How to Win at the Futures Trading Game

By: David James Bennett

As a new trader, you are probably impatient to get to the study of charts and evaluation of various trading strategies. Surely, winning involves predicting future market direction using sophisticated technical analysis to identify the best entry and exit points for our trades? So why delay discussion of all that stuff for a look at a bit of mundane statistics?

The reason is simple. If you regard the trading game as some kind of super intelligence test where you are pitching your skills against the rest of the world, you are unlikely to play the game with the right attitude and expectations. On the other hand, if you see trading as a numbers game, then you are more likely to approach it correctly.

So, if it is a numbers game (which it is), then you need to know what numbers are important for a speculator in the futures markets.

When you read books about trading you will be struck by the great emphasis placed on psychological aspects of the business. There are good reasons for that, because many traders suffer greatly from stress. They are distressed when their picks turn out to be wrong, and they are beset with doubts when they have a run of losing trades. This stress causes them to make mistakes, which increases stress even more. It becomes a vicious circle.

One of the reasons for this is a fundamental misunderstanding of the trading business (especially futures trading). As long as you believe that trading is a contest of your intelligence against the rest, or a test of your market knowledge, you are doomed to have a difficult time.

The trick is to understand that trading is a game, a probability game. Your job is to set up the parameters of the game so that you have a long term edge, and then execute your strategy consistently. With the right attitude to the game, your stress levels are reduced and eventually profits begin to come, reducing stress further. It leads to a virtuous circle.

Try to strip away your self-image of whiz kid financial trader, and start thinking in very basic terms. You need to really understand that future market action cannot be predicted with a high degree of accuracy, so nobody gets it right all the time.

This is not to say that you will not make predictions and it is all dumb luck. Quite the contrary, you will need to take decisions based on partial knowledge and probabilities, not certainties. Working in the fuzzy world of probabilities is harder than working with certainties.

Others may disagree, but I choose to see a futures trader as a gambler playing a simple game repeatedly. It is a bit like betting on coin tosses for a living. If you win money when you call the toss correctly and lose money when you call incorrectly, you can intuitively see how this game is likely to play out.

One thing you know is that you are likely to lose as often as you win. You know this because you realize that it is not possible to predict what the outcome of a fair coin toss is going to be. You are unlikely to spend time trying to develop better strategies for selecting heads or tails, because you can see that whatever you do you will never improve on a 50% chance of being right for any specific toss of the coin.

You also know that there will be runs of heads or tails, but in the long term they will tend to even out. If your first four tosses all turn out to be heads, you will not assume that it is better to call heads rather than tails in the future, although you can see it would have been better in the small sample you have looked at so far. Small samples are not much use for reliably determining statistics for future action.

Assuming an unbiased coin, what would induce you to play this (rather boring) game for a living? Well, suppose I give you $200 every time you make a correct call, and you give me $100 whenever you call incorrectly. That should be attractive.

Intuitively you can tell you will make money over time, although in the short term you might easily have a series of five or six losses. You would want to have enough money when you start the game to ride out a bad sequence which could bankrupt you before you start to win. For example, if you start off with capital of $200, you can be sent broke by guessing wrong just twice. If your starting capital is $10,000 the odds of going broke are negligible.

You can see that if there is only time to toss the coin once a day, you are not going to make as much money as you would if there is time to toss it 100 times a day. In other words, even a game with favourable odds is unattractive if it does not provide enough opportunities to profit.

You can work out that your Expectancy, over time, is an average of $50 per coin toss. (Think of 10 tosses where you are right half the time. You would win $1000 and lose $500, for a net $500 profit. $500 over 10 tosses is an average of $50 per toss.) Only games with a positive expectation make money in the long run.

As another example, how about rolling a die for a living? Suppose the winning and losing rewards are equal, say $100.

What might make this game attractive? Well, what if you win when you roll a 3,4,5 or 6 and lose if you roll a 1 or a 2. Once again it is obvious that you are going to win quite a bit of money if you play long enough.

This time you will not profit because a win has a bigger payout than a loss, but rather because you are more likely to win than lose. Over time you expect to win two thirds of the time and lose one third of the time. Your Expectancy is $33.33 per throw. (Think of 30 throws where you win 20 and lose 10 times. You would win $2,000 and lose $1,000 for a $1,000 profit. $1,000 over 30 throws is $33.33 per throw.)

These two simple examples tell you a lot about the trading game. You know that you can only win a game where your Expectancy is positive. You can increase expectancy by (a)

increasing the size of wins versus losses, and/or (b) increasing the probability of winning versus losing.

You know that a profitable strategy with a good positive Expectancy will nevertheless have bad runs where you lose money for a while.

So what does all this tell us about how to trade? Consider the following points:

- Your strategy must be repetitive and consistent. You will be unable to define system parameters with any accuracy if you are doing something different every time you trade. (If you are a prodigy who can make a fortune trading your gut instincts, I congratulate you and you certainly will not need any help from me. For the rest of us, we need to define one or more favourable strategies and repeat them consistently whenever we get the opportunity.)
- You need to know what your probability of winning is, whenever you place a trade. (Knowing the probability of winning, you automatically know the probability of losing.) This can be a difficult statistic to get a handle on in real life. Tossing a coin is easy; obviously the Probability of Winning = 50%. But with a market strategy, the probability will not be intuitively obvious, so you will have to figure out a way of measuring it. You can only measure it on the basis of historical information and there is no guarantee that your estimate will be correct in the future. You can have greater confidence that your estimate is correct if it is derived from a logical trading strategy based on your knowledge of the ways markets work.
- You need to know the size of your average winning trade and the size of your average losing trade. Depending on your strategy, this may be well defined, or you may need to figure out a way to estimate it from historical data (again with the caveat that history does not necessarily repeat itself).
- Based on these numbers, your Expectancy must be positive. Expectancy can be worked out from the following formula:
    - Expectancy = (Probability of Winning x Average Win) - (Probability of Loss x Average Loss)
    - In the die throwing example I used before: Probability of a Win = 2/3; Probability of a Loss = 1/3; the Average Win and Average Loss are both $100.
    - Therefore Expectancy = 2/3 x 100 - 1/3 x 100 = 66.66 - 33.33 = 33.33.
    - Remember, this means that over time you will earn an average of $33.33 every time you play the game.
- You know that statistics gleaned from small samples are of little value, and also that strategies with a good expectancy are almost certain to have bad runs of several losses in succession. Such runs are simply random fluctuations in a series of results which will revert to the statistical norms in the long run.
- Because bad runs are to be expected, you must anticipate them when determining the amount of capital needed to play the game.
- An important part of any strategy is the opportunity to profit provided. A good strategy which provides few opportunities may well be a lot less profitable than a mediocre strategy which provides a lot of opportunities.

Think about the casino owner, or your local bookmaker. They do not berate themselves if one of their clients has a big win. They do not change their entire business plan if they have a few unprofitable days. They do not tinker with the rules of their games after a few losses. They know the odds are in their favour, and in the long run their profits are assured.

If you can really internalize the simple concepts in this article, not just read and understand them, your attitude to futures trading will be much more realistic. You will expect strings of losses to occur at times. You won't get down on yourself because you have made a wrong bet on something that is, after all, basically unknowable.

You understand that if you act consistently over time, and take care to employ sufficient capital to ride out bad runs, then you will be profitable in the long run providing your strategy has a profitable expectation.

To win at the trading game you need a strategy with a positive expectancy. The system parameters that determine expectancy are the Probability of Winning, the size of the Average Win and the size of the Average Loss.

You apply this strategy consistently, without variation, as often as possible. The positive expectancy asserts itself in the long run and profits accrue, although there will be bad runs which cause short term losses.

When you look at examples like tossing a coin or rolling a die, it is easy to see what the Probability of Winning is, but in real trading situations it is far from obvious. The only way of determining system parameters is by estimating them from samples of market action.

The usual way of doing this is by obtaining historical data and back-testing your strategy to see how it performed in the past, or by paper trading the strategy for a test period. In either case, your objective is to get reliable estimates of the system parameters.

There are some important caveats to emphasize:

- Small samples provide unreliable estimates of system parameters! Your test period should include a minimum of 20 trades, and preferably 50 or more.
- A strategy may not work in all market conditions. If you back-test your strategy in different periods when market conditions vary (bull market, bear market, sideways market), your parameter estimates are more reliable.
- The greatest trap of all is curve fitting.
    - This occurs when you define rules in your strategy to optimize results obtained in a test period. If you look at any particular set of historical data, you can often specify trading rules which produce magnificent results applied over that period. (If only we could trade in the past, we would all be wealthy.)
    - Curve fitted strategies can usually be recognized by their complexity and large number of rules and exceptions.
    - Curve fitting is a very natural thing to do, so it is vital that you are on guard against it. The problem is that markets are infinitely variable, and a strategy

optimized on data from one time period is most unlikely to perform well in other periods.
- The other problem with curve fitting is that the sample estimates of system parameters are no longer accurate, since they have been deliberately optimized.
- The best way of avoiding curve fitting is to define a strategy based on a trading idea (I will look at some of these in future articles). A strategy based on an idea of how markets work, or other traders react to certain events, can be developed independent of past data. If you then back-test that strategy, the results will not be curve fitted.
- But if, as a result of observations you make during the test period, you decide to make adjustments to the strategy, that is the time to beware. Any change you make must have a logical trading rationale - otherwise you will be falling into the curve fitting trap.

Consider a soybean futures strategy traded at the Chicago Board of Trade (CBOT). The strategy is based on the simple idea of trading price breakouts which occur during the first 30 minutes of the trading day. If no breakout occurs, there is no trade for the day. Otherwise the market is entered with a Buy or Sell order in the direction of the price breakout.

(A price breakout occurs when the price moves out of a previously established trading range.)

The target profit for the trade is determined from the chart pattern forming the trade setup, and the stop loss is set at an equal amount. In other words, the amount risked is equal to the potential profit in this strategy. If neither the profit target not the stop loss are reached during the trading day, the position is closed at the end of the session.

view the spreadsheet here:
http://spreadsheets.google.com/pub?key=pUm7Om973YR2qhZnE31AcLg

For each date when the setup occurs, the trade result is entered as a number of points. In the soybean market, each point is worth $50, so the first result of -4.25 points represents a loss of $212.50 on the trade.

The third column shows the number of contracts traded. Next is a column showing the cumulative profit (in points), followed by the contract code (ZS).

Then there is a column indicating whether the trade is a win or a loss. Note the runs that occur here. It is interesting that 4 out of the first 5 trades were losers, although the strategy as a whole has proven successful. This illustrates the futility of relying on small samples for useful information.

Next come columns showing the cumulative winning amount, cumulative loss amount, number of wins and number of losses. This enables calculation of the Average Win and Average Loss.

Finally, the three highlighted columns show the ratio of the average win to average loss, the probability of winning, and the Expectancy.

As results for each day are added, the sample size gets larger and a better picture of performance emerges. Note how the estimates in the highlighted columns vary a lot in the first few rows, but settle down as the number of results increase. After about 20 trades, the numbers do not change much, giving confidence that they are converging to good estimates of the system parameters.

On the date of writing this article, 23 April, 2007, the Win/Loss ratio is estimated at 0.97. This means the average win is about the same as the average loss.

The Probability of Winning is estimated at 0.66. In other words, the strategy wins about 2 out of 3 times.

The expectancy is estimated at 1.1 points (1 point = $50). So, on average, the strategy has made just over 1 point every time it is traded. Brokerage costs of about $5 would have to be deducted from this.

This is an example only. It shows how testing can be used to estimate the Expectancy for a trading strategy. It may be possible to improve this strategy in a number of ways.

- You can improve your win/loss ratio by using a tighter stop loss. For example, instead of risking the same amount as the target profit, you might choose to risk only one quarter of that amount before quitting the trade. That would mean your Average Win should come out at about four times the Average Loss, which is certainly a good thing. Unfortunately the Probability of Winning will also reduce, because some trades which are winners at the moment would hit the tighter stop loss point, and be closed for a loss.
- Alternatively you could increase the Probability of Winning by specifying a smaller Profit Target, leaving the stop loss amount unchanged. For example, if the profit target is reduced to just 1 point, then some trades which currently end up as losers would reach this reduced target, changing them to winners. However, the higher Probability of Winning will be offset by a reduced Win/Loss ratio because your average winning amount will be smaller.
- At this point you might be tempted to program your computer to work through all the different combinations of Profit Target and Stop Loss levels to see which gives the best Expectancy during the test period. However, this would be an example of curve fitting.
- The point is that the original trading idea puts the stop loss point just beyond a major support or resistance area on the chart. It is a logical thing to do because it is known that other players in the trading game will perceive the support or resistance areas as a barrier. That barrier would have to be penetrated before the stop is triggered. This trading idea is arrived at quite independently of the test data. However, if your computer analysis shows that a fixed stop loss level of (say) 1.5 points would have doubled returns during the test period, and you change the rules

of your strategy to incorporate this value instead of the original rule, you are guilty of curve fitting!

- Remember this concept. You can not use test results to optimize a strategy and still expect those same test results to provide valid estimates of the underlying parameters for the strategy.
- If you truly understand this point, you will save yourself a lot of wasted effort. You will also look at the results quoted for advertised trading systems with a jaundiced eye, because many of them rely on curve fitting to achieve high returns.
- I will continue to update this spreadsheet with trading results on a daily basis. It will be interesting to see if the key parameters remain consistent as time passes and the market moves through different conditions.

Back tested results can be used to get an idea of how much capital you need to trade a particular strategy. As of April 23, 2007, the largest draw-down has been about 10 points. (The draw-down is the difference between the previous highest cumulative profit and a subsequent low point. For example, the cumulative profit on 16 Mar reaches 31 points and then subsides to a low of 20.25 points on 5 April. That is a draw-down of 10.75 points, equivalent to $537.50 per contract traded.)

Conservatively, you should be able to withstand a draw-down of at least five times that experienced in a relatively small sample like this, so think in terms of around $3,000 risk capital to trade this strategy with one contract. Some brokers require $2,000 in your account before you can trade, so you would need a $5,000 account to feel comfortable trading the strategy. With $8,000 you might trade 2 contracts, with $11,000 you could look at 3 contracts, and so on.

The results also indicate that this strategy has quite a good level of opportunity to profit, with most market days yielding a trade opportunity.

Finally, you can see that the strategy produced a profit of over 40 points ($2,000) in the period from 6 Feb to 23 April, 2007. On a $5,000 trading account, that would be a 40% return in less than 3 months, giving you an idea of the rate of return anticipated for this particular trading game!