Module 3

Money Management

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Contents

Learning Outcomes

What you will learn:
- How to manage and apply appropriate risk
- How to survive in trading
- The importance of understanding drawdown
- How to manage your trading account.

What you will be able to do:
- Calculate risk of ruin, expectancy
- Competently use backtesting performance spreadsheet
- Apply position size to manage risk
- Calculate risk multiple.

1. Martingale verse Anti-Martingale

1. 1 Martingale

Martingale refers to a betting strategy used in 18th century France. The simplest of the strategies is placed on a coin toss where a gambler will win on heads and lose on tails. To recover any losses he would keep doubling his bet each time he lost with the expectation that when he did win he would recover his losses plus win a profit equal to the original stake. This strategy is well and good for gamblers who have infinite wealth since the probability is 1. In fact, the exponential growth of loss and the limited wealth of gamblers proved this method is flawed and would eventually bankrupt the players. One way for gambling houses to prevent the use of Martingale strategies is to place a betting limit on the game. This proves that the Martingale betting system is unsound and has a long-term mathematical disadvantage over other betting systems - even on randomly placed bets.

1.2 Anti-Martingale (Paroli System)

In a classic martingale betting style, gamblers will increase their bets after each loss in hopes that an eventual win will recover all previous losses. The anti-martingale approach instead, increases bets after wins, while reducing them after a loss. The idea is that in this manner the gambler will benefit from a winning streak or a "hot hand" while reducing losses while "cold" or otherwise having a losing streak.

Equal loss and growth in trade capital will increase trade size over the long term. This is typical of a trading strategy used in an Anti-Martingale approach.

Two different anti-martingale money management strategies are available to traders:

1. Fixed risk suggests that the loss amount stays consistent for every trade

2. Fixed position value suggests that the face value of the position stays consistent for every trade.

2. Managing Your Trades

It is imperative to understand your money management on trades. A few important points to consider are:

2.1 Trade Capital

Trade capital, otherwise referred to as the trading float, is the amount of money a trader has in their account.

2.2 Risk Amount

Risk amount refers to the amount of capital you are willing to lose on any one trade. Should it be $100, $200, $500 or maybe $1000? There needs to be a point of pain. Ask yourself, where is your pain threshold? Keep in mind two questions:

1. How big is your account?
2. How many times will your system allow you to lose?

2.2.1 Calculating Stop Loss Position

The risk amount will define where you will place a stop loss. Typically traders will risk no more than 2% of capital per trade. Therefore if trader "Bob" has $10,000, he will not lose any more than $200 if a trade goes against him.

Example 1: Calculate the stop loss position on the E-mini S&P500 with the following:
Trade Capital = $10,000
Risk Amount = 2%
Contract = 1
1 ES point = $50

$10,000 x 2% = $200
$200 ÷ $50 = 4 ES points

Example 2: Calculate the stop loss position on the AUD/USD with the following:
Trade Capital = $10,000
Risk Amount = 2%
Contract = 1 standard lot
1 Pip = $10

$10,000 x 2% = $200
$200 ÷ $10 = 20 pips

2.3 Position Size / Exposure

Often a trader will use a stop loss at a given value. This will then require a formula to derive the amount of capital allocated to a position.

For example: if trader "Bob" places a buy on the AUD/USD at 0.92430 and has his stop loss at 0.92130, then a 30 pip stop loss is in place. Bob still wants to risk only 2% of float. He uses the following:

Float = $10,000
Risk = 2%
Stop Size (pips) = 30 pip
Pip Value = $10.78
Stop size $ = Pip Value x Stop size (pips)= $323.40

Position Size = (Float x Risk) ÷ Stop size
($10,000 x 2%) ÷ $323.40 = 0.618429

This means the position size will be 0.618429 x 1 standard contract. However, dividing a standard contract is not always available. To overcome this problem one of two methods can be used.

1. Use mini lots to the nearest 10
2. Round to the nearest 100

2.4 Risk to Reward

Otherwise called the Risk Multiple, the risk to reward ratio can be used for both a single trade and a trading system and it defines the health of a trade.

For example, if Bob's stop loss is 20 pips and profit is 10 pips, this will equate to a 2:1 risk to reward. On the other hand, Bob has a risk of 20 pips and a profit of 4 pips then the risk-reward is 1:2. This means for every two losers Bob needs 1 winner to make up the difference. This is referred to an R-Multiple of 2 or 2R

2.4.1 System Risk Multiple

Risk to reward is used when understanding the overall risk versus reward for a system. To find the Risk to Reward Ratio in a system, use the following:

Average Winning Trades/ Average Losing Trades

Take into account the following trades using FOREX profit and losses.

	Profit	Loss
Trade 1	$176	
Trade 2		$200
Trade 3	$678	
Trade 4	$31	
Trade 5		$200
Trade 6	$51	
Trade 7	$579	
Trade 8	$754	
Trade 9		$200
Trade 10	$1,065	
Total	**$3,334**	**$600**
Average	$476	$200
R-Multiple	2.38	

2.5 Expectancy / Profit Factor

System risk multiple isolates the average win relative to the average loss. To convert this to a $ amount returned per trade, an expectancy formula can be used.

Expectancy is simply the dollar amount of return for each dollar risked.

Creating expectancy in a trading style is the foundation to trading. The aid of expectancy will douse the influence of your emotions and allow a clear understanding of the outcome. If you have expectancy then you should have no issue with psychology. Fear, Hope and Greed!

Expectancy% = (Win Ratio x (Average $Win ÷ Average $Loss)) - (Loss Ratio x (Average $Loss÷ Average $Loss))

Expectancy = gross profit / gross loss

eg. profit of $6000 and a loss of $3000 would give a profit factor of 2.0. This means that for every $1 risked, you can expect a return of $2. If something has a profit factor less than 1, eg, 0.9, this means that for every $1 you can expect $0.90 back (i.e the strategy is a losing one!). If something has a high-profit factor, this is a good thing - eg 5.0 ($5 gained for every $1 risked).

Expectancy$ Per Trade = Expectancy% x Average Win

For example:

Win to loss ratio = 60%
Average $Won = $476
Average $Lose = $200

Expectancy per dollar risked
(0.6 x ($476 ÷ $200)) − (0.4 x ($200 ÷ $200)) = 102.8%

Expectance per trade
102.8% x $476 = $489.33

2.6 Drawdown

According to back tested results drawdown is the maximum equity lost due to losing trades. This allows a trader to be prepared for a "worst-case scenario" in the event of either consecutive losing trades or a higher number of losers than winning trades. This also ensures that a trader has enough trade capital in their account to survive such an event. It is good to work out the maximum drawdown in a system.

Drawdown = Lowest value between two consecutive equity highs

Maximum Drawdown = Lowest low value in range of the current equity value – maximum equity value in range

For example: consider the following 10 trades:

	Profit/Loss	Equity	Drawdown
Trade 1	$176	$176	$0
Trade 2	-$200	-$24	-$200
Trade 3	$45	$21	-$155
Trade 4	$876	$897	$0
Trade 5	-$200	$697	-$200
Trade 6	$34	$731	-$166
Trade 7	-$200	$531	-$366
Trade 8	$187	$718	-$179
Trade 9	$456	$1,174	$0
Trade 10	$1,065	$2,239	$0
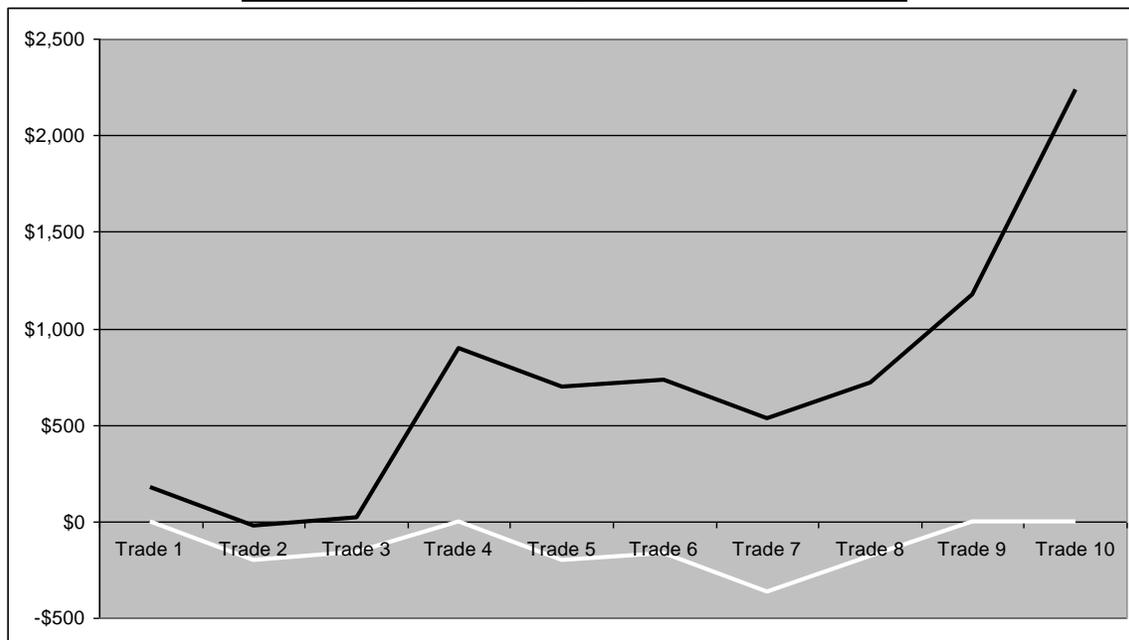
3. Managing Your Account

3.1 Account Risk Tolerance

Account risk tolerance refers to the amount of the trading float you are prepared to lose. Some traders are comfortable losing 50% of their account and others more. Assigning a tolerance of the trading float to loss will help identify the number of trades available. Available trades are calculated by:

Available Trades = Account $Size x Risk Tolerance ÷ Risk Amount

Consider the following
Account size = $10,000
Risk Tolerance = 75%
Risk = 20 pips = $200

$10,000 x 75% = $7,500
$7,500 ÷ $200 = 32.5 available trades

3.2 Risk of Ruin

Once a trader's available trades are assigned, then the risk of ruin can be calculated.

Often new traders commit too many contracts or too much leverage to trading. A proportionate balance between account size and possible number of losing trades is necessary to survive. In the event of a catastrophic disaster (maximum drawdown), the risk of ruin outcome will restrict a trading account. Also used in backtesting, it can alert the trader of a possible ruin if they were to trade the system live.

For example:

Trading account = $10,000
Risk Tolerance = 75%
Trade = 5.0 Lots
Risk Amount = 20 pips ($200)
Max drawdown = $10,000

10,000 x 80% = $8000
$8000 - $10,000 = Ruined!

Risk of ruin is a formula that gives a % of success based on the probability of wins versus loss. If a 0% Risk Of Ruin is achieved, then you will survive!

Risk of Ruin = (1-(Win Ratio – Loss Ratio)) ÷ (1+ (Win Ratio – Loss Ratio)) to e raised to the power of Available Trades

3.3 Standard Deviation and Variance

The variance helps determine the data's spread size when compared to the mean value. As the variance gets bigger, more variation in data values occurs, and there may be a larger gap between one data value and another. If the data values are all close together, the variance will be smaller. This is more difficult to grasp than are standard deviations, however, because variances represent a squared result that may not be meaningfully expressed on the same graph as the original dataset.

Standard deviation is a measure of the dispersion of a set of data from its mean. It is calculated as the square root of variance by determining the variation between each data point relative to the mean. If the data points are further from the mean, there is higher deviation within the data set.

$$s_x = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}}$$

$n =$ The number of data points

$\bar{x} =$ The mean of the x_i

$x_i =$ Each of the values of the data

3.4 Sharpe

The Sharpe Ratio is a measure for calculating risk-adjusted return, and this ratio has become the industry standard for such calculations. It was developed by Nobel laureate William F. Sharpe. The Sharpe ratio is the average return earned in *excess* of the risk-free rate per unit of volatility or total risk. Subtracting the risk-free rate from the mean return, the performance associated with risk-taking activities can be isolated. One intuition of this calculation is that a portfolio engaging in "zero risk" investment, such as the purchase of U.S. Treasury bills (for which the expected return is the risk-free rate), has a Sharpe ratio of exactly zero. Generally, the greater the value of the Sharpe ratio, the more attractive the risk-adjusted return.

The Sharpe ratio has become the most widely used method for calculating risk-adjusted return; however, it can be inaccurate when applied to portfolios or assets that do not have a normal distribution of expected returns. Many assets have a high degree of kurtosis ('fat tails') or negative skewness. The Sharp ratio also tends to fail when analyzing portfolios with significant non-linear risks, such as options or warrants. Alternative risk-adjusted return methodologies have emerged over the years, including the Sortino Ratio, Return Over Maximum Drawdown (RoMaD), and the Treynor Ratio.

Modern Portfolio Theory states that adding assets to a diversified portfolio that have correlations of less than one with each other can decrease portfolio risk without sacrificing return. Such diversification will serve to increase the Sharpe ratio of a portfolio.

Sharpe ratio = (Mean portfolio return − Risk-free rate)/Standard deviation of portfolio return

$$= \frac{\bar{r}_p - r_f}{\sigma_p}$$

Where:
$\bar{r}_p$ = Expected porfolio return
r_f = Risk free rate
σ_p = Portfolio standard deviation