What are some Examples of Calculating Expected Value?

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Investing in the stock market, playing the lottery, risk management for insurance, product development, and sports betting all involve the use of expected value calculations to determine potential returns on investment or payouts. By analyzing the probability of different outcomes and their associated costs or rewards, individuals and companies can make informed decisions in these areas. This involves weighing the potential risks and rewards to determine the most profitable course of action. These calculations are crucial in making sound financial and business decisions.

5 Examples of Calculating Expected Value in Real Life

Expected value is a value that tells us the expected average that some will take on in an infinite number of trials.

We use the following formula to calculate the expected value of some event:

Expected Value = $\Sigma x * P(x)$

where:

x: Data value
P(x): Probability of value

That formula might look a bit confusing, but it will make more sense when you see it used in the context of actual examples.

The following examples show how expected value is

calculated in five different real-world situations.

Example 1: Investments

Expected value is often used by trading firms to determine the expected profit or loss from some investment.

For example, suppose a particular investment is could deliver a 5% annual return with a probability of 0.95, but it could also deliver a -20% annual return with a probability of 0.05.

Annual Return	Probability
5%	0.95
-20%	0.05

We would calculate the expected value of this investment to be:

Expected value = 5%*.95 + (-20%)*.05 = 3.75%

This particular investment has a positive expected value.

This means that if we invested in this particular

investment an infinite number of times, we would expected a long-term average annual return of 3.75%.

Example 2: Weather

Expected value is often used by agricultural companies to determine the expected amount of rain that will fall during a given season.

Amount of Rain	Probability
1 inch	0.2
2 inches	0.7
3 inches	0.1

We would calculate the expected value for the amount of rain to be:

Expected value = 0.2*1 + 0.7*2 + 0.1*3 = 1.9 inches

Example 3: Gambling

Expected value is often used by gamblers to determine how much they could potentially win at a certain game.

For example, suppose in a certain game there is a 5% chance of winning $100, a 50% chance of winning $0, and a 45% chance of losing $20.

Amount	Probability
$100	0.05
$0	0.5
-$20	0.45

We would calculate the expected value for winnings to be:

Expected value = 0.05*$100 + 0.5*$0 + 0.45*(-$20) = -$4

This means that if we played this game an infinite number of times we would expect to lose $4 each time we play, on average.

Example 4: Business

Expected value is often used by businesses to calculate the expected return on advertising spending.

For example, suppose for a particular advertisement there is a 10% chance of receiving a $5 return, a 30% chance of receiving a $2 return, and a %60 chance of receiving a -$8 return.

Amount	Probability
$5	0.1
$2	0.3
-$8	0.6

We would calculate the expected value for the advertisement to be:

Expected value = 0.1*$5 + 0.3*$2 + 0.6*(-$8) = -$3.70

This particular advertisement has a negative expected value.

This means that if the company used this particular advertisement an infinite number of times, it would expect to lose $3.70 each time, on average.

Example 5: Entrepreneurship

Expected value is often used by individuals when deciding whether or not they should pursue entrepreneurship.

For example, suppose an individuals thinks that if they quit their job and work for themselves that there is a 60% chance they could earn $20,000 in their first year, a

30% chance they could earn $60,000, and a 10% chance they would earn $0.

Amount	Probability
$20,000	0.6
$60,000	0.3
$0	0.1

We would calculate the expected value for their income in the first year of entrepreneurship to be:

Expected value = 0.6*$20,000 + 0.3*$60,000 + 0.1*$0 = $30,000

Depending on whether or not this amount of money is sufficient, the individual could then choose to remain in their current job or quit.

Additional Resources

The following tutorials provide additional information about expected value: