Introduction to Position Sizing™

Tacoma IBD

Feb. 3, 2014

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Terminology

Risk Management –

- Position Risks
- Portfolio Risks
- Market Risks
- Personal Performance Risks

Position Size –

- How big, each position / trade

Common Errors

- Most Traders trade without a Plan
- Many Traders take on way Too Much Risk
- Many Traders have not developed the Discipline needed for Trading
- Many Traders are impatient, and abandon a good system before they realize its potential
- Many Traders have too small of an Account which forces them to take too Much Risk

I think I am the single most conservative trader on earth in the sense that I absolutely hate losing money.
~ Paul Tudor Jones

Risk management is ESSENTIAL to good investing. And risk management is all about minimizing the downside. As Warren Buffet noted: "*Rule No.1: Never lose money. Rule No.2: Never forget rule No.1*." And the best way to not lose money is to identify and prepare for potential losses in advance.

Common Causes of Failures

Most Traders fail because they are:

1. Not Prepared for the Distribution of Trades (A String of Losses)
2. Overleveraged and/or Under Capitalized

- Dr. Van Tharp

Geometric Progression & Recovery

Drawdown %	Gain for Recovery %
5 %	5.3 %
10	11.1
15	17.6
20	25
25	33
30	42.9
40	66.7
50	100
60	150
75	300

Recoverable

Very difficult to Recover

What is most important

For Trading / Investing

- Protecting your Capital
- Making a Profit

For Every Trade – Must Ask:

- What is the Risk of this Trade?
- Is the potential Reward worth the Risk?

- Various Position Size Methods and Rules, as well as Portfolio Risk Rules, can be created to help meet our various trading goals. HOWEVER, if we do not have the Discipline necessary to Follow our own Rules, then what good is this effort?
- Understanding the Value & Purpose of each rule, will help us a great deal in both building our Beliefs, and our Discipline.

Position Sizing™

- What is it?
  - The part of your trading system that tells you "how much" (how many shares or contracts to trade).
- Why is it Important?
  - "Poor position sizing strategies are the reason behind almost every instance of account blowouts." - *Van Tharp*

Terminology

- Martingale
- Gambler's Fallacy
- Anti-Martingale

Martingale

- A common Gambler's Thinking
  - you cannot lose all the time "Double Down"
- Martingale Strategy – Increase bet size after losses, increasing position size as account value lowers.
  Decreasing position size as account values increases. Focused on recovering losses quickly.

Very Risky

Gambler's Fallacy

"The **gambler's fallacy**, also known as the **Monte Carlo fallacy,** or the **fallacy of the maturity of chances**, is the belief that if deviations from expected behavior are observed in repeated independent trials of some random process then these deviations are likely to be evened out by opposite deviations in the future. For example, if a fair coin is tossed repeatedly and tails comes up a larger number of times than is expected, a gambler may incorrectly believe that this means that heads is more likely in future tosses. [1] Such an expectation could be mistakenly referred to as being "due". The gambler's fallacy implicitly involves an assertion of negative correlation between trials of the random process and therefore involves a denial of the exchangeability of outcomes of the random process." -Wikipedia

Anti-Martingale

- Anti-Martingale Strategy – Decrease bet size after losses, decreasing position size as account value lowers.
  Increasing position size as account value Increases.

Less Risky

Grows in time, with aide from the power of Compounding.

Rogue Trader Examples

- Nick Leeson lost $1.4 billion and brought down a bank that had been around since 1762.
- John Rusnak hid losses of $700 million at Allied Irish Bank, his total losses were twice that. Too make it back, he secretly bet $7.5 billion on the yen rising, and lost.
- Yasuo Hamanaka lost $2.6 billion for Sumitomo Co. Most his trading was a fraud, covered up for a decade.
- Peter Young lost about $900 million for Morgan Grenfell.
- Jerome Kerviel lost $7 billion for Societe Generale by hiding massive losses, in order to earn a big bonus.

Each tried to hide their losses, while putting on Larger and Larger Positions, in hopes to make it all back some day.

All violated Risk Rules & were Seduced by Martingale.

Which would You Choose?

Martingale - or - Anti-Martingale ?

Why?

Couldn't we blow out a Trader's Account,
with a perfectly Good Trading System…
By trading TOO LARGE of Size ?

Terminology

- "**R**" - A Unit of Risk, R = position $s risk
- **R-Multiple** – A measure of P/L relative to R

  +2R = Profit 2x $s risked. -0.8R = Loss 80% of $s risked.
- **Expectancy** – the Average P/L of a trading system, over time, relative to R

  +0.8R Expectancy = Average R-Multiple of every trade.

R-Multiples

- The Win or Loss amount of any trade can be expressed as a ratio to the initial ‘Risk’ “R”

R Examples

- Risk $1,000 and Profit $3,000
  - a +3 R return
- Risk $1,000 and loose $500
  - a -0.5 R return
- Risk $500 and Profit $5,000
  - a +10 R return

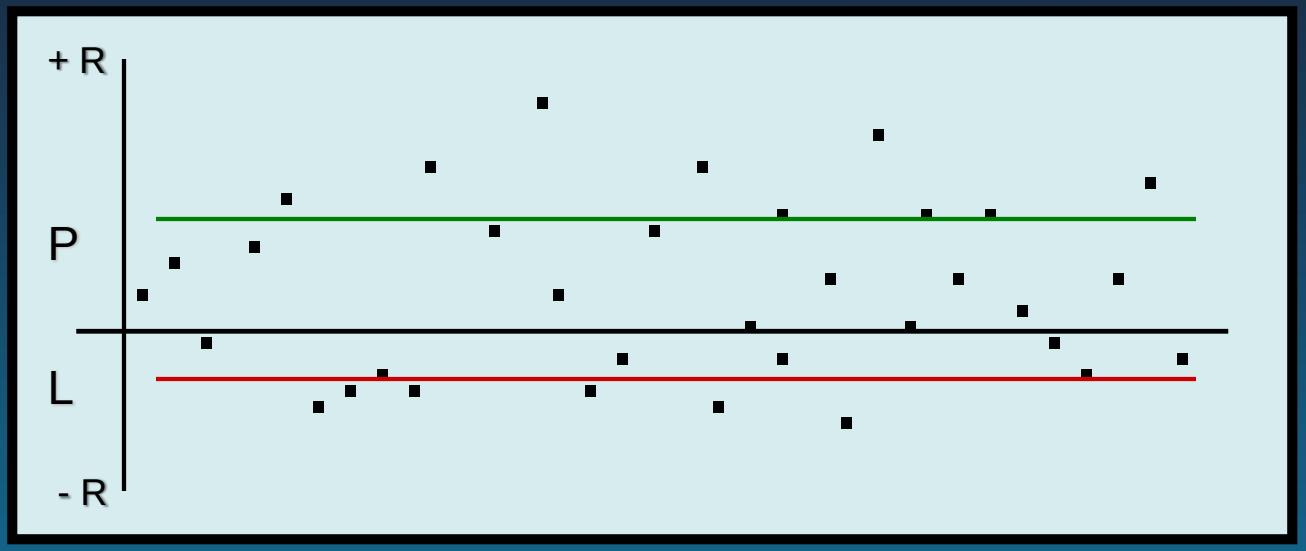
R-Distribution

- After a large sample of Trades, the performance of a system can be represented as a Distribution of “R”

Total Profits (or loss) / Avg. R amount

System Performance

- Viewed as a Distribution of wins and losses.



Example: If R = $1,000

	Risk	Buy	Sell	P/L	R	
1	$1,000	$20.12	$22.08	$1,960.00	2.0	
2	$1,000	$55.35	$54.45	($900.00)	(0.9)	
3	$1,000	$87.25	$89.11	$1,860.00	1.9	
4	$1,000	$15.89	$16.75	$860.00	0.9	
5	$1,000	$34.10	$33.50	($600.00)	(0.6)	
6	$1,000	$52.24	$50.90	($1,340.00)	(1.3)	
7	$1,000	$28.54	$33.50	$4,960.00	5.0	
8	$1,000	$48.35	$47.96	($390.00)	(0.4)	
9	$1,000	$72.20	$73.80	$1,600.00	1.6	
10	$1,000	$65.11	$64.25	($860.00)	(0.9)	

Gap

$7,150 Total Net profit / 10 Trades = $715 per Trade +0.71R

Trading System Performance

Expectancy Measurements

50% Winners 50% Losers

Avg Win $2,248 Avg Loss $818

Avg Risk $1,000

= [(2248 x .5) – (818 x .5)] / 1000

= [1124 – 409] / 1000

= 715 / 1000 = 0.715 R Expectancy

Expectancy

- Reliability
  - Win/Loss Ratio
- Profitability [Payoff Ratio]
  - Win Size / Loss Size
- Slippage Cost
  - Commissions, Bid/Ask Spread

System Performance

Review ‘Expectunity’

((W/L x $W/$L) – SL) x FOO

W/L = # of Wins / # of Loss Ratio

$W/$L = Average Payoff ratio

Avg Win $ / Avg Loss $

SL = less Slippage Bid/Ask + Comm +Fees

FOO = Frequency of Opportunity

System Performance

Review ‘Expectunity’

((W/L x $W/ $L) – SL) x FOO

OVERALL PERFORMANCE is the Measure that matters.

You will often find, that changes that improve one aspect, may often have a negative affect on another aspect.

Always Evaluate the NET Affects !

Positive Expectancy is Not Enough

A Trading system with a Good Positive Expectancy, and plenty of Opportunity, does NOT Mean you will make a Profit Trading it.

What if you Blow out your Account before you have time to realize your system's expectancy.

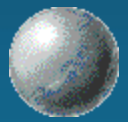
Van Tharp's - 'Marble Game'

A Trade Simulation Game

- Designed to equalize all variables but one.
- Everyone starts with the same account value & takes all the exact same Trades.
- Only the $ amount Risked for each trade is unique for each participant.

Game Results

- What were the results of the Marble Game … ?
- Dramatically different ending account values after a small group of trades !



Every Trading System - Must Have

- **Markets** – What to buy or sell
- **Position Sizing** – How much to buy or sell
- **Entry** – When to buy or sell
- **Stops** – When to get out of losing positions
- **Exits** – When to get out of winning positions
- **Tactics** – How to buy or sell

BOTH are Important to define RISK

Definitions

- **Stops** - define YOUR decision point where a trade is determined to be NOT working. Can dramatically affect the performance ODDS of a trade ***/*** system.
- **Position Size** – Determines ‘How Much’ the $ amount at Risk in a position.

Common Errors: Adjusting one or the other for the wrong reasons…not realizing the net affects.

Often Confused with Each other

Trader Survival

Most Common Trader Error — Fatal

- Trading too large of a Position for their:
  - Account Size (too much at risk)
  - Experience level
  - Risk ‘Comfort’ level

The ability of a Trader to make Objective Observations and Decisions based upon the Markets, is Severely Hindered when they have too much risk in a Trade.

Golden Rule of Trading

Cut your losses short, and
Let your Winners Run.

Goal of a Position Sizing Method:

to Equalize Risk

Why ?

Do you KNOW which trade is a winner and which is a loser BEFORE you Enter each Trade?

Goal of a Position Sizing Method:

to Equalize Risk

Why ?

Will you more likely survive a String of losses, if each Trade's Risk is Equalized?

Goal of a Position Sizing Method:

to Equalize Risk

Why ?

Are you more likely able to REALIZE your system's Measured Expectancy if each Trade is weighted Equally?

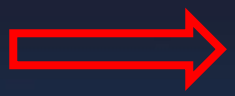
Goal of a Position Sizing Method:

to Equalize Risk

Why ?

Would it be much more difficult to STICK to your System, if you had 'Too Large' of a position open ?

Position Size Methods



- Fixed
- Fixed Fractional
  - % of Acct value
- Fixed Ratio
  - equalized profit goals per Contract
- Volatility based methods

Fixed Position Size

- Same positions size for each trade.
  10 contracts, 500 shares, etc.

Fixed Position Size

- Examples:

100 Shares Long INTC
$19.00 Long Entry
$18.00 Stop [-5.5%]
= $100 Risk
$1,900 Capital

100 Shares Long IBM
$124.00 Long Entry
$118.00 Stop [-5%]
= $600 Risk
$12,400 Capital

100 Shares Long GOOG
$560.00 Long Entry
$532.00 Stop [-5%]
= $2,800 Risk
$56,000 Capital

Is RISK Equal?

Fixed Position Size

- Did Fixed Position Size meet our Goal?

100 Shares Long INTC
$19.00 Long Entry
$18.00 Stop [-5.5%]
= $100 Risk
$1,900 Capital

100 Shares Long IBM
$124.00 Long Entry
$118.00 Stop [-5%]
= $600 Risk
$12,400 Capital

100 Shares Long GOOG
$560.00 Long Entry
$532.00 Stop [-5%]
= $2,800 Risk
$56,000 Capital

No

Fixed Position Size

- What if: my Winning trades also happened to be my Smallest Positions, and my Losers were the Largest Positions ?
- How Would my performance Look ?

Fixed Position Size

- What if we Adjust STOPs for Equal Risk?

100 Shares Long INTC
$19.00 Long Entry
$18.00 Stop [-5.5%]
= $100 Risk
$1,900 Capital

100 Shares Long IBM
$124.00 Long Entry
$123.00 Stop [-.8%]
= $100 Risk
$12,400 Capital

100 Shares Long GOOG
$560.00 Long Entry
$559.00 Stop [-.17%]
= $100 Risk
$56,000 Capital

Now is RISK Equal?

YES - However

Fixed Position Size

- What if we Adjust STOPs for Equal Risk?

100 Shares Long INTC
$19.00 Long Entry
$18.00 Stop [-5.5%]
= $100 Risk
$1,900 Capital

100 Shares Long IBM
$124.00 Long Entry
$123.00 Stop [-.8%]
= $100 Risk
$12,400 Capital

100 Shares Long GOOG
$560.00 Long Entry
$559.00 Stop [-.17%]
= $100 Risk
$56,000 Capital

INTC's ATR $0.43
Stop = 2.3 x ATR

IBM's ATR $1.65
Stop = .6 x ATR

GOOG's ATR $8.50
Stop = .11 x ATR

Are Odds of Being Stopped out Equal?

Problem

In an effort to Equalize Risk by adjusting Stops, we Dramatically affected the overall Expectancy of our System, causing us to be much more likely Stopped Out of many potential ‘winners’, thus significantly decreasing the overall Win/Loss Ratio & Expectancy.

Never Forget

- RISK
- REWARD
- PROBABILITY

Are Linked Together

Position Size Methods

- Fixed
- Fixed Fractional
  - % of Acct value
- Fixed Ratio
  - equalized profit goals per Contract
- Volatility based methods

Fixed Fractional

- Most Common Method to equalize Risk.
- Risk is usually computed as a Percentage of Account Value
- A simple method for Stock, Options, Futures traders.

Fixed Fractional

If STOPs set at - 5% of Entry Price

and R = $400 (2% of $20,000 acct value)

[redacted] Shares Long INTC
$19.00 Long Entry
$18.05 Stop [-5%]
= [redacted] Risk
$ [redacted] Capital

[redacted] Shares Long IBM
$124.00 Long Entry
$117.80 Stop [-5%]
= [redacted] Risk
$ [redacted] Capital

[redacted] Shares Long GOOG
$560.00 Long Entry
$532.00 Stop [-5%]
= [redacted] Risk
$ [redacted] Capital

Are Odds of Being Stopped out Equal?

Fixed Fractional

If each position uses 10% of Available Capital, with 2% at Risk, for a $100,000 Account Value

[redacted] Shares Long INTC
$19.00 Long Entry
$15.20 Stop [-20%]
= $[redacted] Risk
$[redacted] Capital

[redacted] Shares Long IBM
$124.00 Long Entry
$ 99.00 Stop [-20%]
= $[redacted] Risk
$[redacted] Capital

[redacted] Shares Long GOOG
$560.00 Long Entry
$442.35 Stop [-20%]
= $[redacted] Risk
$[redacted] Capital

Fixed Fractional

If each position uses 10% of Available Capital, with 2% at Risk, for a $100,000 Account Value

526 Shares Long INTC
$19.00 Long Entry
$15.20 Stop [-20%]
= $1,999 Risk
$9,994 Capital

80 Shares Long IBM
$124.00 Long Entry
$ 99.00 Stop [-20%]
= $2,000 Risk
$9,920 Capital

17 Shares Long GOOG
$560.00 Long Entry
$442.35 Stop [-20%]
= $2,000 Risk
$9,520 Capital

Is Risk Equalized ?

Are Stops Logical? Size of Average Loss?

Sample Trade - LMT

- LMT chart of Jan 6, 2014
- Pause in established Bullish Trend


LMT | Add Indicator | Daily | Settings
BATS Real-Time
Volume Estimated
3.74
Lockheed Martin Corp Add to Portfolio Drawings
Price Avg 50 Avg 20 Avg 200 BBand 14 1.5 KeltChan 14
LMT Long Entry: $146.86
Prior 6 days support at $145.84 L
Set Stop below support = $145.36
Risk per Share $1.50
If "R" [= 1% Acct Risk] = $300
Max. Position Size = shares
Entry
Stop
150.00
148.00
146.00
144.00
142.00
140.00
138.00
136.00
134.00
132.00
130.00
128.00
126.00
124.00
122.00
Volume Moving Average 50
5.0M
2.1M
7 14 21 28 4 11 18 25 2 9 16 23
Nov 2013
Dec 2013
1/6/2014

Fixed Ratio

- Equalize profit goals per contract.
- Effective for Derivatives (Futures) trading.

Position Size Methods

- Fixed
- Fixed Fractional
  - % of Acct value
- Fixed Ratio
  - equalized profit goals per Contract
- Volatility based methods

Volatility Based Position Sizing

Since each Trading Instrument can represent very different levels of Volatility, lets take this into account in order to better Equalize Risk.

Volatility Measurement

- Average True Range
  - Wells Wilder

True Range = The greater of:

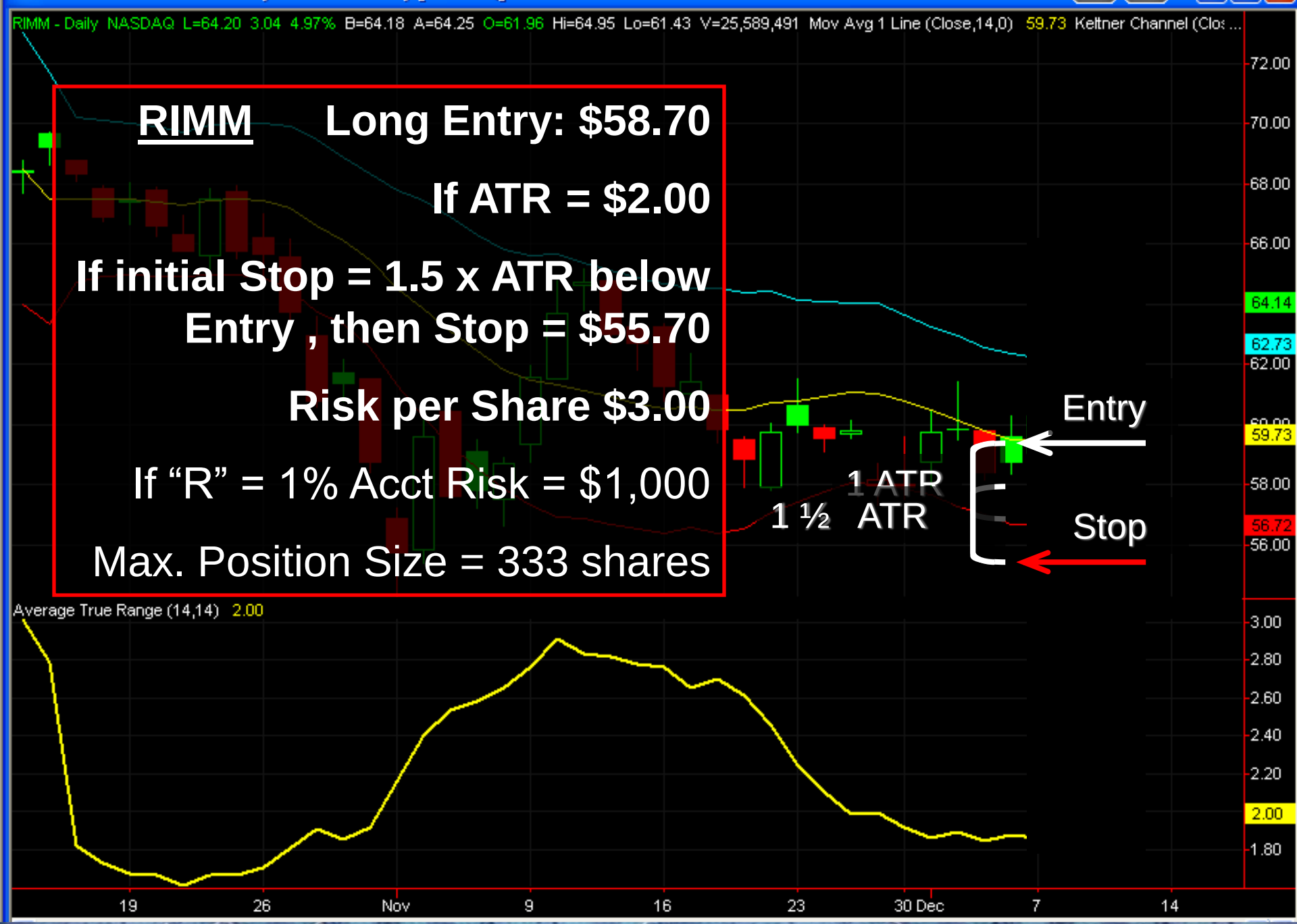
- High – Low
- or High – Prior Day's Close
- Low – Prior Day's Close

ATR = (14 period) EMA of True Range

Volatility Based

- If your Initial Stop is placed at some multiple of that Instrument's current ATR, then you are taking price volatility into account (for both the current market conditions, and the trading instrument's volatility) when position Sizing.

- Compute Position size, based on this stop, and your Risk Rules (Fixed Fractional).



Charts Courtesy TradeStation Securities Inc.

Volatility Based

A Famous Example of a Volatility Based Position Sizing Method

Re-Calculated the trading ‘Unit Size’ for each Trading Commodity, each week.

Volatility Based – Fixed Ratio

If STOPs at 2x ATR, find # Shares for Equal Risk and R = 2% of a $20,000 Acct. Value

[redacted] Shares Long INTC
$19.00 Long Entry
$18.14 Stop [-4.5%]
= [redacted] Risk
$[redacted] Capital

[redacted] Shares Long IBM
$124.00 Long Entry
$120.70 Stop [-2.7%]
= [redacted] Risk
$[redacted] Capital

[redacted] Shares Long GOOG
$560.00 Long Entry
$543.00 Stop [-3%]
= [redacted] Risk
$[redacted] Capital

INTC's ATR $0.43
Stop = 2x ATR

IBM's ATR $1.65
Stop = 2x ATR

GOOG's ATR $8.50
Stop = 2x ATR

Volatility Based – Fixed Ratio

If STOPs at 2x ATR, find # Shares for Equal Risk and R = 2% of a $20,000 Acct. Value

464 Shares Long INTC
$19.00 Long Entry
$18.14 Stop [-4.5%]
= $399 Risk
$8,816 Capital

120 Shares Long IBM
$124.00 Long Entry
$120.70 Stop [-2.7%]
= $396 Risk
$14,880 Capital

23 Shares Long GOOG
$560.00 Long Entry
$543.00 Stop [-3%]
= $391 Risk
$12,880 Capital

INTC's ATR $0.43
Stop = 2x ATR

IBM's ATR $1.65
Stop = 2x ATR

GOOG's ATR $8.50
Stop = 2x ATR

Are Odds of Being Stopped out Equal?

Efficient Market
System Adjustments

- As you try to Increase your win Probability, then usually both Reward and Risk are reduced.
- As you try to Increase Reward, you also increase Risk and reduce win Probability.
- As you increase Risk, hoping to increase Reward, you increase your Probability of Ruin.

Always Look at the NET Affect when evaluating any change.

SIMPLE is often Better

K.I.S.S.

Keep It a Simple System

- Less likely to make mistakes
- Quicker to learn
- Easier to Remember

Position Size Methods - Review

- Fixed Shares or $ size → Very poor
- Fixed Fractional → Good & simple
  - % of Acct value
- Fixed Ratio → Good for High Leverage
  - equalized profit goals per Contract

Volatility adjustments built into system

Powerful

Not a Recommendation, for educational purposes only.

Objectives

- **Equalize** each trade's Risk, to be an equivalent financial risk. Since you do not know which trades will be winners before you Enter.
- Equalizing the risks, helps the Realized System's performance be more likely similar to it's tested Expectancy.
- More likely to survive a string of losses
- **Do NOT Confuse DIVERSIFICATION with Risk Management .**

"Diversification is a substitute for not Thinking." - Warren Buffett

"Wide Diversification is only required when investors do not understand what they are doing." - Warren Buffett

"Risk comes from not knowing what you're doing."

- Warren Buffett

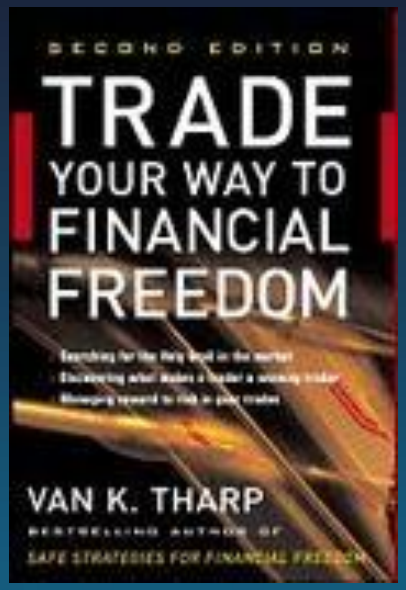
Summary

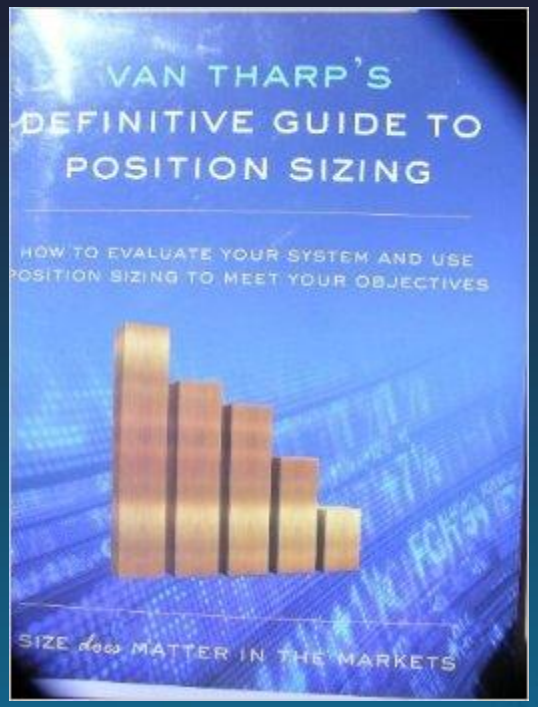
- Manage Risk on EVERY trade and every Portfolio.
- Define your System & Stick to it.
- Keep losses small and let winners run.

Risk Management Resources

- Dr. Van Tharp
- Ryan Jones
- Nauzer J. Balsara
- Dr. Alexander Elder
- Fred Gehm
- Ralph Vince

Dr. Van K. Tharp





www.iitm.com

Other Books on Risk Management

- Ralph Vince -
  - "The Handbook of Portfolio Mathematics: Formulas for Optimal Allocation & Leverage"
  - "The new Money Management: A Framework for Asset Allocation"
  - "The Mathematics of Money Management: Risk Analysis Techniques for Traders"

Other Books on Risk Management

- Ryan Jones -
  - "The Trading Game"
- Robert Pardo -
  - "The Evaluation and Optimization of Trading Strategies"
- Philip McDonnell –
  - "Optimal Portfolio Modeling"

Thank You

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