

PERSPECTIVES

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Behavioral finance

Investors, be wary: Our intuitions don't have a feel for probabilities

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Let's start with a puzzle. Imagine there are 100 passengers boarding a 100-seat jetliner. Somehow, between the gate and the door, the first passenger has lost his boarding pass. He takes his chances with a random seat.

After him, every subsequent passenger takes their assigned seat, if it's available. Otherwise, they take a random unoccupied seat. What is the probability that the last passenger to board will find their assigned seat unoccupied?

The most common answer for this, produced by our intuition, is one in 100. There are 100 seats. So, chances should be one in 100 that the last passenger's assigned seat will be the one left at the end. Some people might think the chances are one in 99, or some similar number. But the actual answer is: It's exactly 50%! The last unoccupied seat will either belong to the first or the last passenger. And, it's equally likely to be either.

That doesn't seem intuitive. Yet, if you think about it, that last remaining seat *couldn't* belong to any other passenger. For example, it couldn't have belonged to passenger 37 – had it been empty when passenger 37 came along, he would have sat in it.

This is an example of how our intuition, although powerful and useful in many ways, does not have a good feel for probabilities. Even people well educated in statistics make mistakes when using intuition to figure out probabilities.

Another example is the famous Monty Hall Problem, based on the game show *Let's Make A Deal* and named after its original host Money Hall. When the problem was first introduced, even many mathematics professors got it wrong. You are given the choice of three closed doors. Behind one is a car, behind the other two, goats. You make your choice, say door #1. Monty, who knows what's behind the doors, then opens one of the other two doors, say #3, to reveal a goat. He then asks, do you want to change your choice to pick door #2? Is it to your advantage to switch?

Most people would say there are now two doors, the odds are 50:50, and it doesn't matter. In fact, your odds would be twice as high if you switched your choice to the other door. That's because the odds were

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twice as high before Monty opened that door. That he showed you which of those two doors the prize was not behind didn't change that. But it's hard for most people's intuition to feel this.

In other areas of mathematics, like geometry and algebra, we usually have an intuitive grasp of the answers. We use formal "proofs" as a check. However, with probabilities, our intuition often leads us astray. Perhaps that's why the other areas of math were developed thousands of years ago, whereas probability theory wasn't formulated until the seventeenth century.

Investing often involves making choices under uncertainty. Our natural weakness in this area makes our "gut feel" very unreliable. Be wary of people who use a subjective approach to buying stocks and bonds. The subjective approach often involves assessing probabilities intuitively. Even the brightest people are simply not very good at this. Also be wary of jumping to conclusions on anything based on only a few years of data. People's natural tendency is to put far too much weight on small numbers of observations.

This is one more reason why it's important to use a disciplined, systematic approach to financial planning and investing. If you don't, the odds are you'll get the odds wrong – and this can cost you a lot of money over your lifetime. ■



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