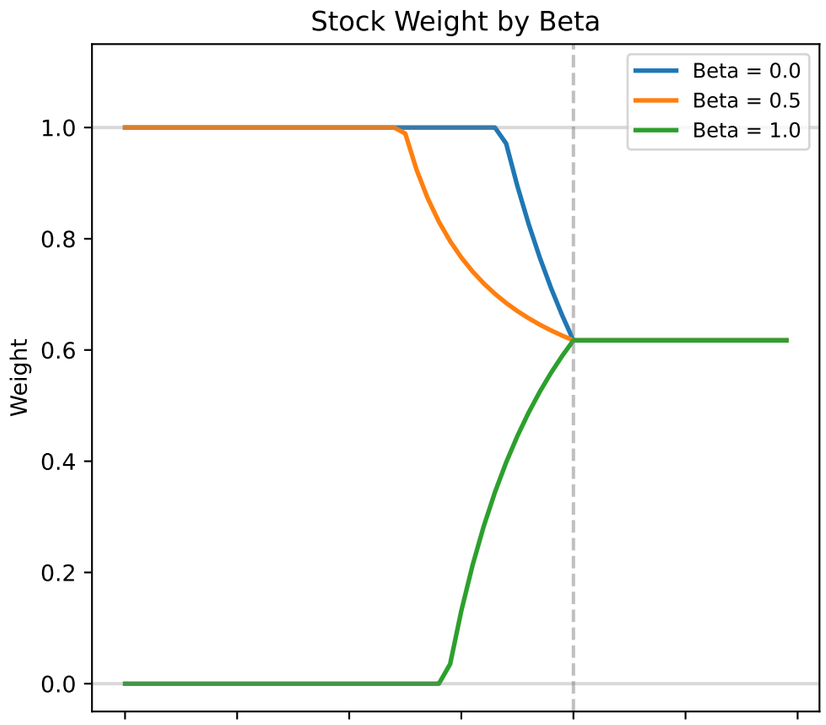
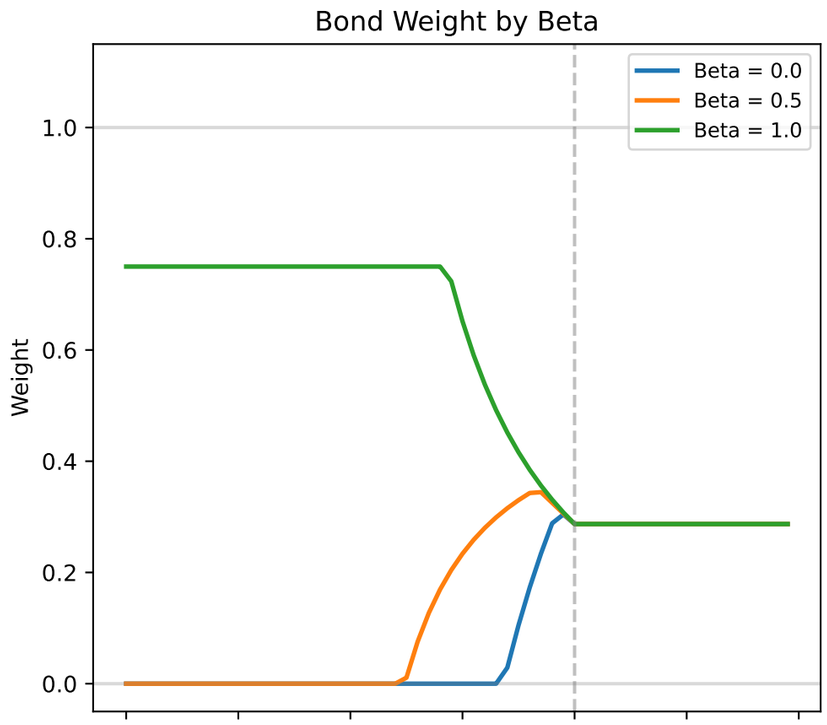
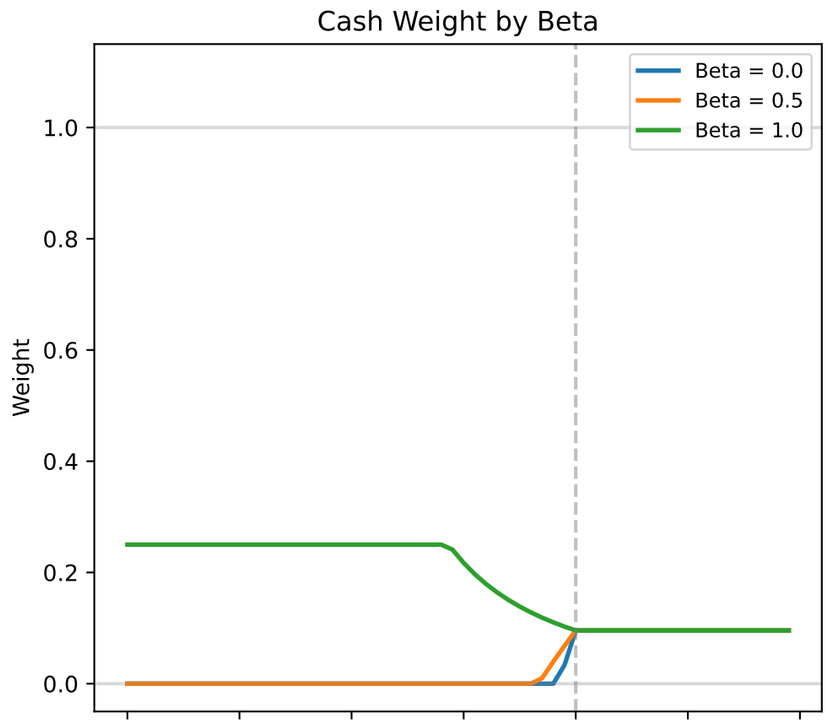
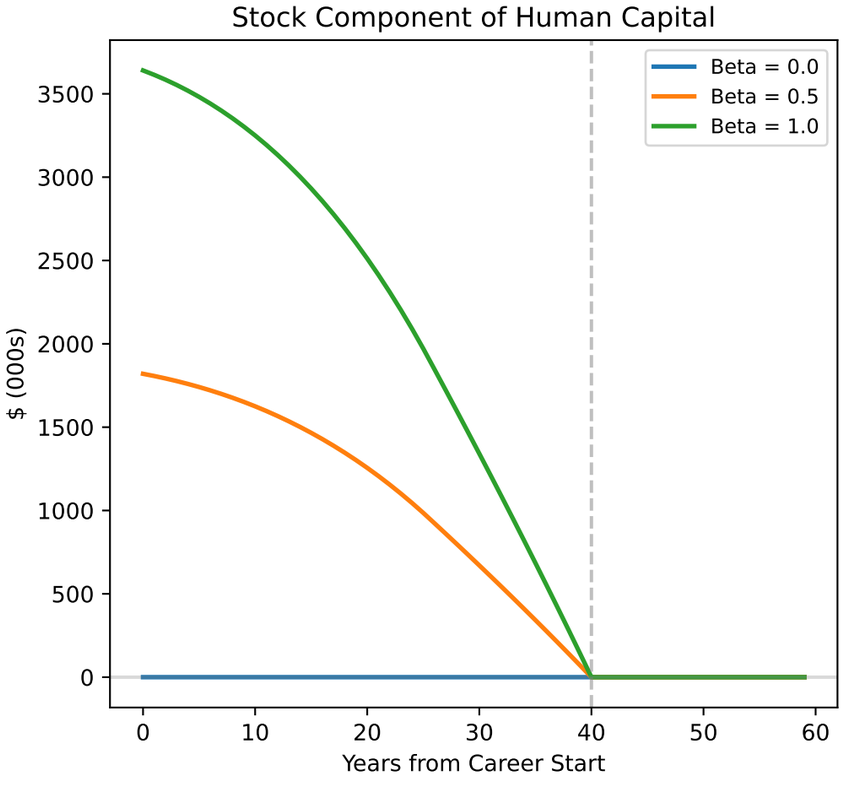
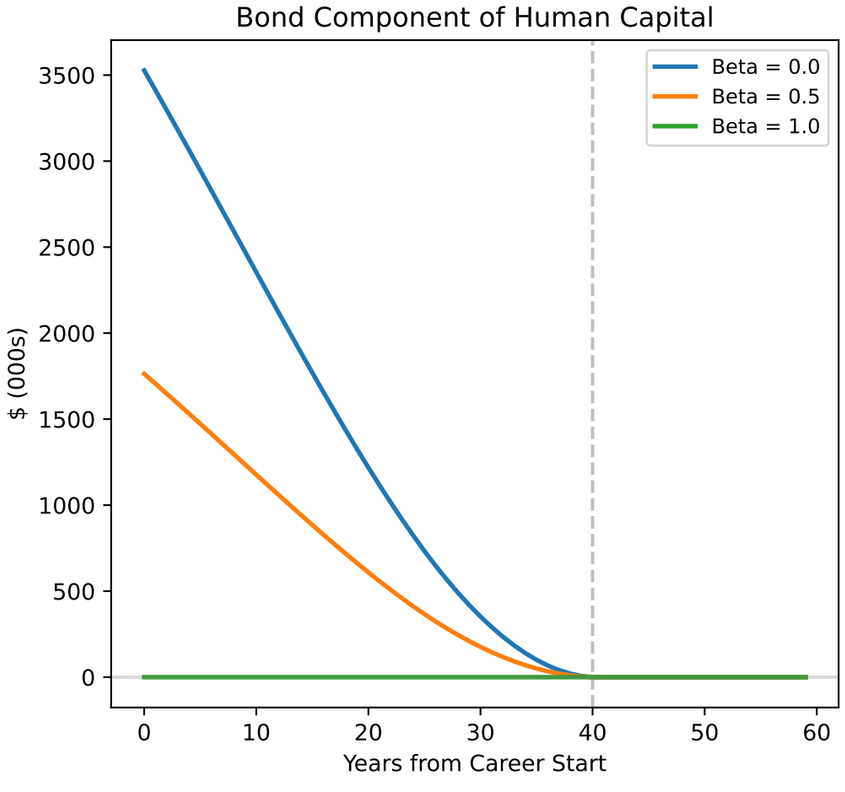
Effect of Stock Beta on Portfolio Allocation

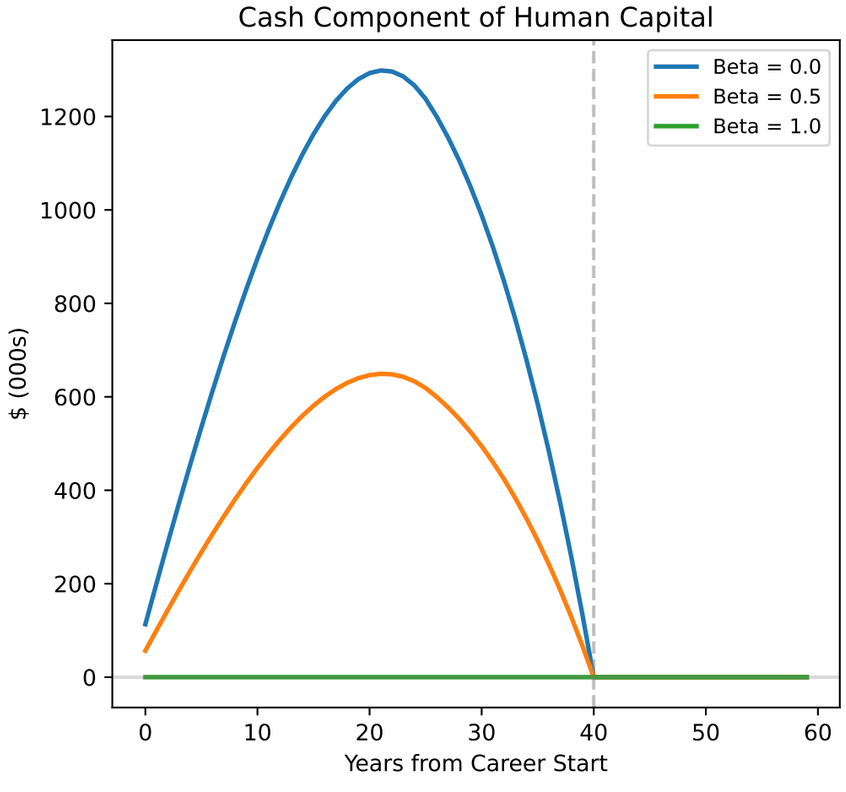




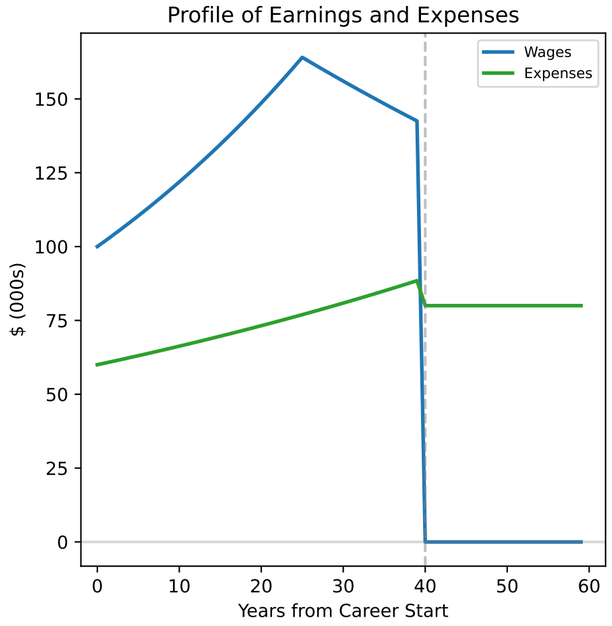


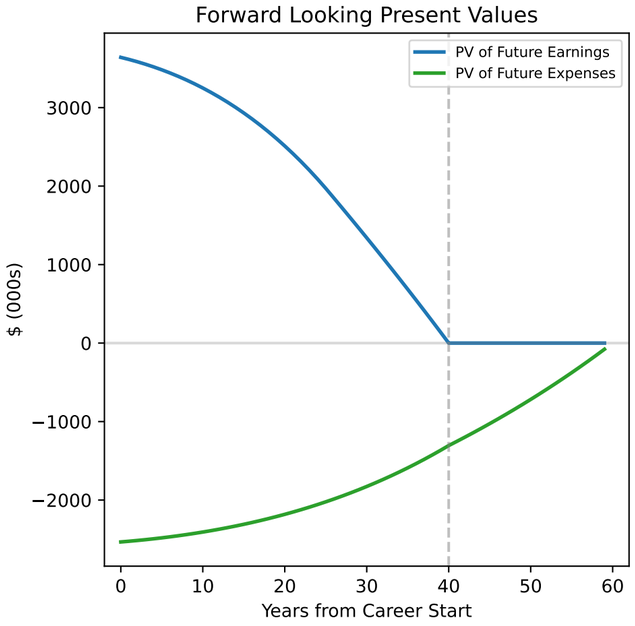


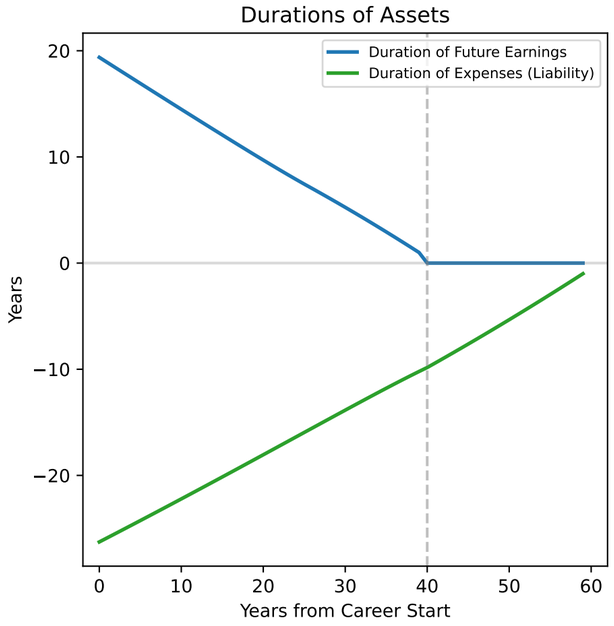


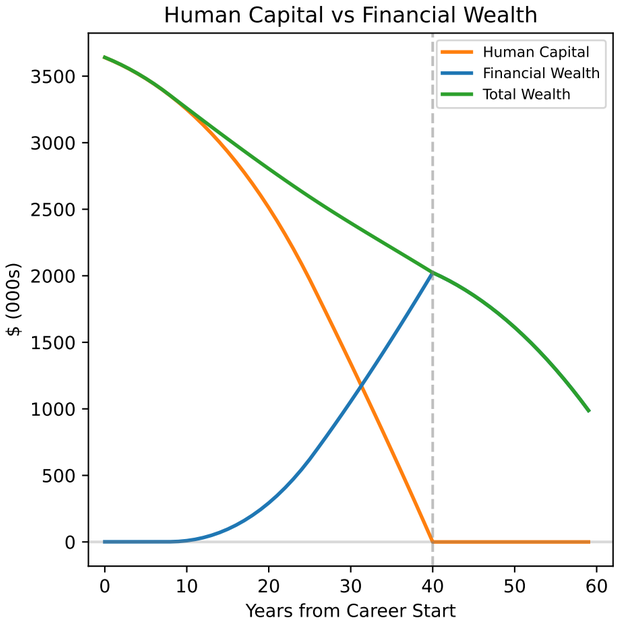


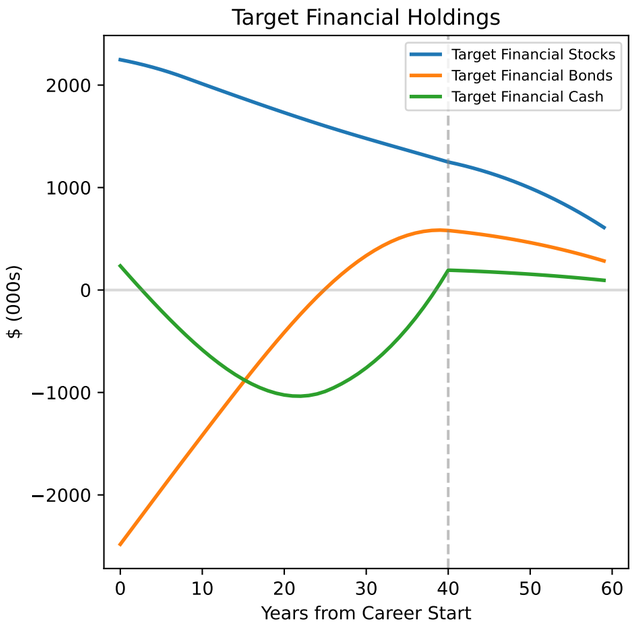
Lifecycle Investment Strategy - Beta = 0.0

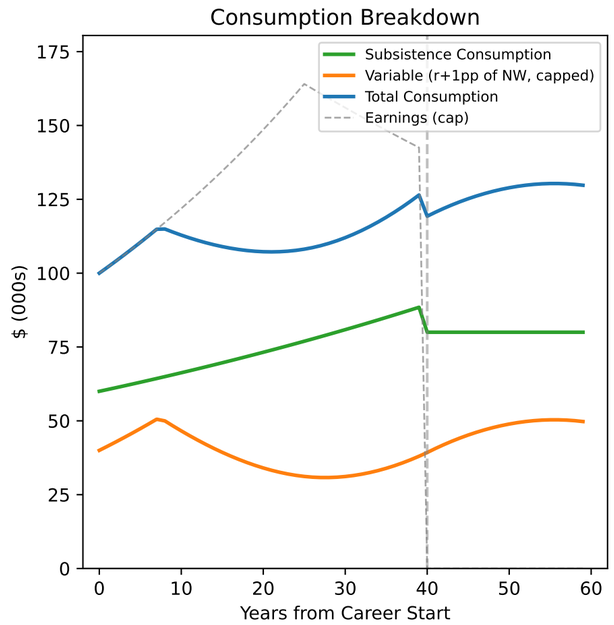


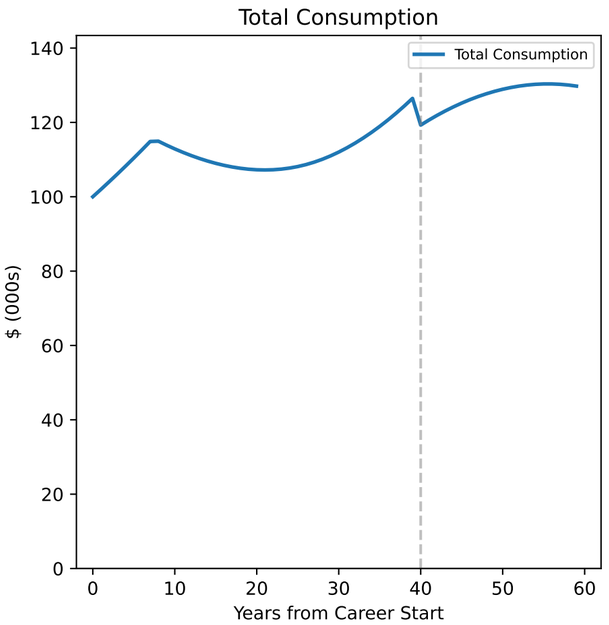












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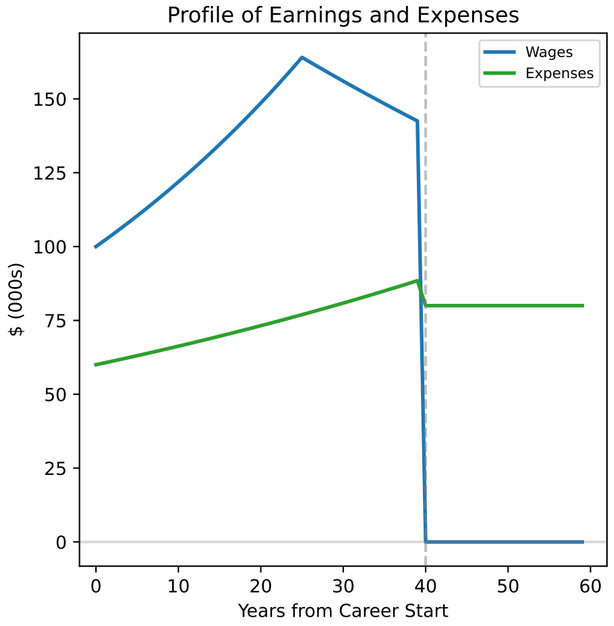
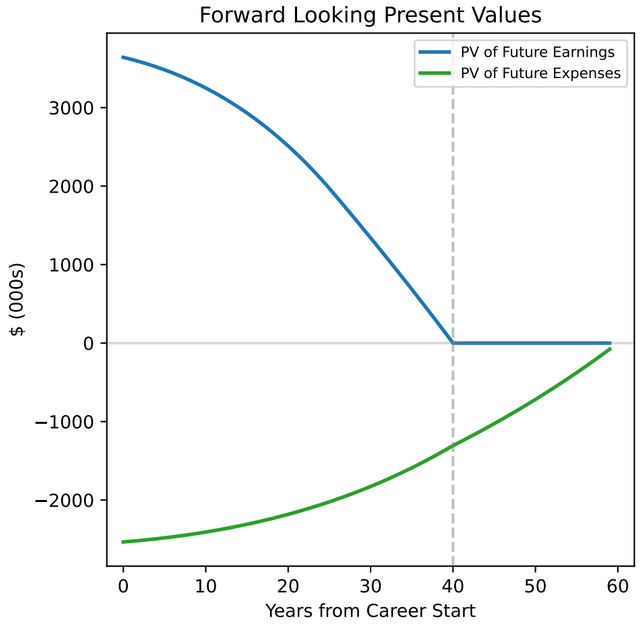
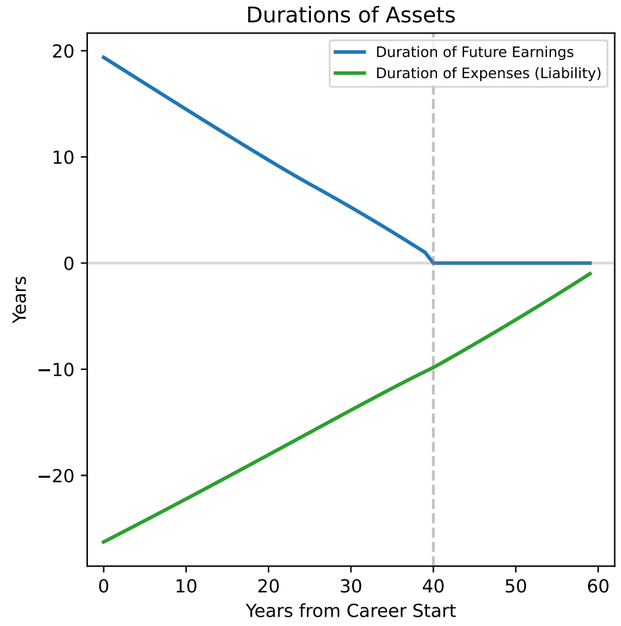
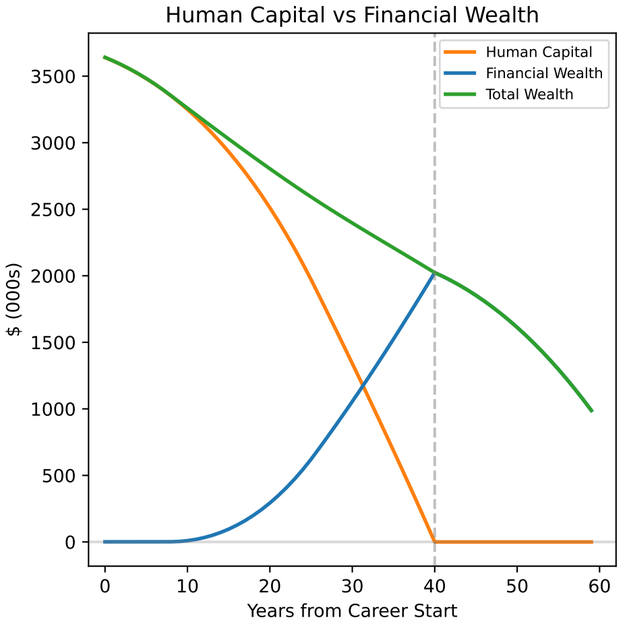
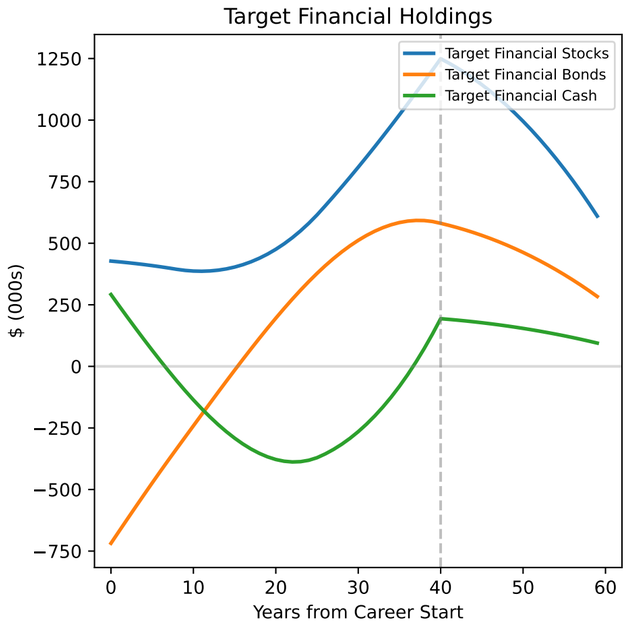
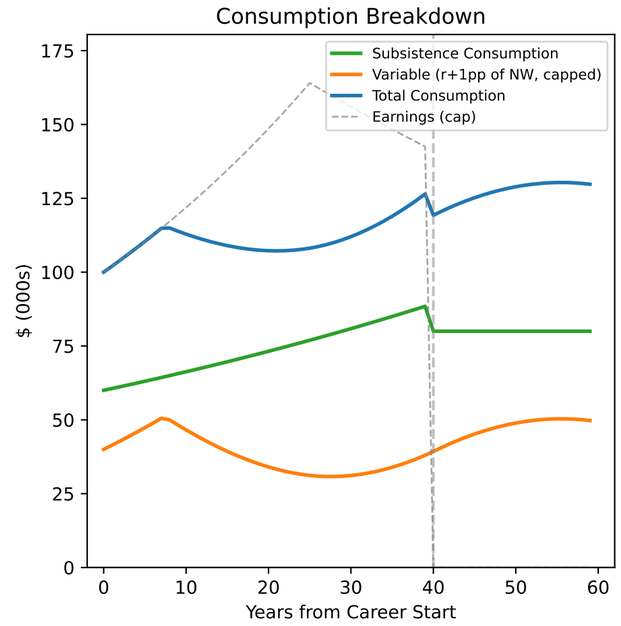


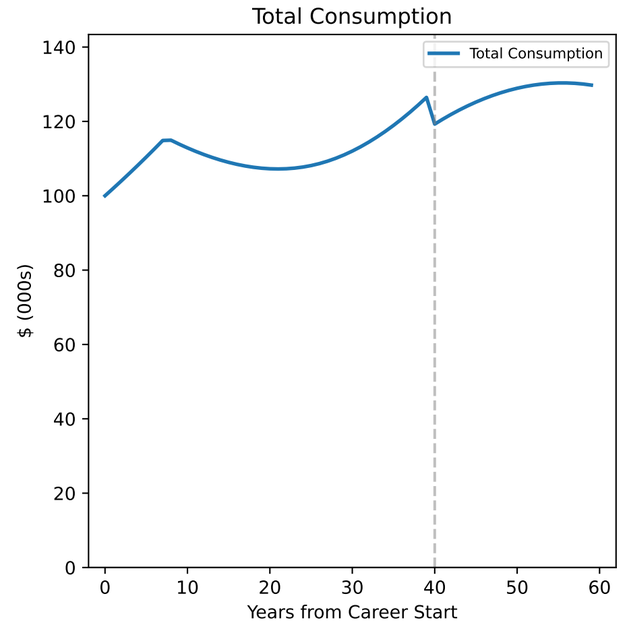




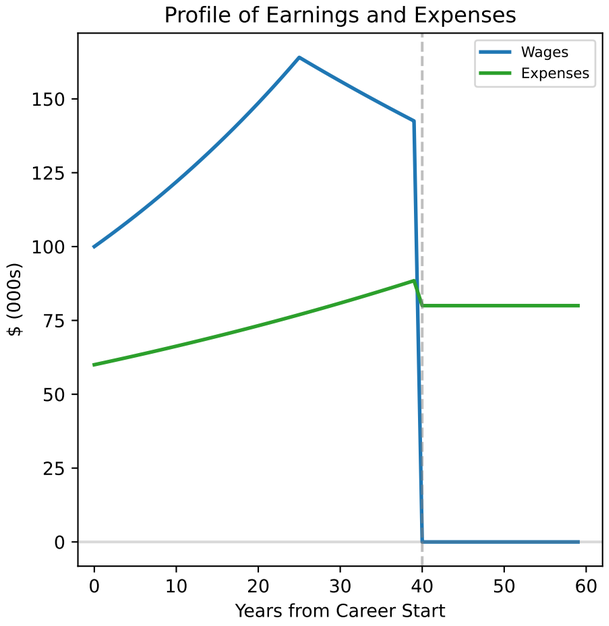


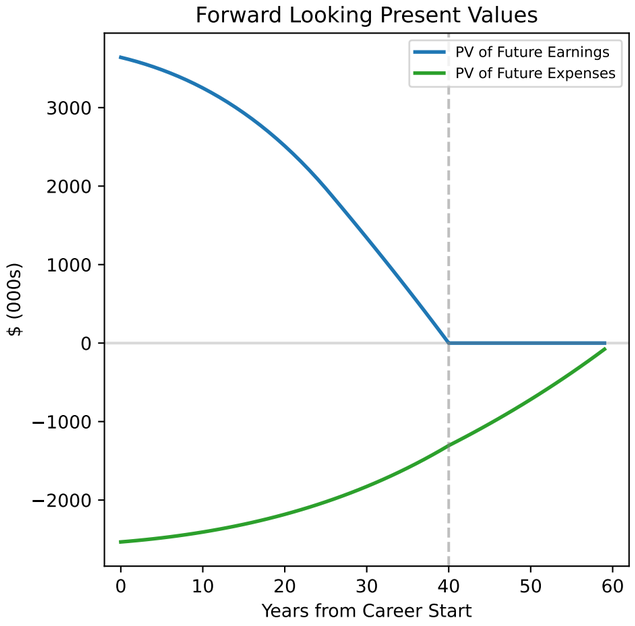


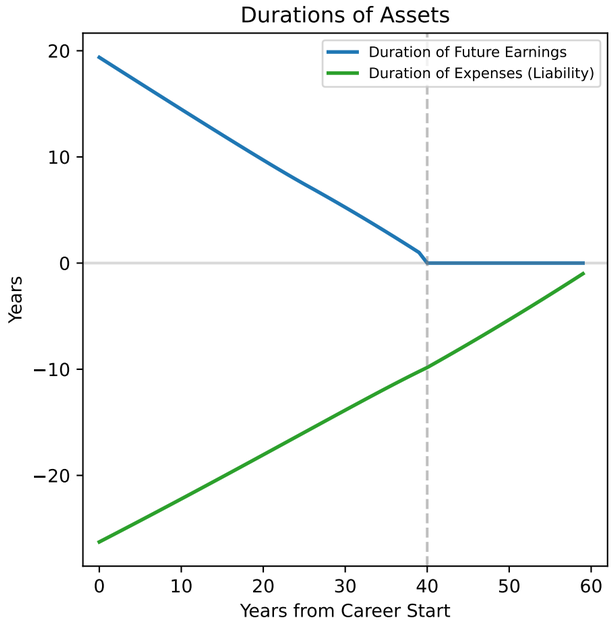


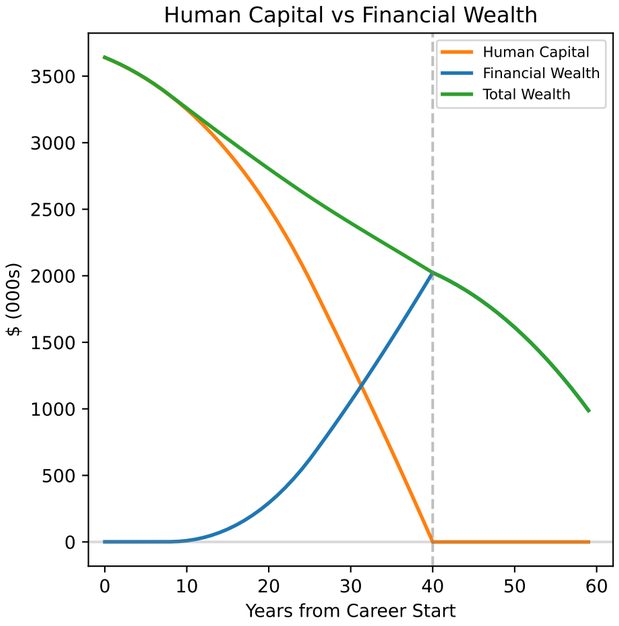


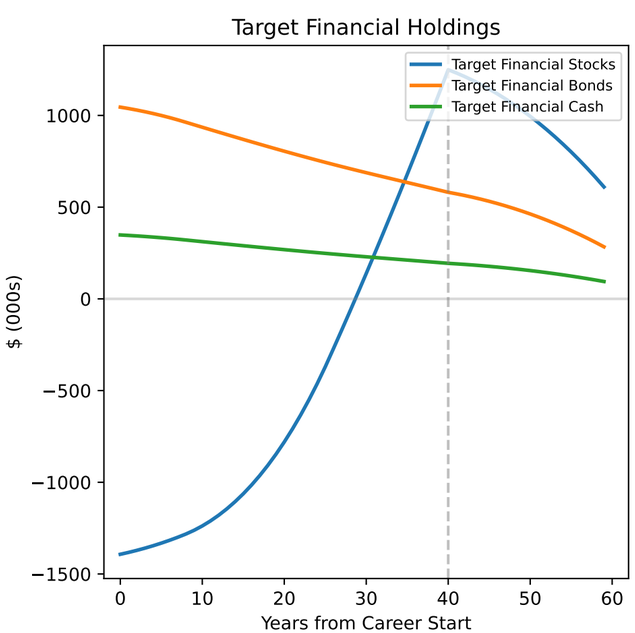
Lifecycle Investment Strategy - Beta = 1.0

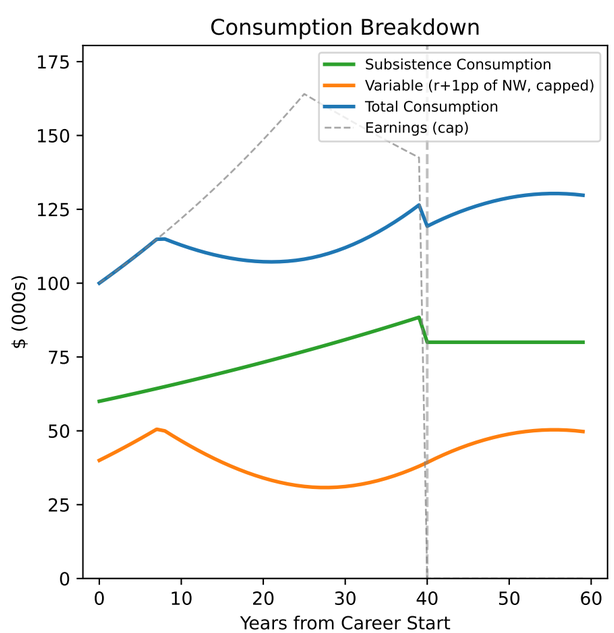


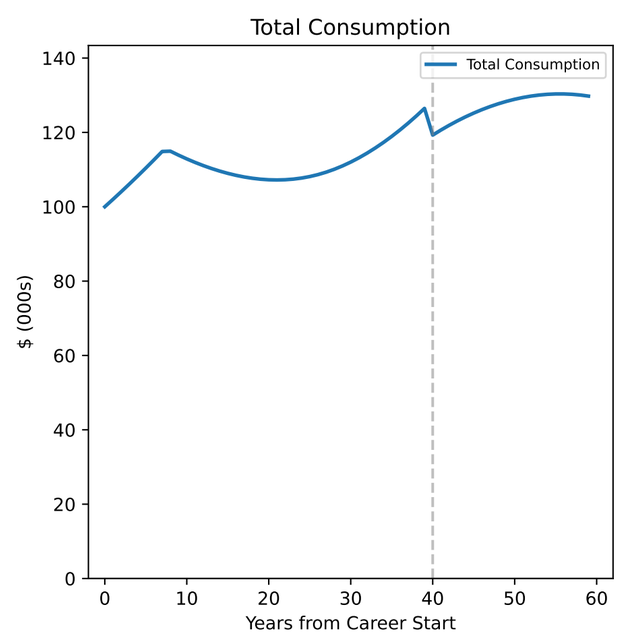












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Lifecycle Investment Strategy Parameters
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Age Parameters:
  - Career Start: 25
  - Retirement Age: 65
  - Planning Horizon: 85

Income Parameters:
  - Initial Earnings: $100k
  - Earnings Growth: 2.0%
  - Peak Earnings Age: 50

Subsistence Expense Parameters:
  - Base Expenses: $60k
  - Retirement Expenses: $80k

Consumption Model:
  - Total Consumption = Subsistence + Rate x Net Worth
  - Net Worth = Human Capital + Financial Wealth - PV(Future Expenses)
  - Consumption Rate = Median Return + 1pp

Human Capital Allocation:
  - Stock Beta: 0.10
  - Bond Duration Benchmark: 20.0 years

Mean-Variance Optimization (DGP Parameters):
  - Risk-Free Rate (r_bar): 2.0%
  - Equity Premium (mu): 4.0%
  - Stock Volatility (sigma): 18%
  - Risk Aversion (gamma): 2.0
  - Allocation Source: Mean-Variance Optimization
  - w* = mu / (gamma * sigma^2) = 0.04 / (2.0 * 0.18^2) = 61.7%

Target Total Wealth Allocation (from MV):
  - Stocks: 61.7%
  - Bonds: 28.7%
  - Cash: 9.6%

Key Insights:
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1. Portfolio allocation is derived from mean-variance
   optimization using consistent DGP parameters.

2. The Merton optimal share w* = mu / (gamma * sigma^2)
   determines target stock allocation in total wealth.

3. Changing gamma, mu, or sigma allows studying how
   retirement trajectories respond to return assumptions.

4. Human capital is treated as implicit asset holdings,
   and financial portfolio adjusts to reach total targets.
```