

# Robert C. Merton, Nobel Laureate 1997

*The European Colloquia Series, London 2010*



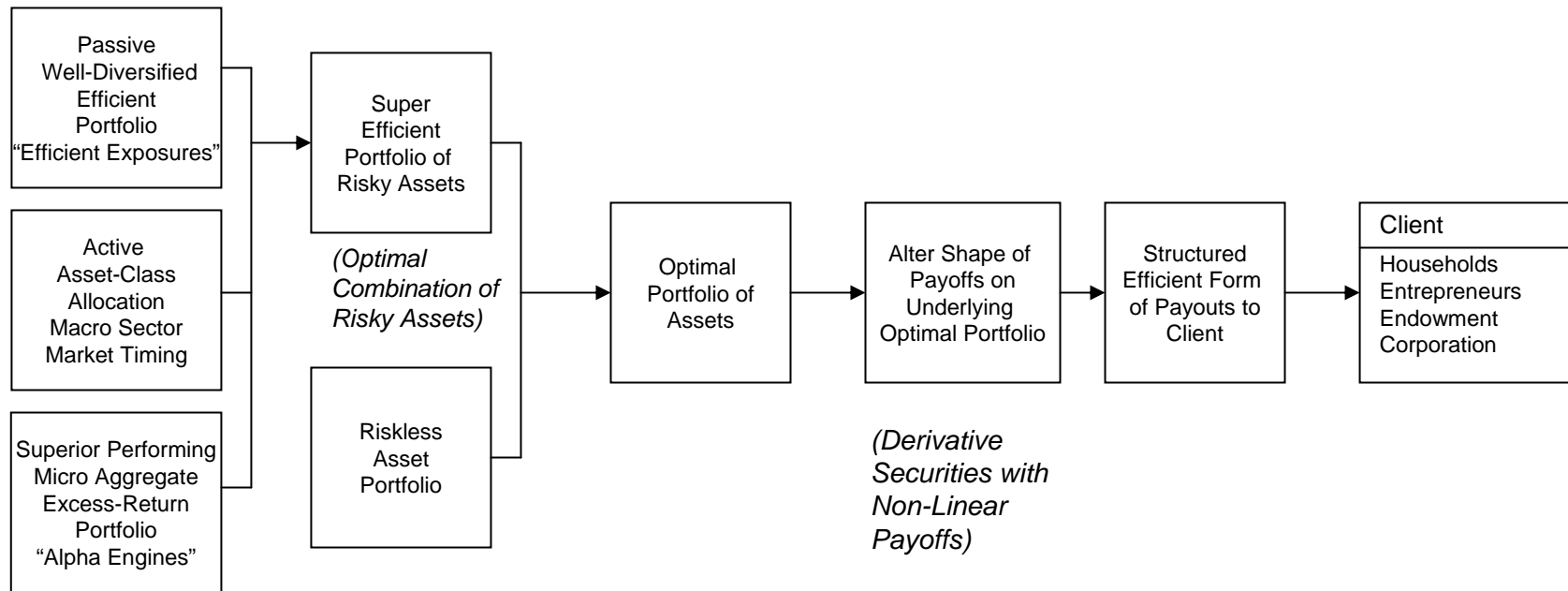
# **Product Innovation in Long-Term Savings Vehicles**

---

**Robert C. Merton  
Harvard Business School**

**European Colloquia Series: Towards a New Architecture**

# Domain of Investment Management: Stages of Production Process



- Components of Best Performing Risky Assets Only Portfolio:
- Diversification Risk Modulation

- Risk Modulation through Hedging or Leveraging
- Market Timing Active Management

- Risk Modulation through Insurance or non-linear leverage
- Pre-programmed dynamic trading
- "Building Block" State-Contingent Securities to create specialized payout patterns

- Tax efficient
- Regulatory efficient
- Liquidity allocation

# Integrated Endowment Management: Risk Balance Sheet University

---

- Tuition Undergraduate
- Tuition Executive Education
- Endowment
- Alumni Gifts
- Grants
- Sponsored Research
- Publishing
- Real Estate: Commercial
- Real Estate: Residential
- Patents

- Salaries Tenure Faculty
- Financial Aid
- Energy
- Forward Tuition Contracts
- Debt
- Other Liabilities
- Net Worth

# Integrated Optimal Endowment Asset Allocation

## University "A"

|           | Total Assets | Other Assets | Endowment |       |
|-----------|--------------|--------------|-----------|-------|
| Total     | \$800        | \$500        | \$300     |       |
| Risk free | 480          | 400          | 80        | (27%) |
| Risky     | 320          | 100          | 220       | (73%) |

## University "B"

|           |       |       |       |       |
|-----------|-------|-------|-------|-------|
| Total     | \$800 | \$500 | \$300 |       |
| Risk free | 480   | 250   | 230   | (77%) |
| Risky     | 320   | 250   | 70    | (23%) |

## University "C"

|           |       |       |       |       |
|-----------|-------|-------|-------|-------|
| Total     | \$600 | \$300 | \$300 |       |
| Risk free | 360   | 120   | 120   | (40%) |
| Risky     | 240   | 180   | 180   | (60%) |

# Define-Benefit Pension Fund Asset/Liability Management Expanded

---

**Corporate Pension Plan: Immunized match-funded: No risk to Corporation    Benchmark**

|   |   |
|---|---|
| Nonfinancial Corporation  |   |
| Operating Assets<br>Pension Assets [100 long-maturity fixed-rate bonds] | Senior Debt<br>Pension Liabilities [100 long-maturity fixed payments] |
|   | Common Stock  |

**Corporate Pension Plan: Mismatch Funded: Risky to Corporation    Normal Practice**

|  |   |
|--|---|
| Nonfinancial Corporation                                       |   |
| Operating Assets<br>Pension Assets [75 Common Stock; 25 bonds] | Senior Debt<br>Pension Liabilities [100 long-maturity fixed payments] |
|  | Common Stock  |

# Familiar vs. New Risk Comparison: Equities in Pension Fund VS. Swap

---

Incremental Pension risk is: receive: the total return on stocks on 75

Give up: the total return on bonds on 75

Derivative: Total-Return Equity Swap for Total-Return on Bonds on 75  
notational amount

Incremental Swap risk is: Receive the total return on stocks on 75  
Pay the total return on bonds on 75

**Risk and Return on Equities in the pension fund is identical to Swap**

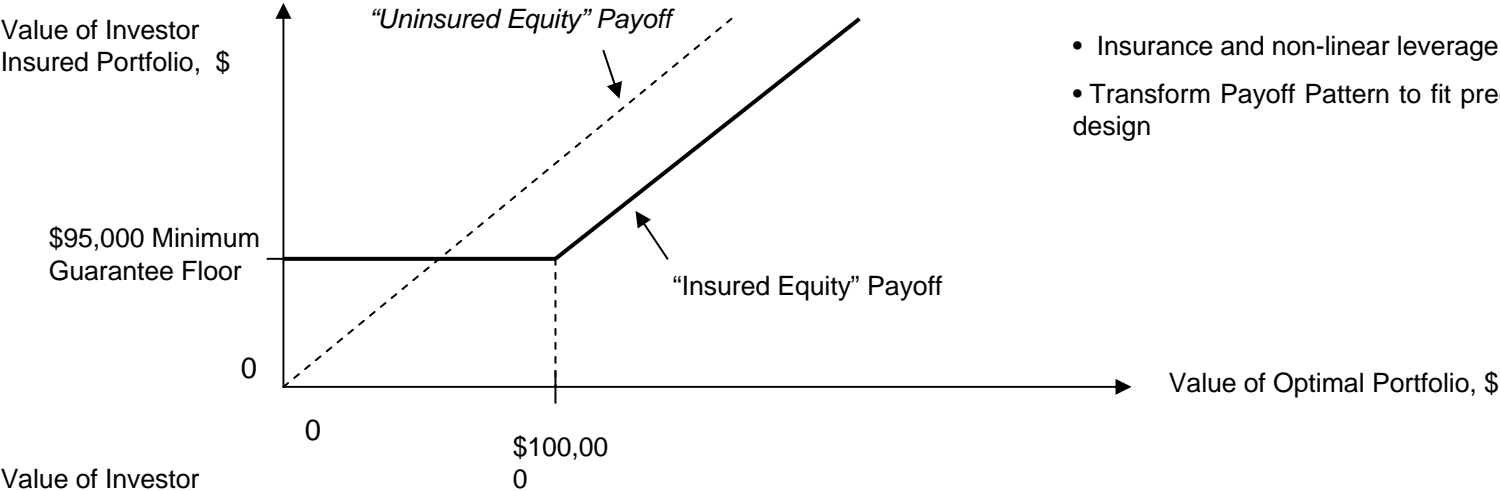
Yet total return swap viewed as leveraged and very risky and the pension plan as normal

# Household Lifecycle Investment Management in the Future

---

- Efficient Risk-Return plus hedging
  - Human Capital
  - Investment opportunity change: interest rate, risk premia, volatility
  - Relative consumption-good prices and inflation
  - Longevity change
  - Standard of living change
- What is the “risk-free” asset for retirement funding?
- Housing: Risky asset or pre-paid consumption?
- Bequests: Reverse Mortgage
- Targeted Expenditures: college tuition, room, board
- Products to mitigate behavioral dysfunctions
- Efficient bundling: annuity and long-term care
- Floor products and guarantees
- Structured Defined-Contribution

# Transform Shape of Payoffs from Investing in the Optimal Portfolio: Derivatives



- Insurance and non-linear leverage
- Transform Payoff Pattern to fit precise preferences: custom design

