TradeEQ Occasional Paper No 1
06 August 2009

SUCCESS AND PAYOFF

Finding and developing the trading difference that makes a difference

TradeEQ Occasional Reports cover a range of concepts that flow from the Trading Equation Reports' analysis framework. They are designed to help clients deepen their understanding of the core analysis framework and their own trading and active investment processes.

Back issues of the Occasional Reports series are available on request. We welcome suggestions on topics for future reports and can provide clients with customized and confidential reports on areas of specific interest to them.

For further information on TradeEQ analysis products and services please contact us:

Telephone:	0207 608 5759
Email:	info@tradeEQ.com
Web:	www.tradeEQ.com

INTRODUCTION

Success and Payoff are two of the key drivers of investment and trading returns and are central variables in the Trading Equation. Success Rate is probably the more commonly considered factor. Different trading styles and investment processes have different Success Rates and Payoff Ratios. This report defines these two terms and discusses their interactions and their variation across different investment and trading styles. Factors that can influence Success and Payoff levels and the subtle differences between the sources of variation in each of them are then examined.

This report's author is Peter Harnett, Founder and Director of TradeEQ Limited. Peter's background as a retail, institutional and alternative investment manager in both equity and futures markets has given him a broad and deep understanding of the drivers of investment returns. During his time at one of Europe's leading alternative investment managers he directed research on the analysis of trading performance and behaviour for in-house managers and external providers of trading recommendations. As well as holding degrees in Finance and being a Chartered Financial Analyst, Peter is a NLP Master Practitioner and is TradeEQ's lead trading coach.

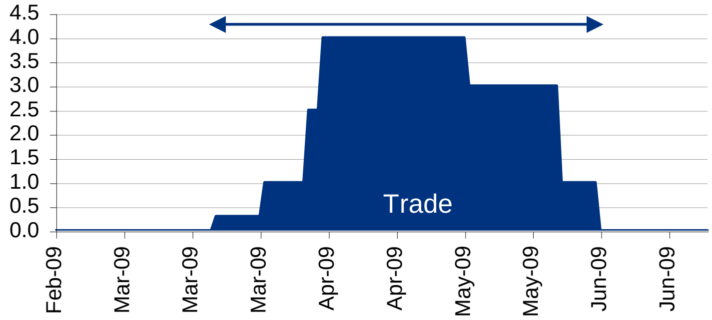
DEFINITIONS

Success Rate refers to the percentage of trades in a period that generate a positive return. Success Rates can be calculated using either absolute returns or market adjusted excess returns according to the context of the trading process.

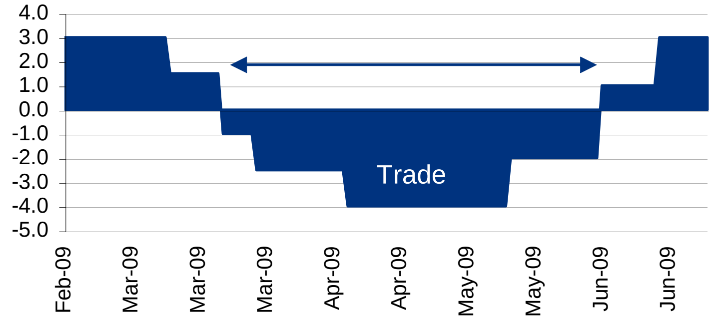
Note that TradeEQ defines "trades" as occurring between the dates when a position in a security first goes from zero to non-zero or the sign of a position changes (Trade Open) and the date when the position returns to zero or changes sign again (Trade Close). Changes to the position size between these dates are referred to as Adjustments.

Figure 1

Position Size: Percent



Position Size: Percent



Source: TradeEQ

The Success Rate can be can calculated based on security price movements only or using total P&L taking account of position size changes during the life of the trade. The first basis is referred to as Prediction Based Success. The second basis is referred to as Traded Success.

The Payoff Ratio is defined as the average gain of successful trades divided by the average loss of unsuccessful trades during a period. Again, Payoff Ratios can be calculated on both a Prediction and Traded basis.

THE EXTRACTION RATIO

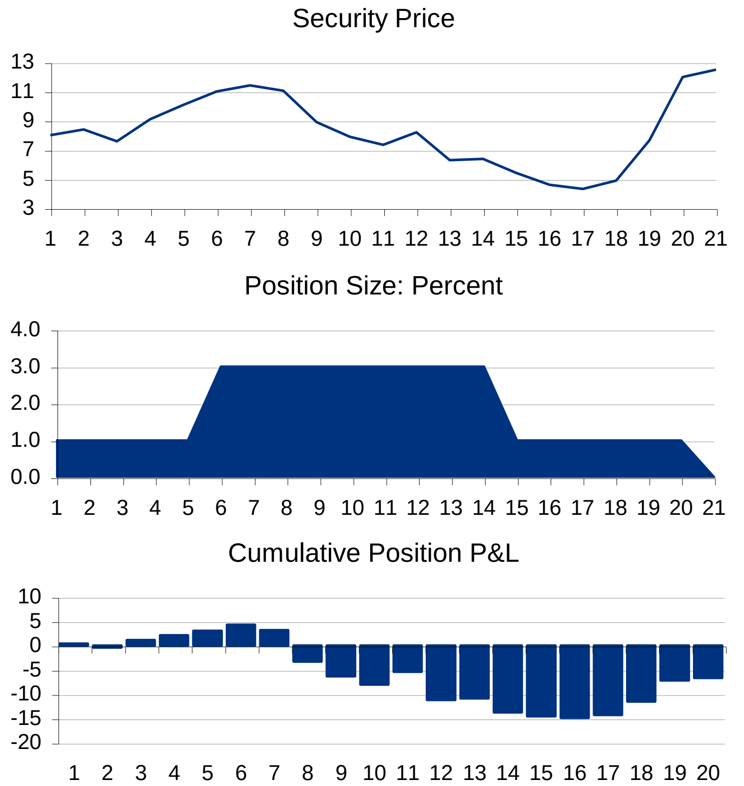
The value of calculating and comparing Success and Payoff on both Prediction and Traded bases comes from the fact that it is quite possible to correctly predict security price movements while losing money in attempting to trade them. Likewise it is possible to extract positive returns from a security where, over the life of the whole trade, the price movement goes against the direction implied by the sign of the trade (i.e. a Long trade where the security price is lower on the Close Date than the Open Date).

Note here that there is an implicit assumption that the duration of the trade was anticipated at the outset. Clearly this is unrealistic for any individual trade in so far as the holding period will be largely determined by the speed and magnitude of the security price's movement. However the average holding period of all trades can be compared with a trader's typical expected holding period (part of the Edge Process – see below) to check the validity of this assumption in the interpretation of Prediction based Success and Payoff measures.

The example below shows how it is possible to lose money trading a successful prediction.

In this example the trader predicts a 50% price increase over a 20 day timeframe. The prediction is accurate. However, due to undisciplined position size adjustments during the life of the trade cumulative P&L at the closing date is negative. By adding to the position at higher prices and then reducing at lower prices what would have been a gain (if position size had been held constant or adjusted more effectively) becomes a loss.

Figure 2: Losing Money with Correct Predictions



Source: TradeEQ

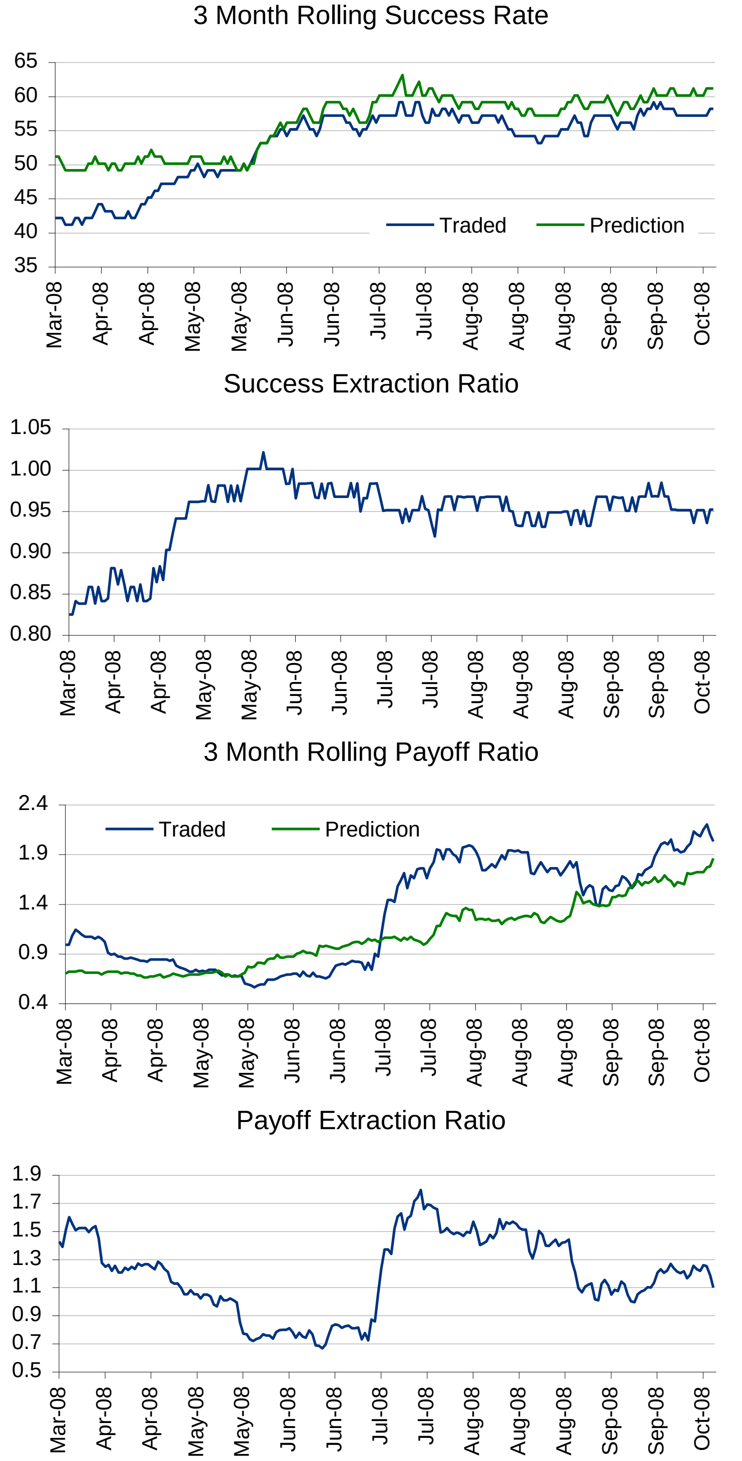
The Success and Payoff Extraction Ratios compare the Traded based measures with the Prediction measures. The example below shows how Extraction Rates can and do vary over time and can form the basis of interesting and powerful further investigations.

The examples here show that this trader's Success Rate, on a Traded basis was initially falling short of his Prediction based Success indicating that his position sizing was subtracting value from his basic directional forecasts. During this period his Extraction Ratio was around 0.9.

From May 2008 onwards his Traded Success converged towards his Prediction based Success Rate and the Extraction Ratio was near to 1.0 during the remainder of the period.

Looking at Payoff, an Extraction Ratio consistently greater than 1.0 is seen throughout the period. Position sizing was substantially increasing the average winning trade's size compared to the average losing trade's loss relative to what this ratio would have been for a constant position size holding.

Figure 3: Extraction Ratios



Source: TradeEQ, RIMES

FACTORS EFFECTING SUCCESS AND PAYOFF

There are interesting and subtle differences between the type of factors that influence Success Rates and Payoff Ratios. The influences on Payoff are more visible and are discussed first.

PAYOFF FACTORS

Different types of trading strategy have intrinsically different natural Payoff Ratios. A useful categorization of strategies from a Payoff Perspective is to classify them as either **Convergent** or **Divergent**.

Convergent strategies exploit the tendency of securities to move back towards, or converge towards some fair value or steady state price level or inter-security price relationship. Temporary deviations from fair value, caused by liquidity pressure, large position taking, noise trading and the impact of transient news flow generate trading opportunities for Convergent strategies.

Convergent strategies are dependent on the stability of the fair value price attractor and thus work best in “steady state” environments. Typical strategies representative of this group include high frequency liquidity provision (market making), statistical arbitrage, option writing programs, factor based quantitative equity programs and to an extent most valuation driven stock selection styles.

Convergent strategies are typified by relatively frequent small gains. The magnitude of the average gain is limited by the size of the deviation from fair value that is possible without the fair value itself having changed due to some major change in fundamentals.

Convergent strategies incur losses when there are major changes or shocks to the prevailing fundamentals. Major changes to economic fundamentals or systemic shocks can cause sudden shifts in fair value prices and price relationships and when these shifts happen Convergent strategies are, by definition, wrongly positioned given that they anticipate status quo. It is then that their occasional and often large losses are incurred.

It is at these periods of inflection and major change that **Divergent Strategies** make their out sized returns. Typical strategies representative of this group include longer term trend following, Macro trading and deep out of the money option buying programs.

In summary Convergent Trading strategies tend to experience frequent, small gains and occasional large losses. Divergent strategies experience frequent small losses and occasion large gains. Convergent Payoffs are thus less than 1.0 while Divergent Payoffs are greater than 1.0, often substantially so.

A second driver of Payoff Ratio derives from the trade by trade decision making of the trader himself. In particular, the management of position sizing and losing positions has a key impact. The trading adage “Run winners and cut losers quickly” is essentially Payoff maximizing advice. However it is well known that there are a number of issues involved with adhering to this rule.

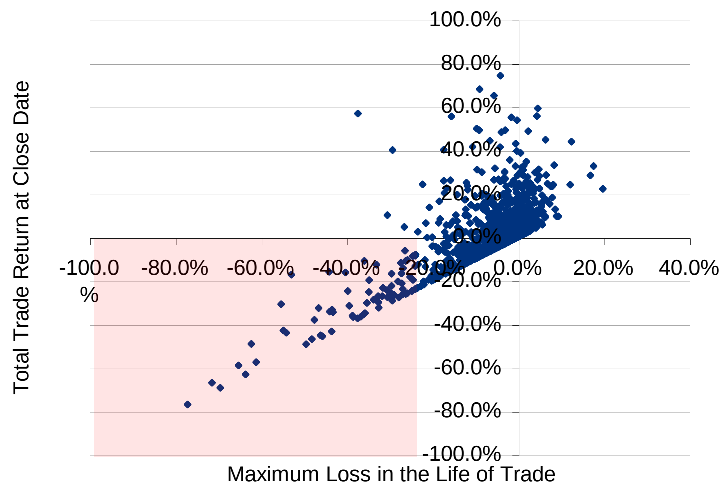
Firstly there is the well documented tendency for people to be risk seeking with losses and risk averse with gains. On the loss side a number of biases have been identified by the Behavioral Finance community such as Regret and Anchoring which prompt traders to run losses in the hope of exiting at more favorable levels.

Similarly there is a strong tendency to lock in gains early. This is driven by the psychological preference for positive “Flow” and high Success (discussed in the following section). Both of these biases tend to work against the maximization of a strategy’s potential Payoff Ratio.

There are two approaches to the issue of loss control. One involves the implementation of a formal or semi-formal loss management approach, typically described as a stop loss rule. The second approach involves the development of psychological and behavioral strategies giving the trader access to high performance states of mind and mental resources during periods when emotional stress is working against optimal decision making.

A **Stop Loss** rule attempts to manage the **Maximum Adverse Excursion** (MAE) experienced during open trades. MAE is the maximum loss incurred at any point between the open and closing dates of a trade and can again be measured on a Prediction or Traded basis. The chart below is an example of a trader’s Prediction based MAE in individual trades compared with the final return of those trades at the close date.

Figure 4: MAE and Stop Loss Strategies



Source: TradeEQ, RIMES

Proposed Stop Loss strategies are often based on the observation that when losses beyond a certain threshold are incurred trades never go on to close in profit (about -20% in the example above).

However, this observation is misleading because what matters for the impact of a Stop Loss strategy is the distribution of returns for securities that pass the loss threshold from that point in time onwards. If the mean of this distribution is zero or positive then a Stop Loss will either do nothing (remember that Stop Loss exits are trading cost neutral assuming constant liquidity: the trade was closed anyway) or have a negative impact.

The conclusion is that there is no one size fits all answer because the post Stop level return distribution will vary according to a trader's style and Edge Process. For example, a catalyst driven, deep value strategy may well accept very inefficient entry timing (i.e. trade opening prices that are substantially worse than the best price that could have subsequently been obtained) because the catalyst's timing is uncertain and the resultant price response is likely to be a large gap move (such as a takeover announcement). The application of a Stop might well remove all positive return in such an extreme example.

The potential value of any Stop Loss strategy will depend on its precise method (Initial stops, Trailing stops, fixed or dynamic values etc.) and its interaction with the trader's style and process. This is something TradeEQ can establish through simulated backward application of Stop rules to determine the expected impact on performance.

To learn more about the application of NLP and NLP based coaching to trading and investment decision making please contact us.

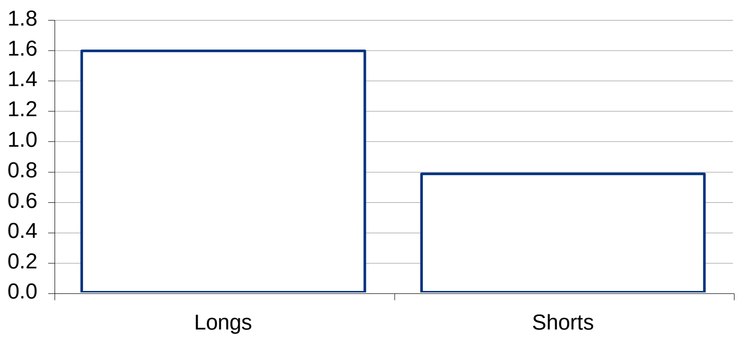
As mentioned, an alternative or additional approach to the management of losses is through the development of behavioral strategies using techniques such as Neuro Linguistic Programming. This approach involves activities including pre-trade mental rehearsal of exit scenarios and anchoring high performance mental states that can be accessed when needed during live trading.

Sizing and Volatility

A number of other factors can impact achieved Payoff Ratios. Sizing is one of these and one subtle impact of sizing is seen in the difference between Long and Short trade Payoff Ratios.

The trader used in the examples in this paper had a Traded Payoff Ratio of 1.29. The chart below shows Traded Payoff for his Long and Short positions separately.

Figure 5: Long and Short Payoff Ratios



Source: TradeEQ, RIMES

One of the key differences between Long and Short positions (including benchmark relative over and underweights) is that losing long positions get smaller over time while losing short positions get progressively larger. If this asymmetry is not fully managed then even with an otherwise excellent trader the negative impact on average Payoff Ratios can be significant.

If a trader experiences consistently different Success Rates in securities with different volatilities or during periods of different overall volatility this can also impact his Payoff Ratio.

For example, if a trader is consistently more successful in lower volatility securities then, for a fixed position size, his gains are going to be smaller than his losses (which occur more often in higher volatility securities).

Likewise if a trader’s strategy tends to be more successful in periods of low overall volatility the gains he makes in these periods will tend to be smaller than the losses experienced during periods of higher volatility.

This highlights the positive impact on Payoff Ratios of adjusting position size to take account of volatility differences between securities and through time. Managed in this way position size becomes a function of Conviction and Volatility and will vary whenever one or other of these factors changes. Scaling position size dynamically by volatility clearly incurs additional trading costs. Therefore the optimal threshold at which to make adjustments needs to be estimated through simulation. At TradeEQ we have seen some quite dramatic risk adjusted performance improvements through nothing more than the application of rigorous volatility based position sizing.

SUCCESS FACTORS

The factors that drive Success Rates and variations in Success are somewhat less visible than Payoff drivers. The starting point for Success Rate is the trader’s **Edge Process**.

A trader’s Edge Process is his trading or investment decision making process for security selection and timing decisions. When a certain set of conditions are present the trader judges that a position in a security has a positive expected return (in either absolute or relatives terms) and he has a tradable edge over the market. Flowing from the Edge Process will be a further set of expectations relating to issues such as expected upside, holding period, downside risk and catalyst events.

Edge Processes can vary along a number of dimensions, primarily their degree of complexity (the nature and number of conditions that must be present) and the extent to which the process is **Explicit** or **Tacit** (ranging for example from a quantitative computer trading program to an individual who operates purely on “gut feeling”).

With fully Explicit Edge Processes a normal Success Sate can be estimated through back testing and simulation. This will also reveal the magnitude of normal variation in the Success Rate as market and economic conditions vary. Such an exercise is extremely valuable in (1) formally testing beliefs and intuitions and (2) knowing what is a normal and transient deterioration in Success and what might indicate a more serious and permanent change.

With more Tacit processes it may still be possible to do a degree of formal testing. NLP has a set of very effective tools for eliciting mental strategies and it may be possible to model enough of a Tacit process to be able to identify observable proxies for the decision making triggers and use these in back testing and simulation.

To learn more about Edge Process elicitation, trade Congruence measurement and performance analysis based on Congruence please contact TradeEQ.

Once an Edge Process is identified it is possible to measure the extent to which individual trades are **Congruent** with the Edge Process. Congruence is the degree to which an individual position possesses all of the characteristics described in the Edge Process. For example a deep value, mid and small cap investor with a typical expected holding period of 12 months is highly incongruent when they trade a large cap growth stock for a one day bet on an earnings announcement.

Once source of incongruence and bias in Edge Process development is the tendency for people to favor **Positive Flow**. Positive flow exists where favorable feedback is present most of the time. Consider the following two strategies:

Strategy One generates gains of +1 four days a week and a loss of -5 one day a week.

Strategy Two generates losses of -1 four days a week and a gain of +5 one day a week.

The preference for positive flow explains why many people would gain greater psychic benefit from strategy 1 even though strategy 2 is the clear winner and 1 is a guaranteed loser.

Where Congruence can and has been formally recorded for individual trades it then becomes possible to examine the differential expectancy of more and less congruent trades and decompose these differences down into variables such as Success and Payoff. Expectancy may be either a positive or negative function of congruence and either finding represents the starting point for another potentially valuable investigation.

SUMMARY

Both Success Rate and Payoff Ratios are key drivers of expectancy. Neither variable dominates the other and there are numerous subtleties and interactions between the two. TradeEQ's Trading Equation reports examine these measures in a variety of ways and frequently identify numerous interesting and important differences that can form the basis for performance improvement.