Portfolio Construction & Asset Allocation

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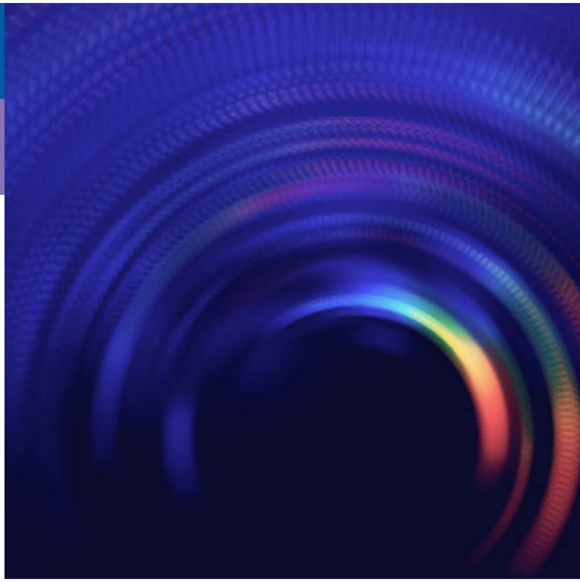


Risk Tolerance Influences Asset Allocation

Goals and Constraints

- Goals:
  - Meet the required return at a constrained level of risk

- Constraints:
  - Liabilities, cash flows, and time horizon
  - Regulatory issues, such as taxes or allowed investments.
  - Liquidity risk

Accessing Alternative Investments

- Investor qualifications determine the ability to access some alternative investments
- Investment Company Act of 1940 Private Placement Exemptions
  - 3(c)1 – Accredited Investor
    - Net worth exceeds $1 million excluding primary residence
    - OR $200,000 personal income or $300,000 family income
    - OR Knowledgeable fund employee / FINRA-registered rep
  - 3(c)7 – Qualified Purchaser
    - Over $5 million in investments excluding primary residence

Risk Tolerance

- Risk Capacity – The financial ability of an investor to withstand adverse investment returns
- Risk Tolerance – Willingness to experience bad outcomes in pursuit of higher returns.
  - Problem when risk tolerance exceeds risk capacity
  - Risk Tolerance is expressed in the asset mix
  - Express risk tolerance over an entire market cycle, not in a bull market. Worst case outcome is selling at the bottom and locking in losses.
  - Lower risk tolerance – forgo higher expected returns to reduce the chance of severe losses.
  - Higher risk tolerance – able to be patient during drawdowns in the pursuit of higher long-term returns

Risk Tolerance

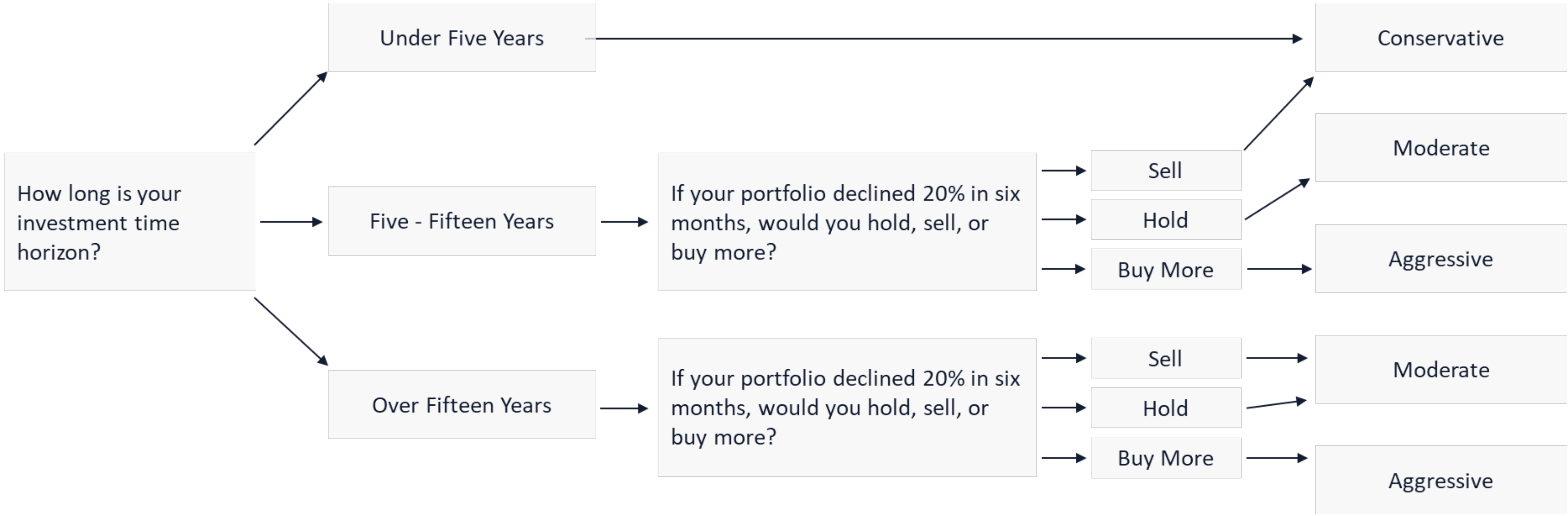
Higher Risk Tolerance

- Longer-Term Goals, Such As Retirement Or Bequests
- Higher Income
- Higher Assets
- Greater Investment Knowledge
- Longer Time To Retirement

Lower Risk Tolerance

- Shorter-Term Goals Such As First Home Or College Tuition
- Inability To Replace Investment Losses During Retirement
- Greater Need To Use Assets For Current Income Needs

Risk Tolerance Questionnaires



Asset Allocation & Portfolio Design

What Is Diversification?

Passive vs Active	Equity vs Fixed Income	Small vs Large	Domestic vs Foreign
Growth vs Value	Funds vs Securities	Multiple Managers and Investment Styles	Alternative Investments

Capital Market Assumptions

- Build asset allocation mix using historical data from indexes
- Actual investments will have tracking error to index returns
- Adjust capital market return assumptions for current market environment
- Lower expected returns with lower current bond yields and higher equity market valuations

Asset Allocation Models

Asset Allocation Methodologies

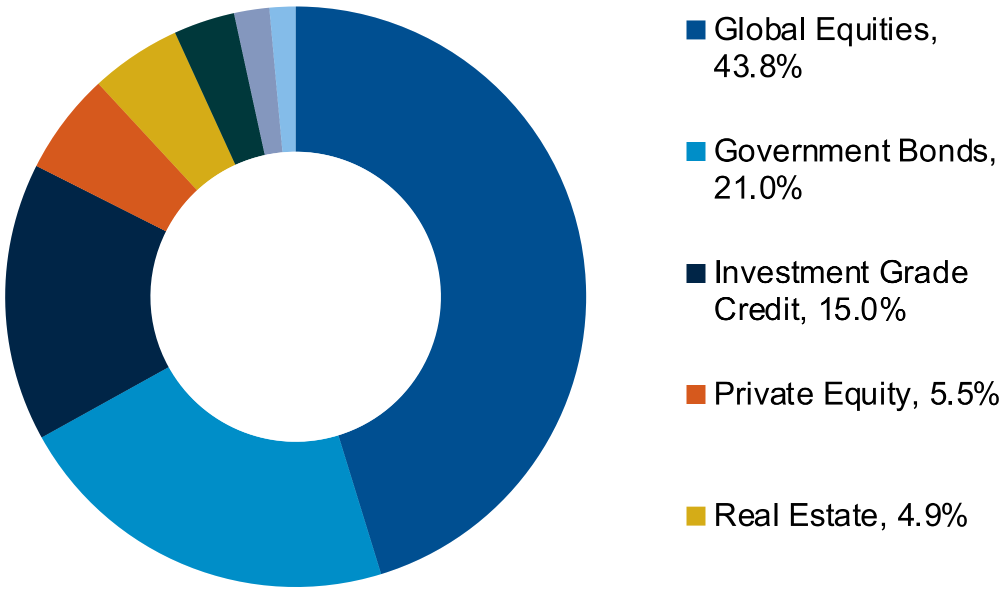
Cap-Weighted Portfolio with Global Weights	Cap-Weighted Portfolio with Home Country Bias	Inclusion of Alternative Investments
All-weather or Scenario-Based Portfolios	Risk Parity	Quantitative Portfolio Optimization of Risk and Return Targets

World Market Portfolio

BCG estimates global wealth at $477 trillion

What is the role of the $2 trillion digital asset market, $12 trillion in gold or $3 trillion annual production of consumable commodities?

Hedge fund holdings would double count global stock and bond holdings



Dec. 2021 update of Doeswijk, R., Lam, T., and Winkels, L., 2014, “The Global Multi-Asset market Portfolio, 1959-2012”, Financial Analysts Journal 70 (2), pp. 26-41.

Home-Country Bias

- US equities are approximately 42.6% of the global equity market
- US fixed income is approximately 39.3% of the global market portfolio
- Investors holding exclusively US holdings benefit from a strong US dollar
- Investors benefit from foreign-domiciled securities
  - When foreign currencies are strong
  - By greater diversification
  - By reduced volatility
- Investors often hedge currency risk for international fixed income holdings, but don’t hedge currency in equities

Sources: 2024 SIFMA Capital Markets Handbook

Alternative Investments

- We have already seen that private equity and real estate each have approximately 5% weights in the global market portfolio.
- Another 5% may be sourced from hedge funds, commodities, digital assets, private credit and other alternatives.
- Stocks and bonds have negative exposures to rising interest rates and inflation, while real estate, commodities, infrastructure, and private credit have the potential to benefit from inflation and rising rates.
- Hedge funds and managed futures typically are defensive during an equity bear market.

All-Weather or Scenario-Based Portfolios

- Investors with all-weather or scenario-based portfolios may have allocations in their portfolio based on all past market history:
- Gold, commodities, real assets, and private credit for times of inflation and rising rates
- Sovereign debt and managed futures for times of risk aversion and falling stock prices

Low Growth, High Inflation	High Growth, High Inflation
Low Growth, Low Inflation	High Growth, Low Inflation

Evaluate Returns Over A Full Market Cycle

- Some investors favor assets that have performed well during past crisis markets
- Be careful not to evaluate return and risk exclusively from bull market periods such as 2009 to 2019

Risk-parity Portfolios

- A portfolio invested 60% in stocks and 40% in bonds derives over 80% of its risk from the equity market
- A risk-parity portfolio seeks to take equal volatility risk in each asset class, such as 50% of the risk in equities and 50% of the risk in fixed income
- This will result in a lower risk portfolio with a large fixed-income allocation, such as 65% bonds and 35% stocks
- Some investors will add futures-based leverage to the 35-65 portfolio to get closer to the risk and return of the 60-40 portfolio

Quantitative Portfolio Optimization

- Investors may seek to quantitatively determine portfolio weights using targets of risk and return
- What combination of assets is expected to earn superior return and risk relative to the 60-40 historical return of 6.8% and standard deviation of 10.2%?
  - Can be used to engineer targeted portfolios for investors with conservative, moderate, or aggressive risk tolerance
- This requires estimates of the future risk and return of each asset class and strategy as well as the return correlation across assets
  - Of course, these numbers are always changing, especially toward higher risk and higher correlation during bear markets

Performance Evaluation

Asset Allocation Largely Determines Risk and Return

- Strategic asset allocation weights
  (Policy asset mix)
  - Long-term weights and regular rebalancing
  - Determine 94% of variations in return and risk
- Market timing, tactical calls, and luck
  - Short-term deviations from long-term weights
  - Determine 2% of variations in return and risk
- Security and manager selection
  - Picking stocks, bonds, and funds with returns deviating from the benchmark
  - Determine 4% of variations in return and risk

Source: Brinson, Hood, Beebower, Determinants of Portfolio Performance

A Quality Benchmark

- Unambiguous – clearly understood
- Investable – a passive option is available
- Measurable – manager return can be calculated
- Appropriate – benchmark correlated to manager strategy
- Specified in Advance – manager knows how performance will be evaluated
- Owned – manager accepts responsibility for being accountable vs. the benchmark

Source: Bailey and Richards, A Primer for Investment Trustees

Challenges of Benchmarking Alternative Investments

- It is difficult to benchmark alternative investments, as no index funds exist
- Most investors default to a peer group or median manager benchmark, which is not investable
- Illiquid investments, such as private equity or real estate, likely have smoothed returns and understated risk statistics

Performance Attribution

- Active return – Deviation of a fund’s return from its benchmark
- Benchmark return from systematic risk, active return from idiosyncratic risk
- Consider why the returns of a fund deviate from the benchmark return
  - Is the manager taking more or less risk?
  - Is the manager’s strategy correlated to the benchmark?
  - Is the performance too good to be true?
  - Policy asset mix, hiring managers, size of allocations to managers
  - Allocation to styles (value/growth), performance of single managers
  - Over/underweight relative to policy asset mix
  - Strategic vs. tactical asset allocation, security and manager selection

Asset Allocations
By Investor Type

The Endowment Model

University endowments have a perpetual time horizon

If illiquidity is a compensated risk factor, there should be a large weight on alternative investments

ASSET CLASS OR STRATEGY	AVERAGE ALLOCATION
Public US Equity	13.0%
Public Non-US and Global Equity	17.9%
Fixed Income, Cash, and Private Debt	10.2%
Private Equity and Venture Capital	28.8%
Hedge Funds and Marketable Alternatives	16.1%
Real Assets	10.8%
Other Assets	3.2%

Source: NACUBO-TIAA 2024 Study of Endowments

Public US Pension Plans

Assumed returns are falling over time, from 8.2% in 1994 to 6.9% in 2023

Pensions are adding more alternative investments over time

Public equity and fixed income allocations fell from nearly 90% in 2004 to less than 65% in 2023

ASSET CLASS OR STRATEGY	AVERAGE ALLOCATION
Public Equity	42.2%
Fixed Income and Cash	22.3%
Private Equity and Venture Capital	14.0%
Hedge Funds and Other Alternatives	8.5%
Real Assets	13.2%

Source: Publicplansdata.org, 2023

Individual Investor Allocations

Retail investors are underweight alternative investments relative to the world market portfolio

- High net worth (HNW) investors have allocations similar to public pension plans
- Ultra-high net worth (UHNW) investors follow the endowment model, but with larger fixed-income holdings

ASSET CLASS OR STRATEGY	RETAIL	HNW	ULTRA HNW
Listed Equity	62%	49%	31%
Fixed Income and Cash	32%	24%	19%
Alternative Investments	6%	26%	50%

Source: HNW and UNHW: KKR, 2021. Retail: Fidelity, 2022

Thank You!