Below are proven horse racing systems that work for nearly any track. Laying is a type of wager in which you predict the best horse on the track will not win or place anywhere except the first. Think of this as the anti-favorite wager, where you predict that the strongest and fastest horse on the track will lose. You are likely asking how this wager makes sense since the likelihood of a favorite winning the race is significantly higher and betting against that outcome is incredibly risky. The critical factor for this betting system to work is to find a "weak favorite." Remember that bookies are responsible for pricing each horse according to their insight. Occasionally, their calculations or analysis of a racing participant is wrong, leading to an incorrect price. Matched betting involves a back and lay bet on one of the horses, which means you are betting on the horse to win and lose in the same race. The idea here is guaranteeing a profit regardless of the outcome. Since the only stakes, your pay is the one you made from the lay bet, you have guaranteed a profit no matter the outcome with zero risks. To use this horse race betting system, you need to have an account in an online gambling platform where you will place your back wager. Finding a platform that offers a free bet or other bonuses to new bettors is essential. You also need to sign up with a betting exchange where you will make a lay wager with a price that exceeds the stake of both bets. One significant risk when using this betting system is the chance for your online gambling account to get suspended. Operators are looking for anyone doing matched betting and will suspend a bettor's account should any evidence of using this betting system appear. Dutching is a betting system where you back more than one horse for one track. This idea stems from covering outcomes that have an excellent chance of occurring. A good example is when there are 2-3 and 2-1 favorites on the track that is likely to win. Backing both results in a profitable payout with reduced risks since the two are seen to outperform other horses. Another kind of Dutch betting is to put a significant amount of stake on the favorite and a small amount on the horse with the lowest price. This method ensures you can profit from the track by backing the participant that will win while having a stake in the highest-paying wager with incredible risk. Named after a US soldier who took home a fortune after winning all of his wagers, the Yankee strategy involves 11 wagers for four different horses with the same value. These 11 wagers consist of six doubles, four trebles, and a four-fold wager. These wagers are similar to sports betting parlays, where you create a bet from multiple selections. Doubles have a reasonable chance to win that pays out significantly more than single bets, while four-folds are the riskiest since all of its selections must win, but it has the best payout possible. The idea of a Yankee bet is to play the odds of accumulator bets with a significant payout. While you are likely to lose most of your wagers, your winning can exceed the stakes made from the 11 accumulators. The Pareto Principle, or 80/20, is a famous principle you can use on horse race betting. This system is similar to Dutch betting, where you back two horses to win the track. About 80% of your stake will go towards the favorite or the horse that will get 1st place. For the other 20%, this will back the underdog or participant with a high payout if it wins. The 80/20 betting system works well when there is only one favored participant on the track since this will increase your chances of getting a decent payout on the 80% stake. You do not have to put the 20% on the least performing horse. This stake can be placed on high-paying exotic bets like exacta or trifecta if you have a good grasp on which participant will place 2nd and 3rd. An exacta bet is an exotic horse betting wager where you predict the horses that will place 1st and 2nd in the right order. Due to the risk of the wager, exacta tends to have an incredibly high payout. The exacta strategy aims to take advantage of the payout while decreasing the risk by making several exacta bets. You must determine three horses with the best possible odds of finishing first and second. Once you have horses A, B, & C, the exacta bet you will make looks like this: Exacta BetsStakeA-B$5A-C$5B-A$5B-C$5C-A$5C-B$5Exacta Betting Strategy The total stake for all six exacta wagers is $30, and either one of them should have a payout that covers your stake while providing a reasonable profit. If B-A were to win with a payout of $50, you would profit $20 out of the system. Lucky bettors using this system may hit an exacta bet that has triple the return of their stake. Back and lay bets are also involved with the scalping system, similar to matched betting. The scalping method uses cash to make back bets instead of free credits. Because actual cash is used for both stakes, the returns for this betting system are small. You also need to ensure the payout covers the total stake used. On the other hand, the scalping system can be used multiple times since you do not need to rely on free bets. You can earn a steady profit from a hundred monthly tracks with discipline and patience. Bet sizing formula for long-term growth Example of the optimal Kelly betting fraction, versus expected return of other fractional bets. In probability theory, the Kelly criterion (or Kelly strategy or Kelly bet) is a formula for sizing a sequence of bets by maximizing the long-term expected value of the logarithm of wealth, which is equivalent to maximizing the long-term expected geometric growth rate. John Larry Kelly Jr., a researcher at Bell Labs, described the criterion in 1956.[1] The practical use of the formula has been demonstrated for gambling,[2][3] and the same idea was used to explain diversification in investment management.[4] In the 2000s, Kelly-style analysis became a part of mainstream investment theory[5] and the claim has been made that well-known successful investors including Warren Buffett[6] and Bill Gross[7] use Kelly methods.[8] Also see intertemporal portfolio choice. It is also the standard replacement of statistical power in anytime-valid statistical tests and confidence intervals, based on e-values and e-processes. In a system where the return on an investment or a bet is binary, so an interested party either wins or loses a fixed percentage of their bet, the expected growth rate coefficient yields a very specific solution for an optimal betting percentage. Where losing the bet involves losing the entire wager, the Kelly bet is: f ∗ = p − q b = p − 1 − p b {\displaystyle f^{*}=p-{\frac {q}{b}}=p-{\frac {1-p}{b}}} where: f ∗ {\displaystyle f^{*}} is the fraction of the current bankroll to wager. p {\displaystyle p} is the probability of a win. q = 1 − p {\displaystyle q=1-p} is the probability of a loss. b {\displaystyle b} is the proportion of the bet gained with a win. E.g., if betting $10 on a 2-to-1 odds bet (upon win you are returned $30, winning you $20), then b = $ 20 / $ 10 = 2.0 {\displaystyle b=\$20/\$10=2.0} .The figure plots the amount gained with a win on the x-axis against the fraction of portfolio to bet on the y-axis. This figure assumes p=0.5 (that the probability of both a win and a loss is 50%). If the amount gained with a win is 1, then the Kelly betting amount is $0, which makes sense in a fair bet with no expected gain. As an example, if a gamble has a 60% chance of winning (p = 0.6 {\displaystyle p=0.6} , q = 0.4 {\displaystyle q=0.4}), and the gambler receives 1-to-1 odds on a winning bet (b = 1 {\displaystyle b=1}), then to maximize the long-run growth rate of the bankroll, the gambler should bet 20% of the bankroll at each opportunity (f ∗ = 0.6 − 0.4 1 = 0.2 {\textstyle f^{*}=0.6-{\frac {0.4}{1}}=0.2}). The figure plots the amount gained with a win on the x-axis against the fraction of portfolio to bet on the y-axis. This figure assumes p=0.6 (that the probability of a win is 60%). 3D figure representing the optimal Kelly bet size (vertical axis) as a function of win probability and amount gained with win. If the gambler has zero edge (i.e., if b = q / p {\displaystyle b=q/p}), then the criterion recommends the gambler bet nothing. If the edge is negative (b < q / p {\displaystyle b 0 {\displaystyle f^{*}>0}). It is even possible that the win-loss probability ratio is unfavorable W L P < 1 {\displaystyle WLP 1 {\displaystyle WLP*WLR>1} . The Kelly formula can easily result in a fraction higher than 1, such as with losing size l ≪ 1 {\displaystyle l\ll 1} (see the above expression with factors of W L R {\displaystyle WLR} and W L P {\displaystyle WLP}). This happens somewhat counterintuitively, because the Kelly fraction formula compensates for a small losing size with a larger bet. However, in most real situations, there is high uncertainty about all parameters entering the Kelly formula. In the case of a Kelly fraction higher than 1, it is theoretically advantageous to use leverage to purchase additional securities on margin. In a study, each participant was given $25 and asked to place even-money bets on a coin that would land heads 60% of the time. Participants had 30 minutes to play, so could place about 300 bets, and the prizes were capped at $250. But the behavior of the test subjects was far from optimal: Remarkably, 28% of the participants went bust, and the average payout was just $91. Only 21% of the participants reached the maximum. 18 of the 61 participants bet everything on one toss, while two-thirds gambled on tails at some stage in the experiment.[10][11] Using the Kelly criterion and based on the odds in the experiment (ignoring the cap of $250 and the finite duration of the test), the right approach would be to bet 20% of one's bankroll on each toss of the coin, which works out to a 2.034% average gain each round. This is a geometric mean, not the arithmetic rate of 4% (r = 0.2 x (0.6 - 0.4) = 0.04). The theoretical expected wealth after 300 rounds works out to $10,505 (= 25 · (1.02034) 300 {\displaystyle =25\cdot (1.02034)^{300}}) if it were not capped. In this particular game, because of the cap, a strategy of betting only 12% of the pot on each toss would have even better results (a 95% probability of reaching the cap and an average payout of $242.03). Heuristic proofs of the Kelly criterion are straightforward.[12] The Kelly criterion maximizes the expected value of the logarithm of wealth (the expectation value of a function is given by the sum, over all possible outcomes, of the probability of each particular outcome multiplied by the value of the function in the event of that outcome). We start with 1 unit of wealth and bet a fraction f {\displaystyle f} of that wealth on an outcome that occurs with probability p {\displaystyle p} and offers odds of b {\displaystyle b} . The probability of winning is p {\displaystyle p} , and in that case the resulting wealth is equal to 1 + f b {\displaystyle 1+fb} . The probability of losing is q = 1 − p {\displaystyle q=1-p} and the odds of a negative outcome is a {\displaystyle a} . In that case the resulting wealth is equal to 1 − f a {\displaystyle 1-fa} . Therefore, the geometric growth rate r {\displaystyle r} is: r = (1 + f b) p · (1 − f a) q {\displaystyle r=(1+fb)^{p}\cdot (1-fa)^{q}} We want to find the maximum r of this curve (as a function of f), which involves finding the derivative of the equation. This is more easily accomplished by taking the logarithm of each side first; because the logarithm is monotonic, it does not change the locations of function extrema. The resulting equation is: E = log ⁡ (r) = p log ⁡ (1 + f b) + q log ⁡ (1 − f a) {\displaystyle E=\log(r)=p\log(1+fb)+q\log(1-fa)} with E {\displaystyle E} denoting logarithmic wealth growth. To find the value of f {\displaystyle f} for which the growth rate is maximized, denoted as f ∗ {\displaystyle f^{*}} , we differentiate the above expression and set this equal to zero. This gives: d E d f | f = f ∗ = p b 1 + f ∗ b + − q a 1 − f ∗ a = 0 {\displaystyle \left.{\frac {dE}{df}}\right|_{f=f^{*}}={\frac {pb}{1+f^{*}b}}+{\frac {-qa}{1-f^{*}a}}=0} Rearranging this equation to solve for the value of f ∗ {\displaystyle f^{*}} gives the Kelly criterion: f ∗ = p a − q b {\displaystyle f^{*}={\frac {p}{a}}-{\frac {q}{b}}} Notice that this expression reduces to the simple gambling formula when a = 1 = 100 % {\displaystyle a=1=100\%} , when a loss results in full loss of the wager. If the return rates on an investment or a bet are continuous in nature the optimal growth rate coefficient must take all possible events into account. In mathematical finance, if security weights maximize the expected geometric growth rate (which is equivalent to maximizing log wealth), then a portfolio is growth optimal. The Kelly Criterion shows that for a given volatile security this is satisfied when f ∗ = μ − r σ 2 {\displaystyle f^{*}={\frac {\mu -r}{\sigma ^{2}}}} where f ∗ {\displaystyle f^{*}} is the fraction of available capital invested that maximizes the expected geometric growth rate, μ {\displaystyle \mu } is the expected growth rate coefficient, σ 2 {\displaystyle \sigma ^{2}} is the variance of the growth rate coefficient and r {\displaystyle r} is the risk-free rate of return. Note that a symmetric probability density function was assumed here. Computations of growth optimal portfolios can suffer tremendous garbage in, garbage out problems. For example, the cases below take as given the expected return and covariance structure of assets, but these parameters are at best estimates or models that have significant uncertainty. If portfolio weights are largely a function of estimation errors, then Ex-post performance of a growth-optimal portfolio may differ fantastically from the ex-ante prediction. Parameter uncertainty and estimation errors are a large topic in portfolio theory. An approach to counteract the unknown risk is to invest less than the Kelly criterion. Rough estimates are still useful. If we take excess return 4% and volatility 16%, then yearly Sharpe ratio and Kelly ratio are calculated to be 25% and 150%. Daily Sharpe ratio and Kelly ratio are 1.7% and 150%. Sharpe ratio implies daily win probability of p=(50% + 1.7%/4), where we assumed that probability bandwidth is 4 σ = 4 % {\displaystyle 4\sigma =4\%} . Now we can apply discrete Kelly formula for f ∗ {\displaystyle f^{*}} above with p = 50.425 % , a = b = 1 % {\displaystyle p=50.425\%,a=b=1\%} , and we get another rough estimate for Kelly fraction f ∗ = 85 % {\displaystyle f^{*}=85\%} . Both of these estimates of Kelly fraction appear quite reasonable, yet a prudent approach suggest a further multiplication of Kelly ratio by 50% (i.e. half-Kelly). A detailed paper by Edward O. Thorp and a co-author estimates Kelly fraction to be 117% for the American stock market SP500 index. [13] Significant downside tail-risk for equity markets is another reason[14] to reduce Kelly fraction from naive estimate (for instance, to reduce to half-Kelly). A rigorous and general proof can be found in Kelly's original paper[1] or in some of the other references listed below. Some corrections have been published.[15] We give the following non-rigorous argument for the case with b = 1 {\displaystyle b=1} (a 50:50 "even money" bet) to show the general idea and provide some insights.[1] When b = 1 {\displaystyle b=1} , a Kelly bettor bets 2 p − 1 {\displaystyle 2p-1} times their initial wealth W {\displaystyle W} , as shown above. If they win, they have 2 p W {\displaystyle 2pW} after one bet. If they lose, they have 2 (1 − p) W {\displaystyle 2(1-p)W} . Suppose they make N {\displaystyle N} bets like this, and win K {\displaystyle K} times out of this series of N {\displaystyle N} bets. The resulting wealth will be: 2 N p K (1 − p) N − K W . {\displaystyle 2^{N}p^{K}(1-p)^{N-K}W\!.} The ordering of the wins and losses does not affect the resulting wealth. Suppose another bettor bets a different amount, (2 p − 1 + Δ) W {\displaystyle (2p-1+\Delta)W} for some value of Δ {\displaystyle \Delta } (where Δ {\displaystyle \Delta } may be positive or negative). They will have (2 p + Δ) W {\displaystyle (2p+\Delta)W} after a win and [2 (1 − p) − Δ] W {\displaystyle [2(1-p)-\Delta]W} after a loss. After the same series of wins and losses as the Kelly bettor, they will have: (2 p + Δ) K [2 (1 − p) − Δ] N − K W {\displaystyle (2p+\Delta)^{K}[2(1-p)-\Delta]^{N-K}W} Take the derivative of this with respect to Δ {\displaystyle \Delta } and get: K (2 p + Δ) K − 1 [2 (1 − p) − Δ] N − K W − (N − K) (2 p + Δ) K [2 (1 − p) − Δ] N − K − 1 W {\displaystyle K(2p+\Delta)^{K-1}[2(1-p)-\Delta]^{N-K}W-(N-K)(2p+\Delta)^{K}[2(1-p)-\Delta]^{N-K-1}W} The function is maximized when this derivative is equal to zero, which occurs at: K [2 (1 − p) − Δ] = (N − K) (2 p + Δ) {\displaystyle K[2(1-p)-\Delta]=(N-K)(2p+\Delta)} which implies that Δ = 2 (K N − p) {\displaystyle \Delta =2\left({\frac {K}{N}}-p\right)} but the proportion of winning bets will eventually converge to: lim N → + ∞ K N = p {\displaystyle \lim _{N\to +\infty }{\frac {K}{N}}=p} according to the weak law of large numbers. So in the long run, final wealth is maximized by setting Δ {\displaystyle \Delta } to zero, which means following the Kelly strategy. This illustrates that Kelly has both a deterministic and a stochastic component. If one knows K and N and wishes to pick a constant fraction of wealth to bet each time (otherwise one could cheat and, for example, bet zero after the Kth win knowing that the rest of the bets will lose), one will end up with the most money if one bets: (2 K N − 1) W {\displaystyle \left(2{\frac {K}{N}}-1\right)W} each time. This is true whether N {\displaystyle N} is small or large. The "long run" part of Kelly is necessary because K is not known in advance, just that as N {\displaystyle N} gets large, K {\displaystyle K} will approach p N {\displaystyle pN} . Someone who bets more than Kelly can do better if K > p N {\displaystyle K>pN} for a stretch; someone who bets less than Kelly can do better if K < p N {\displaystyle K R (S) {\displaystyle er_{k}={\frac {D}{\beta _{k}}}p_{k}>R(S)} then insert k {\displaystyle k} -th outcome into the set: S = S ∪ { k } {\displaystyle S=S\cup \{k\}} , recalculate R (S) {\displaystyle R(S)} according to the formula: R (S) = D ∑ k ∉ S p k D − ∑ k ∈ S β k {\displaystyle R(S)={\frac {D\sum _{kotin S}p_{k}}{D-\sum _{k\in S}\beta _{k}}}} and then set k = k + 1 {\displaystyle k=k+1} , Otherwise, set S o = S {\displaystyle S^{o}=S} and stop the repetition. If the optimal set S o {\displaystyle S^{o}} is empty then do not bet at all. If the set S o {\displaystyle S^{o}} of optimal outcomes is not empty, then the optimal fraction f k o {\displaystyle f_{k}^{o}} to bet on k {\displaystyle k} -th outcome may be calculated from this formula: f i = p i − β i ∑ k ∉ S p k (D − ∑ k ∈ S β k) . {\displaystyle f_{i}=p_{i}-\beta _{i}{\frac {\sum _{kotin S}p_{k}}{\left(D-\sum _{k\in S}\beta _{k}\right)}}.} One may prove[16] that R (S o) = 1 − ∑ i ∈ S o f i o {\displaystyle R(S^{o})=1-\sum _{i\in S^{o}}{f_{i}^{o}}} where the right hand-side is the reserve rate[clarification needed]. Therefore, the requirement e r k = D β k p k > R (S) {\displaystyle er_{k}={\frac {D}{\beta _{k}}}p_{k}>R(S)} may be interpreted[16] as follows: k {\displaystyle k} -th outcome is included in the set S o {\displaystyle S^{o}} of optimal outcomes if and only if its expected revenue rate is greater than the reserve rate. The formula for the optimal fraction f k o {\displaystyle f_{k}^{o}} may be interpreted as the excess of the expected revenue rate of k {\displaystyle k} -th horse over the reserve rate divided by the revenue after deduction of the track take when k {\displaystyle k} -th horse wins or as the excess of the probability of k {\displaystyle k} -th horse winning over the reserve rate divided by revenue after deduction of the track take when k {\displaystyle k} -th horse wins. The binary growth exponent is G o = ∑ i ∈ S p i log 2 ⁡ (e r i) + (1 − ∑ i ∈ S p i) log 2 ⁡ (R (S o)) , {\displaystyle G^{o}=\sum _{i\in S}{p_{i}\log _{2}(er_{i})}+\left(1-\sum _{i\in S}{p_{i}}\right)\log _{2}(R(S^{o})),} and the doubling time is T d = 1 G o . {\displaystyle T_{d}={\frac {1}{G^{o}}}.} This method of selection of optimal bets may be applied also when probabilities p k {\displaystyle p_{k}} are known only for several most promising outcomes, while the remaining outcomes have no chance to win. In this case it must be that ∑ i p i < 1 , {\displaystyle \sum _{i}{p_{i}}

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