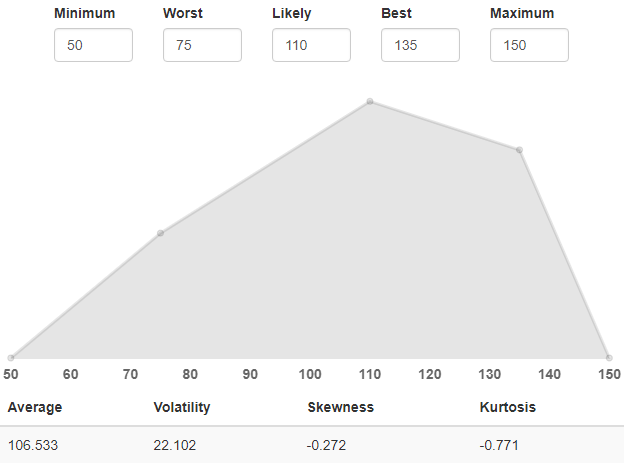
# Goal-Based Investment Comparison

* Compare how different investments affect the probability of achieving an accumulation goal
* Demonstrate the approach using a fictional narrative loosely based on real life events
* Provide links at the end of the article so you can input your own goals and investment assumptions into the calculator

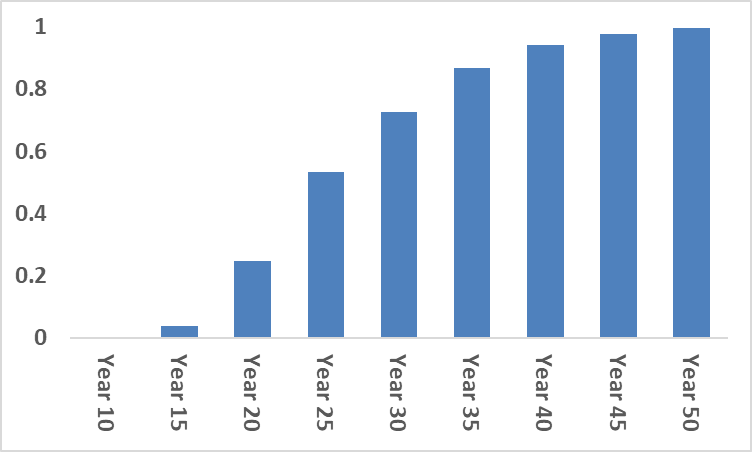
**The Advisor:** Jim is an investment advisor who primarily focuses on 401K plans. In addition to helping corporations select plan options, he also guides the individual investment decisions of employees. In a [previous article](https://seekingalpha.com/article/4242968-achieving-financial-freedom), he attempts to persuade Robert, a 22 year-old management consultant, not to invest all of his contributions in Emerging Markets. However, he is stumped when Robert raises the following question: “Why should an investor not pick a diversified fund with the highest expected gain?”

**The Client:** In the aforementioned article, Robert creates his own long-term forecast for Emerging Markets annual performance as shown in Graph 1:



***Graph 1: Estimated annual long-term forecast for Emerging Markets assuming a current price of 100.***

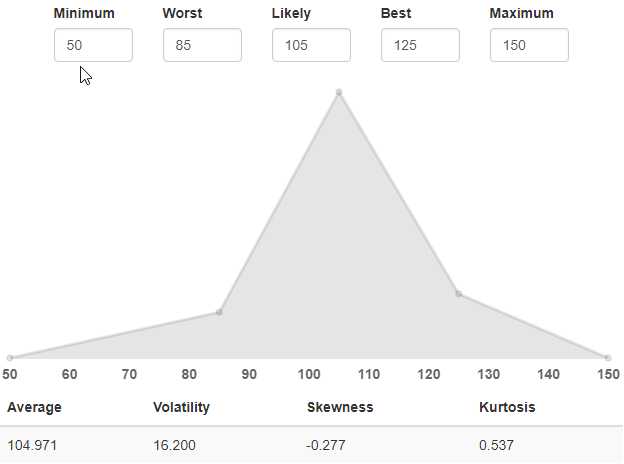
He expects a gain of 6.5% in any given year with volatility of 22. Using the Probicast software, he simulates the probability of hitting his accumulation goal of $3 million over various time periods. This results in Graph 2:



***Graph 2: Probability of accumulating $3 million over various time periods.***

Jim believes Robert’s analysis is reasonable but remains uneasy about the allocation. He wonders, “How do these results compare to simply investing in the S&P 500?”

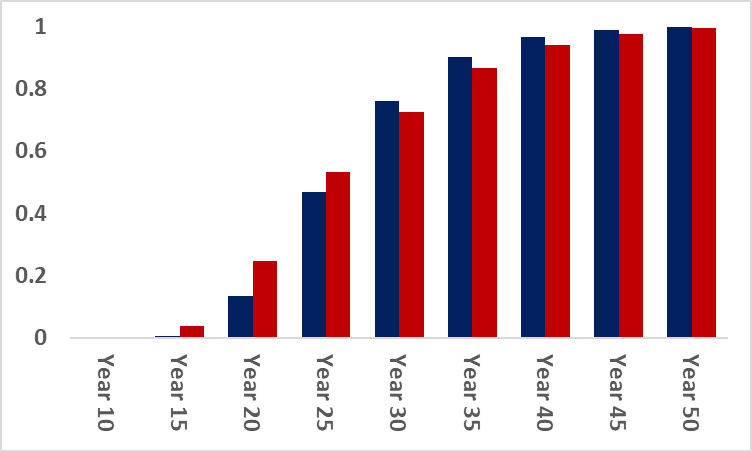
**The Analysis:** To answer his question, Jim needs a long-term forecast for the S&P 500. He enlists the help of Chris, an investment analyst. [In another article](https://seekingalpha.com/article/4231891-choosing-investments-based-retirement-goals), Chris creates the forecast for the S&P 500 Index shown in Graph 3:



***Graph 3: Estimated annual long-term forecast for the S&P 500 Index assuming a current price of 100.***

Jim notes that the expected gain of 5% and volatility of 16 are both lower than for Robert’s forecast. This makes sense: the higher expected return of Emerging Markets matches its higher risk.

Next, Jim inputs both Robert’s cash flow scenarios and Chris’s forecast into the Probicast software. Graph 4 depicts the results:



***Graph 4: Probability of accumulating $3 million over various time periods for the S&P 500 (Blue) and Emerging Markets (Red).***

**The Interaction:** Jim meets with Robert and shows him the results of his analysis. He explains that in both the medium term (less than 30 years), Emerging Markets are likely to deliver a superior outcome based on Robert’s goal. However, the lower risk-return investment leads to a higher probability of goal attainment for years 30 through 50. Mathematically, the larger expected return of Emerging Markets will eventually outstrip its larger volatility; however, the above analysis shows this has still not happened after 50 years1.

Robert is surprised. He had heard from multiple sources that higher risk-reward investments outperform over the long-term, but he had never considered what “long-term” meant. He thinks aloud, “Perhaps, I should reconsider solely investing in Emerging Markets.”

**Input Your Own Assumptions:** The above narrative provides the default inputs for this [investment calculator](https://poppertech.com/goal-based-investment-comparison). You can upload your own cash flow and investment assumptions by following [these instructions](https://poppertech.com/instructions). The calculator is free to use and requires no personal information. Please feel free to share your modifications in the comments section below as well as any questions you may have.

**Footnotes:**

1. The expected return grows linearly with time; whereas, volatility increases as a square root of time. Therefore, an annual expected return of 5% grows to a 25 year expected return of 125% assuming independent annual draws. An annual volatility of 16 increases to 80 for 25 independently simulated years.