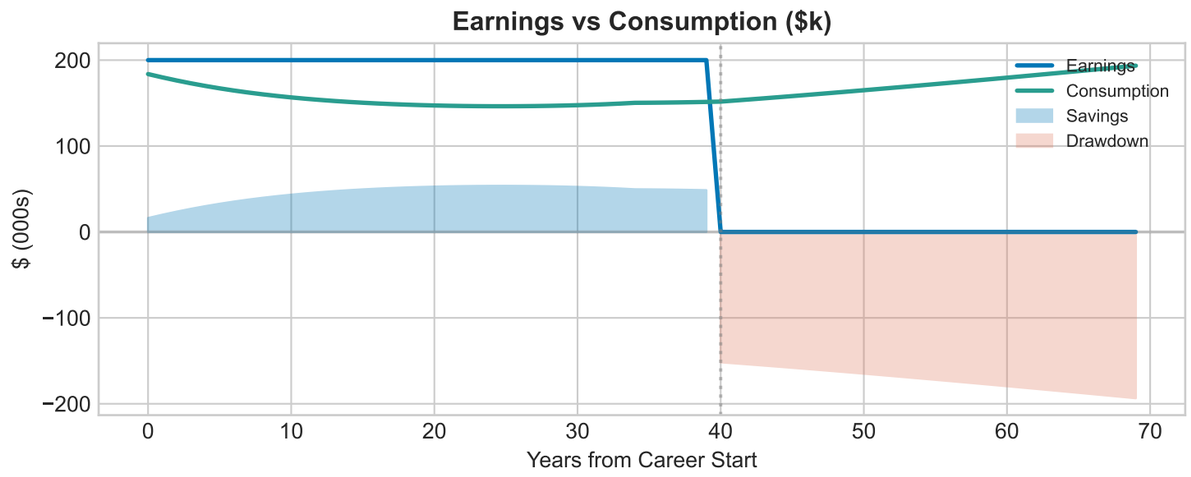
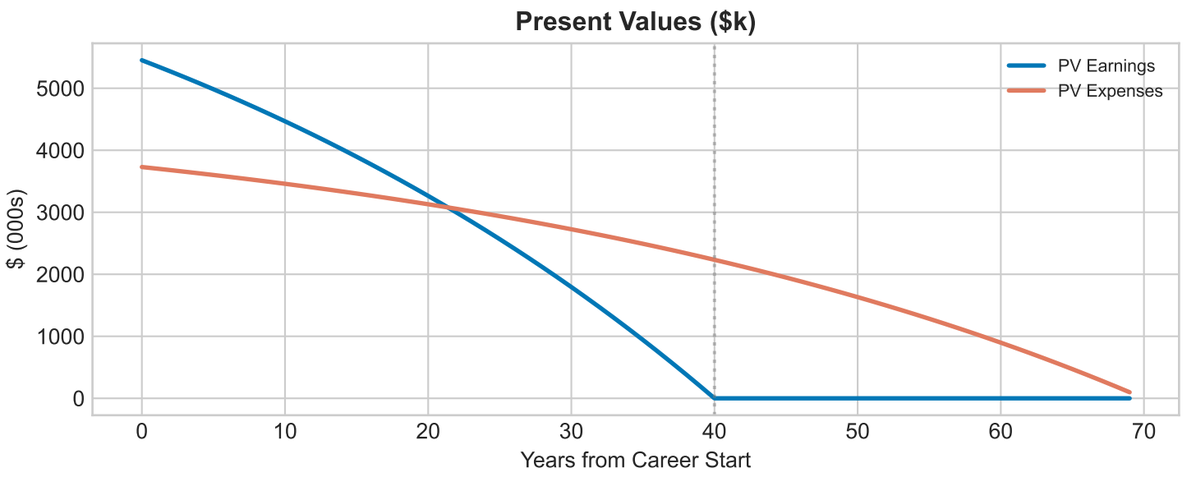
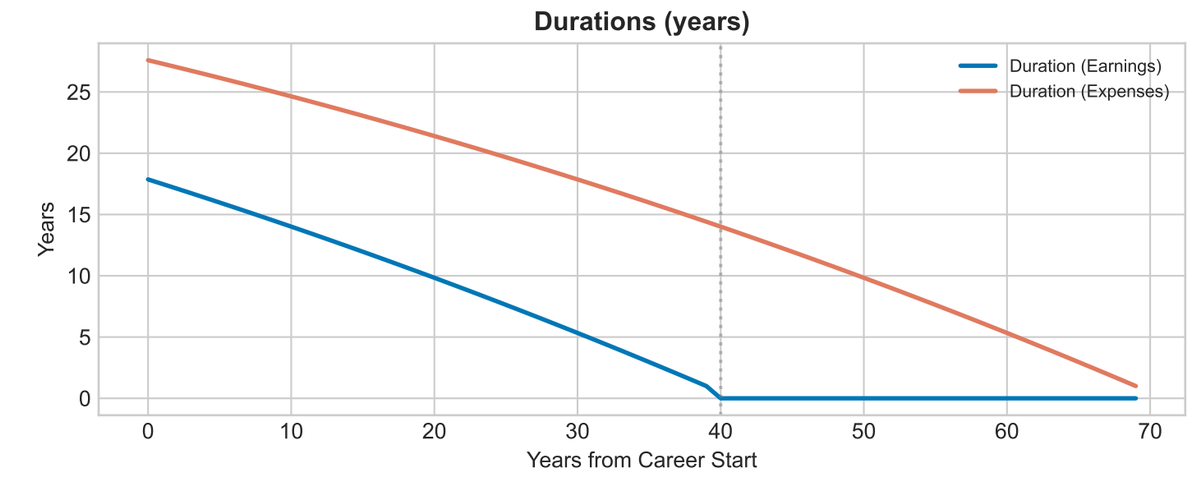
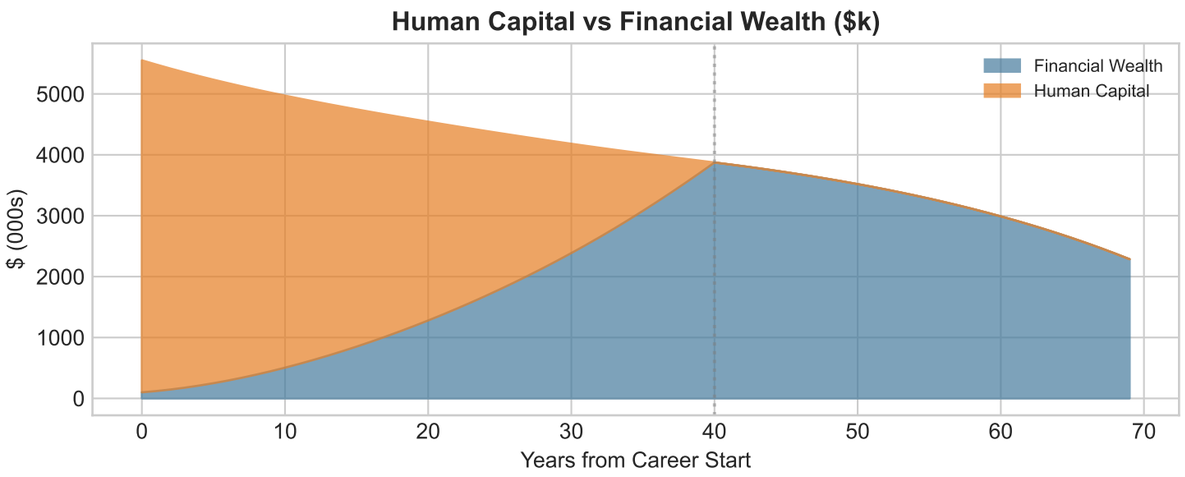
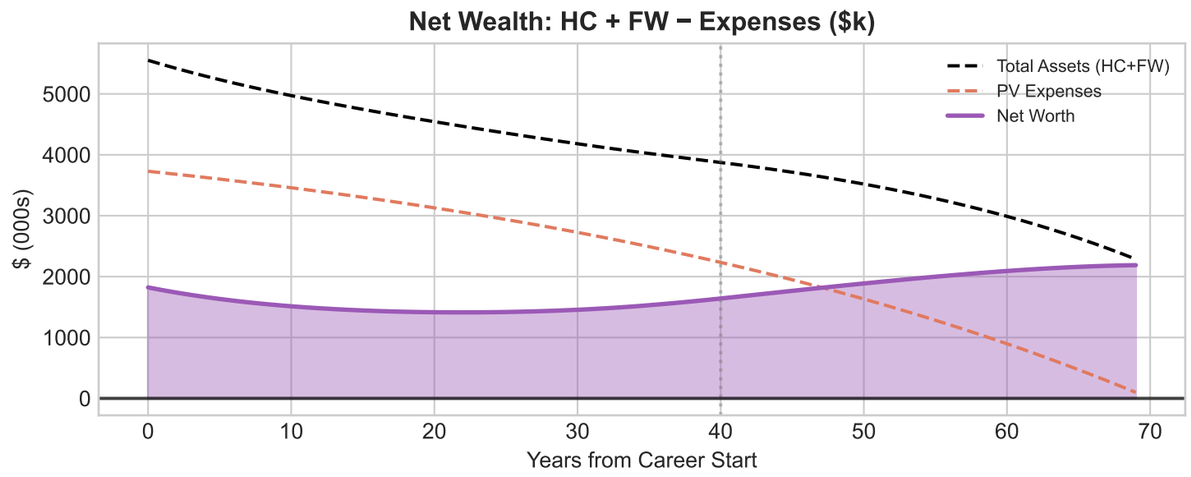
PAGE 1: DETERMINISTIC MEDIAN PATH (Beta = 0.0)

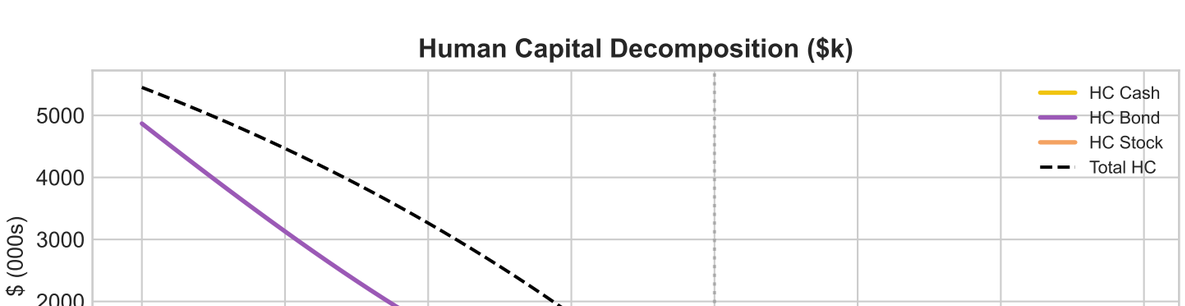


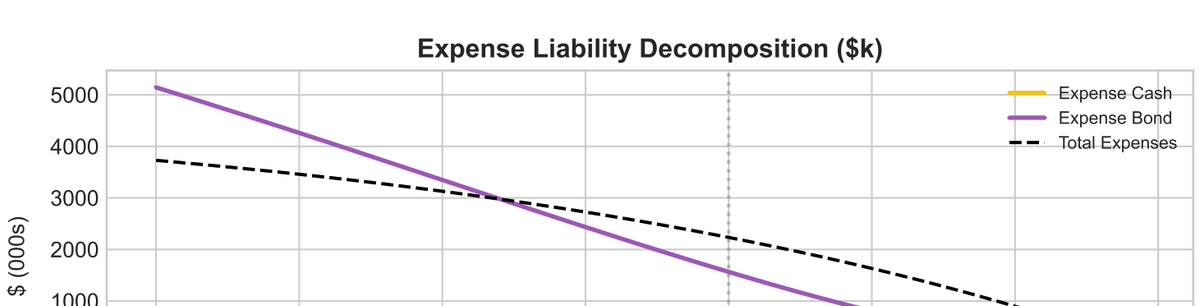


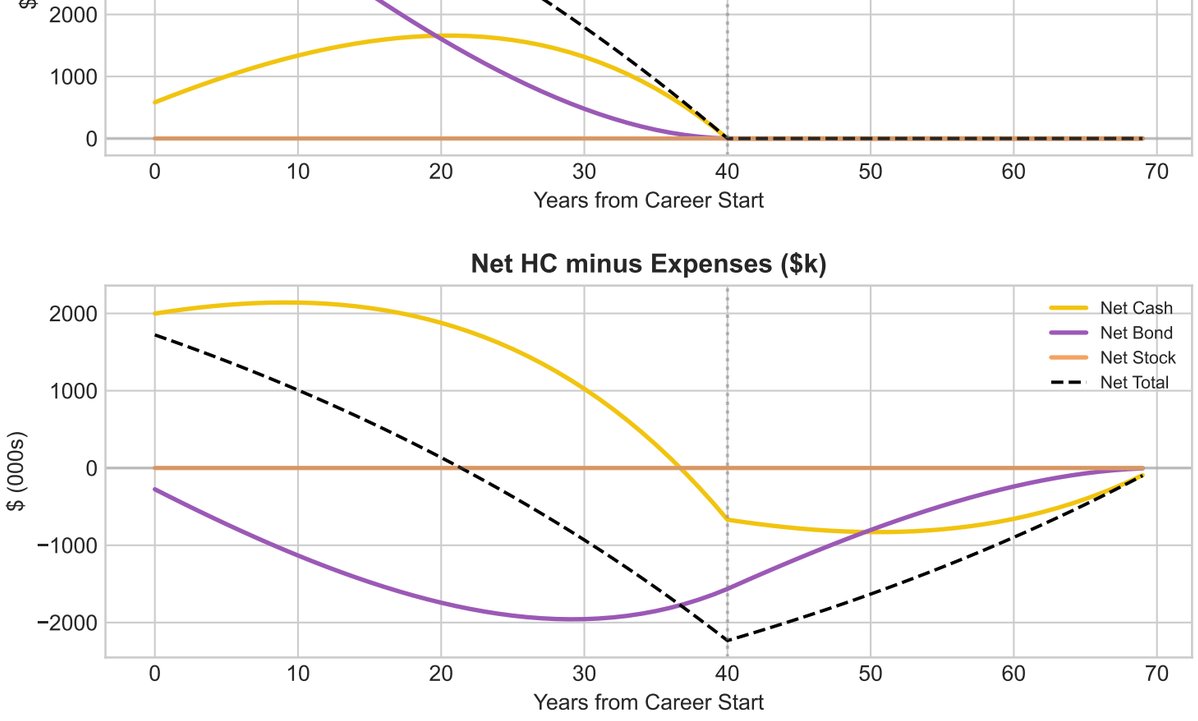


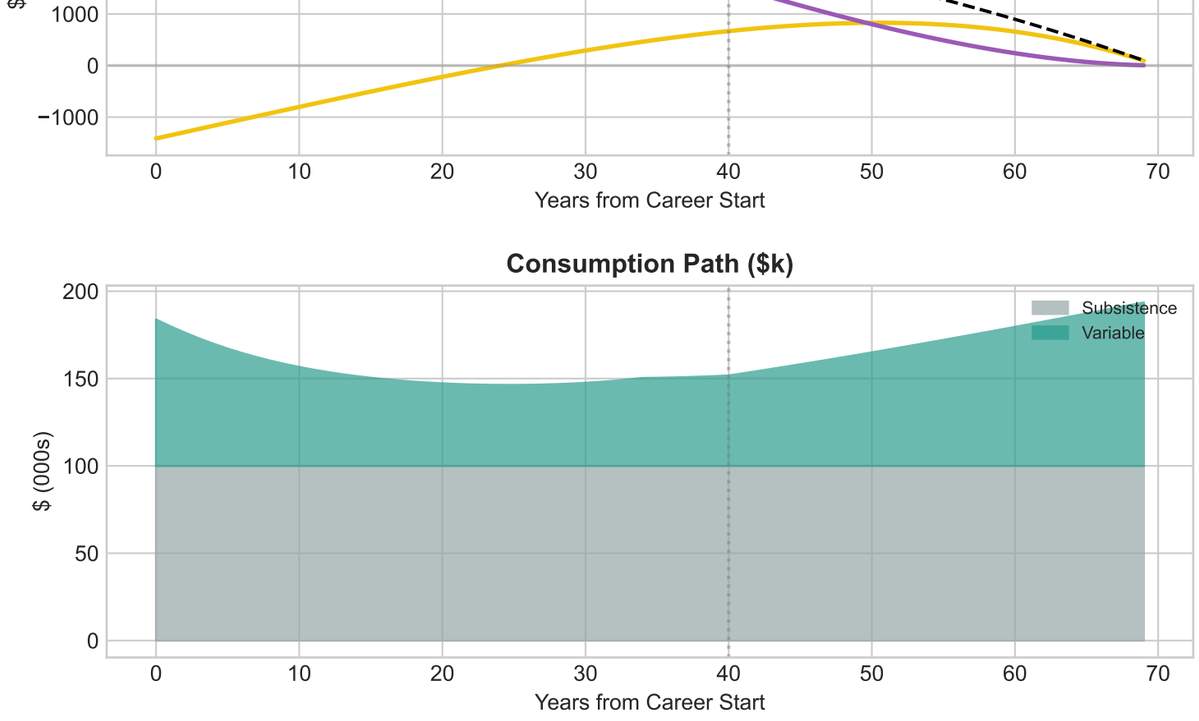


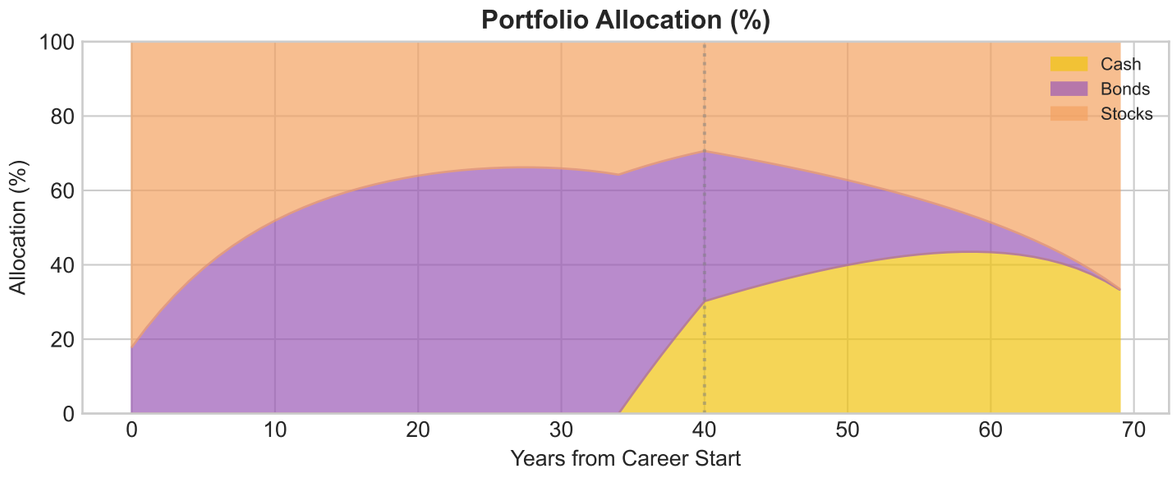


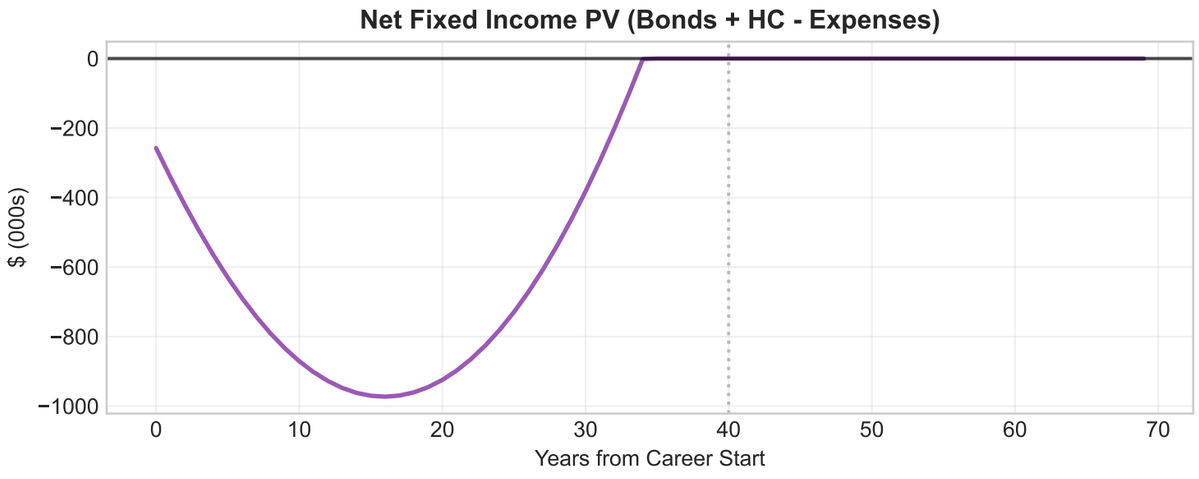


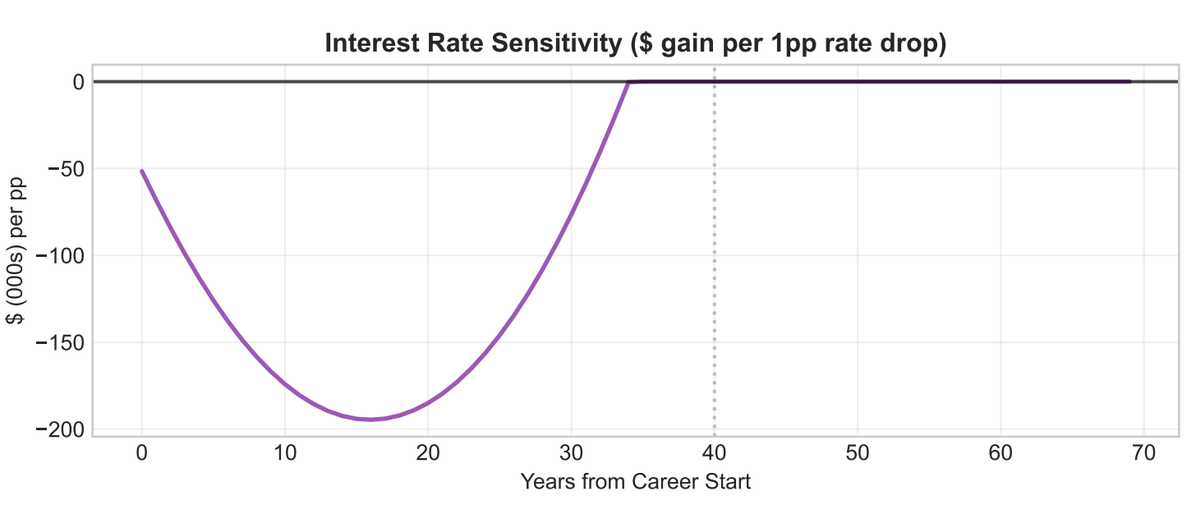


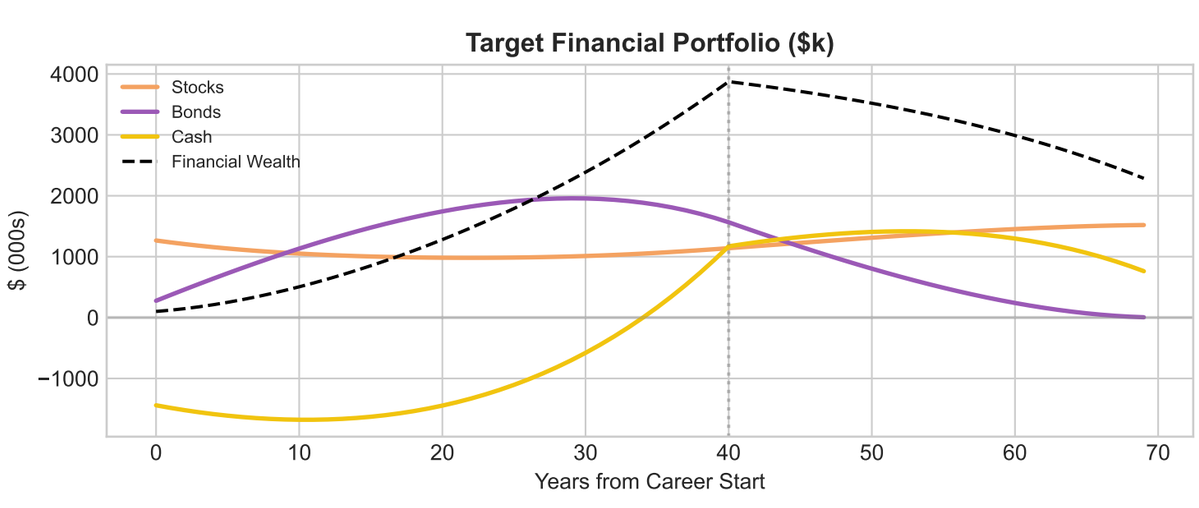


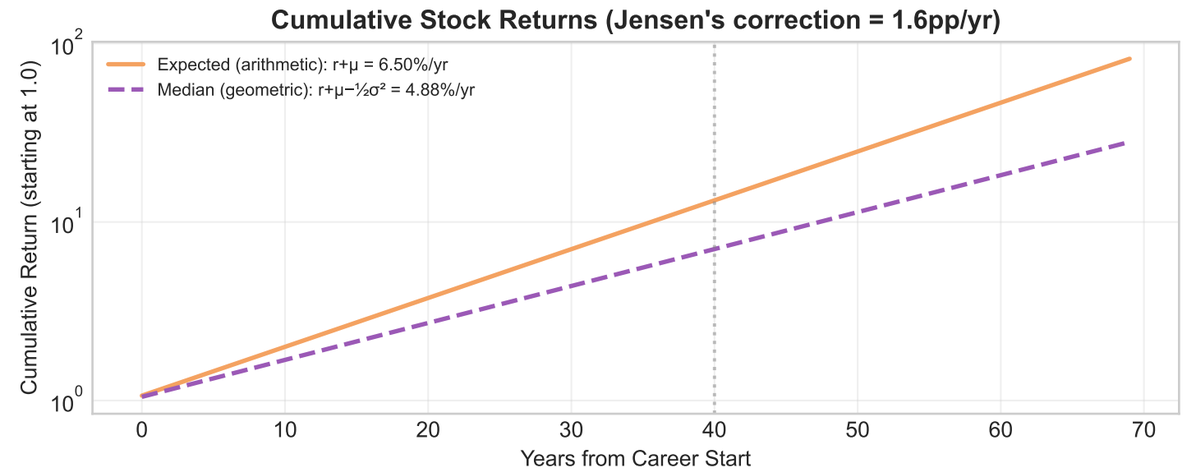


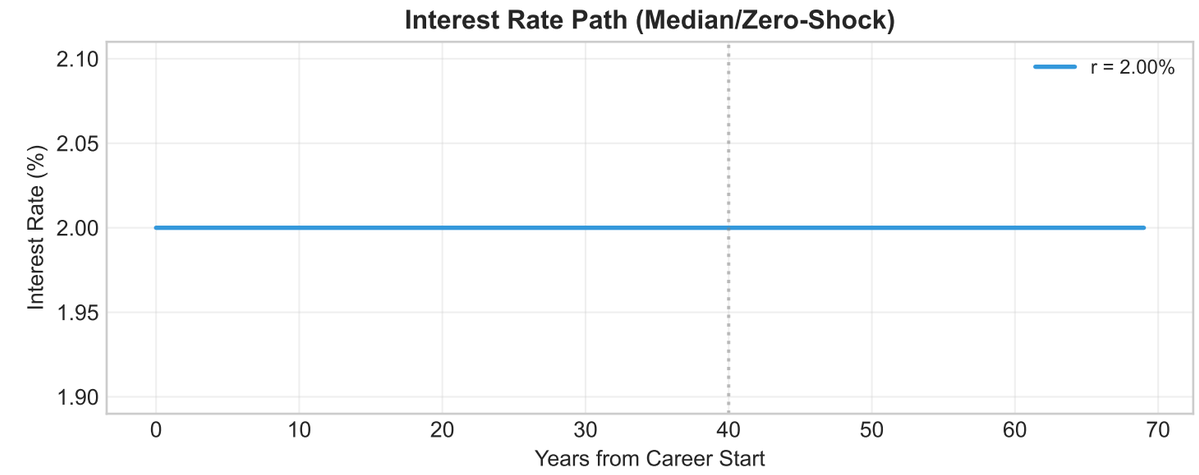








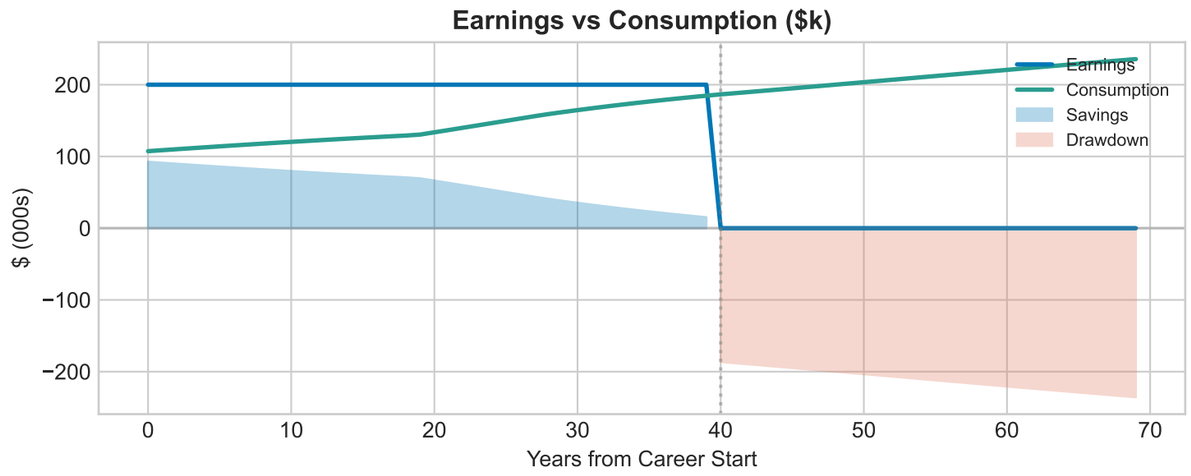




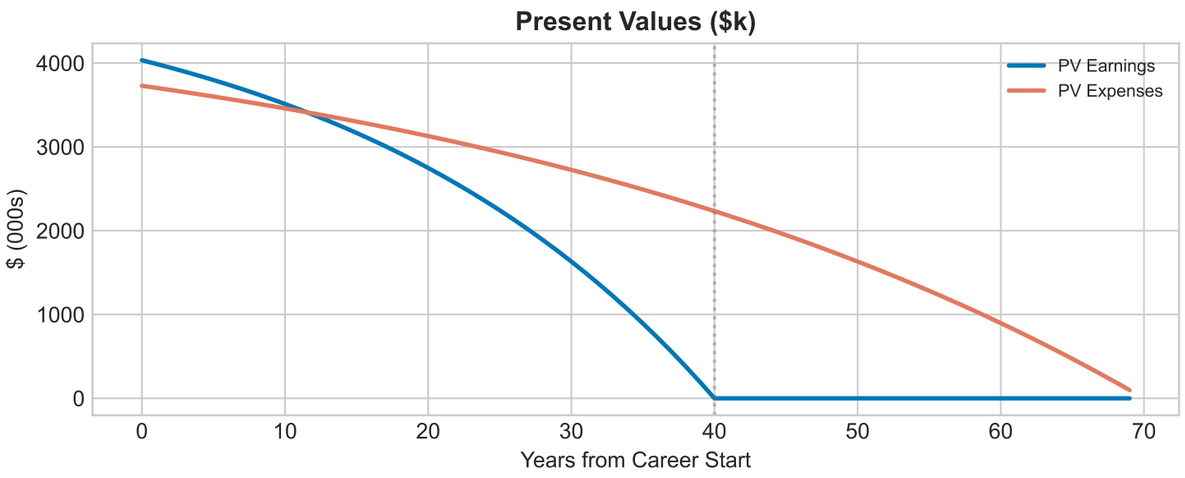
PAGE 2: DETERMINISTIC MEDIAN PATH (Beta = 0.4)

Income & Expenses ($k)

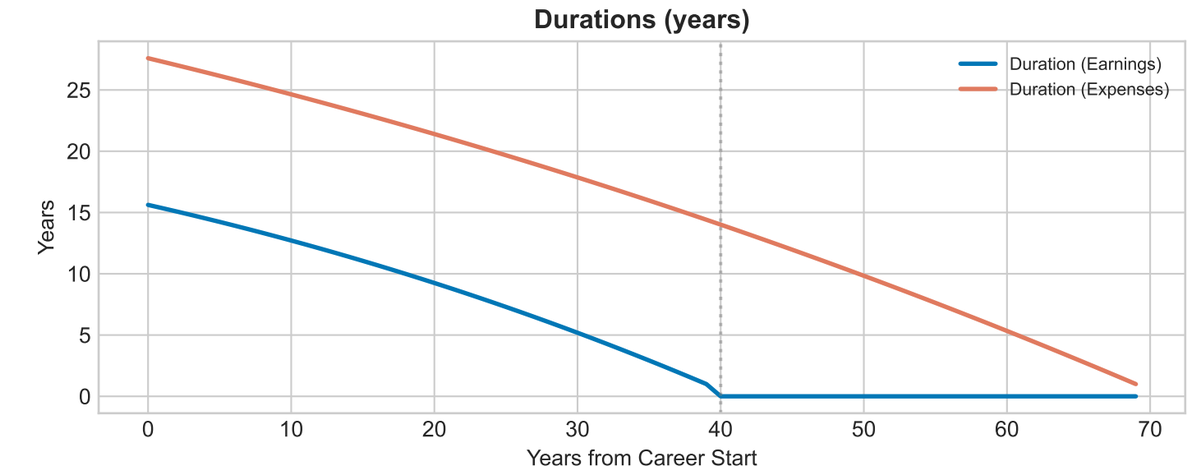
Earnings vs Consumption ($k)



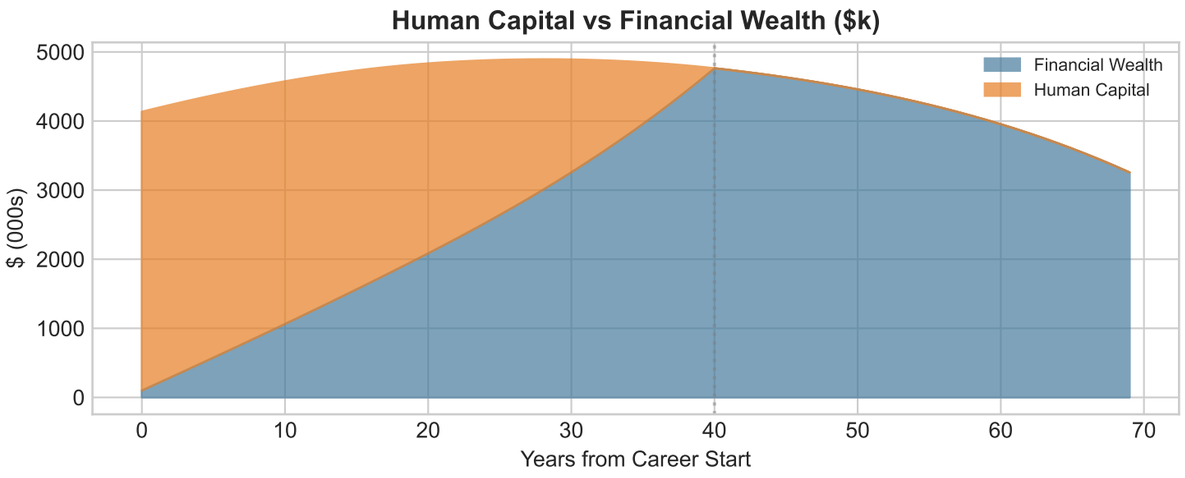
Present Values ($k)



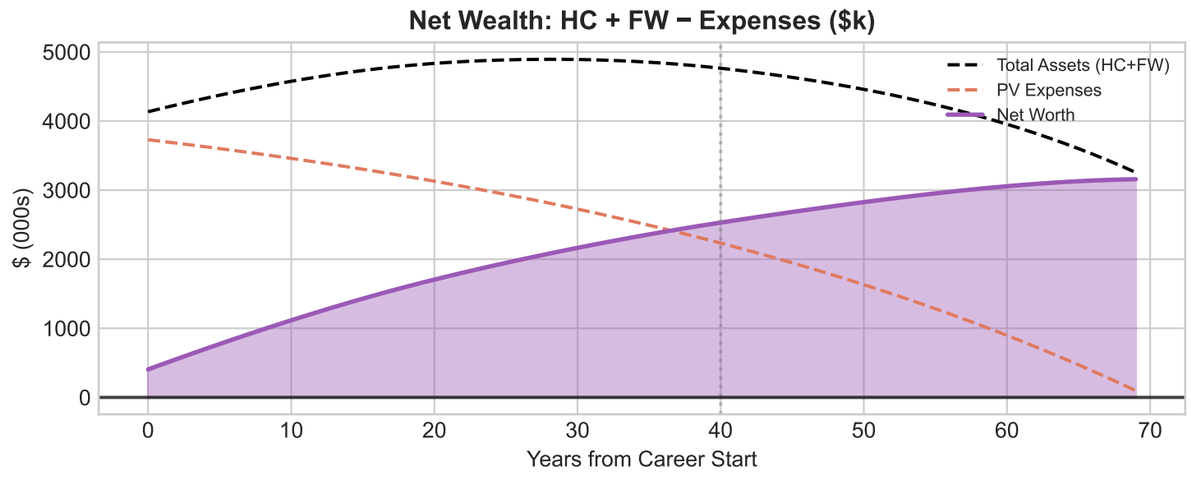
Durations (years)



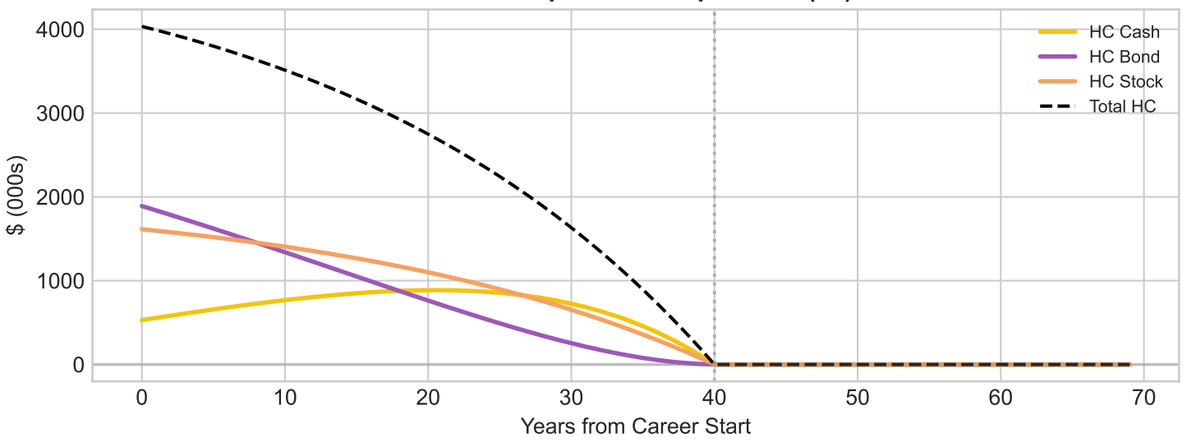
Human Capital vs Financial Wealth ($k)



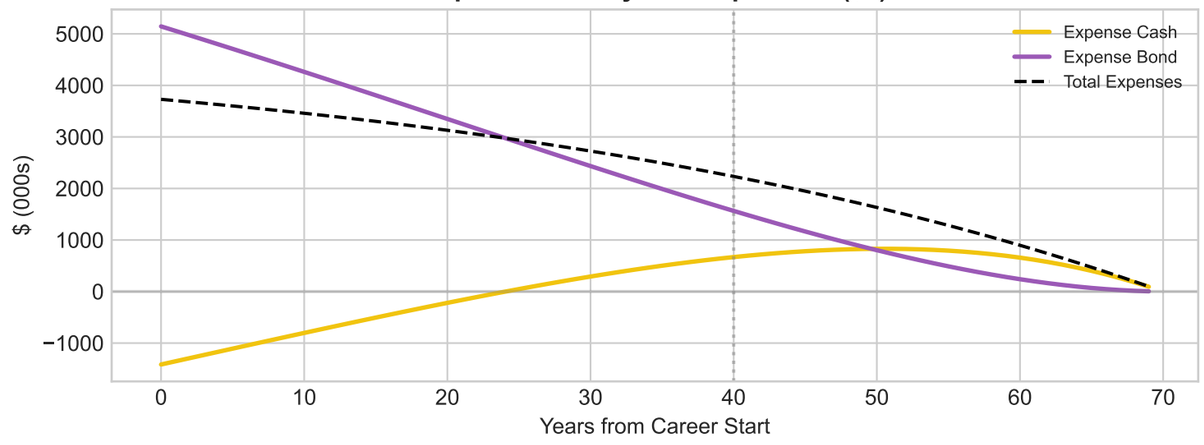
Net Wealth: HC + FW − Expenses ($k)



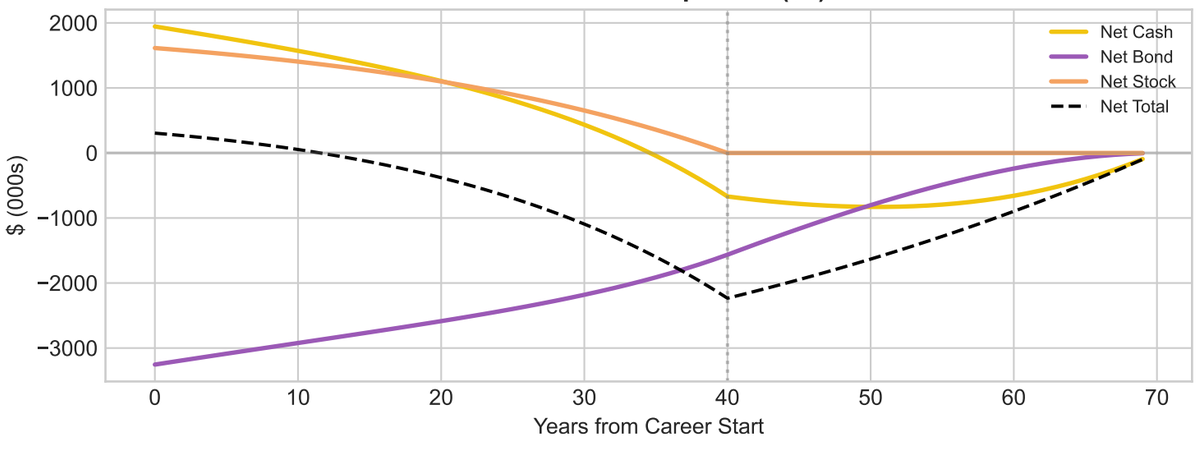
Human Capital Decomposition ($k)



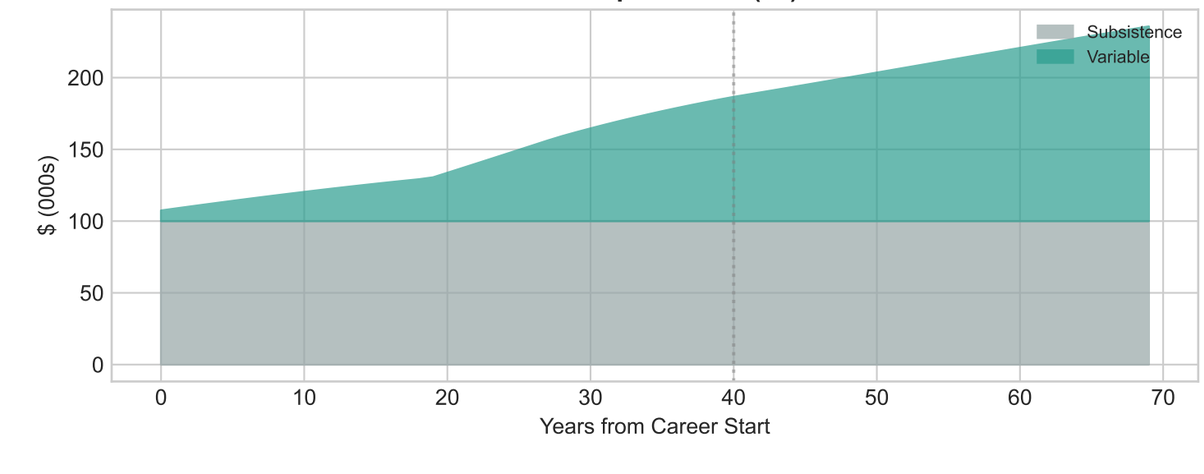
Expense Liability Decomposition ($k)



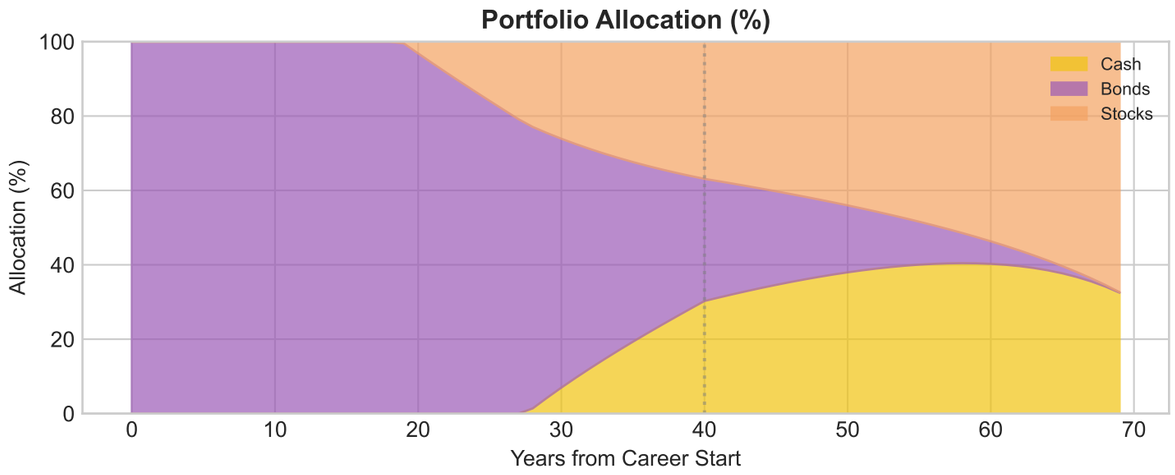
Net HC minus Expenses ($k)



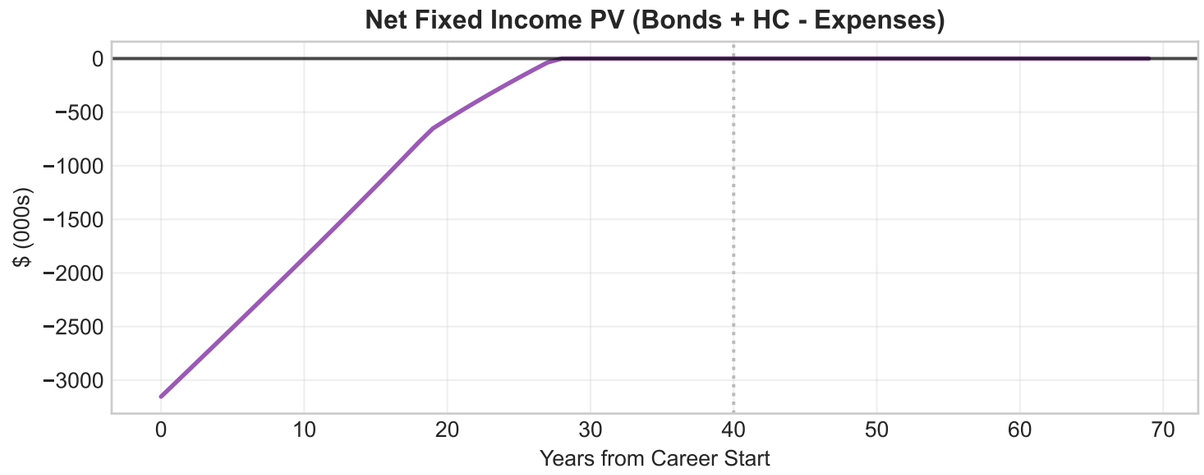
Consumption Path ($k)



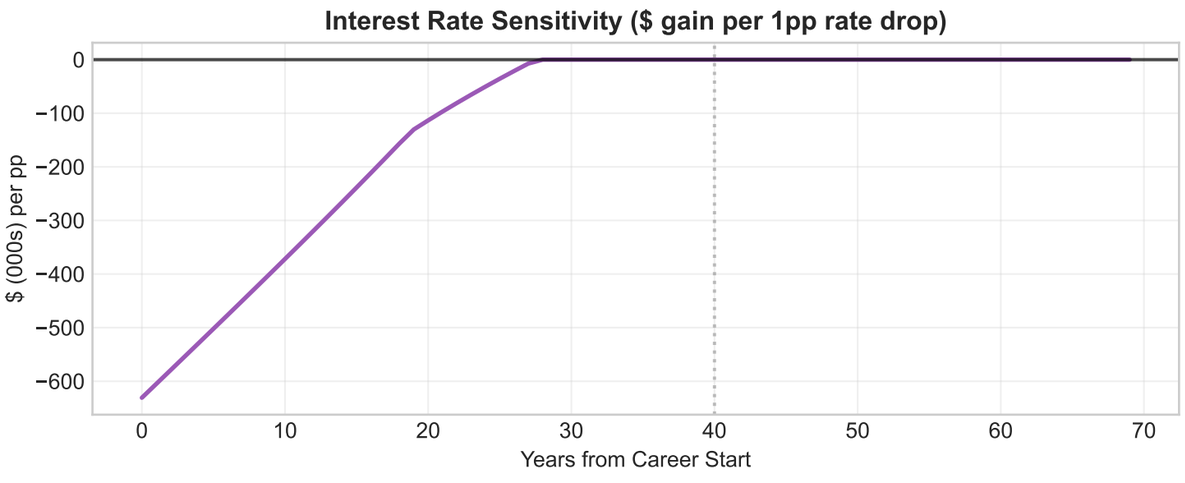
Portfolio Allocation (%)



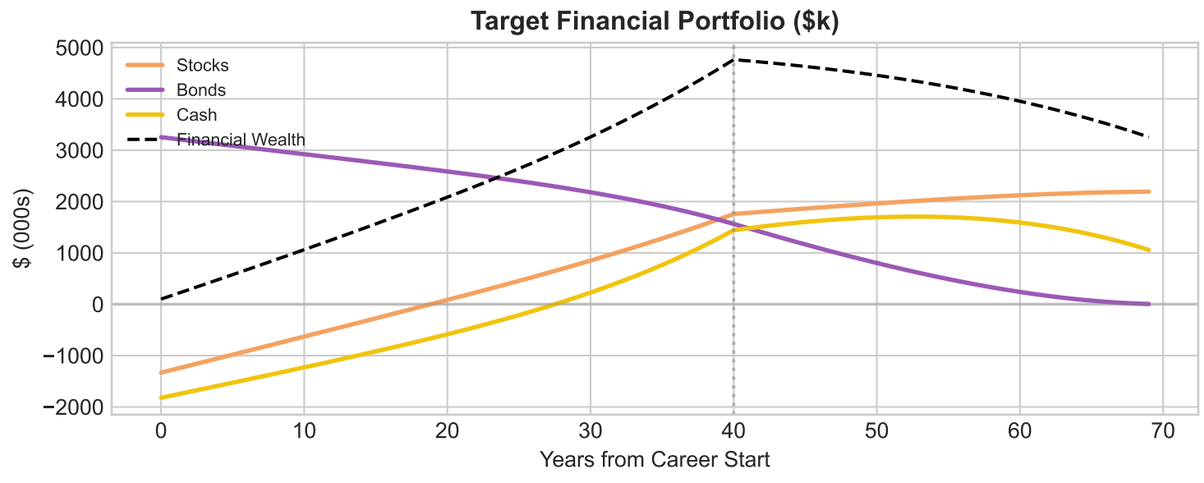
Net Fixed Income PV (Bonds + HC - Expenses)



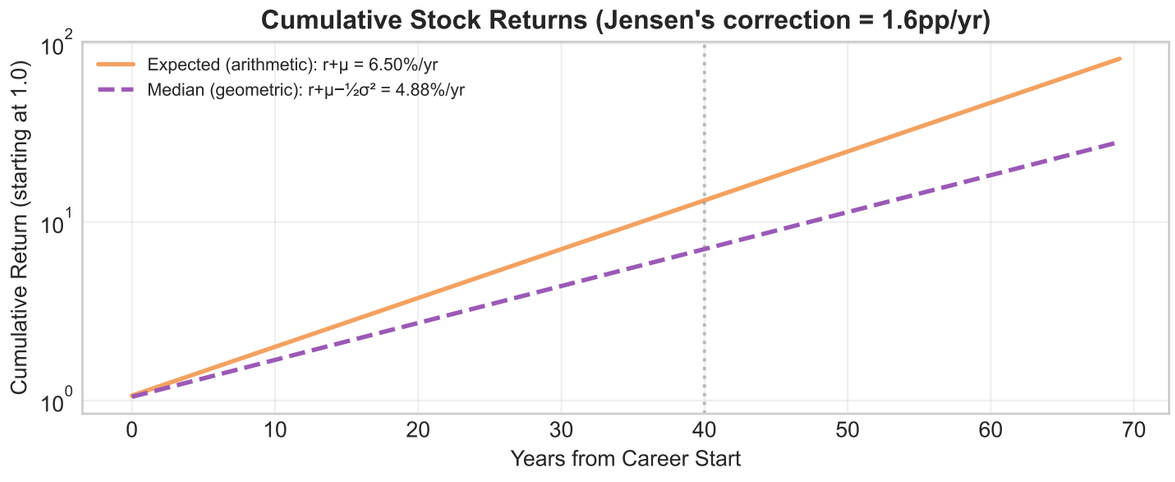
Interest Rate Sensitivity ($ gain per 1pp rate drop)



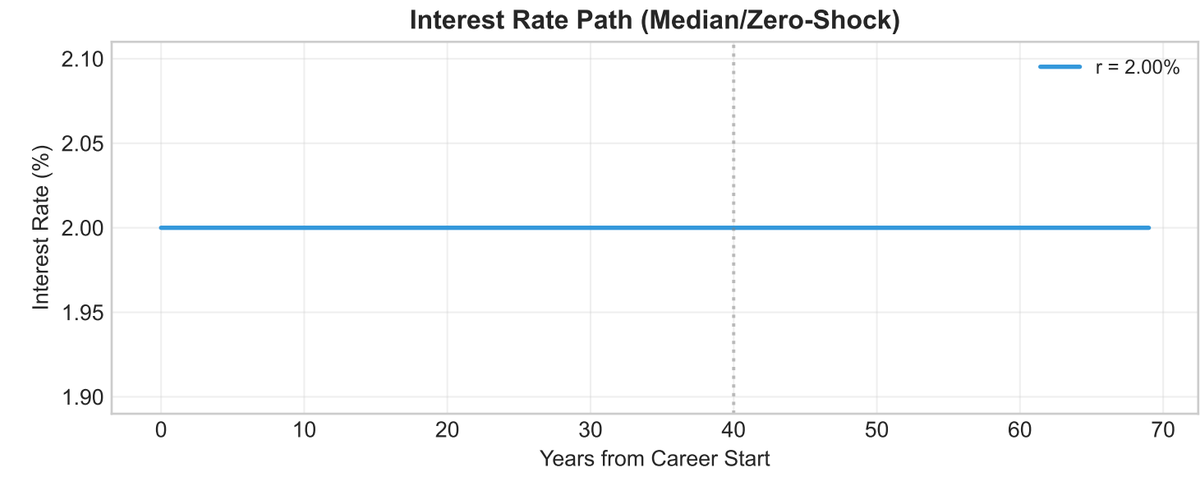
Target Financial Portfolio ($k)



Cumulative Stock Returns (Jensen's correction = 1.6pp/yr)

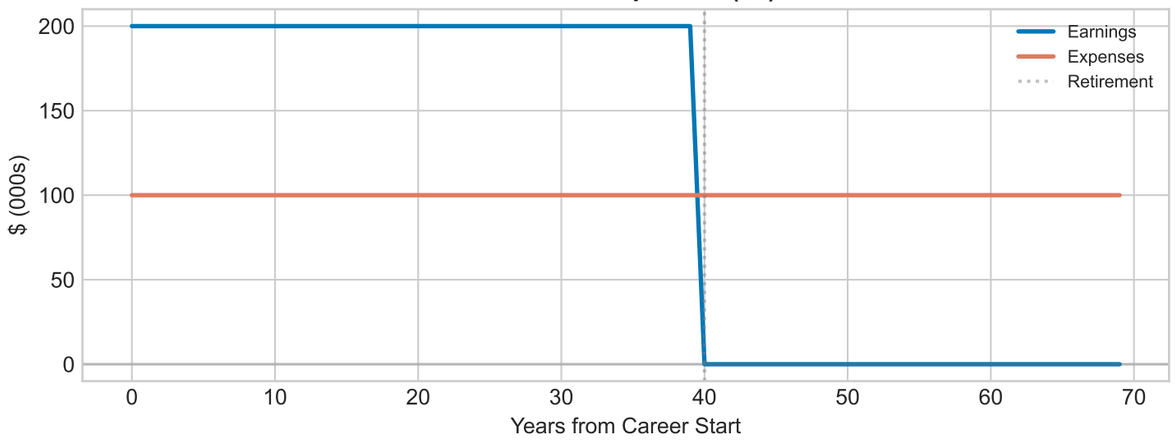


Interest Rate Path (Median/Zero-Shock)

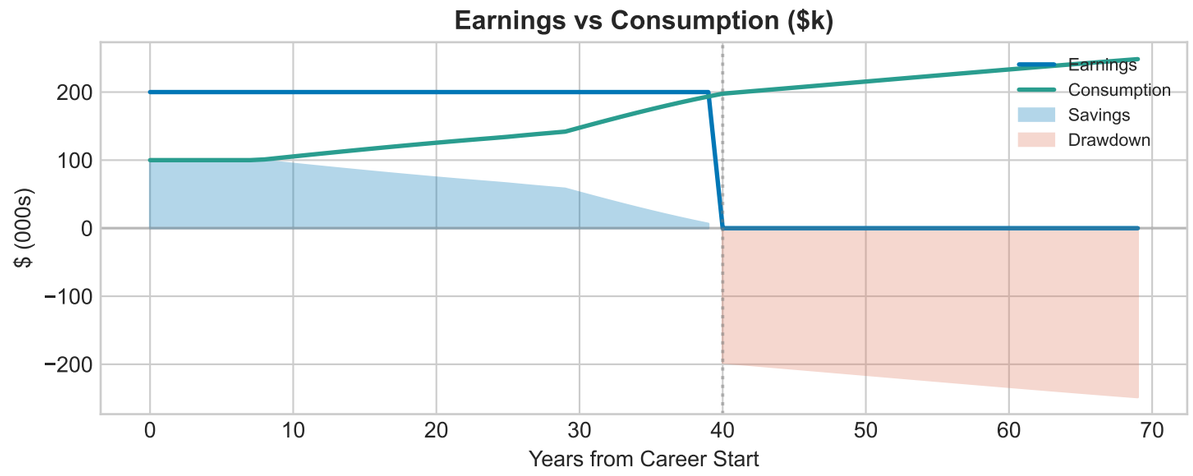


PAGE 3: DETERMINISTIC MEDIAN PATH (Beta = 1.0)

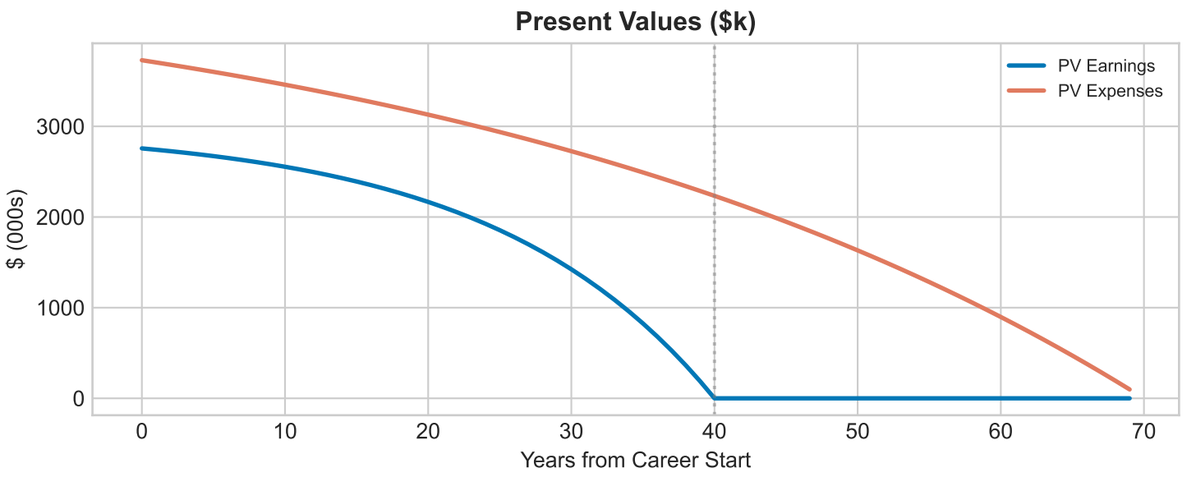
Income & Expenses ($k)



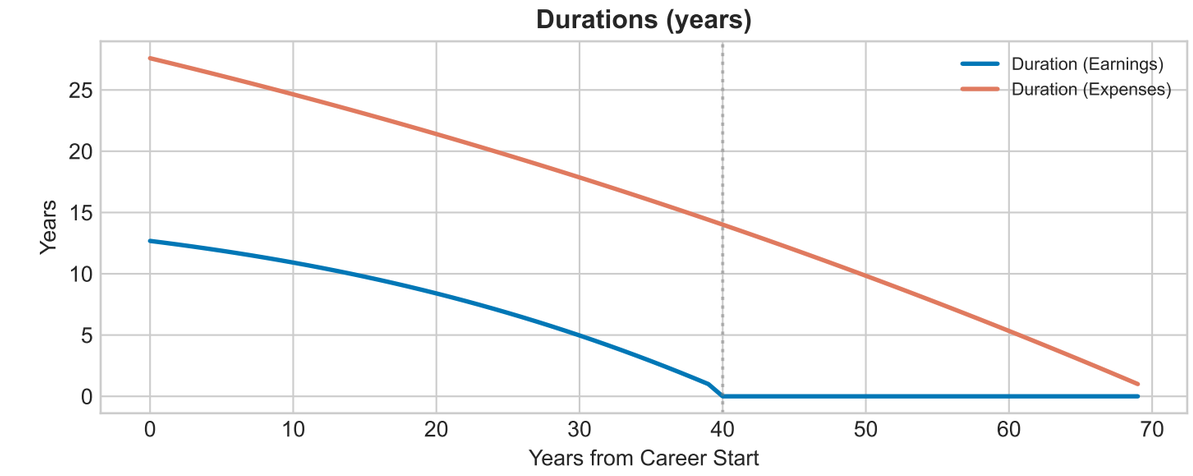
Earnings vs Consumption ($k)



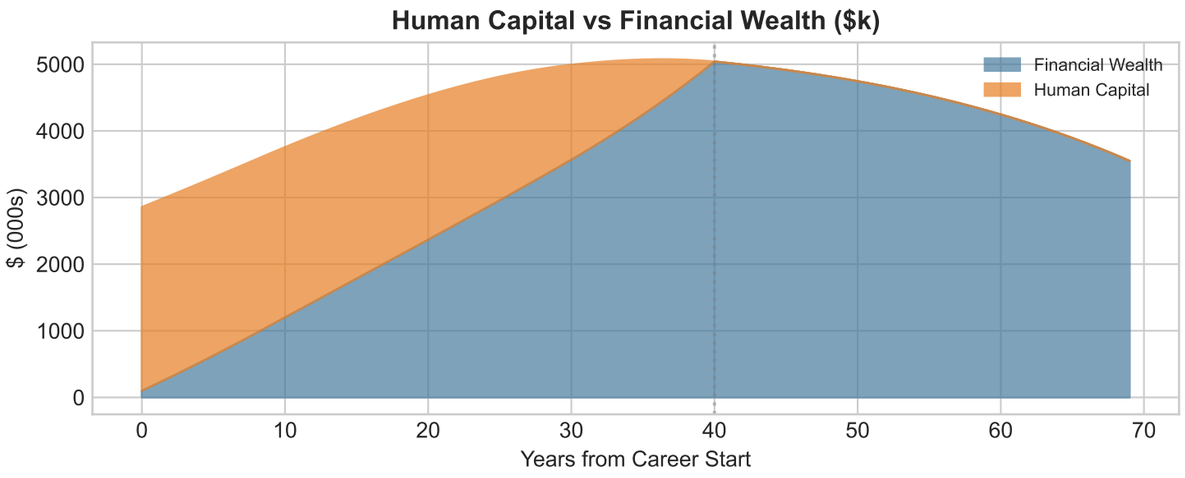
Present Values ($k)



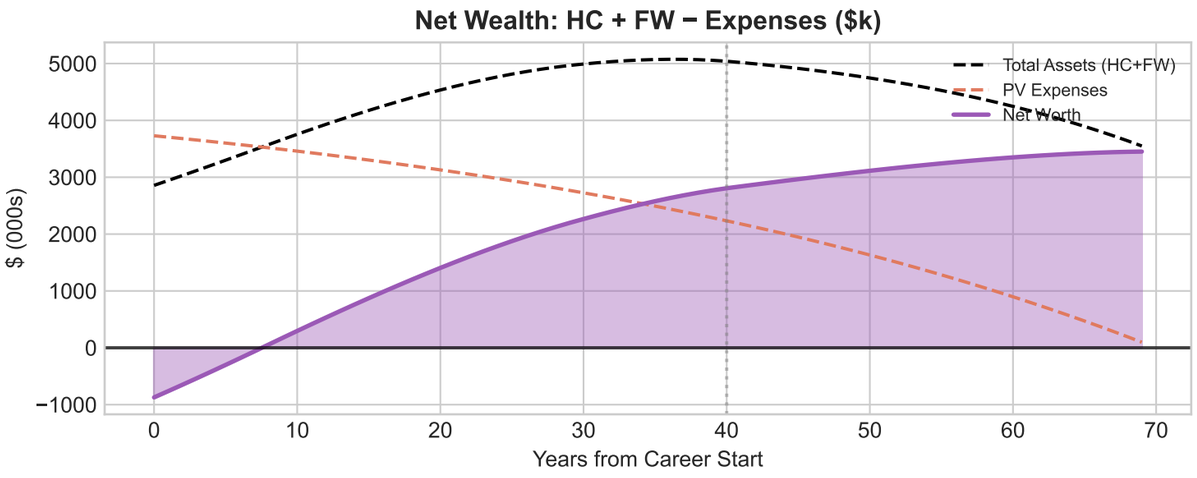
Durations (years)



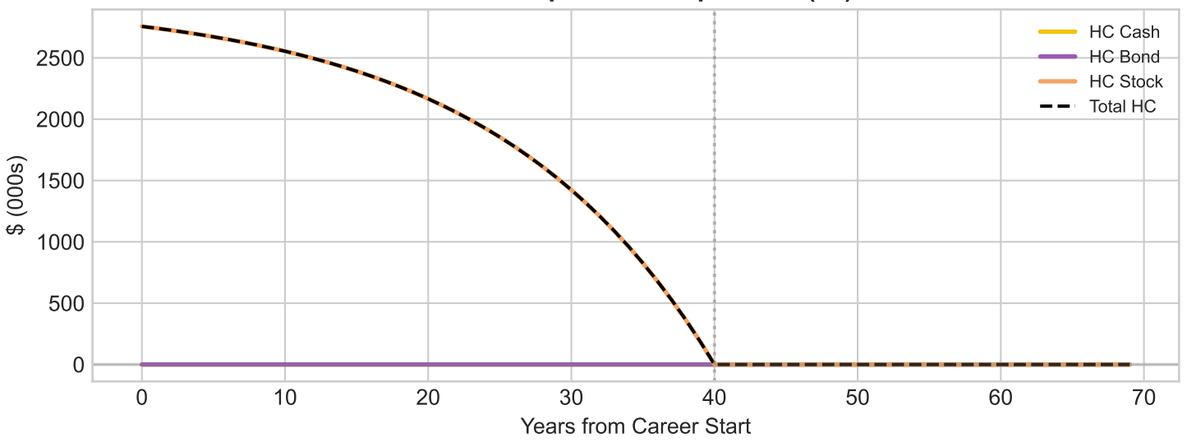
Human Capital vs Financial Wealth ($k)



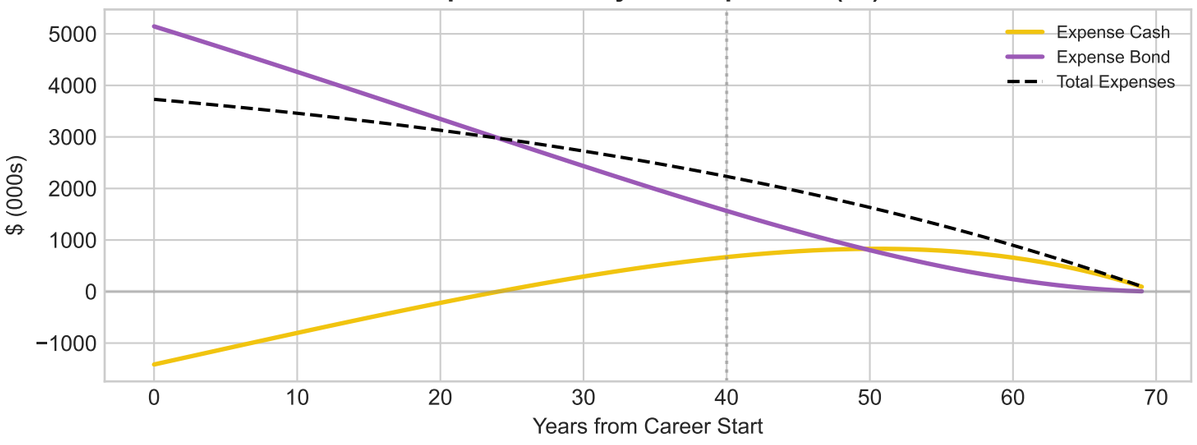
Net Wealth: HC + FW − Expenses ($k)



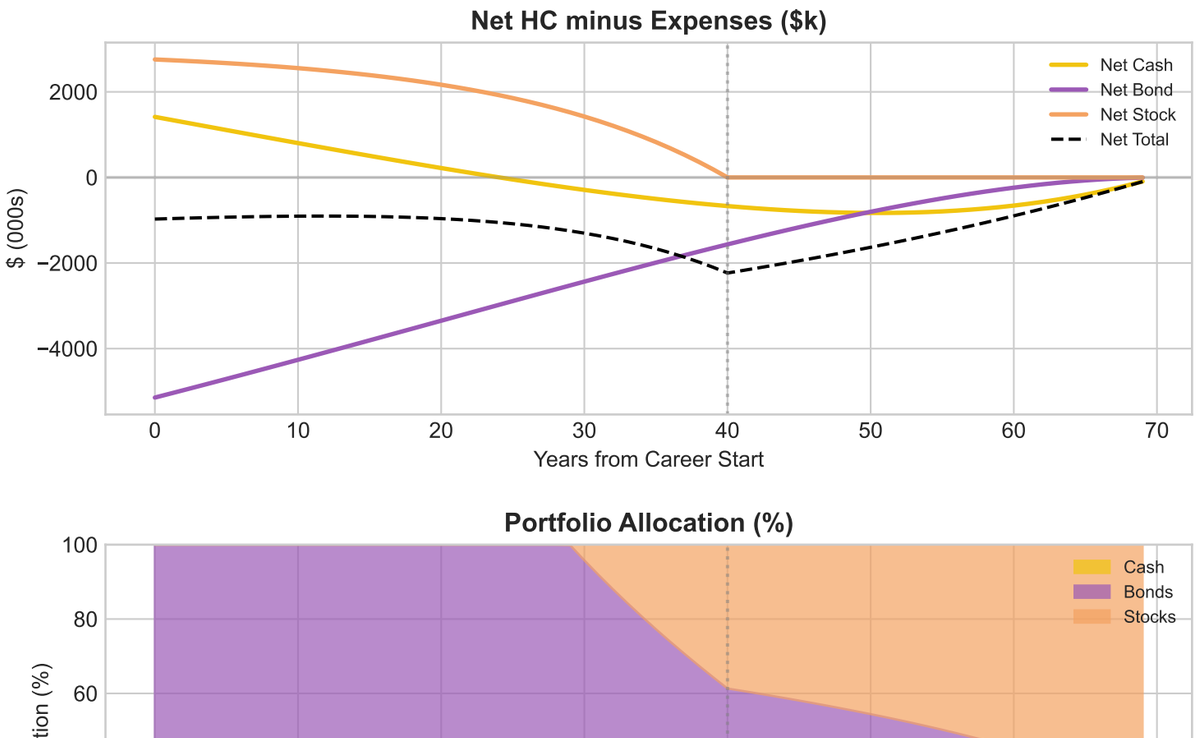
Human Capital Decomposition ($k)



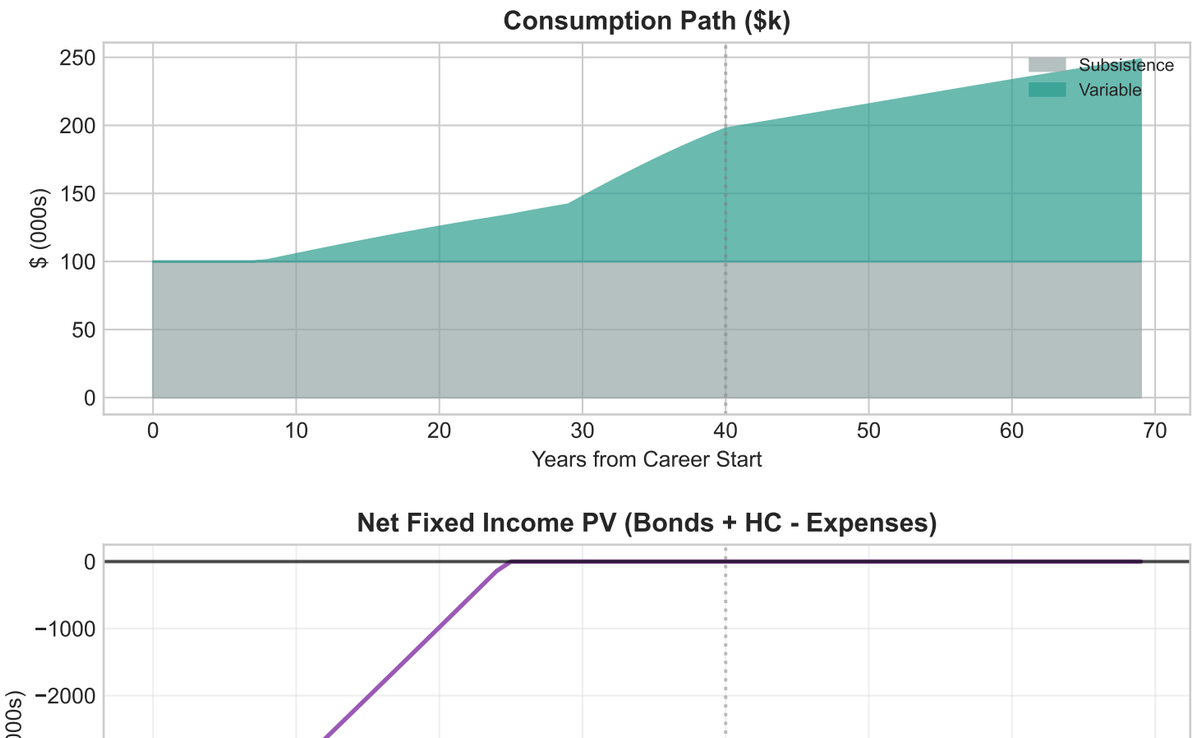
Expense Liability Decomposition ($k)



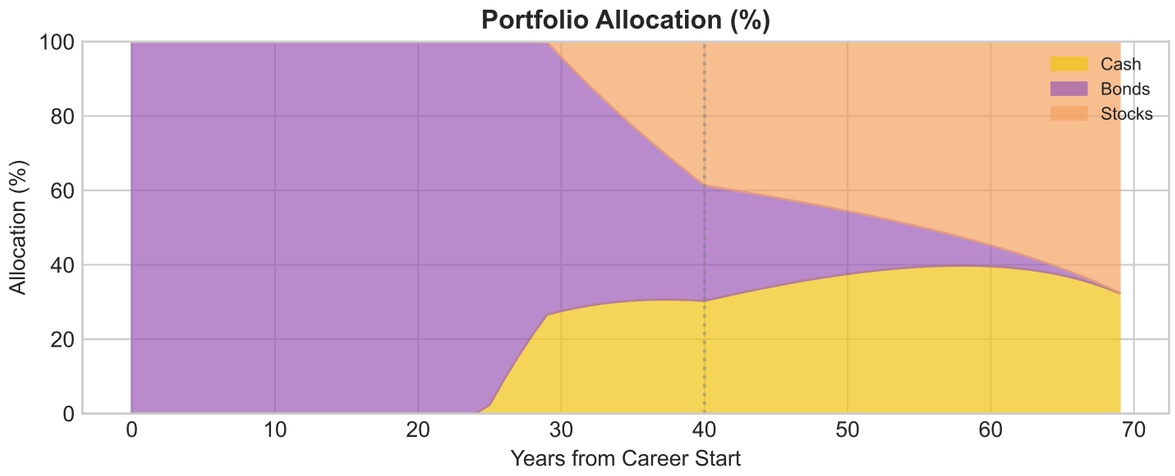
Net HC minus Expenses ($k)



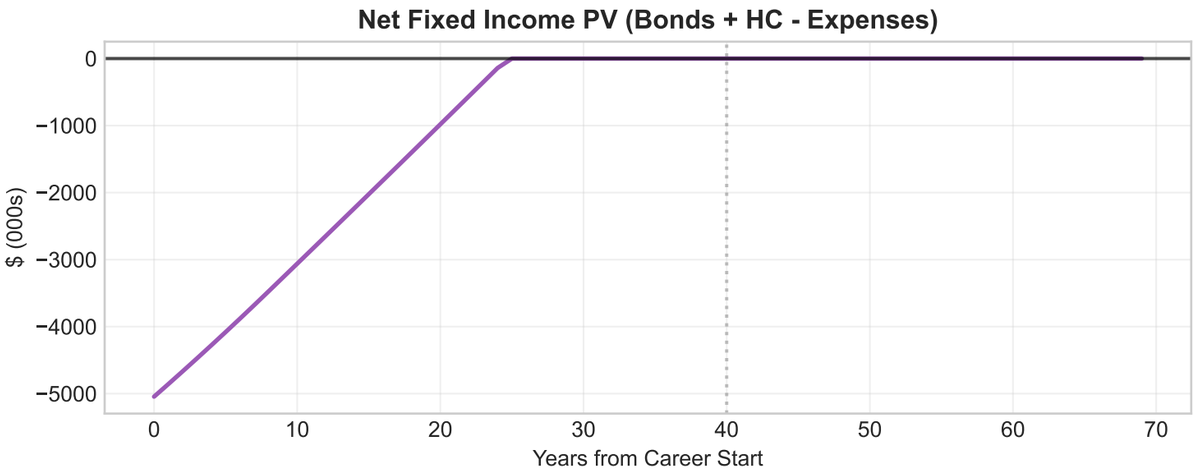
Consumption Path ($k)



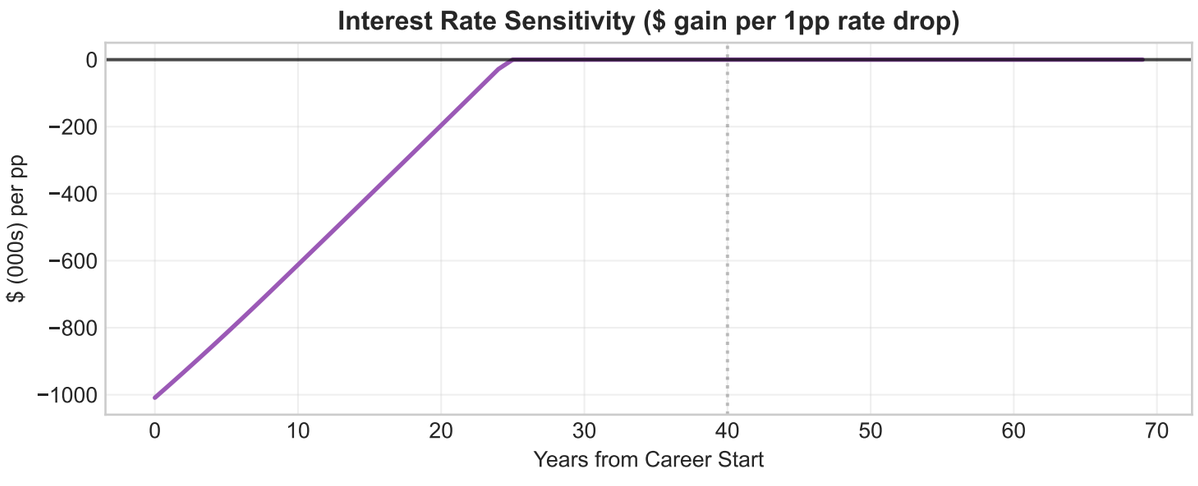
Portfolio Allocation (%)



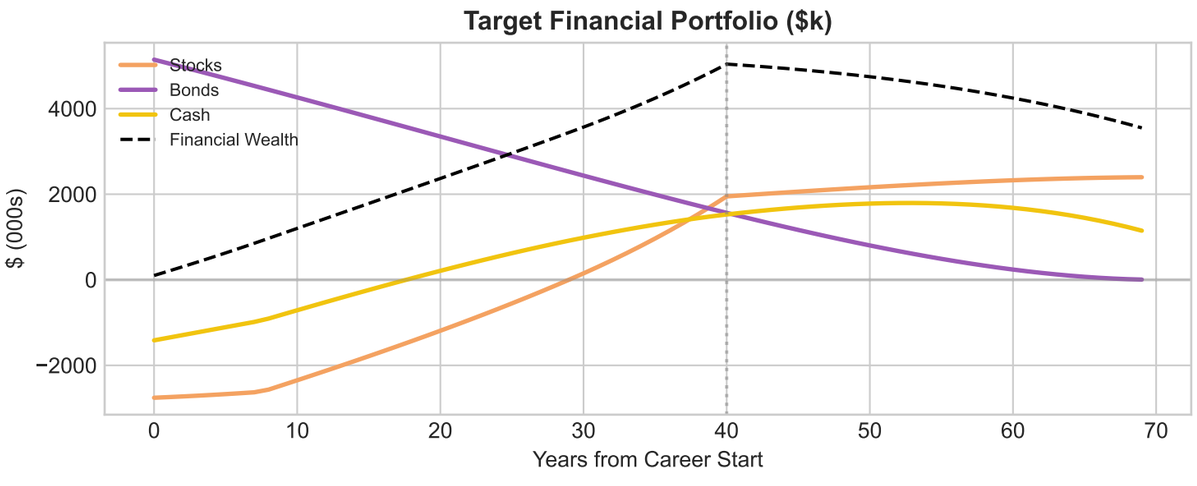
Net Fixed Income PV (Bonds + HC - Expenses)



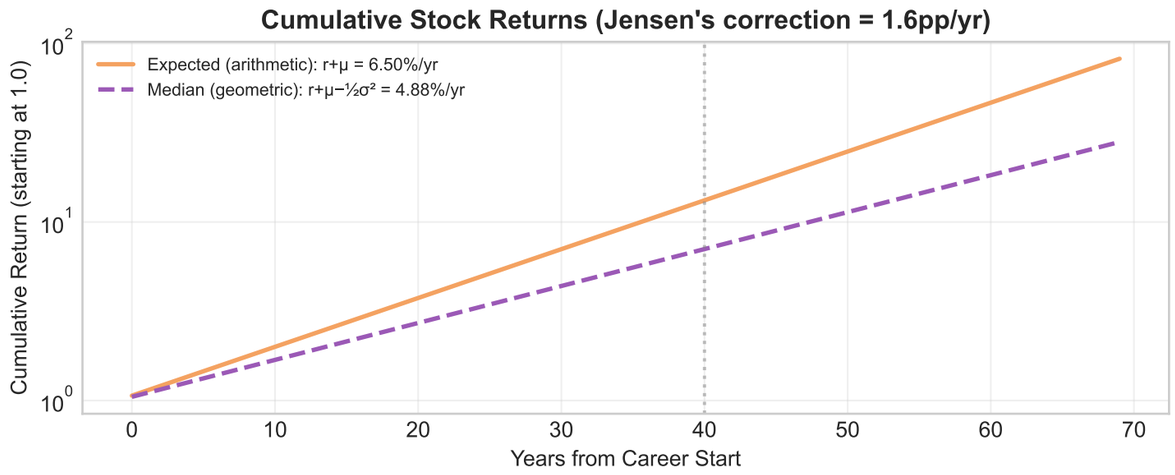
Interest Rate Sensitivity ($ gain per 1pp rate drop)



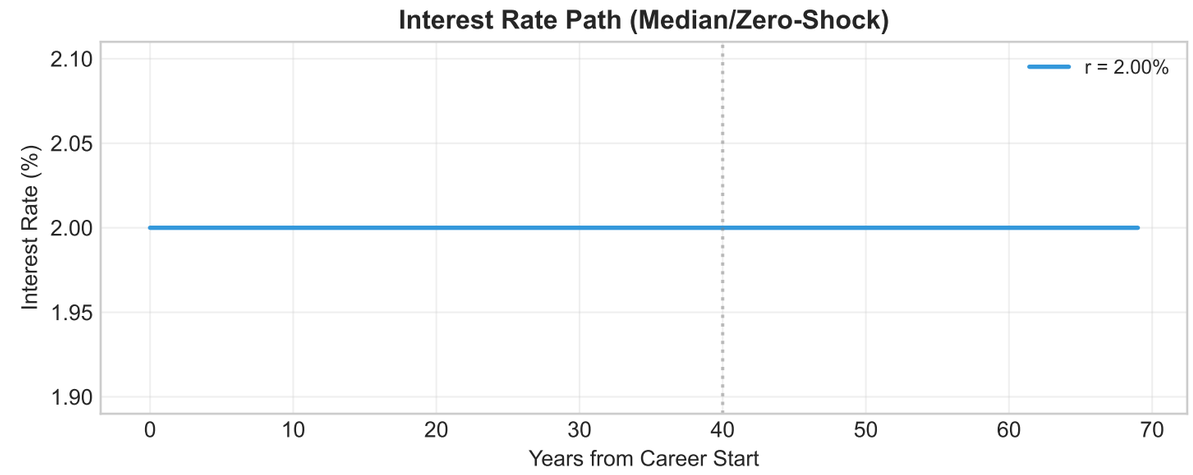
Target Financial Portfolio ($k)



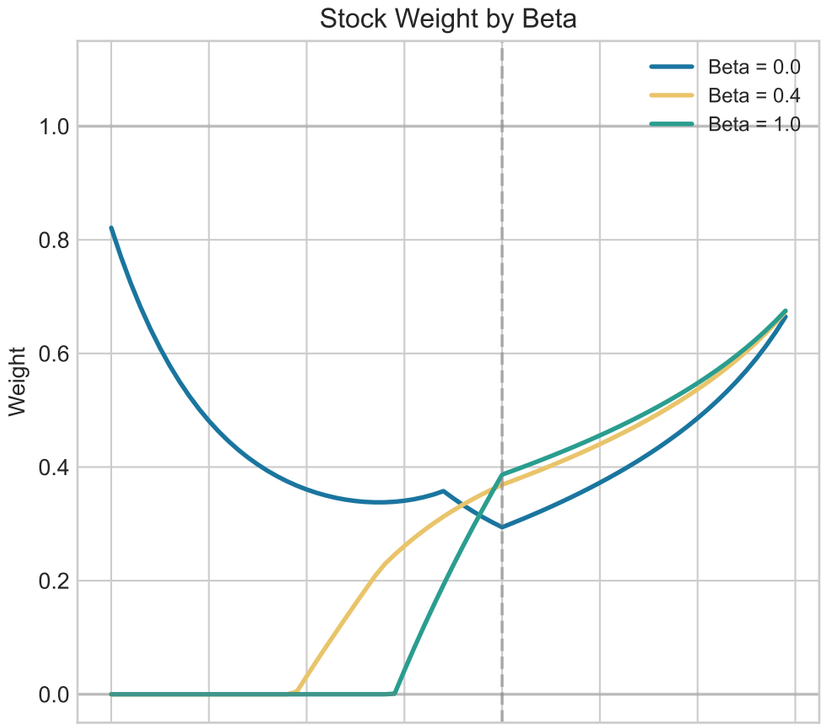
Cumulative Stock Returns (Jensen's correction = 1.6pp/yr)

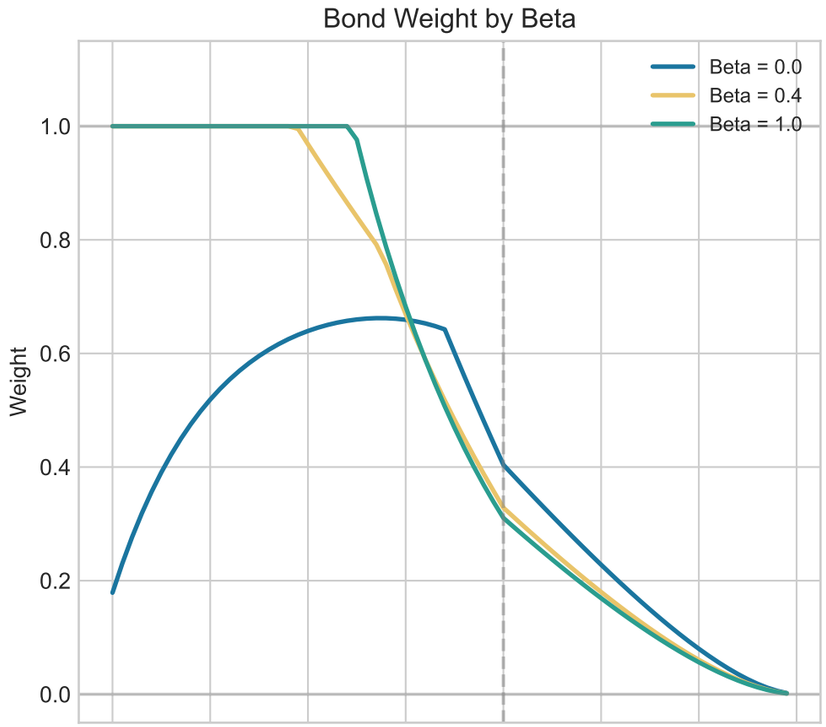


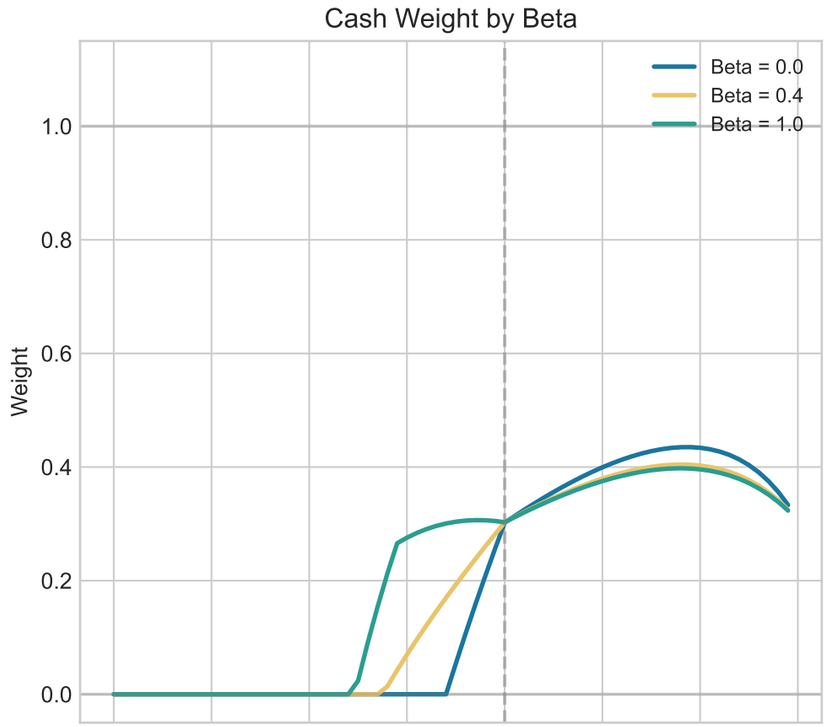
Interest Rate Path (Median/Zero-Shock)

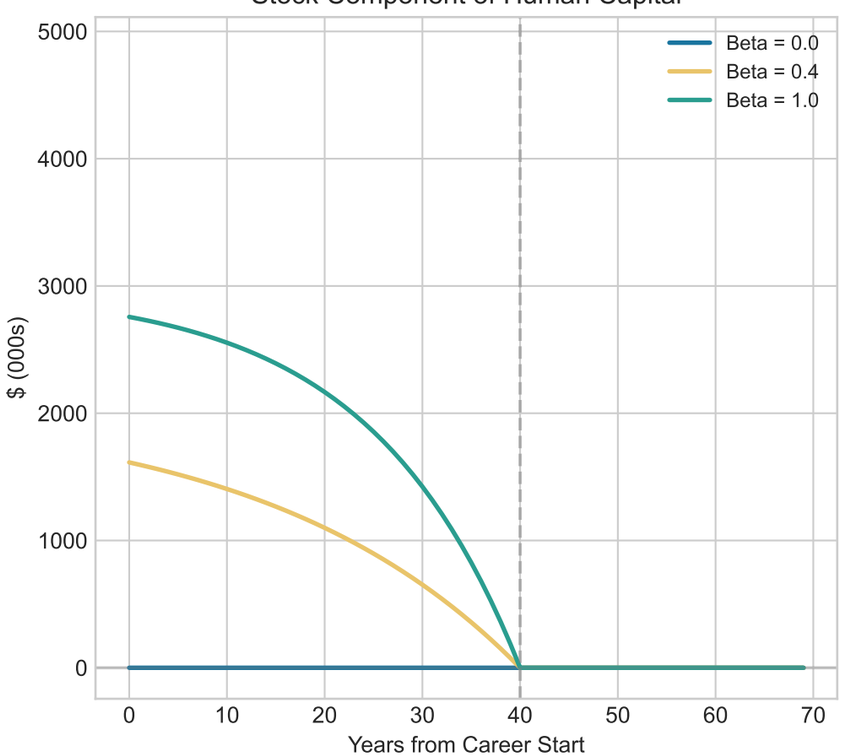


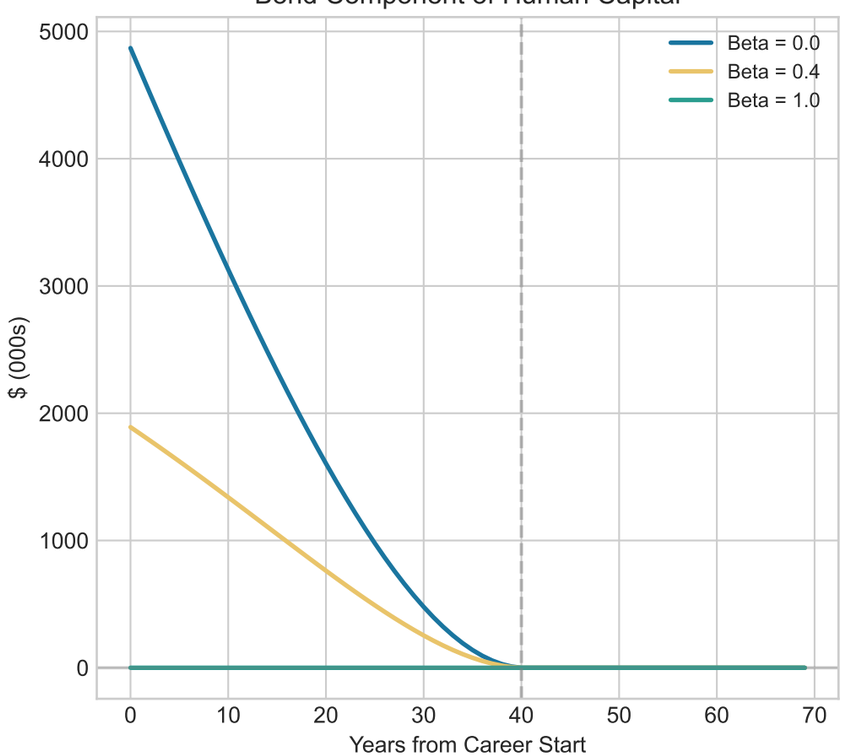
Effect of Stock Beta on Portfolio Allocation & Human Capital

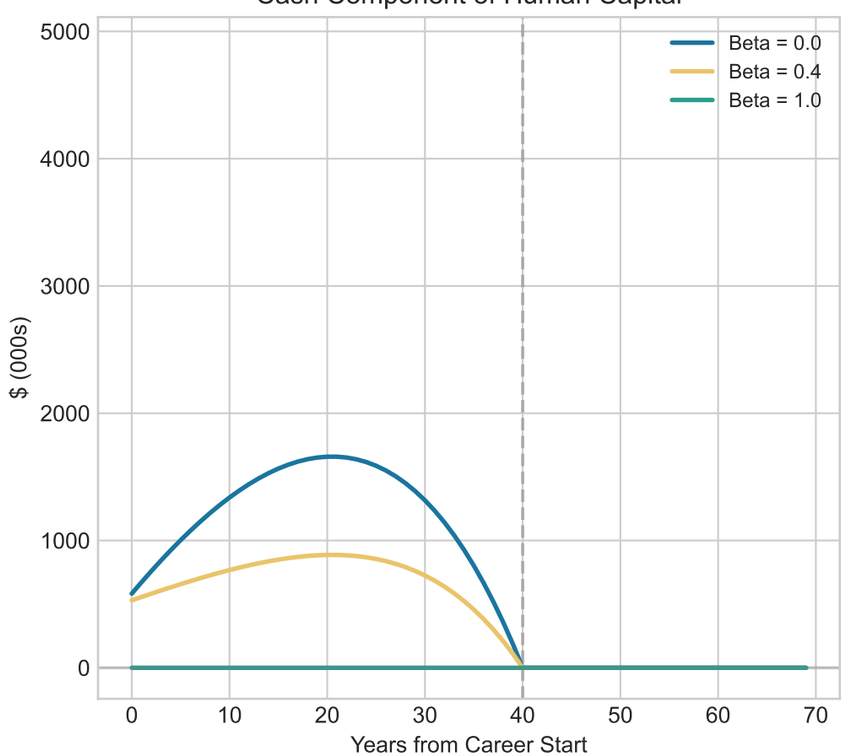




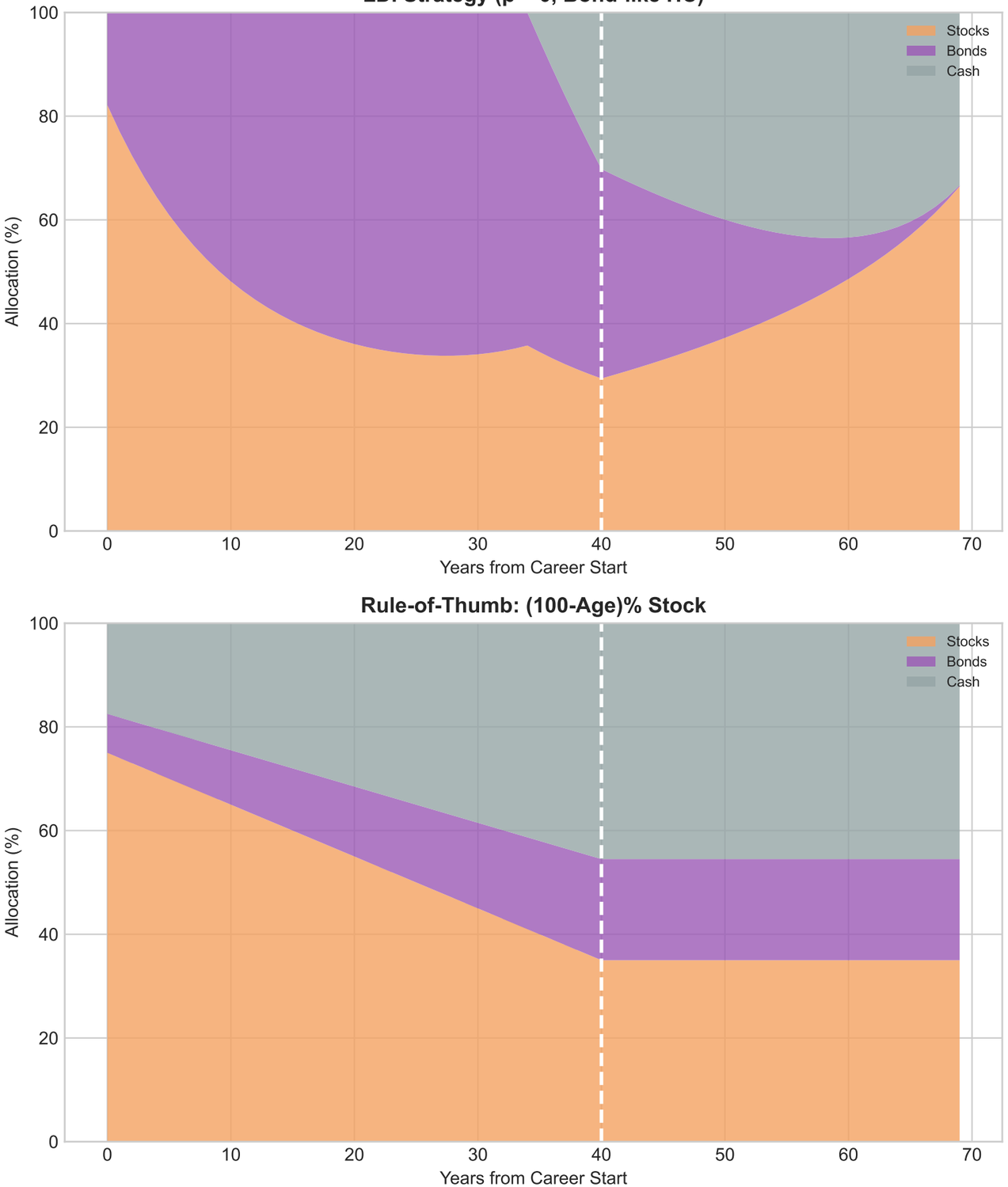


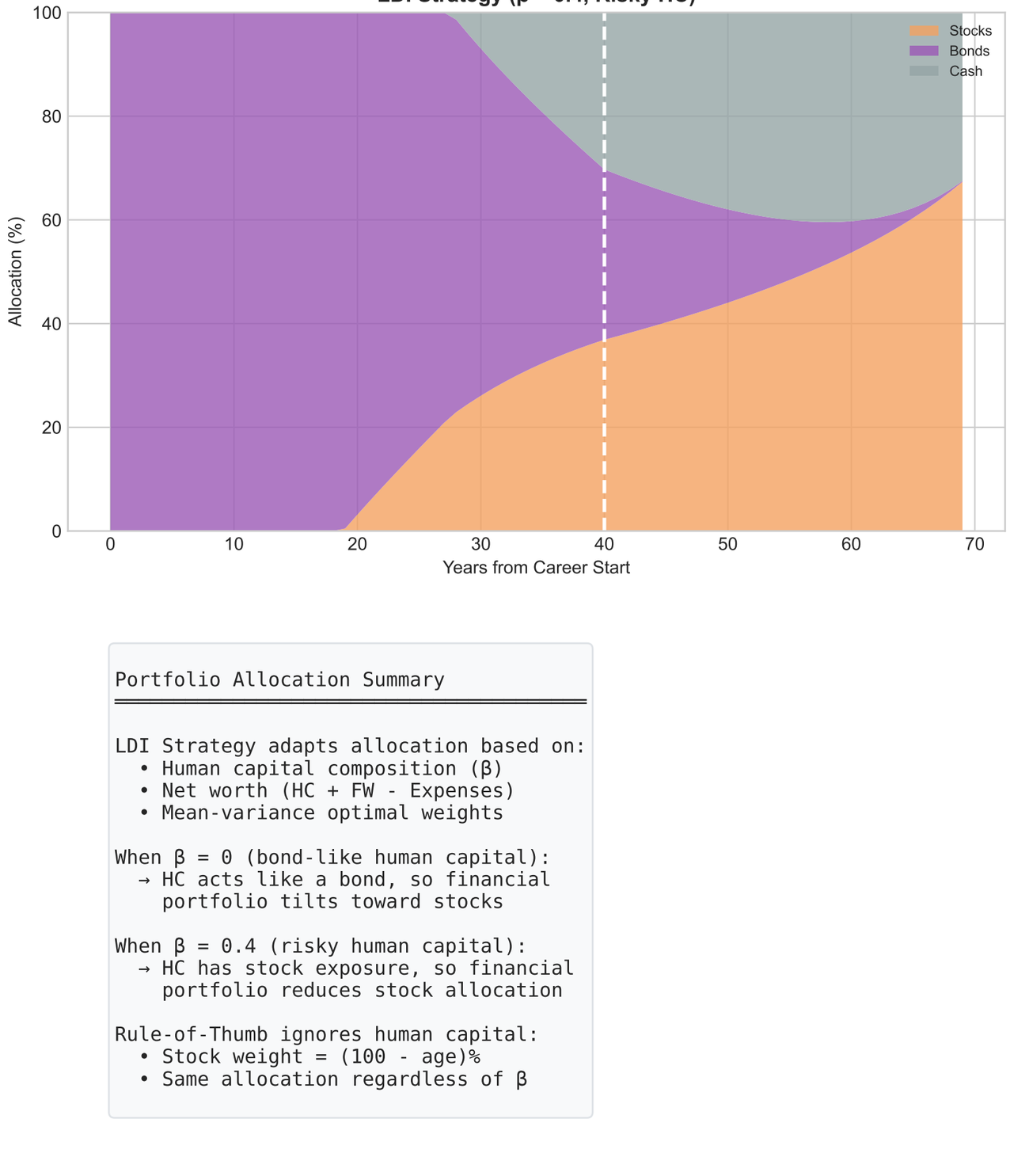






PAGE 5: Portfolio Allocation Comparison — LDI vs Rule-of-Thumb



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Portfolio Allocation Summary
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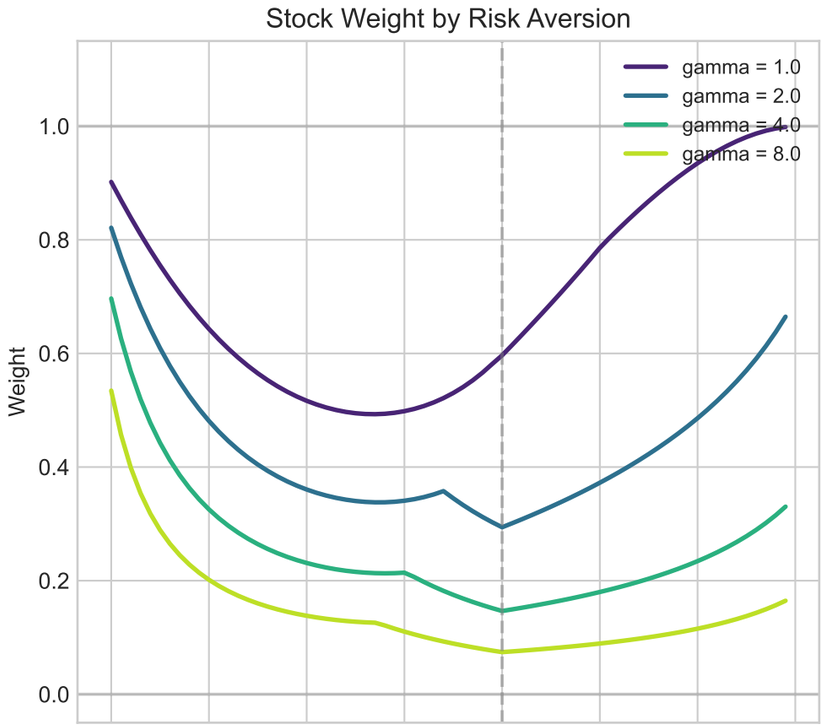
LDI Strategy adapts allocation based on:
  • Human capital composition (β)
  • Net worth (HC + FW - Expenses)
  • Mean-variance optimal weights

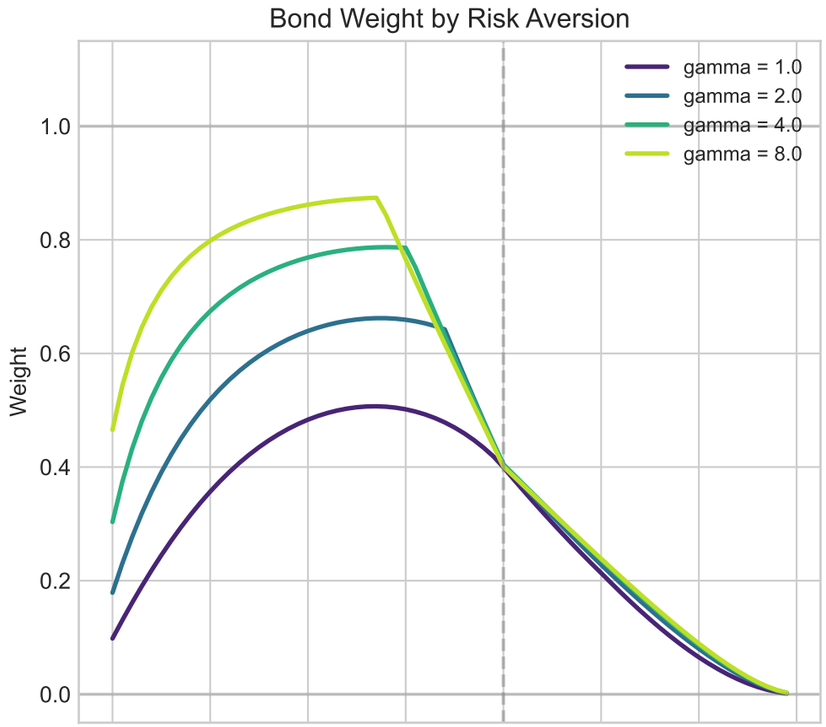
When β = 0 (bond-like human capital):
  → HC acts like a bond, so financial
    portfolio tilts toward stocks

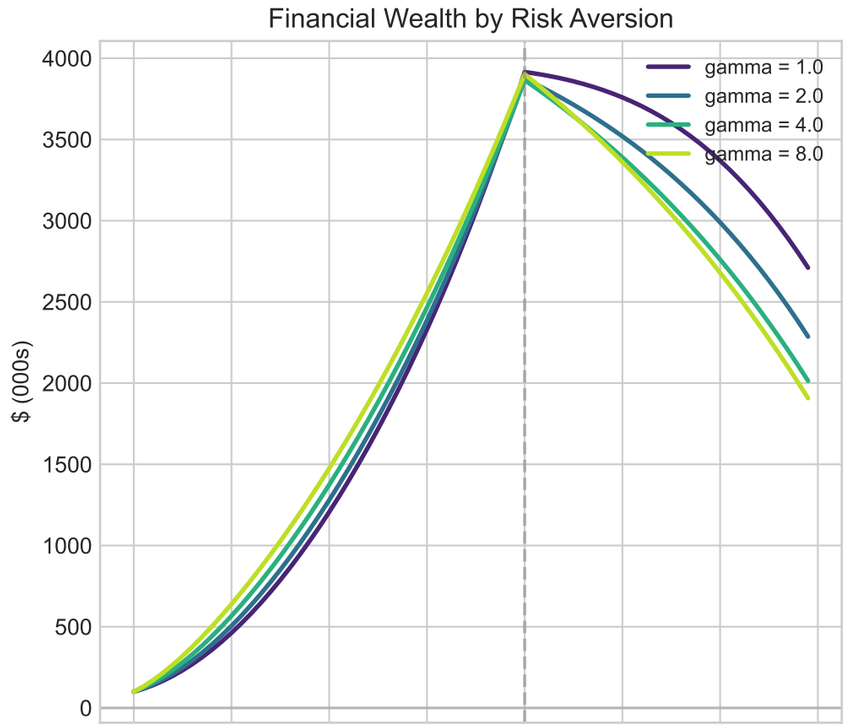
When β = 0.4 (risky human capital):
  → HC has stock exposure, so financial
    portfolio reduces stock allocation

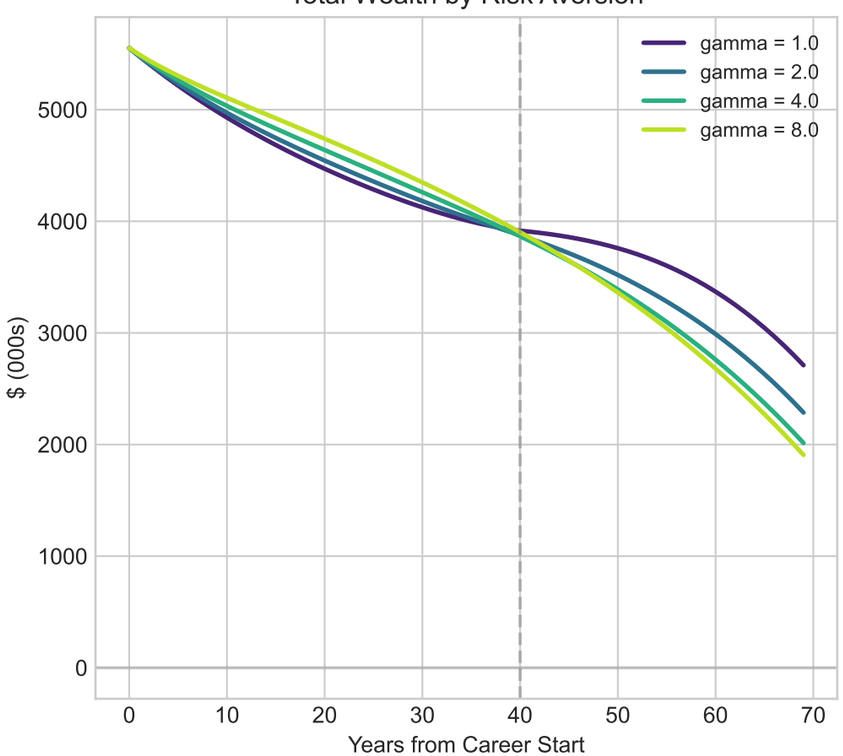
Rule-of-Thumb ignores human capital:
  • Stock weight = (100 - age)%
  • Same allocation regardless of β
```

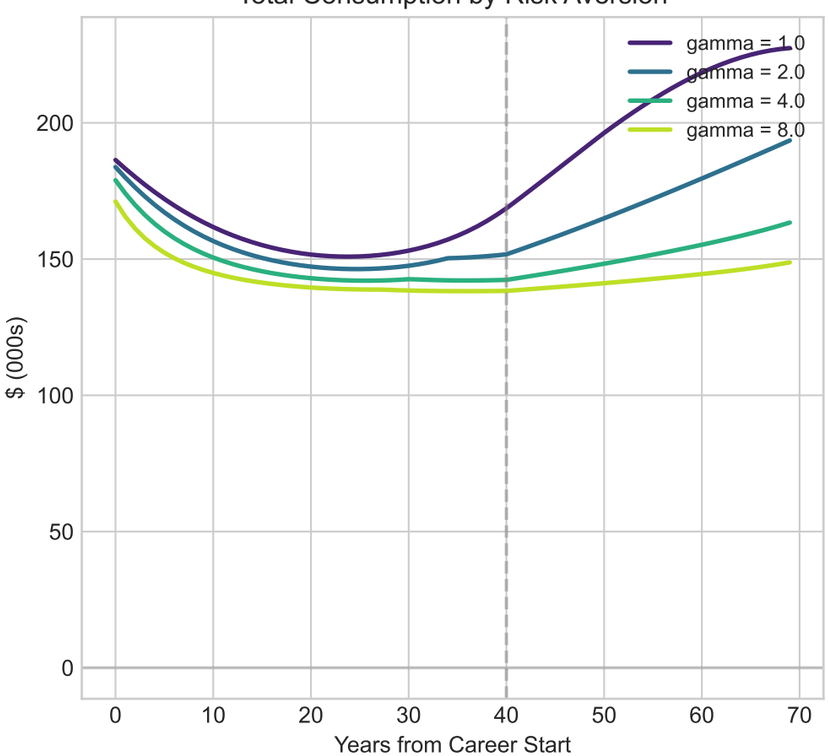
Effect of Risk Aversion on Lifecycle Strategy

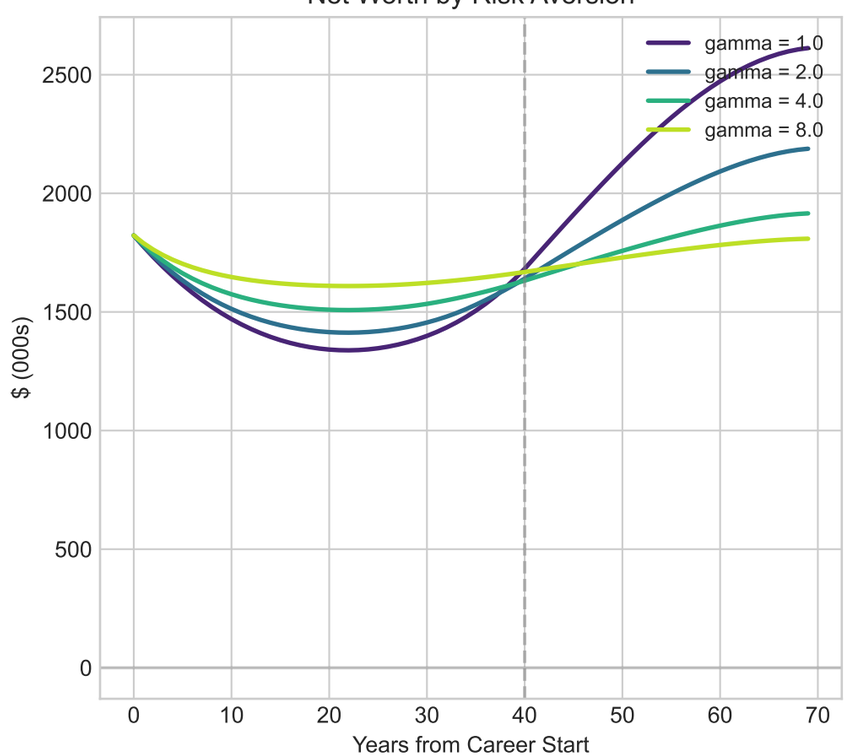




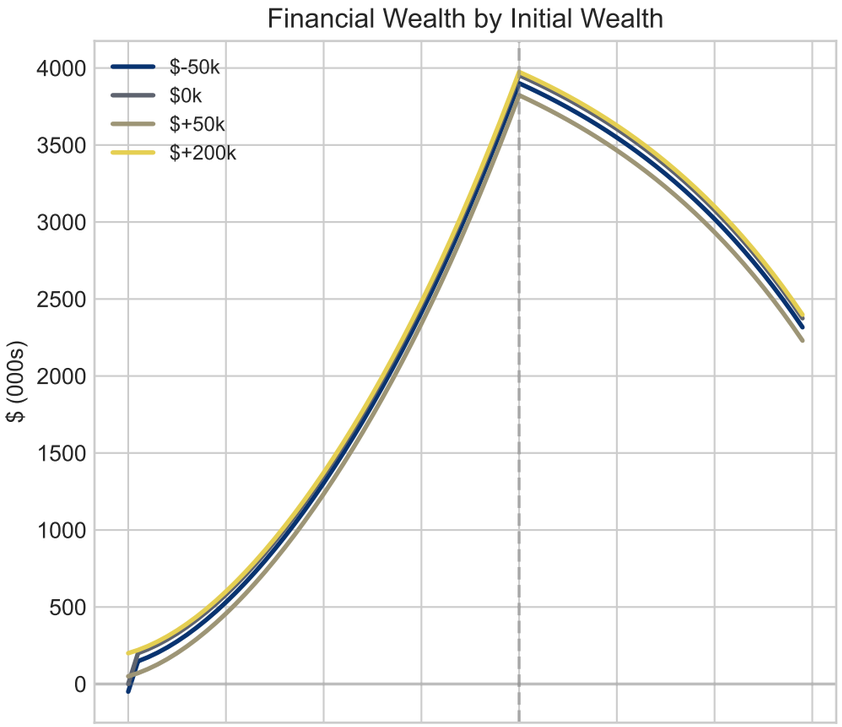


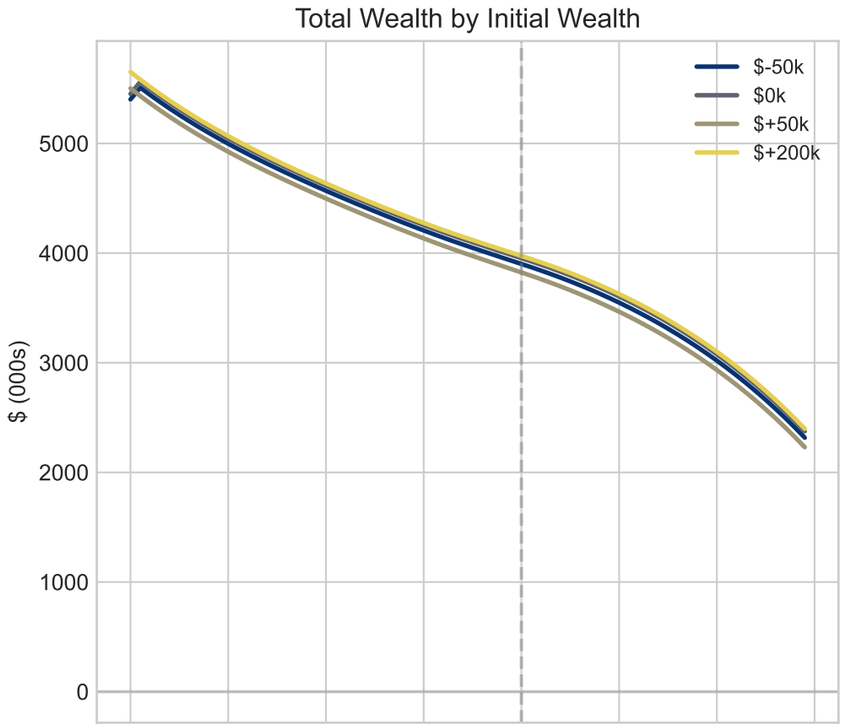


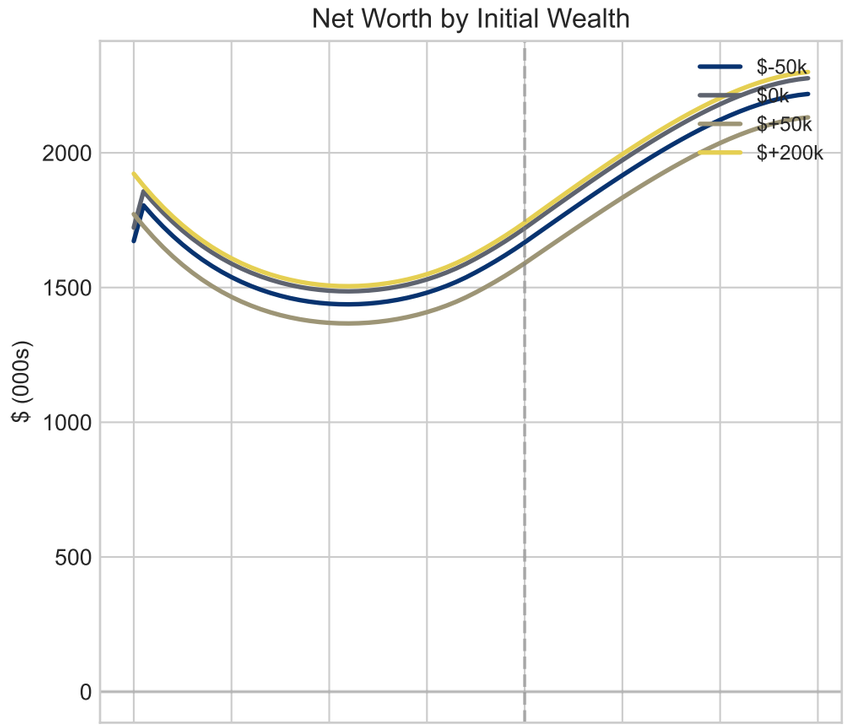


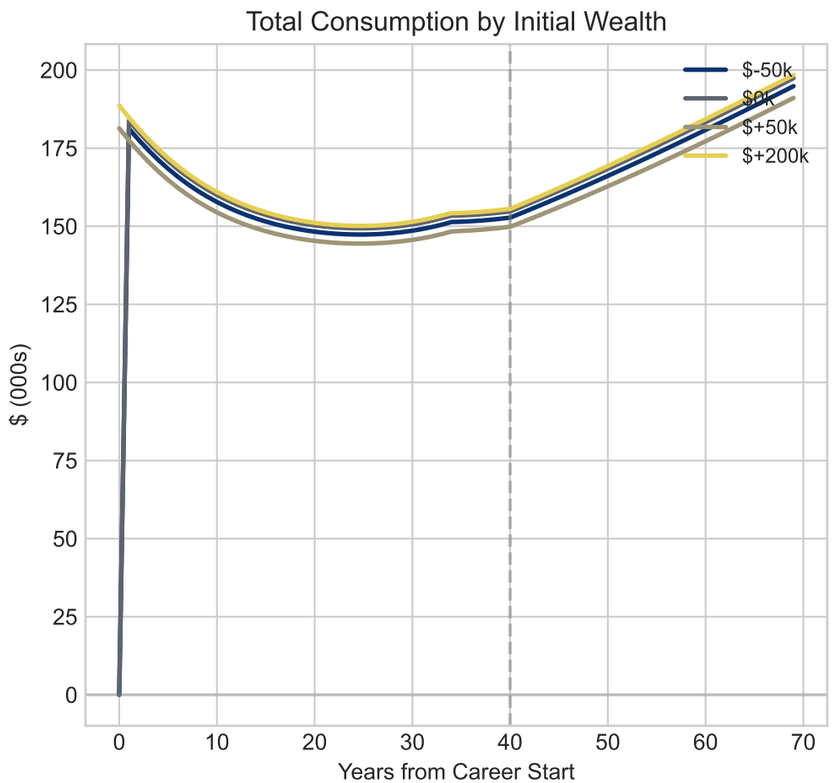


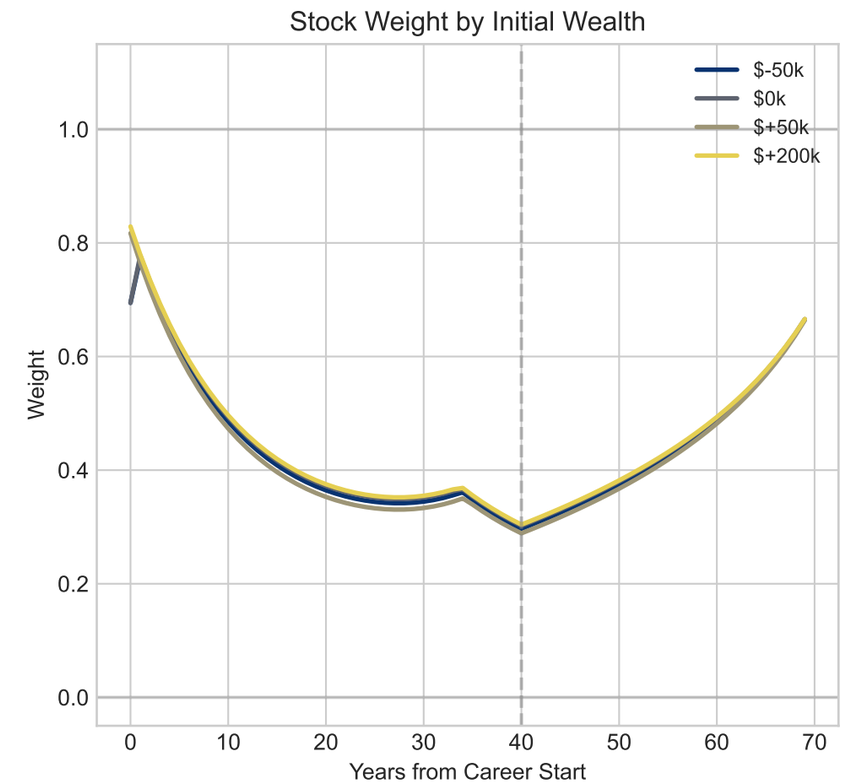
Effect of Initial Wealth on Lifecycle Strategy

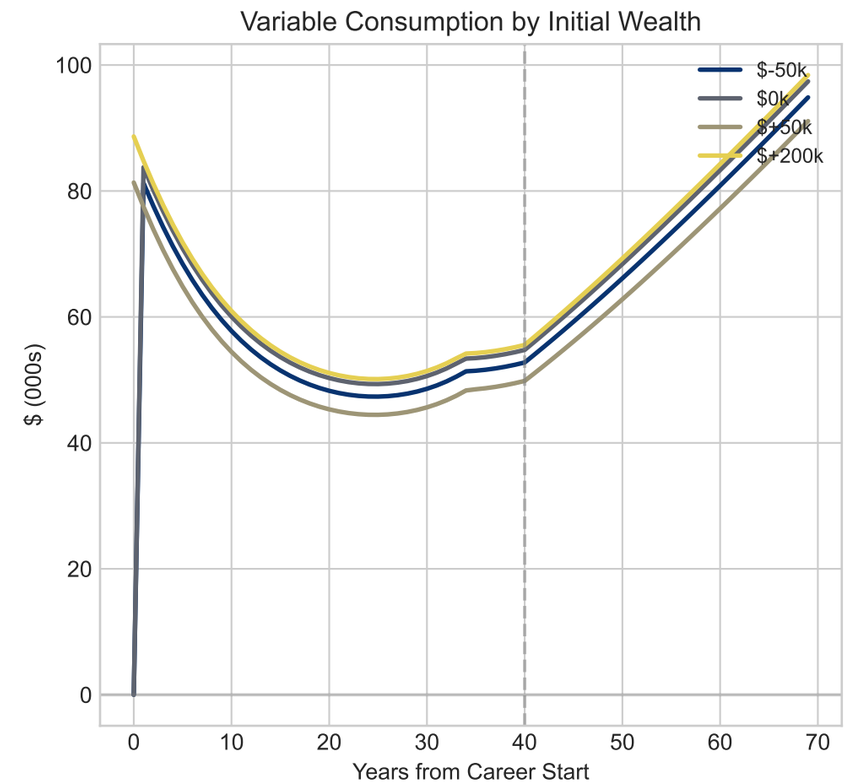




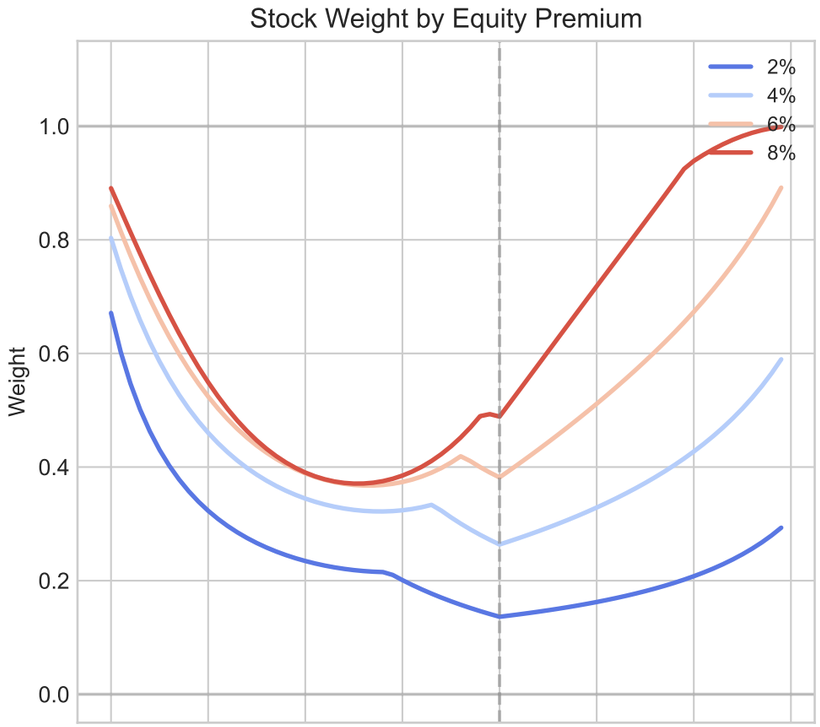


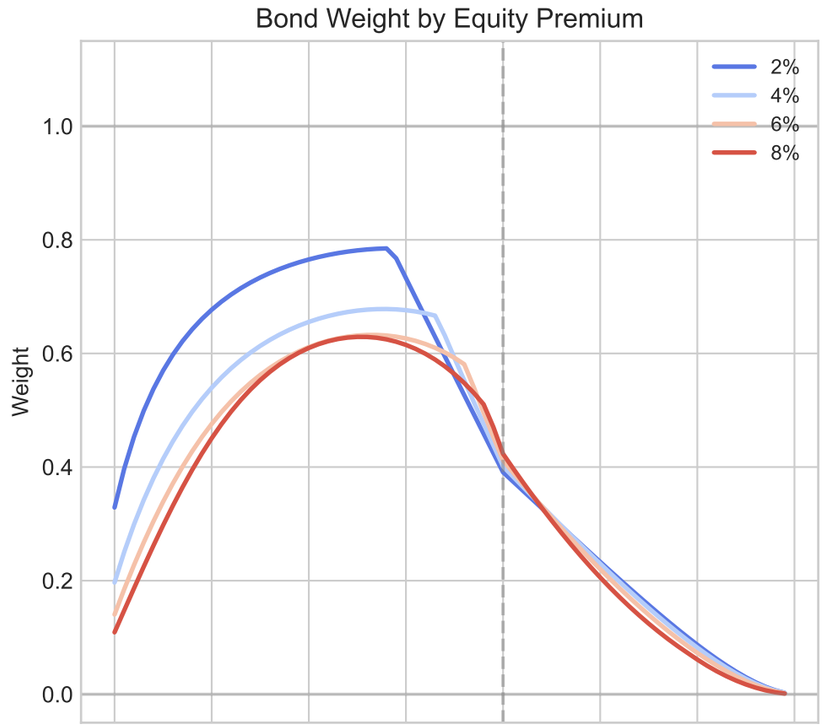


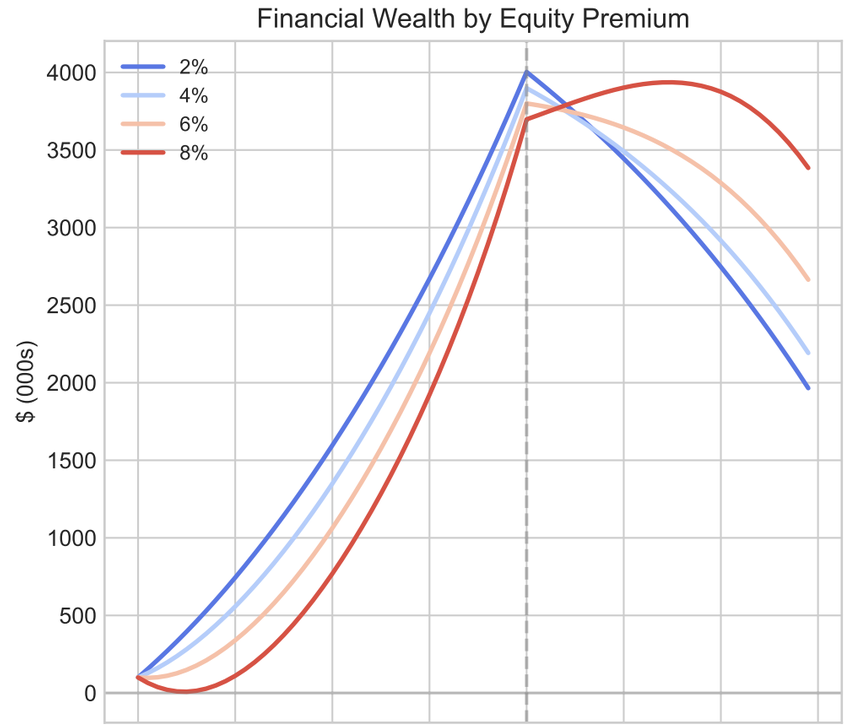


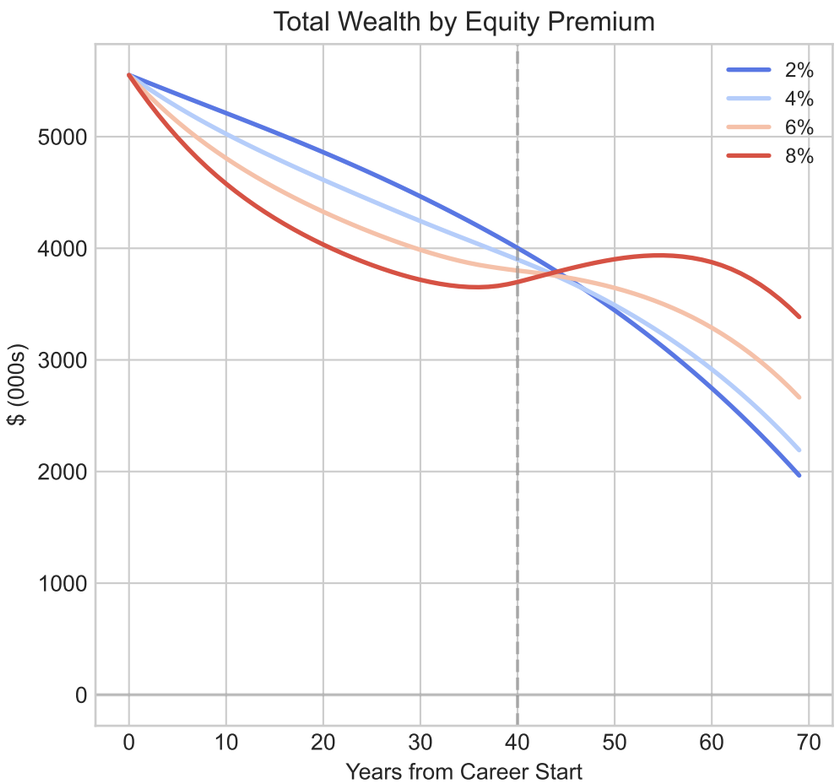


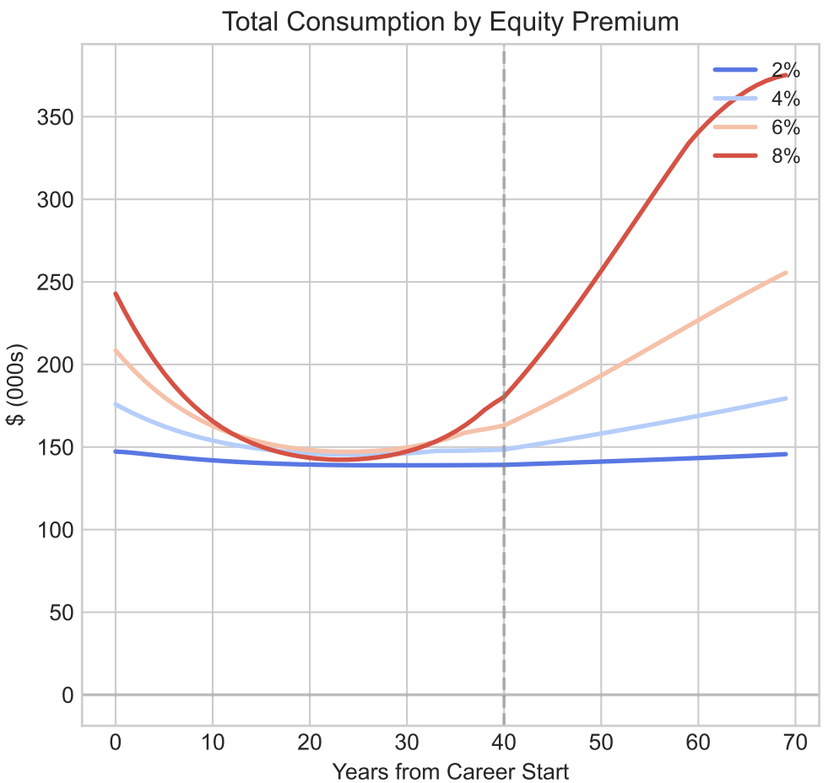
Effect of Equity Risk Premium on Lifecycle Strategy

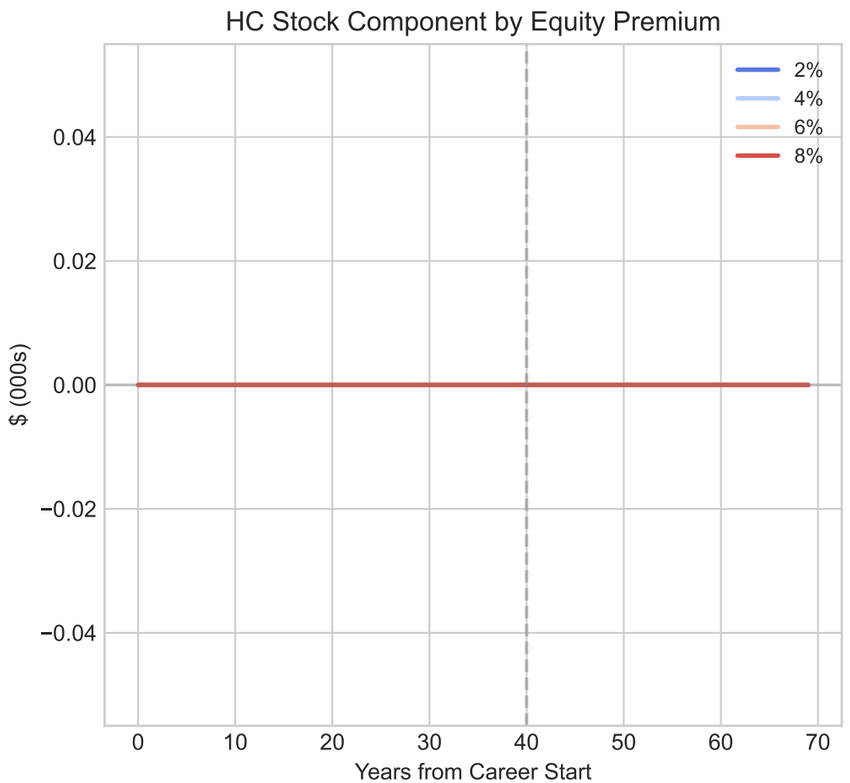




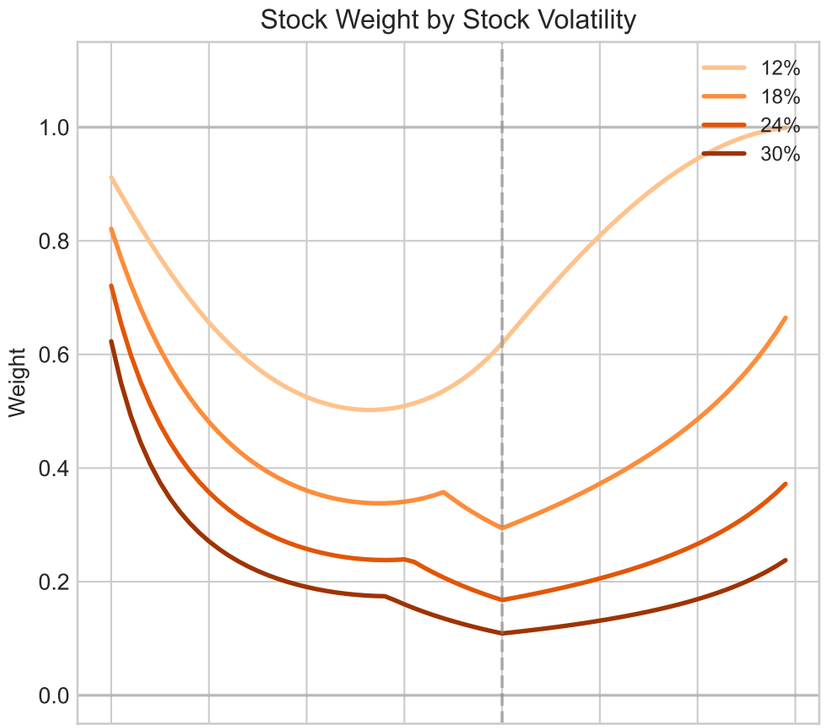


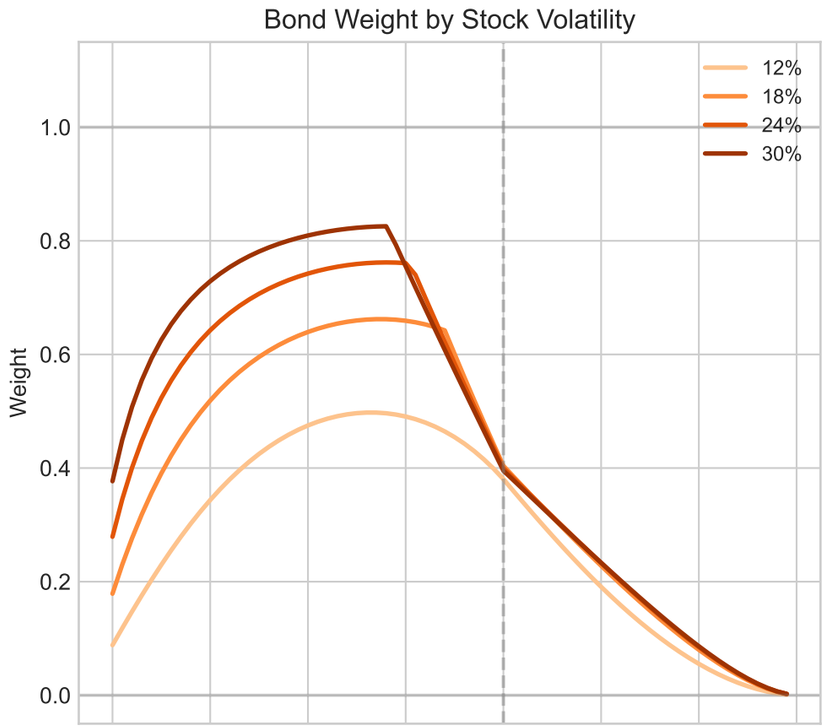


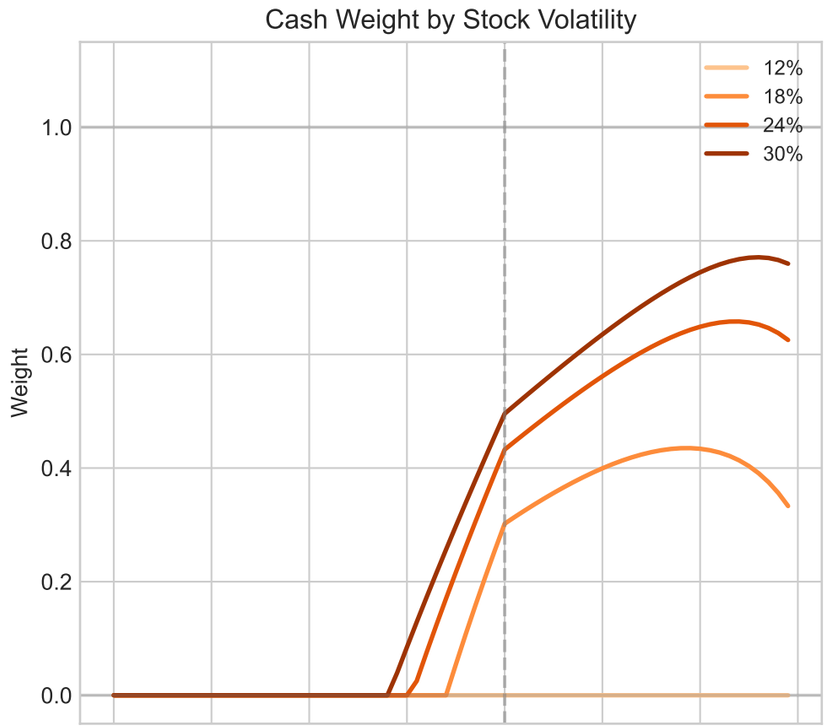


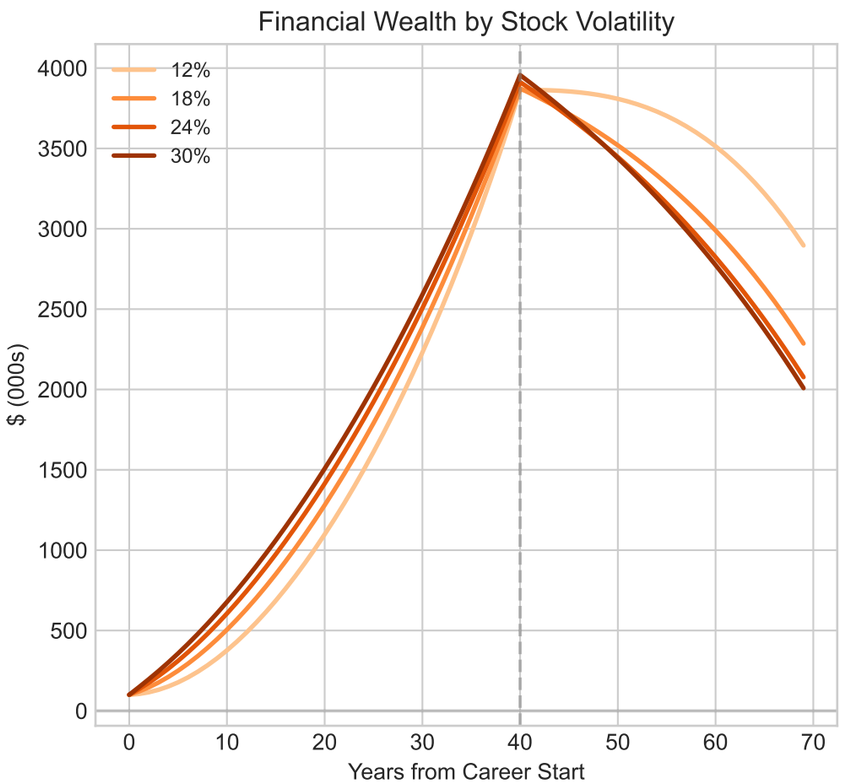


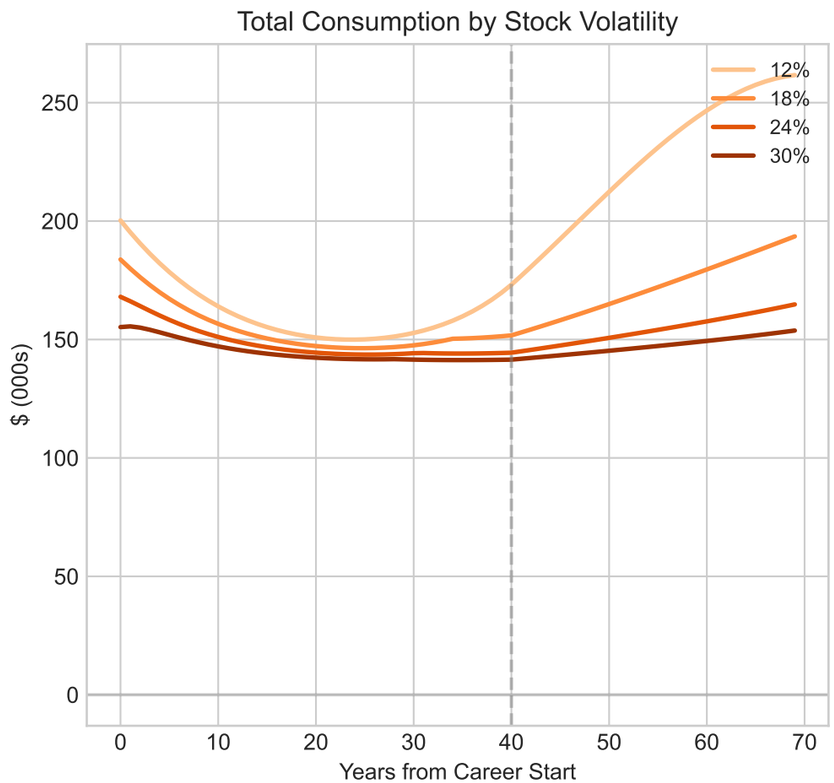
Effect of Stock Volatility on Lifecycle Strategy



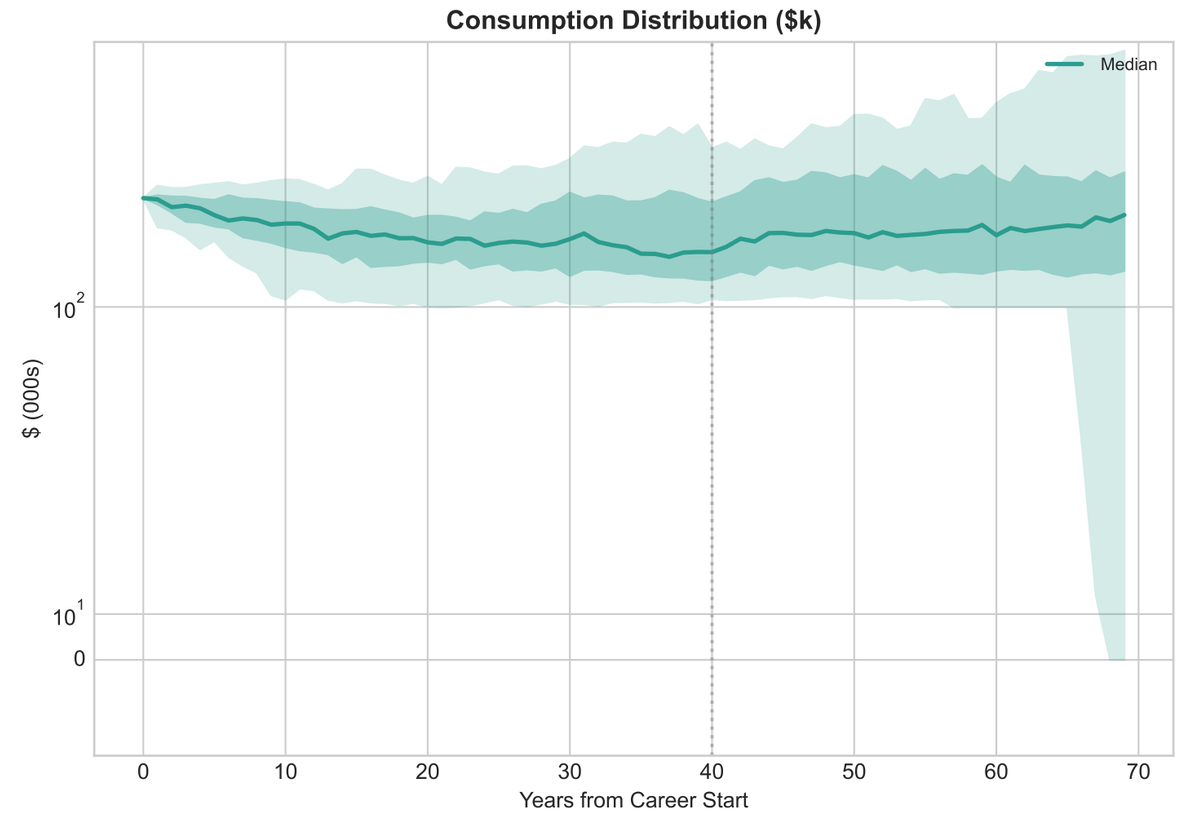


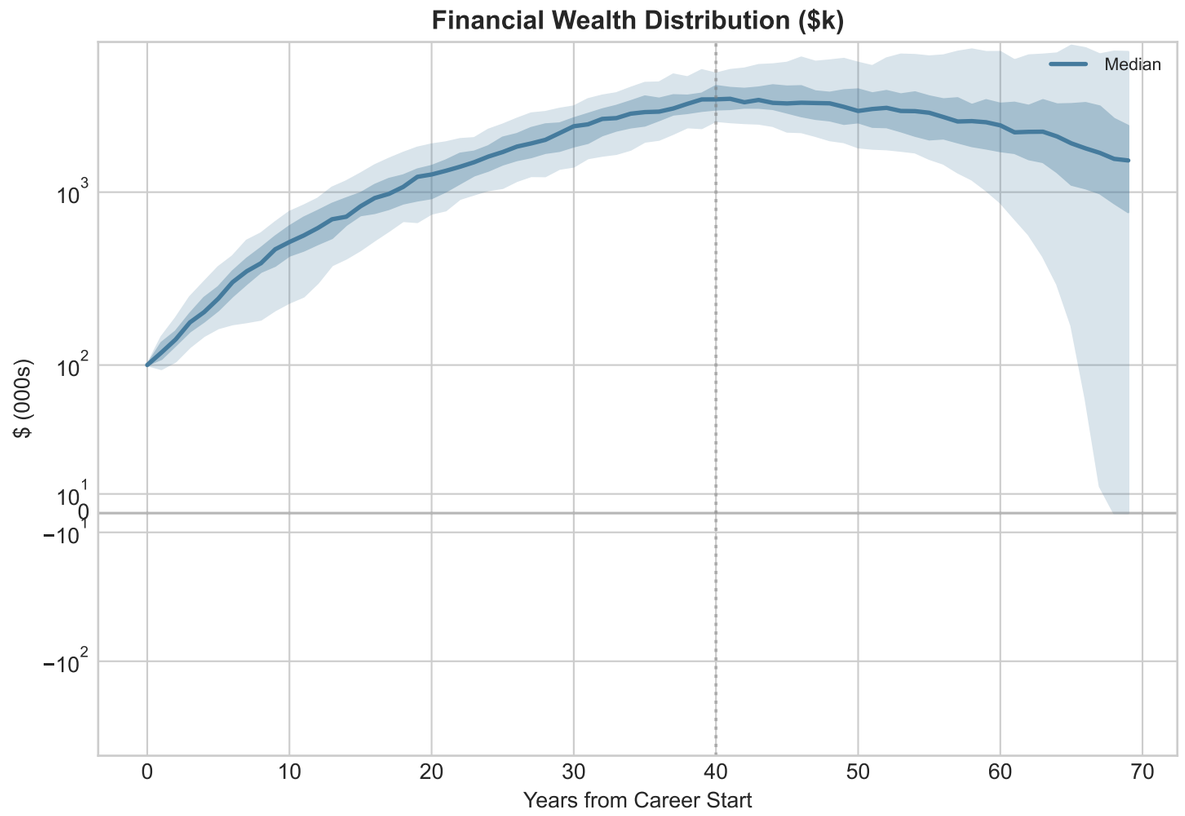


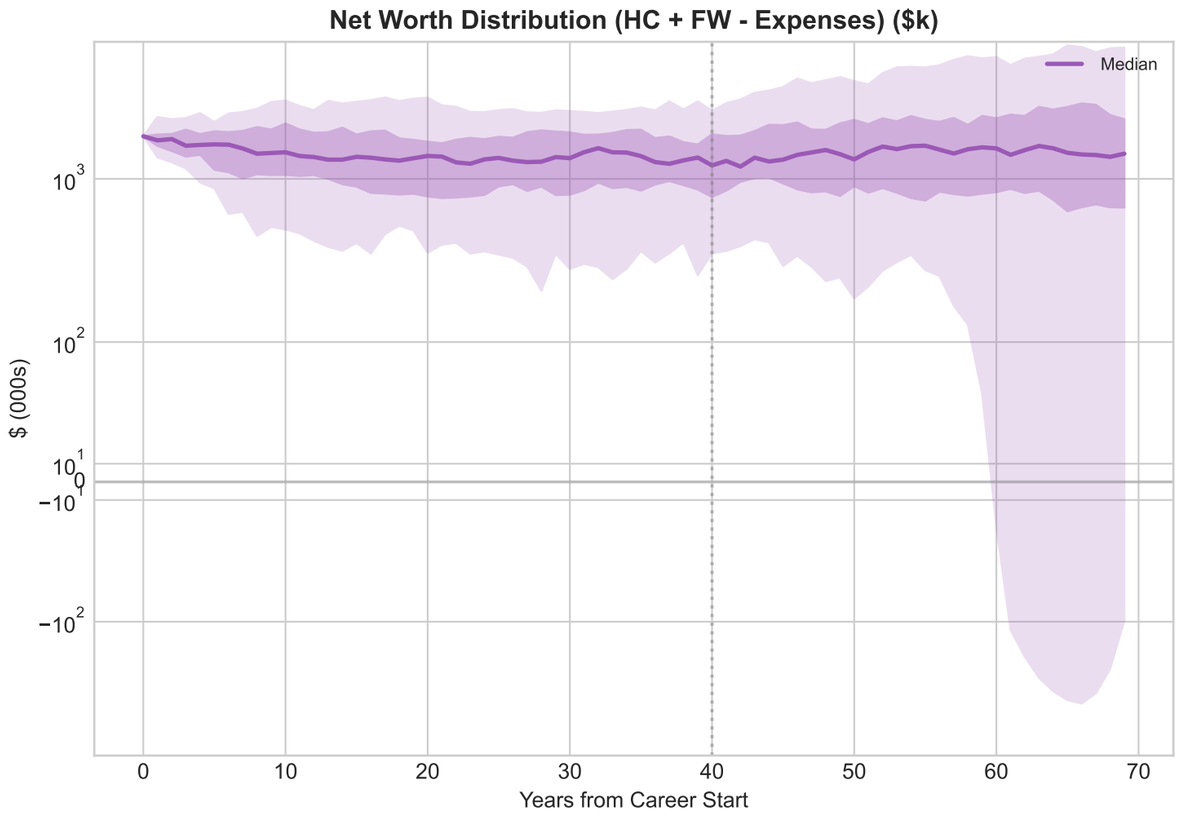




PAGE 2: MONTE CARLO (50 Runs)







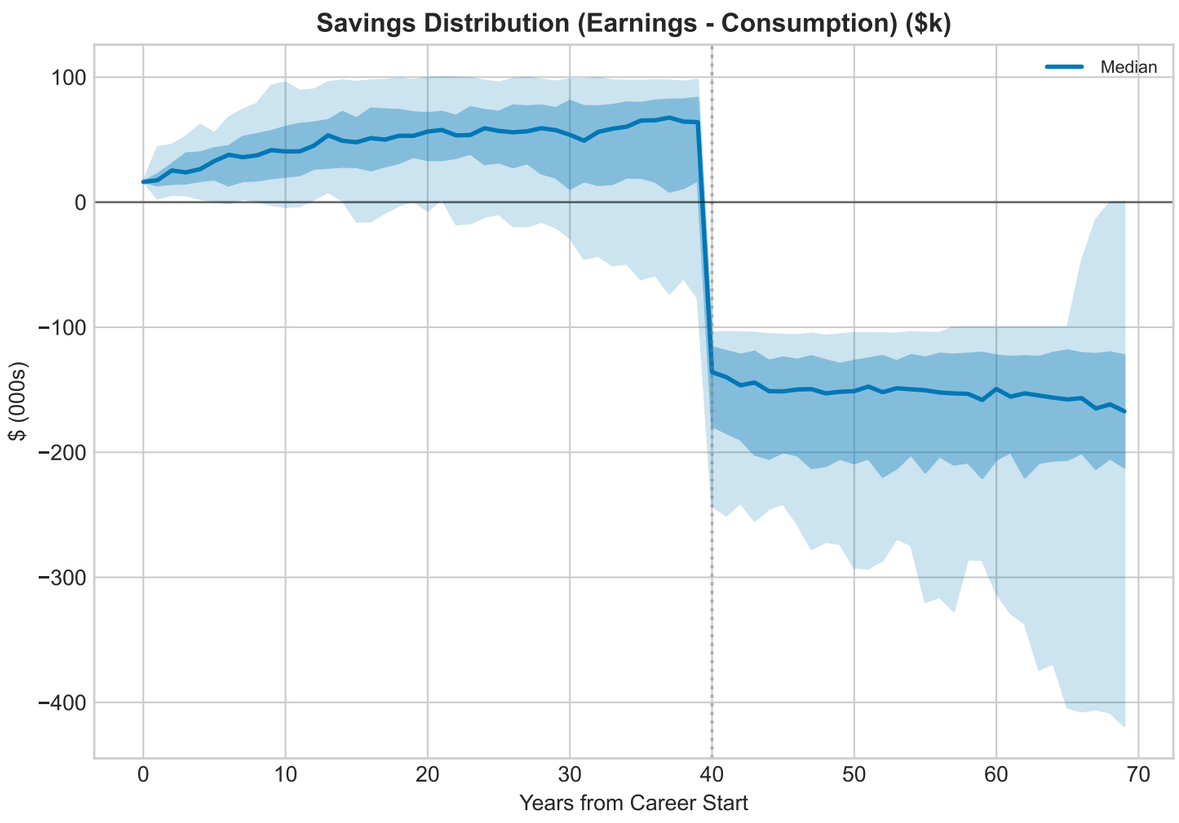
Terminal Values Grid

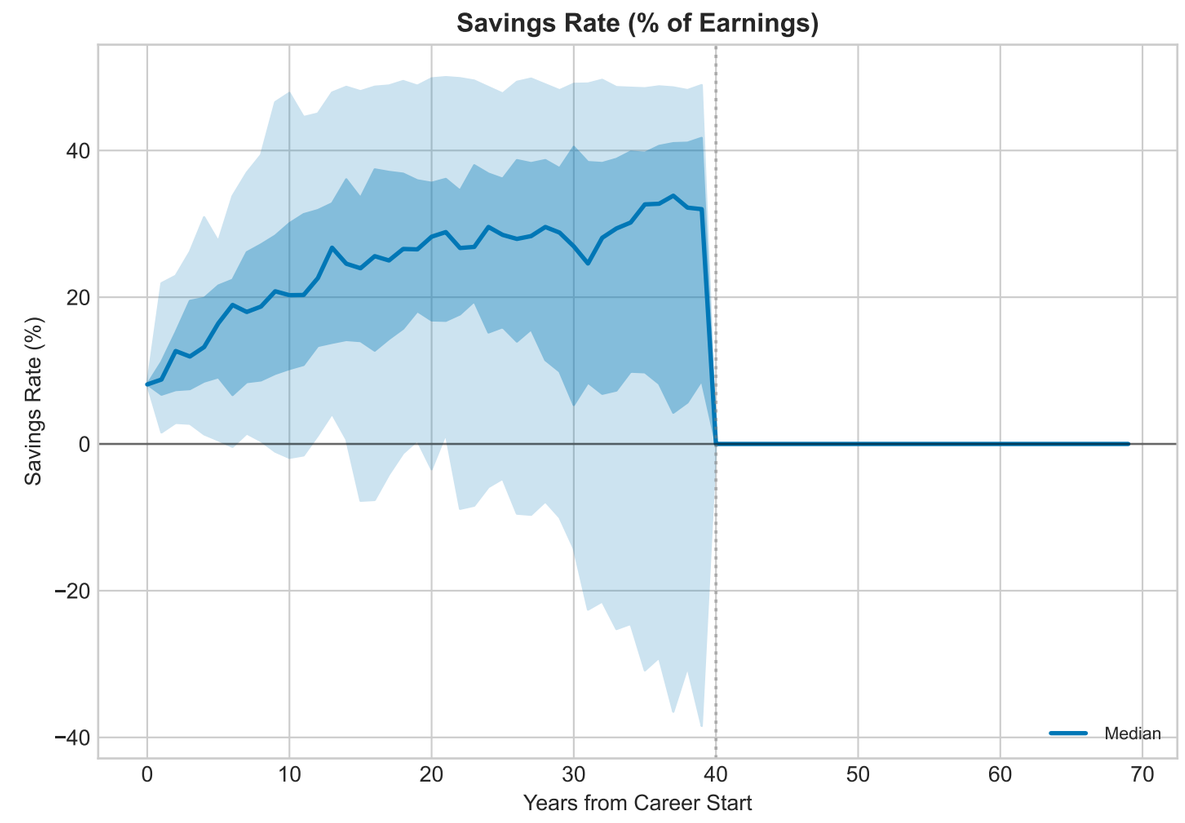
```
Terminal Values at Age 94
================================================

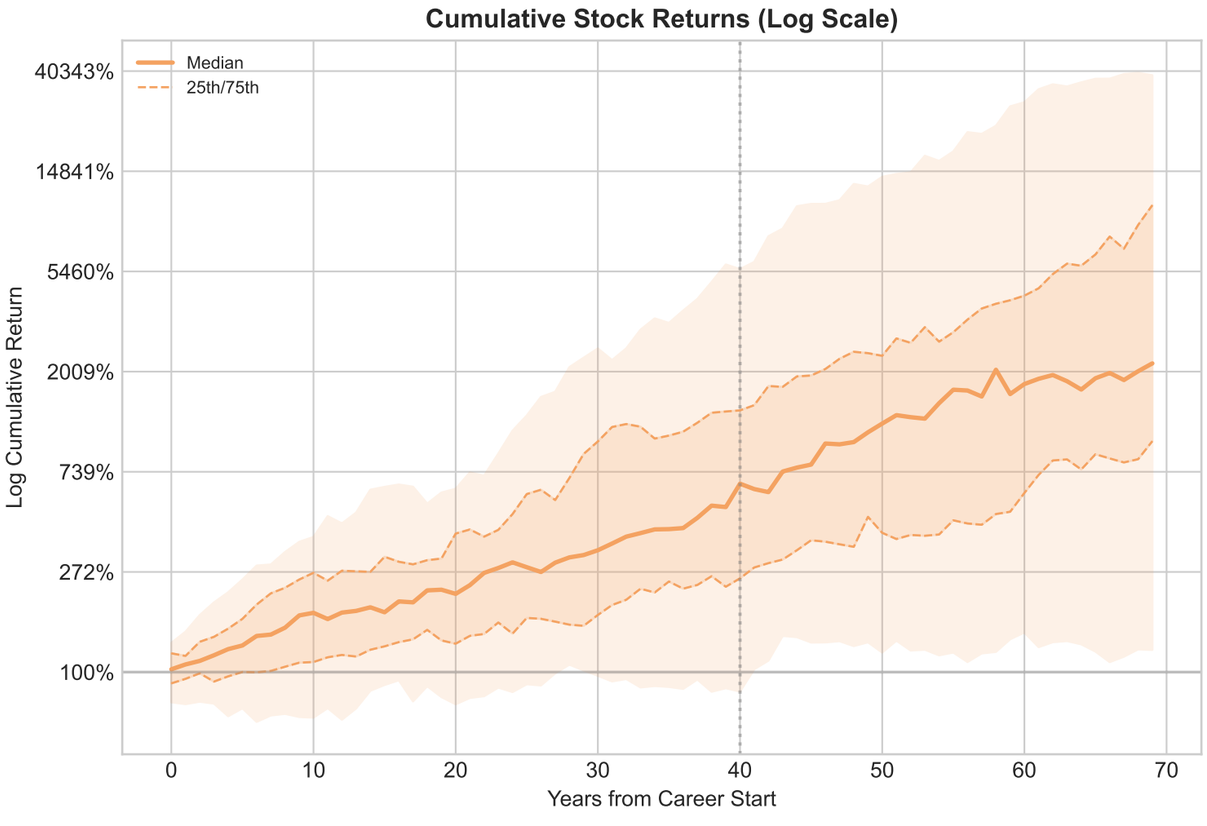
Financial Wealth ($k):
  5th percentile:  $         0
  25th percentile: $       766
  Median:          $     1,525
  75th percentile: $     2,415
  95th percentile: $     6,467

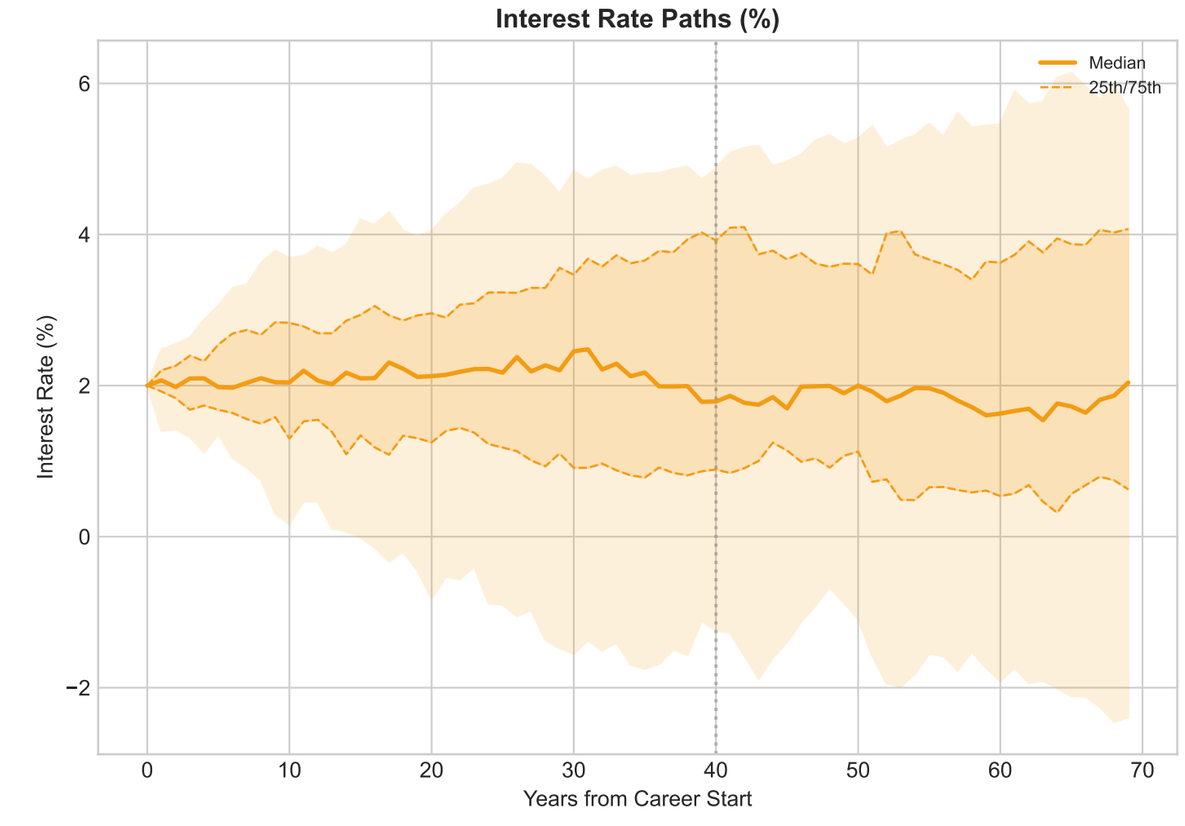
Annual Consumption ($k):
  5th percentile:  $         0
  25th percentile: $       122
  Median:          $       167
  75th percentile: $       212
  95th percentile: $       419

Runs depleted (FW < $10k): 4 of 50
Default Rate: 8.0%
```

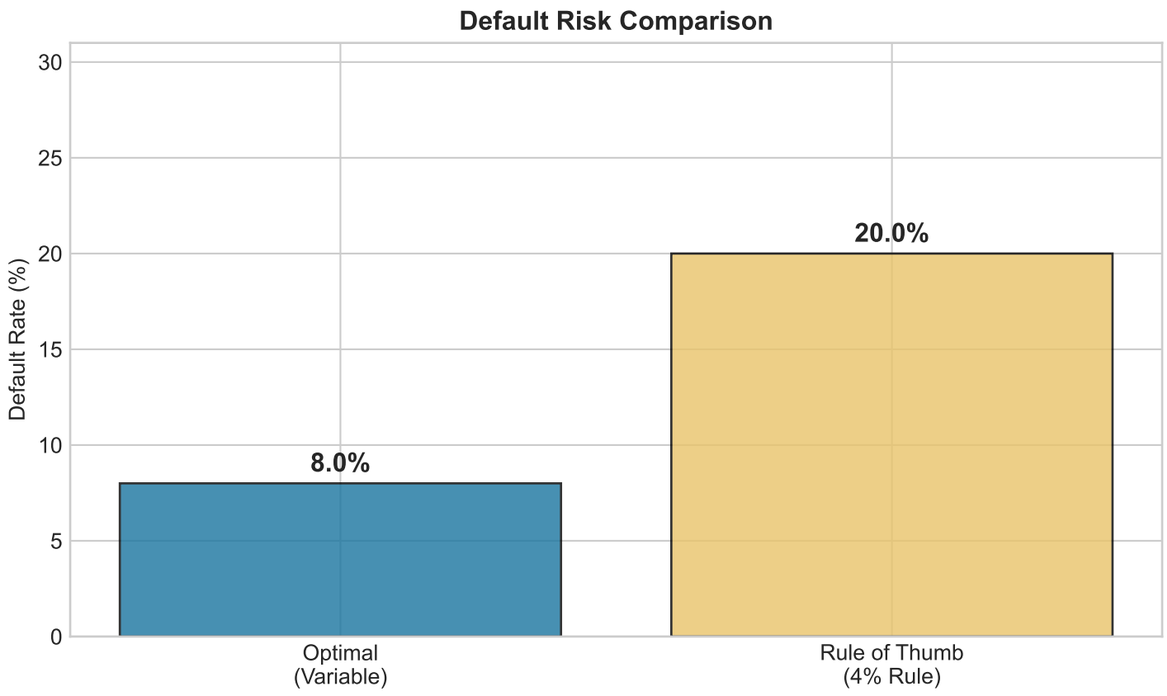


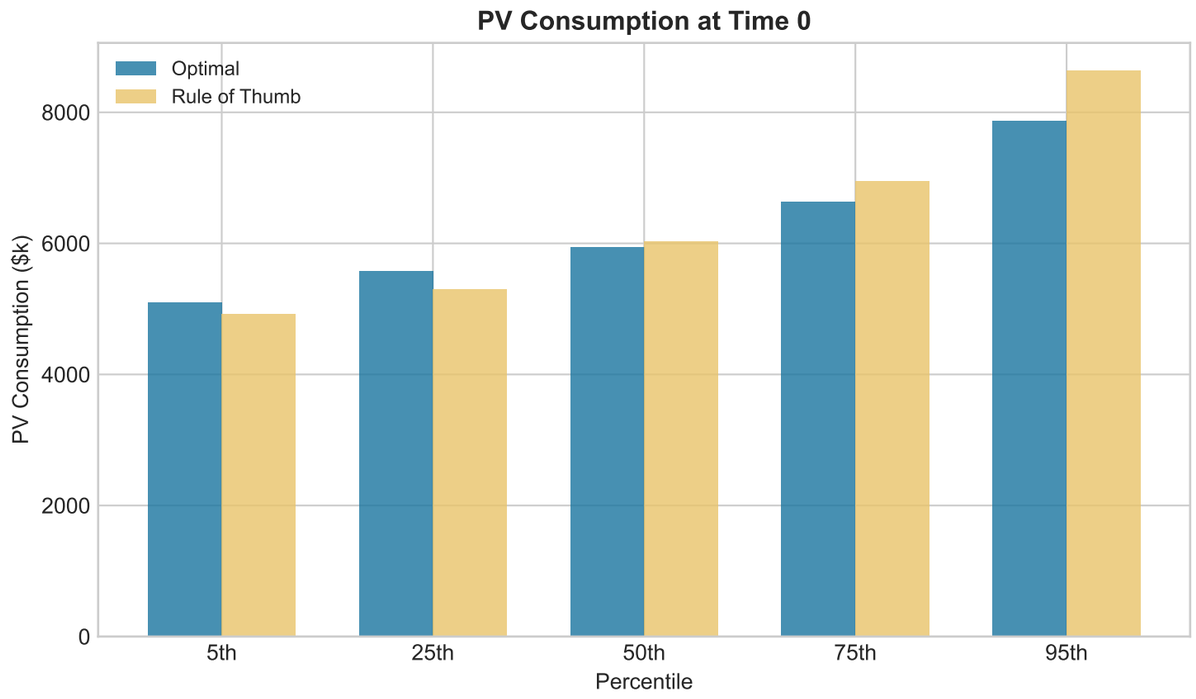


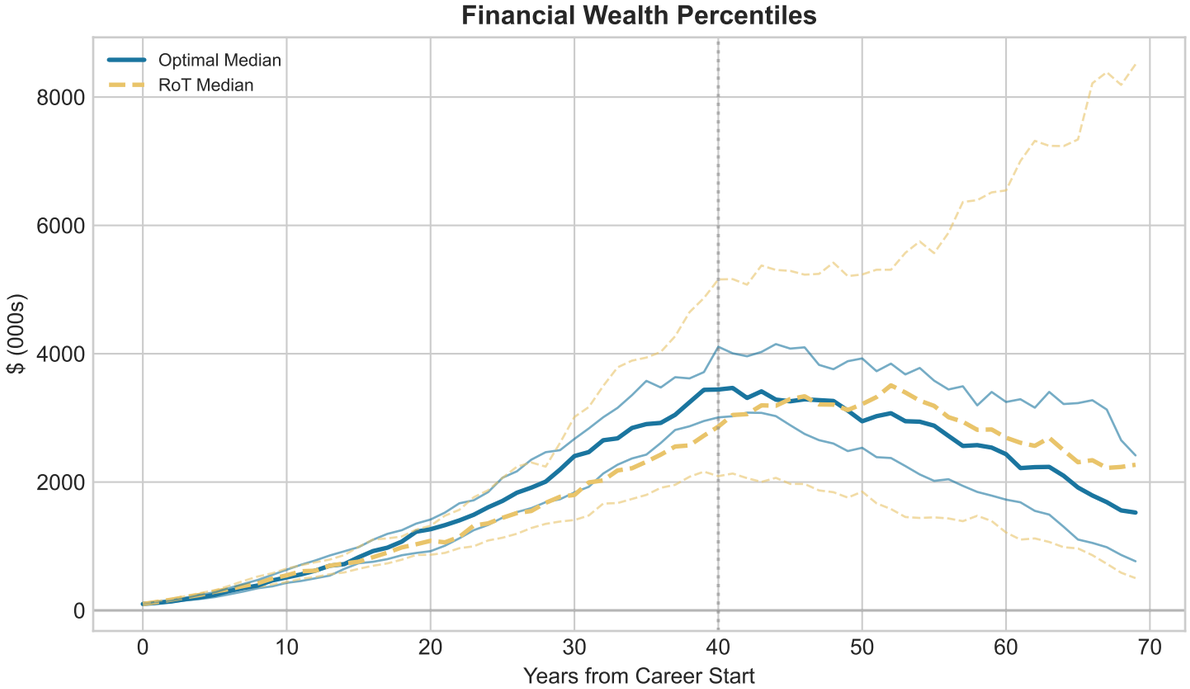


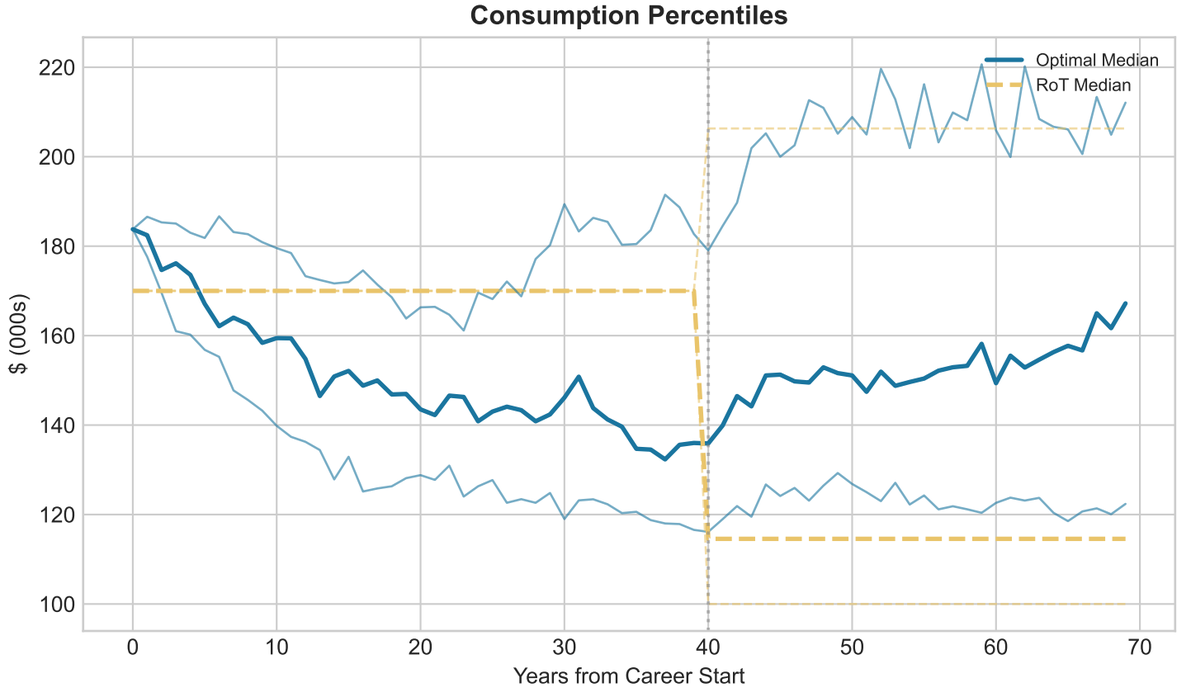


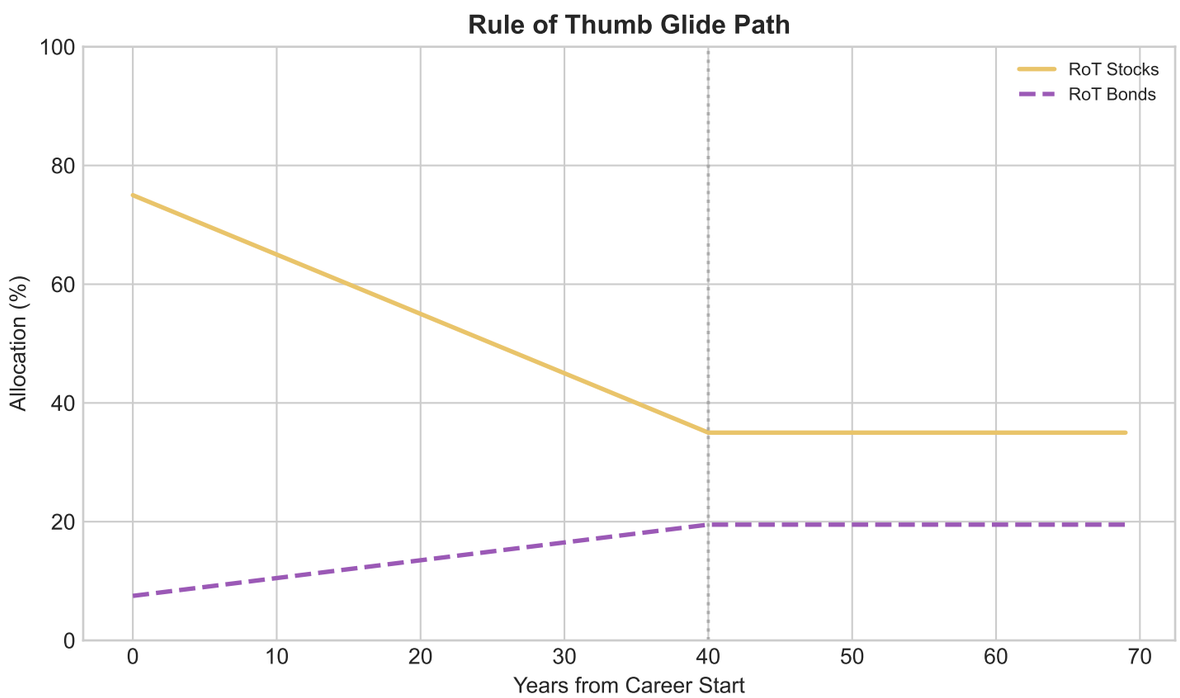
PAGE 3a: TEACHING SCENARIO - Normal Market Conditions












```
Strategy Comparison Summary
====================================================

Scenario: Normal Market Conditions

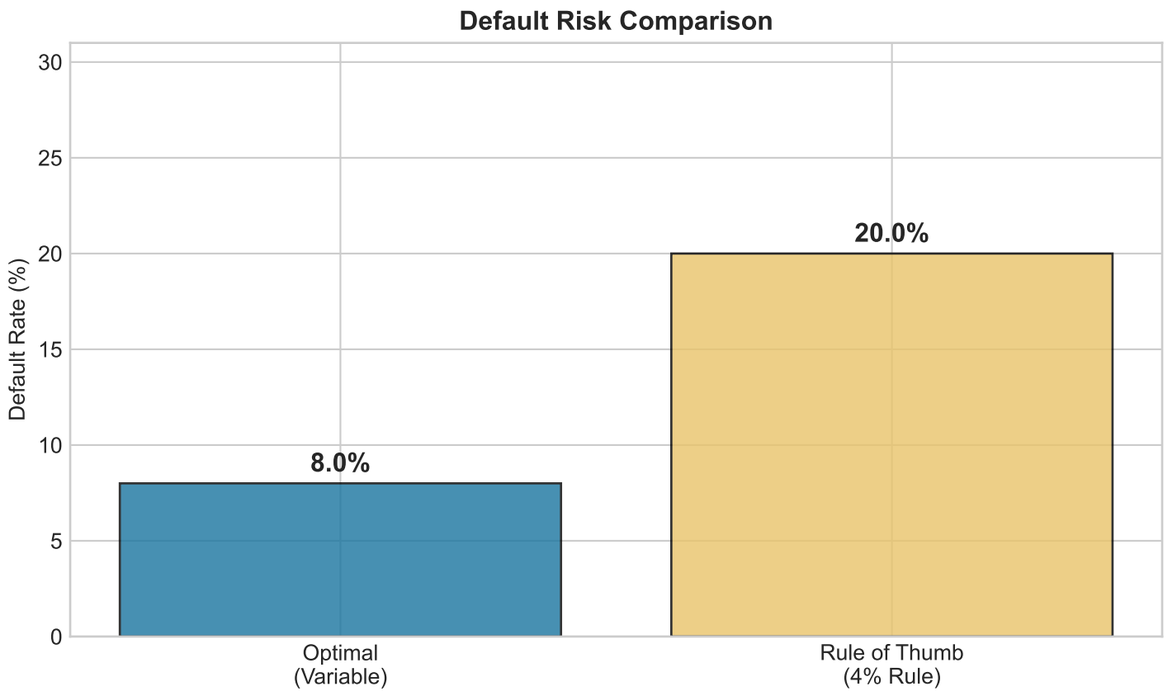
Default Rates:
  Optimal (Variable):        8.0%
  Rule of Thumb (4%):       20.0%

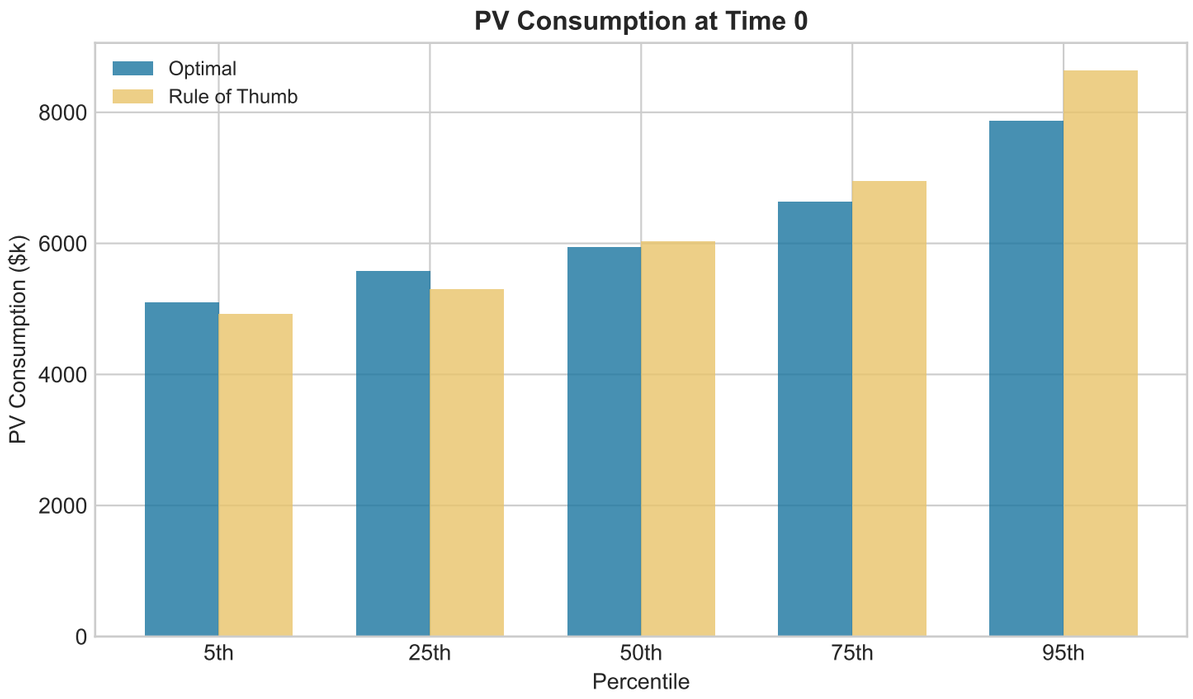
Median Final Wealth ($k):
  Optimal:                $     1,525
  Rule of Thumb:          $     2,270

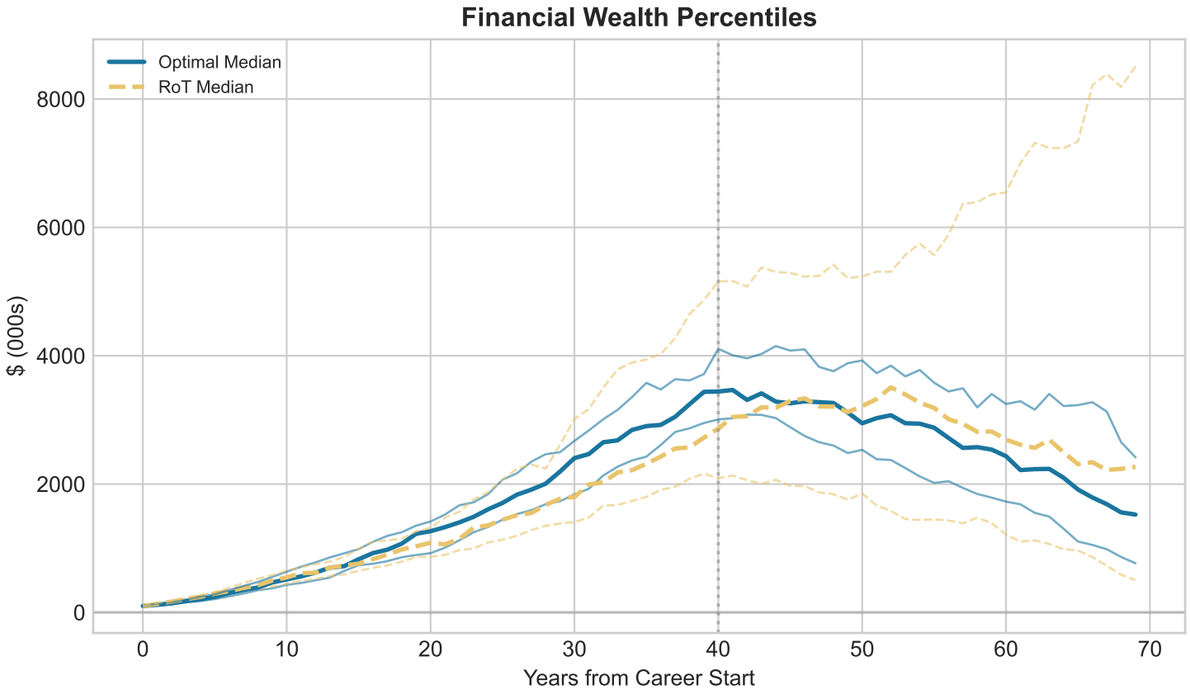
Median PV Consumption ($k):
  Optimal:                $     5,944
  Rule of Thumb:          $     6,023

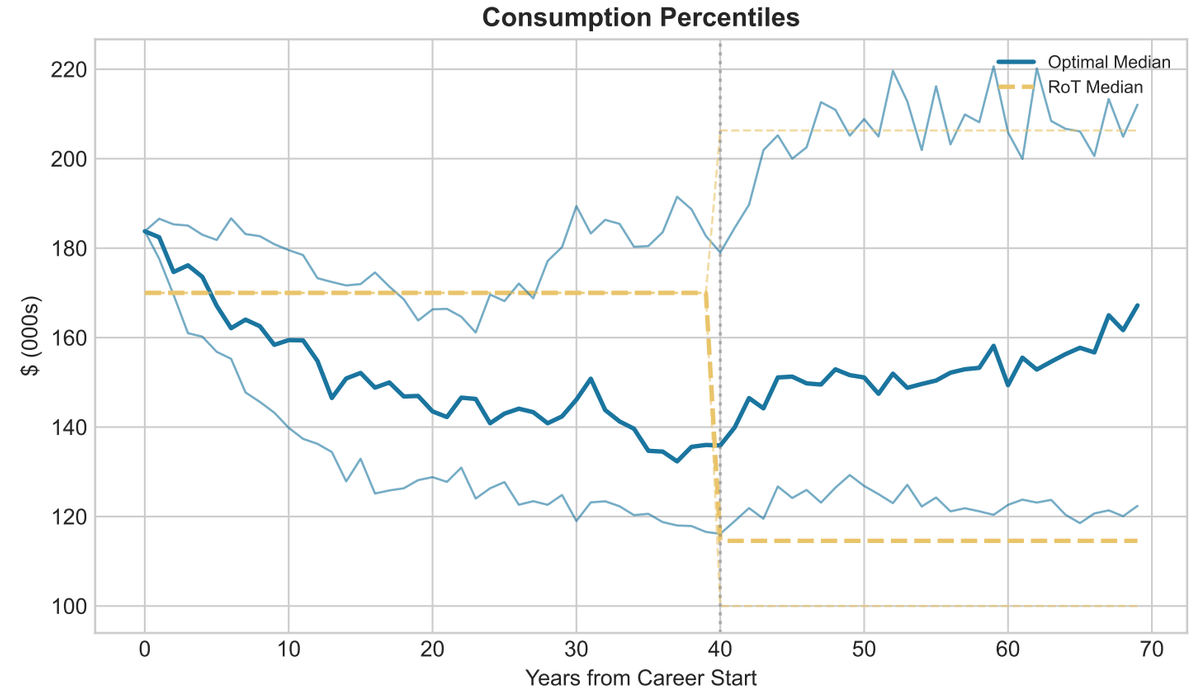
Simulations: 50
```

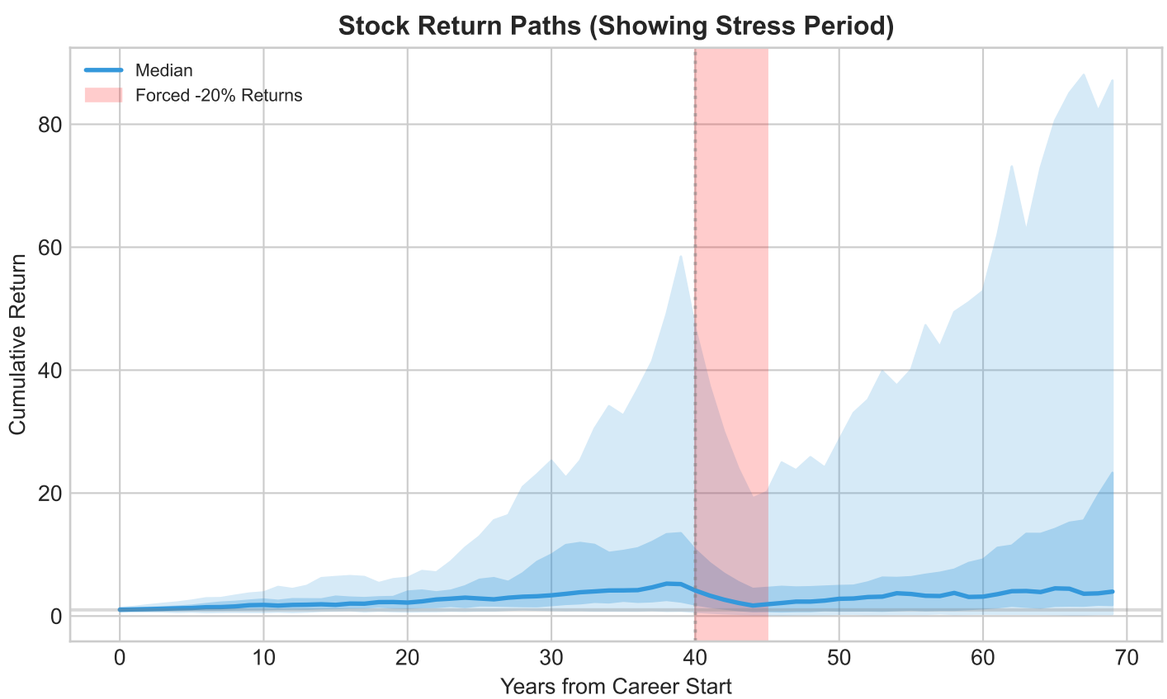
PAGE 3b: TEACHING SCENARIO - Sequence Risk (Bad Early Returns)












```
Strategy Comparison Summary
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Scenario: Sequence Risk (Bad Early Returns)

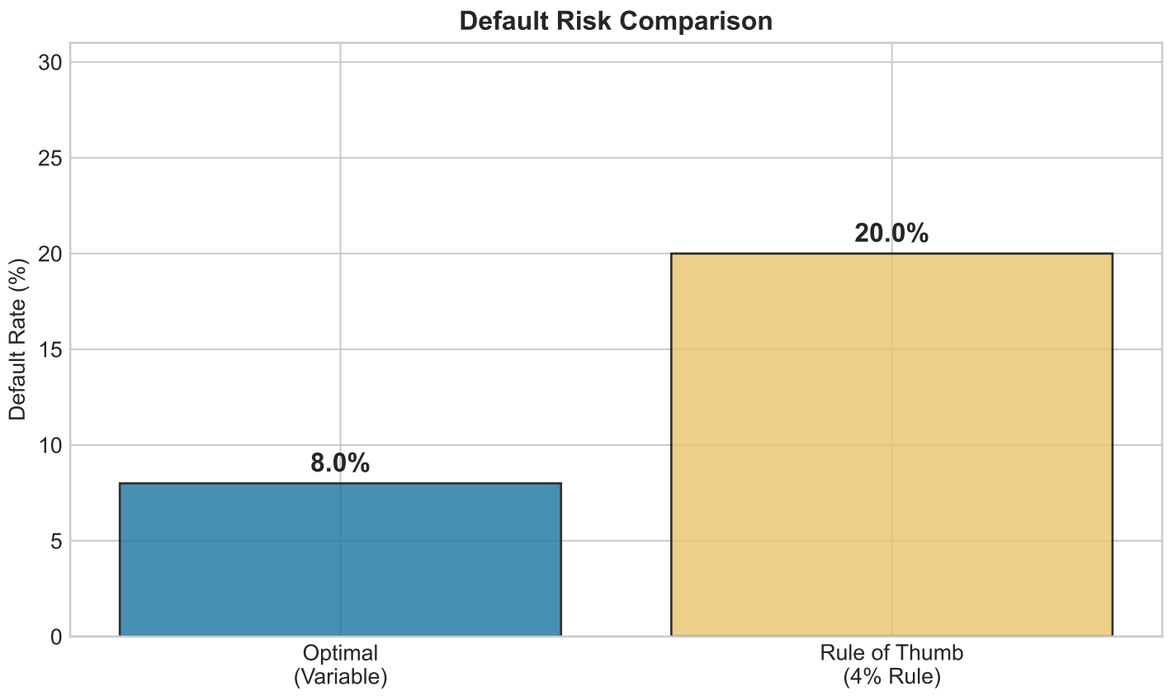
Default Rates:
  Optimal (Variable):        8.0%
  Rule of Thumb (4%):       20.0%

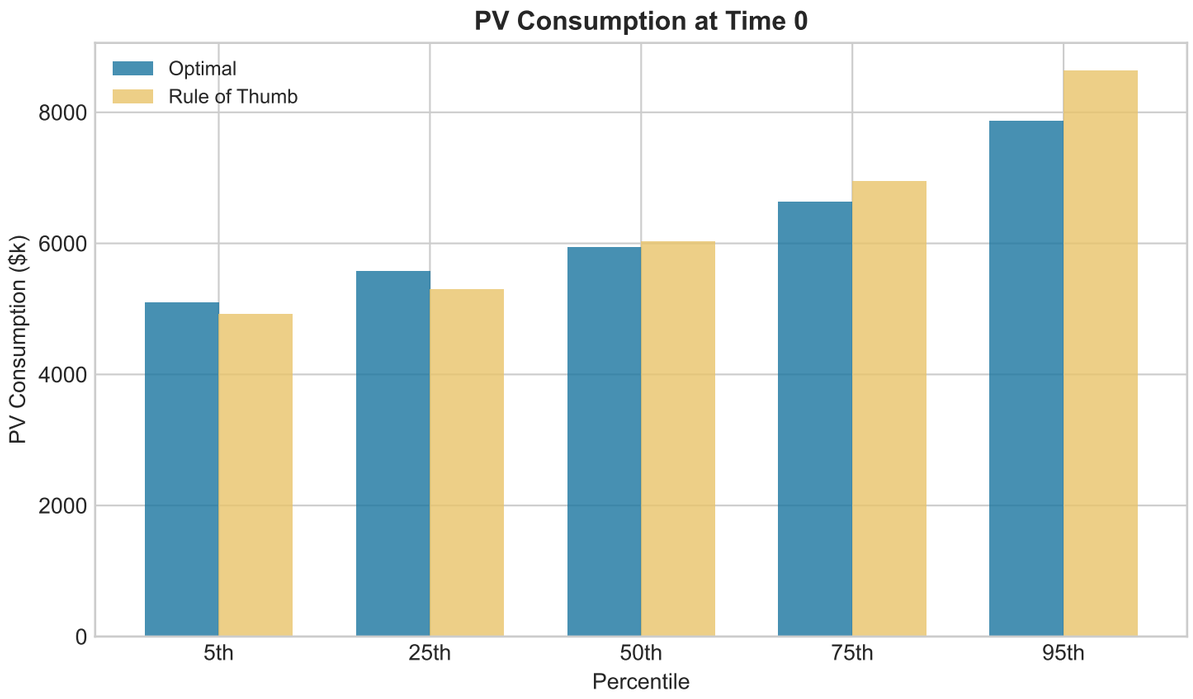
Median Final Wealth ($k):
  Optimal:                $     1,525
  Rule of Thumb:          $     2,270

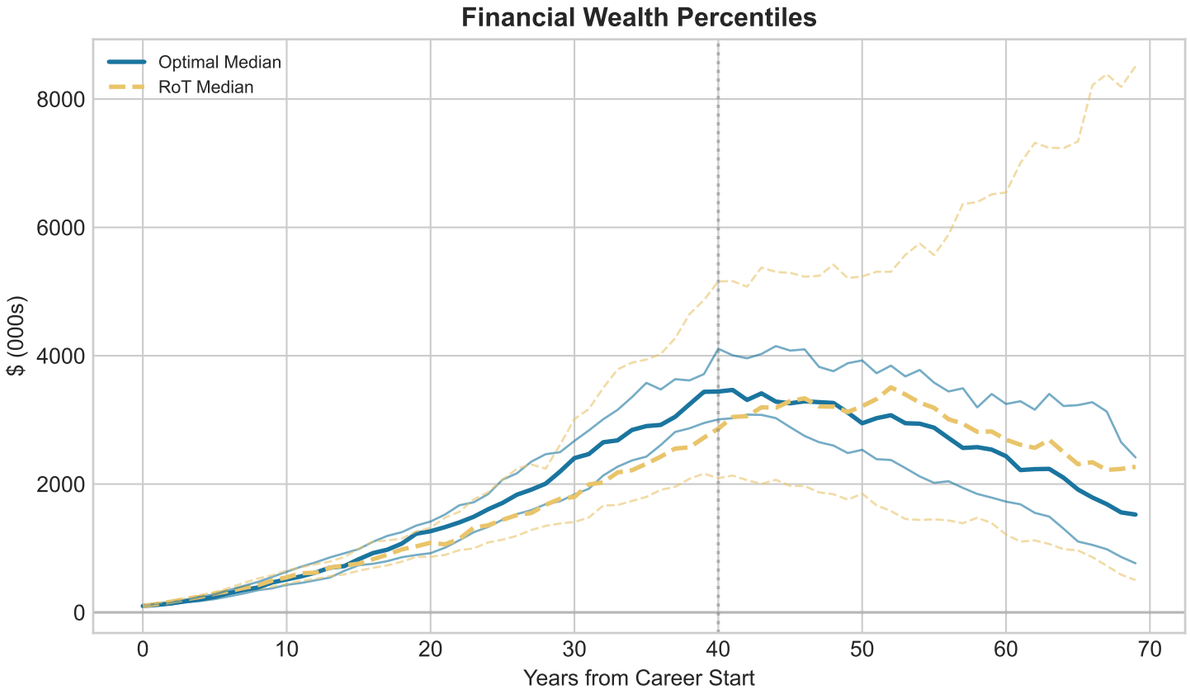
Median PV Consumption ($k):
  Optimal:                $     5,944
  Rule of Thumb:          $     6,023

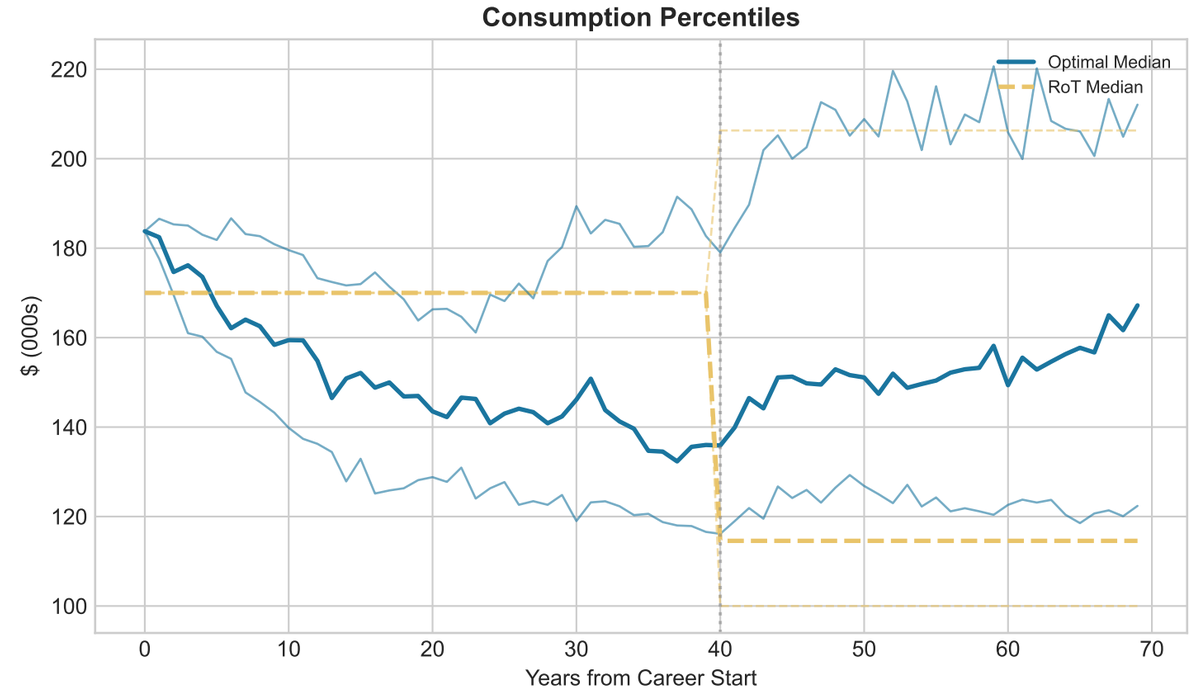
Simulations: 50
```

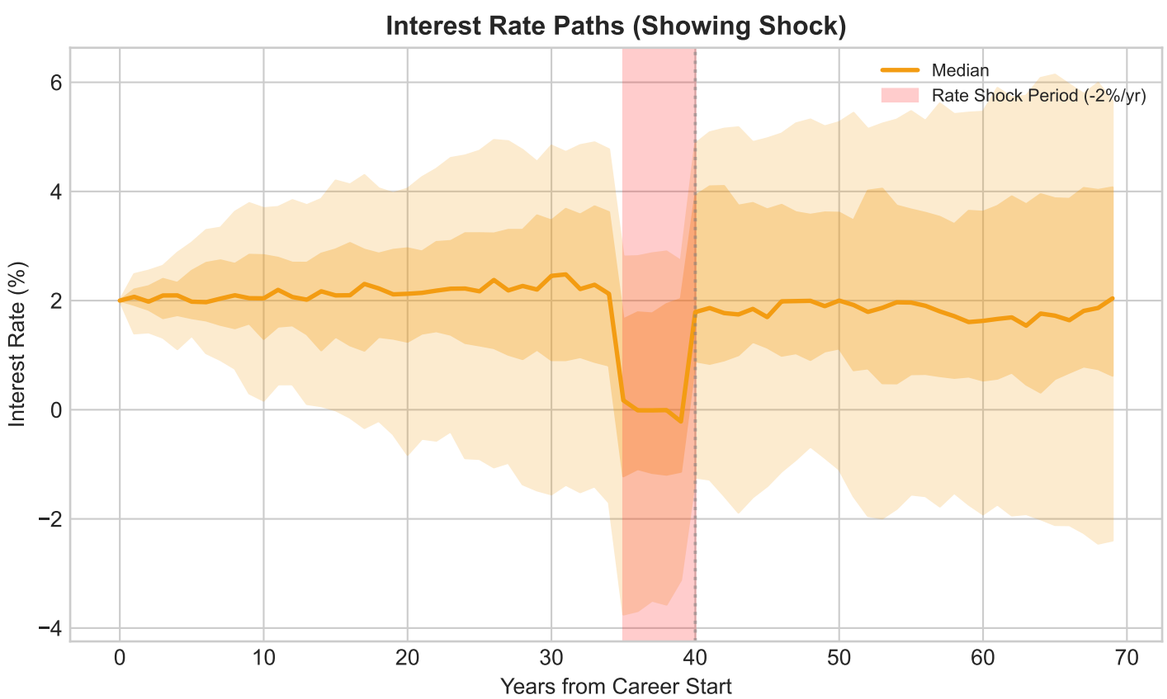
PAGE 3c: TEACHING SCENARIO - Pre-Retirement Rate Shock (5 years before retirement)












```
Strategy Comparison Summary
====================================================

Scenario: Pre-Retirement Rate Shock (5 years before retirement)

Default Rates:
  Optimal (Variable):        8.0%
  Rule of Thumb (4%):       20.0%

Median Final Wealth ($k):
  Optimal:                $     1,525
  Rule of Thumb:          $     2,270

Median PV Consumption ($k):
  Optimal:                $     5,944
  Rule of Thumb:          $     6,023

Simulations: 50
```

Lifecycle Investment Strategy Parameters
==========

Age Parameters:
  - Career Start: 25
  - Retirement Age: 65
  - Planning Horizon: 95

Income Parameters:
  - Initial Earnings: $200k
  - Earnings Growth: 0.0%

Expense Parameters:
  - Base Expenses: $100k
  - Retirement Expenses: $100k

Initial Wealth: $100k

Economic Parameters:
  - Risk-Free Rate: 2.0%
  - Equity Premium: 4.5%
  - Stock Volatility: 18%
  - Risk Aversion (gamma): 2.0

Human Capital:
  - Stock Beta: 0.00
  - Bond Duration: 20.0 years

Target Allocation (Mean-Variance Optimization):
  - Stocks: 69.4%
  - Bonds: 0.0%
  - Cash: 30.6%