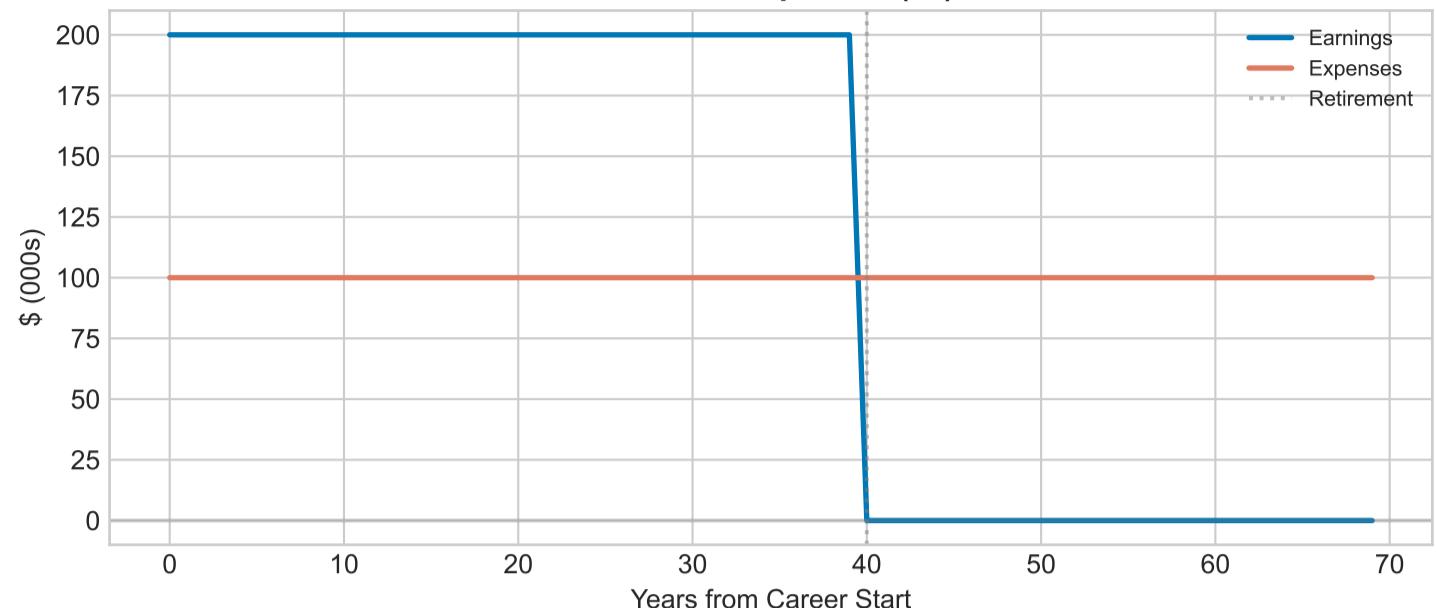
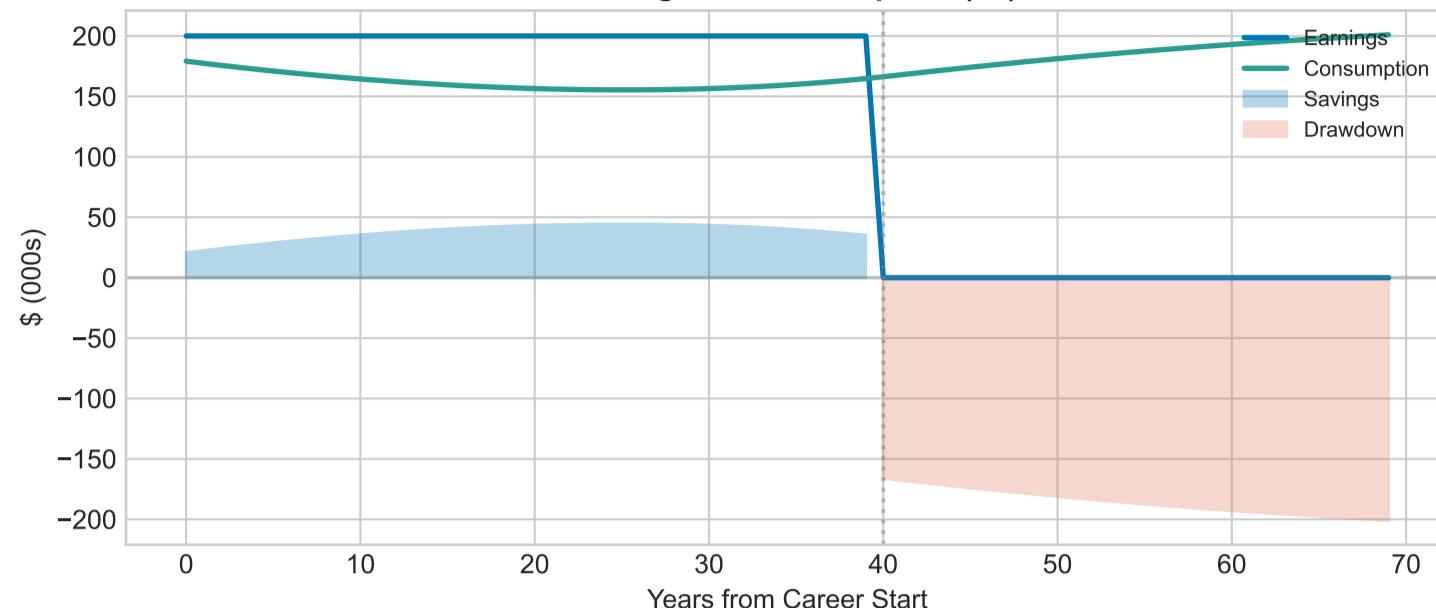


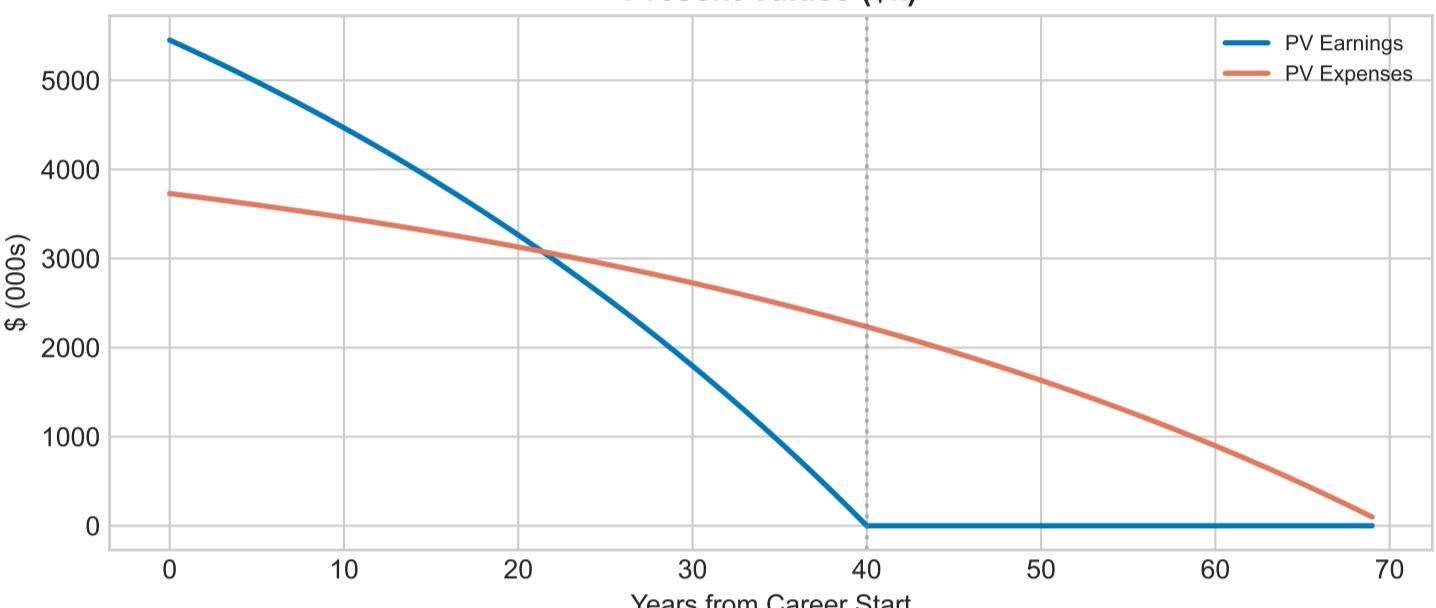
Income &amp; Expenses (\$k)



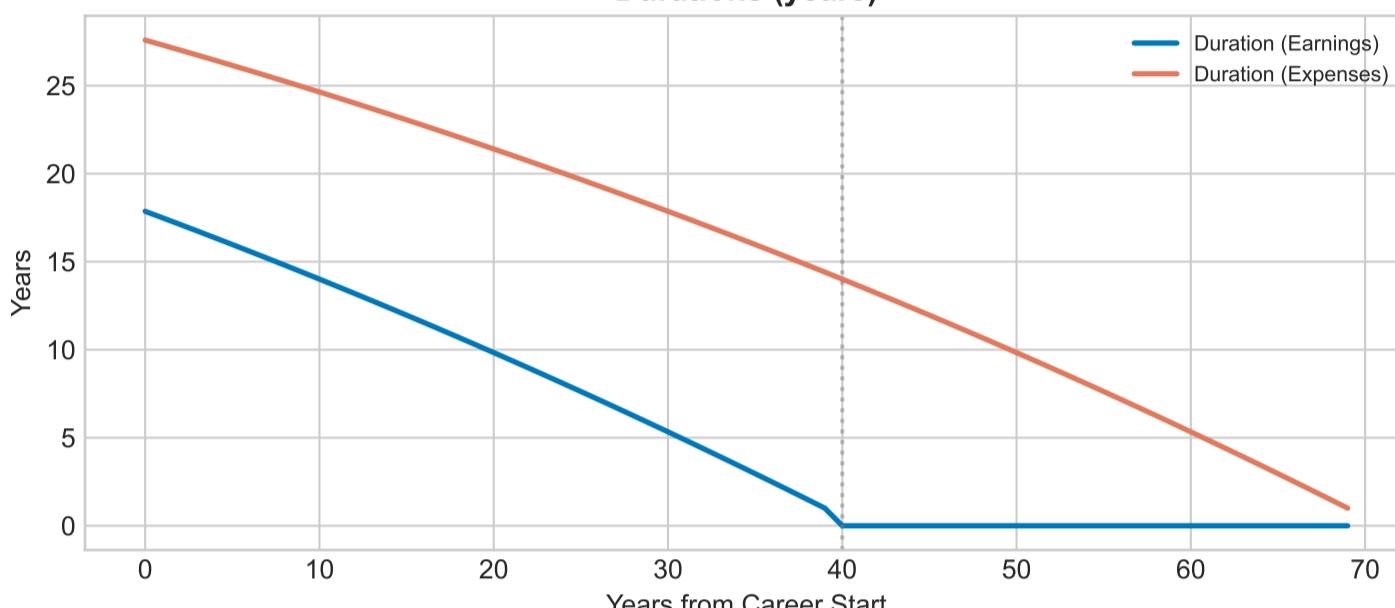
Earnings vs Consumption (\$k)



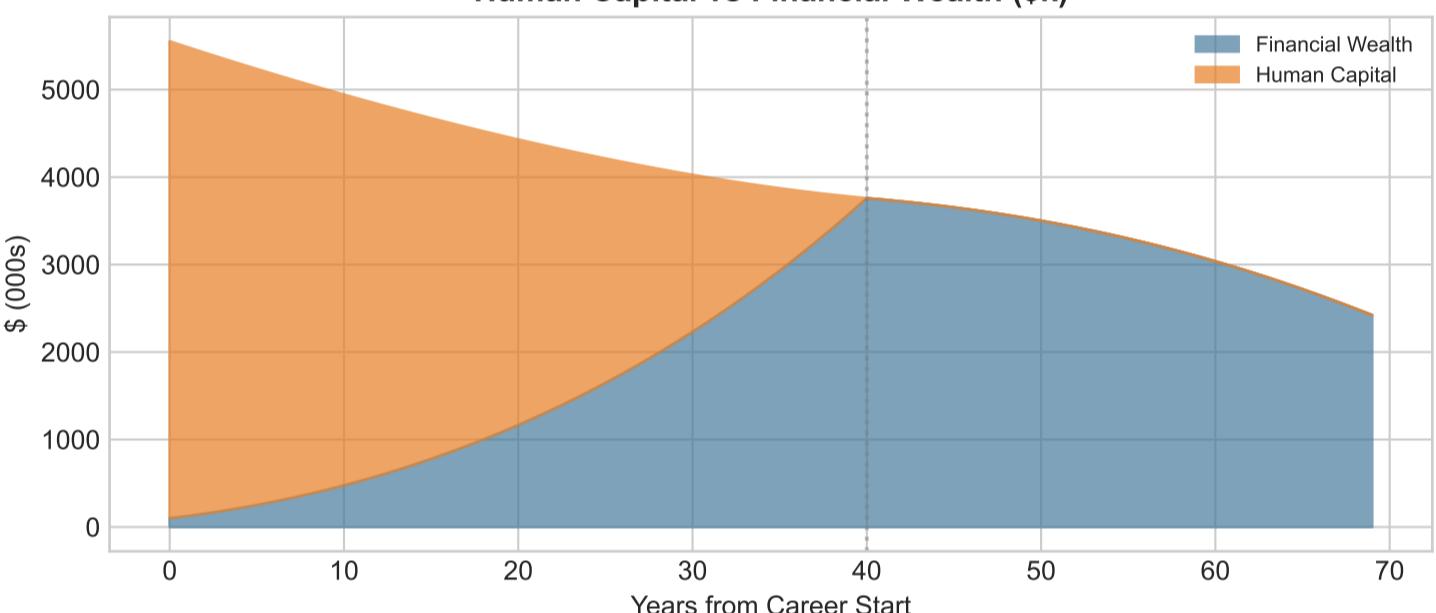
Present Values (\$k)



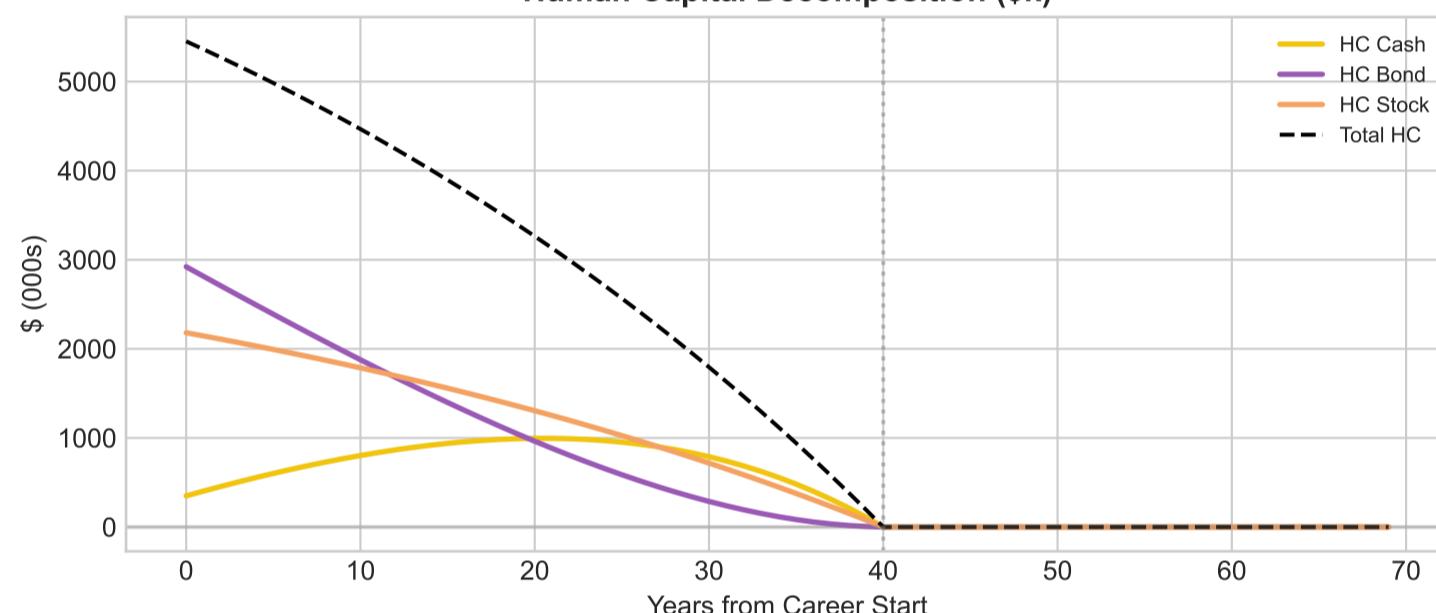
Durations (years)



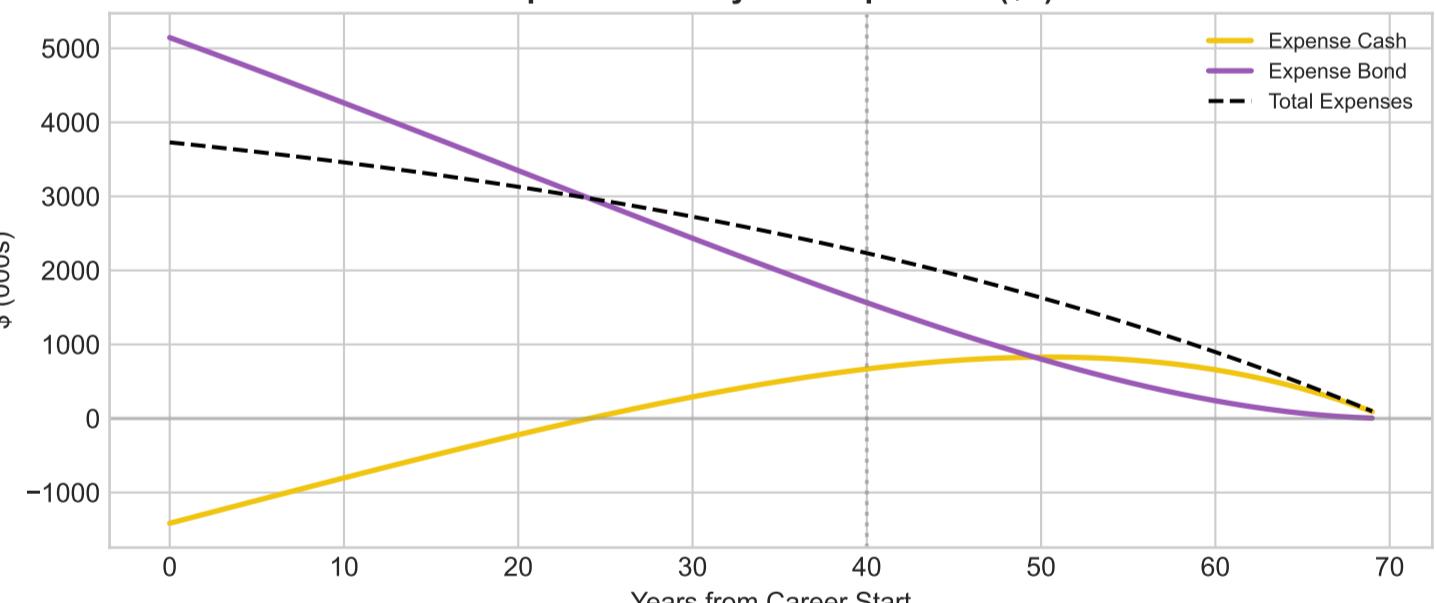
Human Capital vs Financial Wealth (\$k)



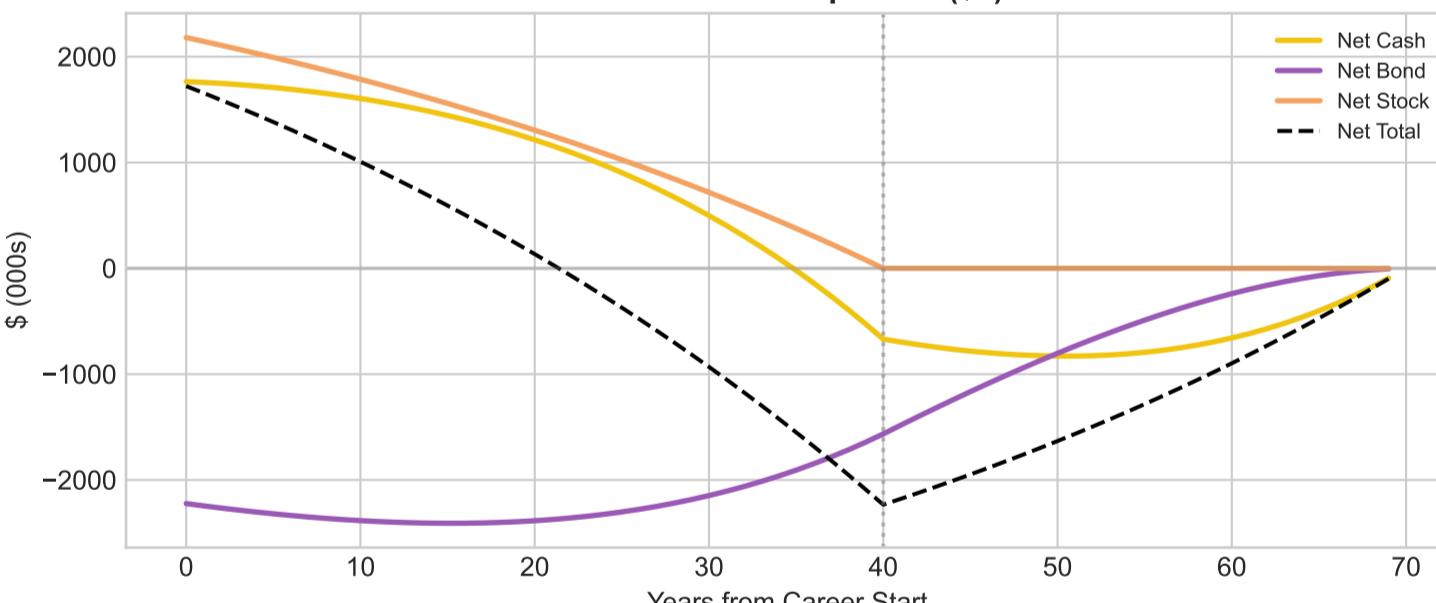
Human Capital Decomposition (\$k)



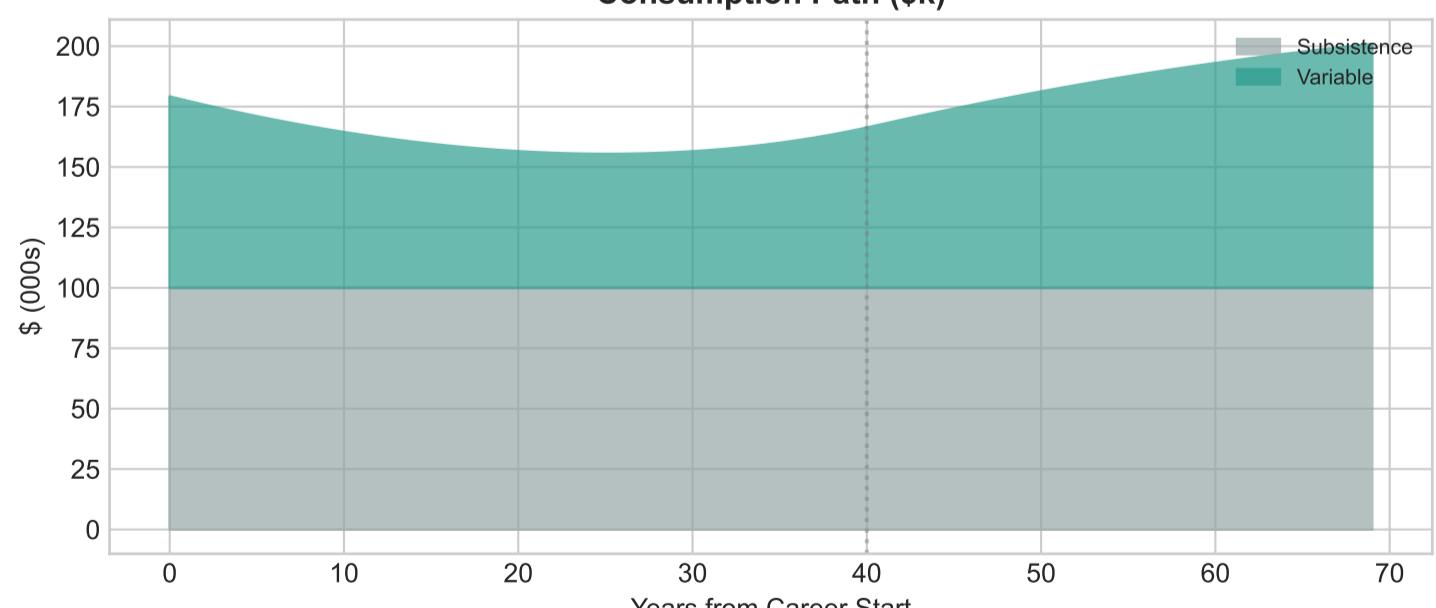
Expense Liability Decomposition (\$k)



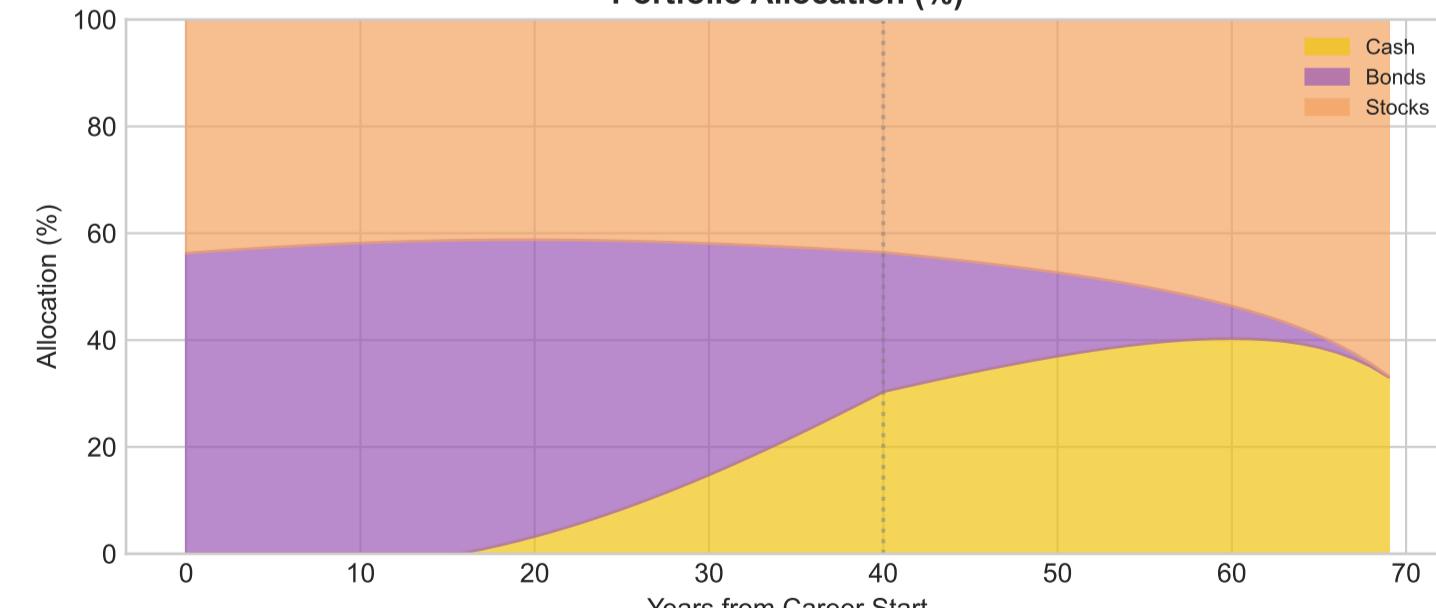
Net HC minus Expenses (\$k)



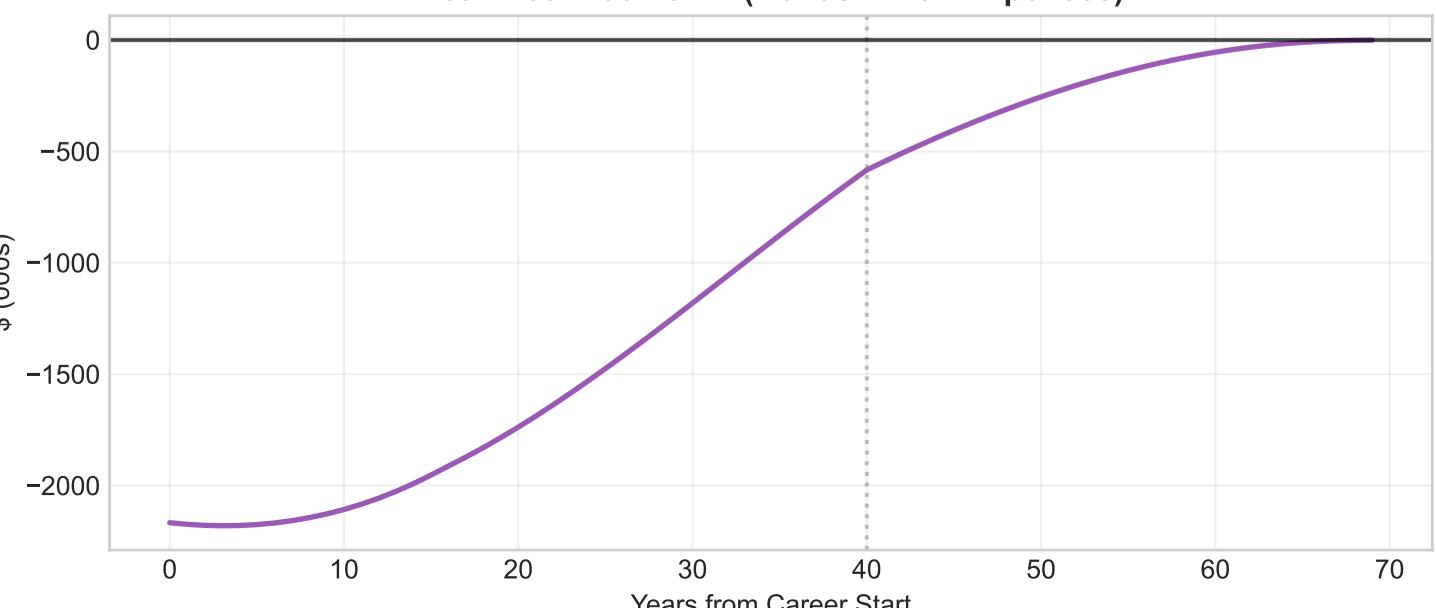
Consumption Path (\$k)



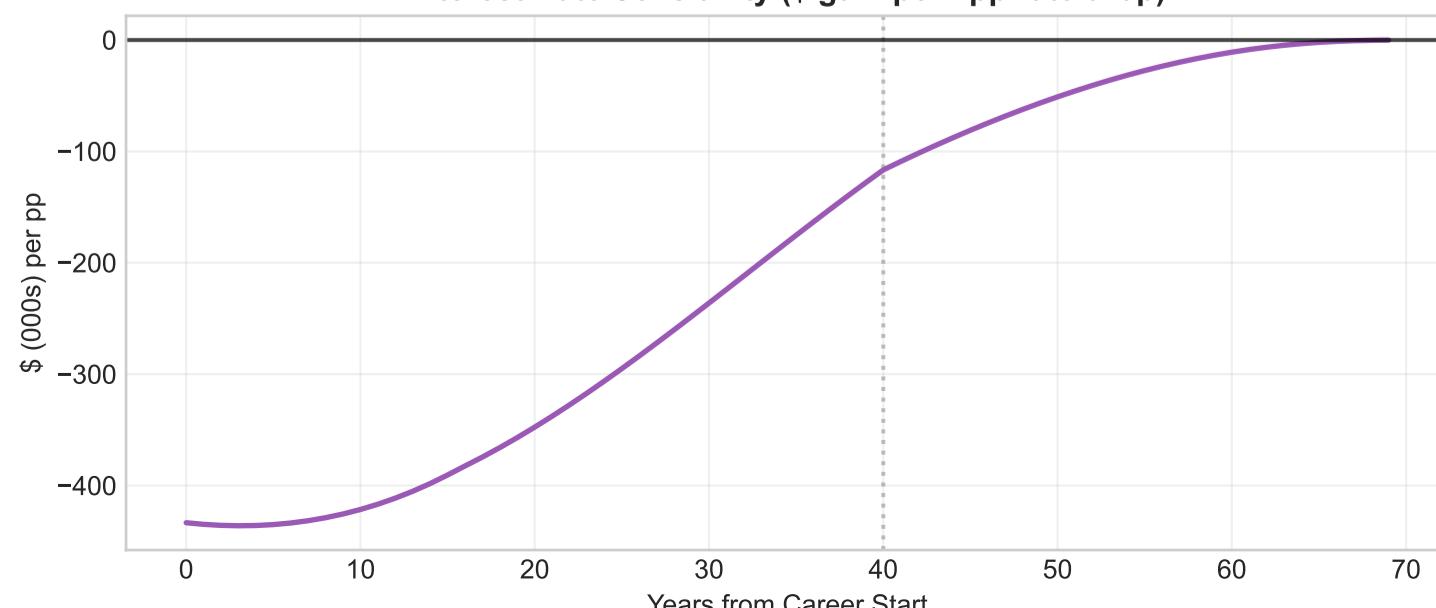
Portfolio Allocation (%)

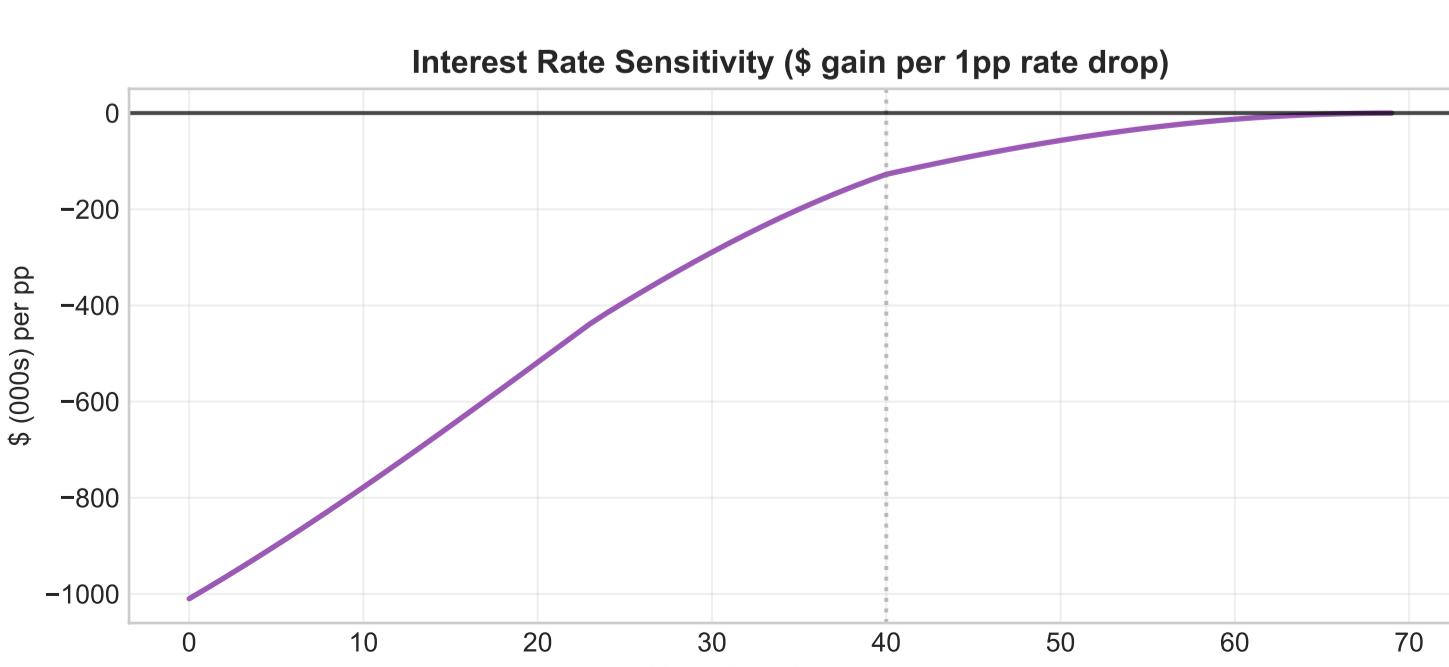
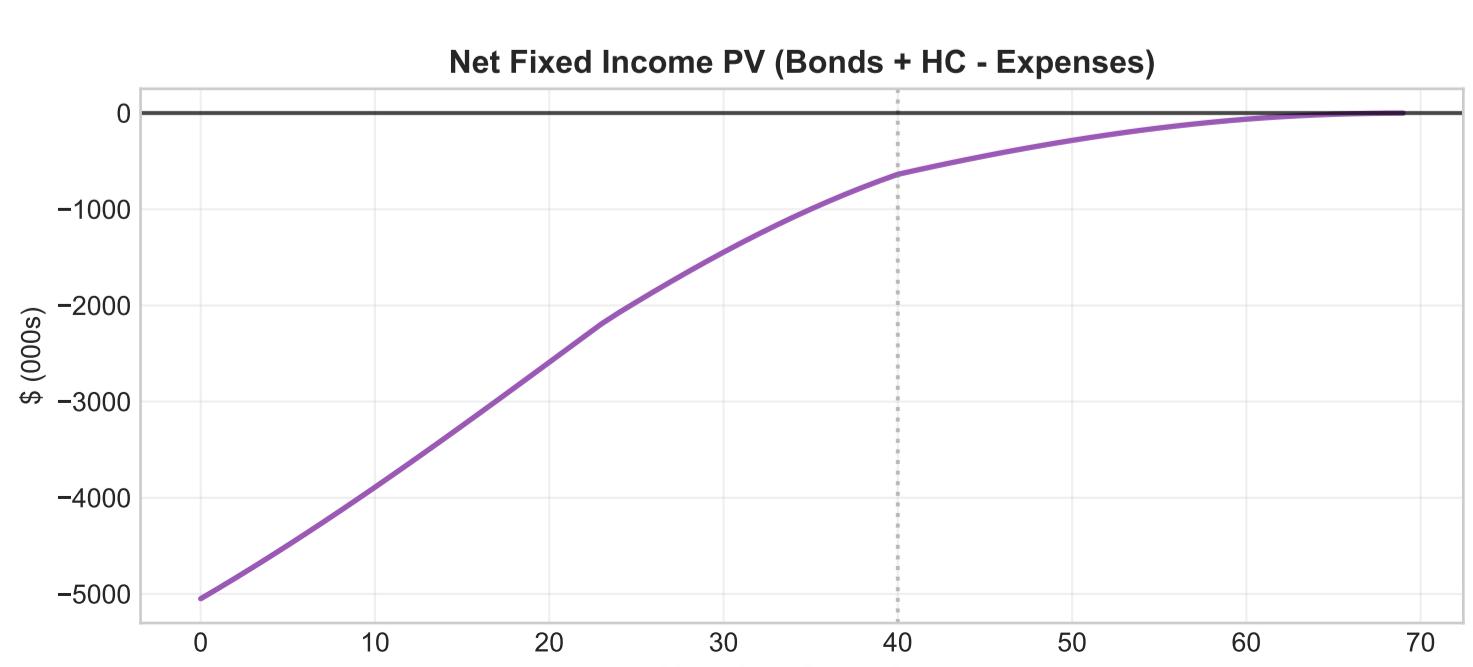
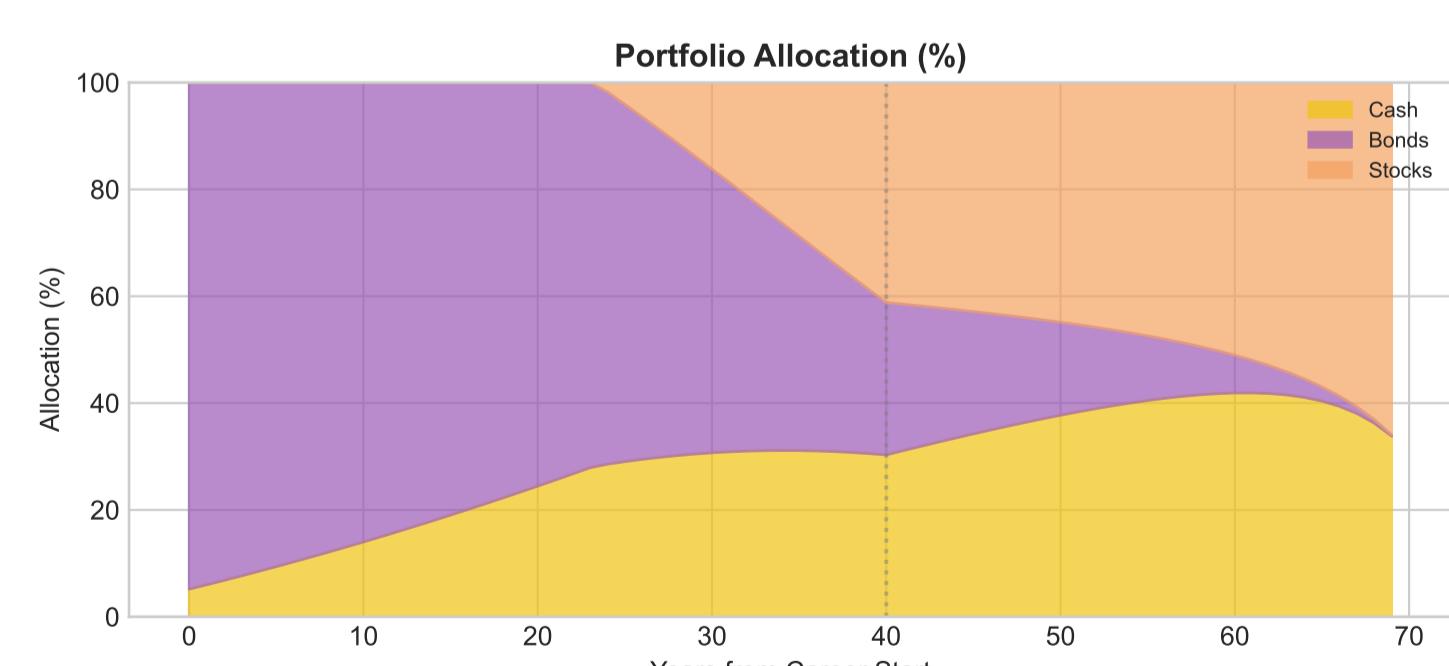
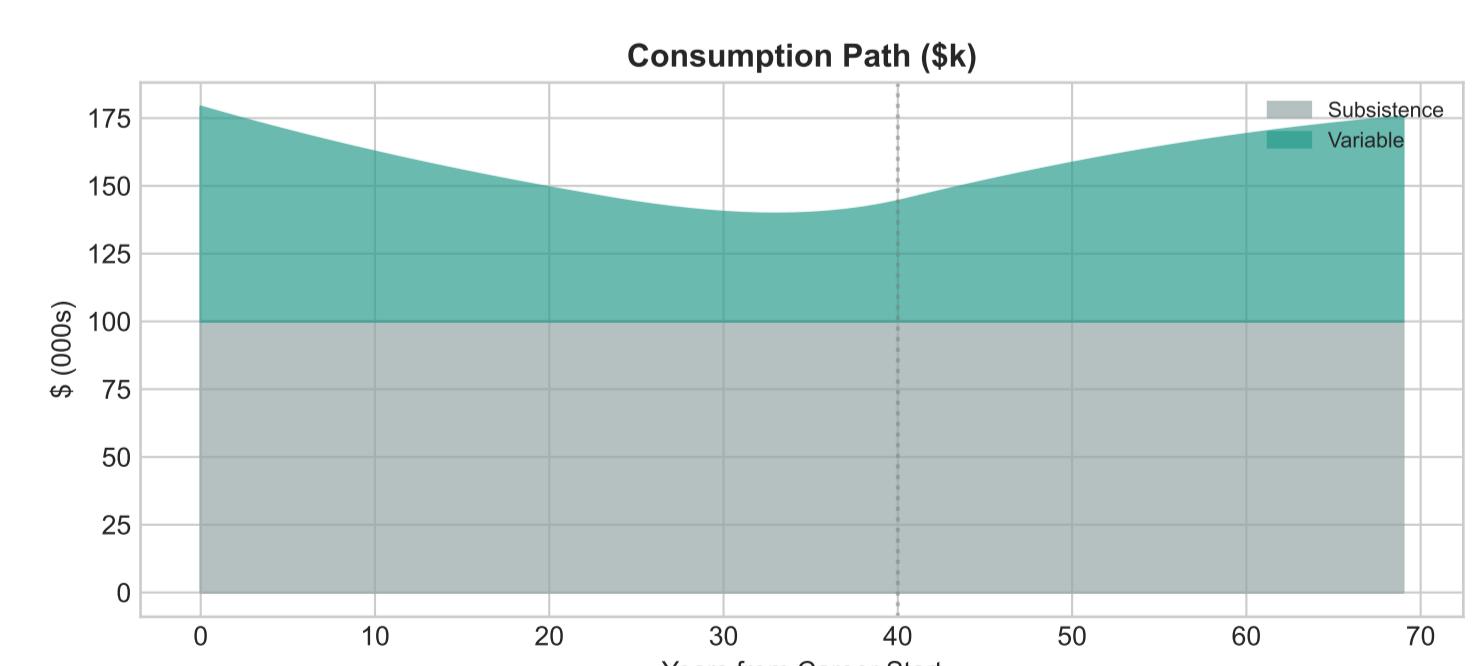
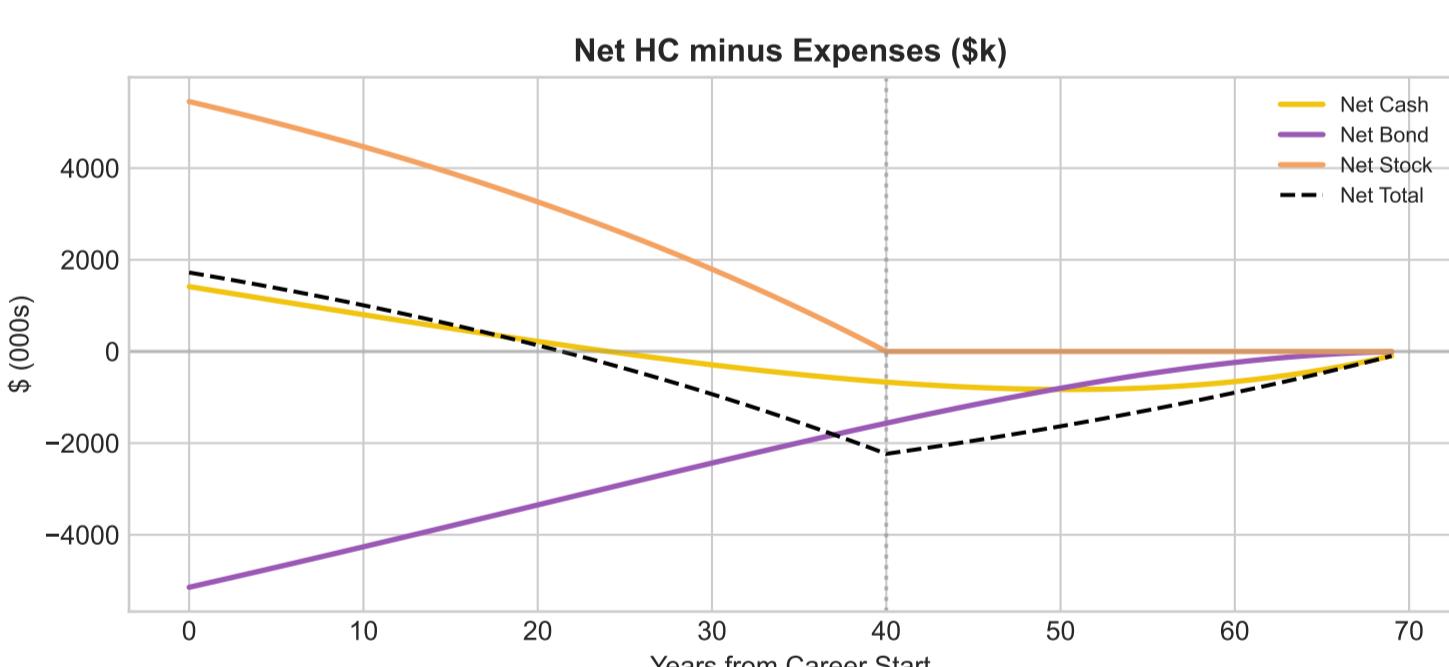
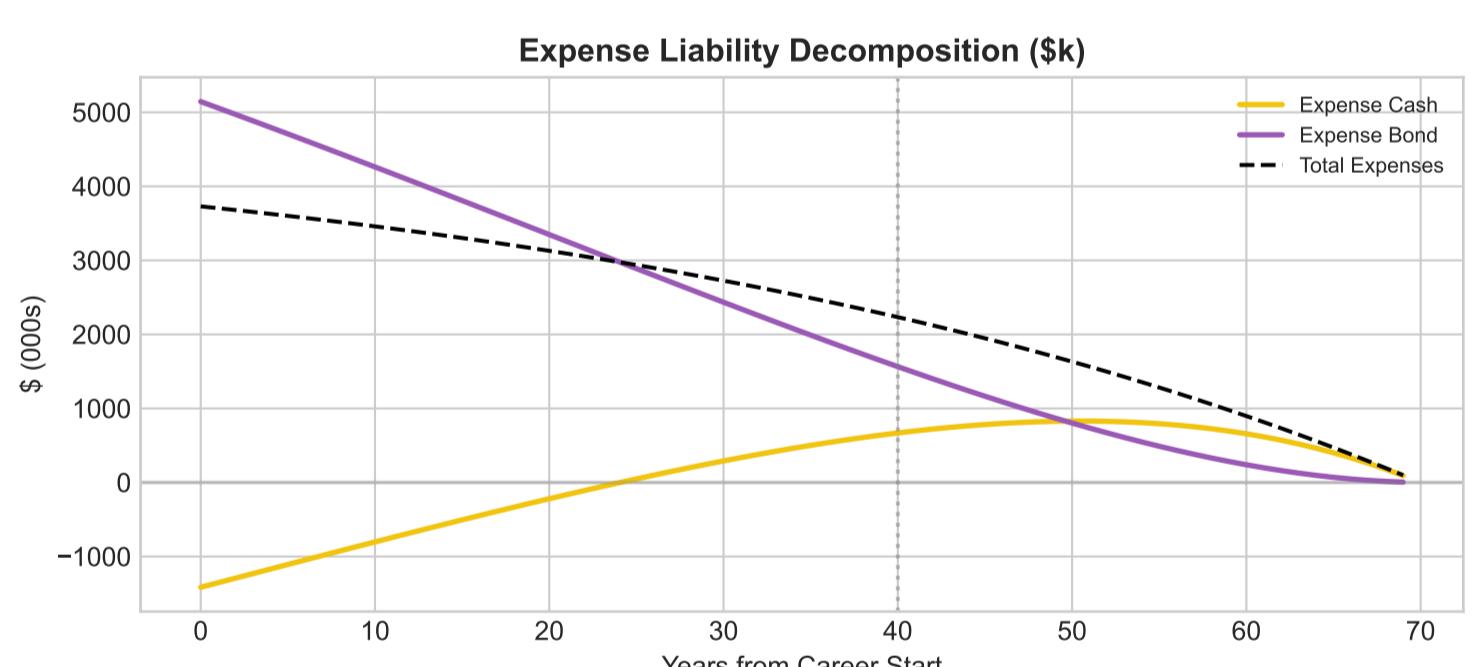
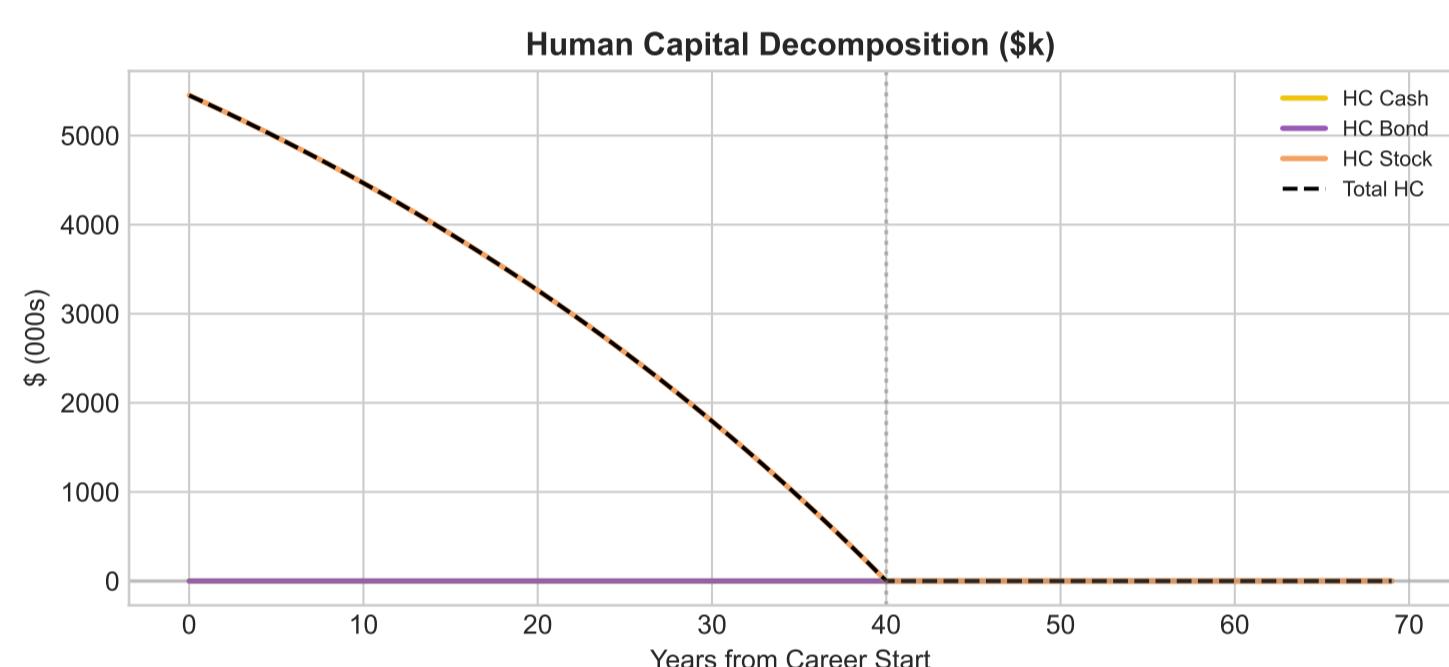
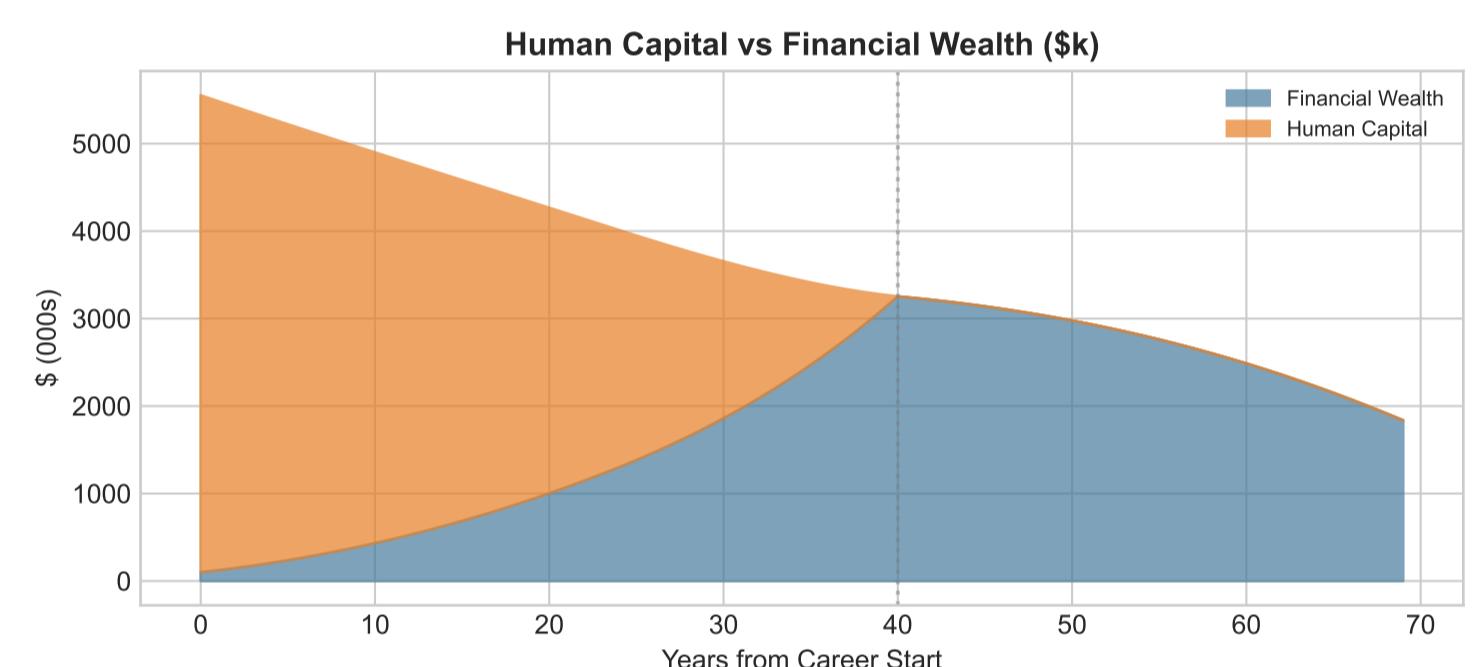
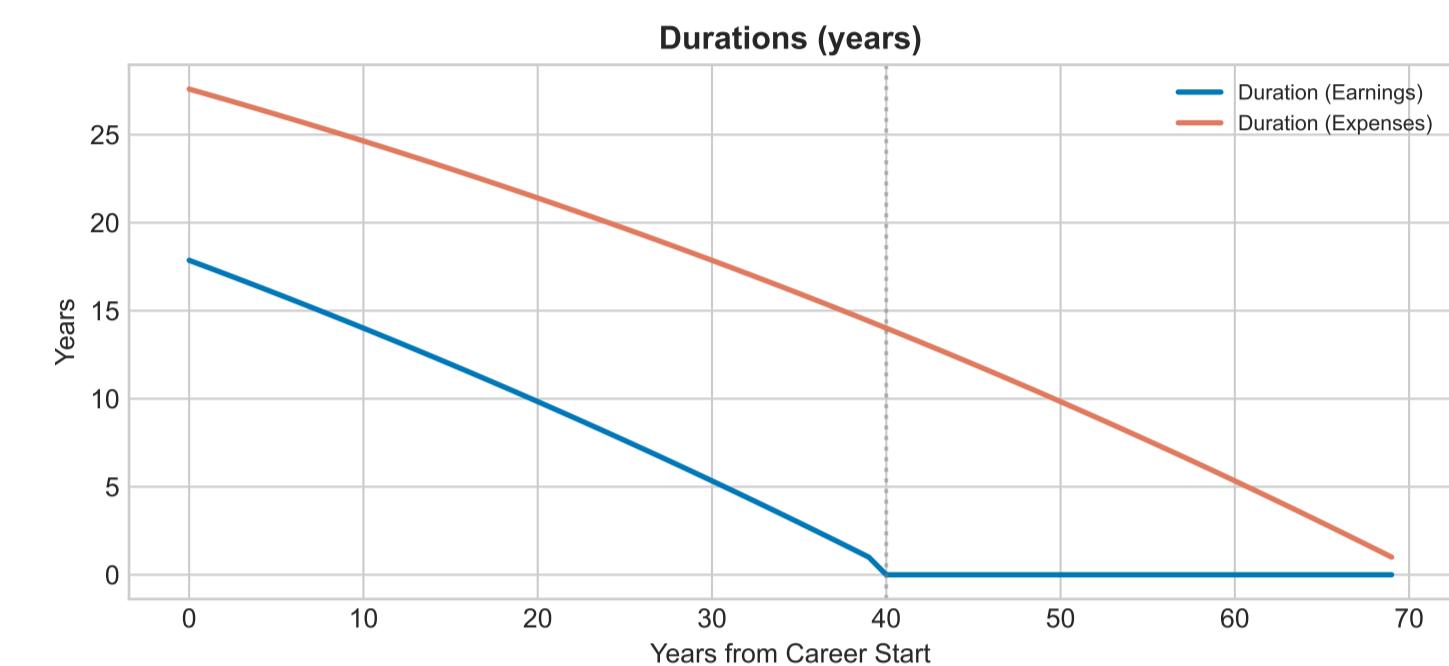
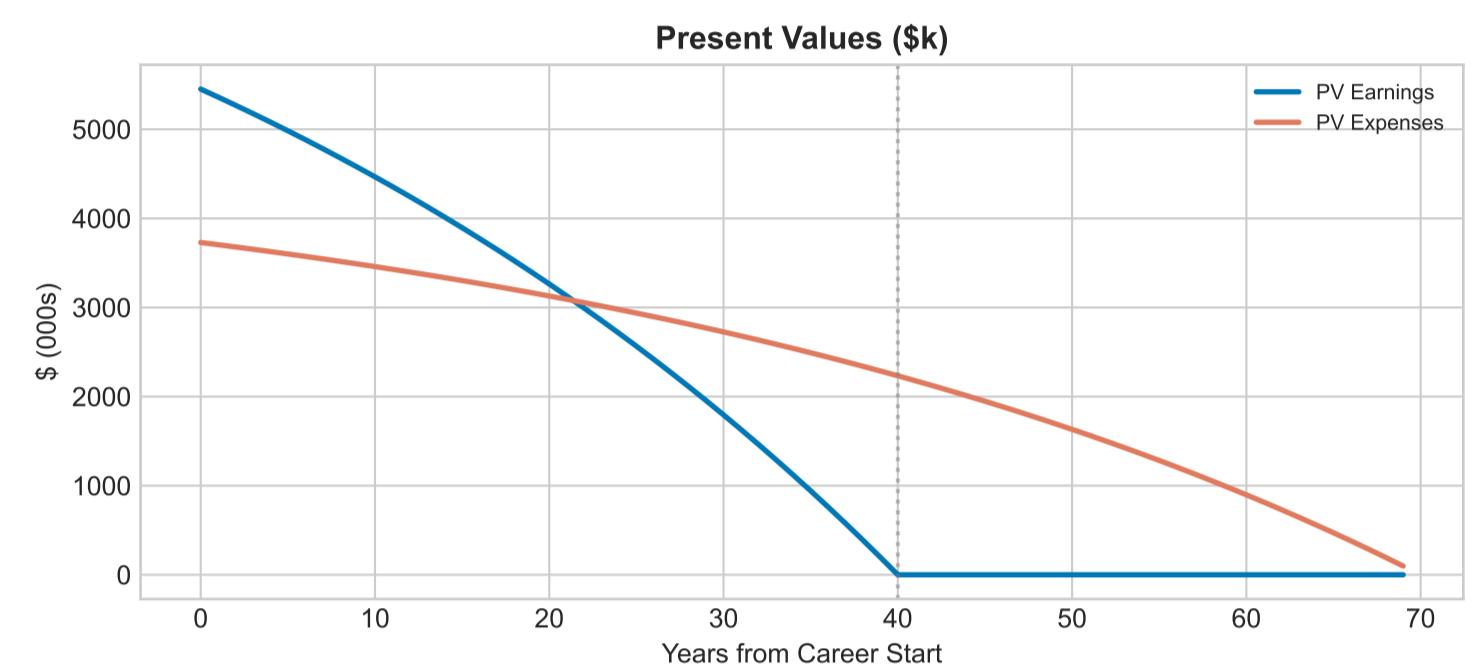
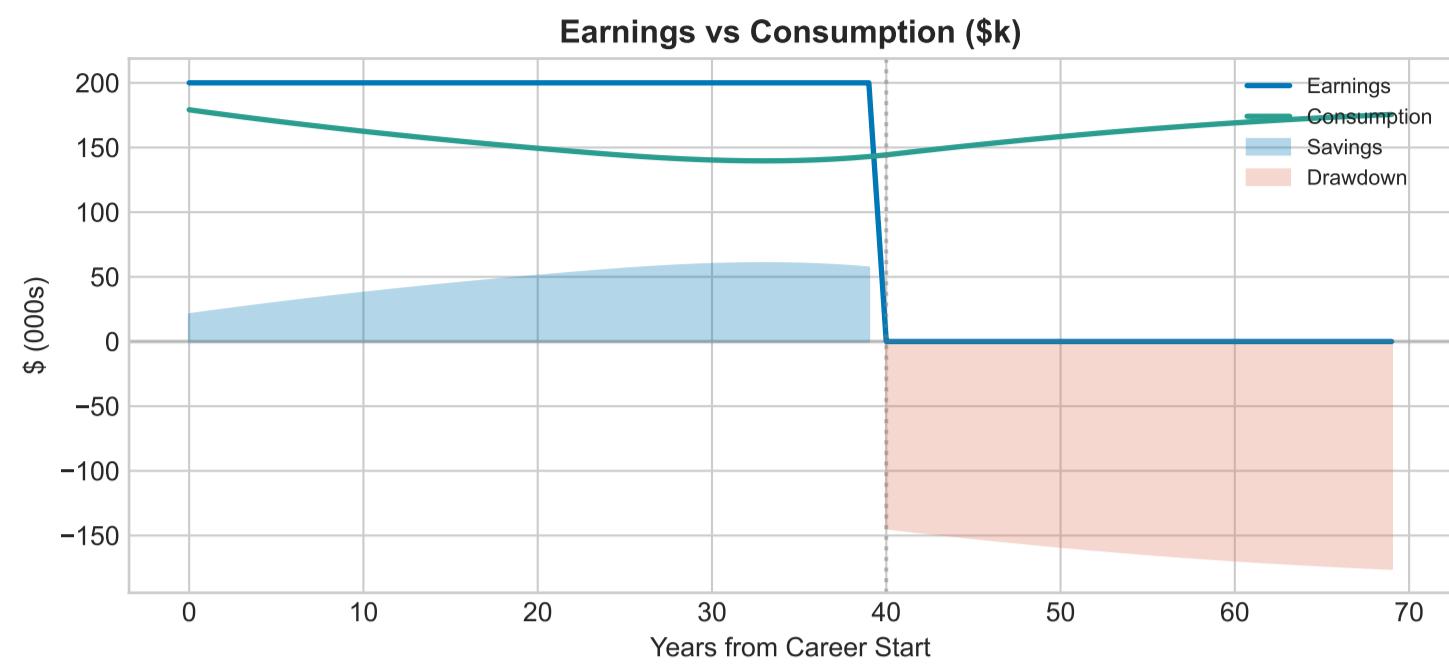
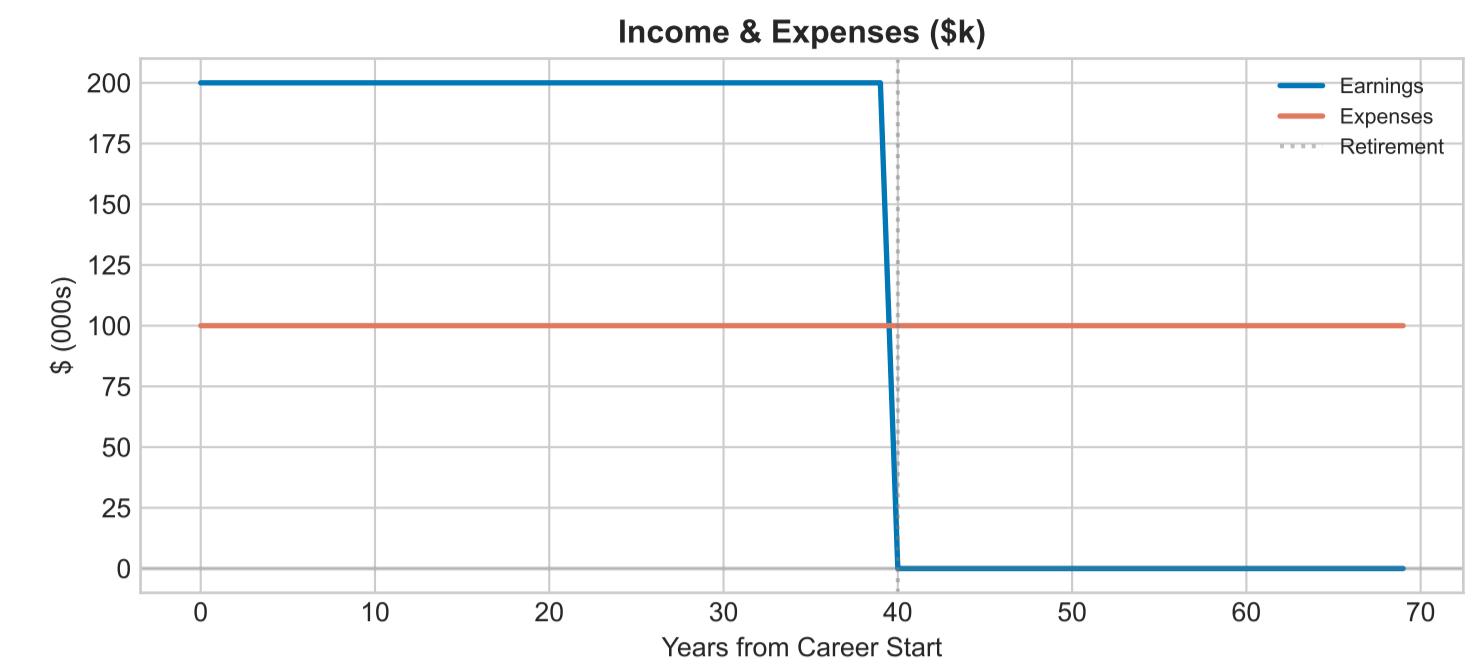


Net Fixed Income PV (Bonds + HC - Expenses)



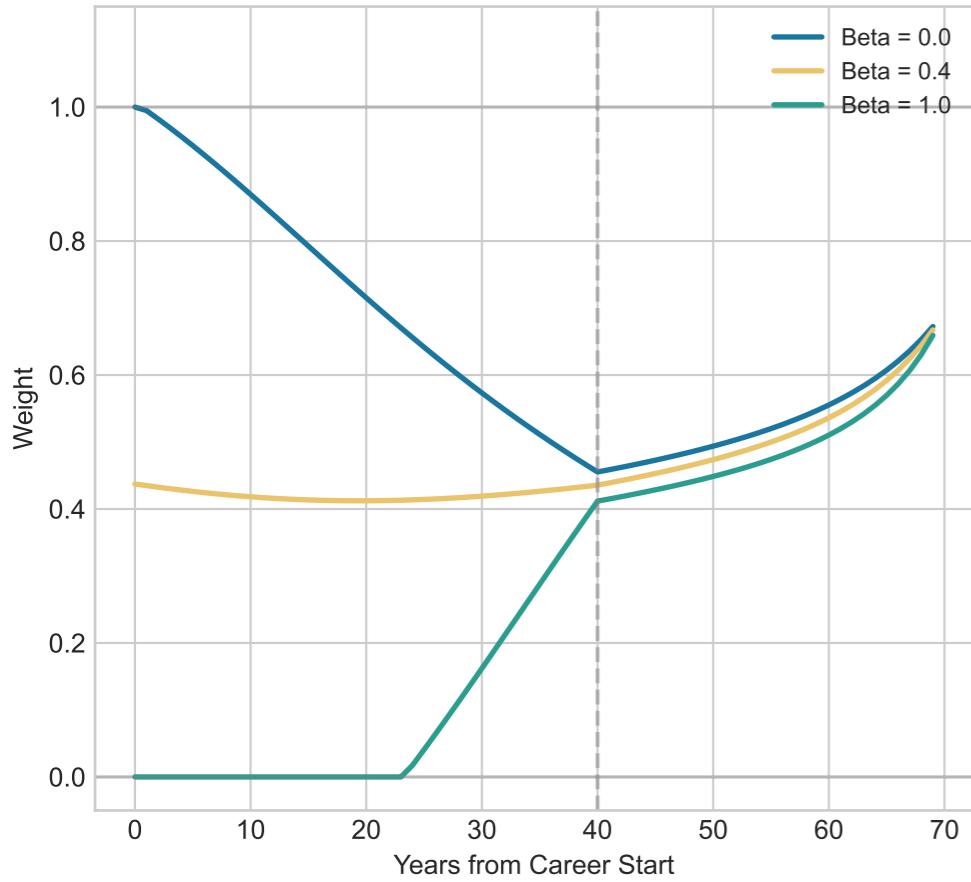
Interest Rate Sensitivity (\$ gain per 1pp rate drop)



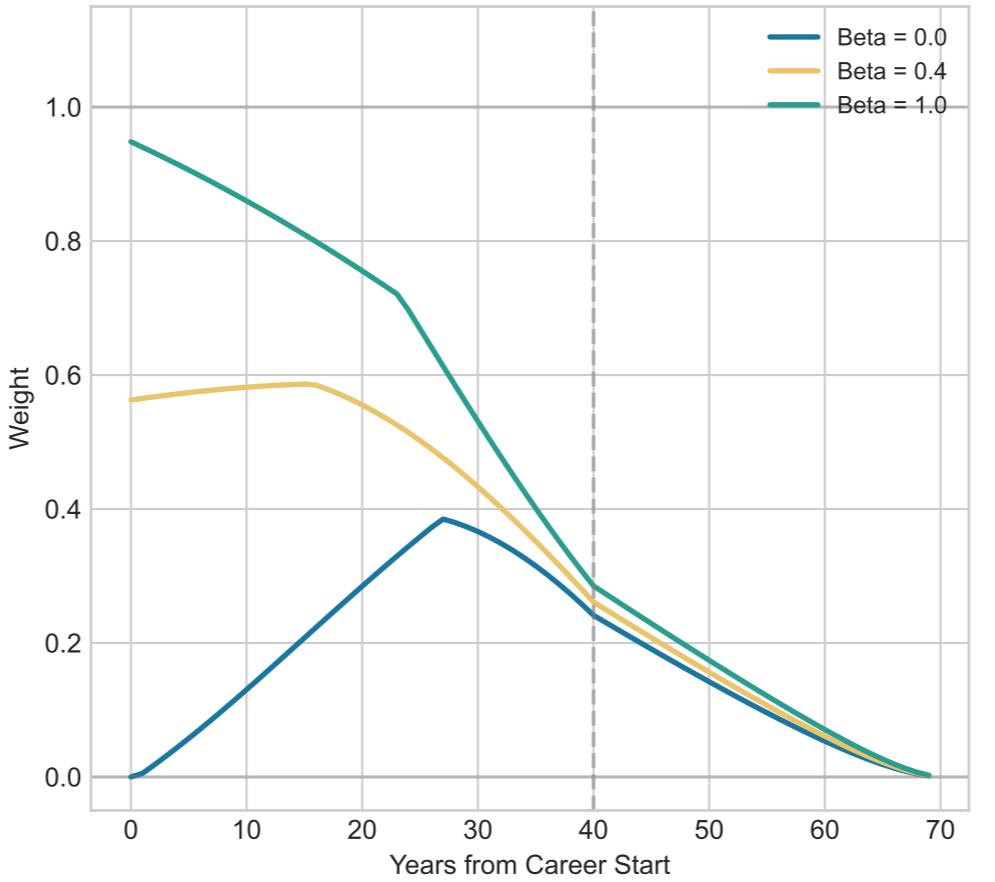


# Effect of Stock Beta on Portfolio Allocation & Human Capital

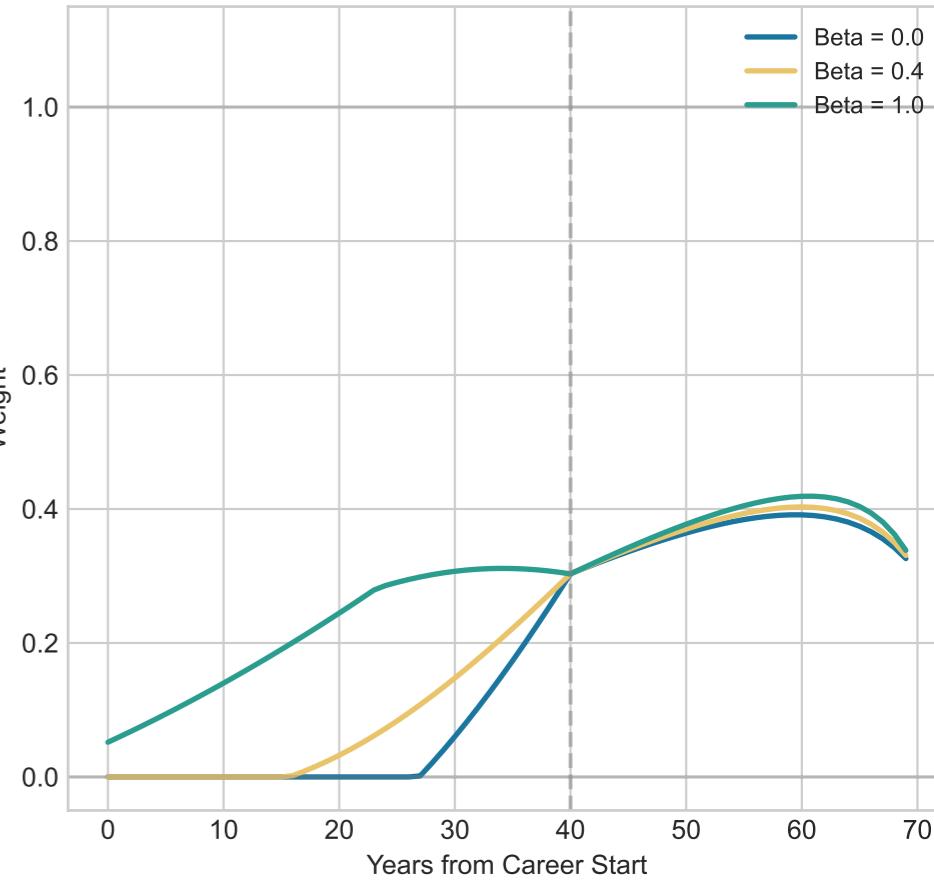
Stock Weight by Beta



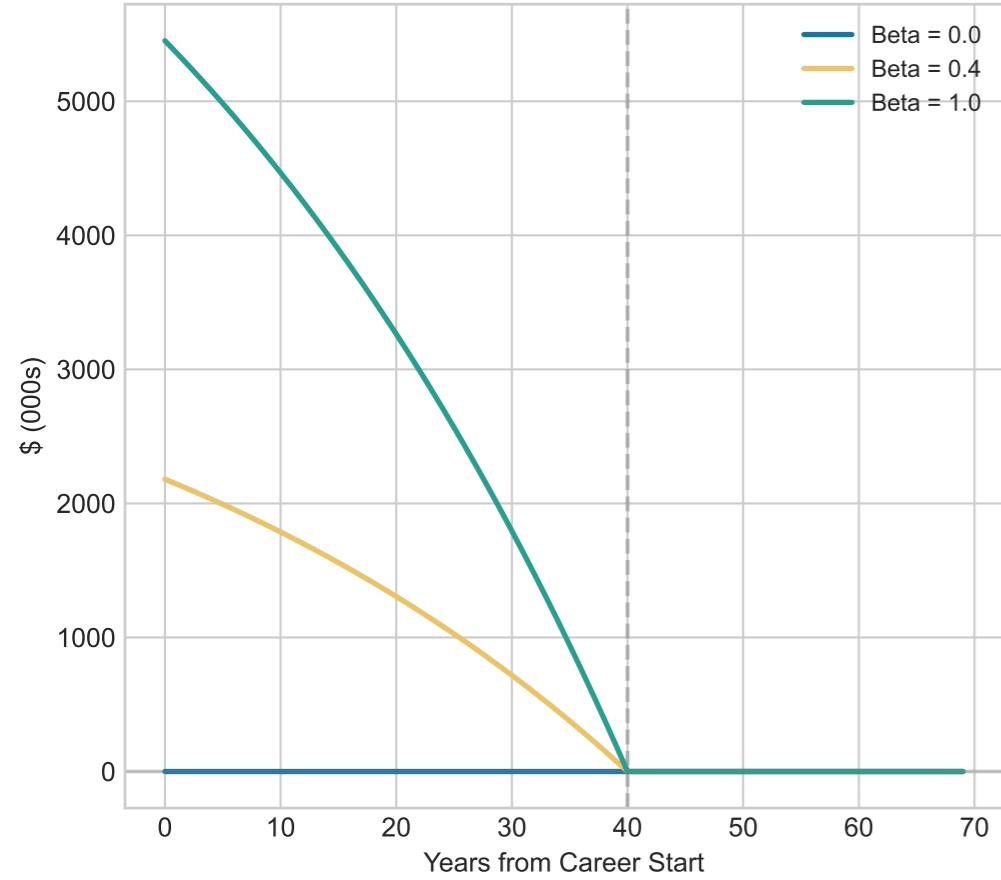
Bond Weight by Beta



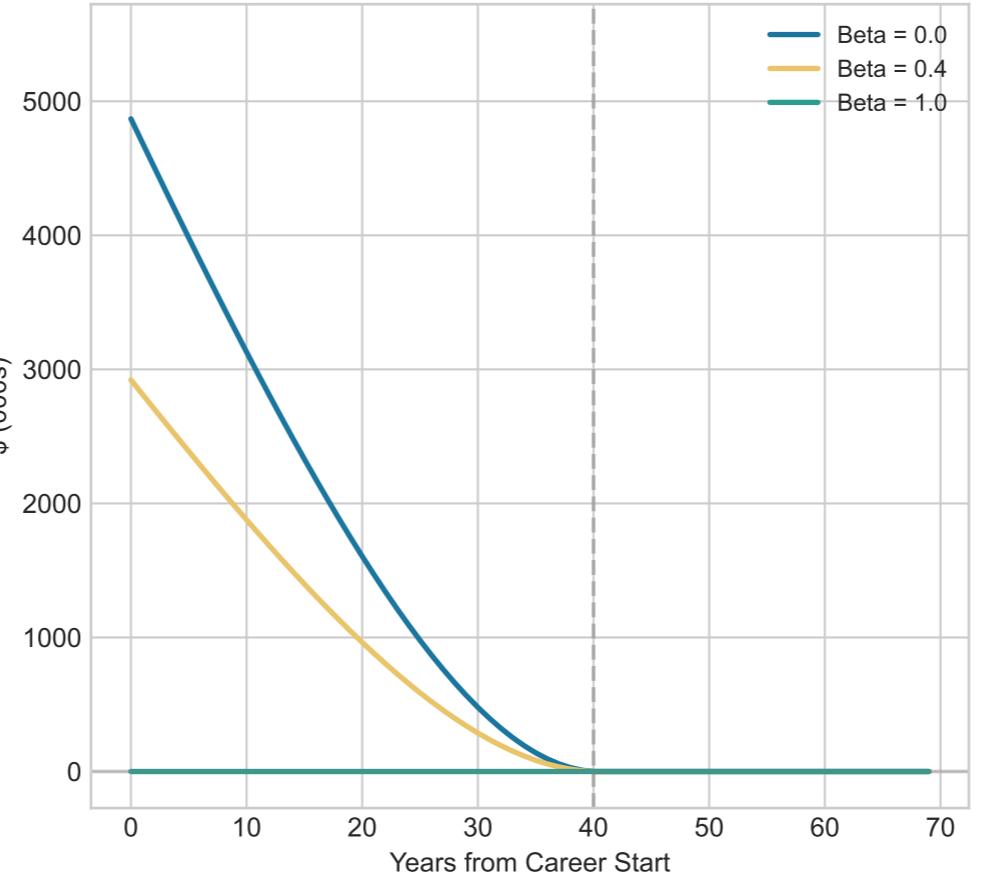
Cash Weight by Beta



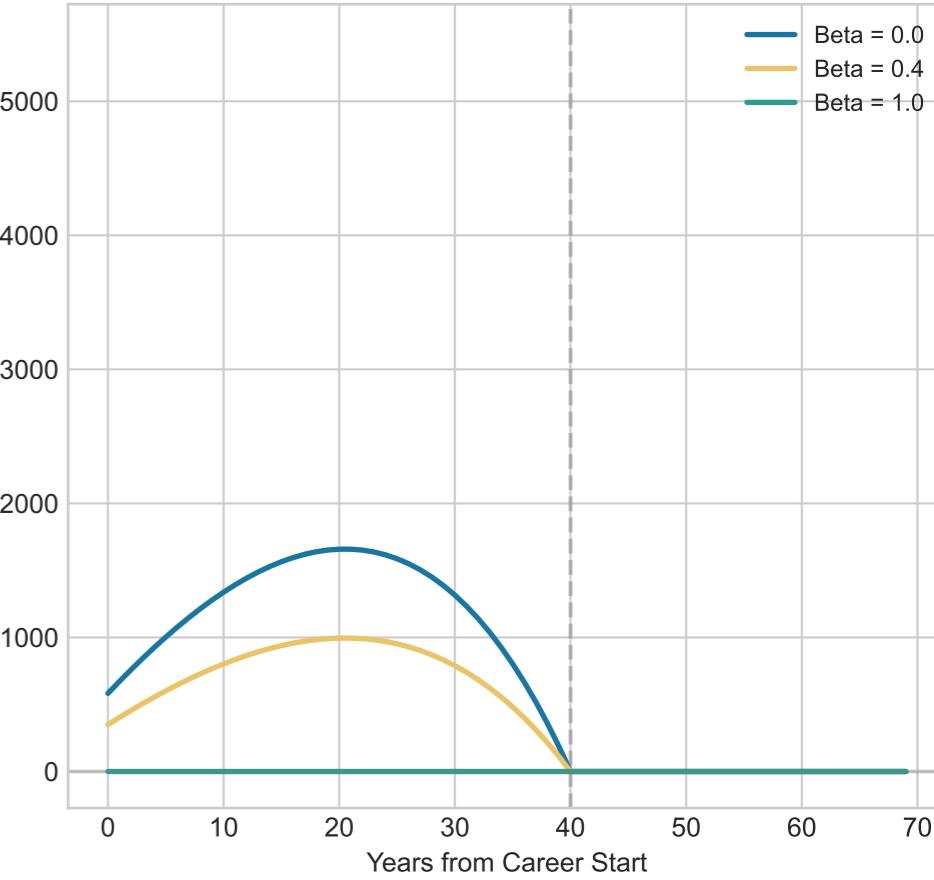
Stock Component of Human Capital

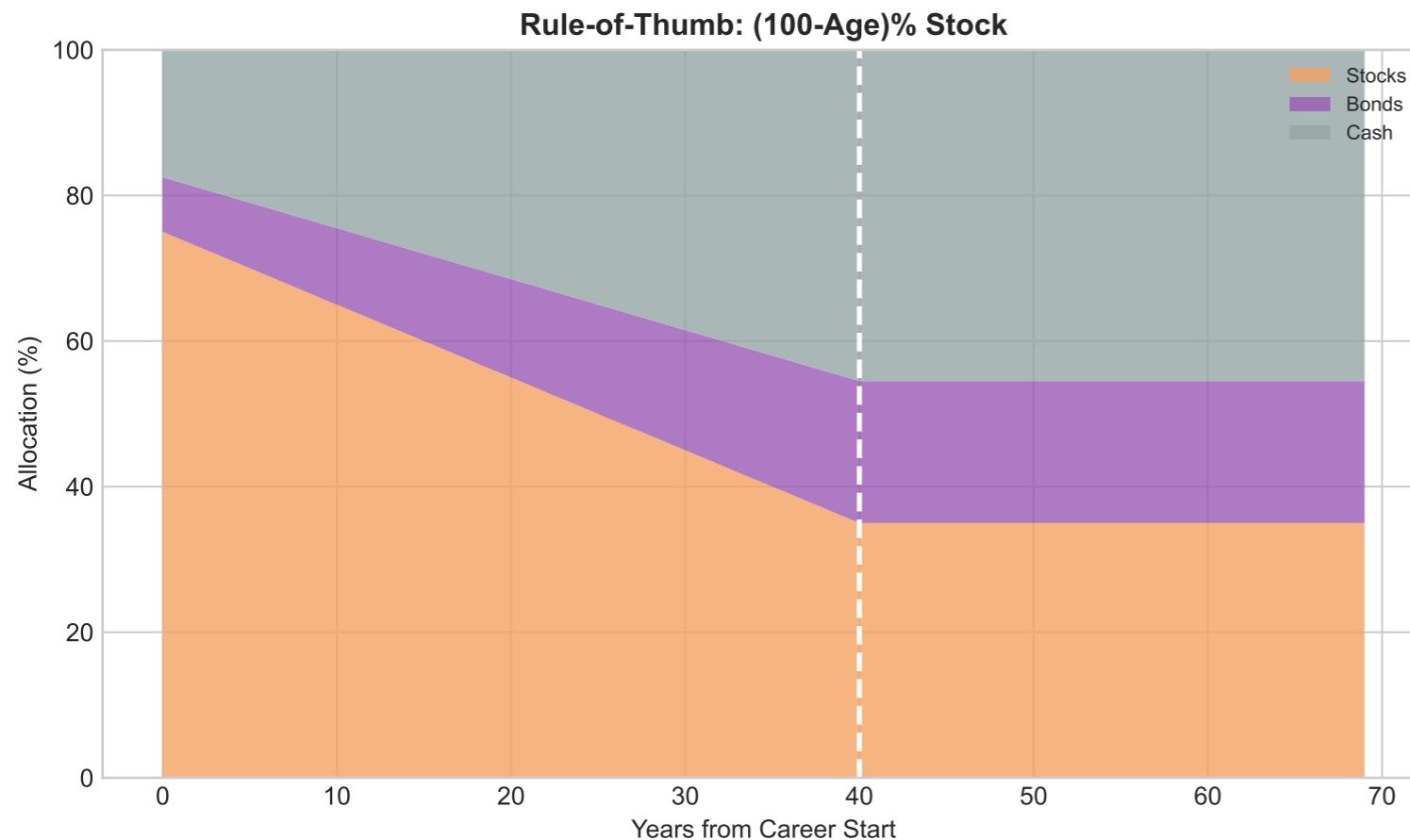
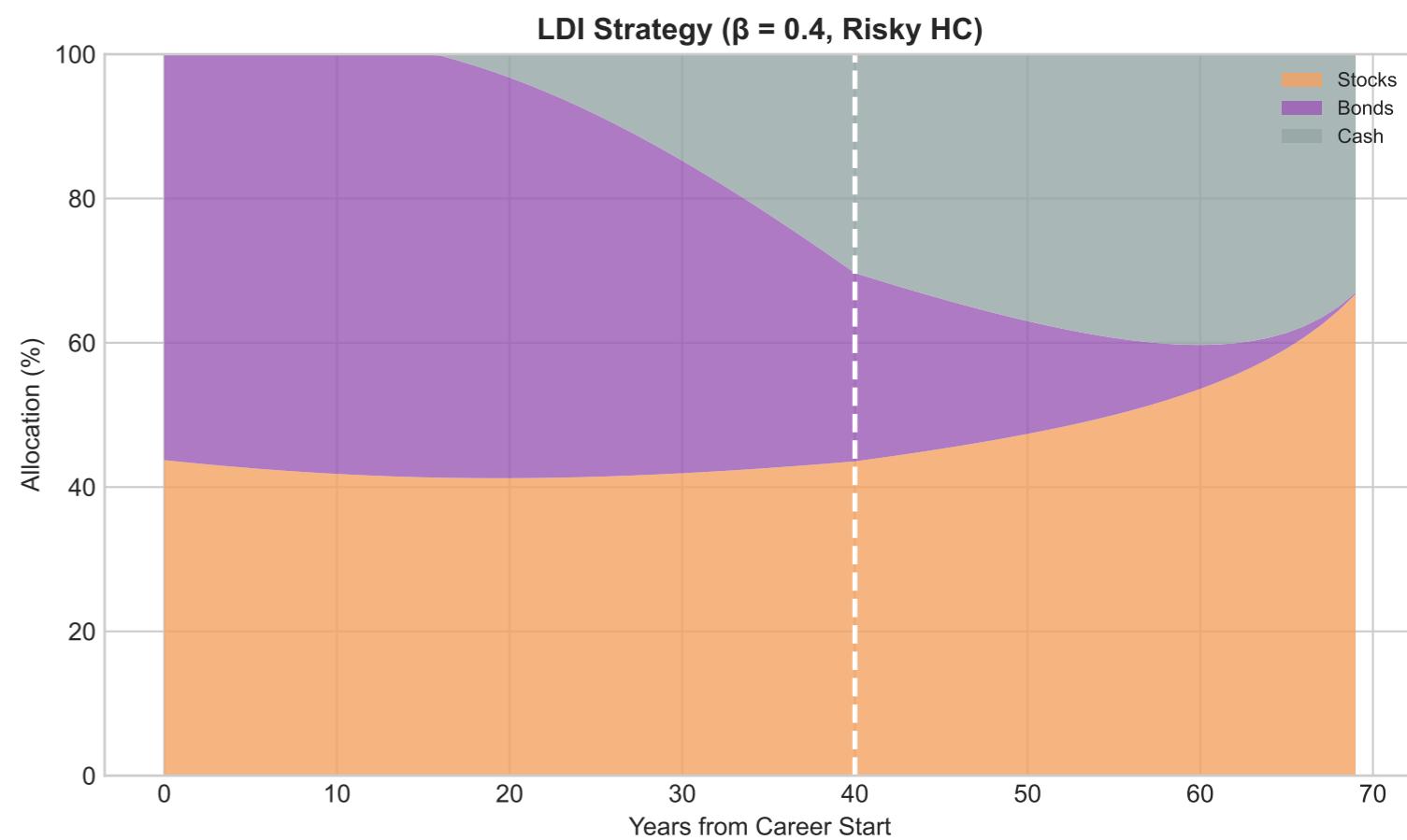
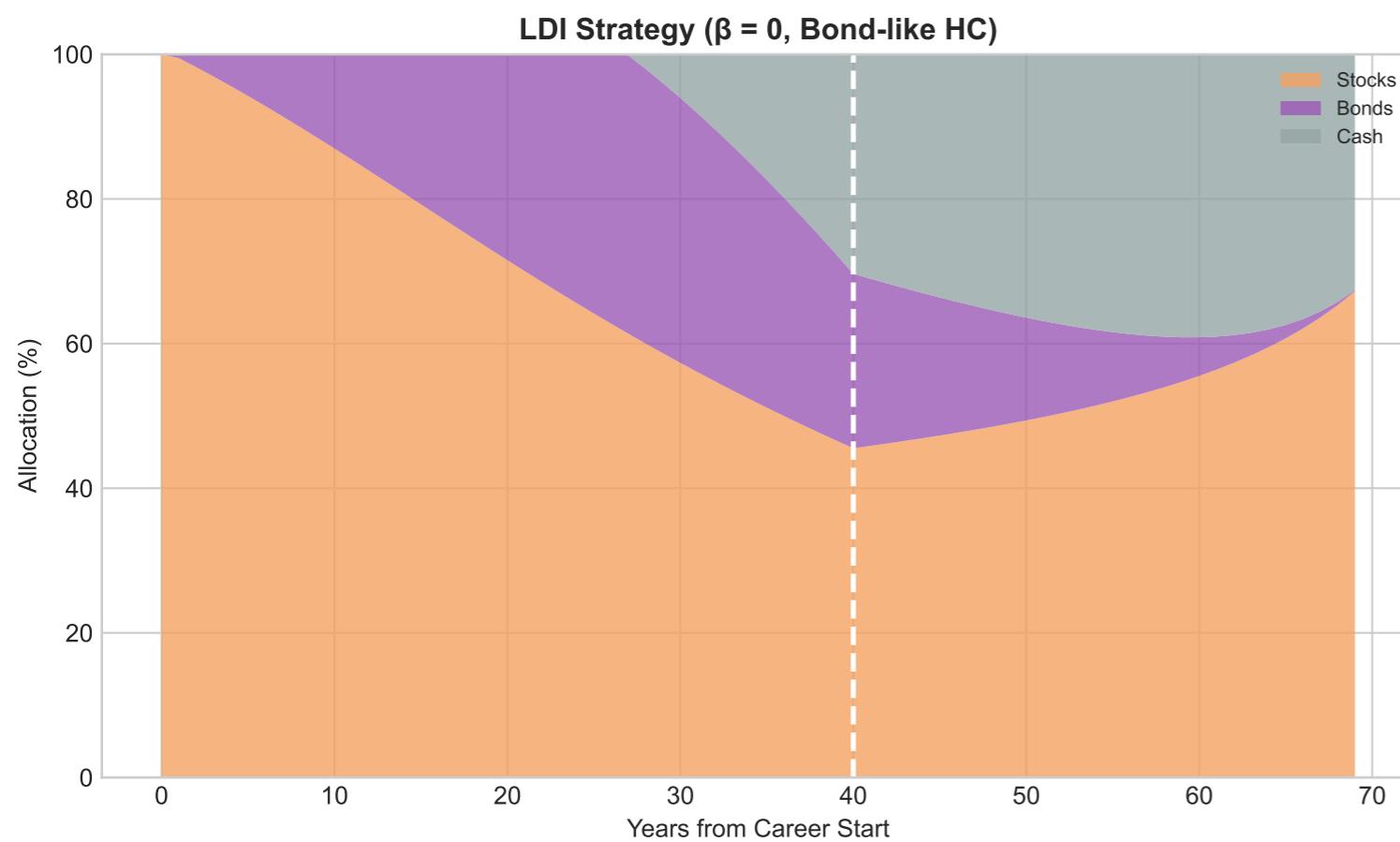


Bond Component of Human Capital



Cash Component of Human Capital





#### Portfolio Allocation Summary

LDI Strategy adapts allocation based on:

- Human capital composition ( $\beta$ )
- Net worth (HC + FW - Expenses)
- Mean-variance optimal weights

When  $\beta = 0$  (bond-like human capital):

- HC acts like a bond, so financial portfolio tilts toward stocks

When  $\beta = 0.4$  (risky human capital):

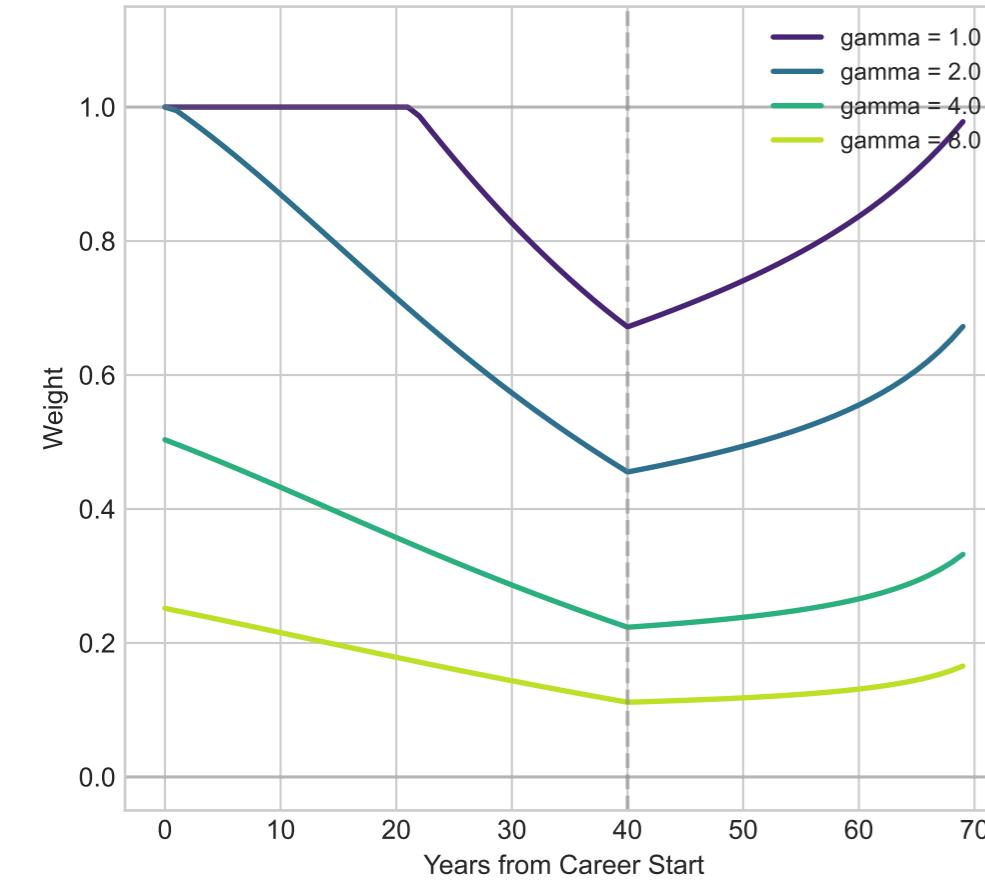
- HC has stock exposure, so financial portfolio reduces stock allocation

Rule-of-Thumb ignores human capital:

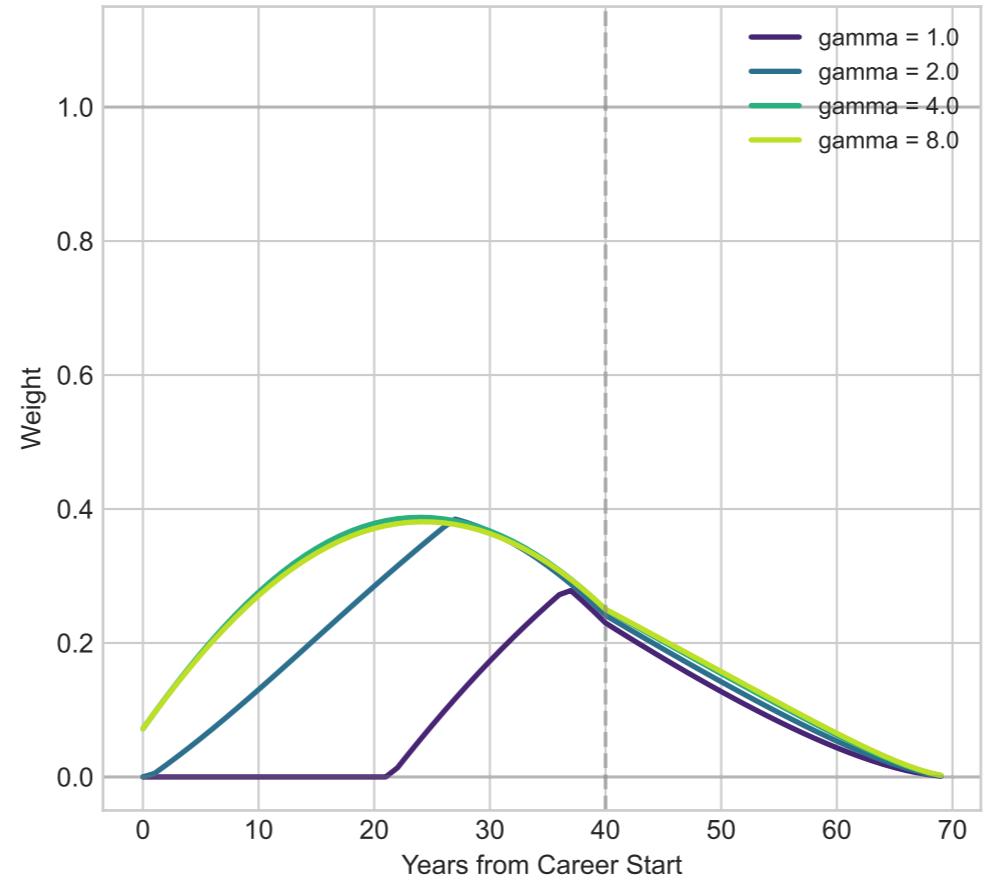
- Stock weight =  $(100 - \text{age})\%$
- Same allocation regardless of  $\beta$

# Effect of Risk Aversion on Lifecycle Strategy

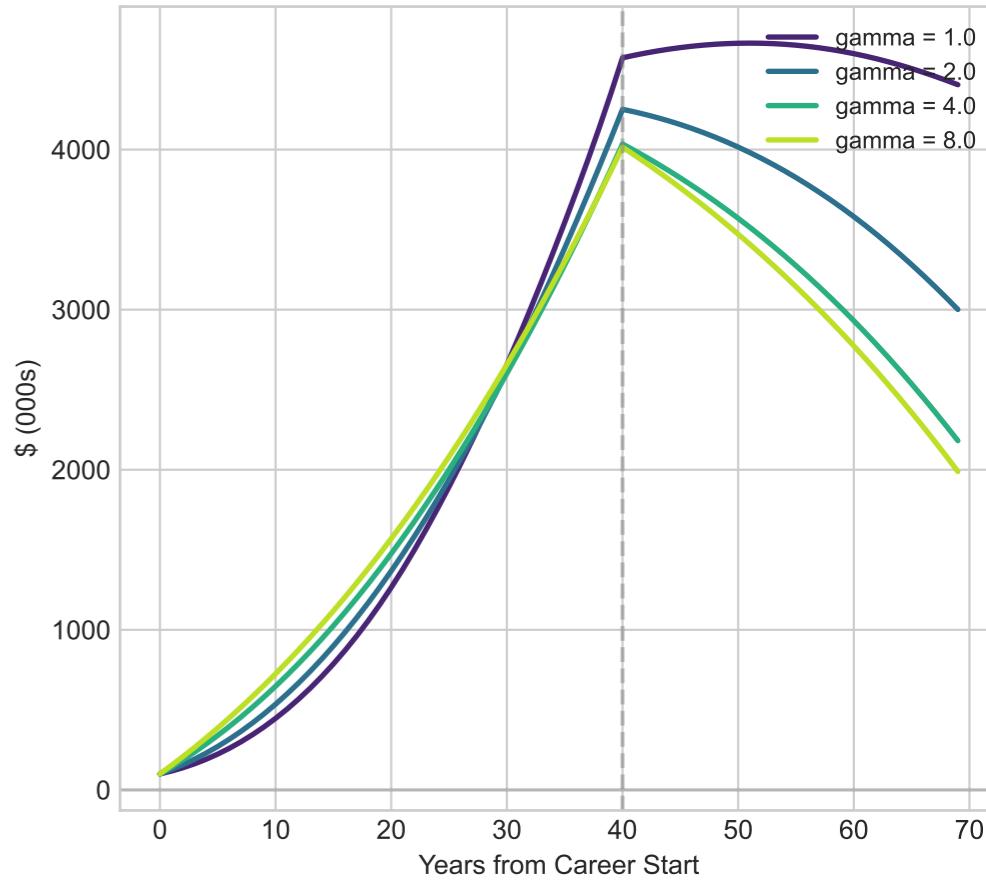
Stock Weight by Risk Aversion



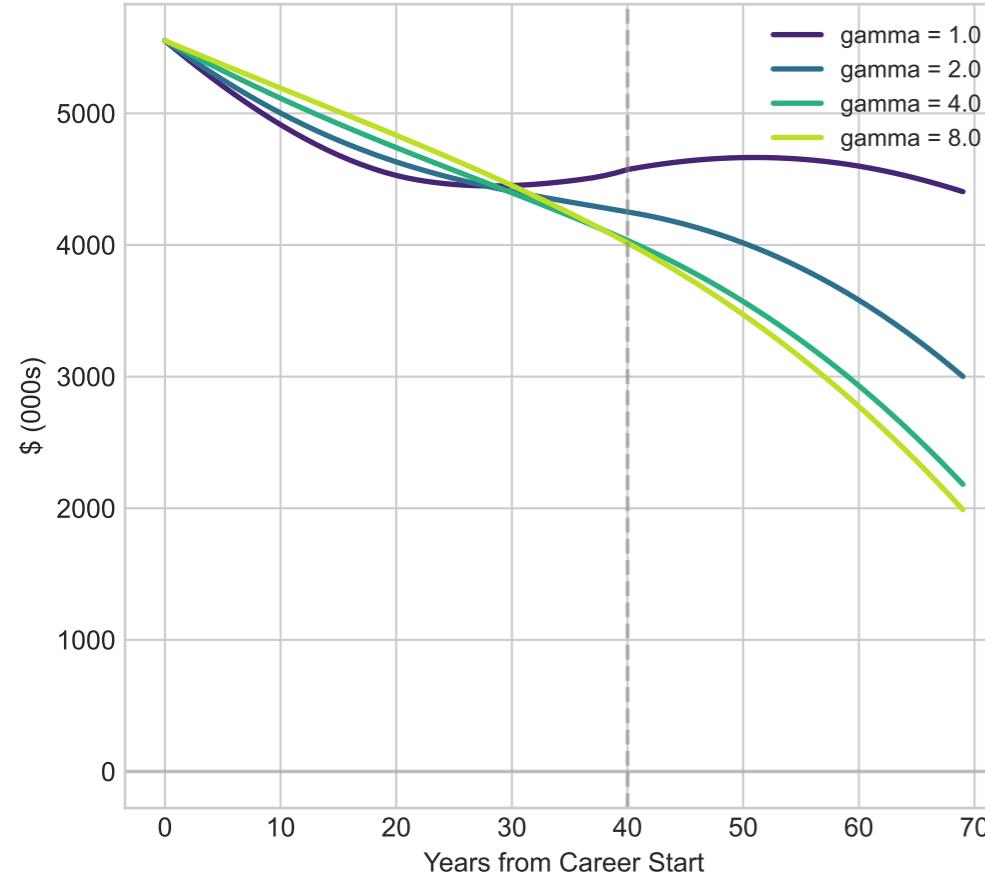
Bond Weight by Risk Aversion



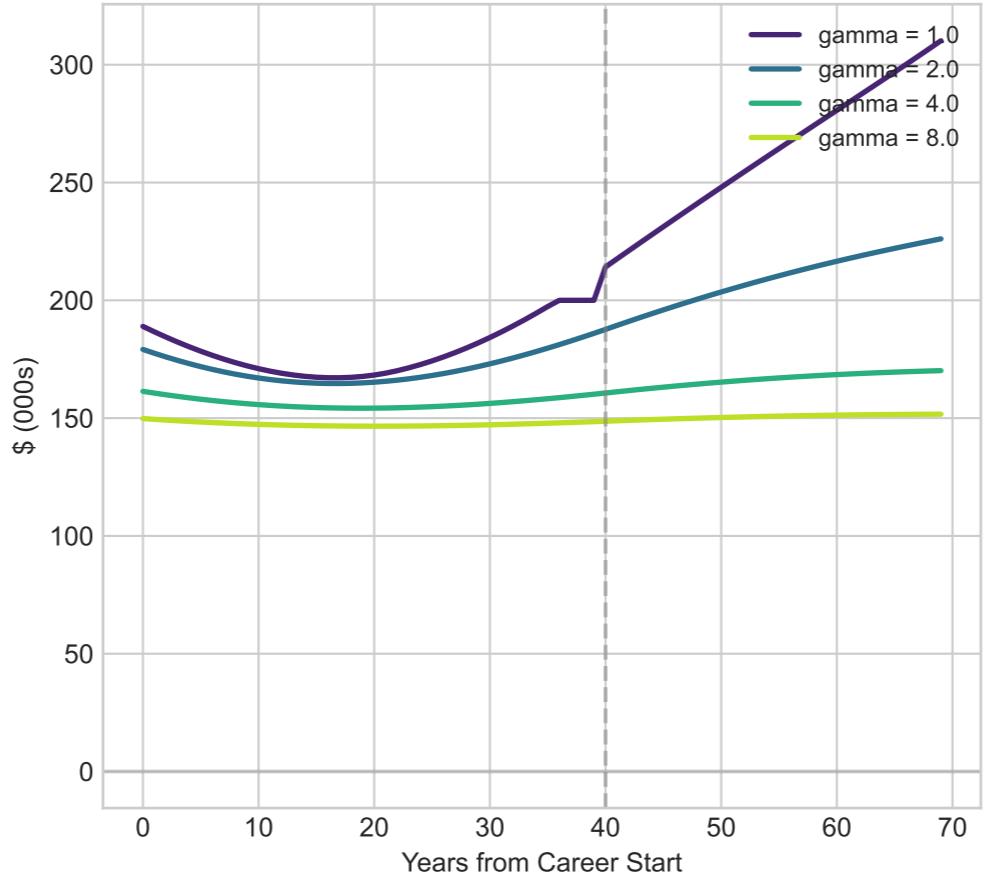
Financial Wealth by Risk Aversion



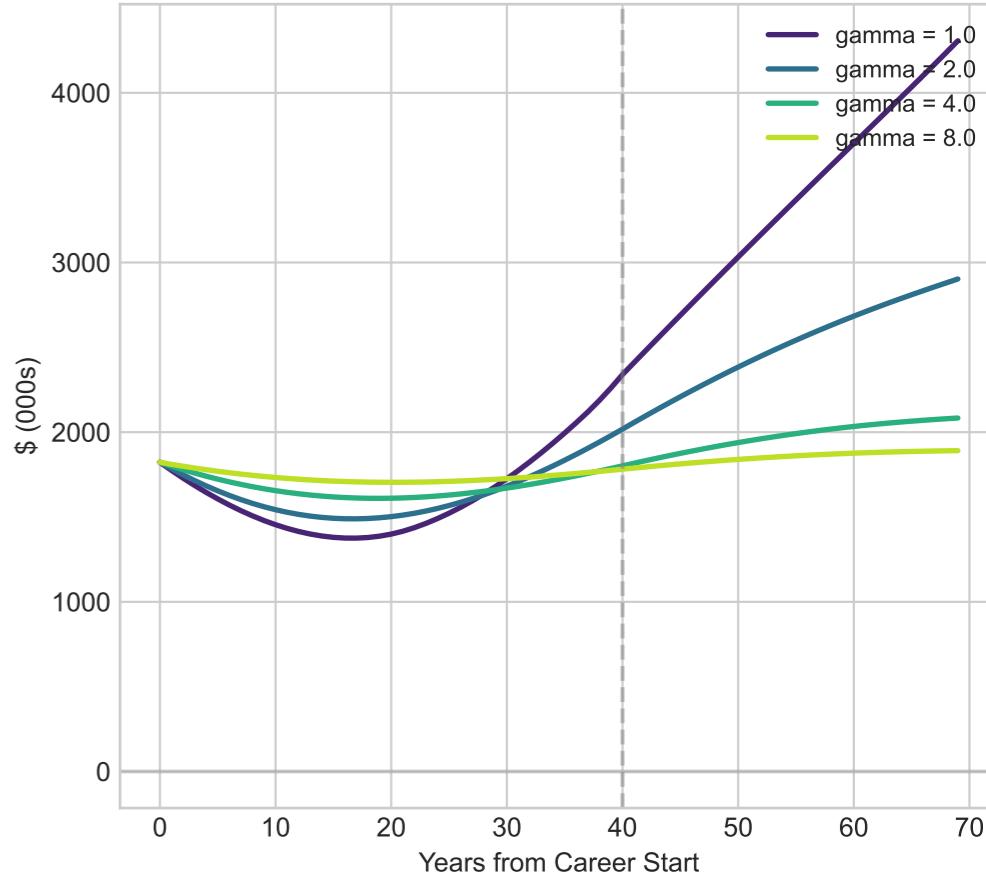
Total Wealth by Risk Aversion



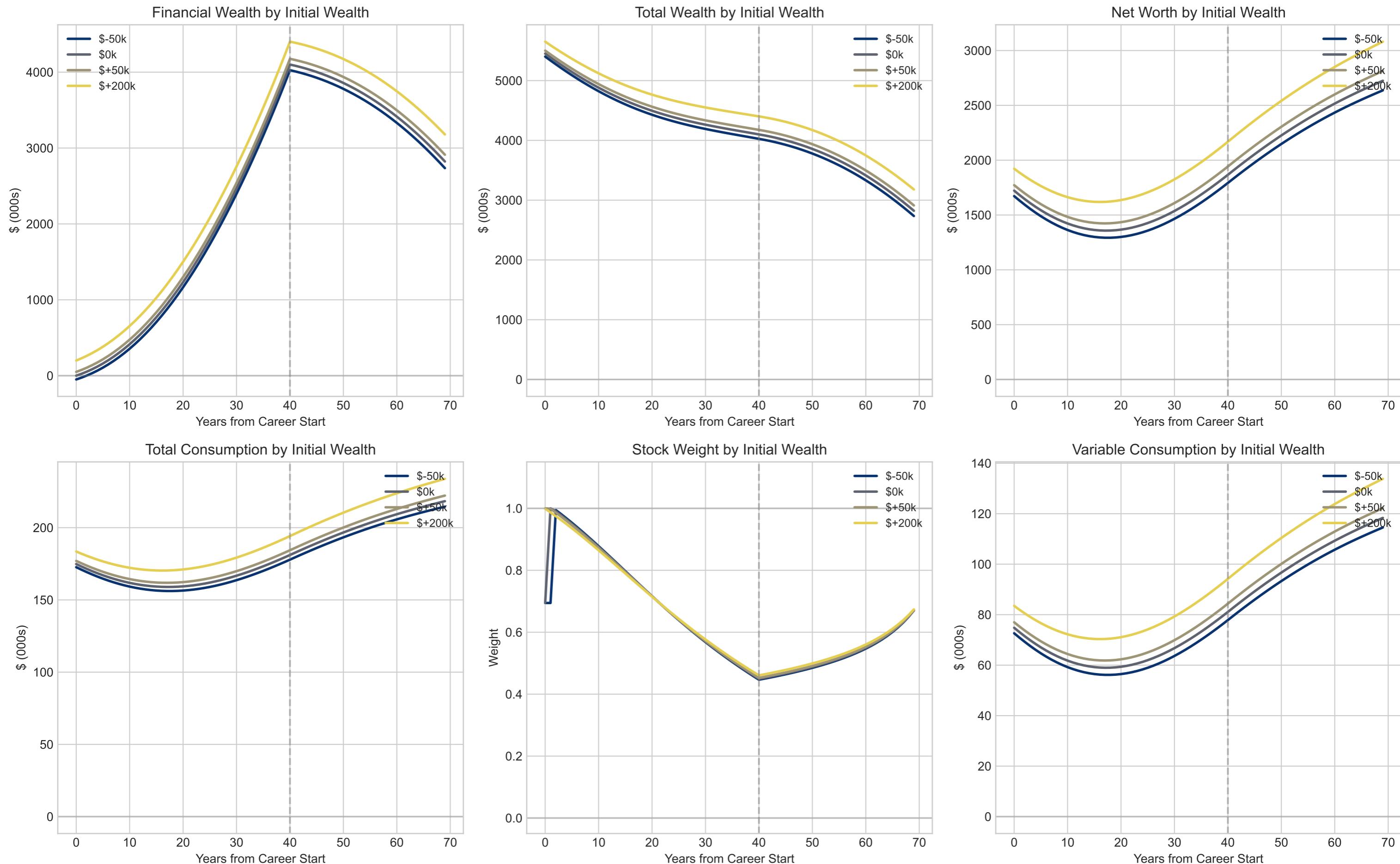
Total Consumption by Risk Aversion



Net Worth by Risk Aversion

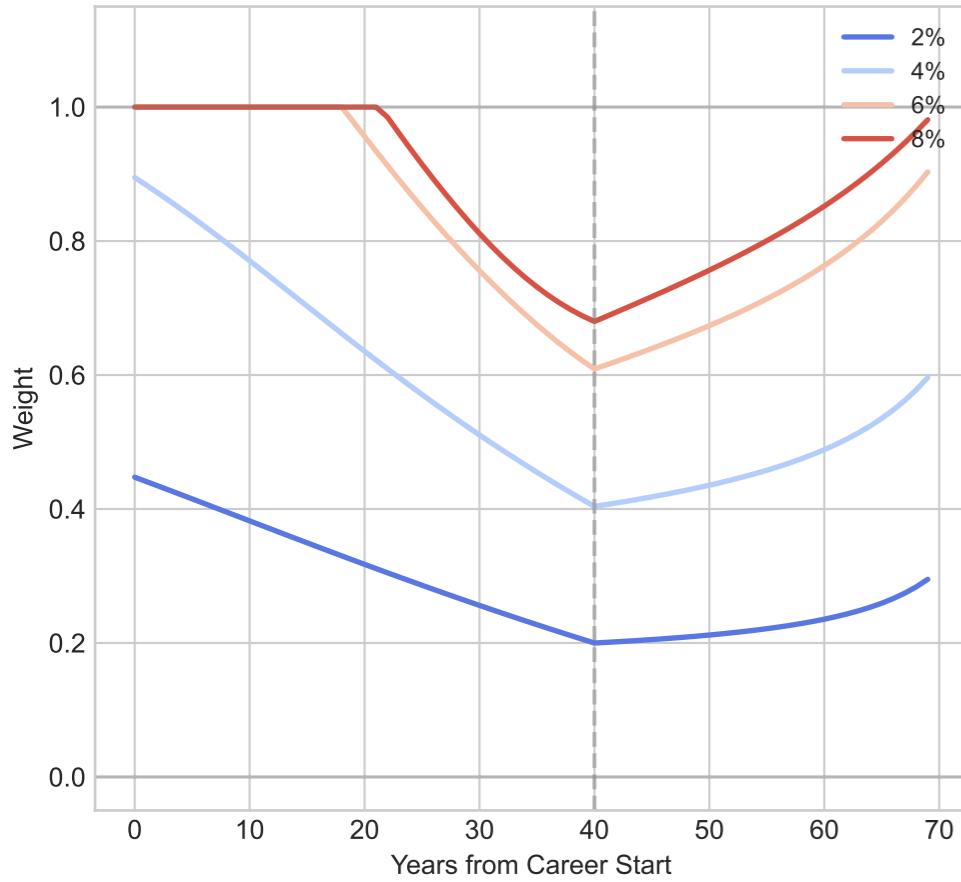


# Effect of Initial Wealth on Lifecycle Strategy

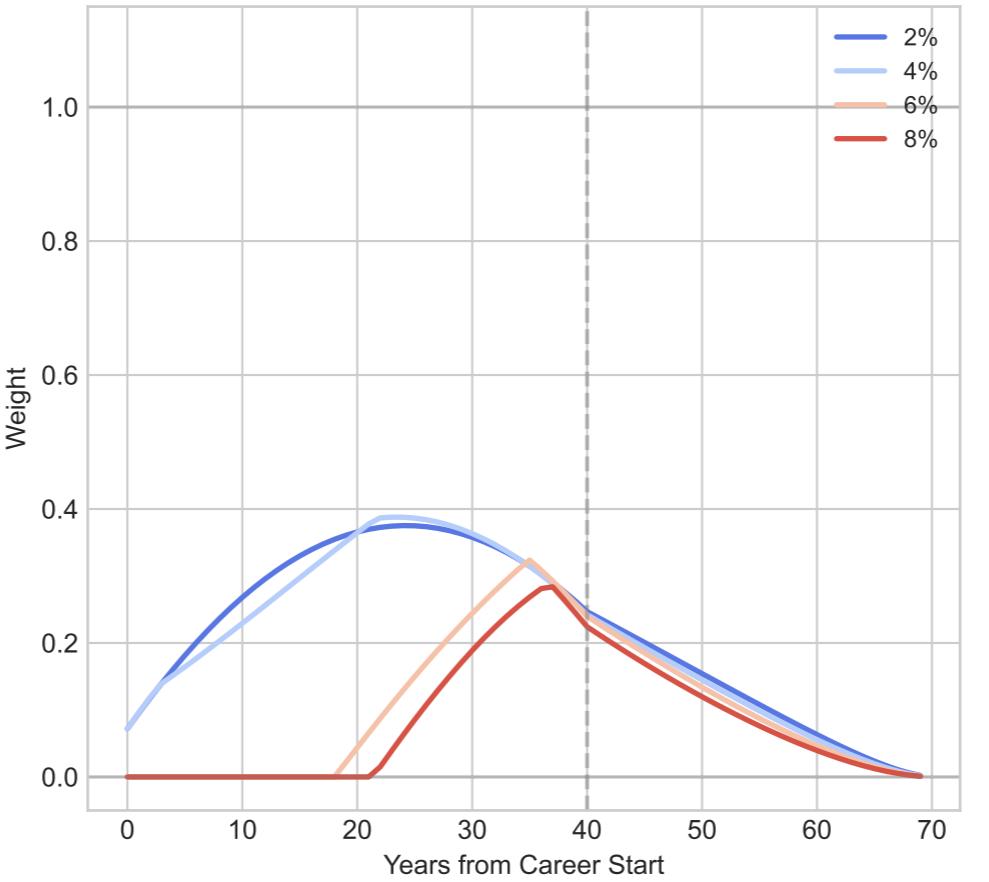


## Effect of Equity Risk Premium on Lifecycle Strategy

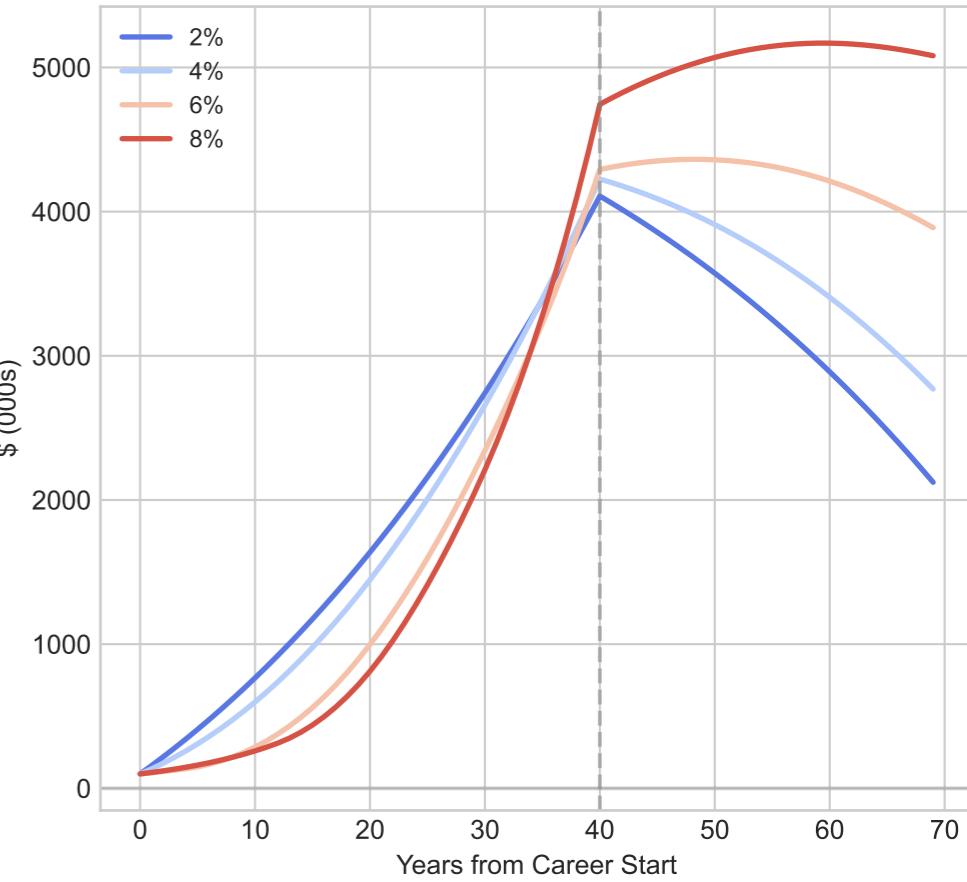
Stock Weight by Equity Premium



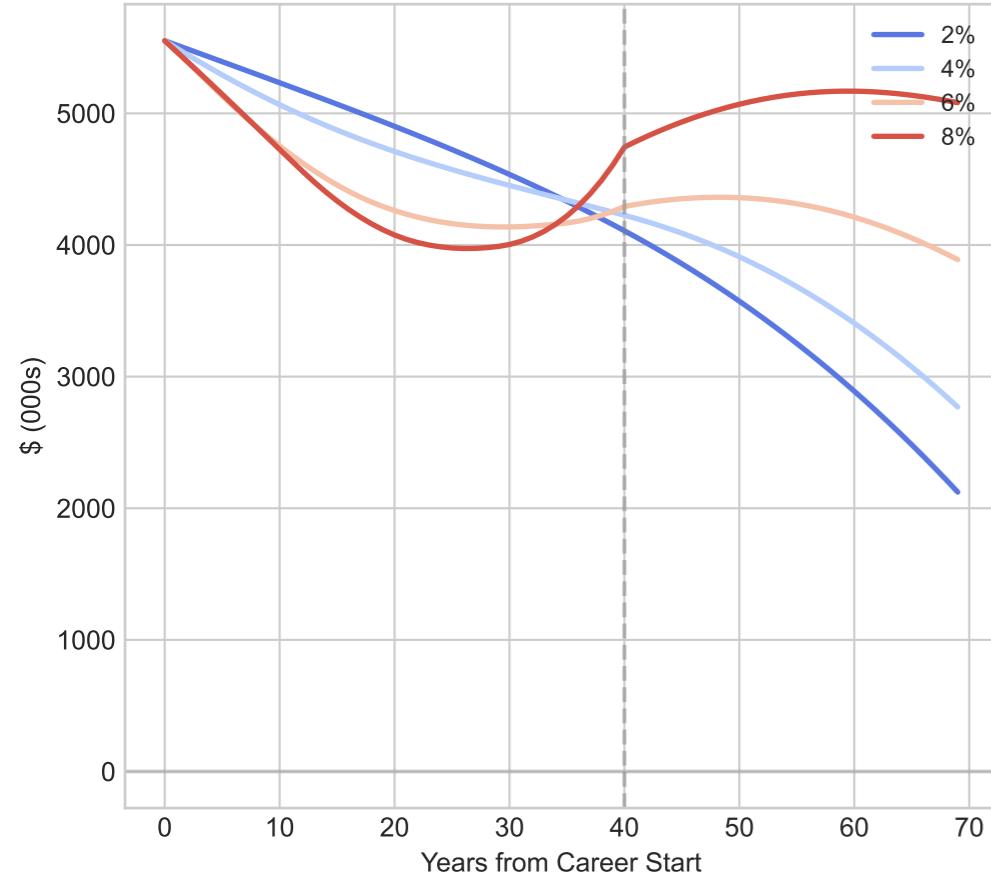
Bond Weight by Equity Premium



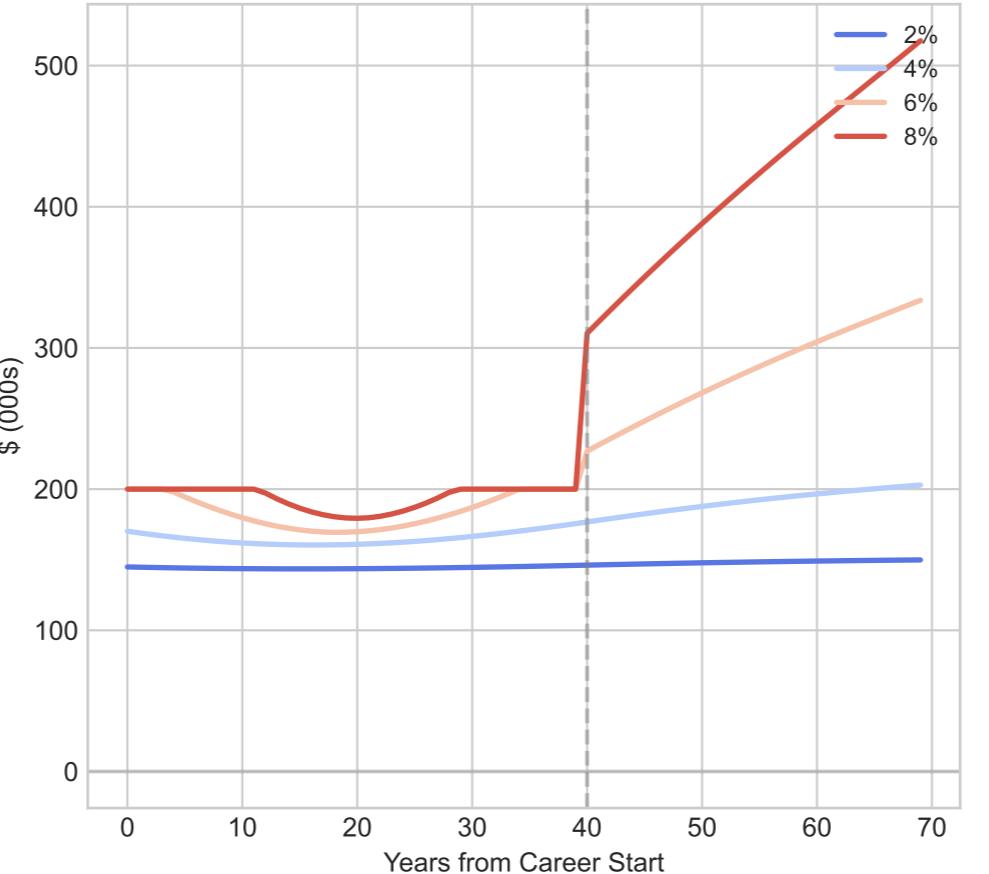
Financial Wealth by Equity Premium



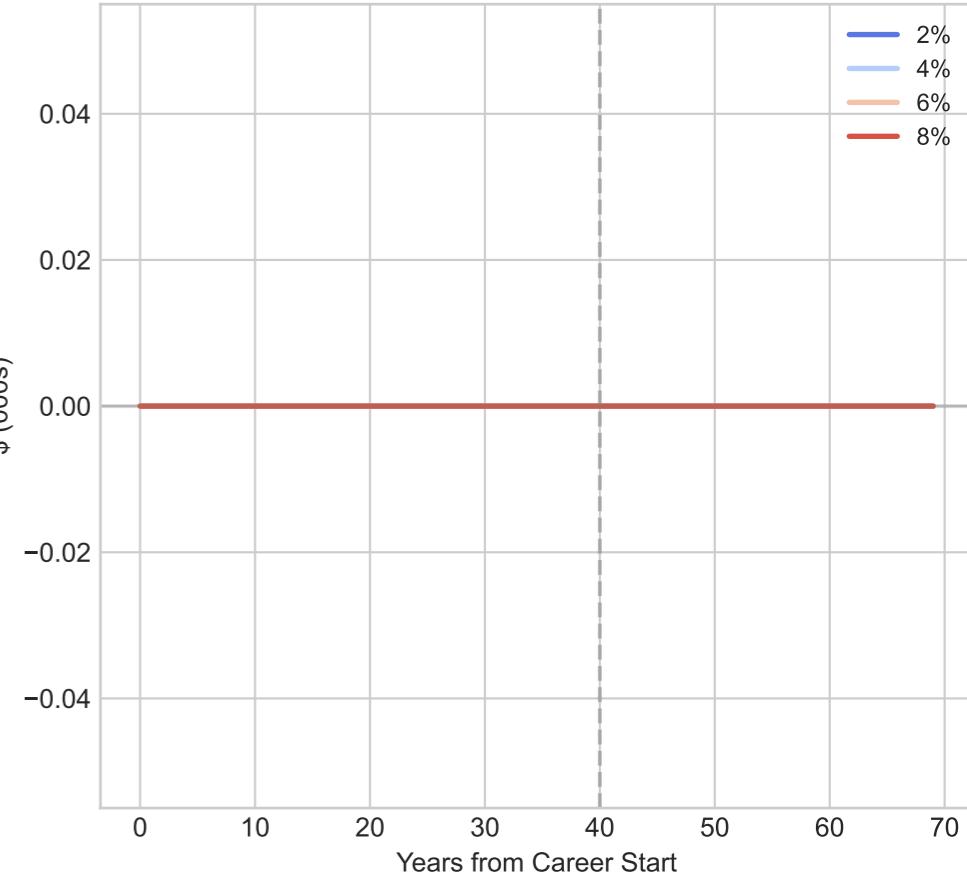
Total Wealth by Equity Premium



Total Consumption by Equity Premium

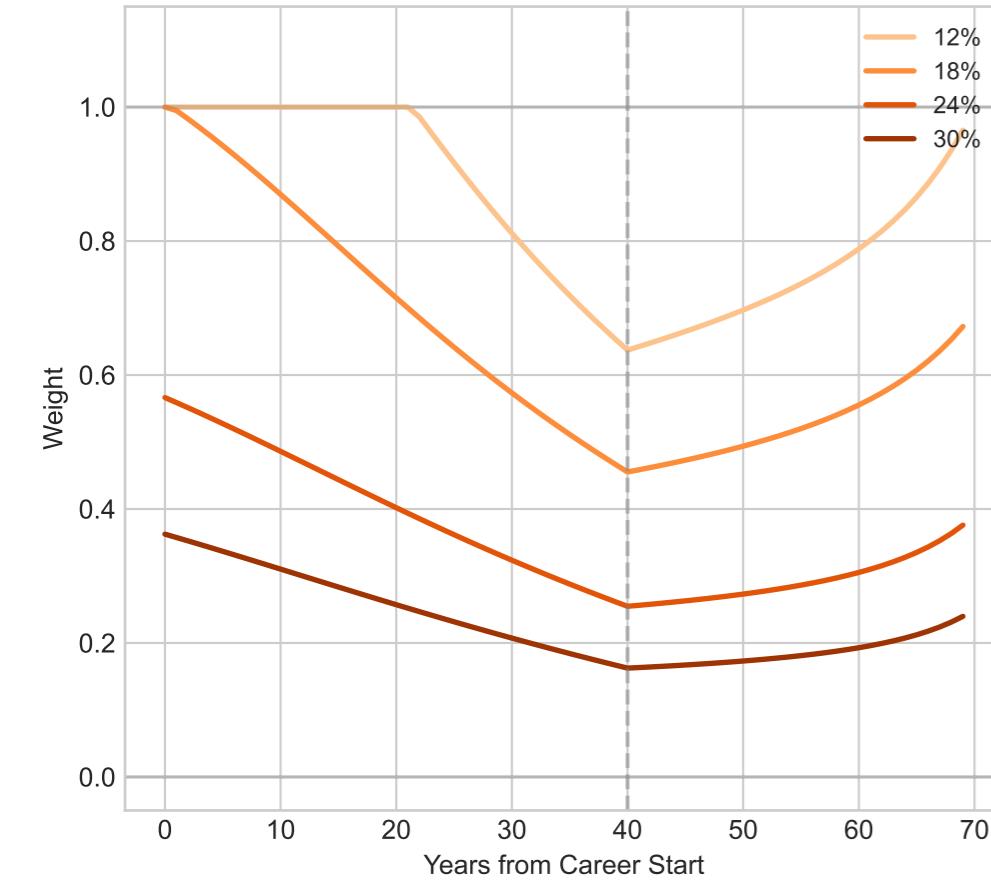


HC Stock Component by Equity Premium

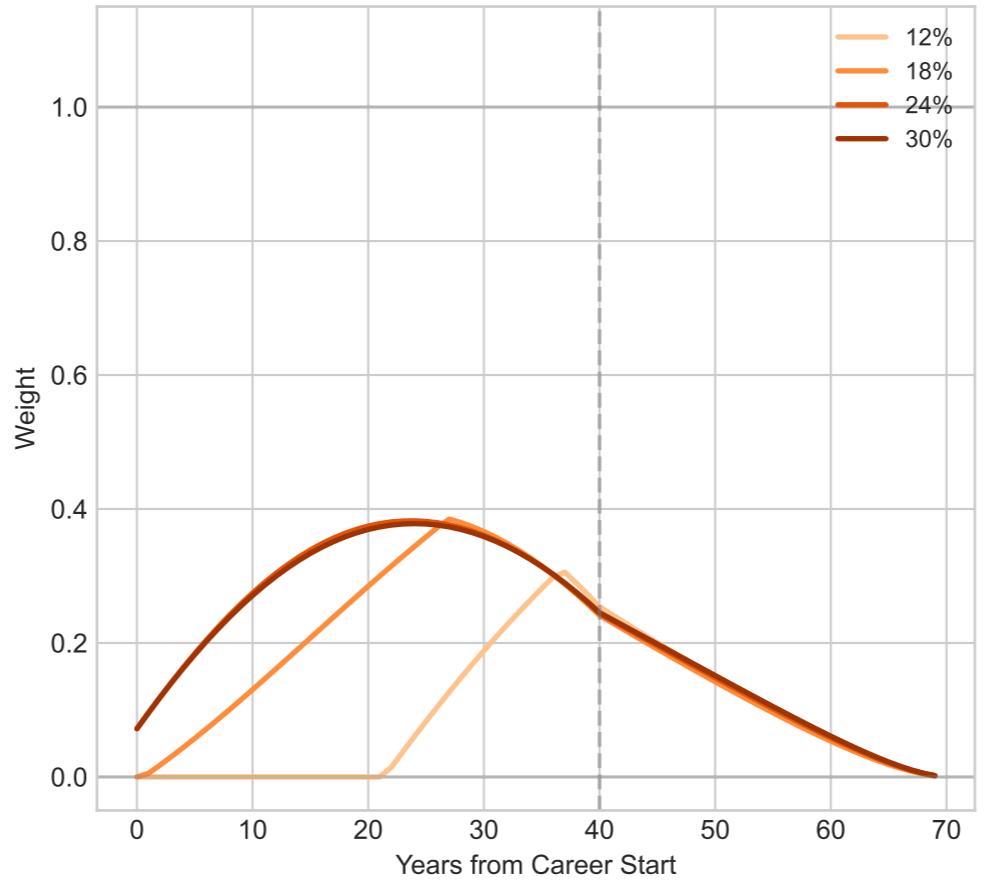


# Effect of Stock Volatility on Lifecycle Strategy

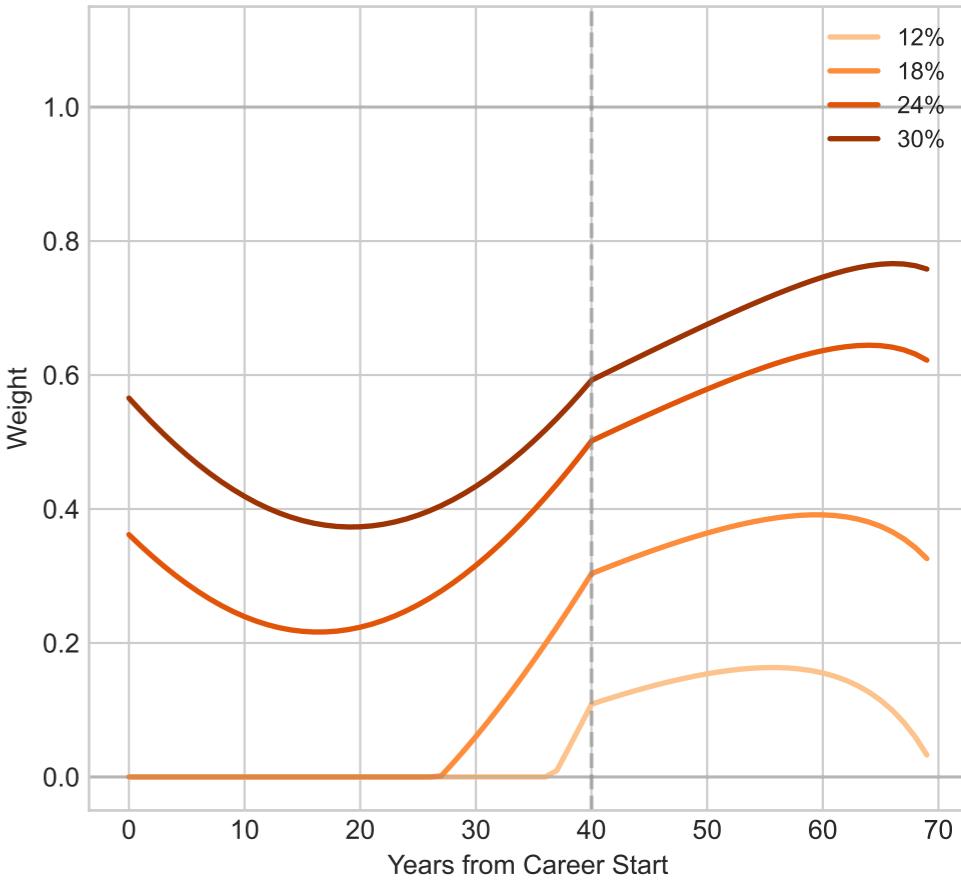
Stock Weight by Stock Volatility



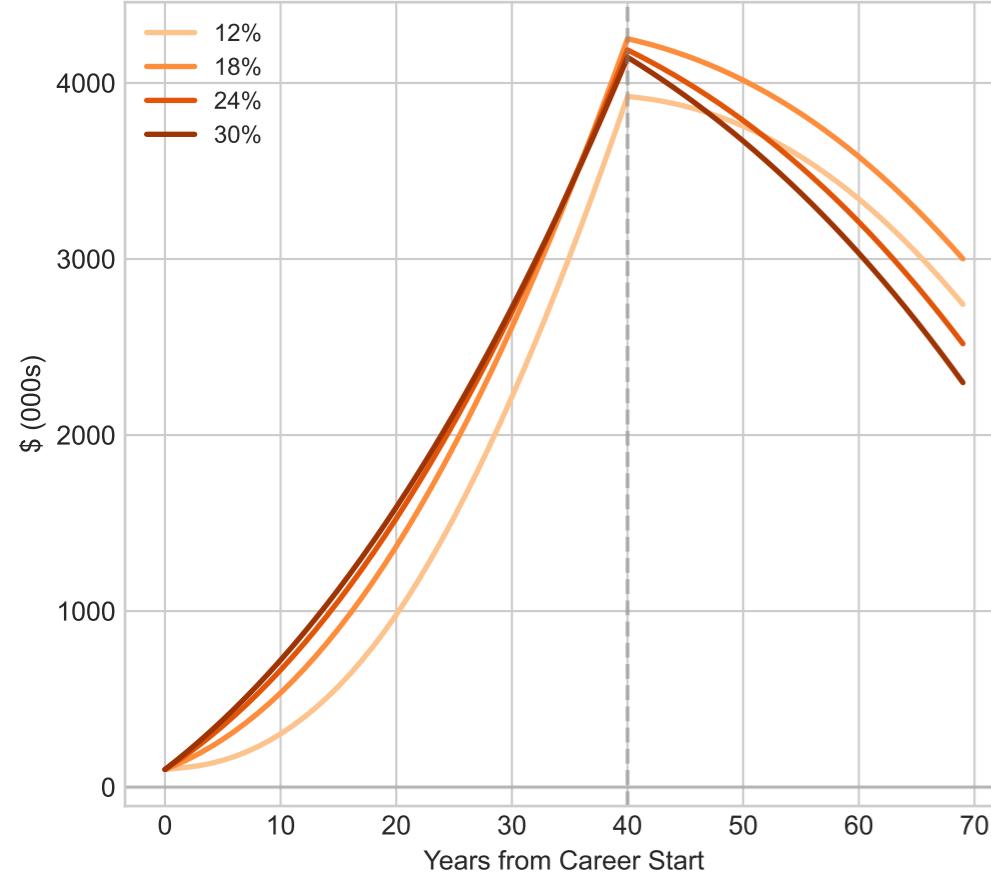
Bond Weight by Stock Volatility



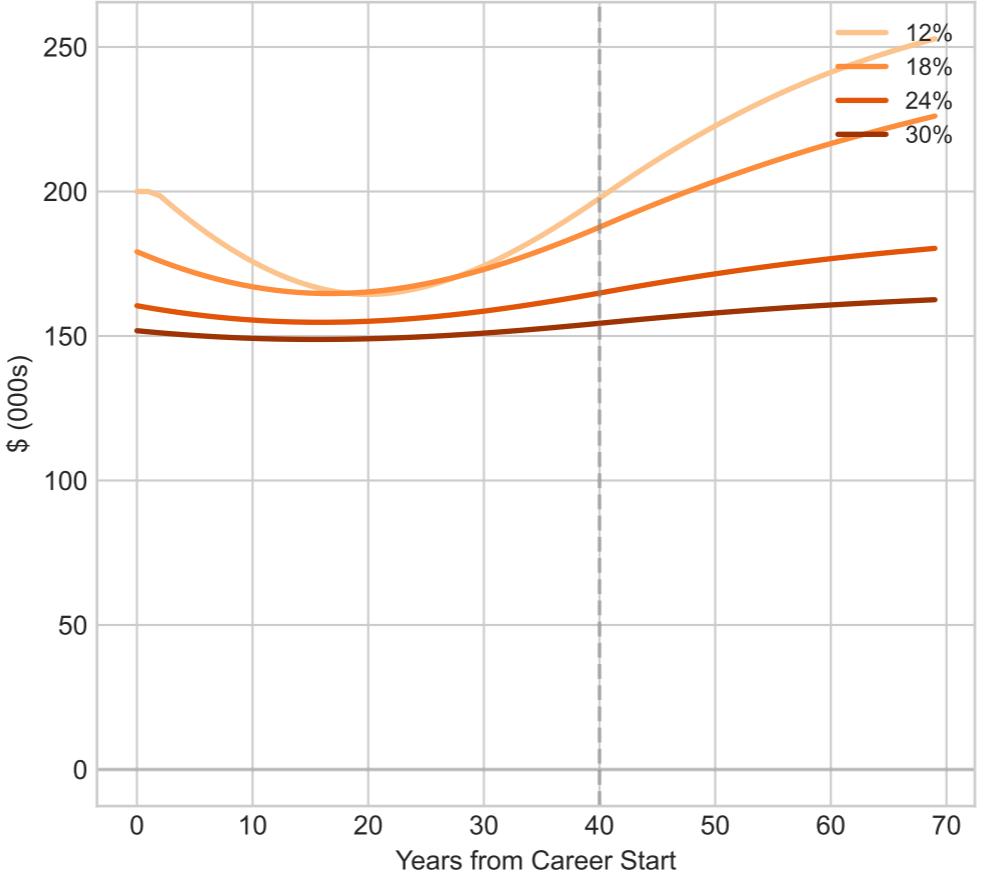
Cash Weight by Stock Volatility



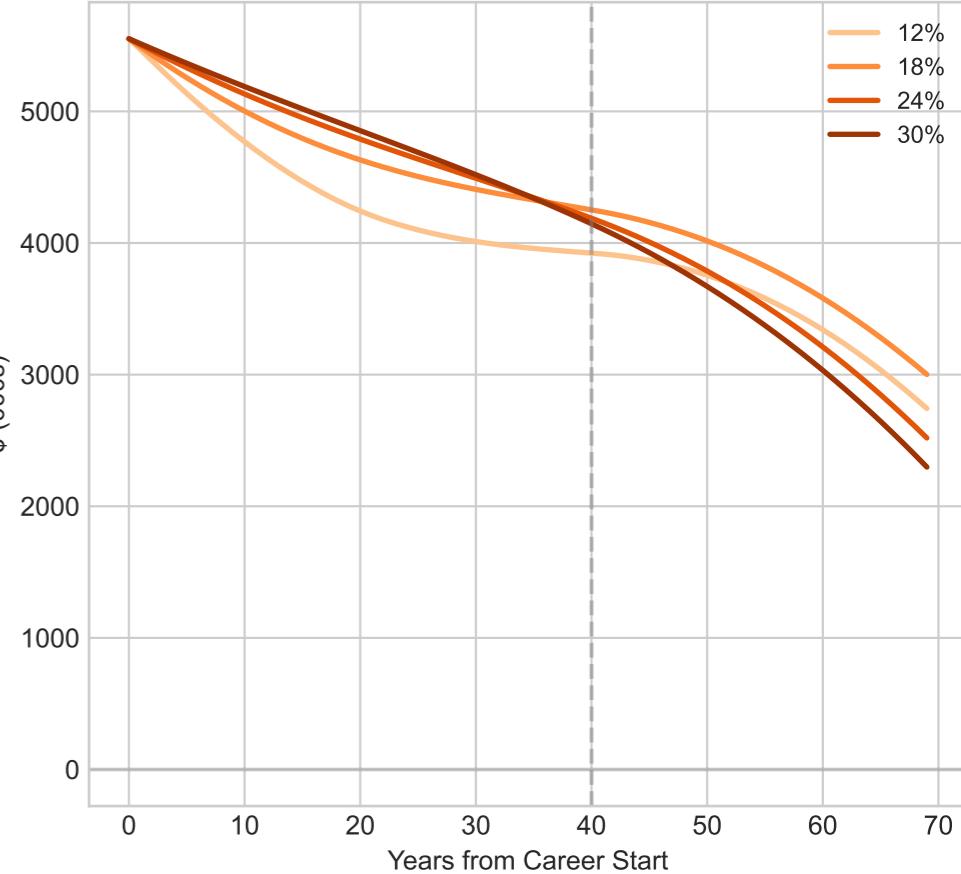
Financial Wealth by Stock Volatility



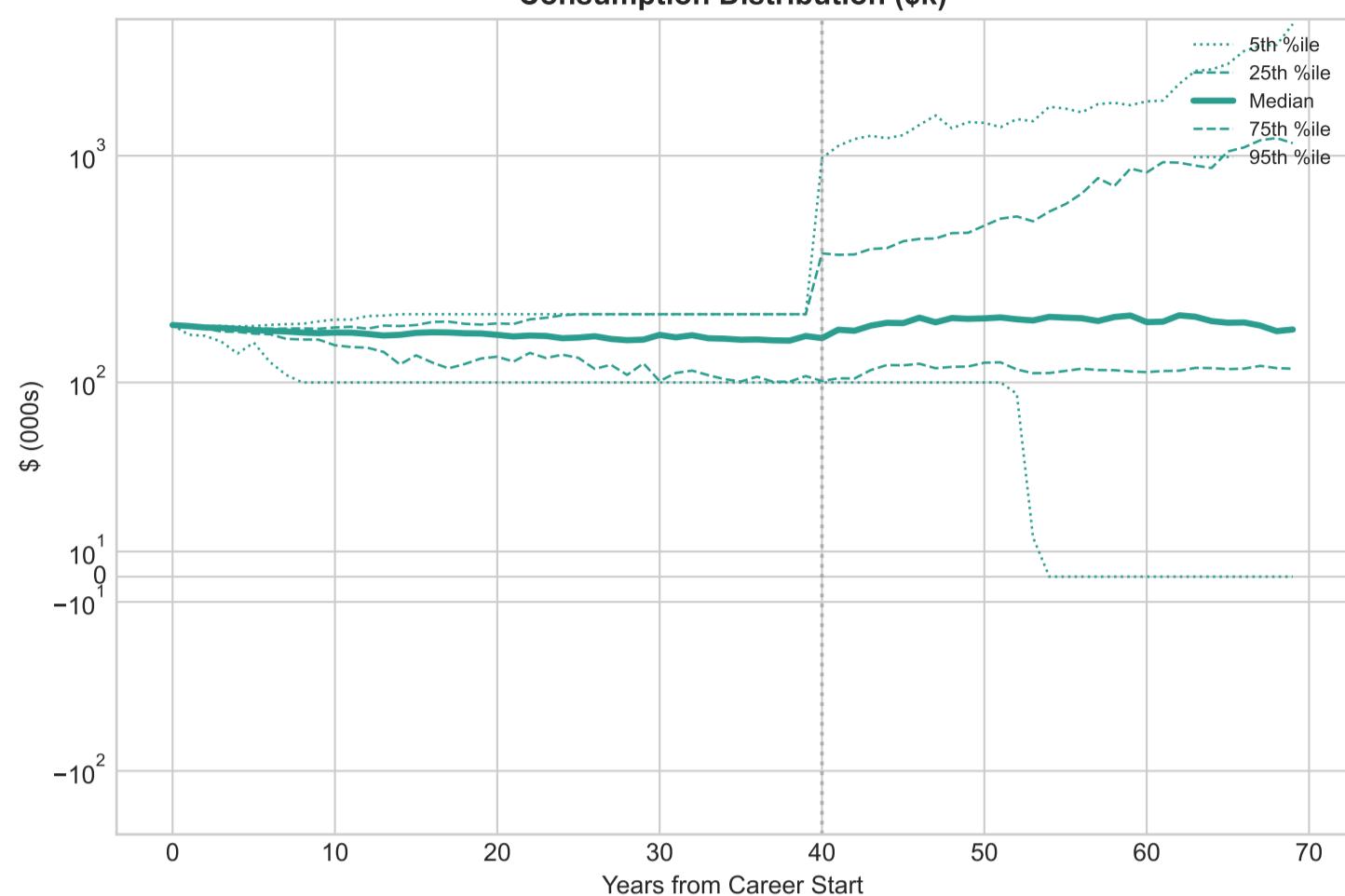
Total Consumption by Stock Volatility



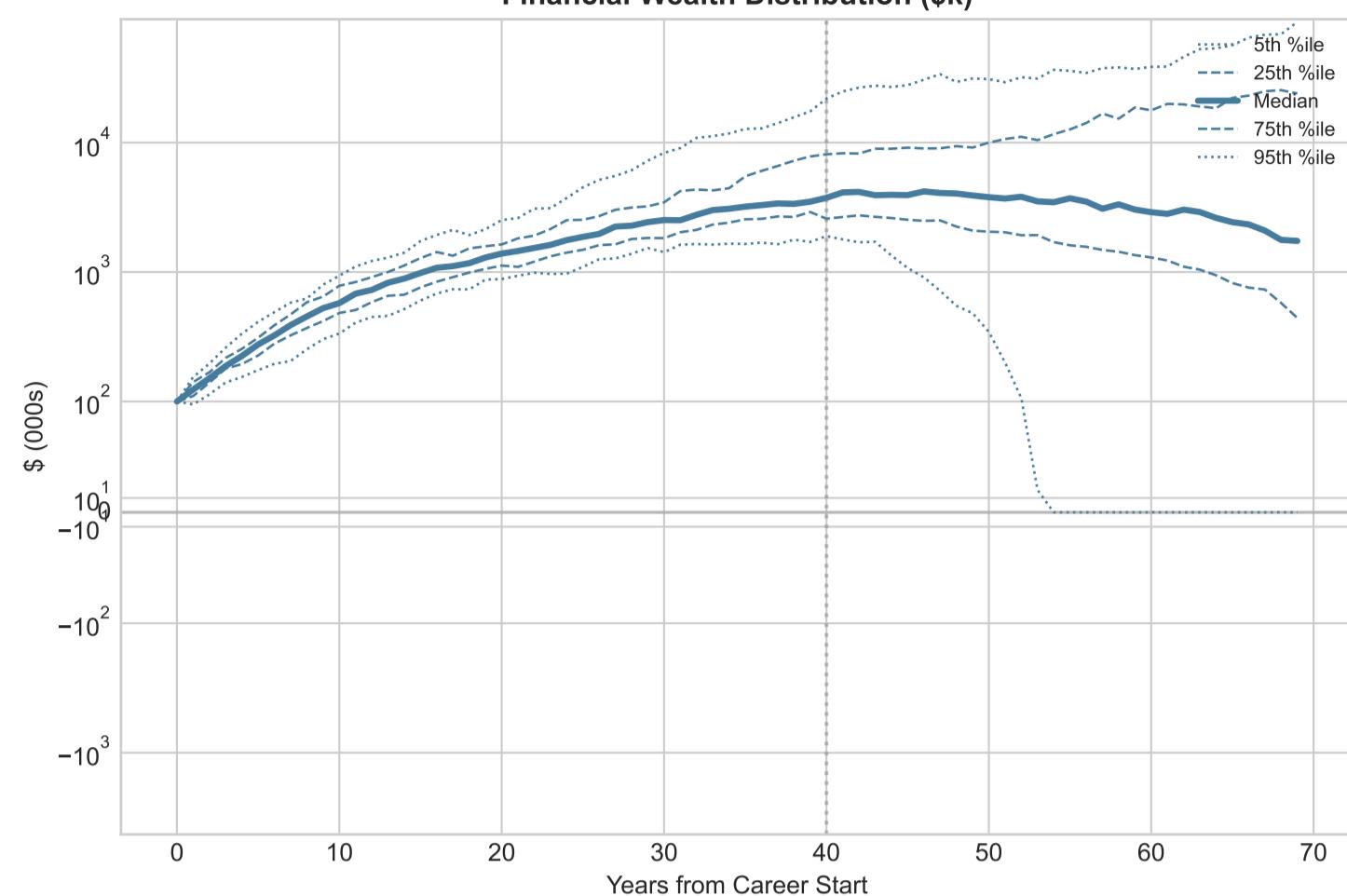
Total Wealth by Stock Volatility



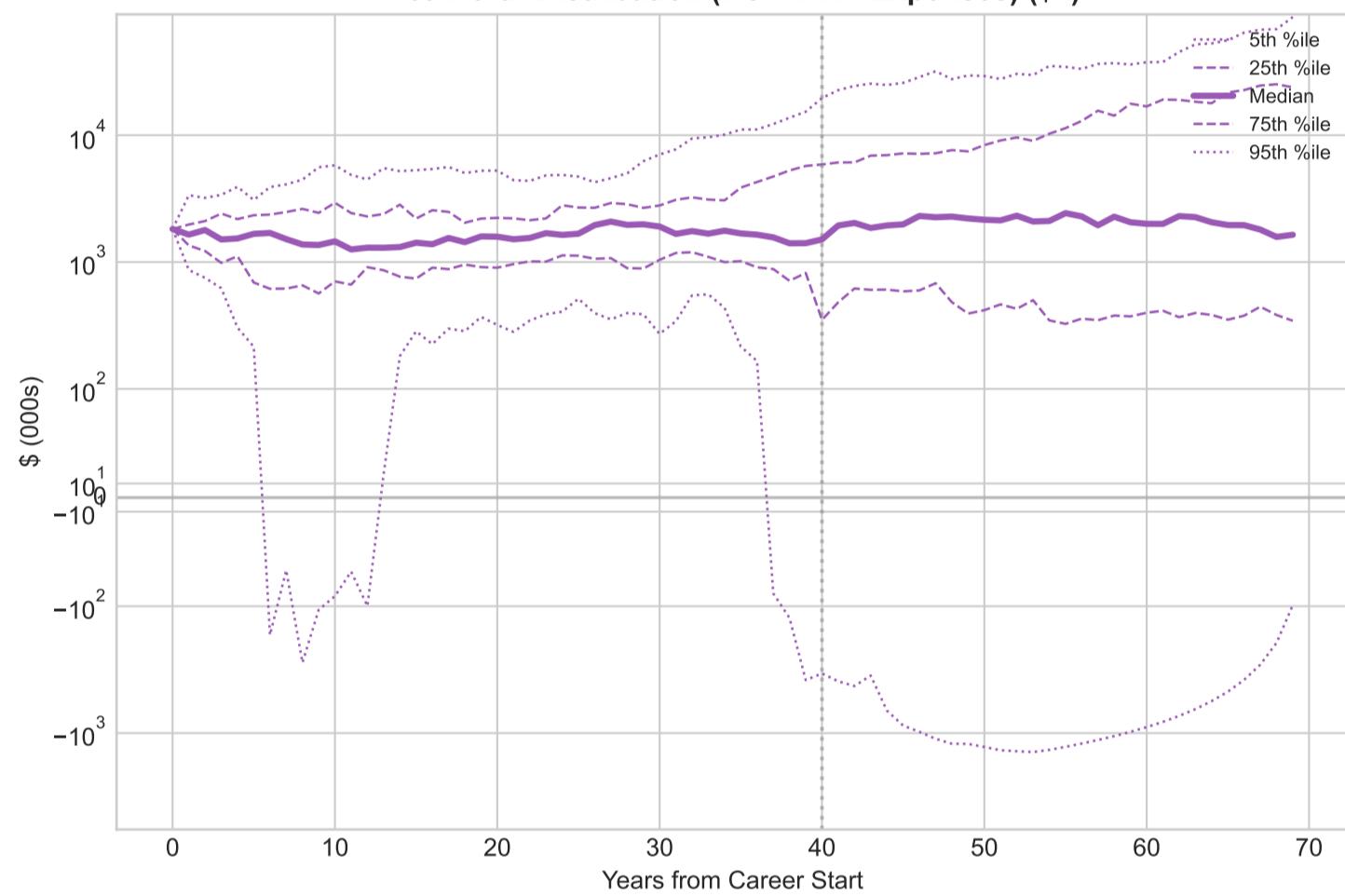
Consumption Distribution (\$k)



Financial Wealth Distribution (\$k)



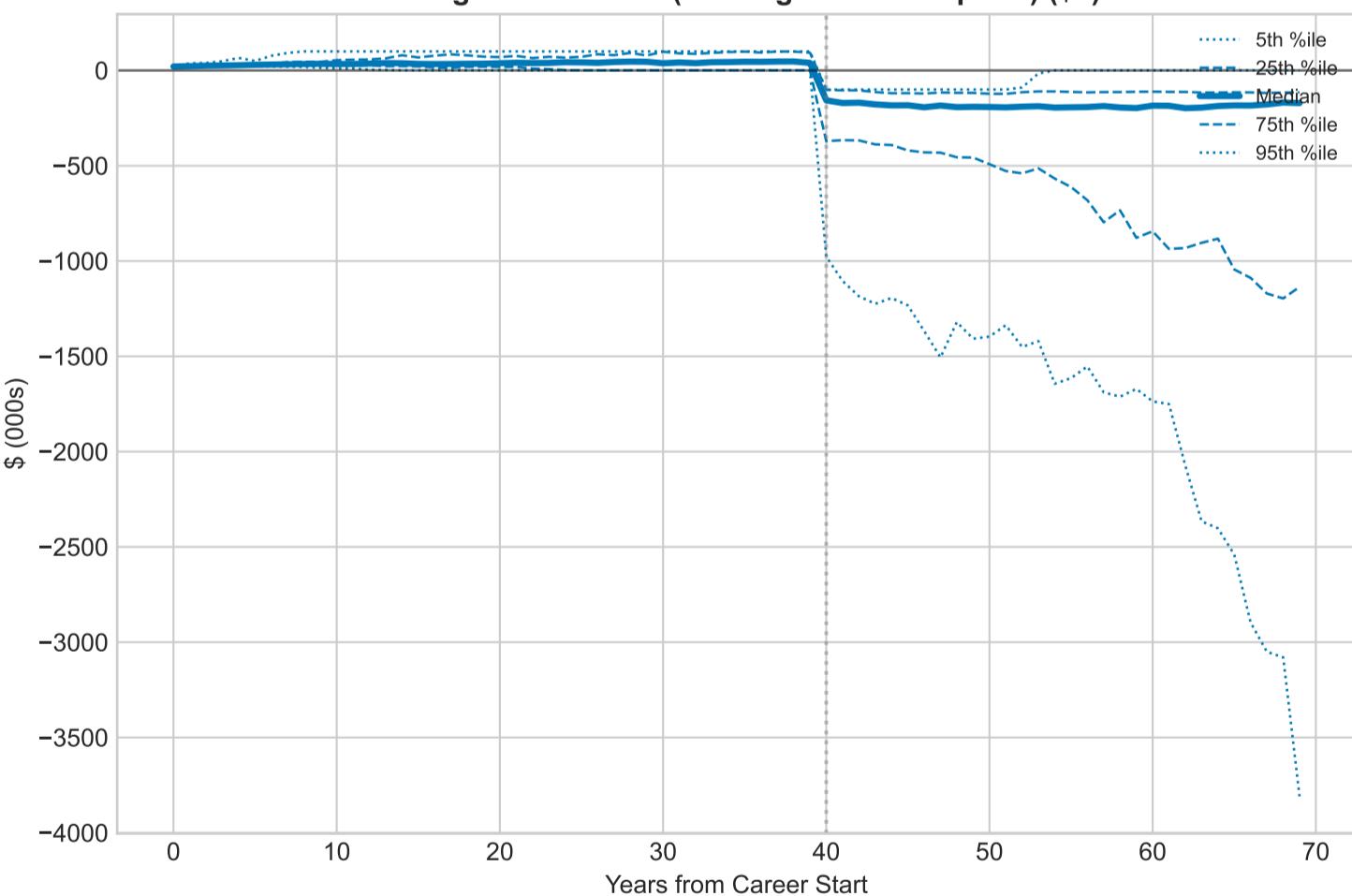
Net Worth Distribution (HC + FW - Expenses) (\$k)



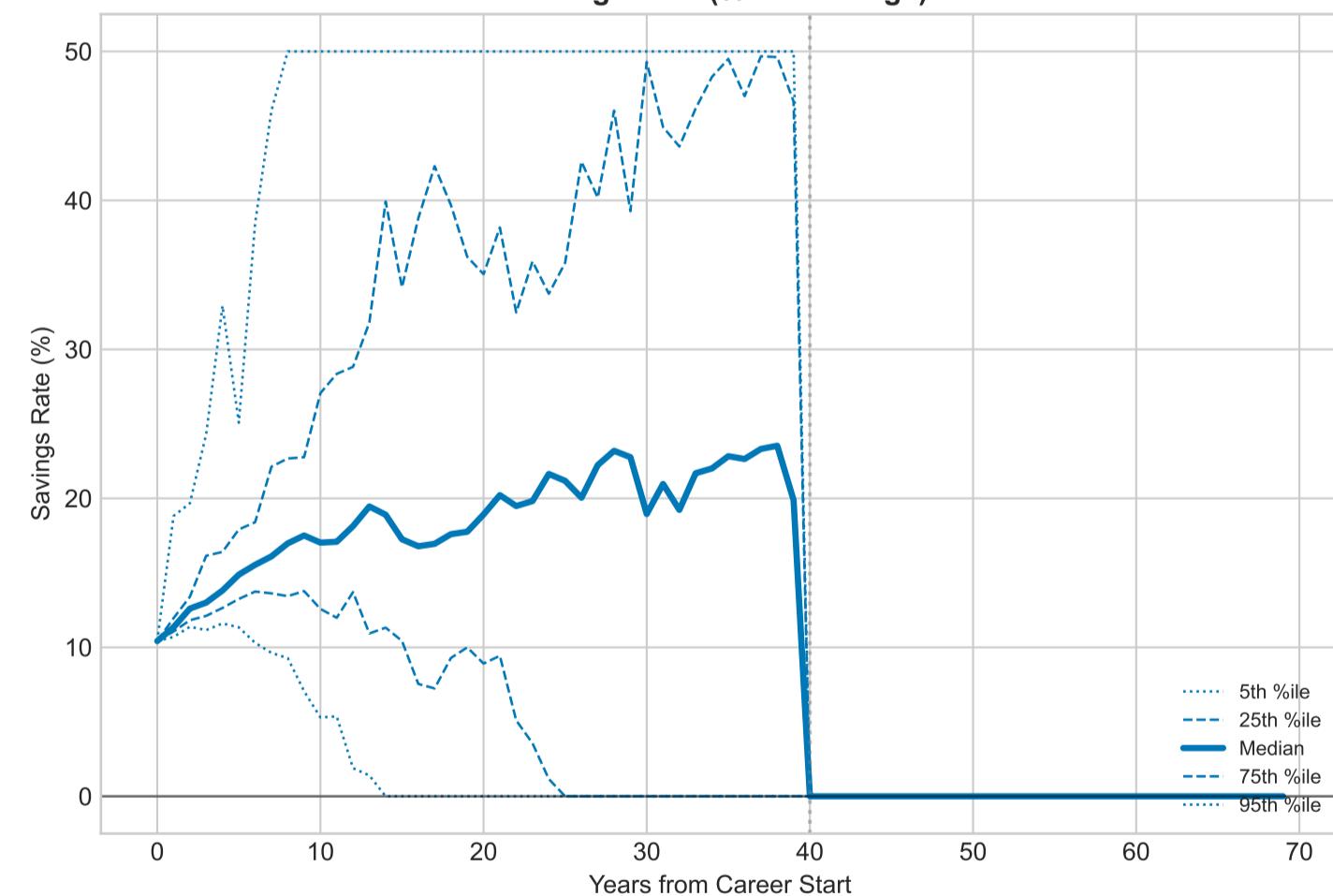
Terminal Values Grid

Terminal Values at Age 94	
<hr/>	
Financial Wealth (\$k):	
5th percentile:	\$ 0
25th percentile:	\$ 443
Median:	\$ 1,739
75th percentile:	\$ 23,940
95th percentile:	\$ 85,469
Annual Consumption (\$k):	
5th percentile:	\$ 0
25th percentile:	\$ 115
Median:	\$ 171
75th percentile:	\$ 1,136
95th percentile:	\$ 3,809
Runs depleted (FW < \$10k):	10 of 50
Default Rate:	20.0%

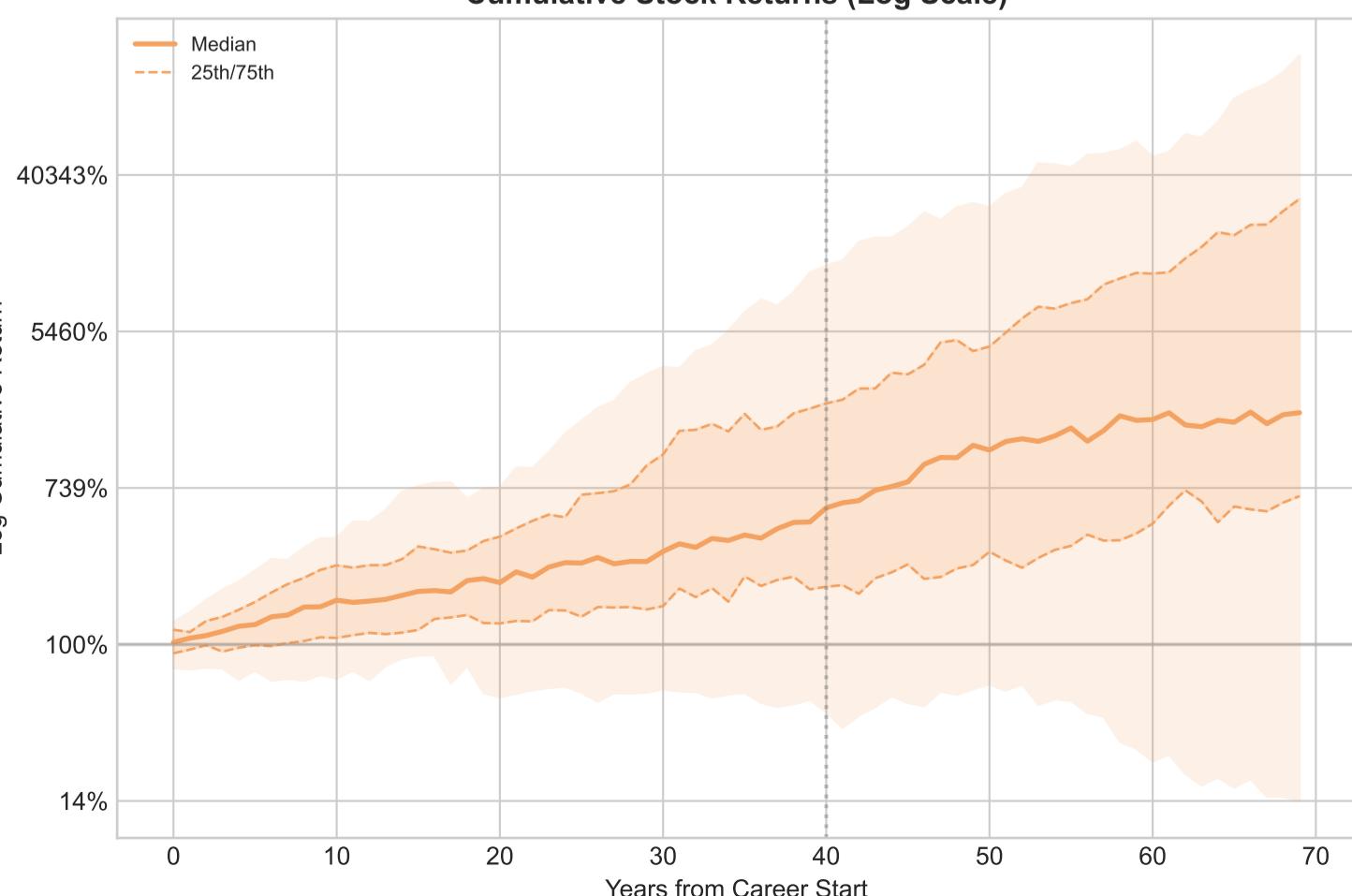
Savings Distribution (Earnings - Consumption) (\$k)



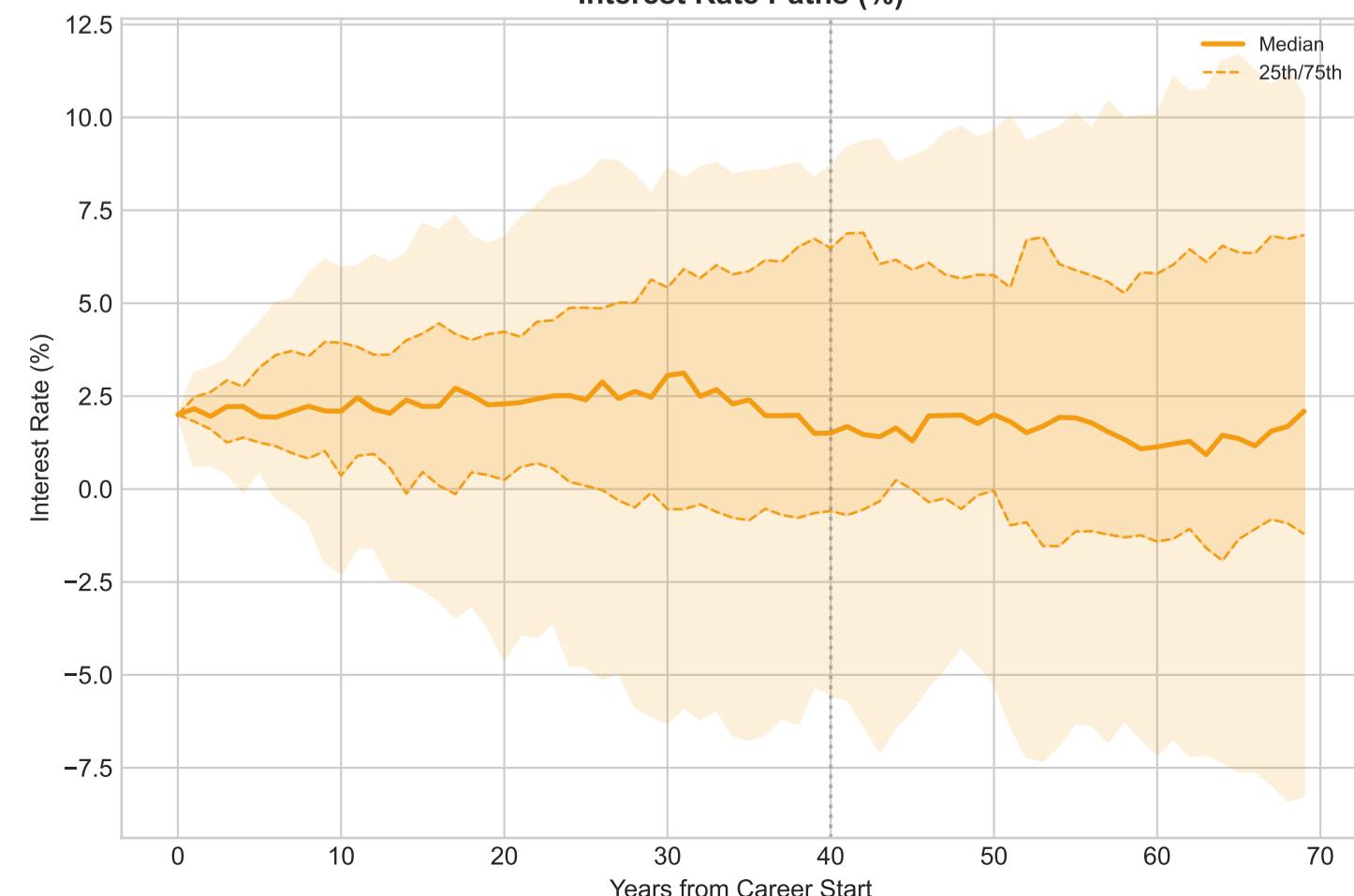
Savings Rate (% of Earnings)



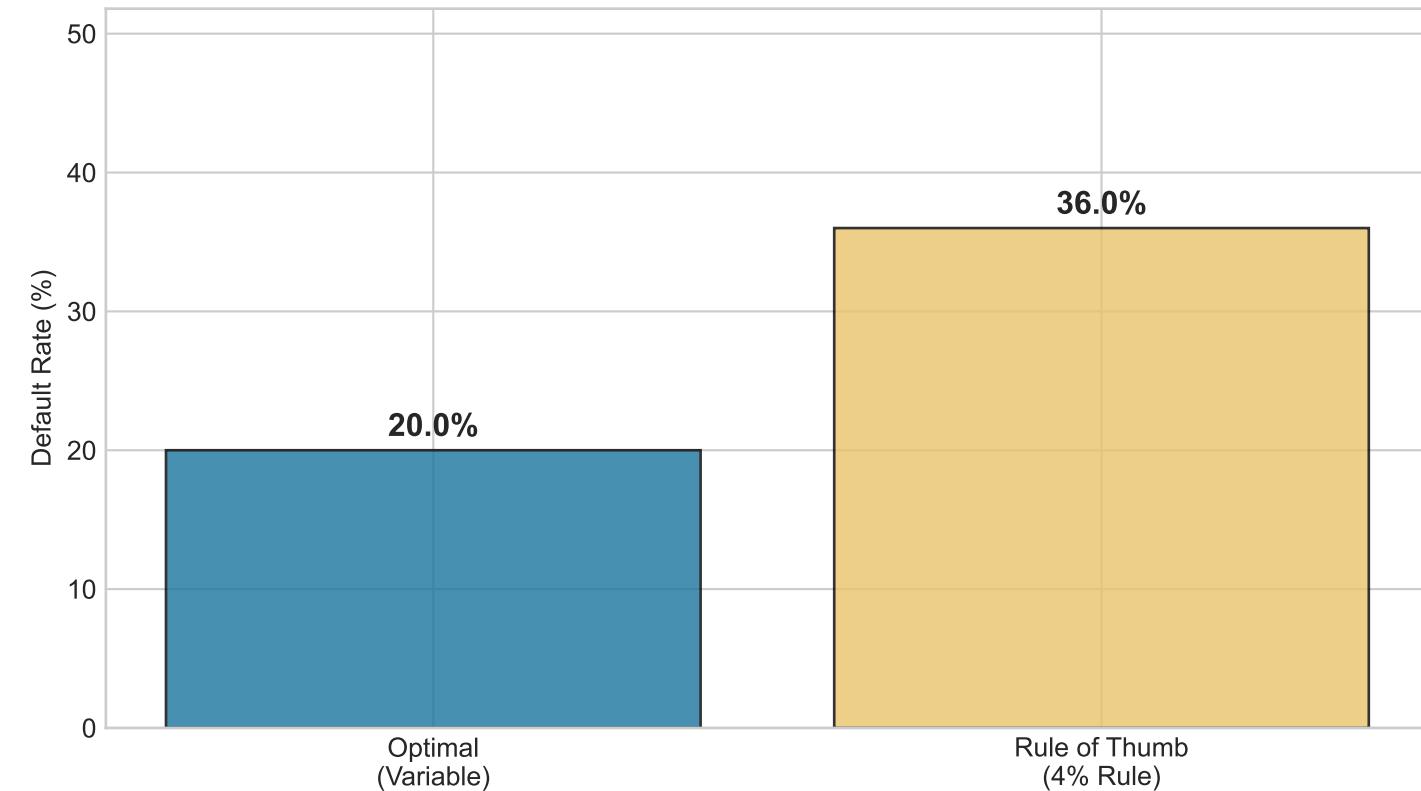
Cumulative Stock Returns (Log Scale)



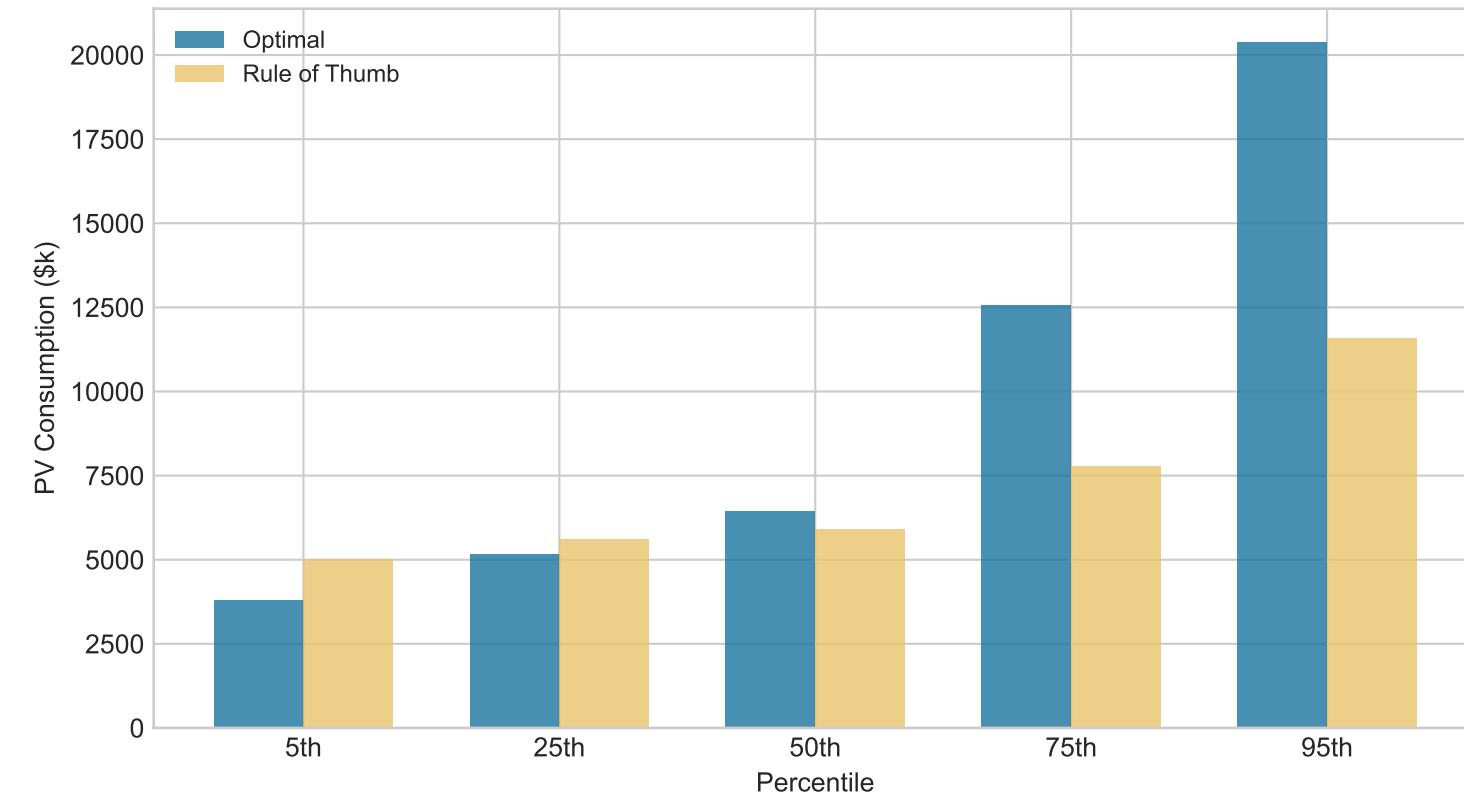
Interest Rate Paths (%)



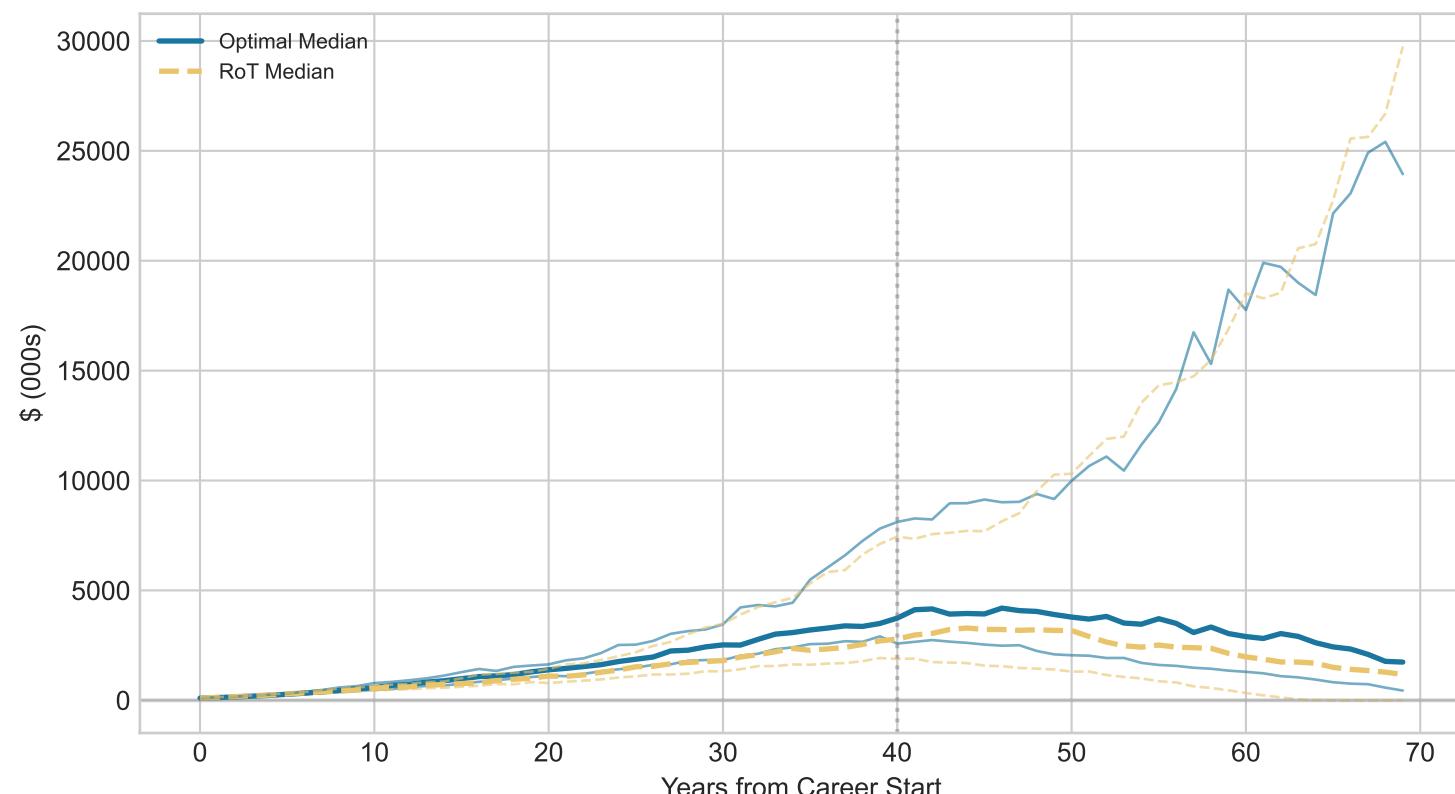
**Default Risk Comparison**



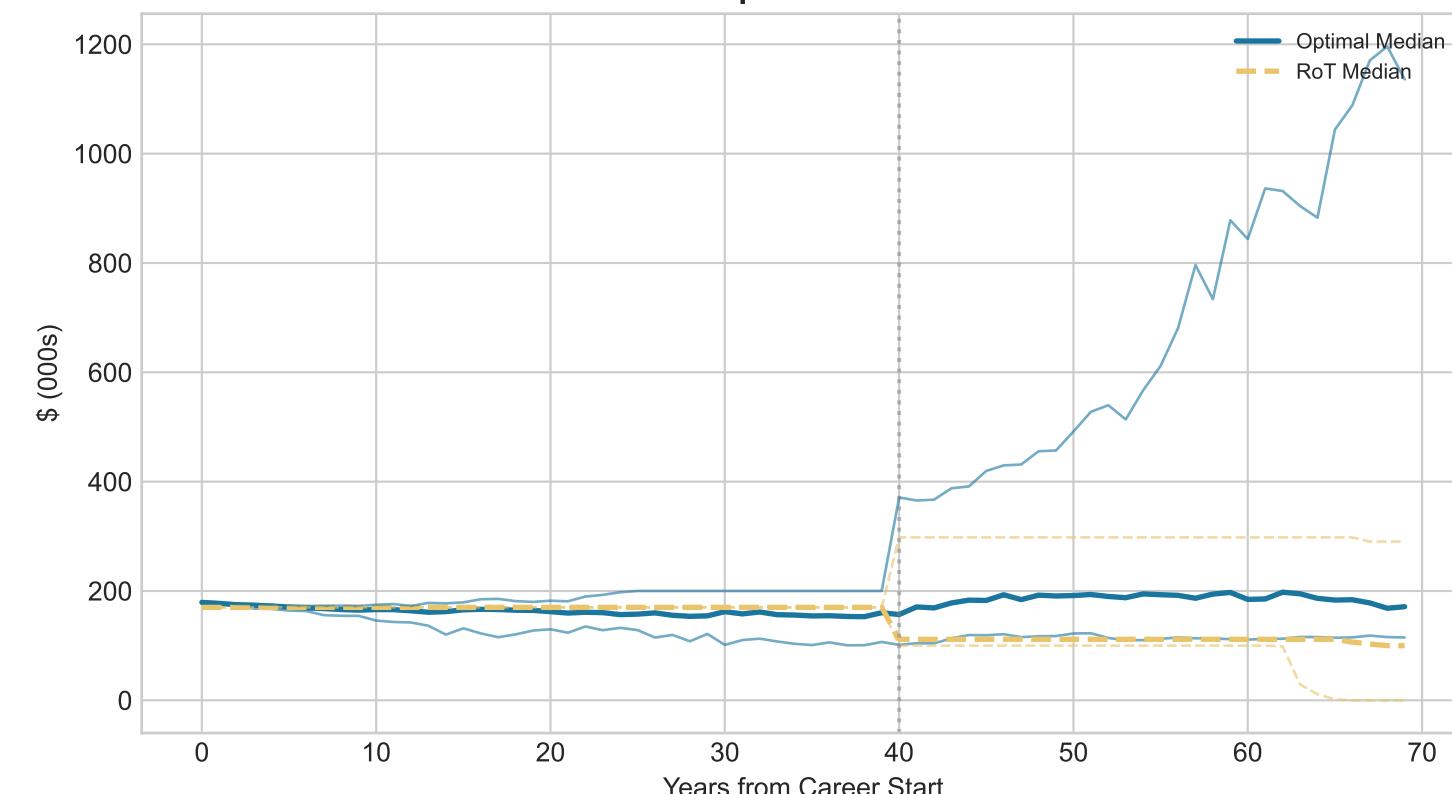
**PV Consumption at Time 0**



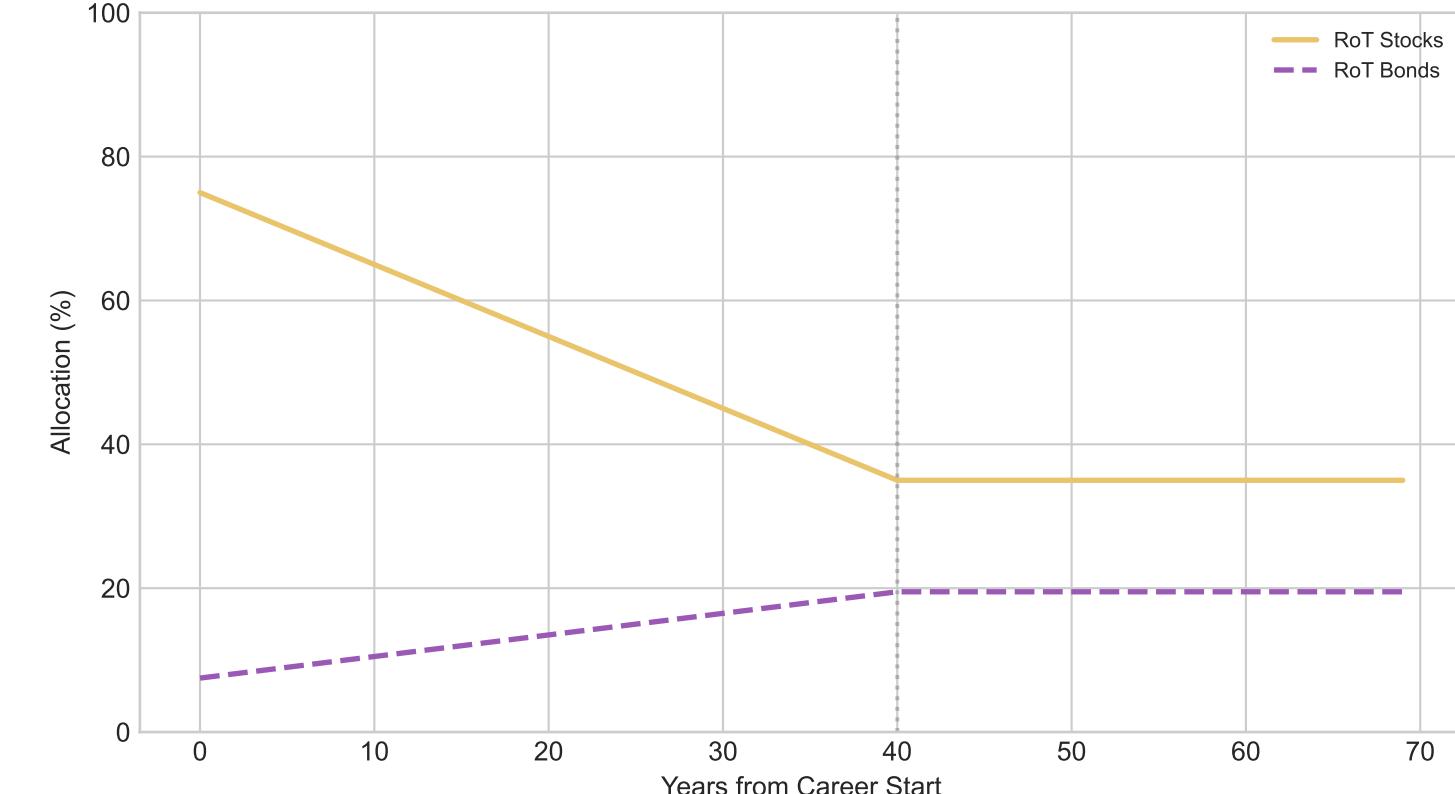
**Financial Wealth Percentiles**



**Consumption Percentiles**



**Rule of Thumb Glide Path**



#### Strategy Comparison Summary

Scenario: Normal Market Conditions

##### Default Rates:

Optimal (Variable): 20.0%  
Rule of Thumb (4%): 36.0%

##### Median Final Wealth (\$k):

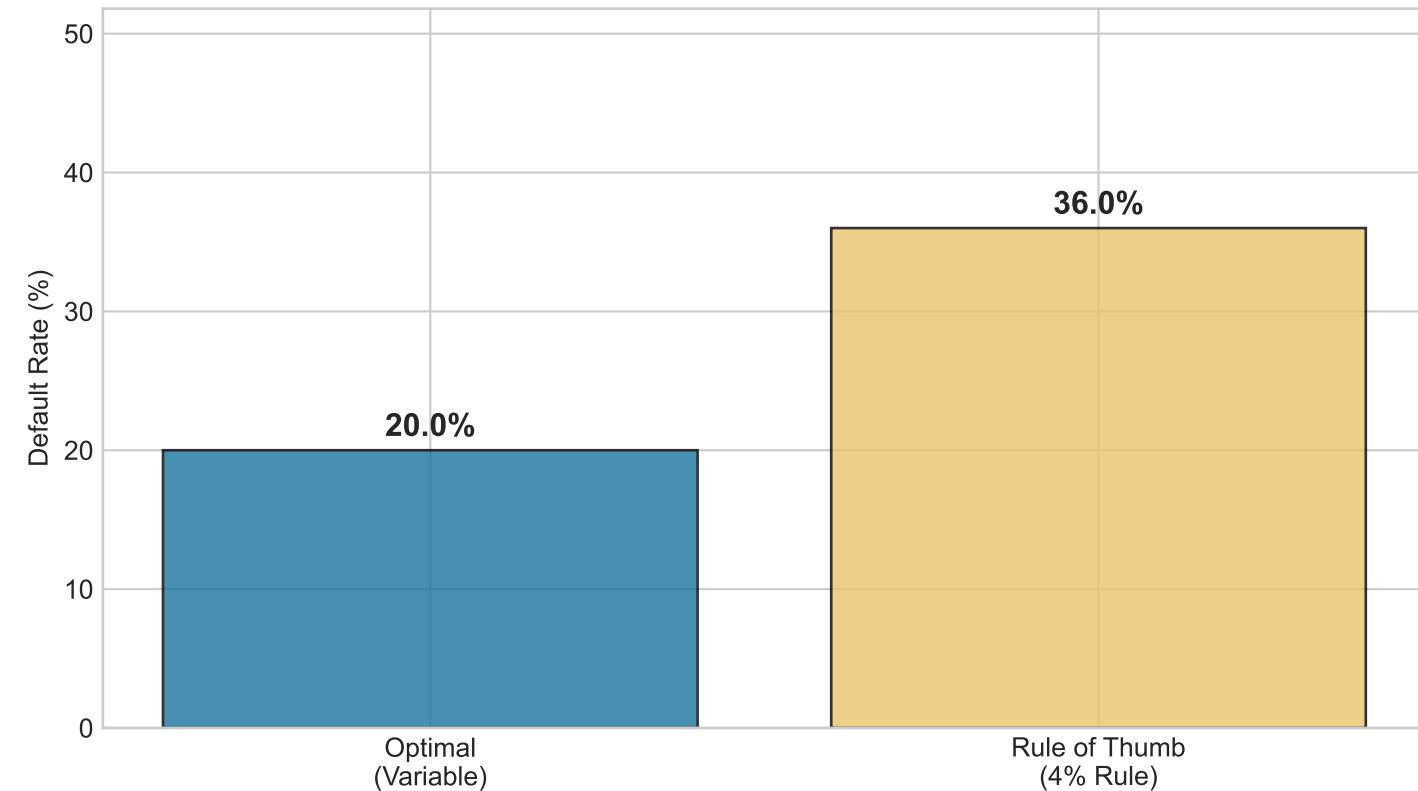
Optimal: \$ 1,739  
Rule of Thumb: \$ 1,174

##### Median PV Consumption (\$k):

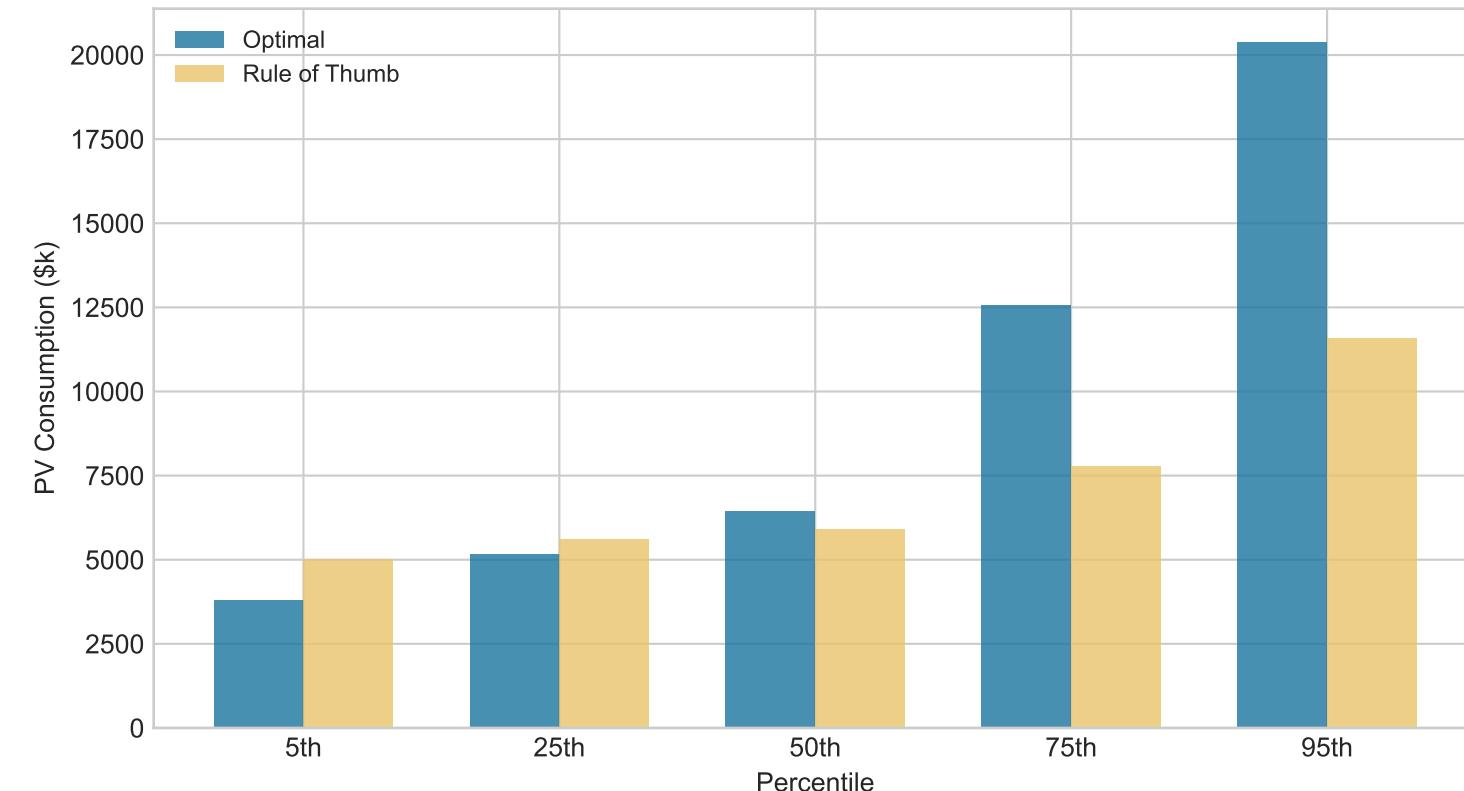
Optimal: \$ 6,436  
Rule of Thumb: \$ 5,898

Simulations: 50

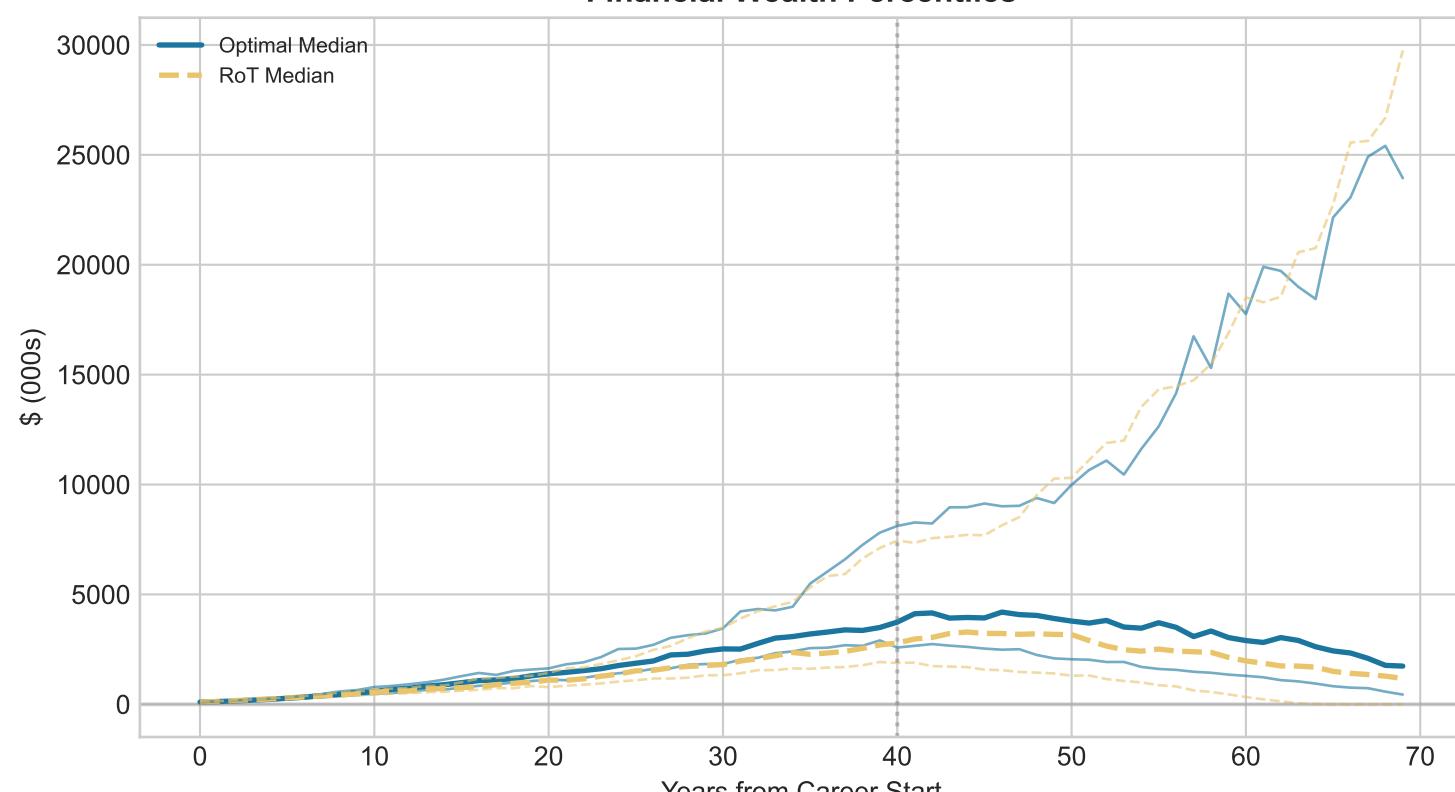
**Default Risk Comparison**



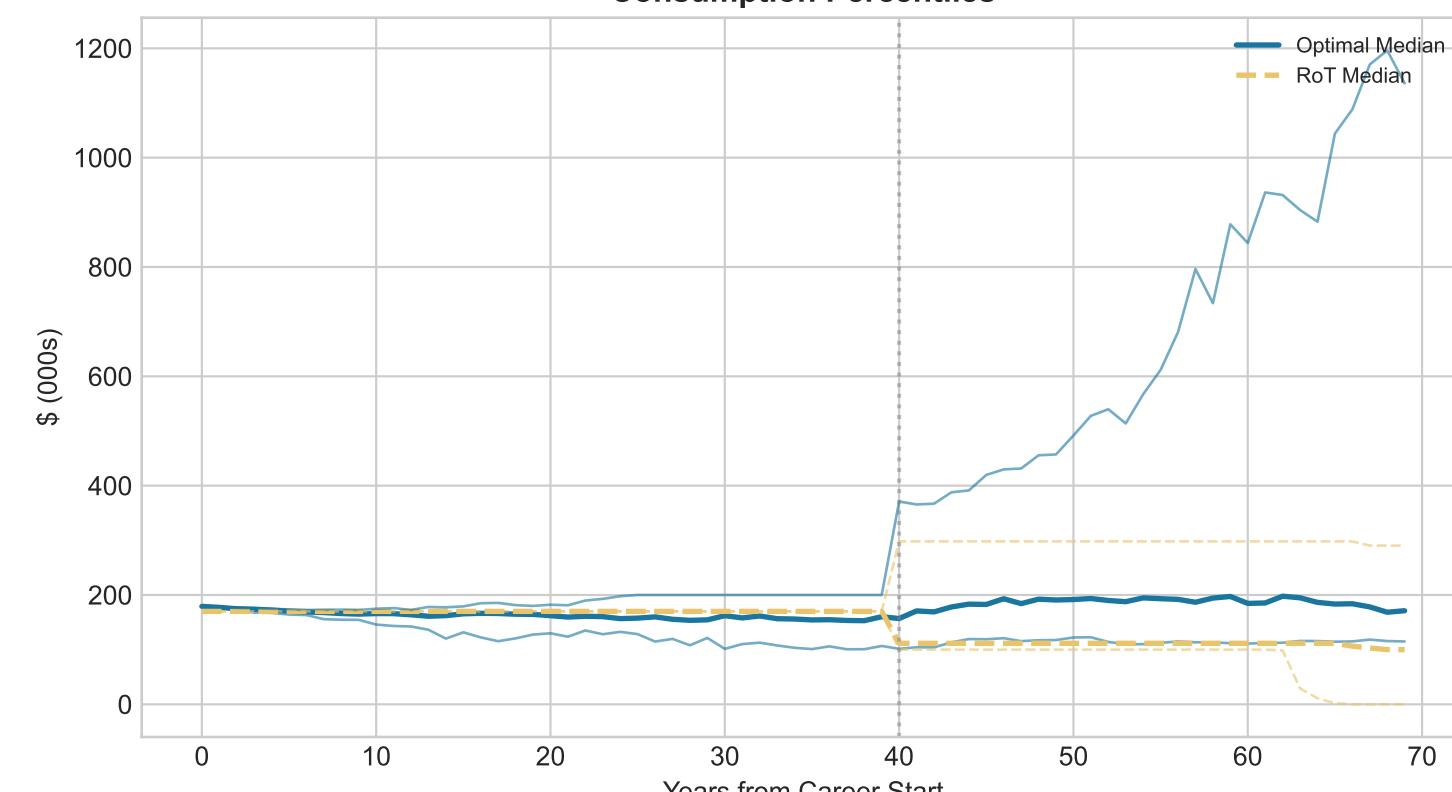
**PV Consumption at Time 0**



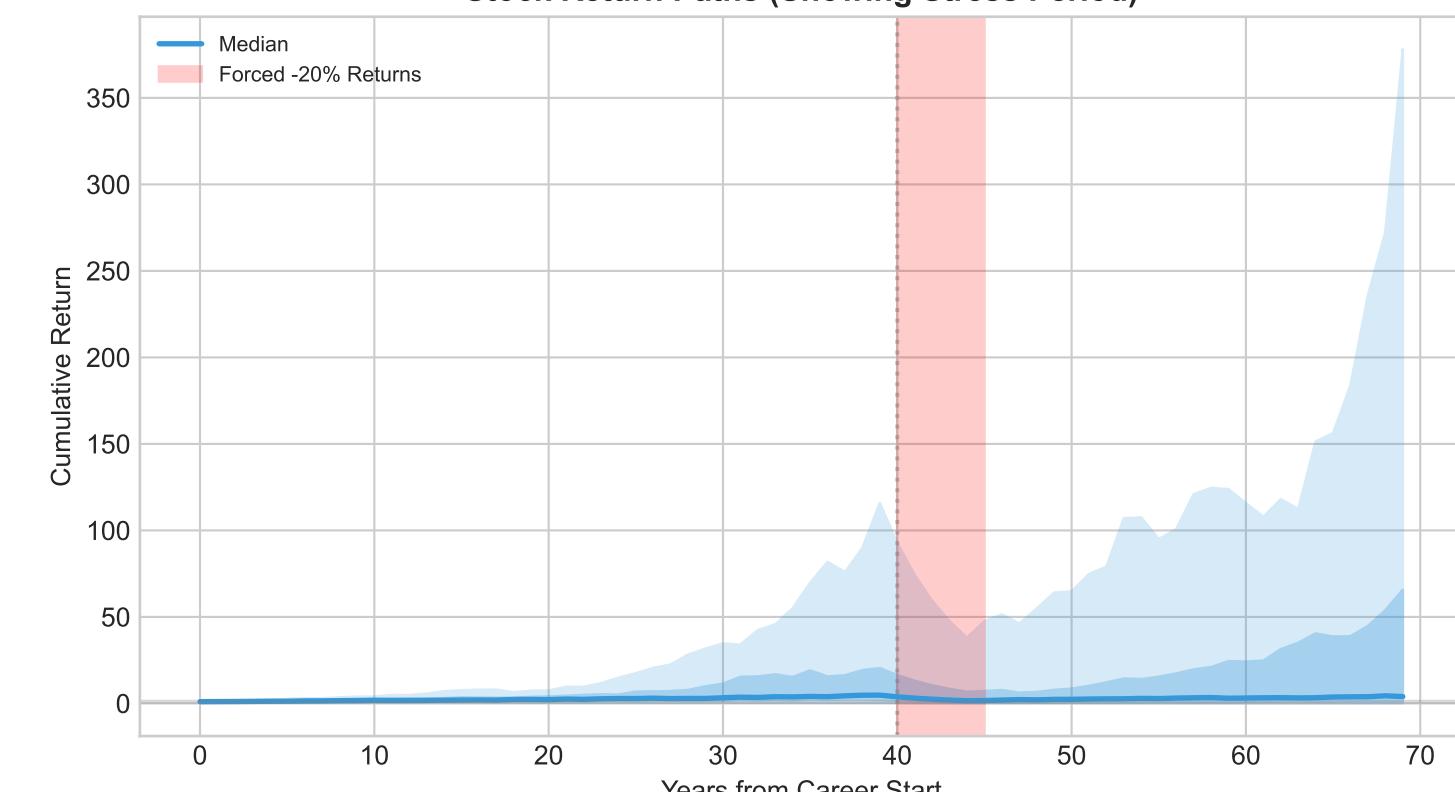
**Financial Wealth Percentiles**



**Consumption Percentiles**



**Stock Return Paths (Showing Stress Period)**



#### Strategy Comparison Summary

Scenario: Sequence Risk (Bad Early Returns)

##### Default Rates:

Optimal (Variable): 20.0%  
Rule of Thumb (4%): 36.0%

##### Median Final Wealth (\$k):

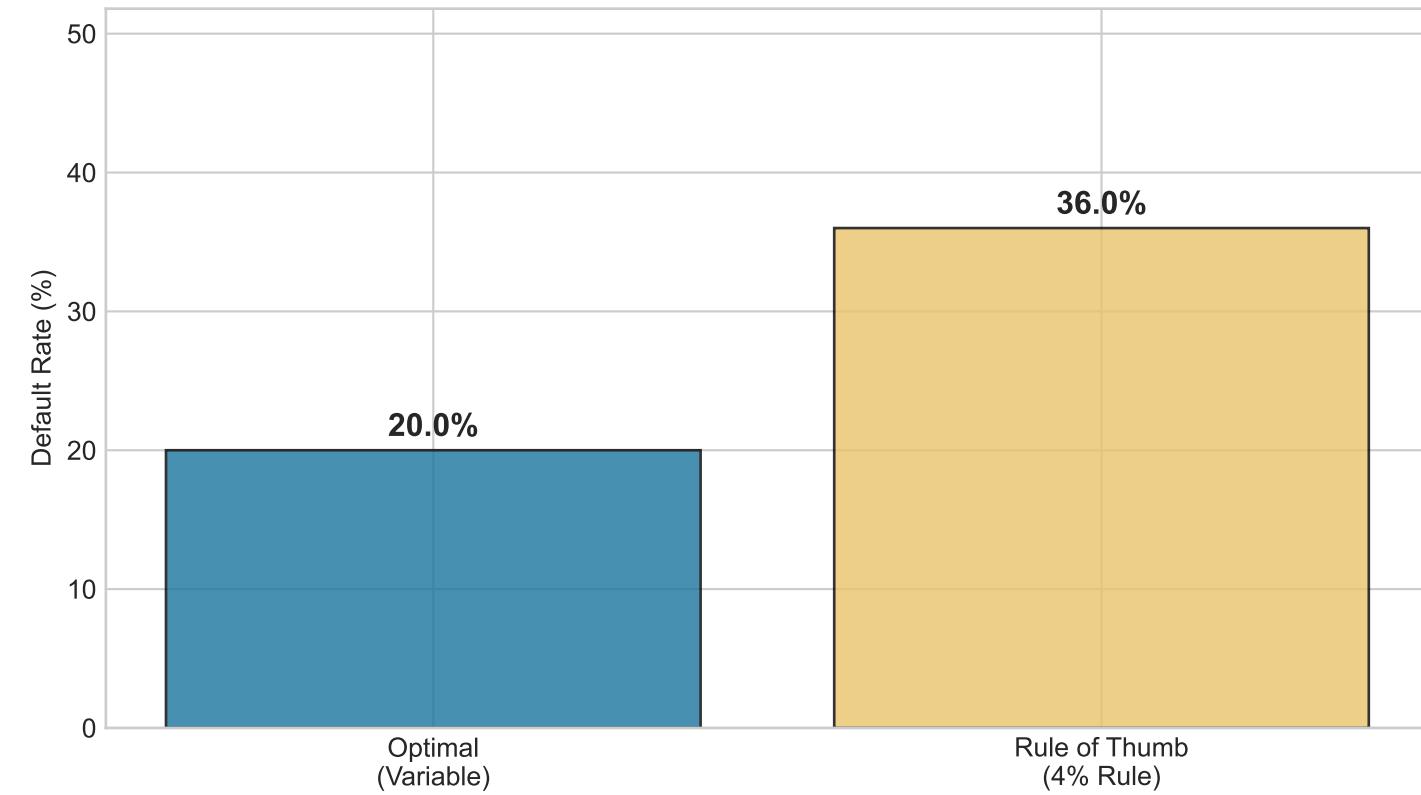
Optimal: \$ 1,739  
Rule of Thumb: \$ 1,174

##### Median PV Consumption (\$k):

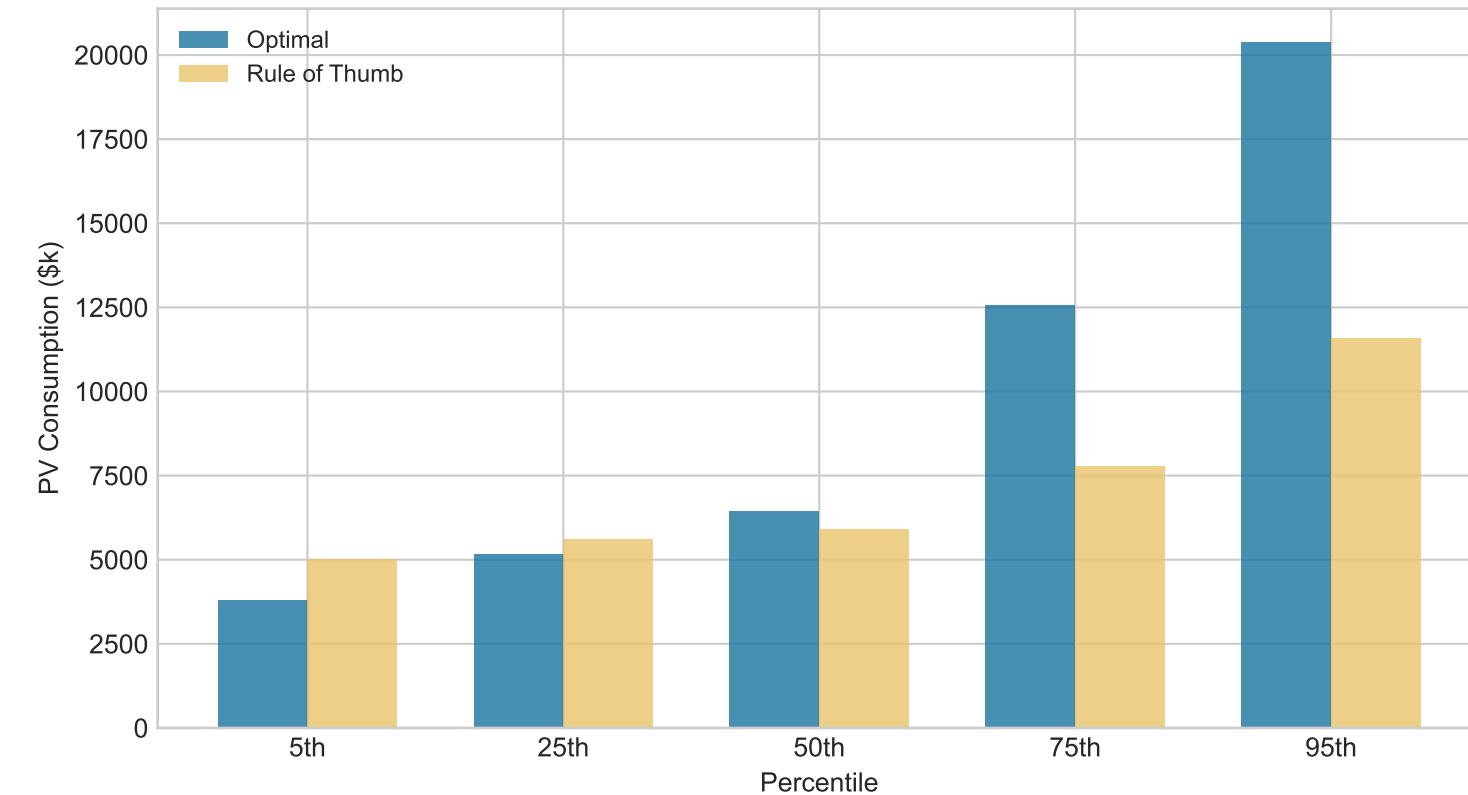
Optimal: \$ 6,436  
Rule of Thumb: \$ 5,898

Simulations: 50

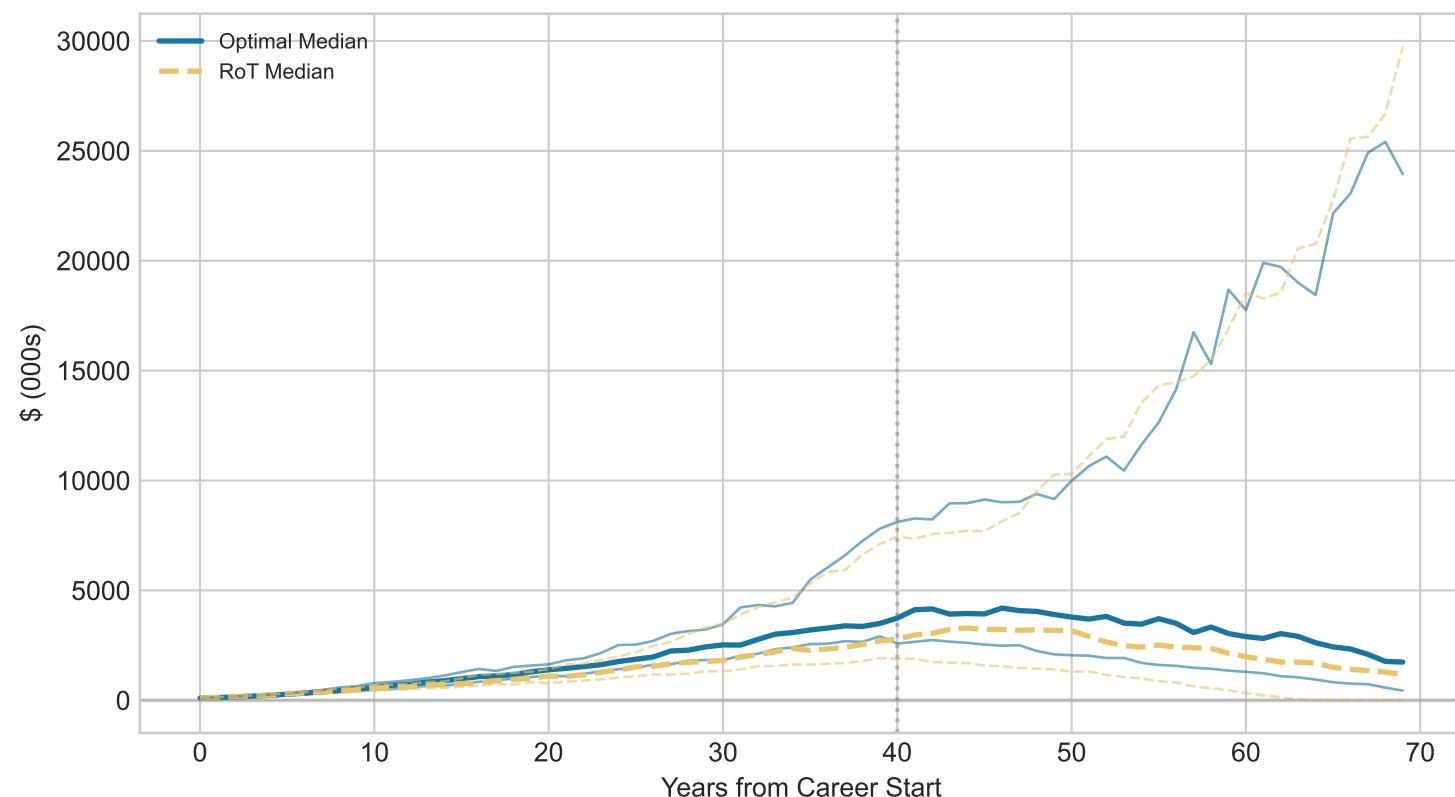
Default Risk Comparison



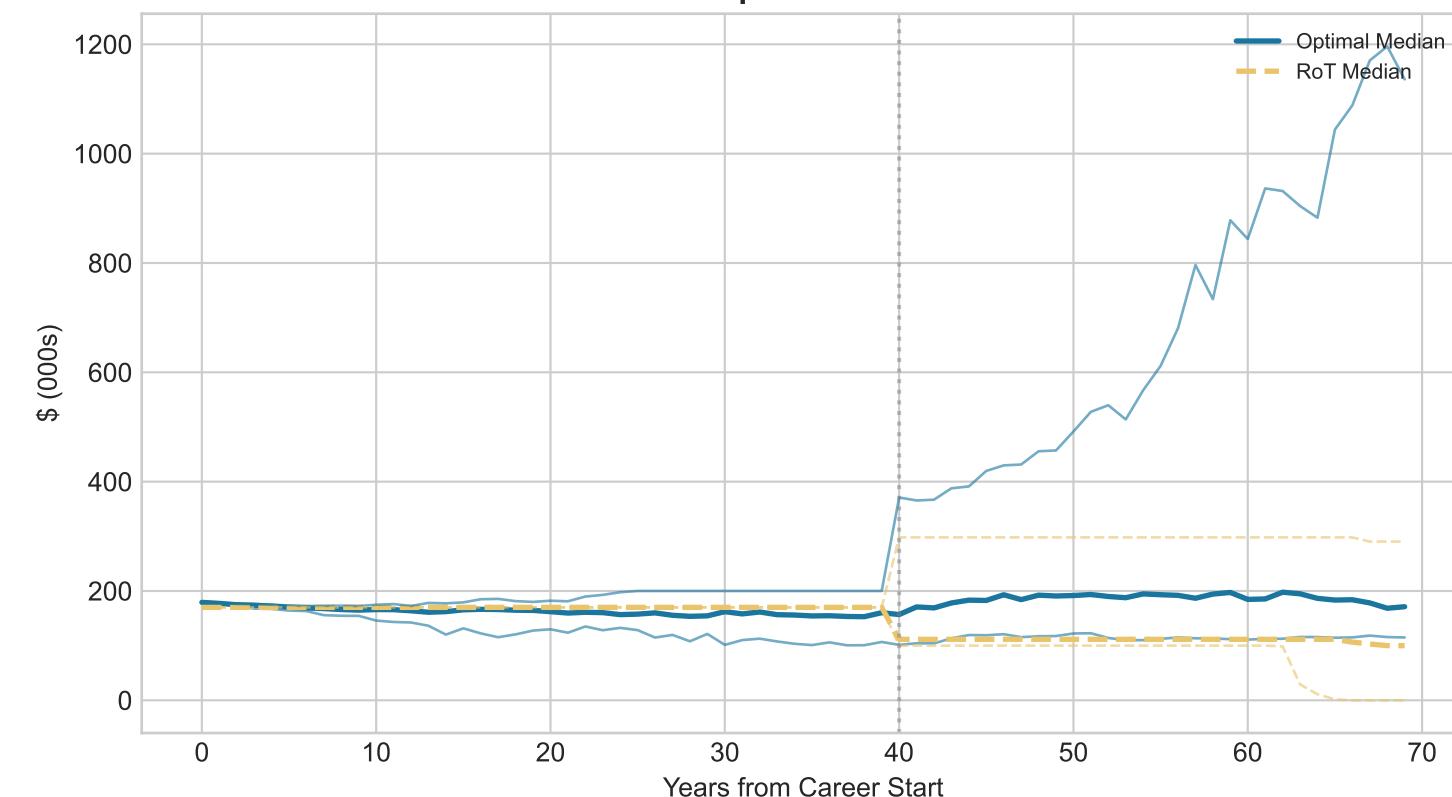
PV Consumption at Time 0



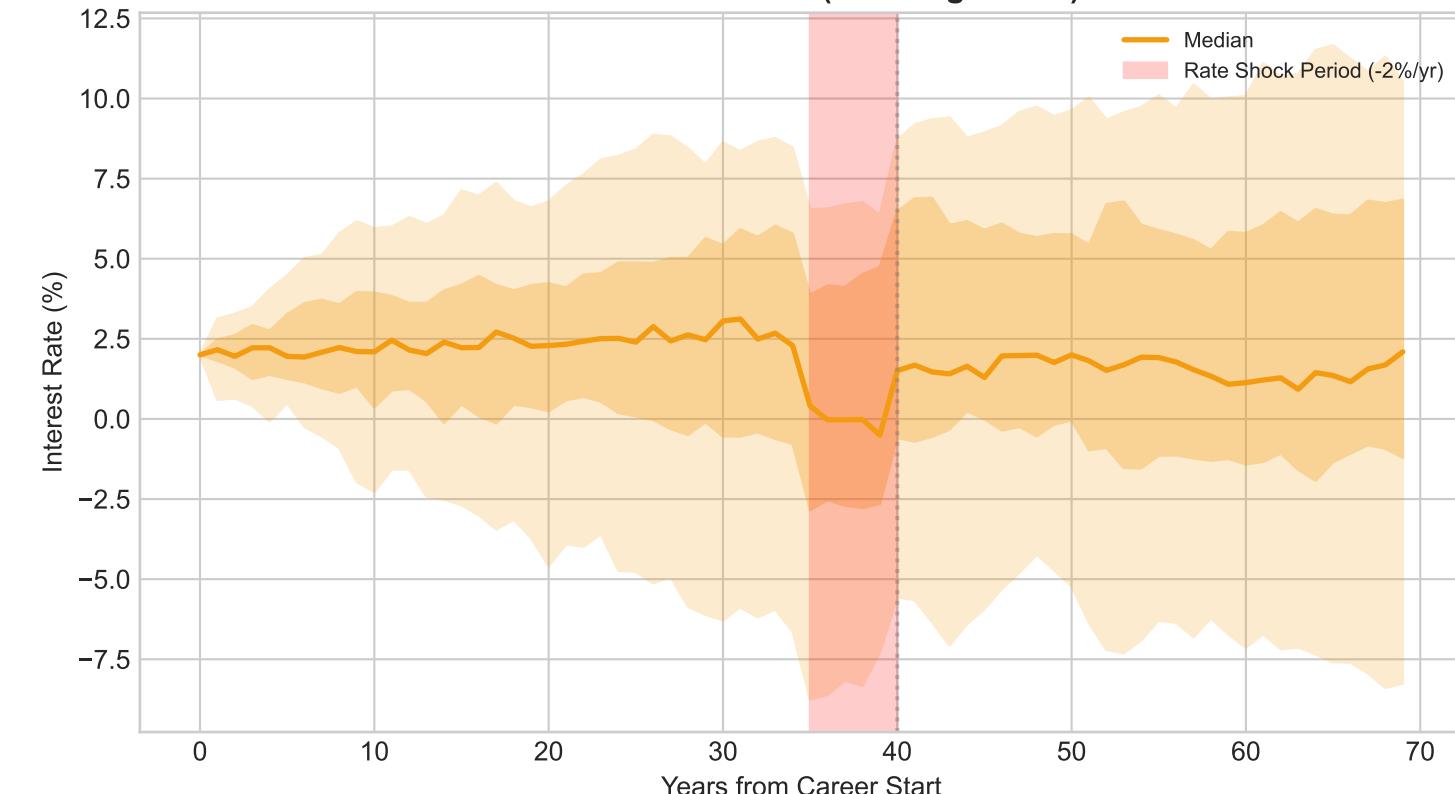
Financial Wealth Percentiles



Consumption Percentiles



Interest Rate Paths (Showing Shock)



#### Strategy Comparison Summary

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

##### Default Rates:

Optimal (Variable): 20.0%  
Rule of Thumb (4%): 36.0%

##### Median Final Wealth (\$k):

Optimal: \$ 1,739  
Rule of Thumb: \$ 1,174

##### Median PV Consumption (\$k):

Optimal: \$ 6,436  
Rule of Thumb: \$ 5,898

Simulations: 50

## Lifecycle Investment Strategy Parameters

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### 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%