

The effective win rate of trend-following strategies

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Abstract

I provide a method for estimating the effective win rate of trend-following strategies so that fair comparisons can be made with higher-frequency methods. As trend-following strategies make money from outlier trades with long holding periods, changing the average holding period based on hypothetical rebalancing results in a higher effective win rate than what is measured by the fraction of winning trades.

1. Introduction

Trend-following strategies, also referred to as divergent strategies, tend to have a lower win rate but higher payoff ratio, as compared to higher frequency trading strategies, including those that are referred to as convergent, which usually have a high win rate but a lower payoff ratio.

The win rate is defined as the percentage of winning trades. Typical win rates of a trend-following strategy are in the range of 20% to 40%, and usually lower than 50%. The reason that trend-following strategies are highly profitable is that they realize a high payoff ratio, which is the ratio of the average winning trade to the average losing trade. This ratio is usually much larger than 1, and values can vary between 2 and 10, or even higher.

In the case of convergent strategies, the win rate is usually higher than 50%, and in some cases above 70%, but the payoff ratio is lower, and usually less than 1.

The profitability of a trading strategy is a function of the win rate and payoff ratio. If we define a profitable strategy as one that has a profit factor greater than 1, or a ratio of the sum of winning trades divided by the absolute value of the sum of losing trades greater than 1, then the following holds:

$$w = \frac{PF}{PF + R} \quad (1)$$

where PF is the profit factor, R is the payoff ratio, and w is the win fraction. This relationship is universal and holds for all trading strategies regardless of frequency or timeframe [1].

Note that the low threshold for profitability is when the profit factor is set to 1, and in that case, the minimum payoff ratio is calculated from equation 1 as follows:

$$R > \frac{1 - w}{w} \quad (2)$$

2. Win Rate as a Function of Holding Periods

We define T_W and T_L as the average holding periods of winning and losing trades. Under the reasonable assumption of a random walk, the following hold [2]:

$$G \sim \sigma \sqrt{T_W} \quad (3)$$

$$L \sim \sigma \sqrt{T_L} \quad (4)$$

where G and L are the average win and average loss, respectively.

Combining equations 3 and 4 yields:

$$\frac{G}{L} = R \approx \sqrt{\frac{T_W}{T_L}} \quad (5)$$

and after combining equation 1, after setting PF=1, and equation 5, we obtain:

$$w \approx \frac{1}{1 + \sqrt{\frac{T_W}{T_L}}} \quad (6)$$

Equation 6 offers an approximation for the win rate w, as a function of the holding times for winning and losing trades, T_W and T_L , respectively.

2. An Alternative Way of Measuring Trend-following Win Rates

Since trend-following strategies "cut losses short and let winners run," the holding times for winners are much longer than those of the losers and also larger than the comparable measures of higher frequency strategies.

For trades that last long, we can assume closing and reopening them to transform them into a series of winners. We can assume that the win rate will be "adjusted" once a day, once a week, or once a month, depending on how long the trade is held. For example, if the average holding period for winners T_W is 252 days, or one trading year, we can imagine 12 trades with a holding period of 21 days each. Equation 6 is used to figure out the strategy's win rate, and we assume that losing trades will be held for 32 days on average. The result is 0.263, or 26.3%.

We can calculate the effective win rate for monthly adjustments by dividing T_W by 12. After using equation 6, we obtain 0.552, or 55.2%, for the effective win rate.

Since the effective win rate depends on the adjustment period, the upper bound for the daily timeframe is when the frequency is daily, and the result is 0.85, or 85% for this particular example.

For most trend-following trading strategies, the monthly adjustment is reasonable, but the choice may depend on the strategy they are compared to or used in conjunction with in a portfolio. The general formula is:

$$w_e \approx \frac{1}{1 + \sqrt{\frac{T_W}{nT_L}}} \quad (7)$$

where w_e the effective win rate, and n is the adjustment frequency.

3. Conclusion

It may make no sense to compare the fraction of winners of a trend-following strategy to a short-term one. Low win rates give the impression that trend-following strategies are not as successful as those short-term ones with high win rates, but this is an artifact of long holding periods. By adjusting the holding period of winners, an effective win rate for trend-following strategies can be calculated, and the equation for that purpose was developed. The effective win rate offers a more realistic measure of the success rate of trend-following strategies as opposed to the traditional measure based on the fraction of winners.

References

1. Harris, Michael, Profitability and Systematic Trading: A Quantitative Approach to Profitability, Risk, and Money Management, 2008, Wiley & Sons., Link to free download: <https://www.priceactionlab.com/Blog/free-trading-book/>
2. Marc Potters, Jean-Philippe Bouchaud, "Trend followers lose more often than they gain", 2008, <https://arxiv.org/abs/physics/0508104>