

Relative Frequency Probability/Empirical Method

by Sophia



WHAT'S COVERED

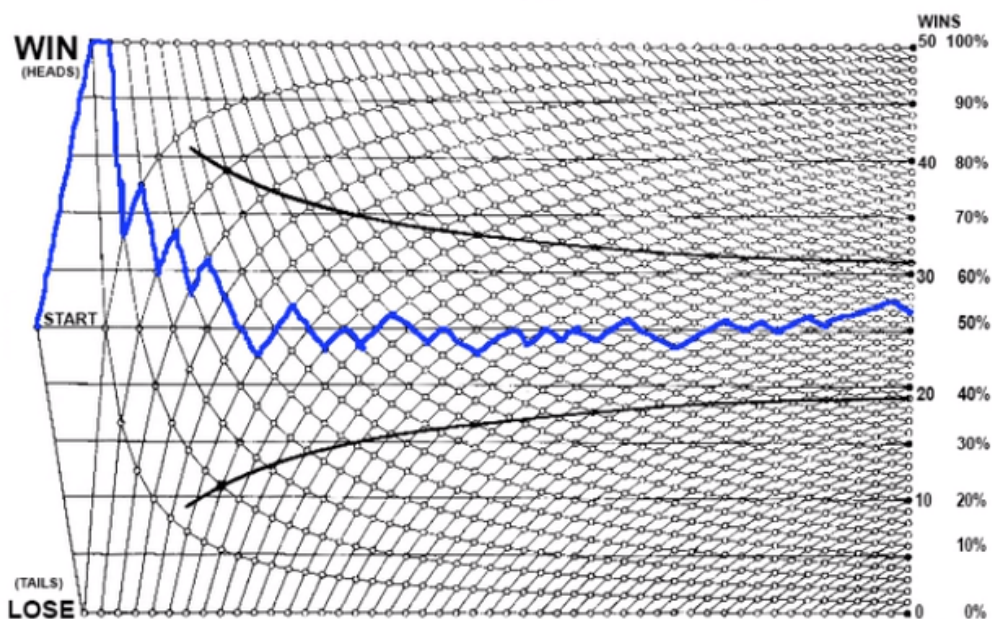
This tutorial will discuss the relative frequency probability method. Our discussion breaks down as follows:

1. Relative Frequency Probability Method
2. Subjective Approach

1. Relative Frequency Probability Method

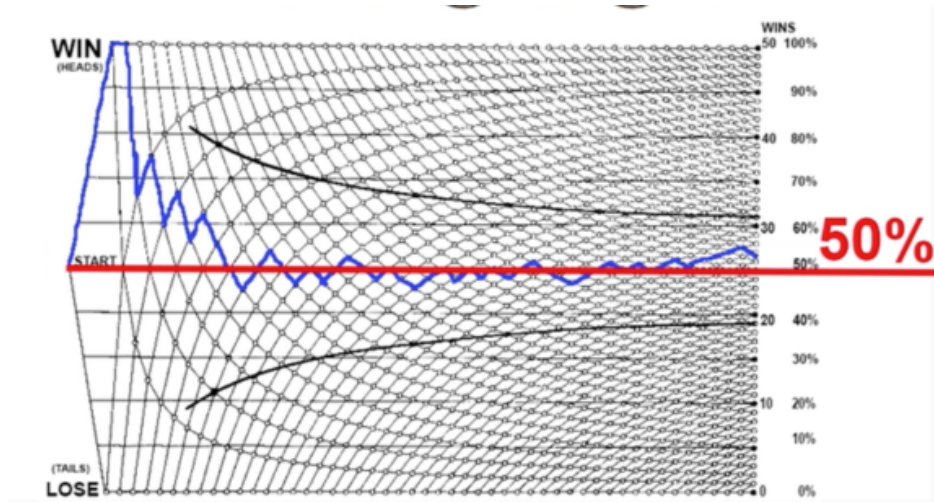
The **relative frequency probability method**, also called the **empirical method**, is based on past experience. Let's explore a coin flip experiment to explain further.

Here is a chart for coin flips. You begin where it says, "start."



If you flip heads--for this scenario, heads will be defined as a win--you will go up the blue line that extends up to 100%. If you flip heads on the first trial, your **experimental probability** is 100%. If you flip heads on the next trial, it remains 100%. Next, if you flip a tail, then it reduces down to 66.6%. The graph simulates what would happen with the continuous flipping of coins.

What do you notice? The graph is fairly erratic at the beginning, but it begins to settle down towards the end. It settles in right around 50%.



BIG IDEA

The longer you run the experiment, the closer the blue line would stay to this red line. If you kept going forever, the blue and red would be indistinguishable.

The relative frequency approach states that the probability of an event is the number of times it has occurred in identical trials, divided by the total number of trials. The relative frequency probability model is also called the empirical method or experimental probability.



FORMULA TO KNOW

Experimental Probability/Relative Frequency Probability/Empirical Method

$$P(E) = \frac{\text{number of times } E \text{ occurs}}{\text{number of trials}}$$

In the case of the coin flips, the chart indicates the probability of a coin coming up heads is 50%--not because there are two faces to the coin, but rather because heads have come up about half the time in repeated trials of coin flipping.



TERM TO KNOW

Experimental Probability/Relative Frequency Probability/Empirical Method

A way of assigning probabilities that states that the probability of an event is equal to the number of times it has occurred in identical trials of a chance experiment, divided by the number of trials of the chance experiment.

2. Subjective Approach

One additional way to talk about probability is called the **subjective probability** approach. It's not a mathematical model like some of the others that we discussed, like the frequentist approach or the a priori model, but it's based on your judgment.

You might hear words like this all the time:

"I'm 90% certain I left the garage open."

Does that mean that if the frequentist approach was used, you would say "90% of the times that I felt this way I did, in fact, leave the garage open?" It doesn't really make a lot of sense. You would basically be saying that you're more sure than not sure that you left the garage open.

What about this kind of a statement?

"I'd say there's about a 50-50 chance I got the job."

Again, what does that mean? About half the time you felt this way, you ended up getting the job? This isn't a frequentist approach. This isn't any mathematical model.

Or what about this?

"There's a one in a million chance of surviving that kind of accident."

Again, they're just saying that they don't think that this scenario is very possible or very probable. They're not saying that there have been a million such accidents and only one person survived.



TERM TO KNOW

Subjective Probability

Not a true probability model at all, this method assigns probabilities based on how likely an individual feels the event is.



SUMMARY

The relative frequency model is the one that you will mainly use. It deals with looking at the past to see, relative to the total number of experiments that you've done, how many of them came up with a particular event. The relative frequency is defined as the probability of the event. We also learned about subjective probability and how it's not technically a probability. It's more of a judgment call, based on how you feel about the likelihood of a particular event happening.

Good luck!



TERMS TO KNOW

Experimental Probability/Relative Frequency Probability/Empirical Method

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Subjective Probability

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