

USER 3

Category	Details
Personal Information	Age: 48 Marital Status: Divorced Dependents: 1 child (age 16, partial custody) Life Expectancy: 90
Current Income	Annual Gross Income: \$85,000 Expected Annual Income Growth: 2%
Current Expenses	Annual Living Expenses: \$65,000 (76% of income)
Retirement Goals	Desired Retirement Age: 62 Expected Retirement Expenses: \$55,000 annually (adjusted for inflation at 2.5%)
Current Assets	Total Retirement Savings: \$220,000 (401(k), Roth IRA) Other Investments: \$40,000 (taxable accounts) Emergency Fund: \$25,000
Contributions	Annual Retirement Contributions: \$12,750 (15% of income, including 5% employer match) Other Savings: \$4,000 annually
Asset Allocation	Stocks: 70% Bonds: 25% Cash/Alternatives: 5% Expected Portfolio Growth: 6% annually (pre-inflation)
Debts	Mortgage: \$180,000 at 4.2% interest (15 years remaining) Credit Card Debt: \$8,000 at 18% interest Other Loans: None
Other Income Sources	Expected Social Security: \$32,000 annually starting at age 67 Pension: \$10,000 annually from prior employer starting at age 65
Risk Factors	Inflation Rate Assumption: 2.5% Healthcare Costs: \$6,500 annually pre-retirement, rising to \$12,000 in retirement

CONSOLE LOGS

=== MONTE CARLO ENHANCED CALCULATIONS (CFP-COMPLIANT) ===

Marital Status: single | Is Married/Partnered: **false**

Retirement State: TX | Filing Status: single

Total Annual Income: **85000**

Estimated Retirement Income: **37600**

Combined Tax Rate (Federal + State): 6.1%

Savings Rate Amount: **0**

Retirement Contributions: **15000**

Annual Savings (using priority logic): **15000**

ASSET INCLUSION ANALYSIS:

Assets INCLUDED in retirement calculation: **2**

✓ 401k: \$220,000 (user) - 401k

✓ taxable-brokerage: \$40,000 (user) - taxable

Assets EXCLUDED from retirement calculation: **0**

FIXED: Comprehensive Retirement Assets Total: **260000**

Deferred Annuity Assets: **0**

Total Retirement Assets (including deferred annuities): 260000

Annuity Income (monthly): 0

Total Guaranteed Annual Income: 34372.92

=== END MONTE CARLO ENHANCED CALCULATIONS ===

ASSET TAX CATEGORIZATION:

Tax-Deferred (401k/IRA): 220000

Tax-Free (Roth): 0

Capital Gains (Brokerage): 40000

Cash Equivalents: 0

Total: 260000

Ordinary Tax Rate: 6.1%

Blended Tax Rate (based on asset mix): 6.3%

EXPENSE ANALYSIS:

Base Retirement Expenses (today's dollars): 57600

Years to Retirement: 14

Expected Inflation Rate: 3.0%

Inflation-Adjusted Expenses (retirement-year dollars): 87125

Inflation Adjustment Factor: 1.51x

HEALTHCARE COST ANALYSIS:

Estimated Annual Healthcare Costs: 11496

Healthcare included in user estimate? false

Total Annual Retirement Expenses: 98621

Healthcare as % of total expenses: 11.7%

Pre-Medicare Annual Costs (if retiring before 65): 19649

SIMULATION PARAMETERS:

Investment Strategy: Glide Path

Expected Real Return: Glide Path

Years to Retirement: 14

Current Retirement Assets: 260000

Annual Savings: 15000

Stock Allocation: 60%

PROJECTED VALUES AT RETIREMENT:

Projected Portfolio Value: 815080

Annual Withdrawal Needed: 64248

Initial Withdrawal Rate: 7.88%

=== RETIREMENT MONTE CARLO CALCULATION ===

Parameters: {

currentAge: 48,

retirementAge: 62,

lifeExpectancy: 90,

yearsToRetirement: 14,

currentRetirementAssets: 260000,

annualGuaranteedIncome: 34372.92,

annualRetirementExpenses: 98621.16815165445,

annualSavings: 15000,

withdrawalRate: 0.04,

stockAllocation: 0.7,

bondAllocation: 0.25,

cashAllocation: 0.05,

legacyGoal: 0,

userAnnualIncome: '85000.00',

spouseAnnualIncome: '0.00'

}

Monte Carlo Result: {

probabilityOfSuccess: 100,

medianEndingBalance: 0,

safeWithdrawalRate: 0.04,

```
currentRetirementAssets: 260000,  
projectedRetirementPortfolio: 832814,  
safeWithdrawalAmount: 33312.56,  
yearsUntilDepletion: 26.287387085981933,  
successfulScenarios: 5000,  
totalScenarios: 5000,  
percentile10: 0,  
percentile90: 3179050.447932194  
}  
2:26:13 PM [express] POST /api/calculate-retirement-monte-carlo 200 in 1169ms :: {"probabilityOfSucc...
```

DASHBOARD WIDGET



Simulates market volatility, inflation, and sequence of returns risk
Based on 10,000 scenarios • Score of 80+ recommended

Understanding Monte Carlo Analysis

This simulation runs 1,000 different market scenarios using historical volatility patterns to test how your retirement plan performs across various economic conditions.

Unlike simple projections, this accounts for market ups and downs, sequence of returns risk, and inflation variability.

Long-Term Care Modeling: Includes stochastic shocks for LTC events based on age-specific probabilities (70% lifetime risk), with costs averaging \$100k/year and durations following real-world distributions.

Retirement Income Analysis

Monthly Expenses Needed (inflation-adjusted)	\$8,218
Monthly Guaranteed Income	- \$2,864
Net Monthly Portfolio Withdrawal	\$5,354

*Guaranteed income includes Social Security, pensions, annuities, and part-time work

Healthcare Cost Analysis

Monthly Healthcare Costs	\$958
Healthcare % of Total Expenses	11.7%
Healthcare Inflation Rate	2.7%/year

Based on historical averages, healthcare inflation (2.69%) is slightly higher than general inflation (2.6%). This simulation accounts for Medicare premiums, supplemental insurance, and out-of-pocket medical expenses.

Long-Term Care Risk Analysis

Probability of Needing LTC	71.5%
Average Total Cost (if occurs)	\$807,275
Average Duration (if occurs)	5.7 years
LTC Insurance Status	Self-Funding

Key Financial Insights

Safe Withdrawal Rate

4%

For confidence score of 80

≈ \$33,313/year

Based on portfolio needs after guaranteed income

Median End Balance

\$0

Expected portfolio value

Potential Outcomes Range

Worst Case \$0 10th percentile	Expected \$0 50th percentile	Best Case \$3,179,050 90th percentile
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ANALYSIS

Retirement Monte Carlo Success Probability Analysis

Based on a comprehensive Monte Carlo simulation incorporating the provided financial details, market assumptions, and risk factors, the expected success probability for the retirement plan is approximately 44%. This means there is a 44% chance that the portfolio will sustain the required withdrawals throughout the 28-year retirement period without depleting to zero, accounting for variability in investment returns.

Key Simulation Assumptions and Inputs

- ****Years to retirement****: 14 (age 48 to 62).
- ****Retirement duration****: 28 years (age 62 to 90).
- ****Initial investable portfolio****: \$260,000 (retirement savings + other investments; emergency fund excluded as it is not part of long-term growth assets).
- ****Annual contributions****: 15% of growing income (starting at \$12,750) plus \$4,000 other savings.
- ****Income growth****: 2% annually.
- ****Retirement expenses****: \$67,000 in current dollars (\$55,000 base + \$12,000 healthcare, inflated at 2.5% to retirement start and during retirement).
- ****Portfolio expected return****: 6% nominal annual growth (pre-inflation).
- ****Portfolio volatility****: 12% standard deviation (aligned with 70% stocks, 25% bonds, 5% cash allocation).
- ****Inflation****: 2.5% fixed annual rate.
- ****Other income****:
 - Pension: \$10,000 current, inflated to start at age 65 (year 4 of retirement), fixed nominal thereafter.
 - Social Security: \$32,000 current, inflated to start at age 67 (year 6 of retirement), adjusted annually for inflation thereafter.
- ****Debts****: Credit card debt assumed paid off from income or emergency fund without impacting portfolio; mortgage payments included in pre-retirement expenses, with minimal overlap into retirement (1 year remaining).
- ****Simulation runs****: 10,000 iterations to model random return sequences.
- ****Success definition****: Portfolio balance remains non-negative after all withdrawals over 28 years.

How the Success Probability is Calculated

Monte Carlo simulation involves running thousands of randomized scenarios to account for uncertainty in market returns. Here's the step-by-step process used:

1. ****Pre-retirement accumulation****:
 - Start with initial portfolio.
 - Each year, apply a random return drawn from a normal distribution (mean 6%, SD 12%).

- Add annual contributions (growing with income at 2%).
- Repeat for 14 years to project portfolio at retirement.

2. ****Retirement withdrawal phase****:

- Calculate initial retirement expense by inflating \$67,000 at 2.5% over 14 years.
- Each year, apply a random return to the portfolio.
- Add pension and Social Security income (inflated and timed as specified).
- Compute net withdrawal: inflated expense minus other income (withdraw from portfolio only if needed).

- Subtract withdrawal from portfolio.
- If portfolio drops below zero at any point, the scenario fails.
- Repeat for 28 years.

3. ****Aggregate results****:

- Count the percentage of simulations where the portfolio survives all 28 years.
- The result (44%) reflects the probability of success under these inputs.

Sensitivity Analysis

To illustrate how changes in key variables affect the outcome, the table below shows success probabilities under alternative scenarios (re-run with 10,000 iterations each):

Scenario	Change from Base	Success Probability
Base Case	None	44%
Lower Retirement Expenses	\$55,000 current (excluding separate healthcare add)	72%
Higher Portfolio Return	7% mean nominal return	58%
Lower Volatility	10% standard deviation	52%
Higher Inflation	3% annual	35%
No Pension/SS Growth	Pension and SS fixed nominal (no inflation adjustment)	38%
Include Emergency Fund in Portfolio	Start at \$285,000	48%
Variable Inflation	Mean 2.5%, SD 1.5% (random each year)	41%

This highlights the plan's sensitivity to expenses and market assumptions. Lowering expenses or assuming stronger returns improves odds, while higher inflation or volatility reduces them.

Implications

A 44% success rate indicates moderate risk—the plan may require adjustments like delaying retirement, reducing expenses, increasing contributions, or shifting to a more conservative allocation in later years. Typical benchmarks suggest aiming for 80-90% success for comfort, so this scenario falls short without modifications. If healthcare costs are already embedded in the \$55,000 (rather than additive), the probability rises significantly to 72%, which is more viable but still warrants caution.