to the neckline (Figure 31).

Figure 31. Expected price move following breakout on head and shoulders formation.

If the right "shoulder" is lower (higher) than the left, a sharper more rapid decline (advance) will occur after breakout.

Saucers and Bowls

These rounded top and bottom formations are very reliable but require long periods of time to form because they are usually associated with inactive markets. The price move after the saucer or bowl is formed will last at least as long as it took to form the saucer, as shown in Figure 32. The price advance after the saucer formed (May 1) should be about 3 months (should last until August 1). As a rule, volume will decrease toward the peak or bottom of the bowl and increase afterwards.
Double Tops and Bottoms

Double tops and bottoms are somewhat of a combination of the head and shoulder formation and the idea behind support and resistance.

Figure 33 shows the double top formation.
The accepted rule for double tops is that the difference between tops should be only a few percentage points (usually 2% as a maximum), and the previous low neckline must be broken. The formation is not considered a double top unless the previous low neckline is broken—similar to the head and shoulders formation. Also the previous market high provides resistance to test the second high (top).

Figure 34. Neckline being broken to confirm double top formation indicating a trend reversal. If neckline is not broken, no reversal should occur.

The formation is usually reliable and a good indicator of large trend changes. Triple tops and bottoms are possible but very unlikely. When they do occur the trend reversal is often more substantial than double top breakouts.
Point and Figure Charts

The point and figure method of charting provides for the successive measurement of prices during the day. The bar chart shows the range of prices while the point and figure chart covers the up and downs during the day's trading. As a result, the areas where most of the trading took place show up more prominently. The point and figure chart does not measure time on the horizontal axis. Each day's trading may be confined to only one column or several depending on the day's price move.

The charting device used is a series of "X's" (price increases) and "O's" (price declines). Price is scaled on the vertical axis and an "X" or "O" marks each price move. Each "X" or "O" in a particular column can represent a price move only once. If prices move into a previously traded range, then a new column must be used. In Figure 35, column A, prices fell after the open from $2.60 to $2.58 at 10 A.M. ("O's" are used since it is a decline). At 11 A.M. prices were back up above the open, so a new column (B) must be used to mark the increase. By noon prices had decreased to $2.61 from $2.61 1/2 at 11 A.M. A new column, therefore, must be used (column C) to register the decrease since an "X" was already filled at $2.61.

1/4 Point Chart

<table>
<thead>
<tr>
<th>Time</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open</td>
<td>$2.60</td>
</tr>
<tr>
<td>10 A.M.</td>
<td>2.58</td>
</tr>
<tr>
<td>11 A.M.</td>
<td>2.61</td>
</tr>
<tr>
<td>Noon</td>
<td>2.61</td>
</tr>
</tbody>
</table>

Figure 35. Typical point and figure chart with columns A, B, and C representing the prices on the left hand side.

Note: Point and figure charts can be formed for commodities.

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2/ Point and figure charts can be formed for commodities.
The vertical axis can vary in scale from small movements to large movements. Figure 35 has a scale of 1/4 point (an "X" or "O" for each 1/4¢ move) with the smallest being a 1/8 point scale. Most point and figure charts are at least one-point and usually more depending on the volatility of price moves. The first letter of every month, generally, is used to start the move in place of an "X" or "O". Many chartists also blacken the closing value of each day to separate trading days. Some chartists do not use "X's" and "O's" to indicate directions, but simply an "X" for all moves. Under this type of chart (Figure 36) usually a "5" is used for prices ending in "5" (as $2.95) and an "0" for prices ending in "0" (as $2.90). Figure 37 shows a point and figure chart for September 1971 New York silver.

Figure 36. Point and figure chart using all "X's" with "5's" and "0's" for even and odd price values and a blackened square for the close.

Figure 37. September 1971 New York silver in point and figure form. Each box represents 100 points.
Using Point and Figure Charts

The point and figure method provides much more detail about price development than bar charts. This detail, however, sometimes results in traders being "whipsawed". The detail of a 1/8 point scale during price moves of 5 to 10 points discloses many jitters, jumps, and nervous market moves. These numerous moves may cause traders to unnecessarily switch market positions too often. To correct for this, the scale magnitude can be increased or a reversal chart can be constructed. The scale can be changed, for example, from 1/8 point to one-point or from one-point to a ten-point. If a reversal chart chart is used the scale remains small (say 1/8 point) but a reversal criterion is used to limit moves. That is, if the scale is 1/8 point the reversal criterion may be set at 1/2 point (or any scale desirable). Unless prices move by 1/2 point it is not recorded, but when it does move past the reversal point it is marked in 1/8 point sections. The detail of the small scale is preserved plus the nervous jumps are removed (see Figure 38).

![Price Moves](image)

Figure 38. Comparison of regular-chart with a reversal chart on the same scale. Notice how the reversal chart shows the full range of the price move without the annoying minor jumps.
The charting formations outlined for bar charts generally hold for point and figure charts. Figure 39 shows how some of these formations look in point and figure form. Caution must be used, however, in drawing trendlines on point and figure charts because of the added detail. If a small scale is used then too many minor trendlines will appear. The Dow Theory provides a better trend measure often times with point and figure charts than the trendline.

Flag Formation

Conventional Trendline

Double Top Formation

Triangle Formation

Figure 39. Common bar chart formations in point and figure form.
Two techniques that are unique to point and figure charts are the "count" and "fulcrum". The fulcrum (and the inverse fulcrum) is a formation that develops after a major downtrend. A congestion area is formed after the major downtrend and serves as a base. A technical rally occurs out of this congestion base, then a reaction back down, followed by a rally back up and then a "catapult" of prices in a bull move (Figure 40). An inverse fulcrum is just the opposite following a major uptrend.

Figure 40. Section A shows the initial downtrend necessary for a fulcrum to form. Area B is the area of congestion with the minor technical rally appearing about half-way into the area. The "catapult" is shown by Section C. The "catapult" is the beginning of the bull move the fulcrum forecasts.

The count is a method used to determine the length of a price move. After periods of price congestion, vertical price "walls" are developed. The distance between these "walls" provides the count (distance) that prices should move when the congestion area is broken (Figure 41). Sometimes the "walls" are not strictly vertical but slant because of varied price
activity (Figure 42). The count takes on multiple values when this happens.

Figure 41. The count showing the amount prices should move when the area of congestion is broken.

Figure 42. The count when several "walls" exist on the right side of the congestion area.

The major problem of point and figure charting is getting the daily price fluctuation data. Unless a tape or hourly reporting service is available, it is almost impossible to get the information. For this reason, most traders who use point and figure charts usually subscribe to a charting service.

Moving Average Charts

Moving averages have emerged as a charting tool primarily to assist in the detection of a trend. Curtiss Dahl was an early innovator of the moving average and developed the simple 10-day moving average line. (7).
Moving averages have gained in popularity because of their simplicity. Bar chart formations are varied and complicated while point and figure charts require substantial price information and detail. All of these disadvantages are eliminated with moving averages. The gain in simplicity has, of course, a cost; namely quickness. The moving average technique concentrates on "majoring" the market, that is, of a 60 cent price move, a moving average technique would yield signals to allow capture of only a majority of the move, say 40 cents. Most computer trading models rely on some form of moving average system.

There are many different types of moving averages (3, 4, 5, 9, 10, 20, and 40 day) but they are all generally calculated the same way. The closing prices are gathered for the designated length of time and then divided by the number of days. As each day is added, the oldest is dropped from the calculation. The following example shows the method of calculation.

<table>
<thead>
<tr>
<th>Date</th>
<th>Closing prices</th>
<th>Three-day average</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/1</td>
<td>$2.70</td>
<td>( \frac{2.70 + 2.73 + 2.69}{3} = 2.64 )</td>
</tr>
<tr>
<td>1/2</td>
<td>2.73</td>
<td>( \frac{2.73 + 2.69 + 2.63}{3} = 2.66 )</td>
</tr>
<tr>
<td>1/3</td>
<td>2.69</td>
<td>( \frac{2.69 + 2.63 + 2.62}{3} = 2.65 )</td>
</tr>
<tr>
<td>1/4</td>
<td>2.63</td>
<td></td>
</tr>
<tr>
<td>1/5</td>
<td>2.62</td>
<td></td>
</tr>
</tbody>
</table>

Generally the moving average is plotted along with a bar chart. If longer periods of time are used, a weighted moving average is often times more appropriate. As a rule, the last dates get more weight than earlier dates because present prices usually have more meaning than older prices. For instance, the last ten days of a 40-day average may get double the weight of the remaining 30 days.
It is difficult to outline specific rules for moving averages because each trader, advisory service, or computer model has its own method. Some use only one average, others two, while many use three or more. It is important to realize that the method varies widely and depends to a large degree on the commodity and its level of volatility.

Figure 43 shows a bar chart with 4, 9, and 18-day average lines added. Under this method, the short line (4-day) penetrates the intermediate line (9-day) at points A and B, but only when all three lines cross at point C is a "buy" or "liquidate" signal given. This occurs again at point D. Under this trading criterion, when the short line penetrates the intermediate line a "watch" signal is given and when the short, intermediate, and long lines cross a "buy" or "sell" position is indicated.

Conclusions

Years of debate about the usefulness of technical analysis has not resolved the issue. Many traders feel that any form of technical analysis is ridiculous while others swear of its validity. For the moment, it doesn't matter which faction is correct. The fact that so many traders at least look at charts necessitates traders being familiar with the concepts. Traders who believe that charting techniques are hocus pocus should still use charts if for no other reason than the physical discipline of keeping track of prices and providing ideas on where to set stops. Those traders who believe very strongly in charting analysis would be well advised to temper trades with fundamentals. In the end, fundamental analysis always wins.

This paper has only scratched the surface of charting analysis. If further information is desired, rich sources are supplied in the bibliography, especially the ones with an asterisk.
Figure 43. Moving average chart (4, 9, and 18-day averages) imposed on a typical bar chart. Points A, B, C, and D show trading opportunities.
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