Lifecycle Investing:
A Finance Theory Perspective

FINC 450

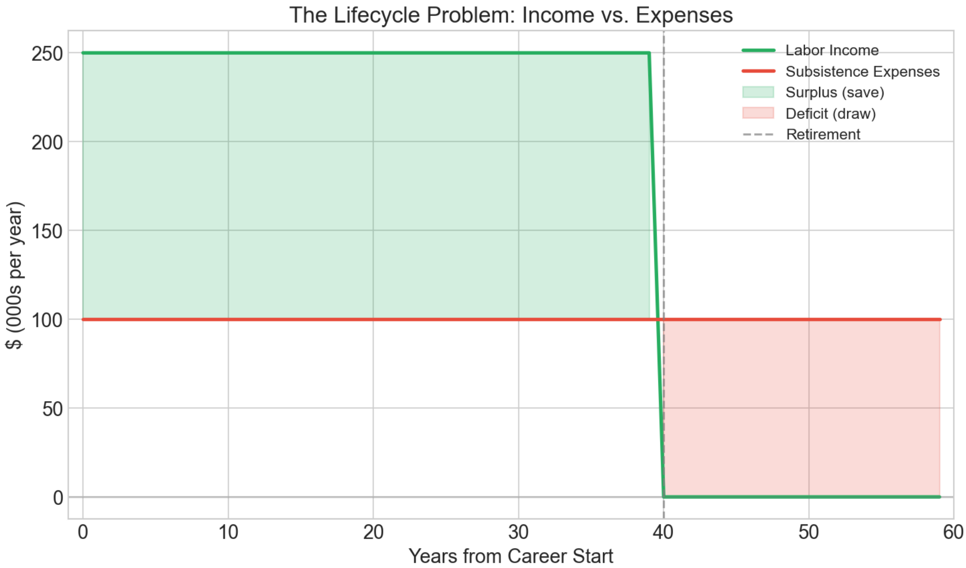
Today's Lecture

The Fundamental Problem

Income and expenses don't match over time.

- You earn during working years (ages 25–65)
- You consume throughout your entire life (ages 25–85+)
- This **mismatch** is THE problem lifecycle finance solves

Income vs. Expenses Over the Lifecycle



The Cash Flow Pattern

Finance thinks in present values.

Assets:

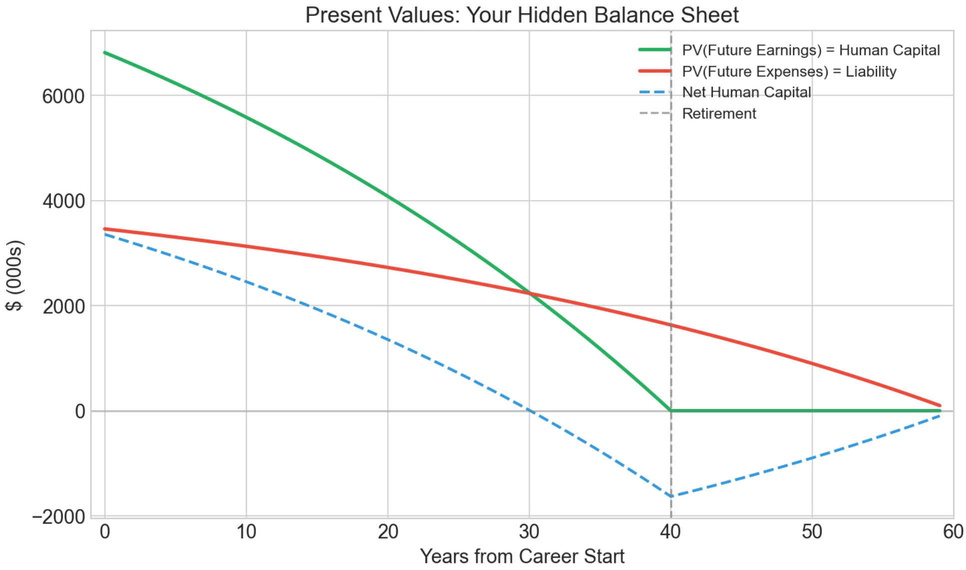
- Financial wealth (savings)
- **Human capital** (PV of future earnings)

Liabilities:

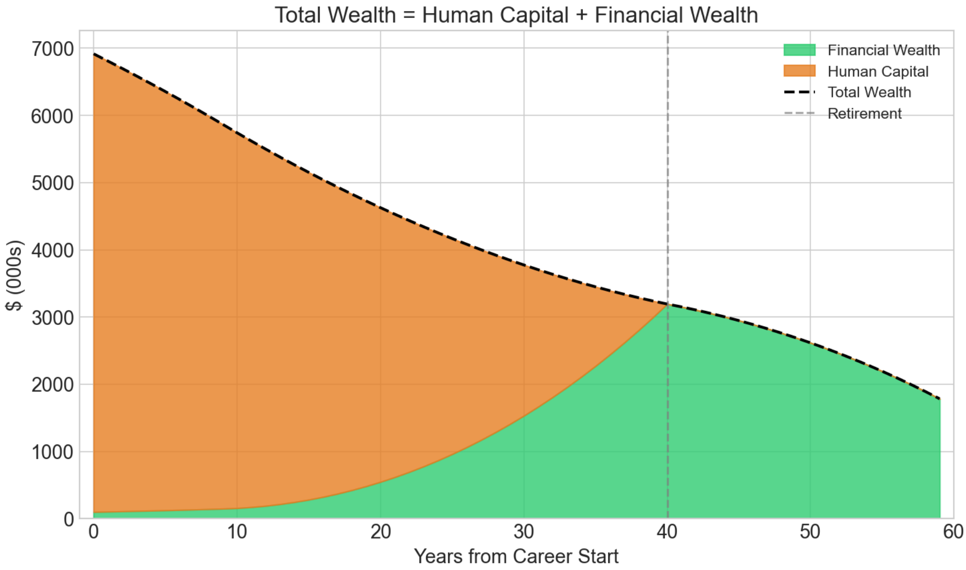
- **Expense liability** (PV of future spending needs)

$$\boxed{\textbf{Net Worth} = \text{Human Capital} + \text{Financial Wealth} - \text{PV(Expenses)}}$$

Present Values: Your Hidden Balance Sheet



Human Capital is Your Biggest Asset (Early On)



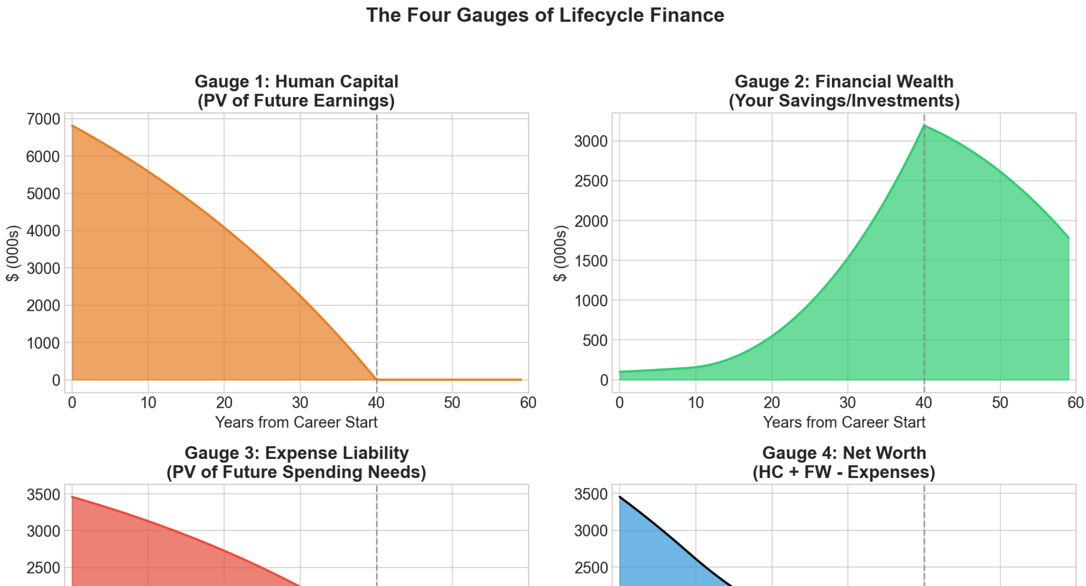
It’s not just about your retirement account.

Traditional advice focuses on one number: your savings balance.

Finance theory says you need to track **four gauges**:

1. Human Capital (your future earning power)
2. Financial Wealth (your savings)
3. Expense Liability (what you owe your future self)
4. Net Worth (assets minus liabilities)

The Four Gauges of Lifecycle Finance



Why Track All Four?

Human Capital (Gauge 1):

- Depletes as you age
- Affected by career risk
- Has duration (interest rate sensitivity)

Financial Wealth (Gauge 2):

- What you control directly
- Grows through savings + returns
- Must replace HC over time

Expense Liability (Gauge 3):

- Your commitment to future self
- Has duration too!
- Determines "fully funded" status

Net Worth (Gauge 4):

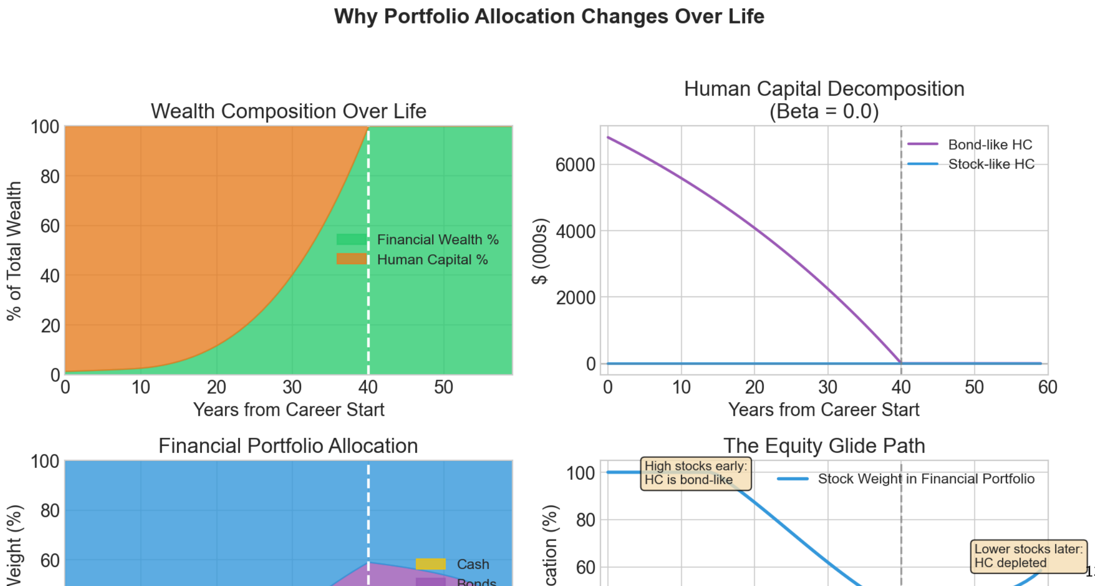
- The bottom line
- Drives consumption decisions
- Should stay positive!

Human capital is like a bond.

- Stable, predictable income stream (for most people)
- Has **duration**: sensitive to interest rates
- Beta to stock market ≈ 0 for professors, consultants
- Beta > 0 for entrepreneurs, tech workers

Implication: To maintain target total risk,
financial portfolio must adjust as HC depletes.

Why Portfolio Allocation Changes Over Life



The Logic of the Glide Path

Young investor (age 25):

- Total wealth = 90% Human Capital + 10% Financial Wealth
- HC is bond-like ⇒ already have implicit bond position
- Financial portfolio should be **100% stocks** to balance

Retiree (age 70):

- Total wealth = 0% Human Capital + 100% Financial Wealth
- No implicit bond position from HC
- Financial portfolio should match **target allocation** (e.g., 50/50)

This is WHY target-date funds have a "glide path"!

Not All Human Capital is the Same

Your job's riskiness matters.

Low Beta ($\beta \approx 0$):

- Tenured professor
- Government employee
- Doctor, lawyer

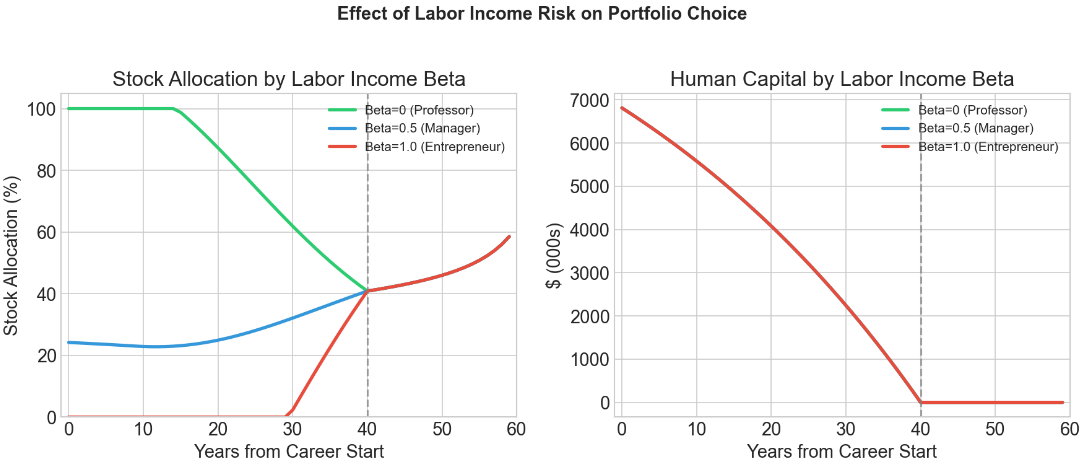
HC is bond-like
$\Rightarrow$ Hold **more** stocks

High Beta ($\beta \approx 1$):

- Tech startup founder
- Investment banker
- Sales (commission-based)

HC is stock-like
$\Rightarrow$ Hold **fewer** stocks

Effect of Labor Income Risk on Portfolio Choice



Practical Implications

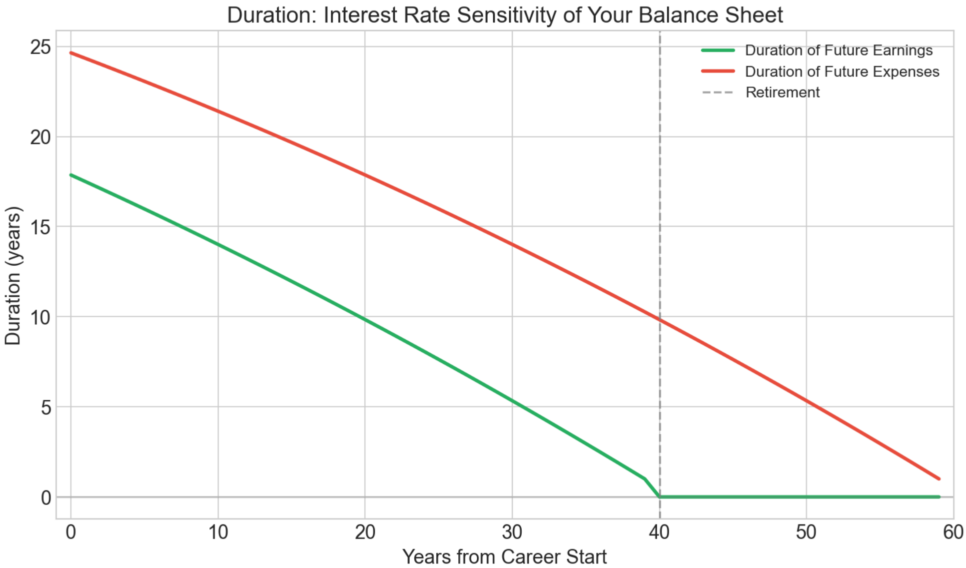
If your income is stable (professor, government):

- You can afford more risk in your portfolio
- 100% stocks early in career is reasonable
- Your human capital provides diversification

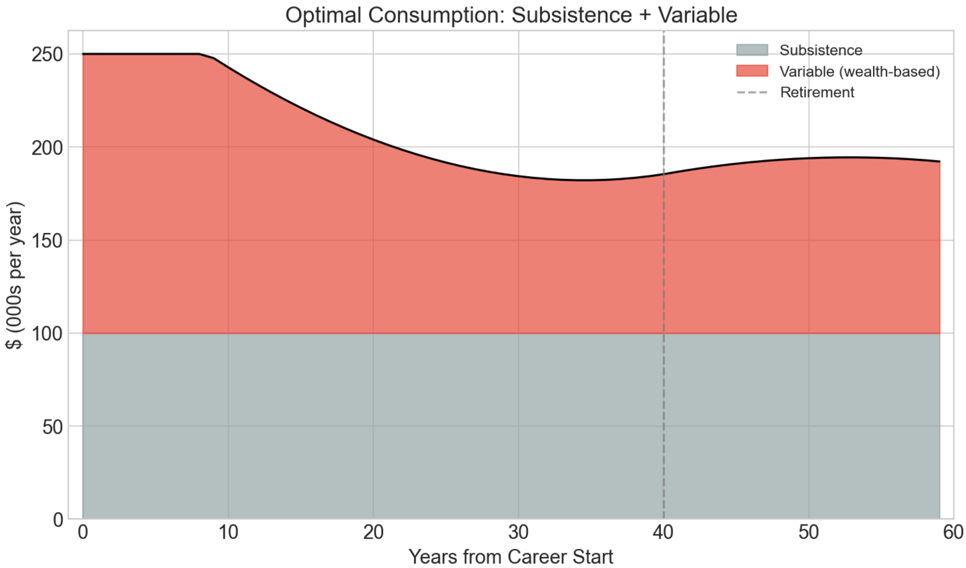
If your income is risky (entrepreneur, tech):

- Be more conservative in your portfolio
- Don't double down on market risk
- Consider your company stock exposure carefully!

Interest Rate Risk on Your Balance Sheet



Consumption Smoothing



Key Takeaways

1. **The Problem:** Income and expenses don't match over time
2. **Human Capital:** Your biggest asset early in life (but invisible)
3. **Four Gauges:** Track HC, FW, Expenses, and Net Worth—not just your 401(k)
4. **Glide Path Logic:** HC is bond-like $\Rightarrow$ young people should hold more stocks
5. **Labor Risk Matters:** Risky job $\Rightarrow$ more conservative portfolio
6. **Duration:** Match asset and liability durations to manage interest rate risk

The Merton Framework

Optimal portfolio allocation:

$$w^* = \frac{1}{\gamma}\Sigma^{-1}\mu$$

where:

- γ = risk aversion coefficient
- Σ = covariance matrix of asset returns
- μ = vector of expected excess returns

Key extension for lifecycle:

- Human capital is an implicit asset in your portfolio
- Financial portfolio adjusts to reach total wealth target
- As HC depletes, financial portfolio converges to w^*

Questions?