

July 2009

### **Expectancy Theory**

For many months in these letters you have heard me criticize the models conventional finance and economics use to forecast the performance of financial markets. Most if not all miss the point that the actors on the economic/finance stage do not always follow rational thought processes the central thesis of these models.

The behaviour of economic actors in reality is uncertain and therefore the way we model expected behaviour should incorporate this reality. I for one believe there is value in the models developed to date, it is just that there is too much expectation from these elegantly designed algebraic formulae and not enough realism. In future letters I will explain how I believe there are ways to forecast market behaviour with greater than random accuracy.

As a diligent student of market behaviour and history I have read many books on trading/investing, there is however one book I regard as the “holy grail”, *Trade your Way to Financial Freedom* by Dr Van Tharp. In this book Dr Tharp initiates the reader to the most understudied and most important subject in the field of trading/investing, namely - money management. It doesn't surprise me that a psychologist with an interest in trading has become the leader in the study of this field providing far greater reality than the bulk of the quantitative finance community.

In this letter I will briefly introduce you to the Expectancy Theory Equation Dr Tharp uses and then I will walk you through a real expectancy study of the VT International Freestyle fund. To keep it brief I will not include a theoretical description of the equation save to say that one can operate a fund with a very low win / loss ratio provided ones system is able to keep losses small and winners larger (it sounds obvious but a natural bias is that we assume a system that losses more than 50% of the time is a poor system).

Expectancy =  $\{[(\text{Avg Profit}) \times (\text{Probability of Winning})] - [(\text{Avg Loss}) \times (\text{Probability of Losing})]\} \div \text{Avg Risk Amount}$ .



Press F9 to recalculate		Monte Carlo Iterations Drawdown defining "ruin"		2000	This sequence:		wins	losses
				30%	average *	\$0.0081	(50.0092)	
<b>MONTE CARLO RESULTS FOR 2000 ITERATIONS</b>								
Sizing model: risk % of equity								
	Return	Max draw down *	Net Profit in \$ units	Max DD in \$ units				
Minimum	-14%	7.7%			currency units \$	8.773420425	12.8055	
-2 StDevs	-3%	9.5%	97	8	percent equity	8.8%	10.7%	
Mean	9%	17.9%	109	18	return / drawdown	0.8(%)	0.7(5)	
+2 StDevs	22%	33.4%	121	42				
Maximum	34%	54.1%	%ruined*	5.8%	expectancy per \$1 risked		\$0.08	
Median	9%	17.7%	mxCnsWin	8.5				
1stStDev	6%	6.6%	mxCnsLos	9.0				

In this sample I have taken 150 daily P&L observations from the worst performing period of the funds existence. I would have done it for the entire period but I am unable to as the reporting system I was using prior to the current system is unable to generate historic mark-to-market daily P&L for our derivative positions. The Freestyle Fund over the sample period has a win / loss ratio of 57% / 43%, the average win is slightly less than the average loss which is not representative of typical Freestyle performance, the total return for this period is 8.8% with a maxDrawDown of 10.7%. The important finding in this analysis is that the system over this period has a positive expectancy; meaning that for every dollar risked we can expect to make 8 cents, therefore the more days we trade our system the more profitable in dollars we are likely to be.

Another important study we do with this information is apply a monte carlo simulator to understand the risks of our system. In the attached study we ran 2000 iterations, meaning that the sequence of the 150 daily P&L returns are scrambled randomly into 2000 different sequences to see what the likelihood of financial ruin is. We define financial ruin as a drawdown of 30% of capital. According to the findings only 5.8% of the 2000 sequences achieved a drawdown of more than 30%. The very worst scenario was a 54% drawdown ending with a profit of 34%.

It is my intention to build our database of daily m-t-m P&L and continue to exhibit our findings in an effort to display the full transparency of the funds risk / return attributes.

**Michael Berman, Ph.D.**