

Risk of ruin

RISK OF RUIN

Risk of ruin is the probability that a method ever loses a chosen share of its account, computed from four numbers: win rate, payoff ratio, risk per trade and the drawdown that counts as ruin. Even a genuinely profitable method carries a real ruin probability when the risk fraction is large, because the fraction sets how few consecutive losses reach the threshold - which is the arithmetic reason small fixed fractions exist.

A method can have a real edge and still destroy the account running it. That sentence sounds like a paradox and is a calculation, and this lesson runs it.

What four numbers set the probability?

Your win rate and payoff ratio describe the method - together they make the edge, the average outcome per unit risked. Your risk fraction sets the unit's size. The ruin threshold defines what counts as dead: total loss, or more usefully the drawdown at which lesson 6's curve says the climb has become unrealistic. Fifty percent is a common working definition, and the calculator takes whichever you give it.

From those four, the mathematics of a random walk with drift produces one number: the probability that the account ever touches the threshold. Not this month, not per trade - ever, if the method's statistics hold.

Why can a winning method still ruin an account?

Because sequences do not respect averages. A method that wins 45% of trades will, often enough, lose ten or twelve in a row - and whether the account survives such a run is entirely a question of how large each unit was. The risk fraction converts the same sequence into a shallow drawdown or a breach of the threshold. Divide the ruin threshold by the fraction: that quotient, the number of consecutive-loss-equivalents the account can absorb, is the buffer the probability is computed over, and it moves in your control.

The edge matters too, and asymmetrically: at zero or negative edge, ruin is certain with enough trades, at any fraction. The calculation cannot rescue a method that loses; it prices the survival of one that wins.

What is the probability good for?

Judging a fraction before the market judges it for you. The worked example prices one configuration; move the risk fraction down and watch the probability collapse - the buffer grows, and the probability falls with a power of it. That sensitivity, far stronger than the sensitivity to win rate, is the quantitative case behind every small-fixed-fraction rule you have ever seen stated without justification.

Worked example - figures in USD

A method that wins 45% of trades at a 1.5 payoff, risking 2% per trade, on a \$12,000 account - ruin defined as losing half.

1. The method: a 45% win rate at a 1.5 payoff gives an edge of 0.125 per unit risked - positive, a genuinely winning method.
2. The exposure: risking 2% per trade against a ruin threshold of 50% gives 25 units of buffer between the account and the definition of dead.
3. The verdict: the probability this configuration ever breaches the threshold is 1.6%. The method's edge did not remove the risk; the fraction sized it.

What this means for you

Put your honest numbers into the calculator - your measured win rate and payoff once module 5 has you measuring, your lesson 1 fraction, and the drawdown you meant it when you called intolerable. The output is the probability you are implicitly accepting every time you trade the configuration. If the number surprises you, the fraction is the input to move: it is the one the probability responds to most, and the one entirely in your hands.

Try it yourself with the risk-of-ruin calculator: <https://ticksprout.com/tools/risk-of-ruin>

Check your understanding

1. Can a method with a genuine positive edge still carry a substantial risk of ruin?

- a. No - a positive edge means ruin probability is zero
- b. Yes - a large risk fraction leaves so few units of buffer that an ordinary losing sequence can breach the threshold
- c. Only if the win rate is below 50%

Answer: b. Edge sets the drift; the fraction sets how many consecutive losses the account can absorb. With a thin buffer, sequences a winning method routinely produces can still reach the threshold. Win rates below 50% are compatible with strong edges at high payoffs - the pair matters, not either alone.

2. Which input does the ruin probability respond to most strongly?

- a. The risk fraction - the buffer it sets enters the probability as an exponent
- b. The payoff ratio
- c. The account's starting balance

Answer: a. Halving the fraction doubles the buffer, and the probability falls with a power of the buffer - a far stronger lever than proportionate changes to win rate or payoff. The starting balance does not enter at all: everything is in fractions.

3. What happens to ruin probability when the edge is zero or negative?

- a. It equals the risk fraction
- b. Ruin is certain given enough trades, at any fraction
- c. It cannot be computed

Answer: b. Without positive drift, the walk eventually visits every depth - sizing changes the schedule, never the destination. The computation handles this case fine; its answer is 100%.