

Technical Analysis

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Investment Analytics

Technical Analysis

- Technical Analysis:
 - Study of past market action to forecast prices
 - Looks for patterns in historical data

Technical Analysis Tools

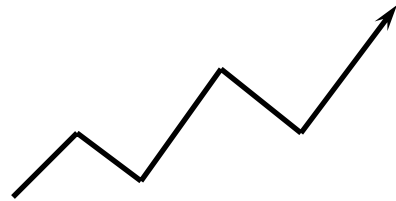
- Charting
- Gann
- Elliot Wave
- Cycle Theory
- Oscillators & Indicators
- Japanese Candlesticks
- Market Profile
- Computerized Trading Systems

Classical Charting

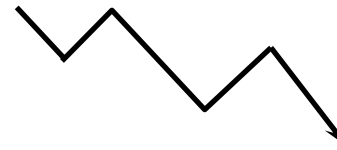
- Trend Lines
- Support/Resistance
- Continuation Patterns
- Reversal Patterns
- Gaps & Spikes
- Moving Averages

Trends

➤ Trend Direction



- Uptrend:
higher highs, higher lows



- Downtrend:
lower lows, lower highs

➤ Trend timeframe:

- 3 Trends: (e.g. weekly, daily, hourly)

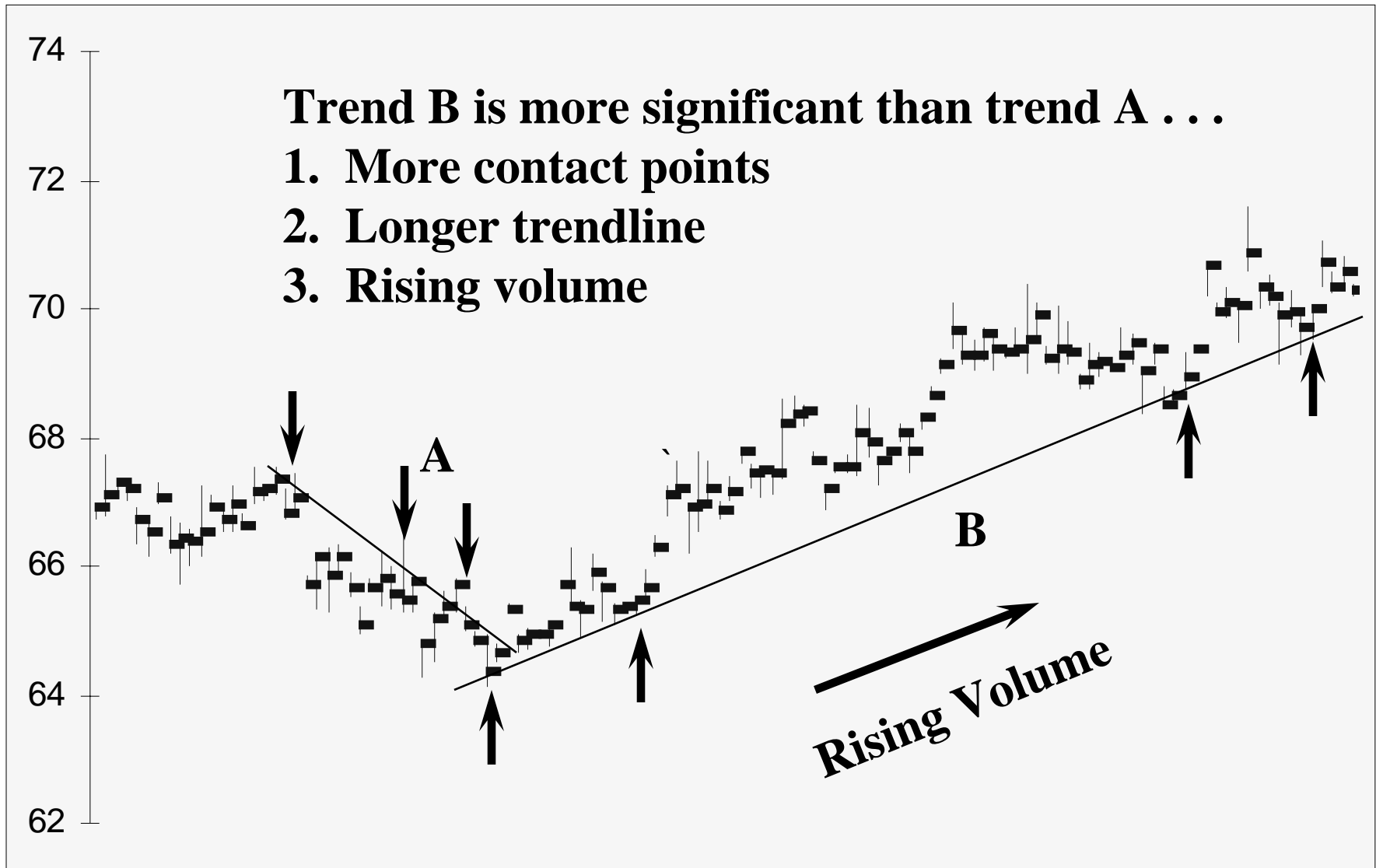
➤ Main technical analysis tools:

- Trend Lines
- Moving Averages

Trendlines

- Drawing Trendlines:
 - Connect highs to highs, lows to lows
 - Draw through congestion areas
 - Ignore ‘tails’ or ‘spikes’
- Trends are stronger
 - The longer the trendline
 - The more contacts between prices and the trendline
 - When volume expands in the direction of the trend

Trendline Examples

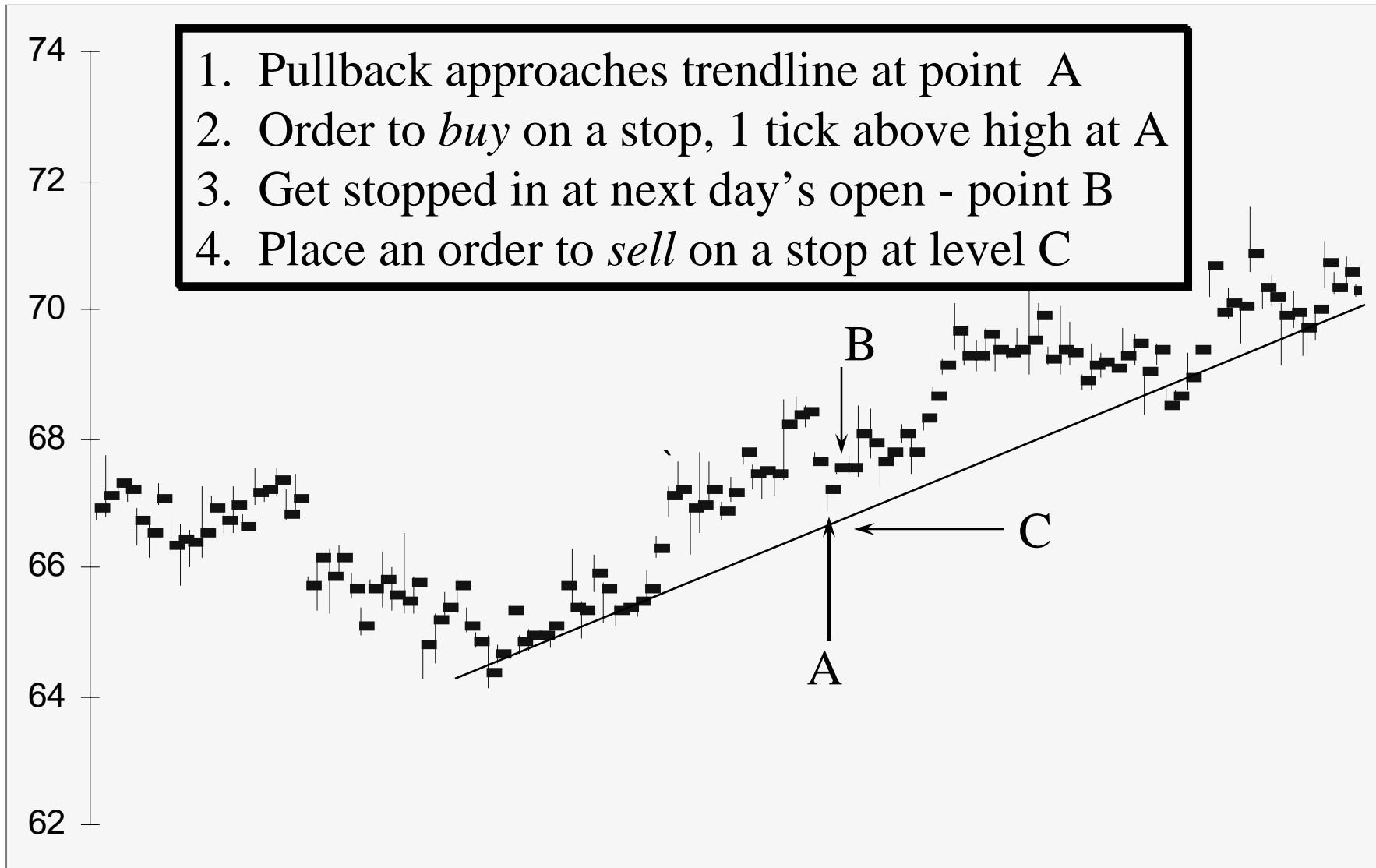


Trading Rules for (UP)Trends

- Trade only in the direction of the trend
 - Ignore all signals to short a bull market
- Wait for a pullback to the trendline to get long
 - Wait! If no pullback - forget it!
- Use a trailing stop to get aboard the trend:
 - As pullback nears trendline, place an order to buy on a stop one tick above previous day's high
- Set protective stop
 - Once you are long the market
 - Place a stop loss order just below the trendline
 - Move your stop up as trend progresses

Trading Rule Illustrated

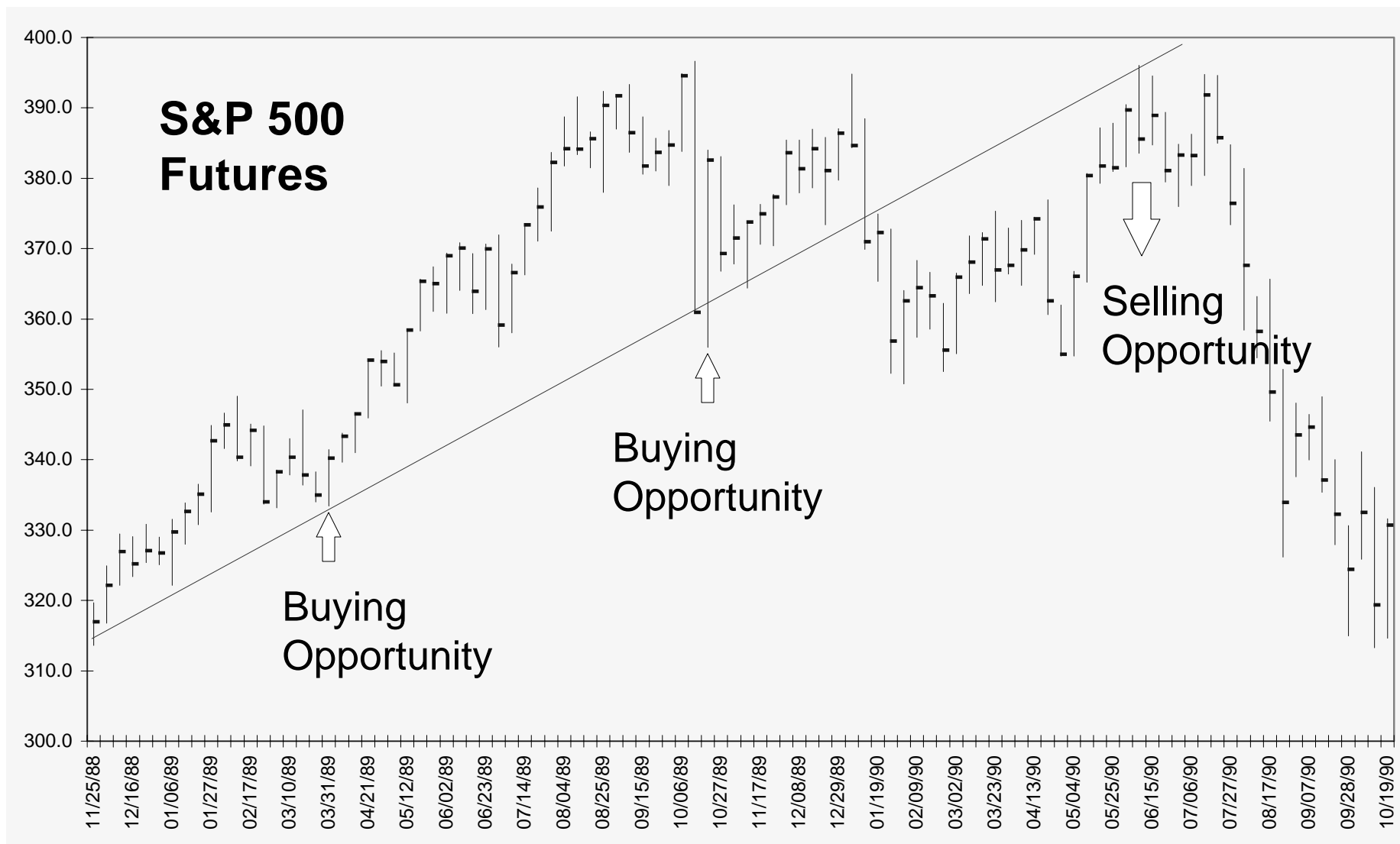
1. Pullback approaches trendline at point A
2. Order to *buy* on a stop, 1 tick above high at A
3. Get stopped in at next day's open - point B
4. Place an order to *sell* on a stop at level C



Trendlines Breaks

- Trendlines provide support & resistance
- Steep trendlines (over 45 degrees) precede sharp breaks
- A pullback to the trendline after a break is often a good shorting opportunity

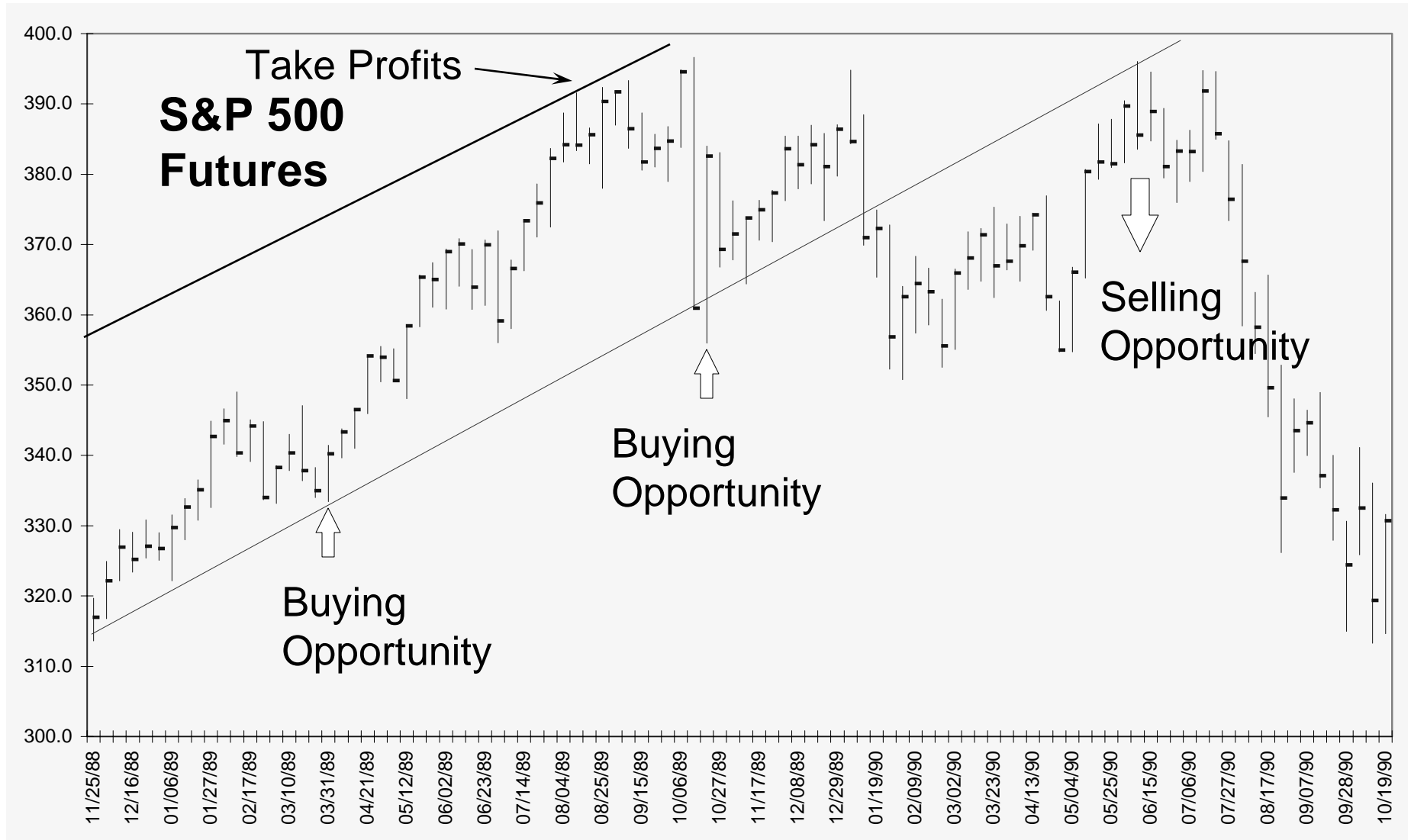
Trading Trendline Breaks



Channel Lines

- A line running parallel to the trendline
- Drawn through tops of rallies
(bottoms of declines)
- Marks maximum power of bulls (bears)
- The *wider* the channel the *stronger* the trend
- Trading Rules:
 - Go long in lower quarter of channel
 - Take profits in upper quarter

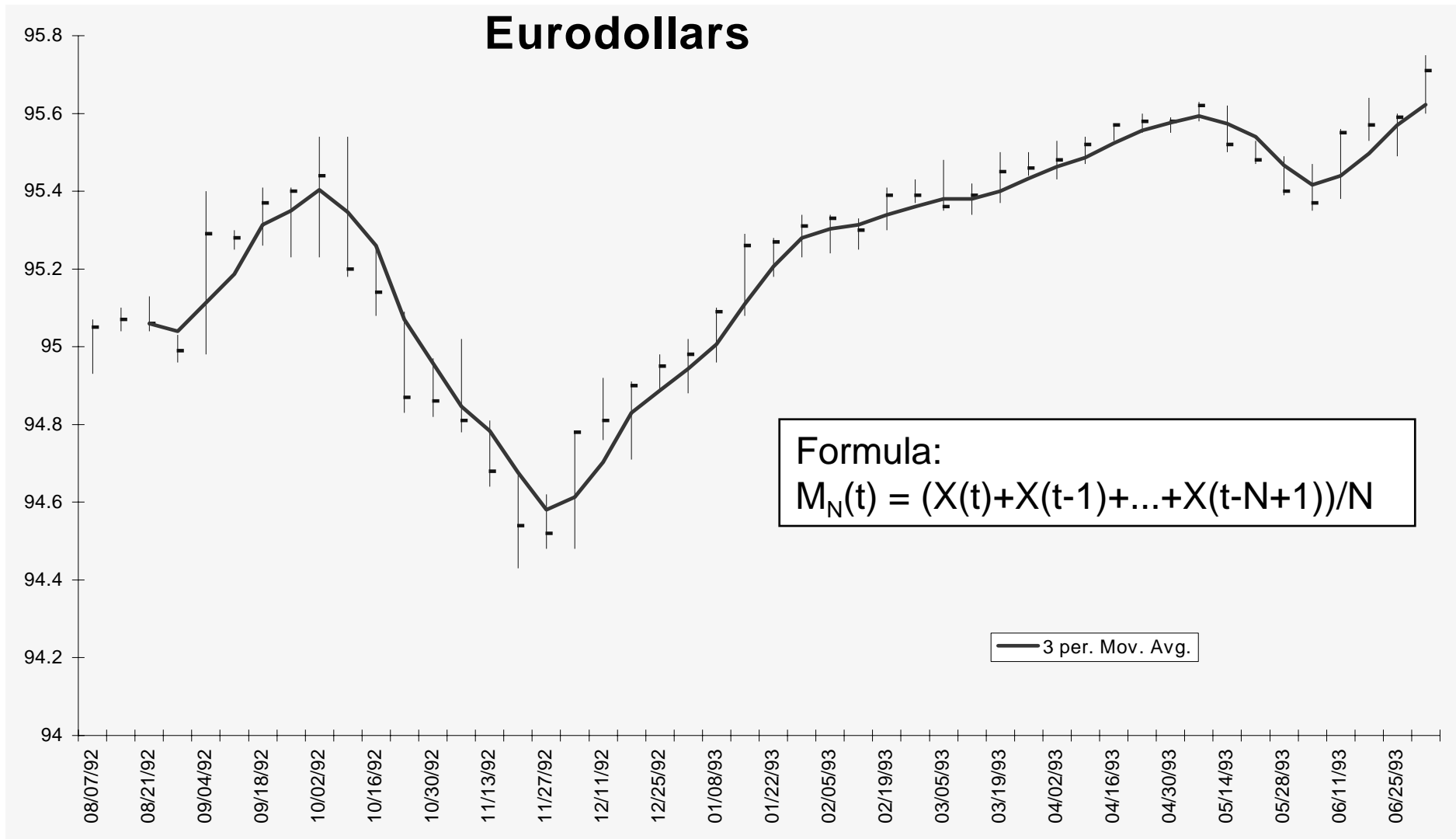
Channel Lines



Moving Average

- Shows the average price during a given time window
 - E.g. a 5-day MA shows the average price over the last 5 days
 - 20-day MA shows the average price over the last 20 days
- Averages the price series to smooth out effect of extreme highs or lows
- Reveals underlying trend
 - Longer MA's show longer term trend
 - Shorter MA's react more quickly to recent prices

Moving Average Example



Moving Average Formula

➤ Formula: $MA = \frac{P_1 + P_2 + \dots + P_N}{N}$

➤ Example:

• Time	Price	3-Day MA
t_1	17	N/A
t_2	16	N/A
t_3	19	$(17+16+19)/3 = 17.3$
t_4	22	$(16+19+22)/3 = 19.0$

Using Moving Averages in Trading

➤ As Trend Indicators

- Trend direction indicated by the slope of the MA
- Short, medium, or long term trend
- Similar trading rules as for trendlines
 - trade with the MA trend
 - buy on pullbacks to moving average

Donchian's MA Crossover System

➤ Method

- Plot short and long term MA on same chart
- Example: 9 day MA and 21 day MA

➤ Trading Signals

- Buy when short MA crosses above long MA
- Sell when short MA crosses below long MA

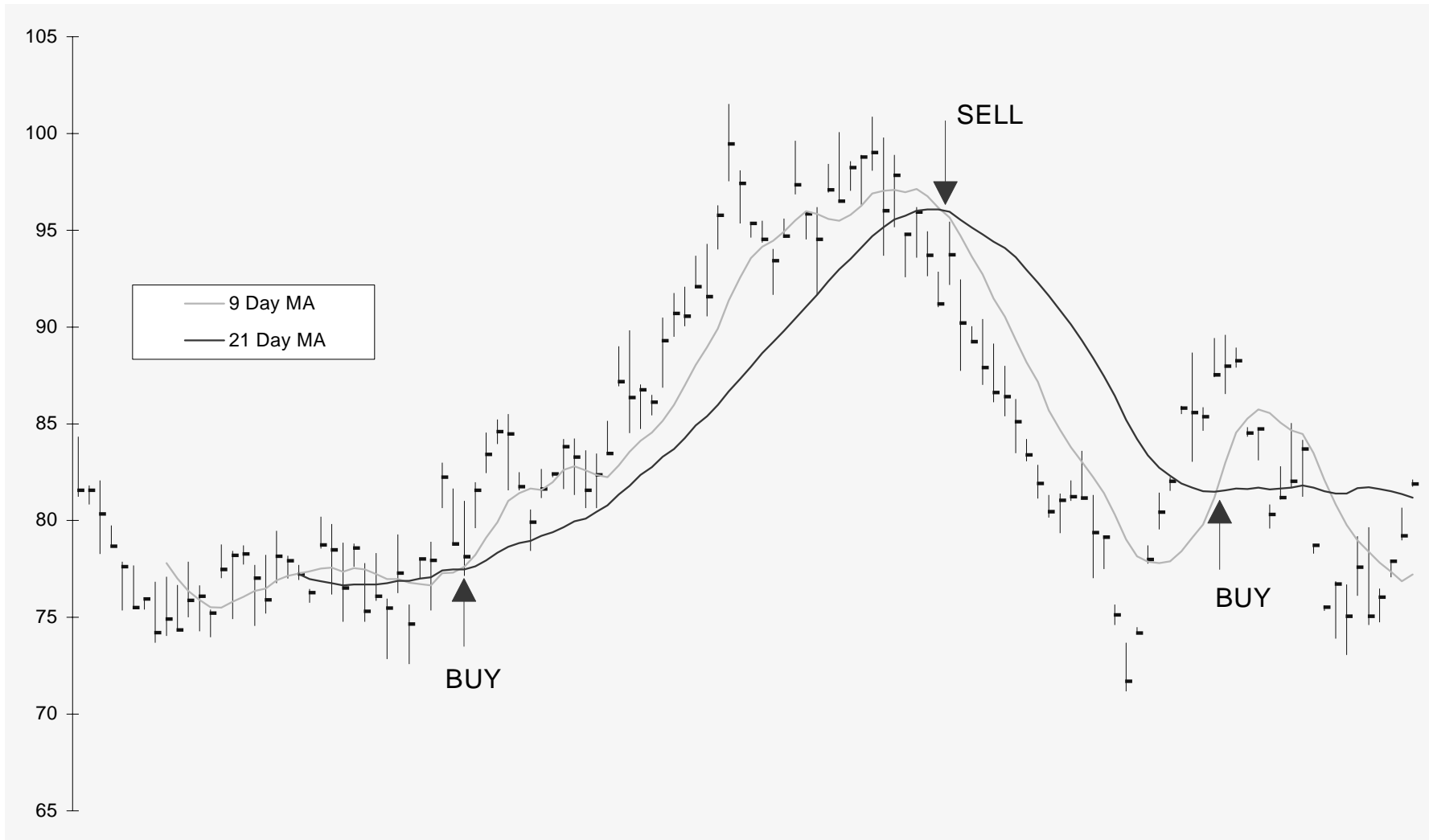
➤ When to use:

- Works well in trending markets
- Loses money in whipsaw markets

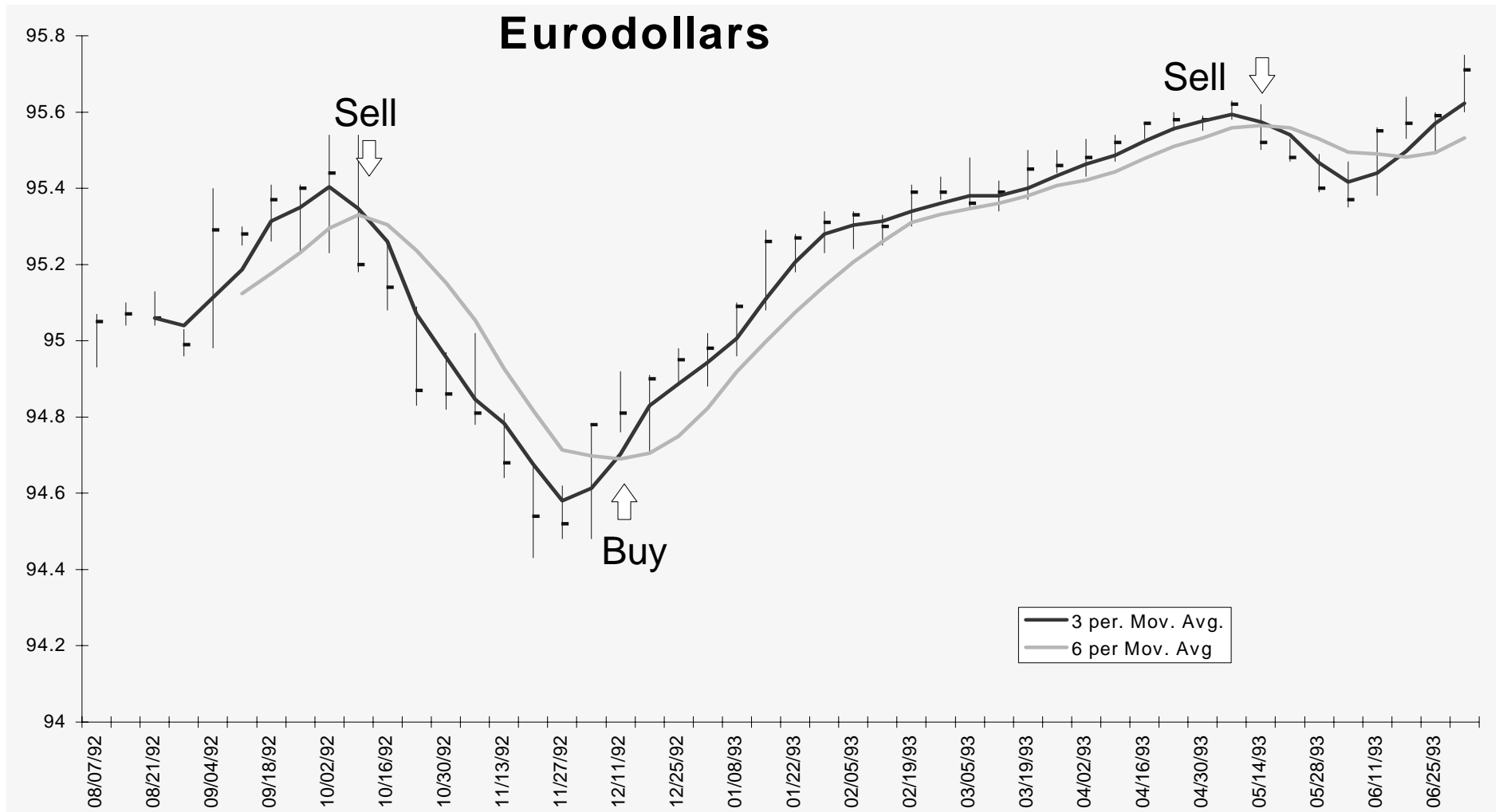
➤ Optimization

- You can find the 'optimal' short and long MA

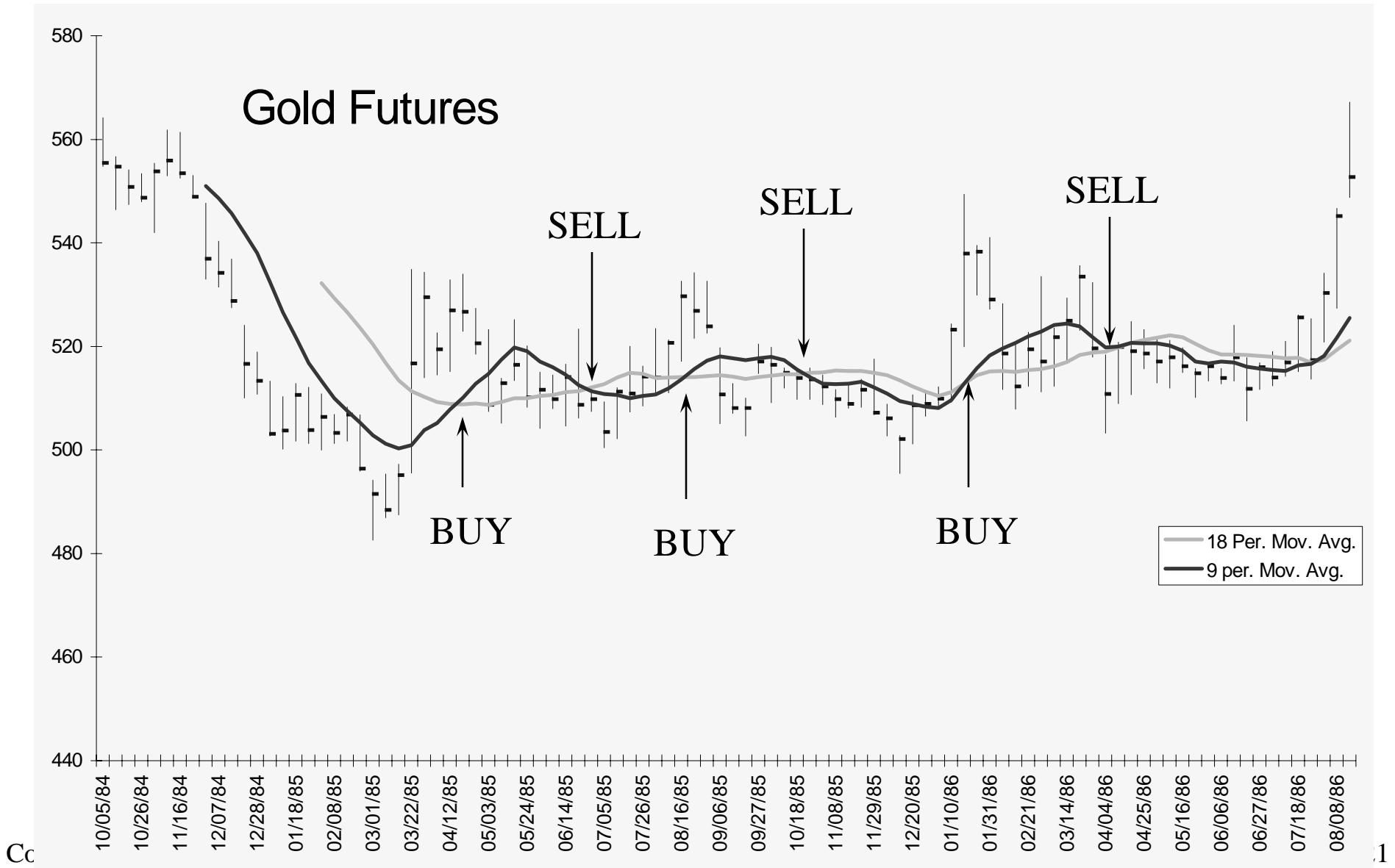
Example: Moving Average Crossover



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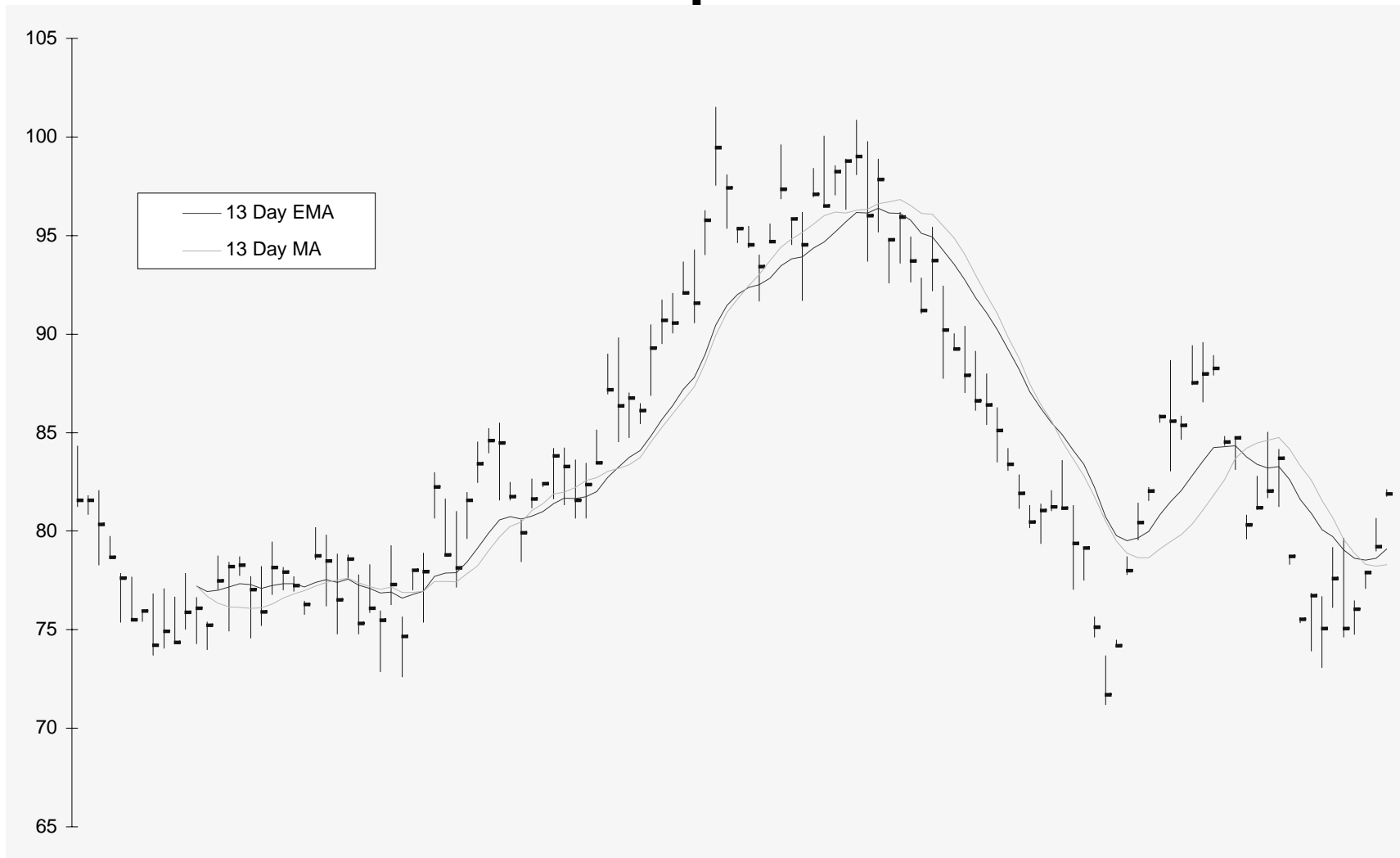
Whipsaw Market



Exponential Moving Averages

- Similar to simple moving average
- Gives more weight to recent observations
- Formula: $EMA_t = wP_t + (1 - w) EMA_{t-1}$
 - W is the 'weight'
 - Large w gives more weight to current price
 - Makes EMA more responsive
 - Typical w: $2/(N+1)$ where N is length of MA
- EMA is more responsive to recent trends than simple MA

Exponential & Simple MA's Compared



Lab: Self-Assessment Test

- Load Excel spreadsheet: technic.xls
- Restart test
- Work through trend & moving average sections
- MA data worksheet
 - Charts EMA & MA
 - Charts MA Crossover
 - Try different length MA's for crossover system
 - Is there a better choice than 9 and 21 ?

Support & Resistance

➤ Support:

- Price where buying power is sufficient to halt downtrend
- Bears are hurting, start buying

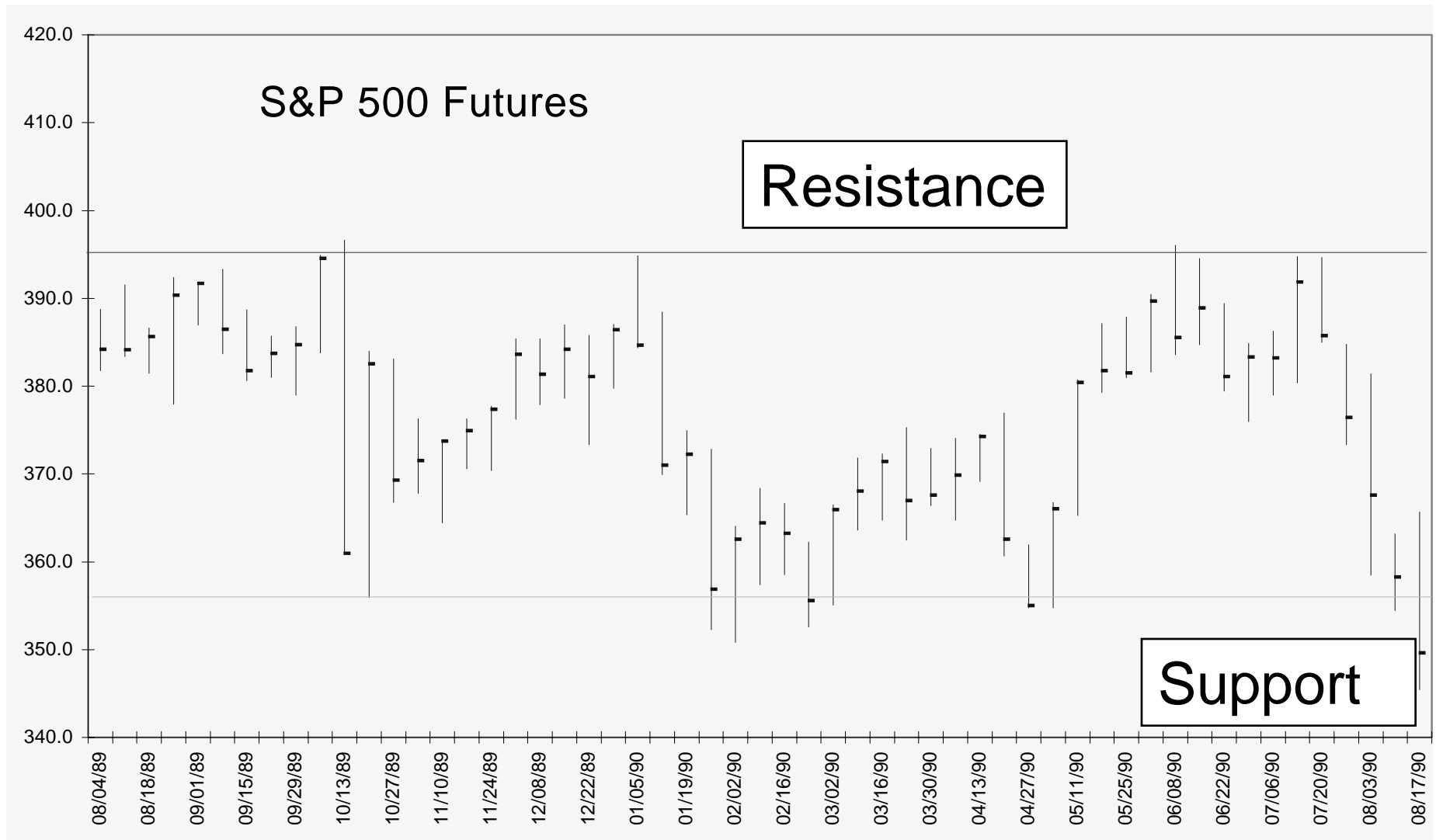
➤ Resistance:

- Price where selling power is sufficient to halt uptrend
- Bulls are hurting, start selling

➤ Support & Resistance Lines

- Draw horizontal lines through congestion areas
- At upper and lower limits of trading range

Support & Resistance Lines



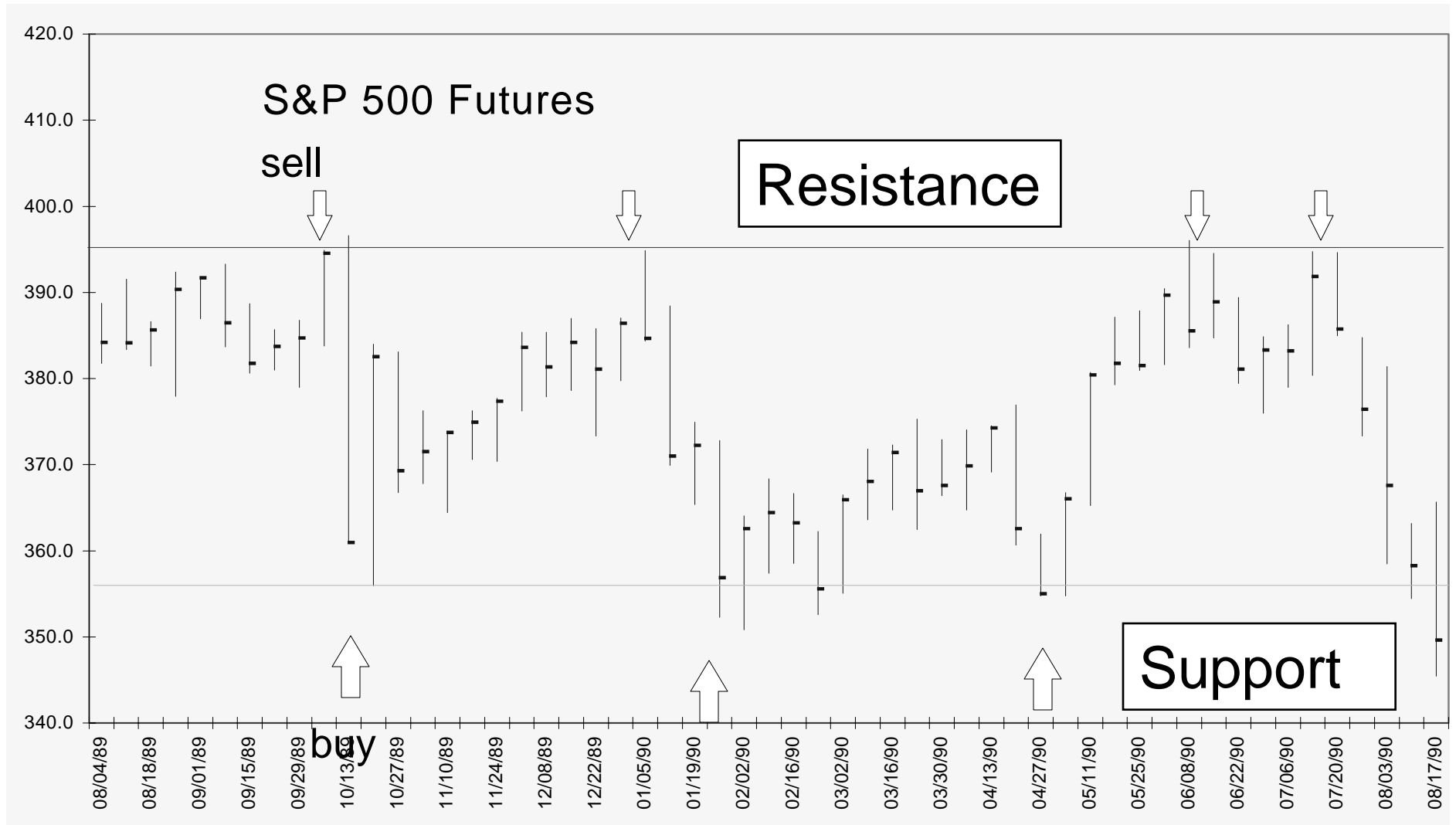
Support & Resistance Levels

- Levels are strongest:
 - The longer they continue
 - The more contacts between prices & the level
 - The wider the range
 - The greater the volume at the level
- If you are riding a trend:
 - Tighten protective stops as prices near levels

Support & Resistance Contrarian Trading

- **As Prices Approach Support:**
 - Place stop order to buy above yesterday's high
 - Place protective sell stop below support
 - If market bounces off support you will be stopped in long
- **As Prices Approach Resistance:**
 - Place stop order to sell below yesterday's low
 - Place protective buy stop above resistance
 - If market bounces off resistance you will be stopped in short

Support & Resistance Trading



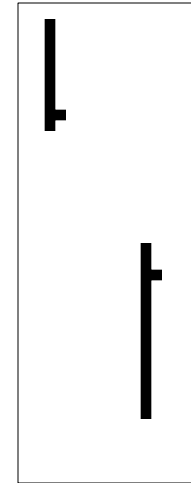
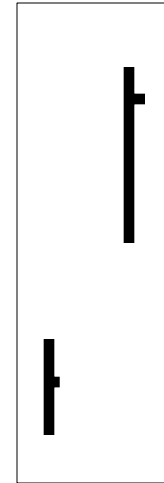
Trading Ranges

- **NAKED (No view on volatility):**
 - Go long at Support
 - Reverse & go short at Resistance
- **GAMMA TRADE (volatility cheap/rising):**
 - Buy Straddles or Strangles (strikes at S/R levels)
 - Rebalance Delta Neutral at Support/Resistance
- **VEGA TRADE (volatility rich/falling):**
 - Sell Straddles or Strangles, or
 - Sell Calls at Resistance, Sell Puts at Support
 - Roll up(down) or buy back options on breakout

Gaps

➤ Occur when market is stampeded

- Caused by news, panic
- Breakdown of trend
- Breakout of trading range
- Losers dumping positions



➤ Breakaway Gap

- Prices leap out of congestion area
- Signifies start of new trend
- Followed by several days of new highs (lows)
- Usually market by high volume
- Almost never gets closed by subsequent prices

Gaps

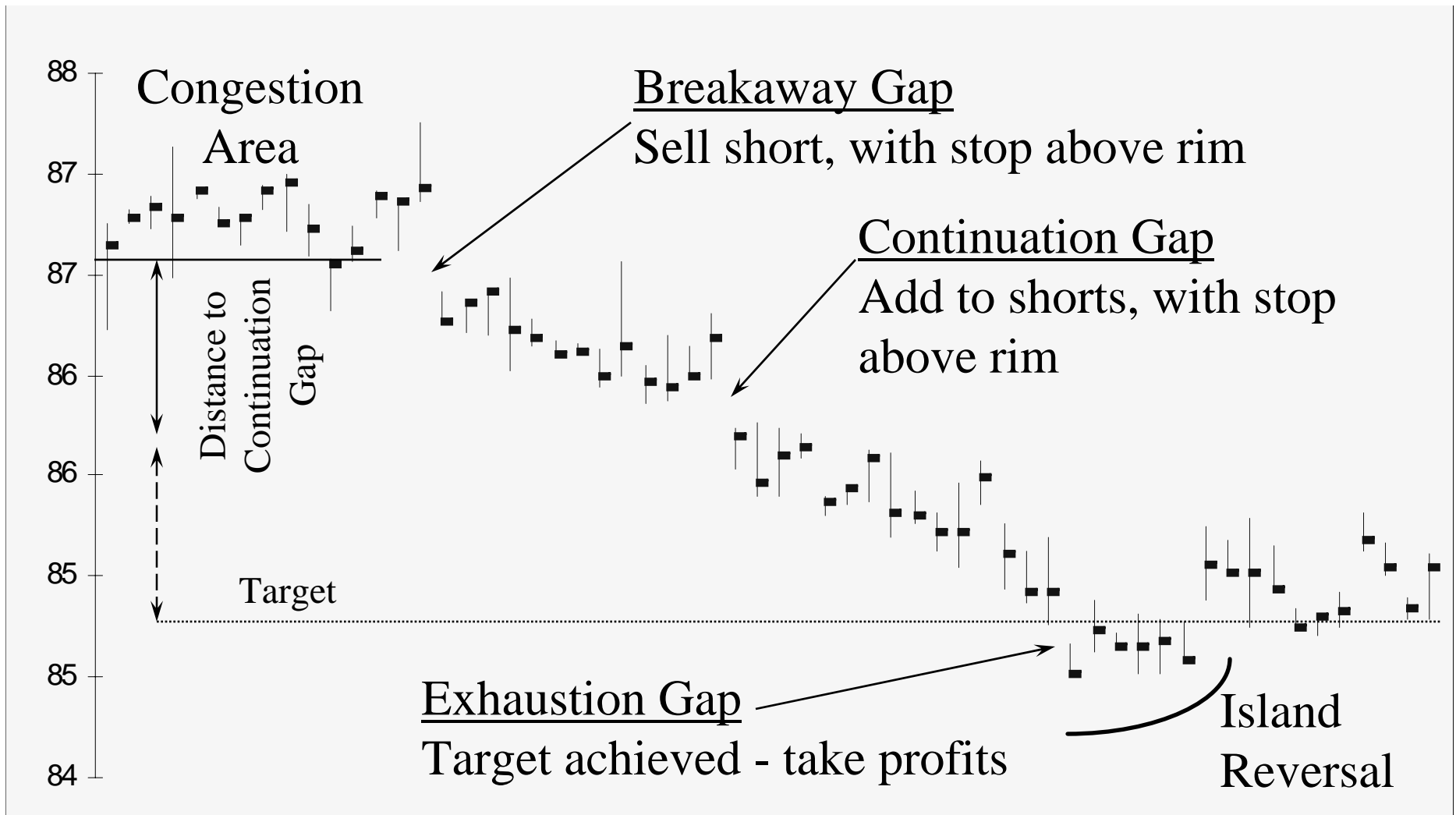
➤ Continuation Gap

- Occurs in middle of powerful trend
- Accompanied by upsurge in volume
- Measure distance from start of trend to gap
- Gives target measured move

➤ Exhaustion Gap

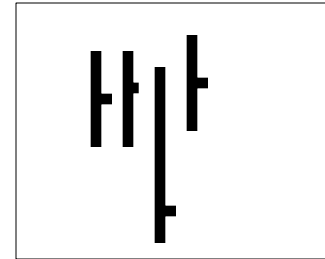
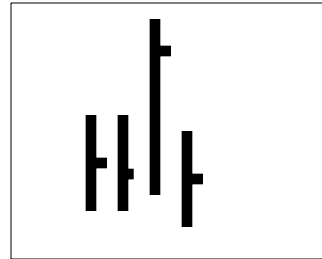
- Occurs towards the end of a trend
- Market *fails to follow through* with new highs (lows)
- Volume may be thin

Gaps - Illustrated



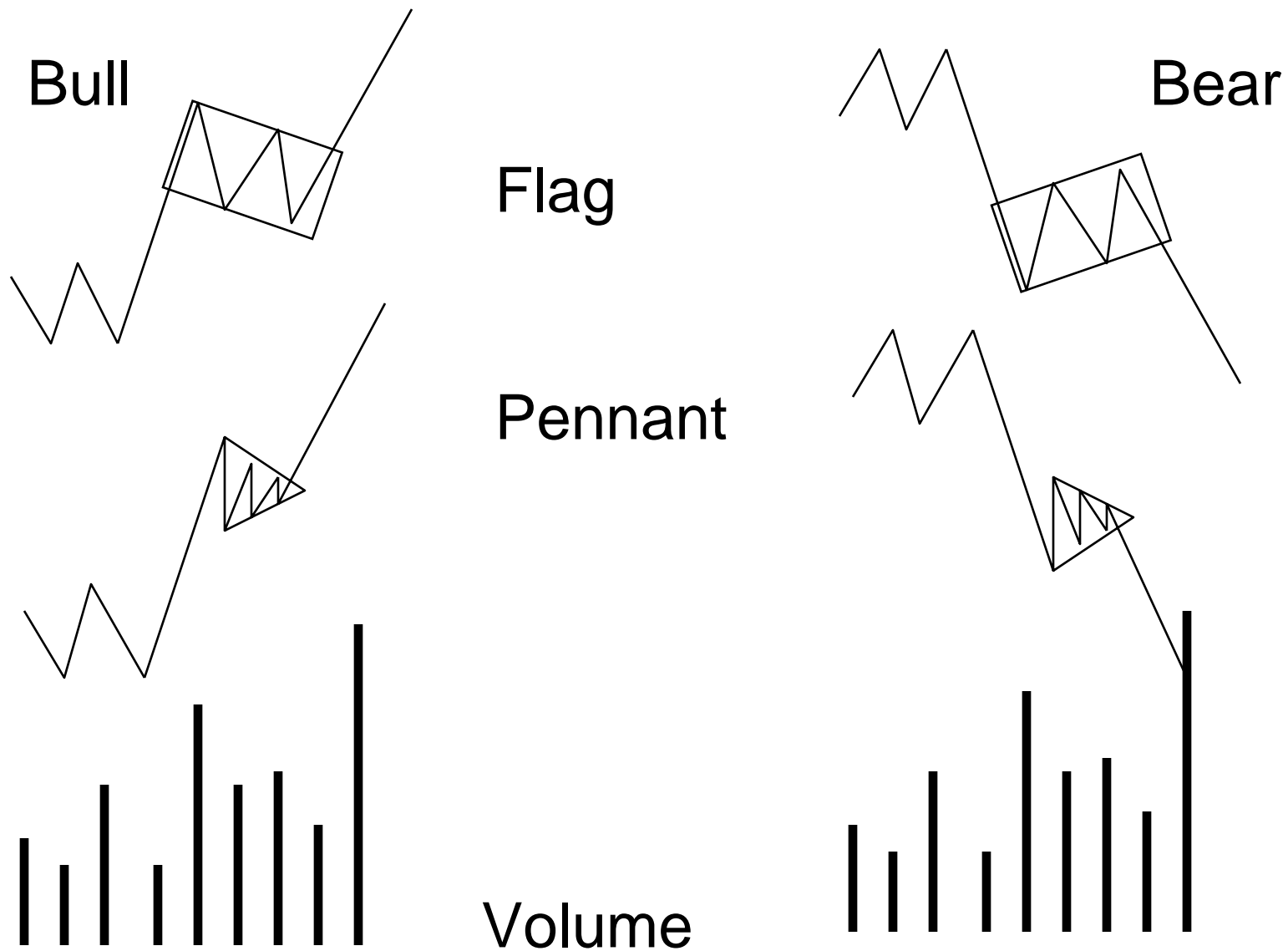
Spikes & Tails

➤ Spikes & Tails

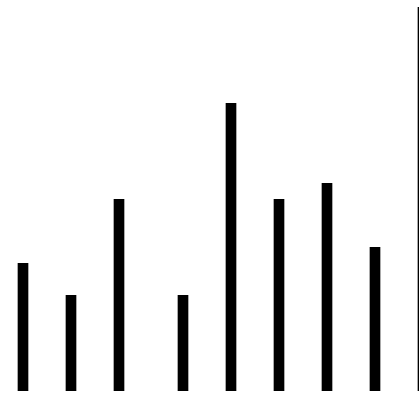
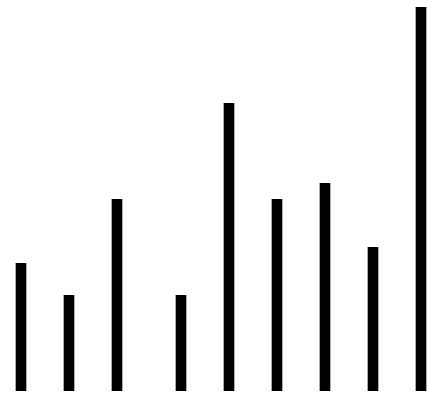
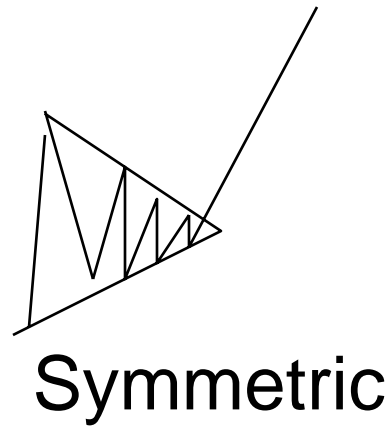
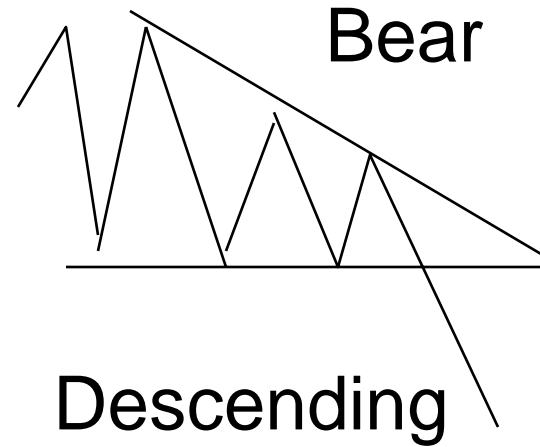
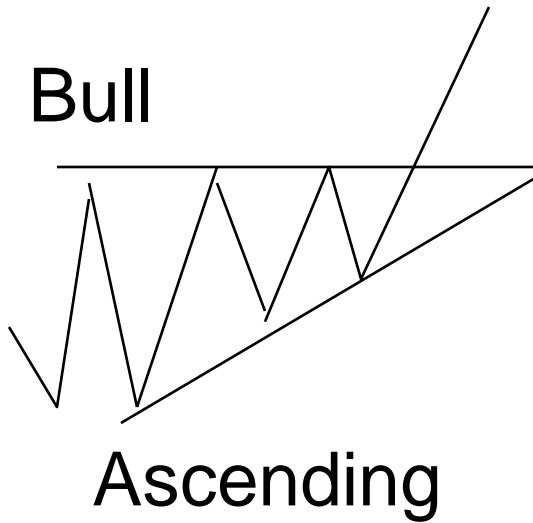


- Extreme price move up or down
- Occurs in middle of congestion area
- No follow-through
- A failed 'test' of new trend direction
- Market often reacts in opposite direction

Continuation Patterns

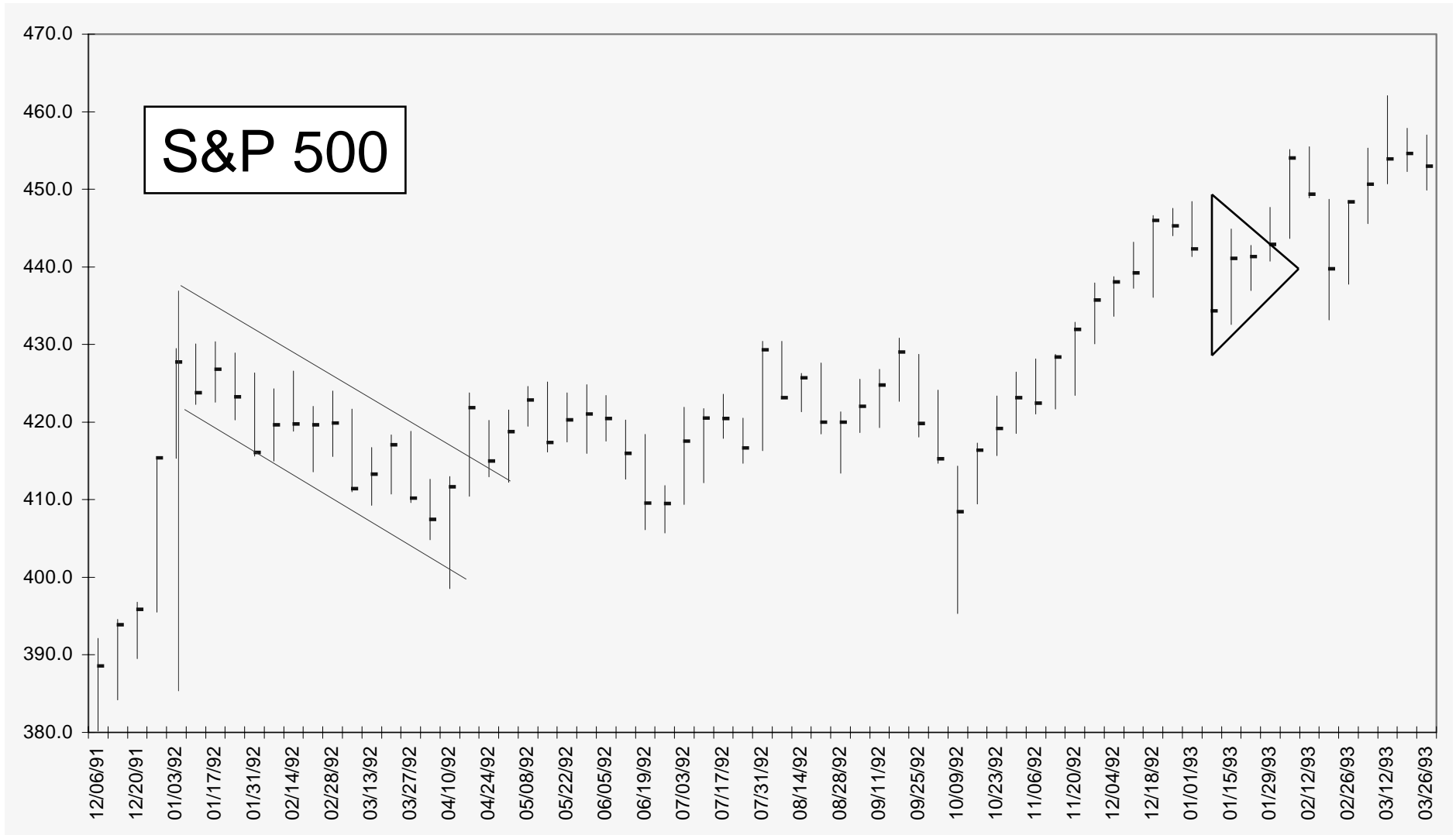


Triangles



Volume

Example: Flag & Triangle



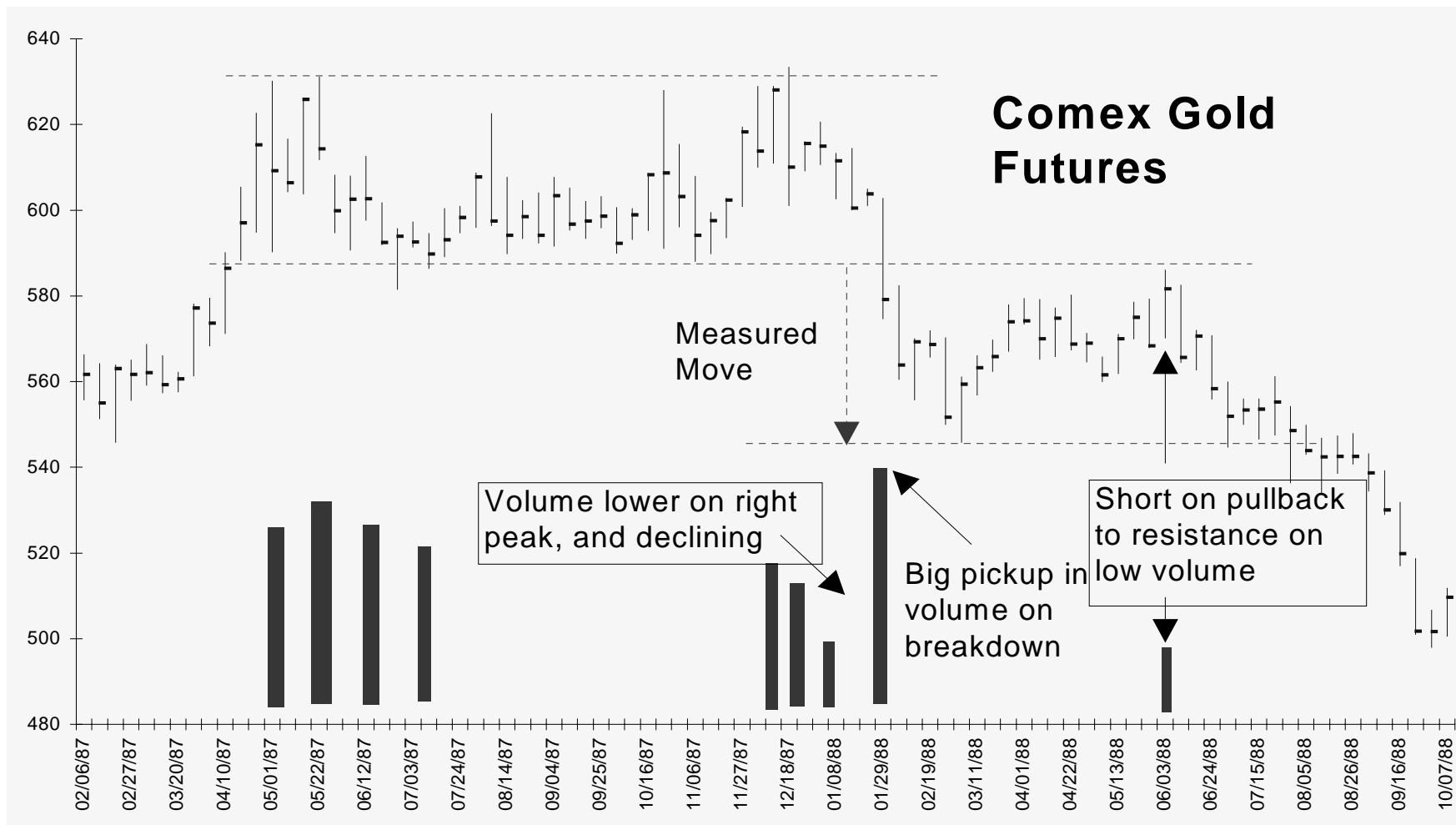
Trading Continuations

- These are trend continuation signals
- Add to positions on breakout
- Buy (sell) stop 1 tick above pattern boundary,
or
- Buy(sell) on close outside boundary

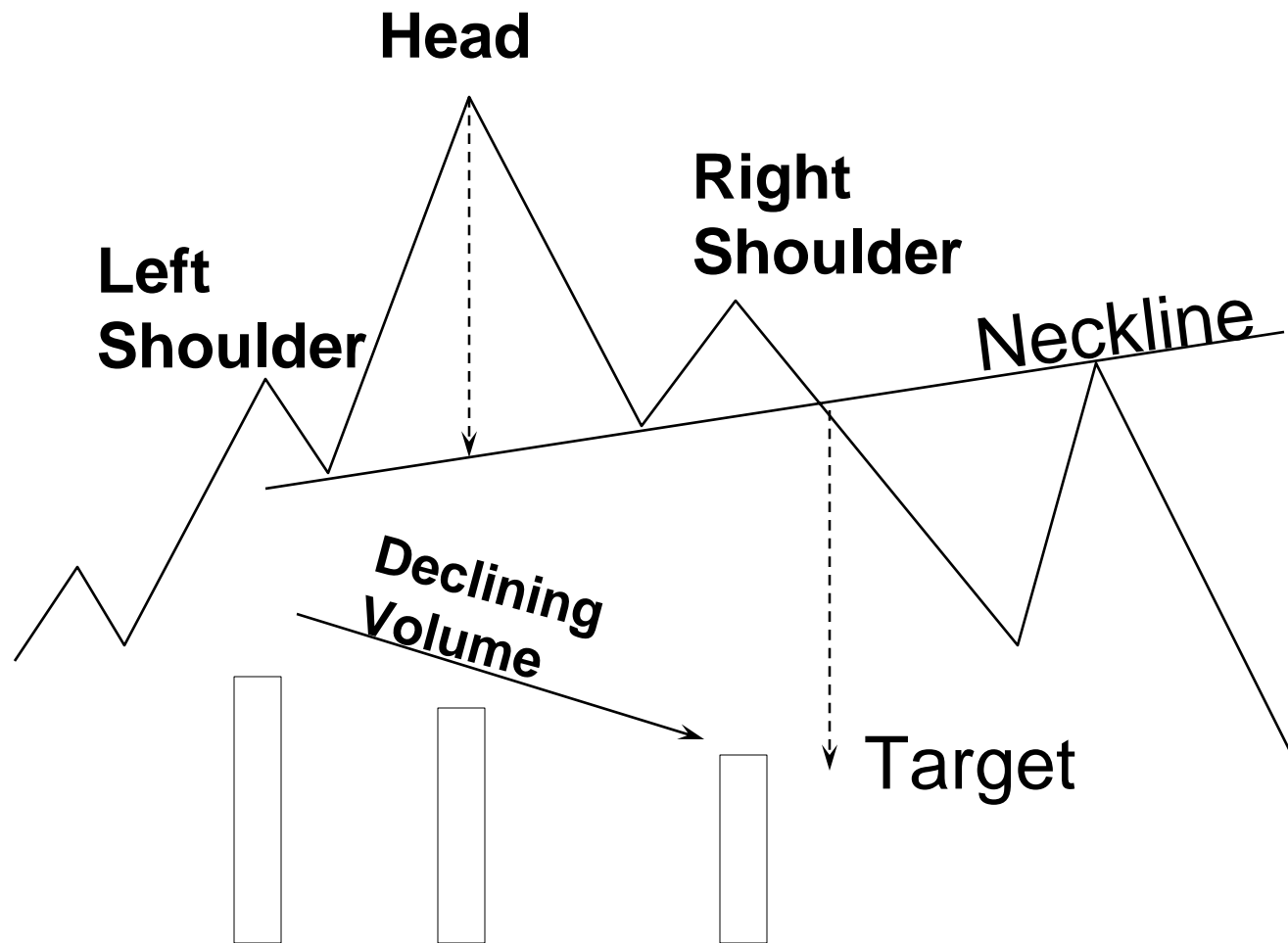
Reversal Patterns

- Indications of trend ending
- Most common patterns
 - Double Tops
 - Head & Shoulders
- Price and Volume confirmation required
- Give indication of new price target

Double Top



Reversal Patterns - Head & Shoulders



Trading Head & Shoulders

- Scale down position as pattern emerges
- Look for confirmation in declining volume
- Get short on right shoulder, with stop above head
- Add to short on break of neckline, with stop above neckline
- Add to short on pullback to neckline
- Place buy limit order at distance of measured move

Lab: Self Assessment Test

- Continue with test
- Worksheets:
 - Support & resistance
 - Gaps
 - Spikes
 - Continuations
 - Head & Shoulders

Oscillators

- Measure extremes of market sentiment
- Oscillator: fluctuates between two extreme values
 - When market is overbought or oversold
 - Market likely to reverse
- Oscillators work well in trading ranges
- Can also be used when market trends:
 - To time trades in direction of trend
 - Nb. *must filter out trades against the trend*
 - In trending markets oscillators can stay overbought/oversold for many periods

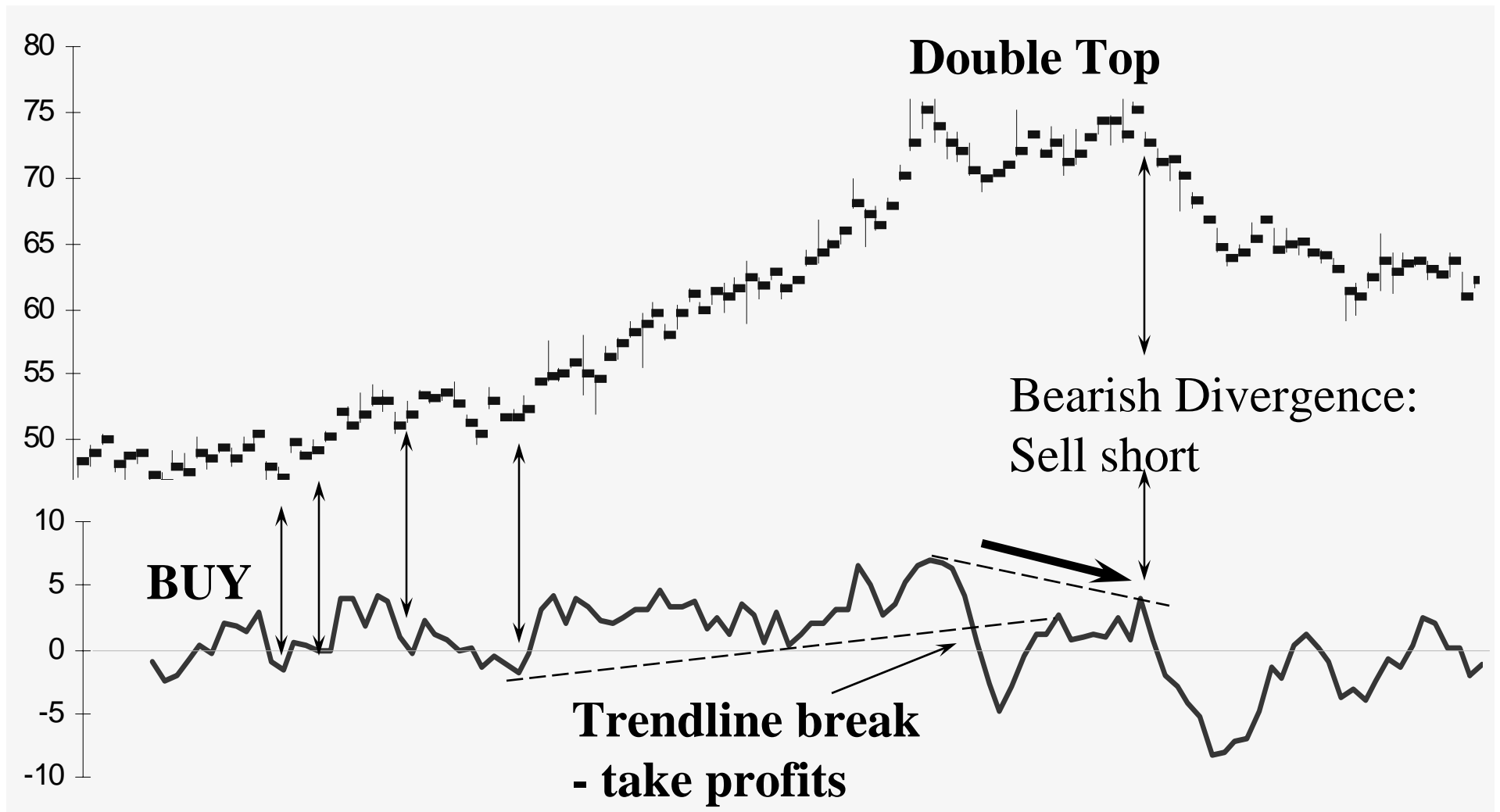
Classic Oscillators

- Momentum
- Stochastics
- Relative Strength Indicator (RSI)
- Williams %R

Momentum

- Measures trend acceleration
- When Trend is Up
 - If oscillator reaches new high, shows uptrend is continuing
 - When oscillator traces lower peak, shows uptrend may be weakening
- Formula: $M_N(t) = P_t - P_{t-N}$
 - P_t is today's price
 - P_{t-N} is price N days ago
- E.g 7 Day Momentum
 - $P_t = 24$; Price 7 days ago = 18
 - 7 day Momentum = $(24 - 18) = 6$

Momentum Chart

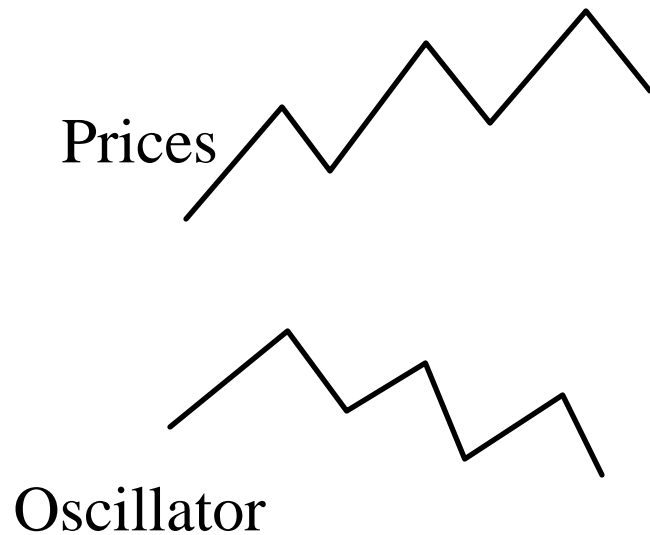


Momentum Trading Rules

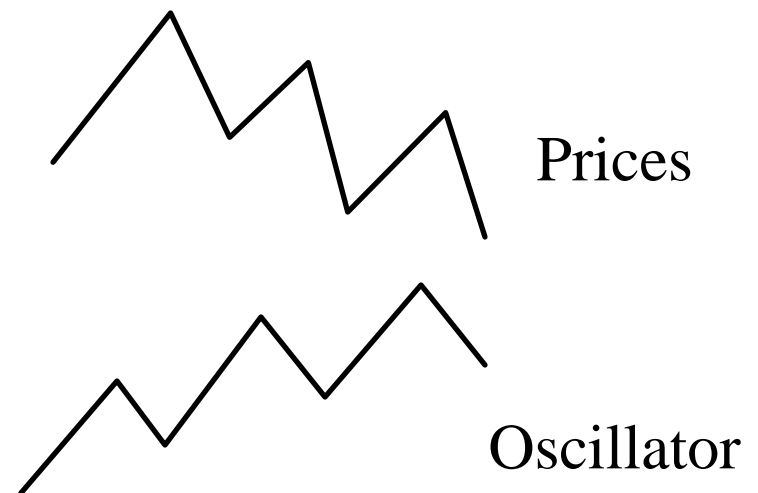
- When Momentum crosses center line & ticks back up
 - Stock is oversold
 - Trend has slowed for a moment
 - Opportunity to get on board - Buy!
- Momentum is a leading indicator
 - Early warning of downturn in trend
- Apply charting techniques to the oscillator
 - Trendline break: take profits

Divergence

➤ Bearish Divergence



Bullish Divergence



➤ Trading Rule:

- Scale back / go short

Trading Rule:

Scale back / go long

Stochastics

➤ Tracks relationship of closing price to recent Hi-Lo range

➤ Formula: $\%K = \frac{C_t - L_n}{H_n - L_n} \times 100$

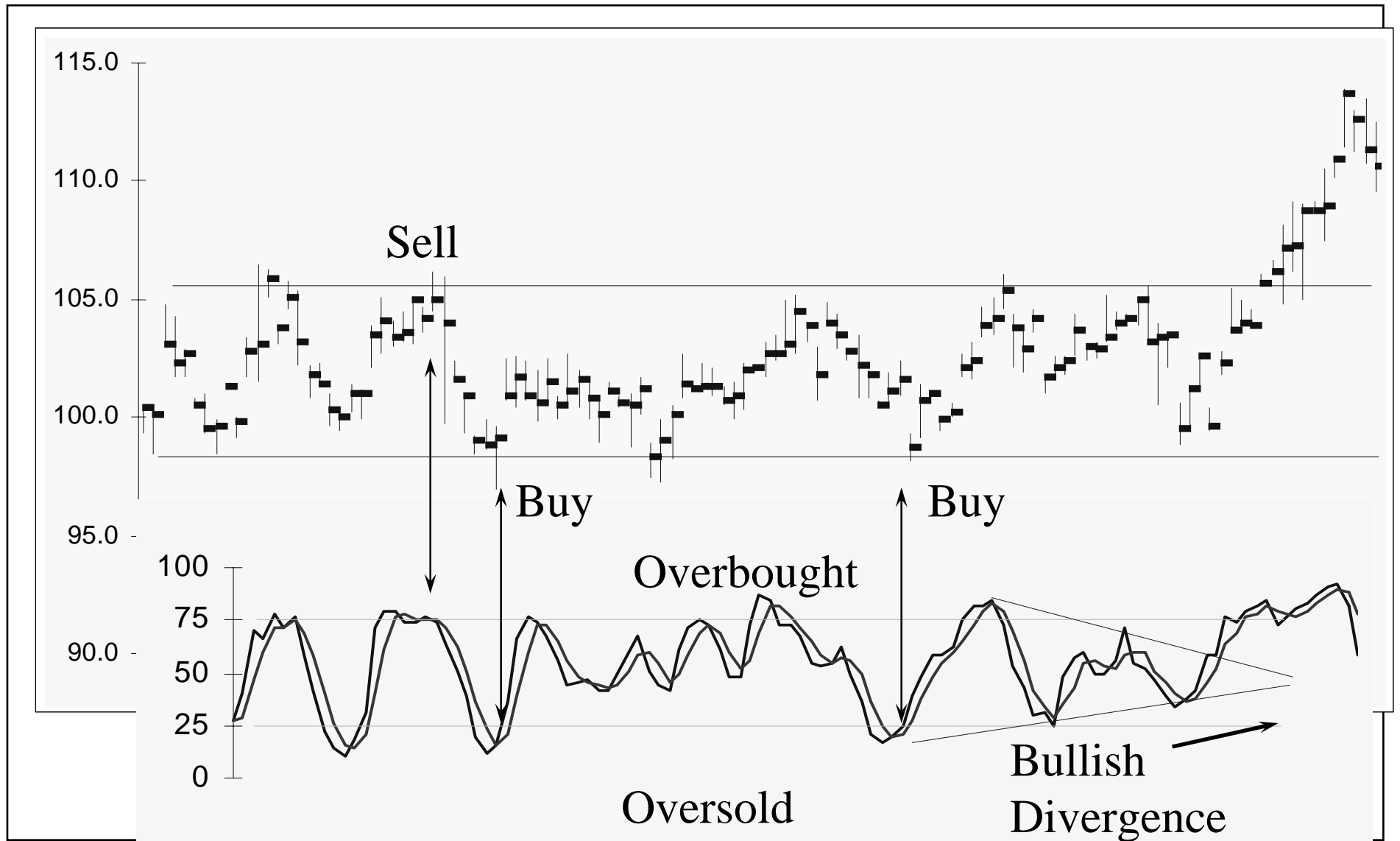
➤ $\%D = \frac{3 \text{ day sum of } (C_t - L_n)}{3 \text{ day sum of } (H_n - L_n)} \times 100$

- H_n is the high of the last n days
- L_n is the low of the last n days
- C_t is today's closing price
- $n = 5$, or 9 is popular choice

Stochastics

- Stochastics fluctuates in range +/- 100
 - Overbought range: 75-80
 - Oversold range : 25-30
- Plot both %K and %D
 - Also plot overbought/oversold regions
- Sell signal:
 - %K, %D both in overbought region
 - %K crosses back down over %D
- Buy signal - the reverse

Stochastics in Trading Range



Trading with Stochastics

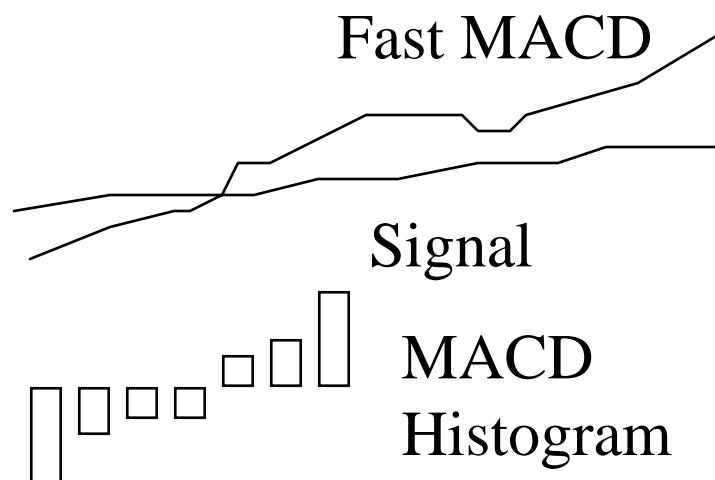
- Ideal for range trading
- In Trends:
 - Tends to stay overbought/oversold for long periods
 - Ignore sell signals in uptrend
 - Wait for oversold signal on pullback to get on board
 - Ignore buy signals in downtrends
 - Wait for overbought signal on pullback to get on board
- Charting: look for trendlines on the oscillator
- Divergence: trade same way as Momentum

Indicators

- These are trend following tools
- Usually based on moving averages
- Popular indicators
 - MACD (Moving Average Convergence-Divergence)
 - Wilder's ADX system

MACD Histogram

- A variation on the MA crossover idea:
 - Uses two EMA's (12 and 26 day)
 - The difference between them is the fast MACD line
 - Calculate a 9 day EMA of the fast MACD line (the Signal)
 - $\text{MACD histogram} = (\text{Fast MACD} - \text{Signal})$

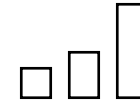


How to use MACD

- Fast MACD reflects short term consensus
- The signal indicates consensus over a longer period
- When the fast MACD rises above the signal, bulls are in control: trade from the long side
- When the fast MACD falls below the signal, bears are winning: trade from the short side

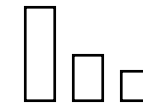
The MACD Histogram

➤ Histogram Positive, rising



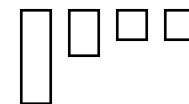
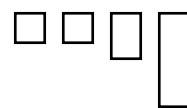
- Meaning: trend strengthening
- Trading rule: hold longs

➤ Histogram Positive, falling



- Meaning: trend weakening / pullback ahead
- Trading rule: (i) tighten protective stops
(ii) place order to buy above yesterdays' high

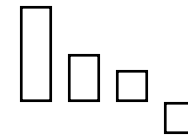
➤ Histogram Negative: reverse of above



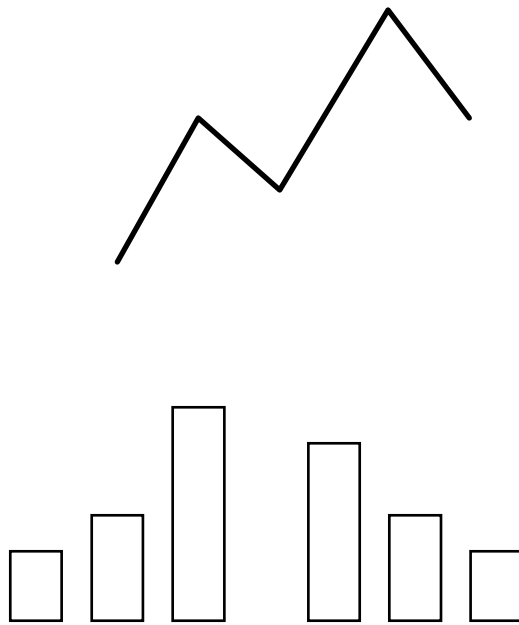
The MACD Histogram

➤ Histogram Crosses Zero Line

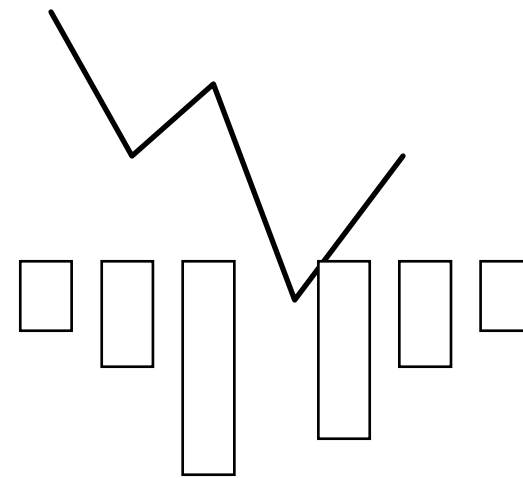
- Meaning: trend change imminent
- Trading rule:
 - (i) liquidate position, if not stopped out
 - (ii) reverse and go short (long)



MACD Divergence



Bearish



Bullish

Lab: Self Assessment Test

- Continue with tests
- Worksheets:
 - Momentum
 - Stochastics
 - MACD

Summary: Technical Analysis

- Most useful techniques:
 - Trendlines, channel lines, moving averages
 - Support & resistance
- Charting:
 - Continuation & reversal patterns
 - Gaps, spikes
- Indicators
 - MACD & other trend indicators
- Oscillators
 - Momentum, Stochastics
 - Ideal for range trading, timing trend entry

Problems with Technical Trading

➤ Trends

- Identifying new trends
- Deciding when trend is over
- When to get in/out?

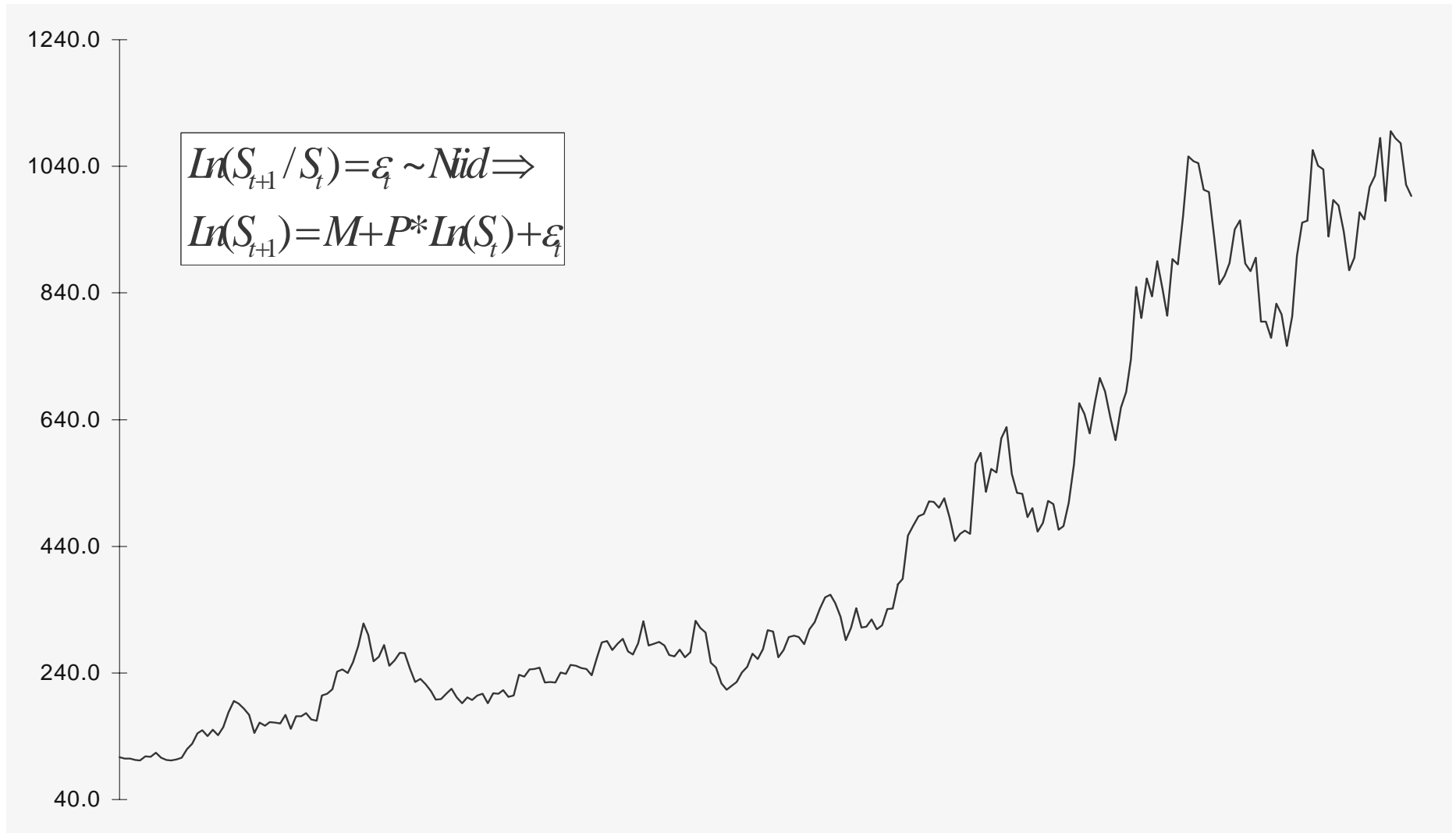
➤ Ranges

- Sometimes support & resistance holds, sometimes not
- False breakouts

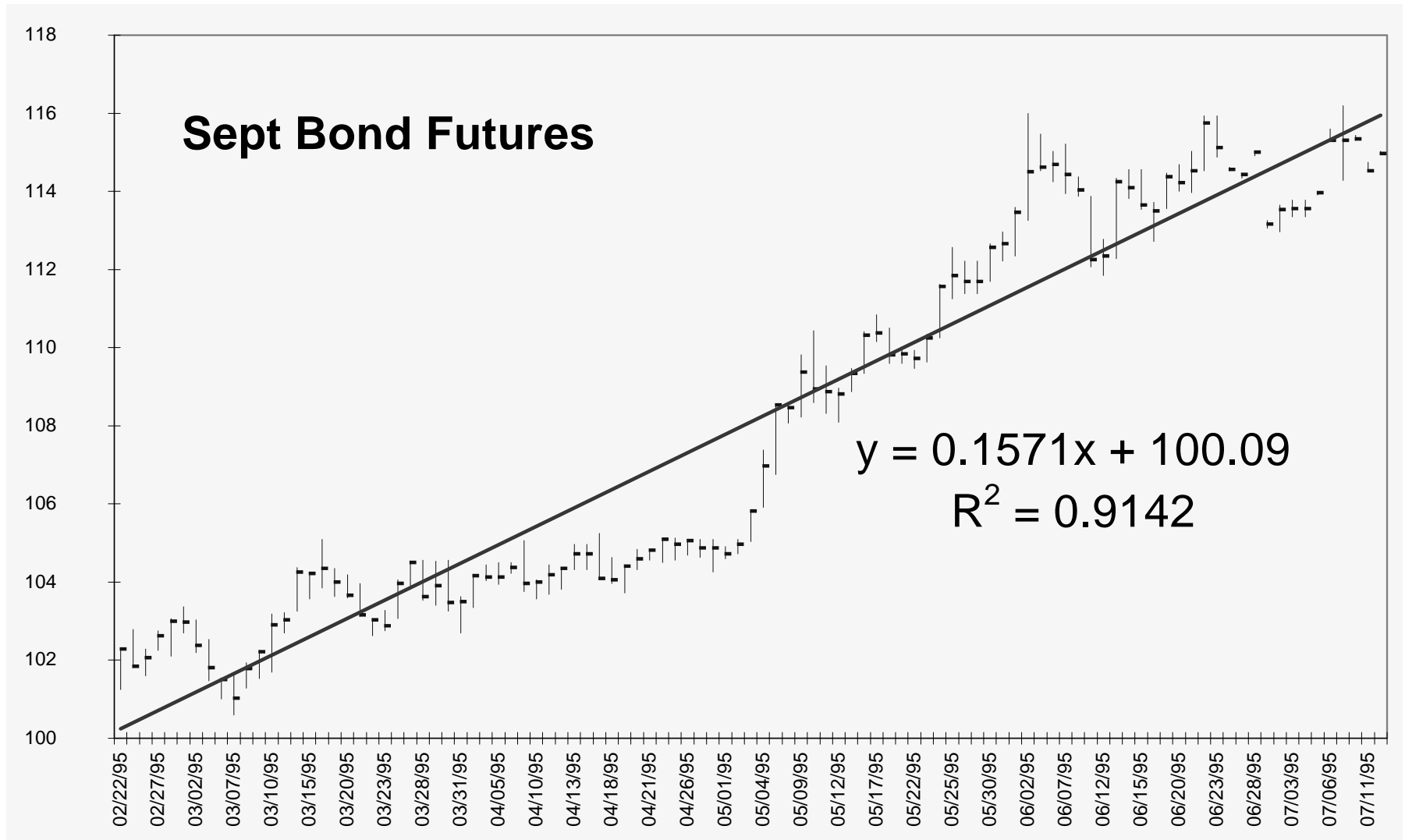
➤ Charting

- We tend to see the patterns we want to see
- Even random prices show chart patterns & trends

Trends in Random Prices



Linear Behavior in Markets



A Foolproof Way to Make Money Using Systems

- Devise a trading rule
- Test it - make sure it loses money
- Reverse the signals
- Optimize the parameters
- Ignore commission & slippage
- **SELL THE SYSTEM!**

Technical Analysis & EMH

➤ EMH:

- All information is incorporated in current prices
- Prices only change when new information arrives

➤ CONCLUSION:

- Technical Analysis is pointless
- BUT most traders use it - WHY?

Rationale for Technical Analysis

- ‘Rational prices’ argument
- Psychological factors
- Market anomalies

‘Rational prices’ argument

- Technical analysts argue EMH is wrong on at least two counts:
 - it says prices are random
 - it says trends and chart patterns aren't real
- **BUT: EMH does NOT say prices are random**
 - EMH: price *changes* are random
- EMH does NOT say trends, chart patterns cannot occur
 - EMH: patterns occur by random chance & you have no way of knowing *in advance* which pattern is going to arise

Psychological factors

- Technical analysis is easy
- ‘Working’ vs. gambling
- Comfort factor
 - To back up a trading decision
 - To trade with the crowd

Market Anomalies

- **Small firm in January effect (Banz, 1981)**
 - Abnormally high returns in first 2 weeks of January
 - Reasons: tax-loss selling, poor liquidity
 - ‘Neglected firm’ effect
- **The Weekend effect (French, 1980)**
 - A negative abnormal return on Mondays
 - Not large enough to overcome transaction costs
 - Nonetheless, don’t buy stocks on Fridays!
- **Value Line (Black, 1971)**
 - Portfolio 1 abnormal +ve returns, Portfolio 5 abnormal negative returns
 - Reranked stocks (esp. small) show abnormal returns