

Grain Market Short Course
February 2 and 4, 2004
Price Forecasting Techniques

An important part of anticipating both future price levels and the risk that anticipated prices will not be achieved is developing strategies for forecasting prices. In general, there are two basic approaches to forecasting prices in grain markets: fundamental analysis and technical analysis. While they are often presented as substitutes or competitors in price forecasting, the two can be complimentary. Most market analysts pay attention to both fundamental and technical factors even though they may emphasize one over the other.

Fundamental Analysis

Fundamental price analysis is based on the notion that the underlying supply/demand conditions in a given market ultimately determine price. Since the futures market is attempting to discover prices that will balance supply and demand in some future time period, there is uncertainty in initially establishing an equilibrium price. The market may be “shocked” by new information, resulting in traders’ changing their assessments of what the equilibrium price will be in the future. Fundamental analysis attempts to both anticipate changes in supply/demand information, and to evaluate the direction and range of price movement resulting from new information.

Fundamental analysis may be simple (intuitive), or complicated (using quantitative statistical or mathematical models). In both cases, analysts are attempting to assess price implications of economic variables including:

- 1) seasonal use patterns
- 2) seasonal supply patterns
- 3) prices of substitute goods
- 4) prices of compliment goods
- 5) market structure

Intuitive analysis uses a basic understanding of economic principles to hypothesize about price changes. Quantitative analysis combines knowledge of economic theory with mathematics and statistics to establish explicit relationships between economic variables and price.

Indicator	Market
USDA Crop Production Reports	Soybean, Corn, and Wheat Futures
USDA Cattle on Feed Reports	Live Cattle Futures
Corporate Earnings	S&P 500 Stock Index Futures
Deficit Projections	Interest Rate Futures

To use a leading indicator model a market analyst must find a time-lagged relationship between an asset's price and the economic indicator. Many of the price projections you here or read about relative to U.S. agricultural markets come from an analysts who has looked at USDA supply/demand projections, adjusted those projections for his or her own expectation of market conditions, and then inferred how the price should behave based on the supply/demand projections. The price forecast is generally based on how prices have behaved in similar circumstances in the past.

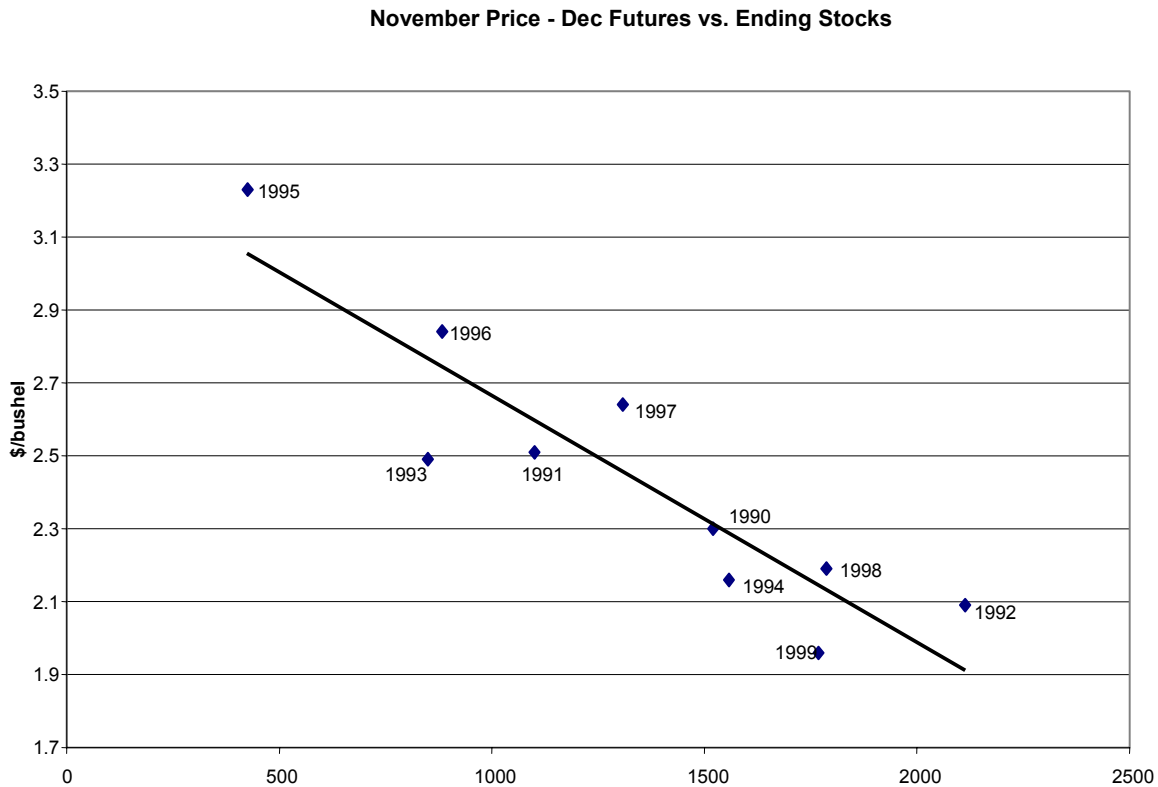
US Corn Balance Sheet (Sep/Aug)						11/09/00	
Marketing Year	USDA	USDA	USDA	USDA	USDA	USDA	USDA
	95/96	96/97	97/98	98/99	99/00	OCT 00/01	NOV 00/01
<i>Million Bushels</i>							
Beg Stocks	1,558	426	883	1,308	1,787	1,715	1,715
Imports	16	13	9	19	15	10	10
Acres Planted	71.2	79.2	79.5	80.2	77.4	79.6	79.6
Acres Harvested	65.0	72.6	72.7	72.6	70.5	73.0	73.0
% Harvested	91.3%	91.7%	91.4%	90.5%	91.1%	91.7%	91.7%
Yield	113.5	127.2	126.6	134.4	133.8	139.6	137.7
Production	7,374	9,233	9,207	9,759	9,437	10,192	10,054
Total Supply	8,948	9,672	10,099	11,085	11,239	11,917	11,779
Feed & residual	4,696	5,302	5,505	5,496	5,676	5,850	5,850
Food/Seed/Ind.	1,598	1,692	1,782	1,822	1,913	1,975	1,975
Exports	2,228	1,795	1,504	1,981	1,935	2,275	2,275
Total Demand	8,522	8,789	8,791	9,298	9,524	10,100	10,100
Ending Stocks	426	883	1,308	1,787	1,715	1,817	1,679
Stocks To Use	5.00%	10.04%	14.88%	19.22%	18.01%	17.99%	16.62%
Avg. Farm Price	\$3.24	\$2.71	\$2.43	\$1.94	\$1.80	\$1.85	\$1.90

For example, consider the supply/demand balance sheet above. USDA has given us their projections for production and consumption of corn for the coming marketing year (September 1, 2000 through August 31, 2001), as well as their average farm price estimate. Their average farm price estimate is derived using fundamental analysis. They know what the average farm price was in previous years, and what the supply/demand balance was in those years. By looking at the previous year's relationship, they can infer what the price will average this year if their supply/demand estimates are realized.

Many private price forecasters start with the USDA data, and then make changes for either supply and/or demand projections that they believe are not realistic. For example, if I thought exports would be less than USDA, I would lower the export estimate and then lower my projected price. This is precisely the method used by a large percentage of market analysts and advisors giving you price projections for agricultural markets.

Fundamental analysis is sometimes used to generate shorter term forecasts as well. For example, one number that comes out of the supply/demand balance sheets from USDA is ending stocks. Grain ending stocks represent the amount of a grain that will be left over as we go into the next harvest (i.e., how much will we still have on August 31). This is important because it represents our safety net against a crop problem in the next harvest. Look at the supply/demand balance sheet above. Notice that, in general, the smaller the ending stocks, the higher the average farm price.

It turns out that harvest prices are also significantly impacted by the ending stocks projection for the following August. The picture below shows the relationship between the average December futures price in November (vertical axis) versus the carryout projection going into harvest (horizontal axis).



If you look at the line going through the various points, you can forecast where the futures price should be each November given the carryout projection USDA estimates in October. For example, this past October USDA projected the corn carryout for the 2000/01 marketing year to be 1.8 billion bushels (on the graph above that would be 1800). Using the graph above one would expect the November price for December futures to average about \$2.10 per bushel. When the ending stocks forecast was released

in mid-October, December futures prices was less than \$2.00 per bushel. If you believed the forecast of an average price of \$2.10 in November, you would have collected your deficiency payment as soon as possible expecting prices to rise in November, and not sold your cash corn until November. If you were a speculator in the futures market, you would have bought December corn futures following the October report and looked to sell the contract in November 10 or 12 cents per bushel higher than you bought.

The picture below shows what actually happened. In November the December futures contract traded between \$22.05 per bushel and \$2.15 per bushel. It also appears to have averaged about \$2.10 per bushel, thus the fundamental price forecast proved accurate.



In this case we were only looking at one variable, and using that one factor to forecast price. In practice, some analysts try to look at a whole host of factors simultaneously in forecasting price. This generally requires the use of statistical and/or explicit mathematical models, and is often quite rigorous. However, the basic principle is the same. We observe a relationship between price and supply/demand factors based on previous experience, and use the historical relationship to make forecasts of future price levels.

Technical Analysis

While fundamental price analysis often asks the question where should the price be given economic conditions, technical analysis asks the question how will we get there. As such, technical analysis often deals with the timing of pricing decisions within a given price range. While sophisticated mathematical models are often employed with technical

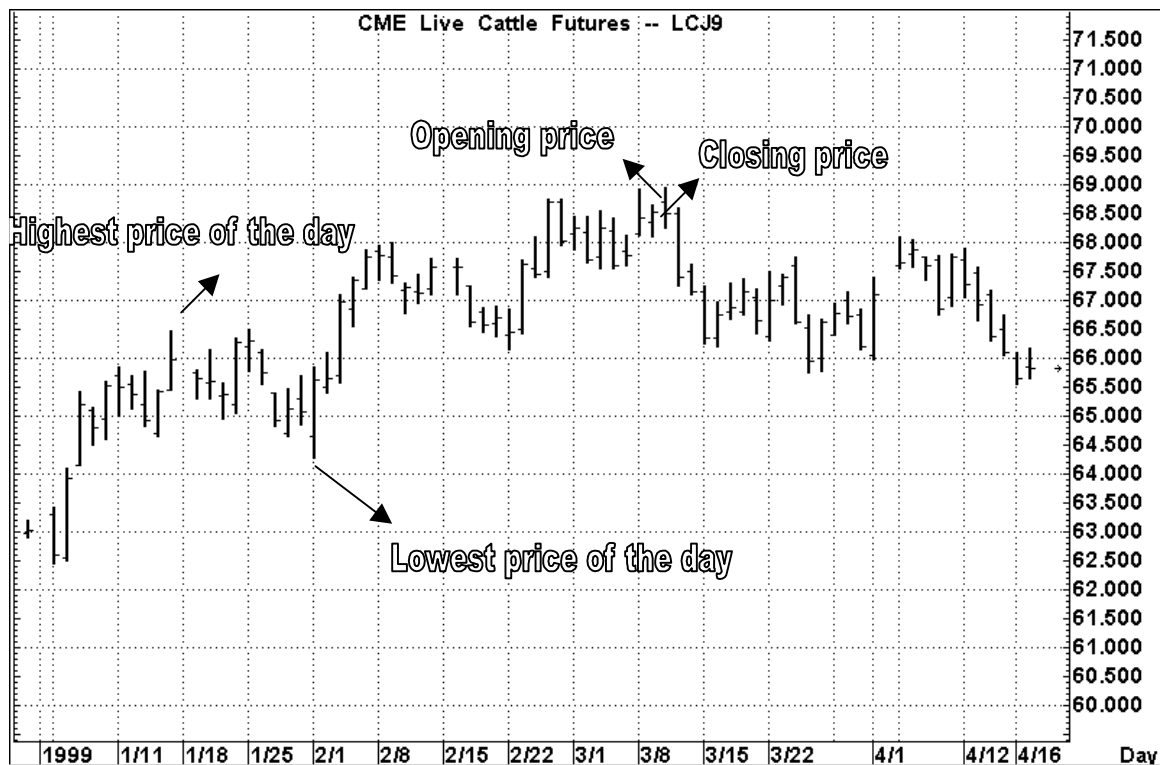
analysis, the only data used is past price history, volume traded, and in futures markets the open interest (i.e., how many futures contracts are outstanding). As such, technical analysis is simply the analysis of price trends -- by looking at past prices, volume, and open interest technical analysts attempt to identify buy and sell signals based on underlying market emotion. The idea is to reduce the opportunity cost of buying too early or selling too late.

There are literally an infinite number of ways to look at past prices, but some of the more common technical indicators include:

- Bar Charts
- Lines of support and resistance
- Consolidation planes (also called price channels)
- Key reversals
- Price Gaps
- Moving Averages

Bar Chart

On bar charts, price is plotted on the vertical axis and time (days or weeks) on the horizontal axis. Each time period shows a vertical bar indicating high, low and closing price (settlement). The open, or first price of the time period, is also often included.



CATTLE BAR CHART

The most common time periods used in constructing bar charts are days, weeks, and months. However, some short term futures traders construct bar charts using 5, 10, or 15 minute intervals. Through time, up and down trends develop, displaying the process of price discovery, and bar charts provide a way to identify these trends.

Trend line (lines of support or resistance)

As trends develop over time, bar charts can be enhanced to determine the exact nature of the trend. This is done by constructing lines of support and/or resistance.

In up trends, support lines are drawn connecting the lowest lows over a given time period. These lines are called lines of support. As long as price action in succeeding trading days does not penetrate the up-trending line, it is assumed that the market will continue to trend upward, and holding long positions (i.e., being a market buyer or a storer of a physical commodity) is justified. Once a day is encountered where price action penetrates the line of support, it is assumed that the market trend is over, and prices are likely to move sideways or down, suggesting that long positions in the market now face an increased likelihood of losing money.

In down trends, resistance lines are drawn connecting the highest highs over some time period. When the resistance lines are penetrated by some day's price action, it is assumed that the downtrend is over and prices are likely to get higher. At this point, short positions (i.e., initial sellers in the market) face increased price risk.

In both cases the lines are extended to and beyond the current date. One (or more) closes below a support line is a "sell" signal. One (or more) closes above a resistance line is a "buy" signal. The close is the market's closing price if the bar chart is plotted using days as the time interval, or the last price traded in the time interval if it is other than days.

As with all technical analysis techniques, the selection of the time interval over which the lines of support and/or resistance are constructed are extremely subjective, and affect the levels of support and/or resistance identified. This is a significant limitation. The length of time over which the trend line is drawn greatly affects its slope and sensitivity. In general, the more bars included in the construction of a trend, the more confidence one has that the prices have changed direction when the trend is violated.

Consolidation Planes

When price congestion occurs in a sideways pattern, parallel horizontal lines are drawn from the highest highs and lowest lows in the congestion area. The market signal is to sell at the upper end of the channel and buy at the lower end of the channel as long as the pattern is maintained.

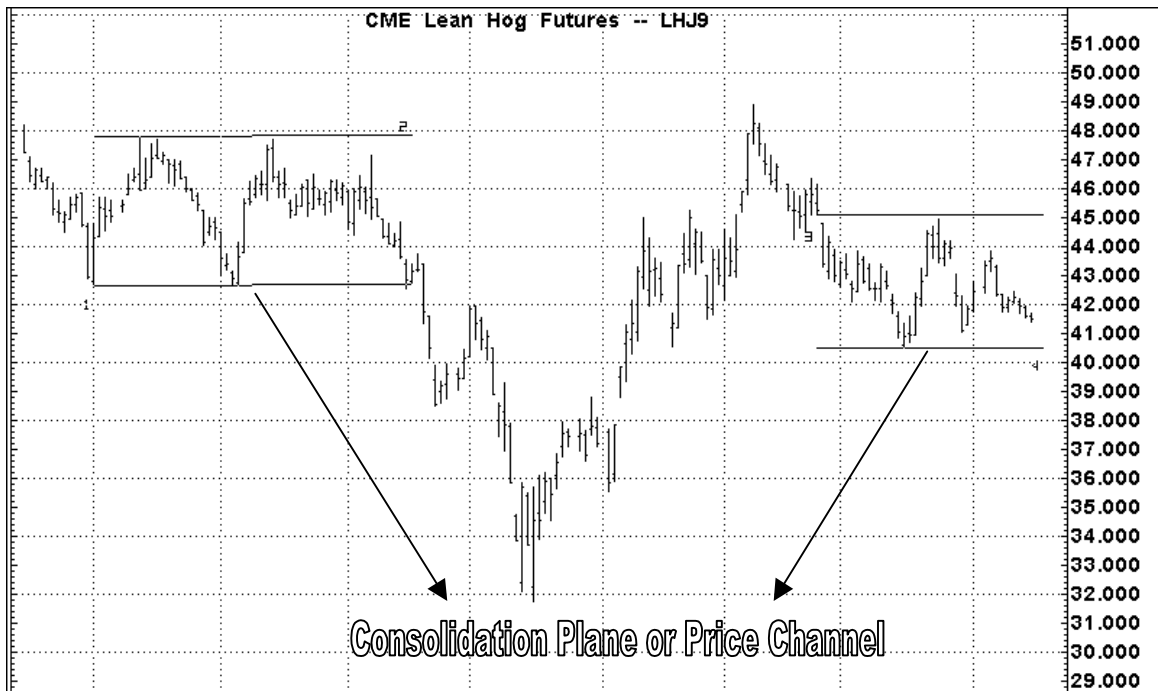
A breakout up or down is indicated when a close occurs outside of the congestion area. This is often interpreted as some important change in the underlying fundamental

relationships for the particular market being watched, but the actual fundamental data is not important to the measurement of the price pattern.

TREND LINES



CONSOLIDATION PLANES



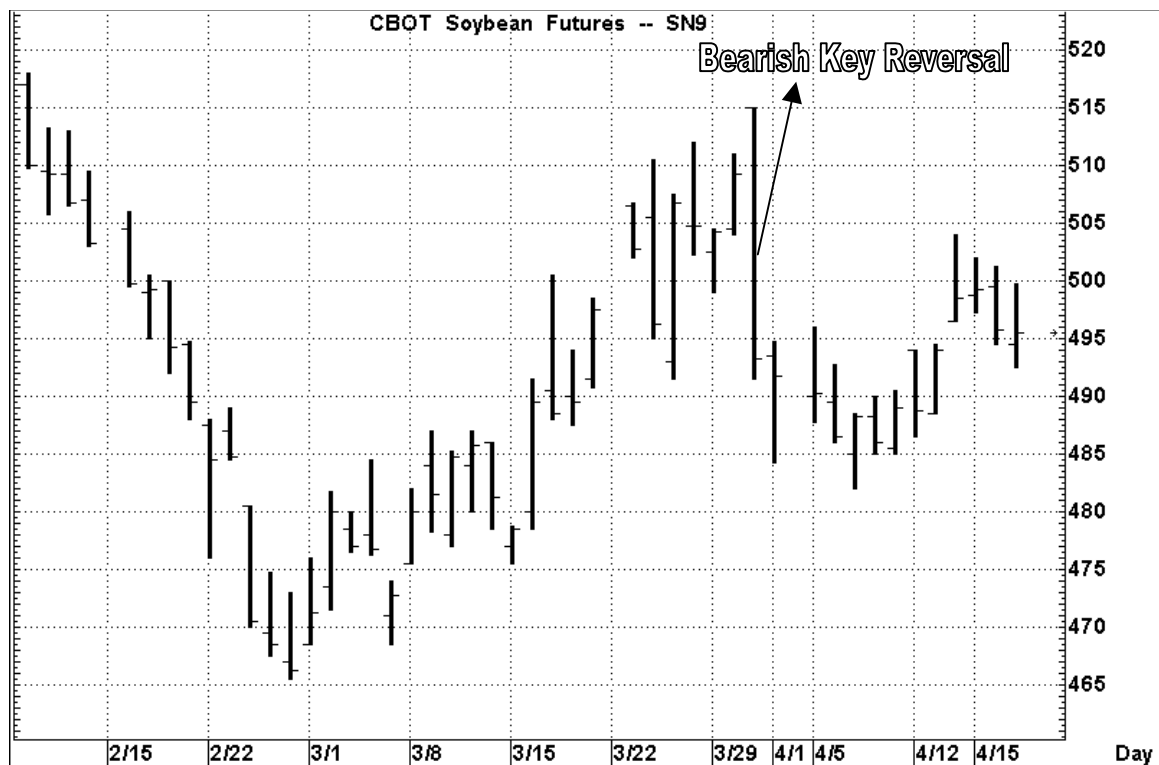
Key Reversal

A key reversal occurs on what is called an outside day, and indicates a reversal in the previous price trend. Outside days are when the day's high is higher than the previous day's high, and the low is lower than the previous day's low.

Many technicians also require that the closing price must be lower than previous day's lowest price for a bearish key reversal. A bearish key reversal means price are expected to go down. In other words, if the market had been trending up, a bearish key reversal would be a sell signal based on the assumption that the market will now trend down. If the market had been trending down, and the close is above the previous days high, a bullish key reversal is recorded, and a buy signal is generated.

A key reversal indicates a day of huge battling over fundamental information. The closing price indicates who won the battle among buyers and sellers.

KEY REVERSAL

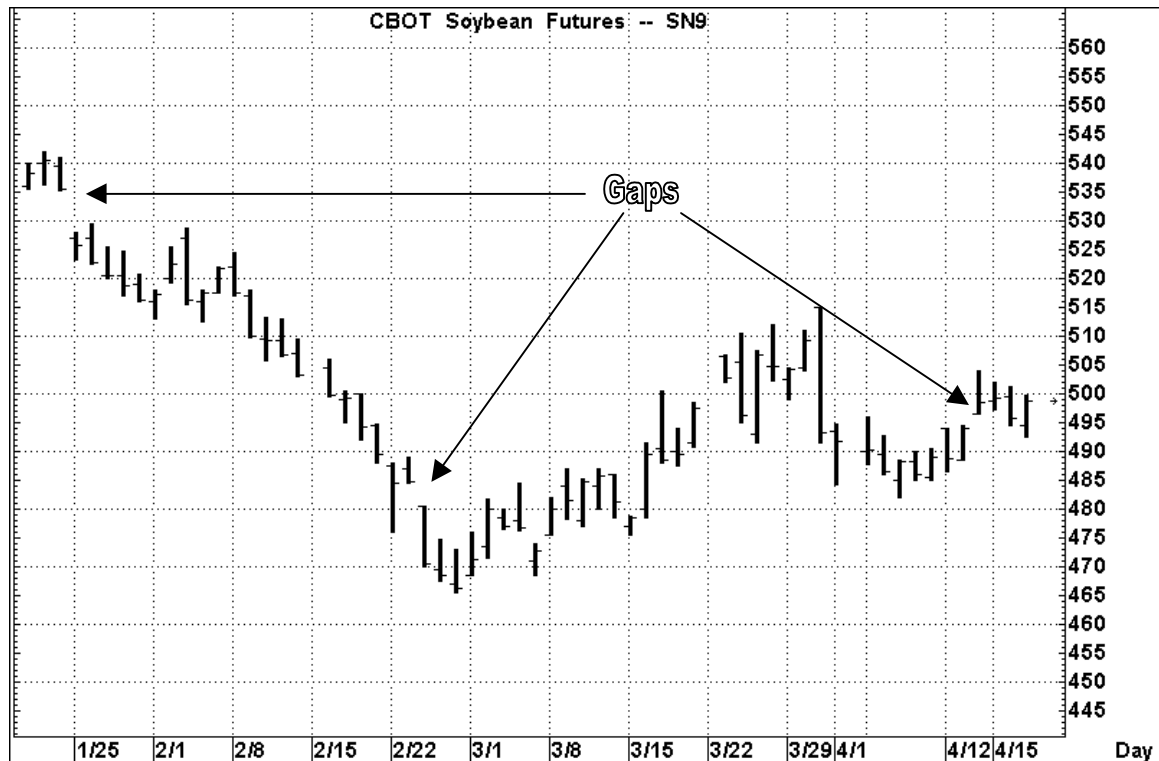


Gaps

Gaps reflect a strong change in supply/demand assessment due to new market information, or a change in the general interpretation of existing information. A gap is

when a given day's high (low) is lower (higher) than the previous day's low (high). This can be interpreted two ways. One is that an important signal of short-term direction has developed and prices will move away from the gap. In other words, if today's highest price is below yesterday's lowest price, prices are expected to continue deteriorating in the short run. However, many \trader's believe that gaps will almost always eventually be filled, and thus expect that at some point prices will turn and trade back through the gap.

GAPS



A close examination of historical charts will reveal both interpretations.

Moving Averages

Moving averages are used to smooth out daily price fluctuations so that an analyst might get a better idea of the underlying market trend. They tend to be used two ways. First, a rather long term moving average is followed. When the price crosses the moving average, a buy or sell signal is generated. For example, a trader might follow a 50-day moving average of corn prices (usually based on the closing prices). If prices are trending up, the moving average will be below the price level. Once the price in a given day closes below the 50 day moving average a sell signal is generated, and the trader would sell corn futures. The second way moving averages are employed is to track a short and a longer moving average, and initiate positions when they cross. For example, a trader may track a 5-day and a 10-day moving average for corn. When the market is moving

up, the 5-day moving average will lie above the 10 day. If prices correct and start to move down, the 5 day moving average will respond quicker than the 10 day, and after a few days of lower prices will cross the 10 day average and then lie below it. When the shorter average crosses the longer average, a trade signal is generated. If the 5-day crosses the 10-day from above, a sell signal is generated. If the 5-day crosses the 10-day from below, a buy signal is generated.

Shorter averages will be more sensitive to trend changes but will also give many false signals in a sideways market. Moving averages work best in well-defined trend markets.

MOVING AVERAGES



Summary

Technical analysis can be a powerful tool in terms of helping one pick market entry and exit points. However, it is very important to realize that the selection of the proper time period over which to contract a technical indicator is completely arbitrary. In general, the longer the time period used, the more reliable the indicator. However, the longer the time period used, the more likely the indicator will not be realized.

It is also important to recognize that technical indicators are sometimes self-fulfilling prophecies (if enough people believe a gap should be filled prices will trade back towards

the gap). Do not confuse this with some market imperative that “forces” the market to achieve a technical objective.

The most successful technical trades use a portfolio of indicators, and look for some consensus among them (i.e., 7 out of 9 reveal the same objective). Focusing on one technical indicator is extremely dangerous, and will not likely lead to satisfactory results.

