



Luke and Jen Smith

MONTE CARLO ANALYSIS
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Monte Carlo Summary

Base Facts

Prepared for **Luke and Jen Smith**

This *Monte Carlo Analysis* runs multiple simulations of your financial plan against future market conditions. The result of introducing random investment volatility to the analysis produces a range of values that demonstrates how changing investment markets may impact your future plans.

The table below shows an upside case, the median case, and a downside case from the 500 trials.

Case	Percentile	Total Portfolio Assets
Upside (Outperform)	97.5	\$19,082,393
Median (Moderate)	50.0	\$5,528,428
Downside (Underperform)	2.5	(\$139,877)

This Monte Carlo simulation is successful in **77%** of the trials resulting in at least **\$3,000,000** of desired remaining assets.

SUMMARY

Upside Case
\$19,082,393

Median Case
\$5,528,428

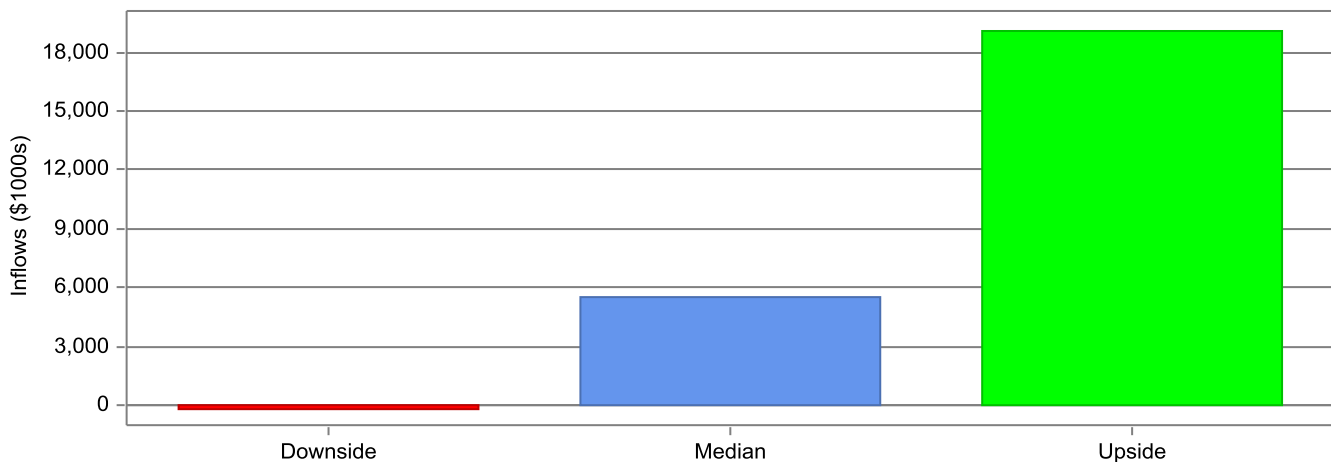
Downside Case
(\$139,877)

Desired Remaining Assets
\$3,000,000

Probability of Success
77%

Portfolio Asset Comparison

The chart below illustrates an upside case (97.5 percentile), the median case (50 percentile), and a downside case (2.5 percentile) from the 500 trials.



This Monte Carlo analysis illustrates the potential results of your financial plan using up to 500 randomly generated market returns and volatility called trial runs. In each trial run, the mean and standard deviation of a selected benchmark index for each account or portfolio is used for a randomly chosen year. This hypothetical investment performance is combined with the detailed cash flow and tax calculations for your plan. The trial runs produce a range of potential results and are one way of illustrating and evaluating the statistical probability of your planning strategies.

IMPORTANT: The projections or other information generated by this Monte Carlo simulation regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results and are not guarantees of future results. Results may vary with each use and over time. Calculations are based upon market index and growth rate assumptions in your financial plan. Other investments not considered might have characteristics similar or superior to those analyzed in this report. Refer to the Assumptions Summary and Monte Carlo Assumptions reports for additional assumption details.

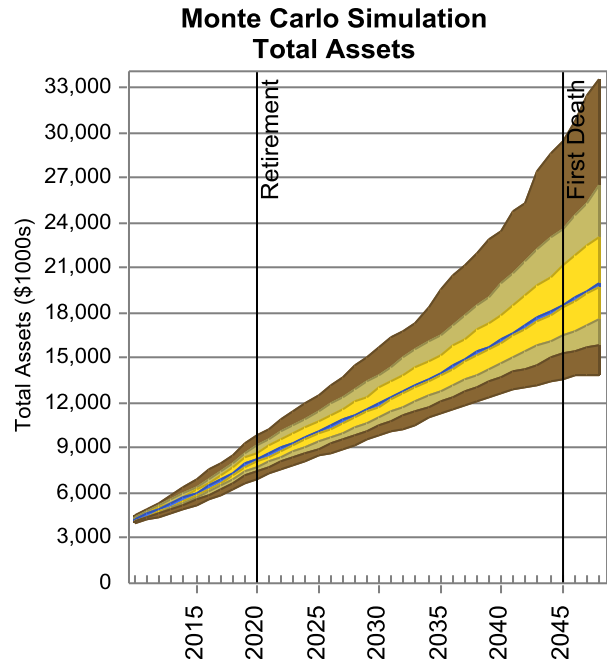
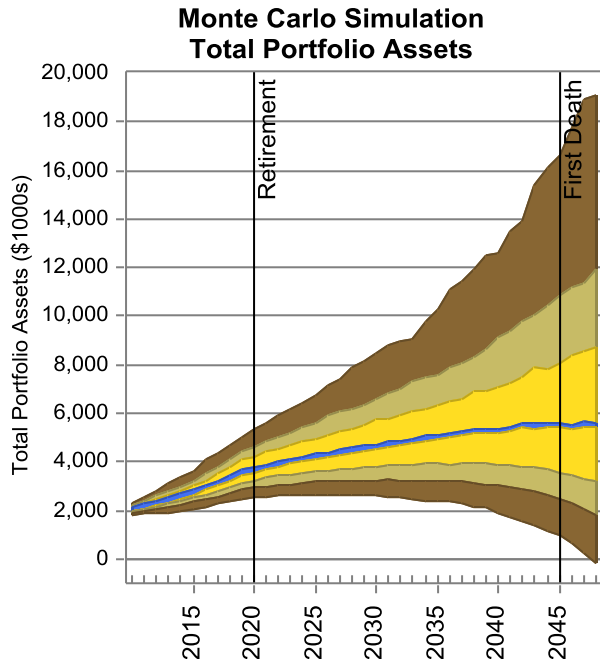
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Monte Carlo - Asset Spread

Base Facts

Prepared for Luke and Jen Smith

The following Monte Carlo charts illustrate a potential range of your assets over time.



Monte Carlo Statistics

	Ending Portfolio Assets	Ending Total Assets
Maximum:	\$39,726,295	\$53,999,614
97.5 Percentile:	\$19,082,393	\$33,609,456
Median:	\$5,528,428	\$19,835,782
2.5 Percentile:	(\$139,877)	\$13,800,573
Minimum:	(\$2,133,452)	\$10,938,851
Average:	\$6,483,506	\$20,765,847
Std. Deviation:	\$5,009,293	\$5,094,775

Simulation Runs: 500

	Luke's Longevity	Jen's Longevity
Age of Death:	90	90

How to Read the Monte Carlo Charts

The Monte Carlo Chart shows the results of running 500 simulations with randomized data. The chart shows the spread of the results of all of the tests.



The blue line shows the median value.
50% of the tests fell within the gold area.
75% of the tests fell within the tan area.
95% of the tests fell within the brown area.

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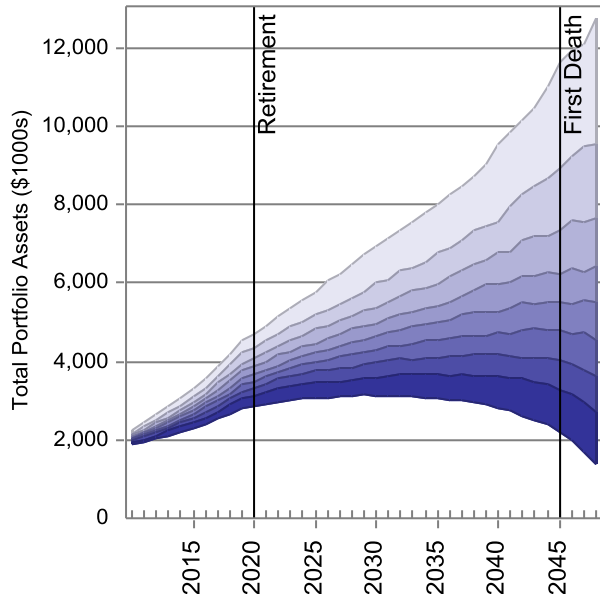
Monte Carlo - Asset Confidence

Base Facts

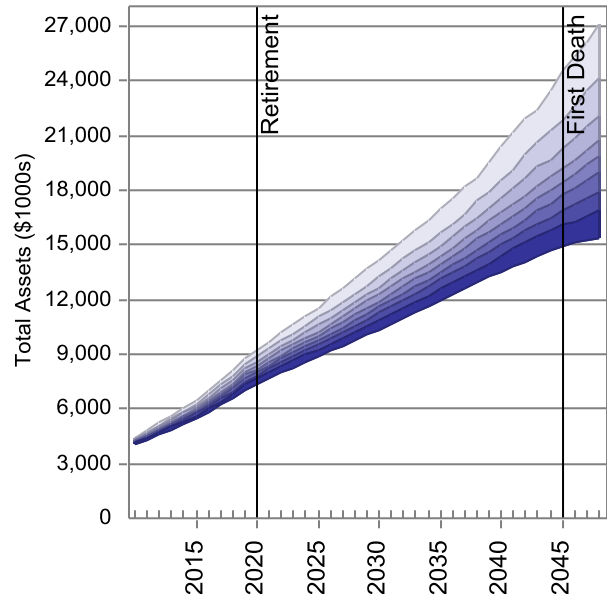
Prepared for Luke and Jen Smith

The following Monte Carlo charts illustrate the probability of achieving a minimum asset level over time.

**Monte Carlo Simulation
Total Portfolio Assets**



**Monte Carlo Simulation
Total Assets**



Monte Carlo Statistics

	Ending Portfolio Assets	Ending Total Assets
Maximum:	\$39,726,295	\$53,999,614
97.5 Percentile:	\$19,082,393	\$33,609,456
Median:	\$5,528,428	\$19,835,782
2.5 Percentile:	(\$139,877)	\$13,800,573
Minimum:	(\$2,133,452)	\$10,938,851
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Std. Deviation:	\$5,009,293	\$5,094,775

Simulation Runs: 500

	Luke's Longevity	Jen's Longevity
Age of Death:	90	90

How to Read the Monte Carlo Charts

The Monte Carlo Chart shows the results of running 500 simulations with randomized returns. The chart shows the combined results of all of the simulations. Each color band reflects the percentage of simulations that had AT LEAST the asset level shown in the chart.



This Monte Carlo analysis illustrates the potential results of your financial plan using up to 500 randomly generated market returns and volatility. In each trial run, the mean and standard deviation of a selected benchmark index for each account or portfolio is used for a randomly chosen year. This hypothetical investment performance is combined with the detailed cash flow and tax calculations for your plan.

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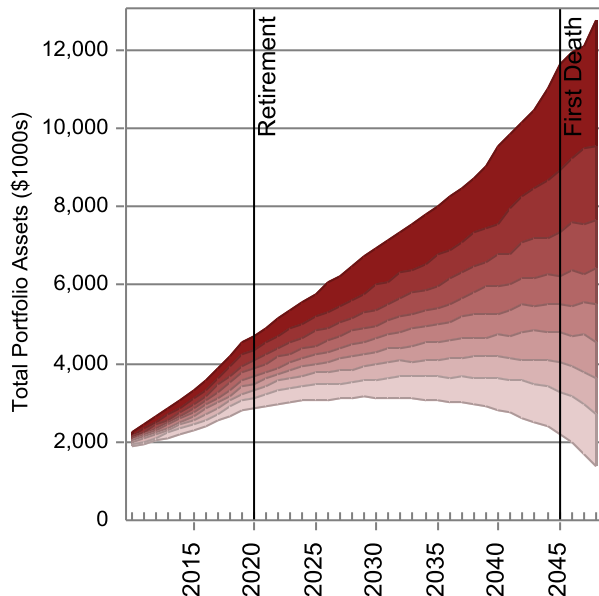
Monte Carlo - Asset Risk

Base Facts

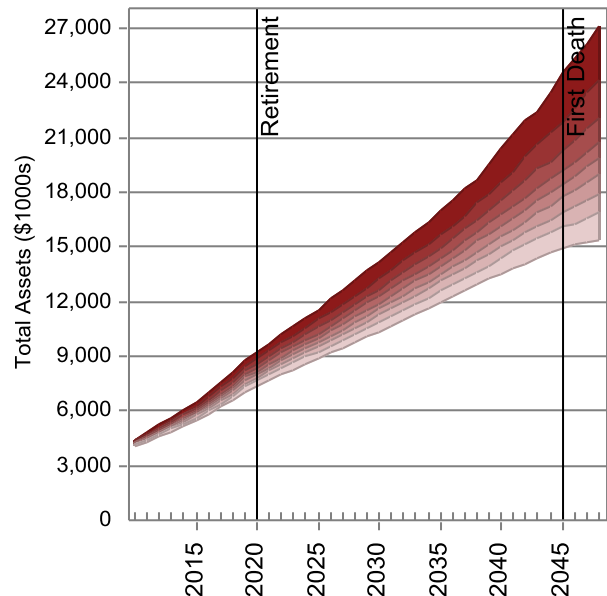
Prepared for Luke and Jen Smith

The following Monte Carlo charts illustrate the probability that the shown level of assets will NOT be reached.

**Monte Carlo Simulation
Total Portfolio Assets**



**Monte Carlo Simulation
Total Assets**



Monte Carlo Statistics

	Ending Portfolio Assets	Ending Total Assets
Maximum:	\$39,726,295	\$53,999,614
97.5 Percentile:	\$19,082,393	\$33,609,456
Median:	\$5,528,428	\$19,835,782
2.5 Percentile:	(\$139,877)	\$13,800,573
Minimum:	(\$2,133,452)	\$10,938,851
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Std. Deviation:	\$5,009,293	\$5,094,775

Simulation Runs: 500

	Luke's Longevity	Jen's Longevity
Age of Death:	90	90

How to Read the Monte Carlo Charts

The Monte Carlo Chart shows the results of running 500 simulations with randomized returns. The chart shows the combined results of all of the simulations. Each color band reflects the percentage of simulations that FAILED to meet the asset level shown in the chart.



This Monte Carlo analysis illustrates the potential results of your financial plan using up to 500 randomly generated market returns and volatility. In each trial run, the mean and standard deviation of a selected benchmark index for each account or portfolio is used for a randomly chosen year. This hypothetical investment performance is combined with the detailed cash flow and tax calculations for your plan.

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Monte Carlo - Goal Analysis

Base Facts

Prepared for Luke and Jen Smith

The following table illustrates the probable funding levels that your defined goals may achieve.

Cash Flow Goal	Type	Start Year	End Year	Present Value Amount	Funded By	Average Funding Level
Living Expenses	Planned Expense			\$125,000		135.5%
Samantha's Education	Expense Goal	2023	2026	\$20,000	Samantha's 529 Plan	65.9%
Sophie's Education	Expense Goal	2026	2029	\$20,000	Sophie's 529 Plan	72.4%

This Monte Carlo analysis illustrates the potential results of your goal planning using up to 500 randomly generated market returns and volatility. In each trial run, the mean and standard deviation of a selected benchmark index for each account or portfolio is used for a randomly chosen year. This hypothetical investment performance is combined with the detailed cash flow of your anticipated future expenses and goal planning priorities. The Average Funding Level displays the average funding for a goal or expense based on the number of times the Monte Carlo simulation has run.

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Monte Carlo - Assumptions

Base Facts

Prepared for Luke and Jen Smith

A Monte Carlo Analysis seeks to approximate actual investment market volatility by adding random investment returns to your financial plan. The result of introducing random investment volatility to the analysis produces a range of values that demonstrates how changing investment markets may impact your future plans.

This Monte Carlo simulation uses randomly selected return and volatility data of market indexes and applies cash flow and tax calculations based on the facts and assumptions you have provided to produce a trial run. The market indexes are assigned to investment accounts and portfolios to represent component asset classes. In each trial run, a rate of return is generated for each asset class using the mean and standard deviation of the market index in the randomly chosen year. Up to 500 trial runs are calculated resulting in a range of values that is further analyzed to produce a statistical probability for your planning strategies.

Carefully consider the high, low and average values in terms of how comfortable you would be with those results. Keep in mind it is impossible to predict future investment results and this analysis should be monitored over time.

MONTE CARLO ASSUMPTIONS

The following fixed growth rates were used in the simulation:

<u>Asset</u>	<u>Pre-Retirement Rate</u>	<u>Post-Retirement Rate</u>
Rydal Knit Shoppe - Business Value	3.52%	3.52%
Home	3.52%	3.52%

All other rates were varied statistically according to historical data.

MONTE CARLO DEFINITIONS

- **Mean:** Simple average, equal to the sum of all values divided by the number of values.
- **Maximum:** The largest value of the distribution.
- **97.5 Percentile:** The value of the distribution that 97.5% of the values fall below.
- **Median:** The middle value of a distribution, above and below which lies an equal number of values.
- **2.5 Percentile:** The value of the distribution that 2.5% of the values fall below.
- **Minimum:** The smallest value of the distribution.
- **Monte Carlo Simulation:** A statistical analysis model generally used to analyze the effect of varying inputs on the outputs of a model. The Monte Carlo simulation randomly applies values for uncertain variables over and over to simulate a model.
- **Standard Deviation:** A statistical measure of the volatility based on the distribution of a set of data from its mean (average value). Example: A portfolio with an average return of 10% and a standard deviation of 15% would return a result between -5% and +25% the majority of the time (68% probability or 1 standard deviation), almost all the time the return would be between -20% and +40% (95% probability or twice the standard deviation). If there were 0 standard deviation then the result would always be 10%. Generally, more aggressive portfolios have a higher standard deviation and more conservative portfolios have a lower standard deviation.
- **Total Assets:** Includes all Total Portfolio Assets plus any Personal Property, Real Estate, Notes Receivable, Business assets, Irrevocable Trust assets and Family Limited Partnerships.
- **Total Portfolio Assets:** Includes all holdings within the following categories: Investment Assets, Cash Assets, Retirement Assets, Annuities, Insurance Assets and any Stock Options / Grants.

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A Monte Carlo Analysis seeks to approximate actual investment market volatility by randomizing investment returns and looks at various scenarios to imitate the random behavior of real life. The result of introducing random investment volatility to the analysis produces a range of values that demonstrates how changing investment markets may impact your future plans.

This Monte Carlo simulation uses randomly selected return and volatility data of benchmark indices. The benchmark index data includes gross monthly returns collected over a span of years of changing market conditions. These benchmark indices are tied to asset classes which are associated to the securities in each investment account or model portfolio in your financial plan. Monte Carlo uses your existing holdings in your financial plan for its trial runs. A blended rate of return for each investment account is calculated based on the underlying benchmark indices that are associated to the asset classes within the account or assigned model portfolio by multiplying the index rate by the percentage allocation for each asset class.

Note that certain of your investments may have fixed growth rates assigned, in which case the fixed rate is used in each trial run. Please refer to the Monte Carlo Assumptions report for a listing of your investments to which fixed growth rates have been assigned. The Monte Carlo Assumptions report also provides definitions for terms associated with Monte Carlo simulation.

Up to 500 trial runs are calculated, resulting in a range of values that is further analyzed to produce a statistical probability for your planning strategies. In each trial run, a rate of return is generated using the mean and standard deviation of the benchmark index in the randomly chosen year, and your cash flow is evaluated using the tax assumptions based on the facts and assumptions you have provided. Please refer to the Assumptions Summary report for your tax rate assumptions. Each run randomly chooses a year from the range of historical data available for each benchmark index that underlies each asset class. Next, a rate of return is generated for each asset class using the historical mean and standard deviation of the benchmark index in that chosen year. The results of each run are then plotted on a graph to show the range of potential outcomes. The calculations plotted on the Monte Carlo graphs illustrate the range of potential results: the best case scenario, the worst case scenario, and hundreds of scenarios in between.

While the simulation does not predict what the market will do, 500 trial runs provide the range of possible returns for your financial plan with greater confidence. Carefully consider the high, low and average values in terms of how comfortable you would be with those results. Keep in mind it is impossible to predict future investment results, and this analysis should be monitored over time.

Please note that other investments not considered might have characteristics similar or superior to those analyzed in this report.

Please refer to the Growth Rates Summary report for a detailed listing of the historical benchmark indices, model portfolios, and for a listing of your investments with their assigned growth rates.

***IMPORTANT:** The projections or other information generated by this Monte Carlo simulation regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results and are not guarantees of future results. There is no guarantee that the results generated by this simulation will be achieved or sustained, and results may vary with each use and over time. Actual results may be better or worse than those generated in this simulation.*

Limitations of this Monte Carlo simulation include:

- Investments assigned fixed rates of return reflect a constant growth rate, which is compounded on an annual basis with no variation and have no underlying correlation data. The growth on investments is the flat rate throughout the Monte Carlo simulation.*
- Market volatility may be more extreme than what is represented by the simulation*
- The accuracy of the simulation is reduced in periods of market crisis.*
- The simulation does not consider all investments, and those not considered might have characteristics similar or superior to those analyzed in this report.*

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