

Technical Analysis

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Howard L. Simons

hsimons@aol.com

Components of Trading

- Trading has three components, in descending order of importance
 - Understanding your own risk tolerance and objectives
 - Managing money and controlling risk
 - Decision methodology (trading system)
- Unfortunately, these are approached in inverse order more often than not

Interplay Between Components

- The entire basis of technical analysis is the constancy of human behavior
 - We react the same ways, both as individuals and as groups, to the same situations
 - These reactions are constant across years and cultures
 - Some say they are constant across markets. I disagree, but the remainder of these sessions will presume constancy across markets

Self-Similarity

- The principle of fractal self-similarity from chaos theory appears to apply well; patterns from five-minute bar charts, daily bar charts, weekly, etc., can be interpreted on the same basis
- This is very useful, as it allows us to approach trading problems on a “macro-to-micro” basis

Risk Management Tradeoffs

- There are tradeoffs between trade frequency, margin/equity ratios, projected profitability, drawdowns and gain retracements, winning percentage, and profits per trade.
- For example, you should not expect to have large drawdowns combined with frequent trading and a high winning percentage, but you won't have large per-profit trade, either.

Portfolio Approach

- Diversification means having some losers
- Spreads are not less risky; that depends on the degree of covariance between the legs, the variance of the legs and stability of the coefficients over time
 - VAR often is statistical self-delusion
 - Measuring risk and managing risk are two different things

Other Risk Controls

- Stops can be placed on a probabilistic, equity, chart, or other technical basis
 - Chart stops are used most commonly
 - Chart stops frequently create self-fulfilling prophecies
- Long options offer intrinsic risk control as do most option spreads

Risk And Timeframe

- Your personality should define your trading style
 - An active trader can take large positions and trade them quickly, but must be very quick to take losses and should have small profit objectives
 - A longer-term trader, should cut position size down, and can have greater loss tolerance and larger profit objectives

How Do You Know Your Style?

- Sometimes it is defined for you. A corporate or fund trader responsible for the best execution of decisions made elsewhere does not have to worry about trading style unless it is job-threatening
- Don't ask yourself what your risk tolerance is. You'll get a lie back for an answer. Try to recall how you feel during a trading day or when you are carrying a position trade

Attitude And Money Management

- Getting nervous or angry at the market means you have too great of a reliance on your need to be right
 - Being right is the most difficult way to make money
 - Each loss needs to be offset
 - A trading gain over and above random requires being right 75% ($75\% - 25\% = 50\%$) of the time, assuming random and normal distribution of results

Study Your Winners

From Jack Schwager's *Market Wizards*:

- Ed Seykota: “Everyone gets what they want from the market.”
- Larry Hite: “We don't make trades, we make money.”

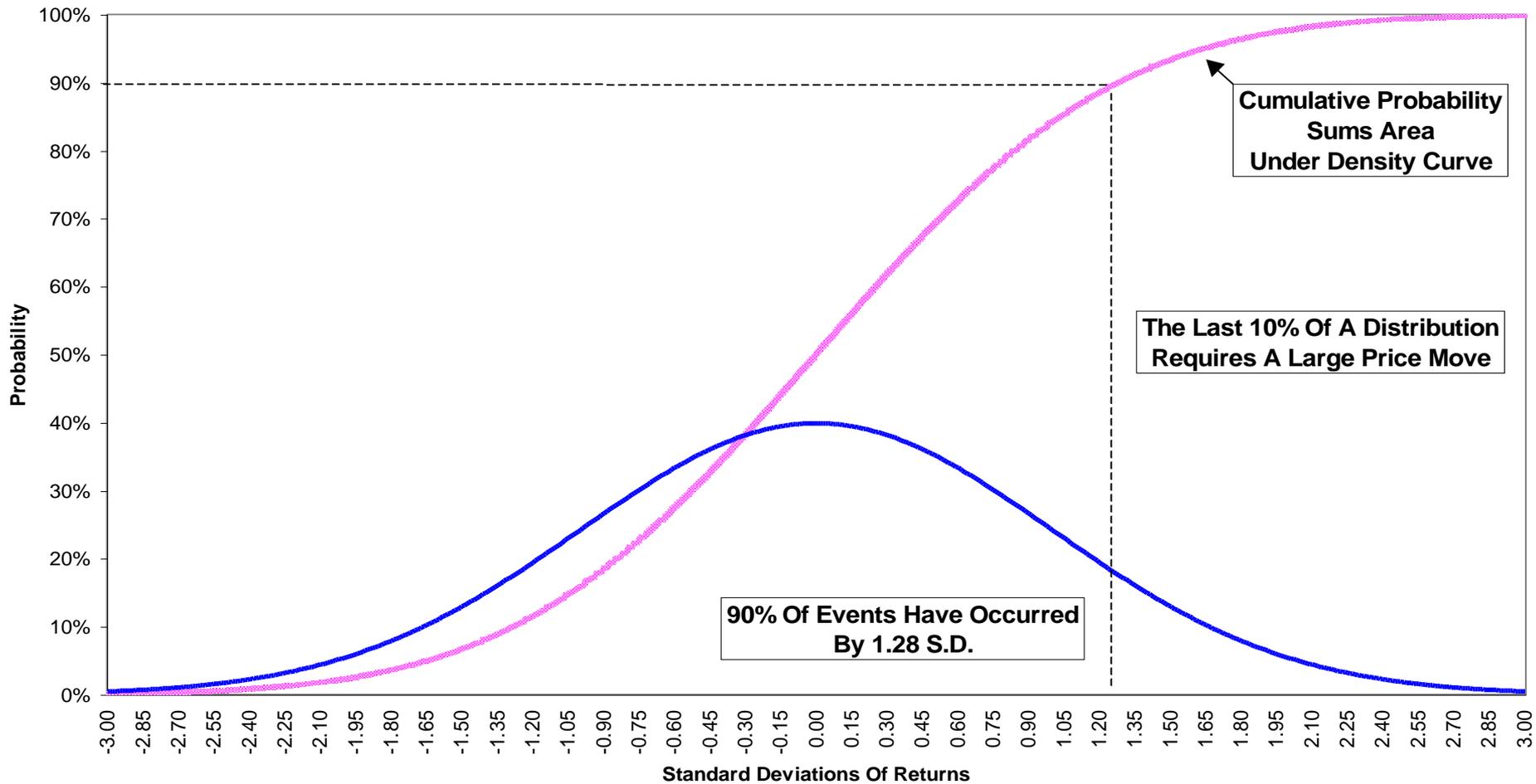
Studying your winners allows you to create self-reinforcing behavior -- if winning is what you want! Decide if this is a business or a diversion.

Technical Or Fundamental?

- The great debate is pointless
 - Over a short timeframe, noise dominates signal. Fundamental information does not arrive at a high enough frequency to explain short-term moves
 - Over a long timeframe, signal dominates noise. If an industry is growing, a poor short-term chart should not affect a long-term investment
- If markets truly were efficient, neither approach to analysis should work; both succeed and both fail

Linking Technical & Fundamental Analyses

- A tenet of behavioral finance is that traders are risk-averse in the domain of profits and risk-seeking in the domain of loss
 - Translation: We cut profits and let losses run
- As a result, trends accelerate as they mature; the old axiom that the last 50% of a move occurs in 10% of the time
- Linked to the distribution of price returns

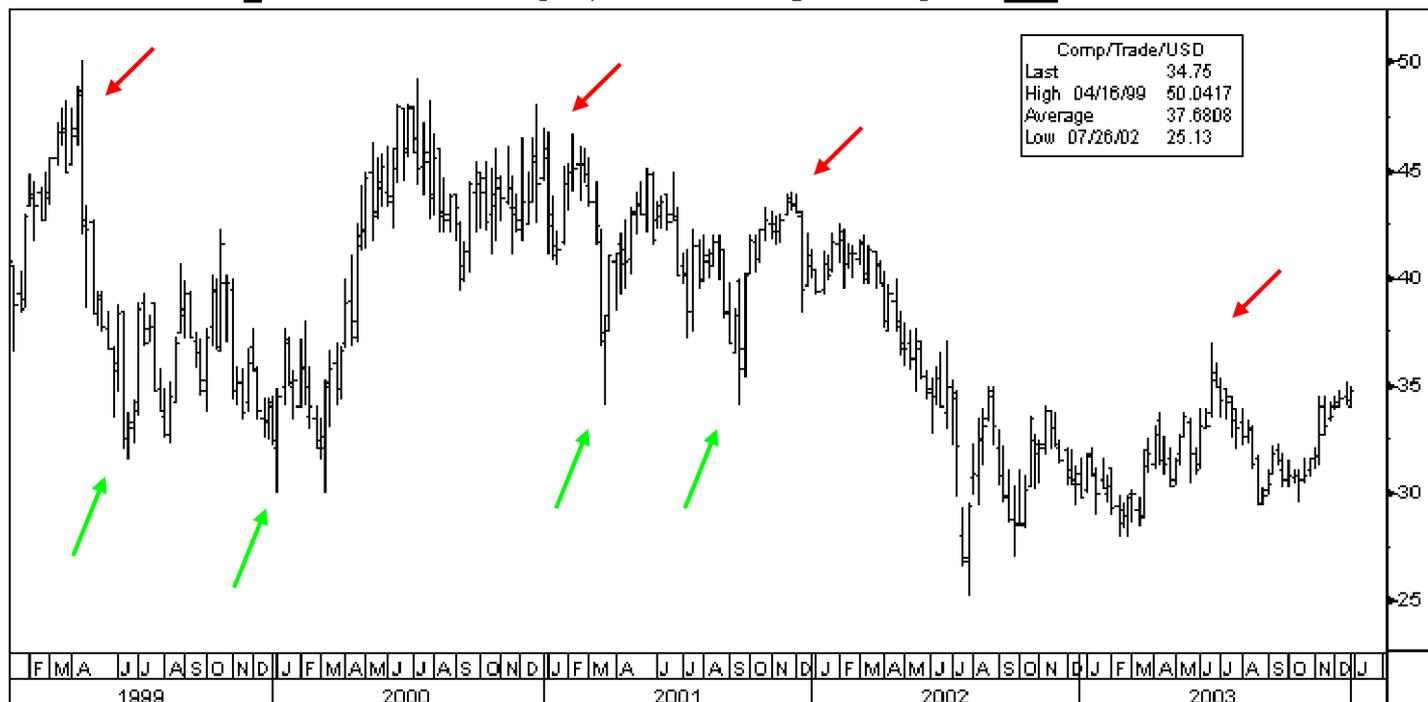


Link To Trading

- The last few percent of a price move show up on charts as spike tops/bottoms
- These represent capitulations on the part of buyers/sellers and mark very important long-term resistance/support points
 - Any move that takes out previous desperation reflects a major change in underlying industry economics
 - Often mark reversal points after capitulation

PFE US \$ C 34.75 +.03 M 33.88/34.90 2x3 Equity GPO
As of Dec26 Vol 3,898,500 Op 34.72 N Hi 34.89 N Lo 34.66 B

Bar Chart PFE US Equity 1/11
 Range **1/ 2/99 - 12/26/03** Period **W Weekly** Base Currency: **USD**
 Upper Chart: **1** Bar Chart Moving Averages **■ ■**
 Lower Chart: **N** No additional graph(s) Moving Average **■** 1) News



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Every Picture Tells A Story

- Our brains are programmed to recognize visual patterns, so we might as well take advantage of this
- The first and most important question – seriously – is whether this is a bull market, a bear market or temporarily neither

What Is A Trend?

- Price is a convergent search process for economic value
 - Economic value is non-constant. Its changes over time are reflected in price
 - It is defined by longer-term supply/demand balances
 - It cannot be known, only inferred
- Price can be known exactly, and that is what we see and have to work with

What To Look For

- Independent of timeframe, are higher/lower prices being accepted or rejected?
- Are both the highs and lows higher or lower for up- and downtrends, respectively?
- Are previous support/resistance levels holding or failing?
- Are moves counter to the primary trend violent and quickly reversed?

Conceptual Definition of Trend

- According to the Efficient Market Hypothesis, the current price should reflect all available information about the asset
 - This means that neither fundamental nor technical analysis should have any value
- EMH is silent, however, on the stream of information into a market and on investor preferences

Conceptual Definition (Cont.)

- A bull market is characterized by an ongoing stream of bullish news; as we shall discuss later, in a bull market all news is construed bullishly, and vice-versa for a bear market
- As trends continue over time, the perceived risk of remaining with the primary trend decreases, with predictable consequences

Attributes Of A Trend

- Interday price change dominates intraday price range
 - A market with large price changes is not “volatile,” it knows where it wants to go and wastes little time getting there
 - A trending market has fewer intraday retracements
- Interday price structures tend to move in the direction of the trend (candlestick)

YHOO US \$ C **44.29** -.48 C 144.27/44.29 9x13 Equity GPO
 As of Dec26 Vol 4,246,871 Op 44.80 Q Hi 45.25 Q Lo 44.25 Q

Bar Chart YHOO US Equity 1/10

Range **12/29/02** - **12/26/03** Period **D** Daily Base Currency: **USD**
 Upper Chart: **1** Bar Chart Moving Averages **■ ■**
 Lower Chart: **N** No additional graph(s) Moving Average **■** 1) News



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Volatility Breakouts

- Markets do not move violently when people are right. When traders are on the wrong side of the market en masse, a wide-ranging day, possibly with a gap occurs
- Not believing strongly enough in the dominant trend can constitute “wrongness”
- A surge in volume typically occurs on such days

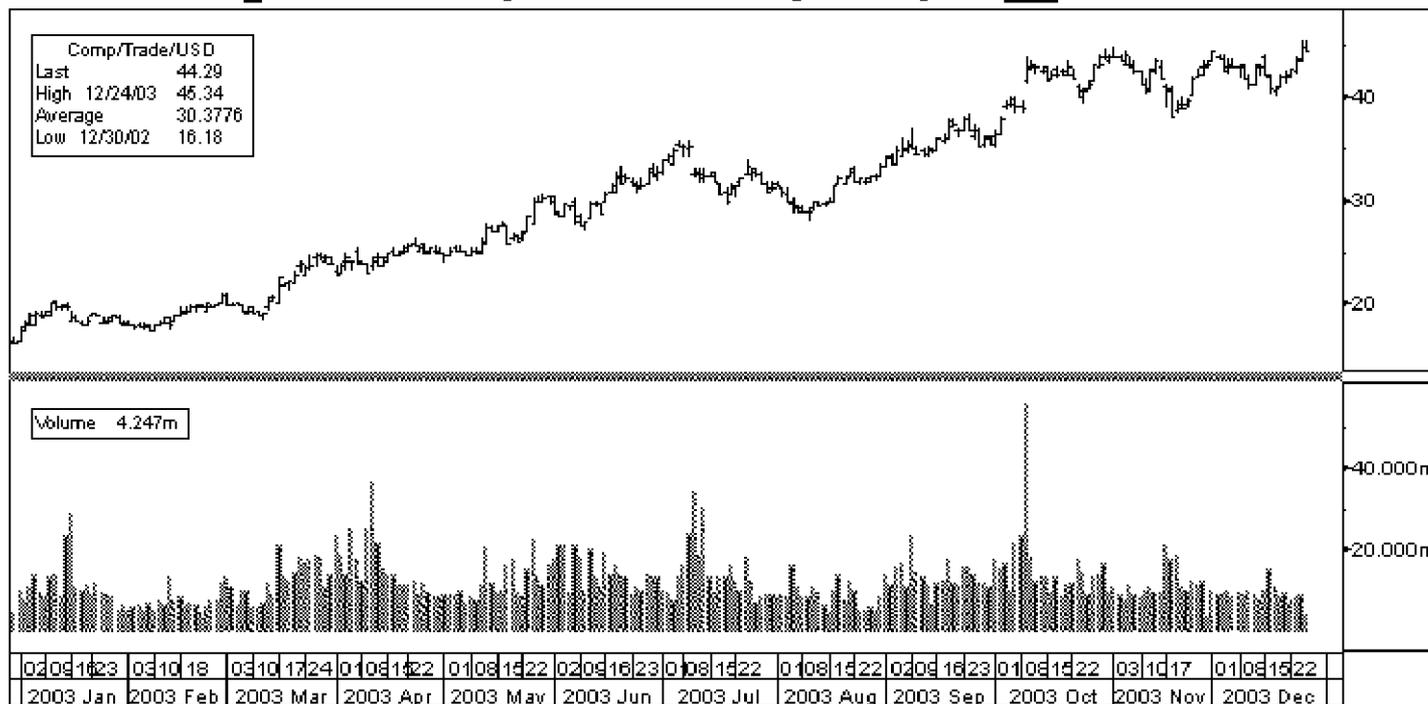
YHOO US \$ C **44.29** -.48 C 144.27/44.29 9x13 Equity GPO
 As of Dec26 Vol 4,246,871 Op 44.80 Q Hi 45.25 Q Lo 44.25 Q

Bar Chart YHOO US Equity 1/10

Range **12/29/02** - **12/26/03** Period **D** Daily Base Currency: **USD**

Upper Chart: **1** Bar Chart Moving Averages **■ ■**

Lower Chart: **V** Volume Histogram Moving Average **■** 1) News



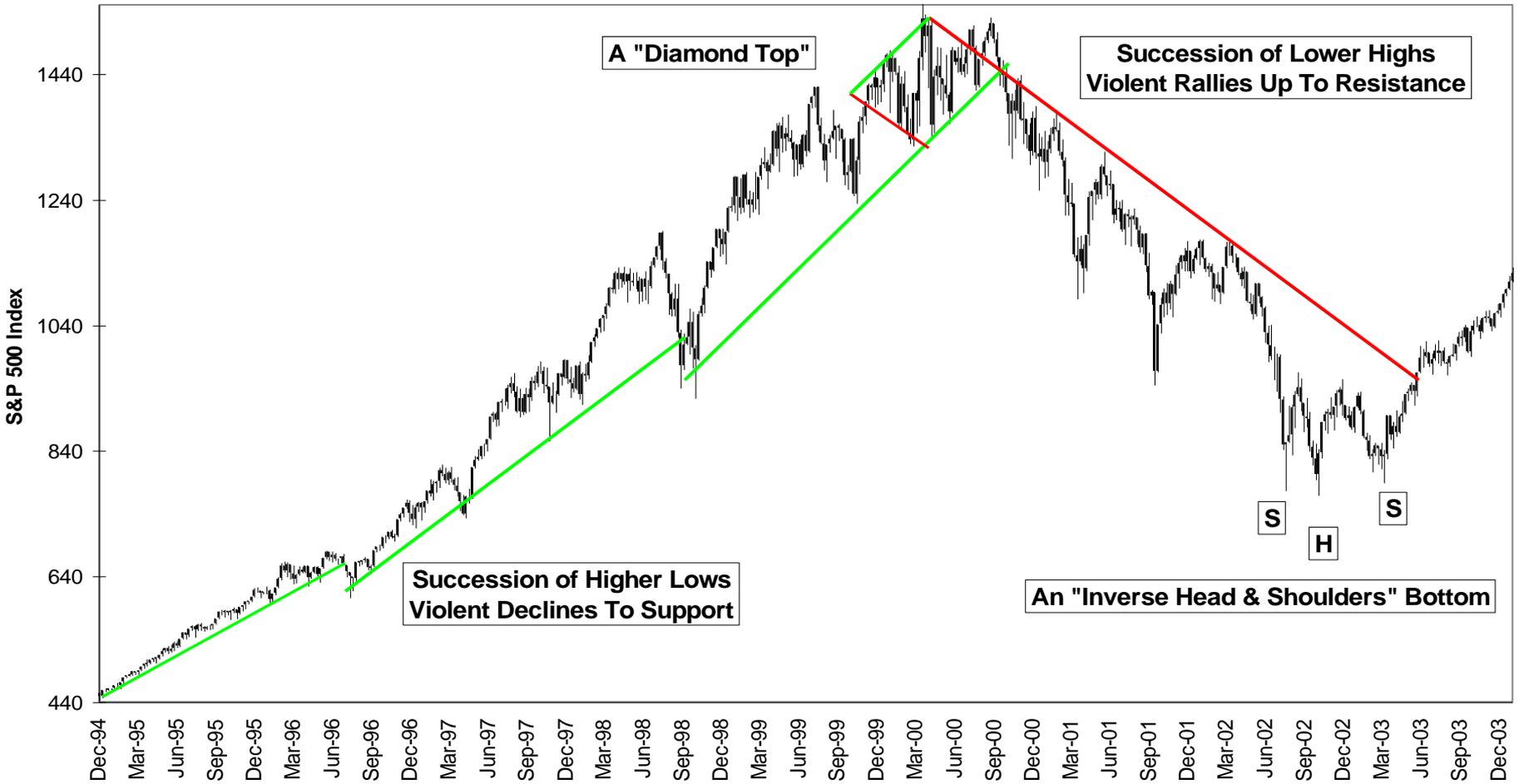
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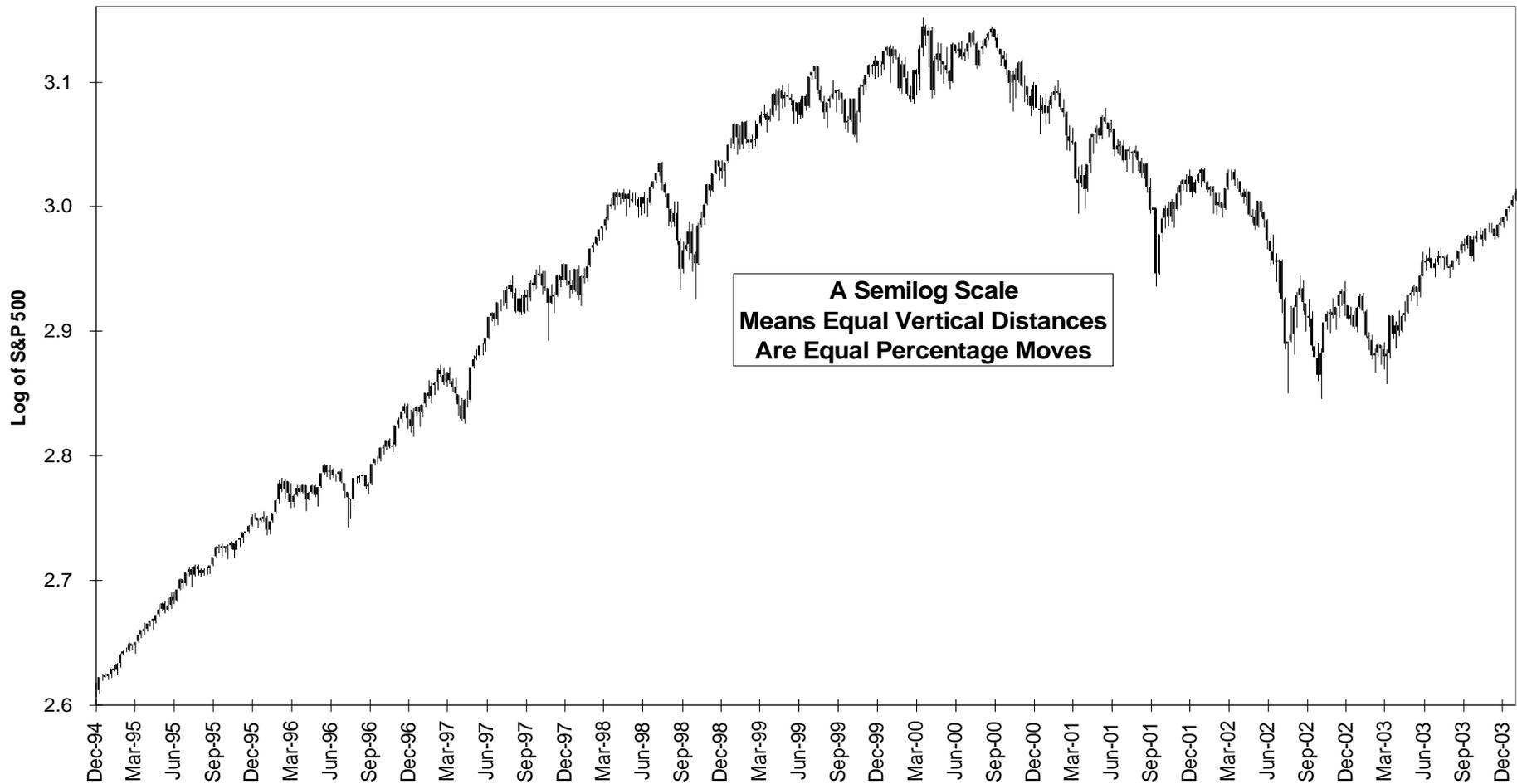
Notes On Volume

- Daily volume data are subject to numerous distortions and special considerations
- In general, volume is a *confirming* indicator, but not a *negating* indicator
 - If volume confirms price-based indications, that makes them stronger
 - If volume negates the price signal, the price signal should be listened to first

Trend Case Study: S&P 500

[In discussion] This weekly chart illustrates channels, double bottoms, spike bottoms, retracement levels, support/resistance levels, double bottoms and bottoms, broken channels, head-and-shoulders bottoms and volatility patterns





Notes On Channels

- A channel is quite common in a trending market. They indicate a growing acceptance of new value, but not at a constant rate – that would be a logarithmic channel
- Their bounds are easy to extrapolate and are quite visible
- Channel bounds form support/resistance bands

Channels (Cont.)

- Markets frequently violate channel boundaries as stops are hit – bad place to put stops
 - When a market re-enters a channel, it tends to move all the way to the other boundary
 - The mid-point of a channel often acts as a consolidation point in such a move

Channels (Cont., 2)

- Quite common for a market to break out of a channel and then retreat back to the channel line
- If a market breaks out of a channel and does not retest the channel line, the subsequent move often is quite strong

WMT US \$ C 52.52 +.08 N 51.88/53.30 1x1 Equity GPO
As of Dec26 Vol 3,119,300 Op 52.32 N Hi 53.03 T Lo 52.32 N

Bar Chart WMT US Equity 1/10
 Range **12/29/02 - 12/26/03** Period **D Daily** Base Currency: **USD**
 Upper Chart: **1** Bar Chart Moving Averages **■ ■**
 Lower Chart: **N** No additional graph(s) Moving Average **■** 1) News



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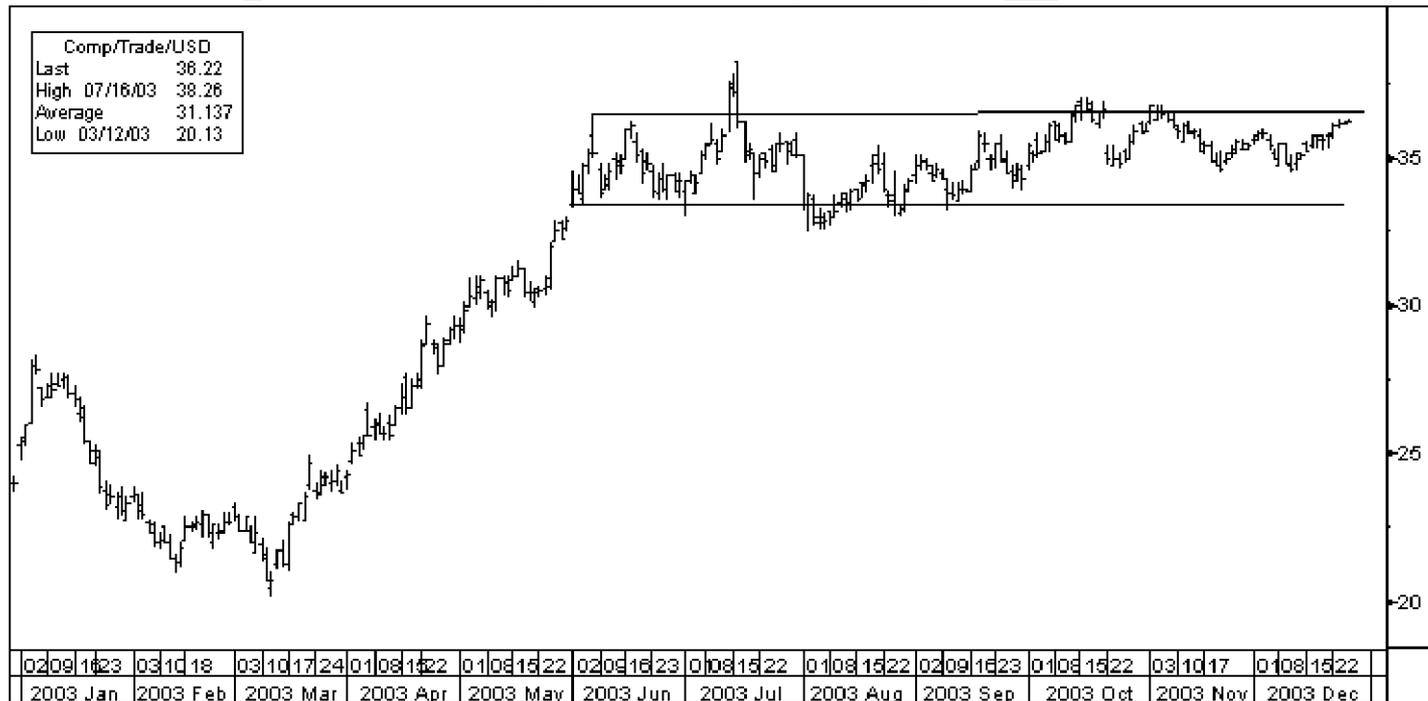
Notes On Support & Resistance

- If underlying economic value is static, a market typically consolidates in a sideways range
- The presence of sellers at higher prices and buyers at lower prices defines the range
- A break of these levels becomes significant as they indicate that value has changed

JPM US \$ C 36.22 +.09 M 35.35/37.14 1x1 Equity GPO
 As of Dec26 Vol 1,347,300 Op 36.27 N Hi 36.31 N Lo 36.12 N

Bar Chart JPM US Equity 1/10

Range 12/29/02 - 12/26/03 Period D Daily Base Currency: USD
 Upper Chart: 1 Bar Chart Moving Averages
 Lower Chart: N No additional graph(s) Moving Average 1) News



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Support & Resistance (Cont.)

- Each time a horizontal support/resistance line is hit, it weakens a little
 - Either supply or demand is absorbed at that level
- The principle of “what was once support is now resistance” is very powerful
- Unlike channels, breaks of horizontal levels are seldom re-tested before continuation

BKX 961.71Y as of close 12/26

Index **GPO**

Bar Chart **BKX Index** 1/10

Range **12/29/02** - **12/26/03** Period **D** Daily Base Currency: **USD**

Upper Chart: **1** Bar Chart Moving Averages **■ ■**

Lower Chart: **N** No additional graph(s) Moving Average **■** No News



/USD	
Last	961.71
High 12/23/03	965.27
Average	840.63
Low 03/12/03	657.51

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Support & Resistance (Cont., 2)

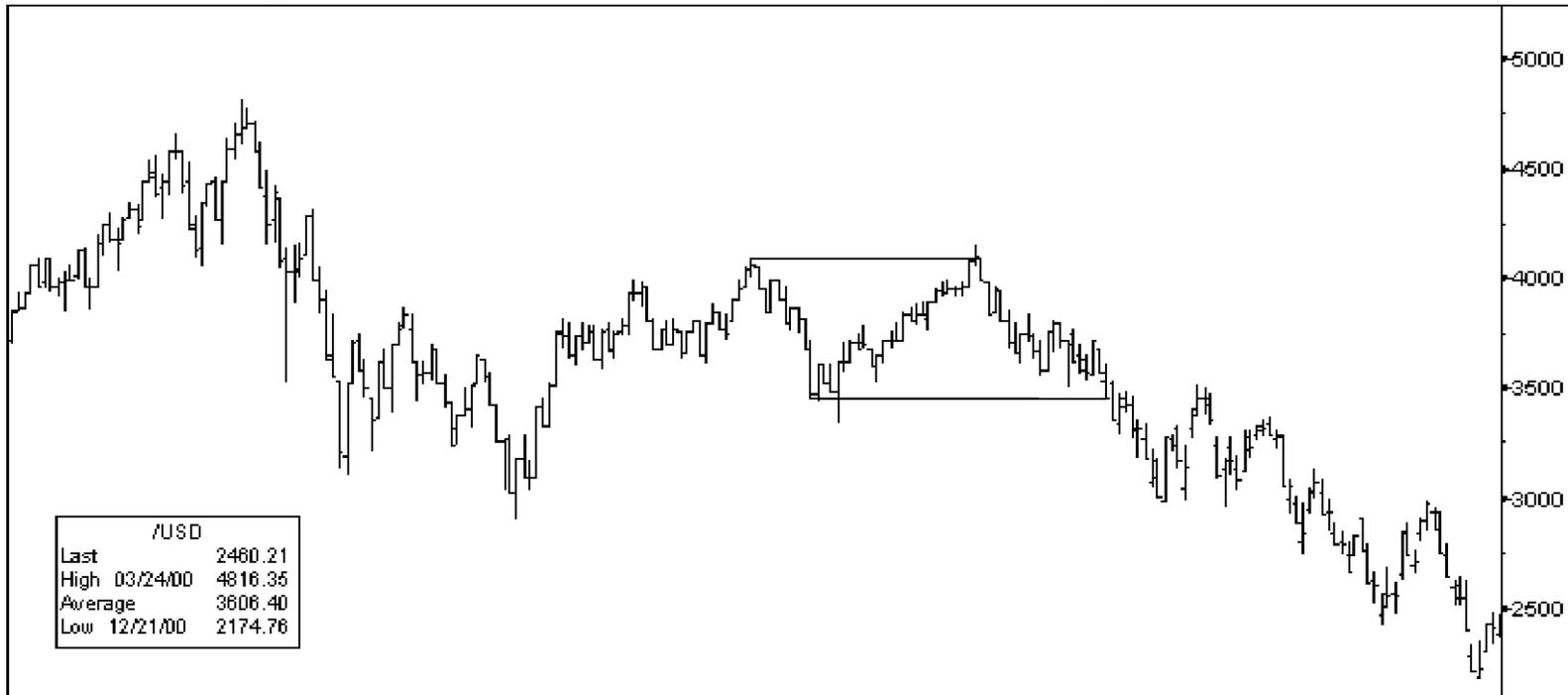
- If a level holds twice, it forms a double-top or double-bottom on the chart
- A double-top has a swing-point in the middle that forms an “M” on the chart; double-bottoms form a “W” on the chart
- A break of the swing point signals a major collapse in a market

NDX 1404.87Y as of close 10/10

Index **GPO**

Bar Chart **NDX Index** 1/10

Range **2/14/00** - **12/29/00** Period **D** Daily Base Currency: **USD**
 Upper Chart: **1** Bar Chart Moving Averages **■ ■**
 Lower Chart: **N** No additional graph(s) Moving Average **■ ■** 1) News



08 14 22	01 08 15 22	03 10 17 24	01 08 15 22	01 08 15 22	03 10 17 24	01 08 15 22	01 08 15 22	02 09 16 23	01 08 15 22	01 08 15
2000 Feb	2000 Mar	2000 Apr	2000 May	2000 Jun	2000 Jul	2000 Aug	2000 Sep	2000 Oct	2000 Nov	2000 Dec

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Head & Shoulders Formations

- A variation of the triple-top/bottom - recall S&P 500 weekly chart on Slide 28
- Once you are aware of these, you see them everywhere... until you recognize that a true H&S is fairly rare
- Once formed, they are excellent measuring devices on a chart, the rule being “halfway up or down the neckline

Retracements

- Markets seldom move in straight lines
 - Winners take profits
 - Countertrend traders enter the market
 - Underlying value changes, and price has to conform
- A common retracement pattern in the convergent search by price for value is the Fibonacci series

Fibonacci Series

- First, let's stipulate there may be a strong element of self-fulfilling prophecy in this pattern; once traders look for it, their actions are changed
 - Currency markets adhere to Fibonacci retracements almost religiously
 - And, FWIW, the pattern shows up in natural formations such as the spiral pattern of a chambered nautilus
- Other retracement and projection methods, Gann and Elliott Wave in particular, converge to Fibonacci, and it's much simpler

SPX 1095.89Y as of close 12/26

Index GPF

FIBONACCI RETR GRAPH for SPX -- S&P 500 INDEX

1/ 8/99	-12/26/03	Period	<input checked="" type="checkbox"/> Weekly	ChartType	<input checked="" type="checkbox"/> Candle	USD
		Market Type	<input checked="" type="checkbox"/> mid/trd			

FROM BOTTOM:	0.0%	23.6%	38.2%	50.0%	61.8%	76.4%	100.0%
FROM TOP:	100.0%	76.4%	61.8%	50.0%	38.2%	23.6%	0.0%

Last 1095.89 on 12/26/03 High 1552.87 on 03/24/00 Ave 1181.5 (Close) Low 768.63 on 10/11/02



1JAN99 30APR 27AUG 31DEC 28APR00 1SEP 29DEC 27APR01 31AUG 28DEC 26APR02 30AUG 27DEC 25APR03 29AUG 26DEC
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Gaps

- Price is not continuous. A gap occurs when today's low is greater than yesterday's high, or when today's high is less than yesterday's low
- A gap is evidence of a strong order imbalance
- Urban legend aside, a gap does not need to be filled: There is still a gap on the Dow going back to 1933, and T-bonds gapped higher in price in November 1994, never to look back

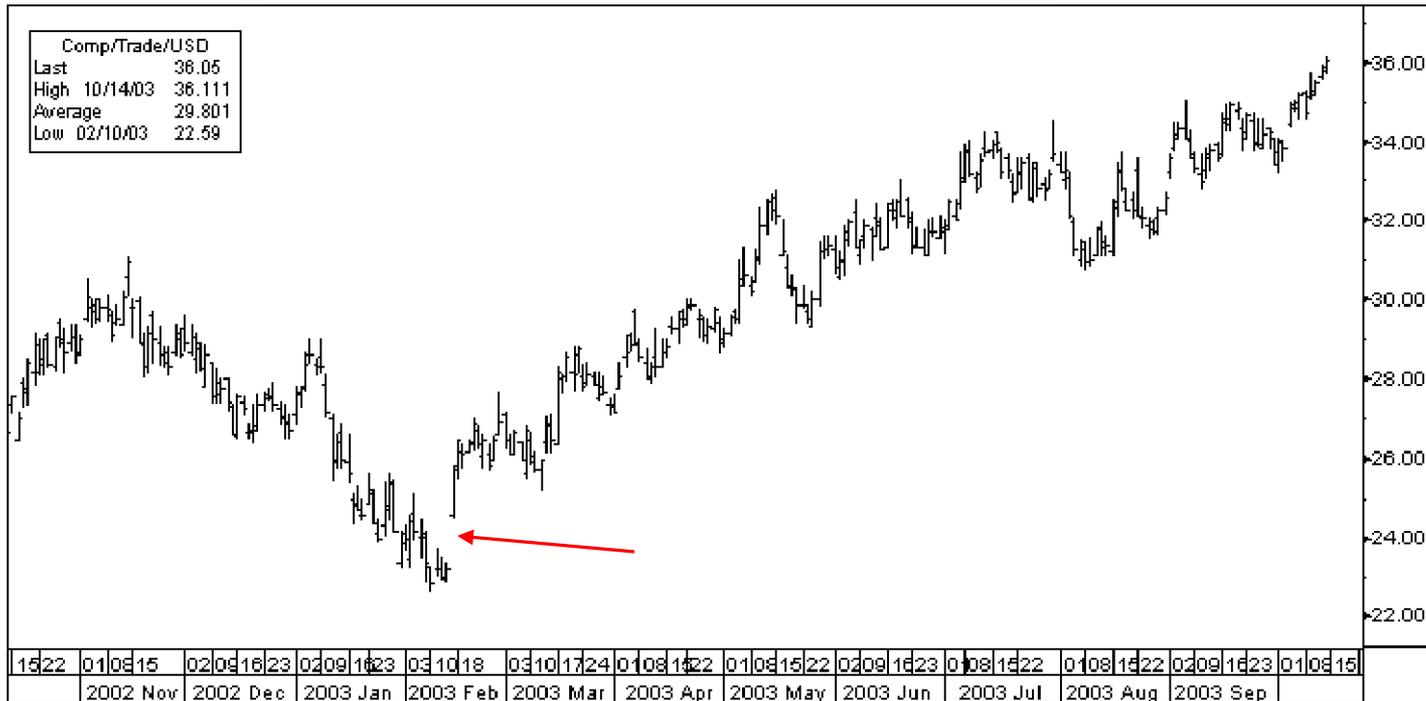
Initiation Gap

- The initiation or breakaway gap
 - This occurs with a major change in the value of the underlying asset
 - The opening move often is faded after initial panic subsides
 - The gap's midpoint acts as support/resistance
 - However, a good trading rule is to go with a gap day that remains open at the end of Day 1 and add to the position if it stays open at the end of Day 3

DELL US \$ ↓ **36.05** +.23 P 1s P ↓36.04/36.05 Q 8x12
 At 14:18 Vol 9,099,576 Op 35.86 P Hi 36.111 C Lo 35.656 C ValTrd 326.980m

Bar Chart **DELL US Equity** 1/11

Range **10/14/02** - **10/14/03** Period **D** Daily Base Currency: **USD**
 Upper Chart: **1** Bar Chart Moving Averages **■ ■**
 Lower Chart: **N** No additional graph(s) Moving Average **■** 1) News



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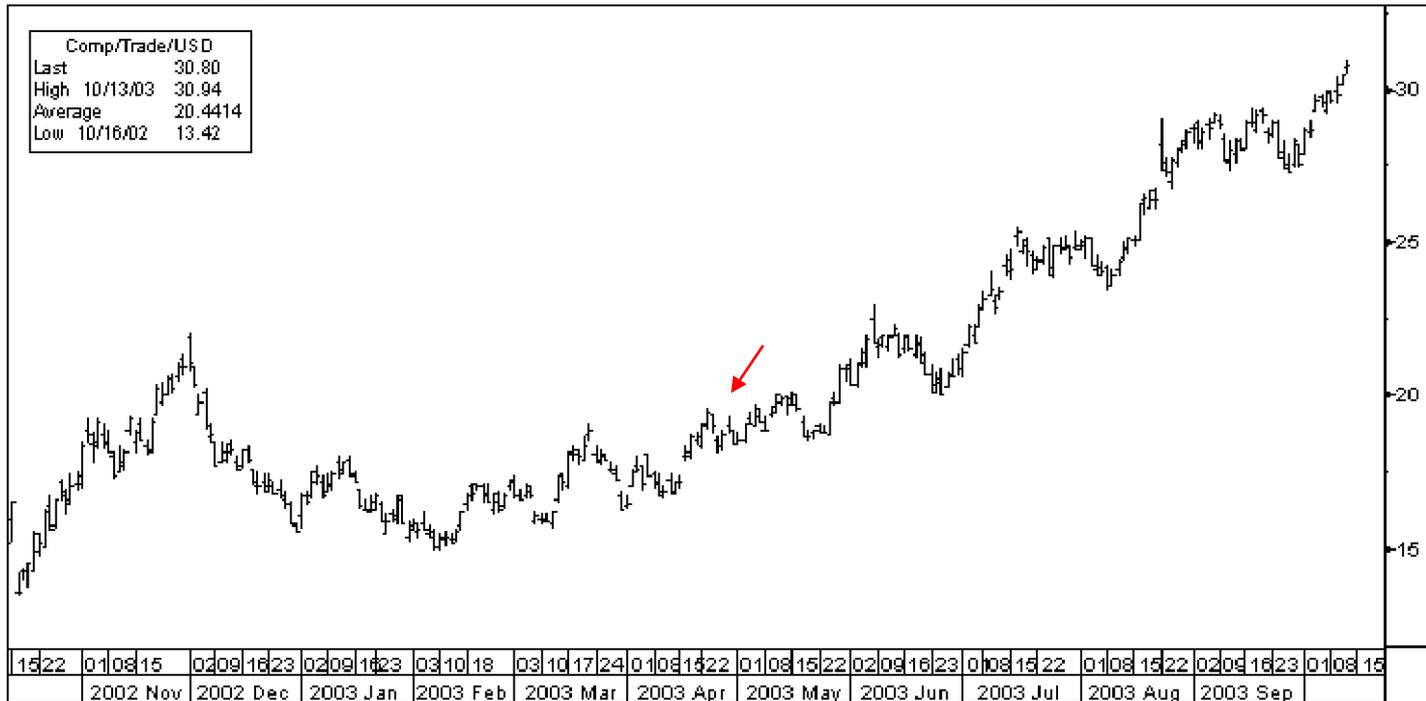
Common Gap

- These occur in the middle of a trading range and do not have any great trading significance until and unless a previous high or low is exceeded
- They occur most commonly in markets with high volatility and low liquidity

INTC US \$ ↑ **30.8** +.37 Q P ↓30.8/30.77 1x27 Equity GPO
 At 15:30 Vol 41,697,419 Op 30.71 P Hi 30.94 Q Lo 30.48 Q ValTrd 1274.189m

Bar Chart INTC US Equity 1/11

Range **10/14/02** - **10/13/03** Period Daily Base Currency: **USD**
 Upper Chart: Bar Chart Moving Averages
 Lower Chart: No additional graph(s) Moving Average 1) News



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Continuation Gap

- These occur within the context of a new trend initiated from a gap
- They constitute important support/resistance targets for subsequent retracements
- A trend can have more than one continuation gap

GM US \$ C 52.97 **-.38 N 52.10/53.70 1x1** **Equity GPO**
As of Dec26 **Vol 1,388,300 Op 53.36 N Hi 53.65 N Lo 52.35 P**

Bar Chart **GM US Equity** 1/10

Range **12/29/02** - **12/26/03** Period **D** Daily Base Currency: **USD**
 Upper Chart: **1** Bar Chart Moving Averages **■ ■**
 Lower Chart: **N** No additional graph(s) Moving Average **■** 1) News



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Exhaustion Gap

- These occur in the last phases of a major trend, often in association with the capitulation process noted earlier
- A minor price extension beyond the gap level followed by a reversal often is called a “hook reversal” or a “bull/bear trap”
- These form very powerful tops and bottoms

EK US \$ C 24.85 -.12 N 24.75/25.88 2x2 Equity **GPO**
 As of Dec26 Vol 1,041,600 Op 24.95 N Hi 25.22 T Lo 24.76 N

Bar Chart **EK US Equity** 1/10

Range **12/29/02** - **12/26/03** Period **D** Daily Base Currency: **USD**
 Upper Chart: **1** Bar Chart Moving Averages **■ ■**
 Lower Chart: **N** No additional graph(s) Moving Average **■ ■** 1) News



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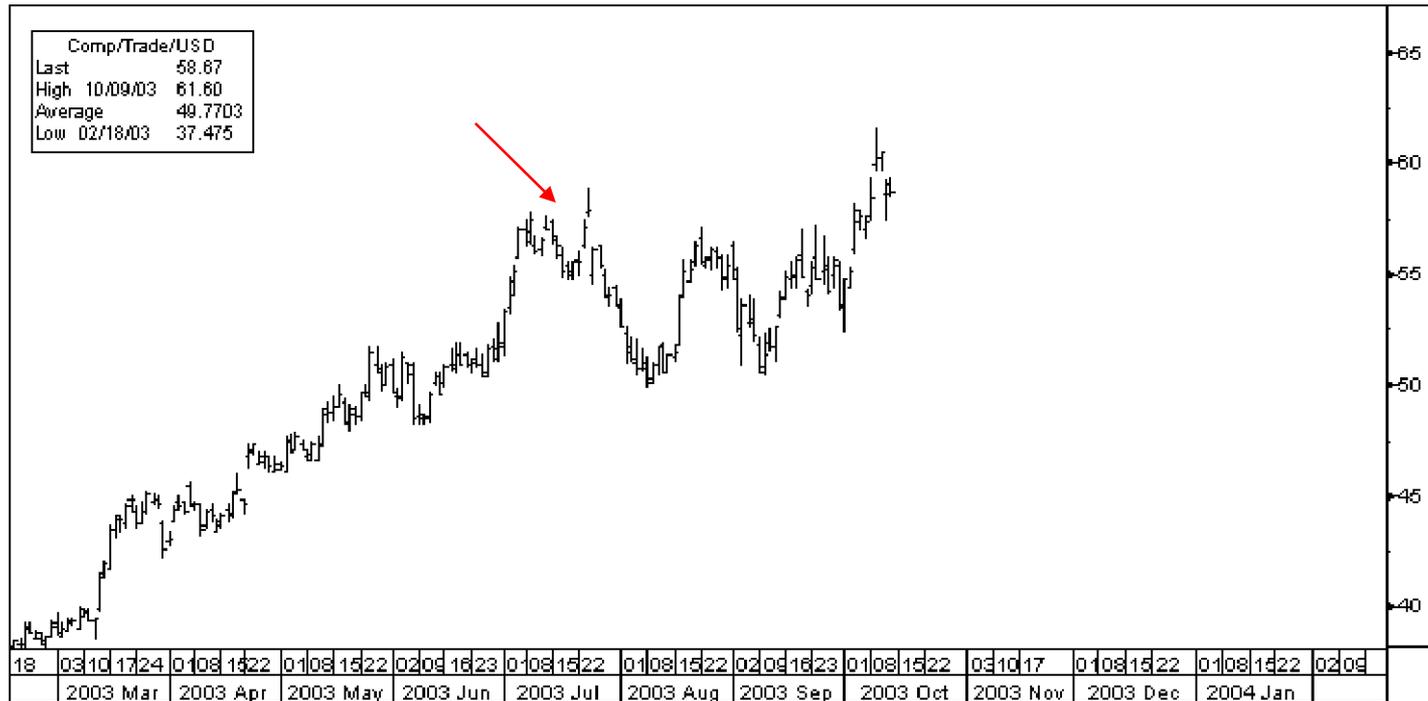
Islands

- An exhaustion followed by a reversal gap leaves an “island” on the chart
- While nothing in markets is certain, these come close to being definitive tops and bottoms as they confirm previous sentiment to be wrong
- They can be quite violent in their formation, and frequently are associated with a news event

EBAY US \$ ↓ **58.67** -.32 P 1s P 158.67/58.68 D 4x2
 At 14:18 Vol 5,956,544 Op 58.62 M Hi 59.4 C Lo 58.5 Q ValTrd 350.992m

Bar Chart **EBAY US Equity** 1/11

Range **10/14/02** - **10/14/03** Period **D** Daily Base Currency: **USD**
 Upper Chart: **1** Bar Chart Moving Averages
 Lower Chart: **N** No additional graph(s) Moving Average 1) News



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Consolidation Formations

- The combination of a market overshooting value and the normal mechanics of retracement make consolidations quite common
- These can be in-trend consolidations such as flags and pennants or sideways consolidations that form rounded tops and/or bottoms

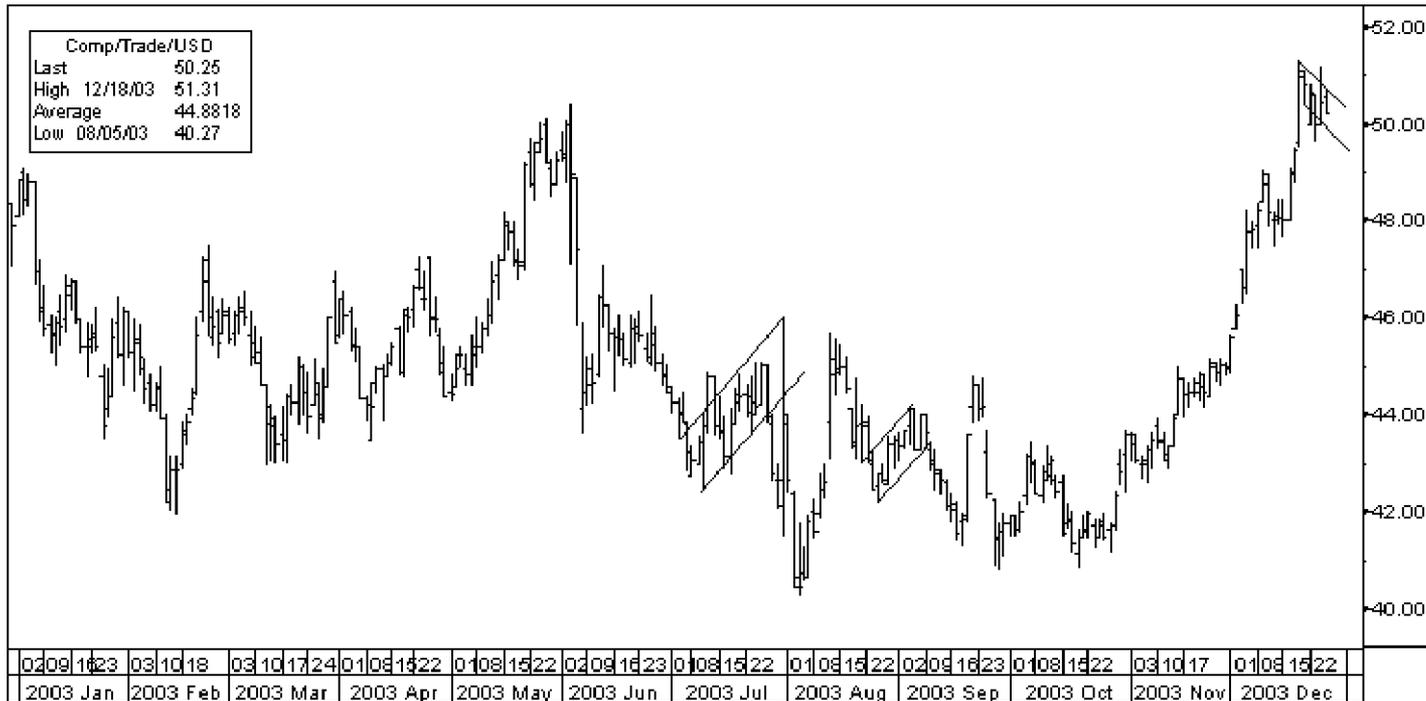
Bull & Bear Flags

- A bullish flag points downward, upper left to lower right; a bearish flag points upward, lower left to upper right
- These are continuation of trend patterns; the opposite flags often are accompanied by expanding ranges and then reversals
- Price moves out of the flag project to the height of the flag

APC US \$ C 50.25 -.20 M 49.55/51.30 1x1 Equity GPO
 As of Dec26 Vol 736,000 Op 50.55 N Hi 50.70 N Lo 50.17 N

Bar Chart APC US Equity 1/10

Range 12/29/02 - 12/26/03 Period D Daily Base Currency: USD
 Upper Chart: 1 Bar Chart Moving Averages
 Lower Chart: N No additional graph(s) Moving Average 1) News



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Triangle Formations

- Some insist there are no pennants, only flags; over time, a pennant becomes a flag
- A narrowing-range pennant is a continuation formation that will project at least the height of the pennant
 - Expanding range pennants are reversal patterns
 - V-shaped vertical pennants are reversal patterns

OSX 94.52Y as of close 12/26

Index **GPO**

Bar Chart

OSX Index

1/11

Range **1/ 2/99** - **12/26/03**

Period **W** Weekly

Base Currency: **USD**

Upper Chart: **1** Bar Chart

Moving Averages

Lower Chart: **N** No additional graph(s)

Moving Average

No News



Australia 61 2 9777 8600	Brazil 5511 3048 4500	Europe 44 20 7330 7500	Germany 49 69 920410
Hong Kong 852 2977 6000	Japan 81 3 3201 8900	Singapore 65 6212 1000	U.S. 1 212 318 2000

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Flat Triangles

- A triangle with a flat top or bottom tends to have strong breakouts to its flat side
 - Either the overhead resistance support has been getting lower or the underlying support has been getting higher
- This holds true whether the triangle is in-trend or at a top or bottom

Quantitative Indicators

Relative Strength

CALCULATION

The RSI calculation appears in its original and derived form. Average Up and Average Down are calculated using a simple average method for the initial observation. Subsequent values are computed using these initial values in conjunction with a damping factor to smooth out extreme points. The RSI equation and two averaging methods are presented below.

$$RSI = 100 - \frac{100}{1 + \text{Avg Up}/\text{Avg Dn}}$$

Avg Up: Sum of all changes for advancing periods divided by the total number of RSI periods.

Avg Dn: Same as Avg Up but for declining periods.

Avg Up: Prior Avg Up * (RSI periods - 1). For advancing periods, add the total period's change to Avg Up, otherwise add 0. The result is divided by the number of RSI periods.

Avg Dn: Same as Avg Up, but for declining periods.

INTERPRETATION

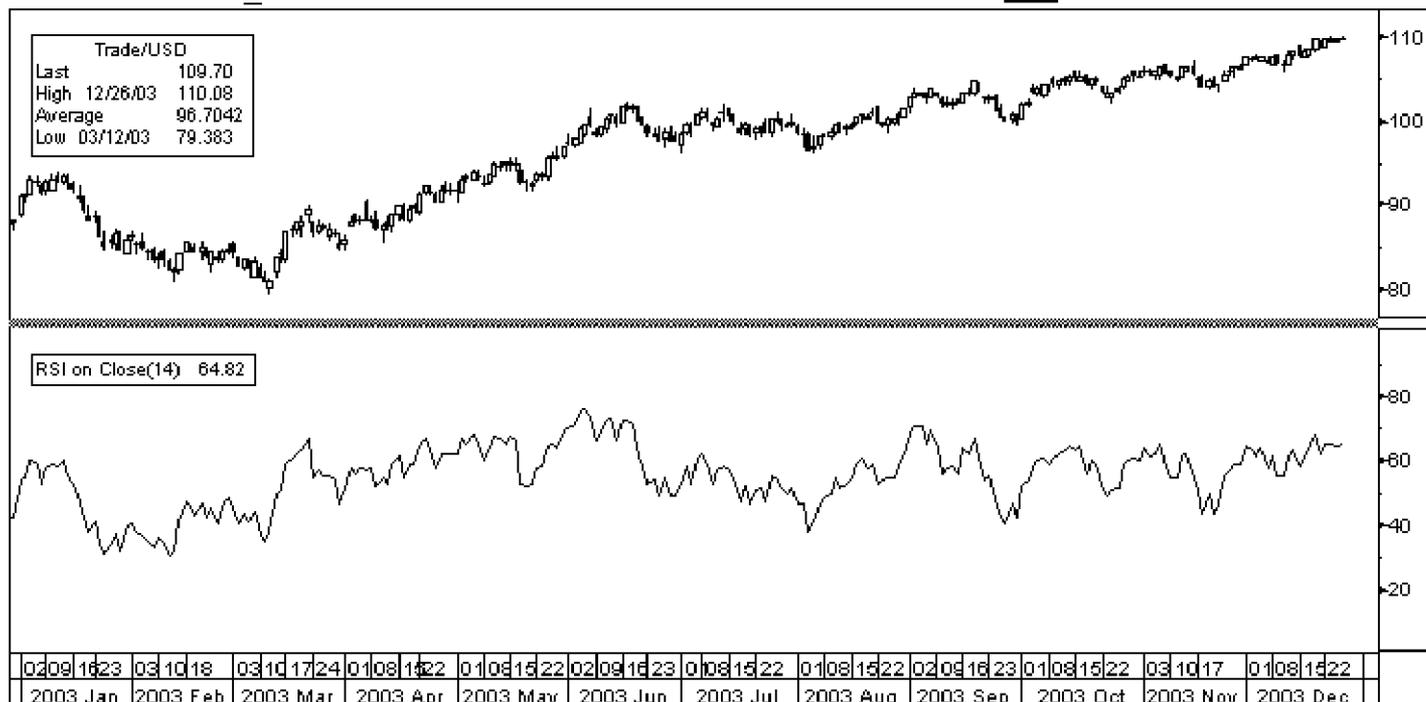
Momentum oscillators, such as RSI, measure the velocity of directional price movement. When the price moves up rapidly, at some point it is considered overbought. When the price moves down rapidly, at some point it is considered oversold.

In general, RSI levels in excess of 70 are thought to indicate overbought conditions. Conversely, RSI levels below 30 are thought to indicate oversold conditions. NOTE: RSI values for yields are interpreted inversely to prices - 70 being oversold and 30 overbought.

When a security reaches extremes, you may want to shift your focus from a weekly to a daily RSI to highlight changes in trends better. NOTE: Shorter RSI periods identify trend changes more quickly at the expense of generating more volatility and possibly more false signals.

SPY US \$ C **109.70** +.08 A T109.60/109.75T INCA/INCA 7x Equity **RSI**
 As of Dec26 Vol 8,308,400 Op 109.71 P Hi 110.08 A Lo 109.63 A

Relative Strength Index for **SPY US Equity** 1/10
 Range **12/29/02** - **12/26/03** Period **0** Daily Base Currency: **USD**
 Upper Chart: **2** Candle Chart Moving Averages **█** **█**
 Lower Chart: **P** Price RSI **14** 1) News



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Gerald Appel developed Moving Average Convergence/Divergence as an indicator of the change in a security's underlying price trend. Theory suggests that when a price is trending, it is expected, from time to time, that speculative forces "test" the trend.

MACD calculates two price averages to locate turning points in a trend. The difference calculated between the averages is referred to as the MACD1 period indicator, which is weighted by a signal indicator. A change in trend occurs when the MACD1 period indicator crosses the signal indicator. If the MACD1 period crosses the signal indicator from below, it indicates a positive change in trend (buy signal). If the MACD1 period indicator crosses the indicator from above, it indicates a negative change in trend (sell signal).

NOTE: An indication of a price trend turning point only occurs when there is a definite crossing of the two lines. For example, if the MACD1 period indicator rides along the signal indicator without crossing, no indication exists.

CALCULATION

Bloomberg's Moving Average Convergence/Divergence analysis, based on an oscillator technique developed by Gerald Appel, is derived from the following formula:

$$\text{Exponential Moving Average} = (C - X)K + X$$

where:

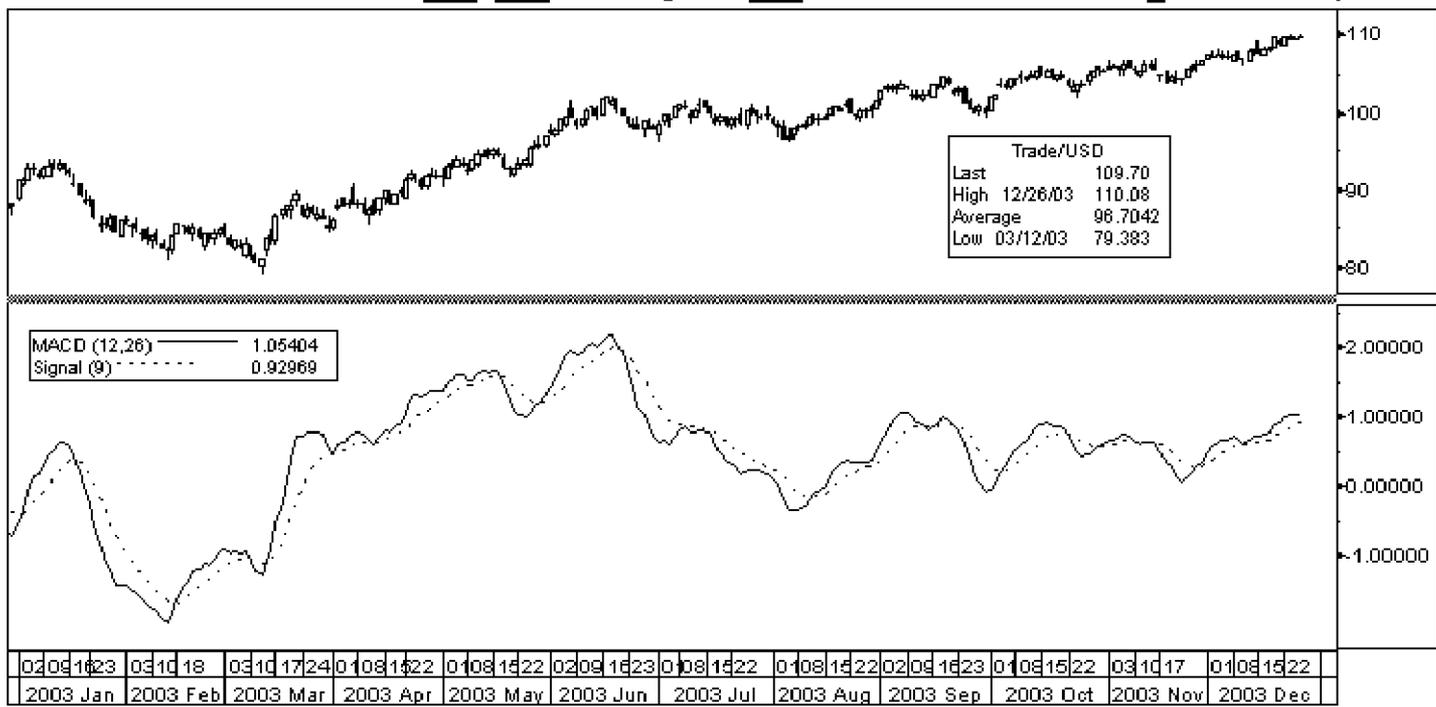
X = Previous Exponential Moving Average

C = Current Price (or P/E)

K = $2/(\text{Number of Periods} + 1)$

SPY US \$ C 109.70 +.08 A T109.60/109.75T INCA/INCA 7x Equity MACD
 As of Dec26 Vol 8,308,400 Op 109.71 P Hi 110.08 A Lo 109.63 A

Moving Avg Conv/Div for SPY US Equity 1/10
 Range 12/29/02 - 12/26/03 Period 0 Daily Base Currency: USD
 Upper Chart: 2 Candle Chart Moving Averages 1) News
 MACD PERIODS: MACD1 (12-26) Signal 9 Additional Lines 1 None



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Lane's Stochastics is based on the observation that as prices increase, closing prices tend to be closer to the upper end of the price range. Conversely, in downtrends, the closing price tends to be near the lower end of the range. Stochastics expands upon the concept of RSI (Relative Strength Indicator), which measures momentum based on changes in daily closing prices. Unlike RSI, however, Stochastics have two lines, and the calculations are based on the rate of change in the daily high, low, and close prices.

Most analysts feel that activity above 70% indicates overbought conditions and, conversely, activity below 30% indicates oversold conditions. When %K crosses %D, many analysts believe this is a potential buy or sell signal. Most feel that activity in the 30% to 70% area is not significant enough to represent a meaningful trend.

All technical analysis is subject to interpretation. The reliability of any method should be examined in retrospect, and you should check all highlighted fields (such as Stochastics, Periods, etc.) to be assured that they make sense for you and your application.

STOCHASTICS: CALCULATIONS

The BLOOMBERG PROFESSIONAL service computes and graphs the following indicators:

%K: An unsmoothed Relative Strength Indicator (RSI) of daily close. The formula is as follows:

$$\% K = \frac{\text{current close} - \text{lowest low price for period}}{\text{highest high price for period} - \text{lowest low price for period}} * 100$$

%D: A moving average of %K for the period specified (n). The formula is as follows:

$$\% D = \frac{\% K1 + \% K2 + \% K3 + \dots + \% Kn}{n}$$

%DS: A moving average of %D for the period specified (n). The formula is as follows:

$$\% DS = \frac{\% D1 + \% D2 + \% D3 + \dots + \% Dn}{n}$$

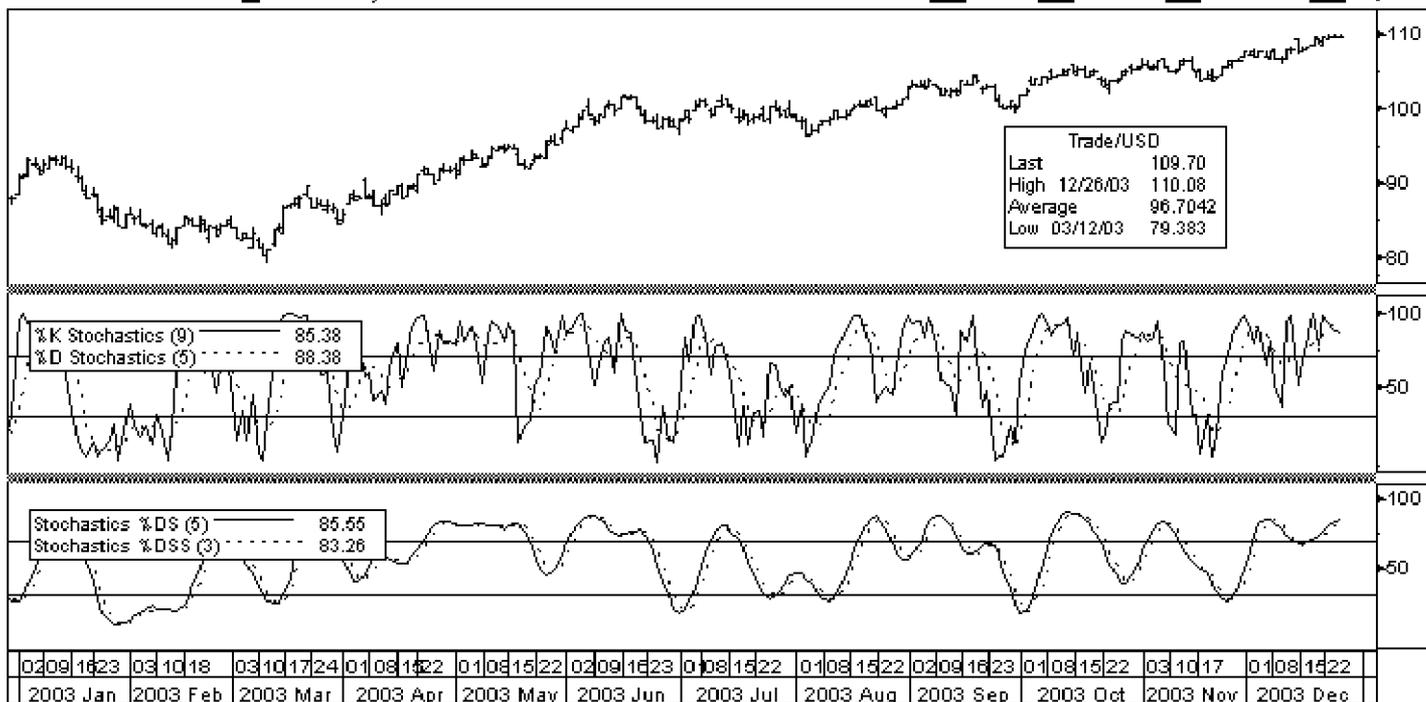
%DS-slow: A moving average of %DS for the period specified (n). The formula is as follows:

$$\% DS\text{-slow} = \frac{\% DS1 + \% DS2 + \% DS3 + \dots + \% DSn}{n}$$

SPY US \$ C **109.70** +.08 A T109.60/109.75T INCA/INCA 7x Equity TAS
 As of Dec26 Vol 8,308,400 Op 109.71 P Hi 110.08 A Lo 109.63 A

Stochastics for **SPY US Equity** 1/10

Range **12/29/02** - **12/26/03** Period **D** Daily Base Currency: **USD**
 Upper Chart: **1** Bar Chart Moving Averages **1** News
 Stochastics **B** %K/%D, Slowed %D Periods: %K **9** %D **5** %DS **5** %DSS **3**



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BOLLINGER BANDS

INTERPRETATION OF BOLLINGER BANDS

Bollinger Bands, developed by John Bollinger, are plotted at a specified number of standard deviations above and below a moving price average. Standard deviation is an excellent measure of price volatility. Bollinger Bands are variable width bands that become narrower during less volatile periods and wider during more volatile periods. Technical analysts can use Bollinger Bands as a graphical means of determining a security's probable price trending range.

Many market participants also use Bollinger Bands to set probable support and resistance levels. For this purpose, most technical analysts use a standard deviation of 2.0 (meaning that the security will trade between the upper and lower bands about 95% of the time) and a moving average period of 20, with a moving average period of 10 or less not recommended. Analysts assume that the price will encounter resistance when it reaches the top band and will receive support when it hits the lower band.

SPY US \$ C **109.70** +.08 A T109.60/109.75T INCA/INCA 7x Equity **BOLL**
 As of Dec26 Vol 8,308,400 Op 109.71 P Hi 110.08 A Lo 109.63 A

Bollinger Bands for **SPY US Equity** 1/10

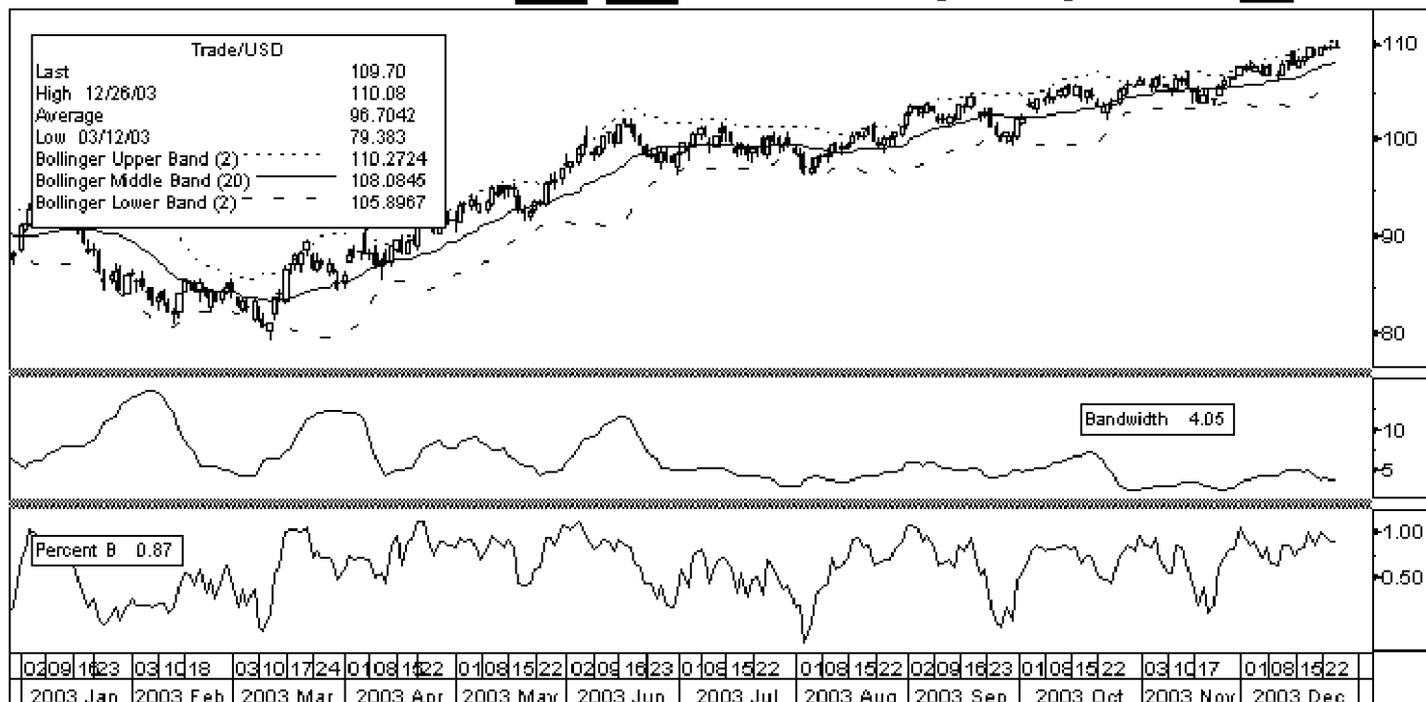
Range **12/29/02** - **12/26/03** Base Currency: **USD**

Upper Chart: **2** Candle Chart

Period **0** Daily 1) News

Standard Deviation Periods **2.0** **2.0**

Moving Average Period **20**



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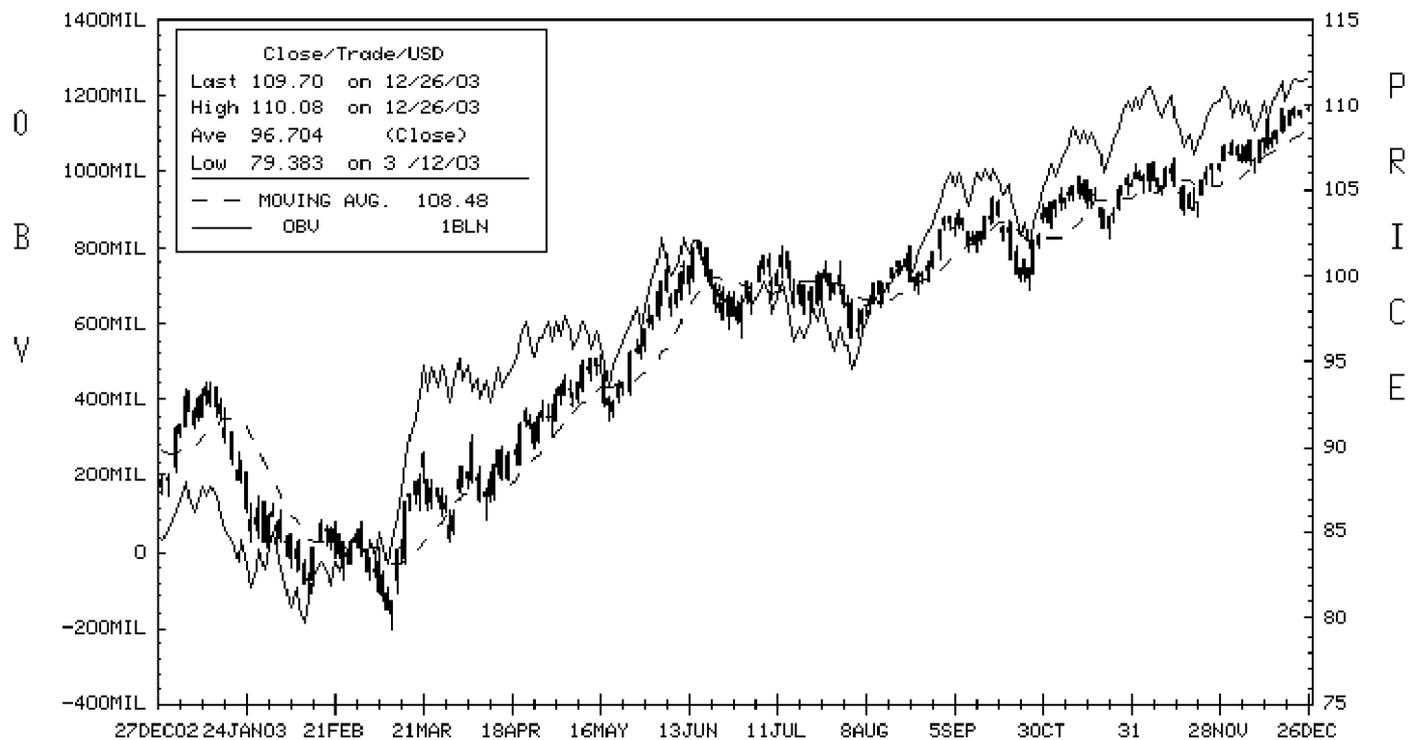
The on-balance volume (OBV) displays a running total of a security's volume. The analysis is based on the assumption that OBV changes precede price changes. The important relationship is the shape of the OBV line to the price lines. When OBV rises or falls together with the price, a trend is confirmed.

When OBV reaches new highs, it confirms the power of the bull market and indicates that the price might continue to rise. Conversely, when OBV reaches new lows, it confirms the power of the bear market and hints at lower prices.

SPY US \$ C 109.70 +.08 A T109.60/109.75T INCA/INCA 7x Equity OBV

ON-BALANCE VOLUME IND for SPY US

12/30/02 - 12/26/03 Period **D** Daily Moving Avg. Period **14** USD
 Chart Type **C** Candle Volume? **N** No



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Candlesticks

BULLISH PATTERN IF AFTER DOWNTREND

Piercing Line (PL): Composed of two candlesticks. The first candlestick is black and has a long real body. The second candle is white and has a long real body. The white candle opens below the low of the prior black day. However, the prices push higher and the candle closes above the mid-point of the prior day's black real body. The greater the degree of penetration into the black real body, the more likely it will be a bottom reversal. A bullish engulfing line is a more meaningful bottom reversal.

Morning Star (MS): A long black real body followed by a small real body that gaps lower (a star). The third candlestick is a long white candlestick that moves well within the first period's black real body. It is usually an important reversal signal.

Bullish Harami (BH): A long black candle followed by a short candle. The body of the black candle completely engulfs the body of the short candle. The color of the short candle is not relevant. The harami is not usually a significant reversal pattern.

Inverted Hammer (IH): A small real body with a long upper shadow and a short lower shadow. Its real body should gap below the previous candle's real body. It is important to wait for bullish verification on the session following the inverted hammer. Verification can be in the form of the next day's opening above the inverted hammer's real body or a white candlestick with higher prices.

Abandoned Baby Bottom (AB): A major bottom reversal signal, and it is extremely rare. It is a distinctive form of the morning doji star. The doji star must have a gap before and after it (the shadows do not touch).

Bullish Engulfing Line (BL): A black candlestick followed by a white real body that wraps around the prior period's black real body. The white candlestick must be long, and the close of the white candlestick must be greater than the open of the black. The open of the white candlestick must be less than the close of the black. The shorter the real body of the black candle and the longer the real body of the white candle, the more powerful the signal. It is usually an important reversal signal.

Morning Doji Star (MD): A distinctive form of the morning star. The star is a doji, which is more important than the morning star.

Bullish Harami Cross (BC): A distinctive form of the bullish harami. The second candlestick is a doji, which gives it more importance. It is usually a major reversal signal.

Tweezer Bottom (TB): A long black candlestick line followed by a second line that has the same low as the first. The length and color of the second candle is irrelevant. A tweezer is usually not a vital reversal signal.

BEARISH PATTERN IF AFTER UPTREND

Dark Cloud Cover (DC): Composed of two candlesticks. The first candlestick is white and has a long real body. The second candle is black and has a long real body. The black candle opens above the high of the prior white day. However, by the end of the second day, the market closes near the low of the day and below the mid-point of the prior day's white real body. The greater the degree of penetration into the white real body, the more likely it will be a top reversal. A bearish engulfing line is a more meaningful top reversal.

Evening Star (ES): A long white real body followed by a small real body which gaps higher (a star). The third candlestick is a long black candlestick that moves well within the first period's white real body. It is usually a major reversal signal.

Bearish Harami (HR): A long white candle followed by a short candle. The body of the white candle completely engulfs the body of the short candle. The color of the short candle is not relevant. The Harami is not usually a significant reversal pattern.

Shooting Star (SS): A small real body with a long upper shadow and a short lower shadow. Its real body should gap above the previous candle's real body. It is usually not a major reversal signal.

Abandoned Baby Top (AT): A major top reversal signal, and it is extremely rare. It is a distinctive form of the evening doji star. There is an upside gap doji star (the shadows do not touch) followed by an downside gap black candlestick where the shadows also do not touch.

Bearish Engulfing Line (EL): A white candlestick followed by a black real body that wraps around the prior period's white real body. The black candlestick must be long. The open of the black candlestick must be greater than the close of the white. The close of the black candlestick must be less than the open of the white. The shorter the real body of the white candle and the longer the real body of the black candle, the more powerful the signal. It is usually an important reversal signal.

Evening Doji Star (ED): A distinctive form of the evening star. The star is a doji, which is more important than the evening star and is usually a major reversal signal.

Bearish Harami Cross (HC): A distinctive form of the bearish harami. The second candlestick is a doji, which gives it more importance. It is usually a major reversal signal.

Tweezer Top (TT): A long white candlestick line followed by a second line that has the same high as the first. The length and color of the second candle are not relevant. A tweezer is usually not a vital reversal signal.

REVERSAL PATTERN AFTER SIGNIFICANT TREND

Hammer/Hanging Man (H): A candlestick with a long lower shadow and a small real body. The lower shadow should be at least twice the length of the real body. The real body is near the top of the trading range, and the upper shadow should be short. A hammer emerges after a downtrend, signaling that the downtrend should end. A hanging man emerges after a rally, signaling the prior move may be ending. They are usually important reversal signals.

REVERSAL PATTERN - WAIT FOR CONFIRMATION

Star (S): Composed of two candlesticks. The first is a long candle, and the second is a small candle. The real bodies do not overlap. During an uptrend, the first candlestick should be white, and the second candlestick should gap higher. During a downtrend, the first candlestick should be black, and the second candlestick should gap lower. The color of the star can be black or white.

Doji Star (DS): A star with a doji. It is more powerful than a star because it contains a doji. A star indicates a reversal and a doji indicates indecision. Therefore, this pattern usually indicates a reversal following an indecisive period. You should wait for confirmation before trading a doji star.

INDECISION

Doji (D): A candlestick in which the opening and closing prices are the same. Doji sessions are only important in markets where there are not many dojis. A doji represents indecision. Dojis are able to call market tops, especially after a long white candlestick in an uptrend. Uncertainty by buyers does not maintain an uptrend. However, you should wait for confirmation during a downtrend because the market can still fall lower.

Double Doji (DD): Two adjacent doji lines, which implies that a forceful move follows a breakout from the current indecision.

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 As of Dec26 Vol 8,308,400 Op 109.71 P Hi 110.08 A Lo 109.63 A

Candle Chart **SPY US Equity** 1/10

Range **12/29/02** - **12/26/03** Period **D** Daily Base Currency: **USD**

Upper Chart: **2** Candle Chart Moving Averages **■ ■**

Lower Chart: **N** No additional graph(s) Moving Average **■** 1) News

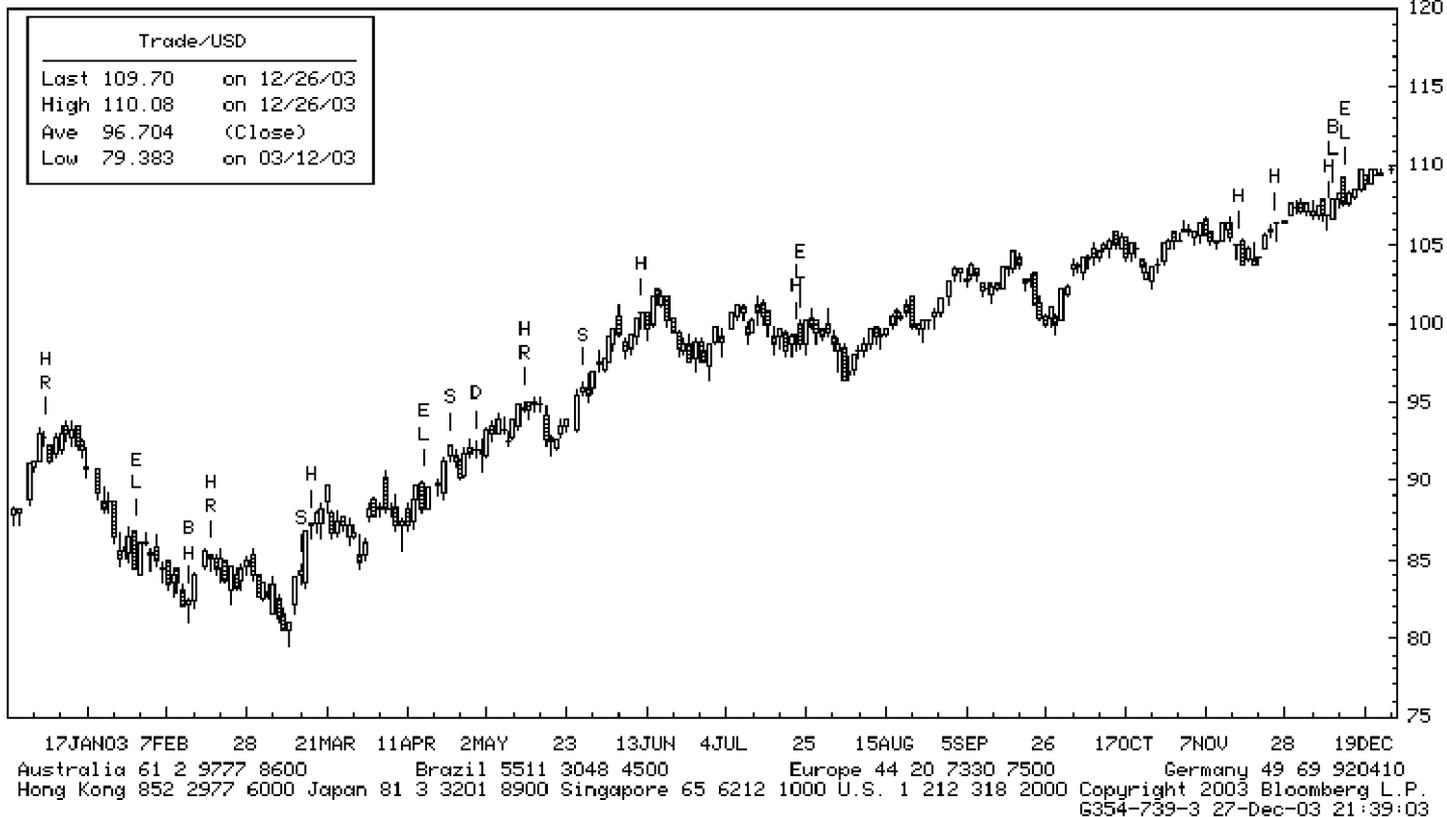


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<HELP> for explanation, <MENU> for similar functions. N151 Equity **CNDL**
 Enter 1 <GO> for a list of options.

CANDLESTICK PATTERNS for **SPY US**

RANGE 12/30/02 TO 12/26/03 USD



Technical Systems

- Each technical indicator we have covered so far has its own strengths and weaknesses.
- All moving averages, moving average crossovers, and oscillators are lagging indicators that will work well in trending markets but will get reversed too quickly in a sideways market.

Technical Systems (Cont.)

- Stochastics tend to work well in slow systems, ones in which you do not intend to reverse quickly
- Relative strength will tend to take you out of strong moves and breakouts; it works best in sideways markets.

Technical Systems (Cont., 2)

- Channel systems like Bollinger bands are useful for determining support and resistance levels, as are trendlines, congestion zones, and Fibonacci retracement levels.
- Cycles are an interesting intellectual exercise, but are of dubious value in making actual trading decisions.

An Art, Not A Science

- The Right Stuff: We should approach any technical study with the attitude, “What Is The Market Telling Me”
- There is no right answer, only a right attitude. If a perfect system ever existed, it would have become self-defeating within days.

Art, Not Science (Cont.)

- Any number of approaches can work if approached with consistency, discipline, and good money management
- A plan is necessary. Trying to make a lot of money in a hurry by being right all of the time is not a plan