# How Do You Quantify Risk?

### Key Terms
- **Systematic Risk**: This type of risk is risk associated with the entire market as a whole and is undiversifiable.
- **Unsystematic Risk**: This type of risk, also called idiosyncratic risk, is risk associated with a particular company or asset class and can be mitigated through diversification in various industries or asset classes.
- **Penny Stocks**: Small companies that typically trade for under $5 are commonly referred to as penny stocks. Due to the lack of trading volume, penny stocks are viewed as risky investments because investors may experience challenges when trying to sell shares as the demand to buy those shares may not be present.

### Risk Is Subjective For Investors
"Risk", especially in the markets, is a tricky thing. It is subjective - everyone has different risk tolerances- and fickle. However, there are a few tried and true ways to translate risk into numbers that all investors can understand.

### Be Happy: Optimism Bias
Optimism bias can cause management teams to over-project key earnings and parameters. Since it is systematic, it can be factored into risk calculation through applying bias-based contingencies to reported numbers. While a good way to broadly understand a firm's associated risk, optimism bias is a very general quantitative metric and will not assist with risk mitigation.

### Most Likely To: Single-Point Probability
Single point probability analysis can be used to calculate the risk premium, which is the cost of accepting risk. The risk premium is calculated by finding the expected value for each known risk; the formula for EV = risk*probability of occurrence.

### Quantitative Risk Analysis (QRA)
Quantitative risk analysis is a way to model risks and their associated financial impacts with regards to a business case. As opposed to single point probability analysis, QRA provides a description of the sources of risk, so it is more thorough than both single point probability analysis and optimism bias. It is most commonly used for high stakes investment deals due to its detail on the probability and outcome of each risk.

### Every Possible Scenario: Monte Carlo Analysis
Monte Carlo analysis utilizes probability distributions and sampling to understand how multiple combined sources of risk affect outcomes. This form of analysis is highly technical and often only done by professionals with specialized skills. It is most frequently used for investment deals in which there are many uncertainties.

### The Bottom Line
There are several ways to quantify risk, and each is appropriate for investment deals of varying magnitude and complexity. QRA and Monte Carlo analyses are the most detailed methods to handle analyzing an investments' risk, however, they are also the most intense and complex.