

## 1. INTRODUCTION

This reading focuses on ways to modify asset allocation process depending on asset owner's needs, circumstances and constraints.

## 2. CONSTRAINTS IN ASSET ALLOCATION

Some common constraints that asset-owners typically consider are asset size, liquidity concerns, taxes, time horizon, regulatory and other external restrictions. These constraints strongly affect their optimal asset allocation decisions.

### Asset Size

Asset size sometimes limits the asset classes accessible to the investors.

- Asset owners with too large portfolios will limit the number of potential asset classes because of lack of availability of investment vehicles.
- Asset owners with too small portfolios will also limit the number of potential asset classes because some investments require a minimum amount.

Managing a large asset pool requires hiring number of asset-managers and asset owners' capability to oversee and monitor their performances.

Investment managers generally have decreasing return to scale because of large trade sizes, greater price impacts, forced pursuit of investments outside their expertise and slow decision-making.

Asset owners have increasing return to scale because of cost savings related to internal management and ability to allocate to asset classes unavailable to small funds (for example private equity).

Owners of very large portfolios generally invest passively in developed market equities. They also allocate assets to private equity, hedge funds and infrastructure where having large size of investment is an advantage.

**Practice:** Example 1 from the CFA Institute's Curriculum.



## 3. LIQUIDITY

Two dimensions of liquidity for appropriate asset allocation are investor's liquidity needs and liquidity features of asset classes.

Investment portfolio's liquidity needs are highly dependent on the asset-owner's financial strength or their goals.

For example, banks require high liquidity for day-to-day operations; therefore, their portfolio must hold some portion of top quality, highly liquid assets.

Some institutions (such as endowments, sovereign wealth funds etc.) or individual owners with long-term time horizon and lower liquidity needs can invest in less liquid investments to take advantage of illiquidity premium.

Some examples for typical liquidity needs for various institutions or individuals are as follows:

- Higher liquidity needs for banks,

- Lower liquidity needs for endowments, foundations, sovereign wealth funds
- Lower liquidity needs for life or auto insurers compared to property/casualty re-insurers
- Higher liquidity requirement for foundations that fund critical projects compared to foundations that support ongoing expenses.
- High liquidity needs for university endowment that faces significant drop in enrollment.
- Higher liquidity needs for a couple with children nearing college-age compared with the couple with no children keeping other things similar.

To assess, the suitability of an asset class for an asset owner or institution, it is important to consider the liquidity concerns during extreme market conditions.

Undisciplined decision making by client may generate losses from panic sell of illiquid assets during times of

stress. Illiquid asset classes may not be appropriate for some clients.

**Practice:** Example 2 from the CFA Institute's Curriculum.



#### 4. TIME HORIZON

An asset owner's time horizon, a critical constraint to be considered in an asset allocation, is defined in terms of a liability to be paid or a goal to be funded at some future date. As time progresses, characteristics of asset owner's assets (human capital) and liabilities change.

##### 1. Change in Human Capital

Individual investor's extended portfolio assets include human capital that typically embodies bond-like features. As time passes and individual's human capital declines, his financial capital requires more allocation to bonds.

##### 2. Change in character of Liabilities

As time passes, changes in liabilities affect the asset allocations that are aligned to fund those liabilities.

For example, the liability of a pension fund whose employees are relatively:

- young, is comparable to long-term bonds,
- middle-aged, can be hedged with intermediate-term bonds
- retired comprises cash-like characters.

Passage of time changes status of goals for individuals. Some goals change from partially funded to fully funded. Asset allocation should change with change in profile of individual's liabilities.

Time horizon also affects an investor's priority of goals or liabilities and as a result preferred allocation for these goals or liabilities shift over the course of the investor's lifetime. As he ages, survival goals replace his aspirational goals, which influence the desired risk profile of the assets aligned to fund those goals.

**Practice:** Example 3 from the CFA Institute's Curriculum.



#### 5. REGULATORY AND OTHER EXTERNAL CONSTRAINTS

Local laws, regulations and other external considerations affect the asset allocation decisions of individuals and institutions.

##### 1. Insurance Companies

For insurance companies, composition of investment portfolio and investment returns are essential part of their daily business activities. Insurers primarily focus on matching assets to the projected cash flows of the risks being underwritten, therefore, the major portion of their asset base comprises fixed income securities.

In some jurisdictions, laws require valuing fixed income investments at book value. This lessens the importance of market value changes.

Many regulators put maximum limits on asset allocations to risky assets (e.g. equity).

Paying claims to policyholders and maintaining company's financial strength are the major concerns for insurance companies. Some factors that directly affect the insurance businesses are:

- Risk-based capital measures
- Yield
- Liquidity
- Impending forced liquidation of assets to meet claims

##### 2. Pension Funds

Asset allocation for pension funds are subject to constraints (such as limiting allocation to certain asset classes), tax rules, and other accounting, reporting and funding restraints. A company operating in multiple jurisdictions must follow the rules and regulations of each jurisdiction.

### 3. Endowments and Foundations

The perpetual nature and controlled spending needs give endowments and foundations flexibility over payments from funds and ability to adopt higher-risk asset allocation. Two categories that influence asset allocation of endowments and foundations are:

- **Tax Incentives:** Some countries do not impose any minimum spending requirements; others provide tax benefits tied to certain minimum spending rules or may relax the spending requirements for investing in socially responsible stocks.
- **Credit Considerations:** As endowments and foundations typically support the balance sheet or borrowing abilities of some university or organization, therefore, lenders often place covenants to maintain certain minimum liquidity and balance sheet ratios.

### 4. Sovereign Wealth Funds

Sovereign wealth funds (SWF) vary with reference to their mission or objectives, though generally they are government-owned pools of capital invested on behalf of the people of their states.

Generally, their time-horizon is long-term, they have no known obligations, and these funds are subject to broad public scrutiny and constraints such as adopting lower risk asset allocation, cultural, religious factors, ESG (environmental, social & governance) considerations in addition to common constraints of asset-size, liquidity, time horizon, regulations etc.

Note: ESG goals are met by 'set aside' part of portfolio.

**Practice:** Example 4 from the CFA Institute's Curriculum.



## 6. ASSET ALLOCATION FOR THE TAXABLE INVESTOR AND AFTER-TAX PORTFOLIO OPTIMIZATION

In the real world, taxes on income and capital gains materially affect the returns achieved by taxable investors, therefore, it is judicious to consider after-tax characteristics during asset allocation.

Some factors that affect the tax efficiency of asset returns include:

- Contribution of interest,
- Dividends
- Realized or unrealized capital gains
- Jurisdictional rules (regarding how returns of certain assets are taxed)

Though tax rules vary across countries and/or change frequently within a country, some typical cohesions across many jurisdictions regarding how investment returns are taxed are:

- Interest income is taxed at progressively higher income tax rates in many countries.
- Typically, dividend income and capital gains are taxed at lower rate compared to interest income and earned income (salaries, wages).
- Capital losses usually offset capital gains.
- Entities and accounts can be subject to different tax rules (tax-deferred, tax exempt, taxable accounts), which give importance to 'strategic asset location', a strategy that

attempts to sort investments into diverse accounts to reduce overall tax cost.

### After-Tax Portfolio Optimization

After-tax portfolio optimization requires adjusting each asset class's expected returns and risk for expected tax.

- Expected after-tax return for bonds =  $r_{after\ tax} = r_{pre\ tax} - (1 - t)$
- Expected after-tax return for equity:  $= r_{after\ tax} = p_d r_{pre\ tax}(1 - t_{div}) + p_a r_{pt}(1 - t_{capital\ gain})$

$p_d$  &  $p_a$  are proportion of  $r_{pre\ tax}$  attributed to dividends & price appreciation respectively:

- When cost basis of assets is < its market value, taxable assets have unrealized capital gains and embedded tax liability is formed.
- When cost basis of assets is > its market value, taxable assets have unrealized capital losses and embedded tax assets are formed.

Three ways to adjust the current market value to reflect these changes (value of embedded tax liability or assets) are:

1. Subtract the value of the embedded capital gain tax from the market value as if it were sold today.

Approximate after tax value = Market value – capital gain tax

2. Assume the asset is sold in the future and discount the tax liability to its PV using the asset's after tax return as the discount rate.
3. Assume the asset is sold in the future and discount the tax liability to its PV using the asset's after tax risk-free rate.

**Note:** Goals-based investing allows more precise tax-adjustments

Taxes also affect the risk for each asset class measured in terms of standard deviation.

Expected after tax standard deviation =  $\sigma_{at} = \sigma_{pt}(1 - t)$   
Taxes reduce mean returns and standard deviation of returns. In many jurisdictions, capital losses can be offset against current or future capital gains

## 7. TAXES AND PORTFOLIO REBALANCING

### Taxes and Portfolio Rebalancing

Periodic portfolio rebalancing is an integral part of portfolio management for both taxable and tax exempt investors. However, taxable investors should take into account the trade-off between the benefits of maintaining the target asset allocation and reducing or deferring taxes.

Rebalancing range for taxable portfolio should be wider as compared to tax-exempt portfolio of a similar risk profile as broader range will reduce trading frequency and will result in taxable gain.

The equivalent rebalancing range for the taxable investor is derived by adjusting the pre-tax deviation by the tax rate.

$$\text{After-tax rebalancing range} = R_{at} = \frac{R_{pre\ tax}}{1 - tax}$$

For example,  $\pm 15\%$  rebalancing range of an asset class (30%-45%) for a tax-exempt investor becomes 18.75% for a taxable investor assuming the asset class is subject to 20% tax rate.

$$18.75\% = \frac{15\%}{1 - 0.2}$$

### Strategies to Reduce Tax Impact

To reduce tax cost other strategies include:

- **Tax-loss harvesting:** intentionally realizing capital losses to cancel out capital gains in other part of the portfolio.
- **Strategic tax location:** a tax minimizing strategy by locating less tax efficient assets in accounts with favorable tax treatment. Two types of account that offer tax benefits are:

- i. *Tax-exempt accounts* that require no tax adjustments to their market value.
- ii. *Tax-deferred accounts* that grow tax-free but are taxed upon distribution.

The optimization process should consider asset classes and asset accounts simultaneously.

For example, consider an investor whose portfolio is divided equally into two accounts: taxable and tax deferred account, and each account has three potential classes, the optimization process uses six different asset classes and derives optimal asset allocation and asset location instantaneously.

The optimization process uses the pre-tax returns and risk inputs for tax-deferred account and after-tax returns and risk inputs for taxable accounts.

### Applicable tax rate on a security determines where it should be located.

- Tax friendly assets (assets subject to lower tax rates) should be allocated to taxable accounts. Equities are generally located to taxable accounts because dividends and capital gains generally get favorable tax treatment.
- Assets subject to higher tax rates should be allocated to tax-deferred or tax-exempt accounts e.g. Bonds and frequently traded securities.

**Note:**

Investments held for short-term liquidity needs should be allocated to taxable accounts to avoid early withdrawals penalty tax.

**Practice:** Example 5 from the CFA Institute's Curriculum.



## 8. REVISING THE STRATEGIC ASSET ALLOCATION

A sound portfolio management involves re-examining periodically the asset owner's strategic asset allocation, even if his circumstances remain unchanged. All asset owners should affirm annually the suitability of their asset allocation given their needs and circumstances.

The circumstances that may initiate a special review of asset allocation policy are:

- i. Change in goals
- ii. Change in constraints
- iii. Change in beliefs

### i) Goals

**Change in goals** - Changes in individual's lifespan that may alter his asset-allocation strategy include:

- Getting married
- Having children
- Leaving/switching occupation
- Becoming physically challenged

Changes in institutional fund's lifespan that can impact the asset-allocation decision are:

- If economic changes are negatively affecting a firm that supports or benefits from a fund, there is need to re-examine the asset allocation decision of that fund.
- Due to major drop in enrollments, a university relying heavily on the endowment fund, to support its ongoing expenses.
- A pension fund requires to re-evaluate its existing asset allocation policy if the organization fails to consistently meet its pension obligation

### ii) Constraints

**Change in Constraints** - There is need to re-examine the existing asset allocation if material changes affect any constraints such as: liquidity, asset size, regulatory or other external constraints.

For example:

- A big check received by a foundation.

- A significant unanticipated expenditure.
- An individual received inheritance from a family member.
- A new government regulation mandates a change in the liability discount rate that may result in large pension contribution to the pension plan.

### iii) Beliefs

**Change in Beliefs** - Investment beliefs are set of rules that govern the investor's investment related actions.

At an institutional level, factors that may lead to change the institution's investing guidelines are:

- Change in economic conditions or capital market expectations
- Change in trustee or committee members

Material changes in the outlook of one or more asset classes can significantly affect their expected returns, volatilities and correlations, which are key inputs of the optimization process.

In certain circumstances, an asset allocation policy is reformed without comprehensive asset allocation analysis.

For example:

- pension plans adjust allocation as a result of changes in plan's funded status
- target date funds use glide-path and shift allocations (from equity to bonds) as target date reaches.

**Practice:** Example 6 from the CFA Institute's Curriculum.



## 9. SHORT-TERM SHIFTS IN ASSET ALLOCATION

1. *Strategic Asset allocation (SAA) or policy asset allocation*: Long-term allocation for asset-class weights as specified in an investor's IPS.
2. *Tactical Asset Allocation (TAA)*: short-term deviation from SAA.

**Characteristics of TAA** are as follows:

- Key objective is to increase risk-adjusted return by capturing temporary return opportunities regarding financial or economic market conditions.
- Assumes that investment returns are predictable in the short-run.
- Finding cyclical variations within a secular trend or short-term price changes in capital markets.
- Short-term adjustments to broad asset-classes, sectors or risk factor premiums rather than individual security selection.

**Common risk constraints:**

As TAA decisions are judged against the benchmark of the SAA, therefore, tactical deviations are developed relative to the strategic asset allocation and the size of these bets are often constrained by the IPS.

Most common risk constraints are:

- acceptable range around each asset class policy weights
- predicted tracking error budget versus range of targeted risk

**TAA Evaluation:**

There are number of ways to measure the success of TAA, some common ones are:

- i. Comparing the Sharpe ratios under TAA and SAA.
- ii. Comparing the information ratio or t-statistic of excess return of TAA portfolio and SAA portfolio.
- iii. Comparing the realized risk and return of TAA portfolio and the realized risk and return of portfolios along the SAA's efficient frontier. This approach better measures the risk-adjusted TAA return. TAA portfolio may have higher return or higher Sharpe ratio than the SAA portfolio but it might be less optimal than other portfolios on the efficient frontier.
- iv. Comparing the performance difference using the attribution analysis by evaluating the under/over weightings.

**TAA Drawbacks:**

- Higher trading costs and higher taxes (for taxable investors).
- Under or over-weighting of certain asset classes may result in higher concentrated risk compared to the policy portfolio.

**Approaches to TAA**

Two broad approaches to TAA are:

- *Discretionary TAA* that relies on qualitative analysis of political, economic and financial market conditions.
- *Systematic TAA* that relies on quantitative analysis to capture return anomalies that may be inconsistent with market efficiency.

### 1. Discretionary TAA

Discretionary TAA typically focuses on:

- asymmetric return distribution i.e. intending to enhance return in up markets and hedging or mitigating returns in down markets.
- skilled managers
- temporary market movements away from expected returns for various asset classes.

Short-term forecasts require number of inputs that provide relevant information about:

1. **Current and expected political, economic and financial market conditions.**  
Valuation measures (such as P/E, P/BV, Div. yield), term & credit spreads, central bank policy, GDP growth, earnings expectations, inflation expectations, leading economic indicators.
2. **Economic sentiment indicators**  
Consumer spending, level of optimism regarding economy and personal finances.
3. **Market sentiment**  
Sentiments of financial market participants. Three key indicators are:
  - **Margin Borrowing**  
This measure reveals the current level of bullishness and how more or less margin borrowing has consequences on future level of bullishness. Higher prices boost confidence and trigger more buying on margin that in turn spur higher prices. Growth rate in

borrowings should be considered in addition to level.

- **Short interest**  
Short interest indicates current as well as future bearish sentiment and a rising short interest ratio signifies extreme pessimism i.e. the market is at or near a low.
- **Volatility Index**  
Also known as fear index, indicates market expectations of near-term volatility. Volatility index measures the expected volatility of an index through the bid/ask quotations of the index options. Index rises(falls) when put (call) option buying increases.

Predictive measures for equities include: dividend yield, cash flow yield and Shiller's earning yield (based on average inflation-adjusted earning of previous 10-years).

- **Fixed Income:** Relative attractiveness of various fixed income markets is explored through yield-to-maturity and term premiums (yield in excess of the risk-free rate).
- **Commodities:** Carry in commodities compares roll yields (+ve is backwardation, -ve is contango) to determine which commodities to own or short.
- **Currencies:** Carry in currencies uses short-term interest rate gaps to determine which currency to overweight or underweight.

**Note:**

Different discretionary TAA approaches can use different data points with varying weights and involve qualitative interpretation of information.

**Trend Signals:** are widely used in systematic TAA in which asset classes or assets are ranked into positive or negative groups and are over or under weighted based on their 'Most recent prior 12-month trend' or 'Moving average cross-over'.

**2. Systematic TAA**

Systematic TAA captures asset class anomalies that have shown predictability and persistence historically. For example, value and momentum factors reveal some level of predictability for individual securities or within or across asset classes.

$$\text{Value Factor} = \frac{\text{return of value stocks}}{\text{return of growth stocks}}$$

$$\text{Momentum factor} = \frac{\text{return of stocks with higher prior returns}}{\text{return of stocks with lower prior returns}}$$

**Valuation signals:** Different asset classes have their own value signals.

- Most recent 12-month trend- is based on the expectation that the most recent 12-month returns will persist for the next 12-months.
- Moving average cross-over – compares moving average price of shorter time frame to moving average price of longer time frame. Upward (downward) trend is when the moving average of shorter time frame is above (below) the moving average of longer time frame.

**Practice:** Example 7 from the CFA Institute's Curriculum.



- **Equity Classes:** Valuation ratios have been used to predict variation in future equity returns.

**10. DEALING WITH BEHAVIORAL BIASES IN ASSET ALLOCATION**

Six behavioral biases common in asset allocation process are:

1. Loss Aversion
2. Illusion of Control
3. Mental Accounting
4. Representative Bias
5. Framing Bias
6. Availability Bias

Recognizing the existence of these behavioral biases and incorporating them into the investment decision-making process can produce better results.

**1. Loss Aversion**

- Loss aversion bias is an emotional bias which suggests that losses are significantly more powerful than gains as investors assign greater weights to negative outcomes.
- Loss aversion affects investor's ability to maintain their asset allocation when returns are negative.
- Loss averse investor measures risk relative to a 0% return (absolute base) rather than expected mean return.
- Goal-based investing alleviates loss-aversion bias by:

Funding high priority goals with less risky assets:

Segregating assets into sub-portfolios with assigned priorities. Funding high priority goals with less risky assets and using riskier assets to fund lower-priority and aspirational goals.

Framing risk in terms of shortfall probability:

Shortfall probability should be used for the asset allocation of these sub-portfolios to define risk. Shortfall probability is a probability that a portfolio will not attain the required return to meet the stated goal.

- In institutional investors, loss aversion can be observed in the form of herding behavior. For example, plan sponsors adopt asset allocation that is similar to their peers because such behavior minimizes reputation risk.

## 2. Illusion of Control

Illusion of control, is a cognitive bias, where individuals overestimate their ability to control events.

When investors believe that they have better information than the market and can control the outcomes, they end up trading too frequently or having concentrated portfolios.

Illusion of control combined with overconfidence bias or hindsight bias worsen the situation.

Some common behaviors attributed to this bias are:

- Alpha-seeking behaviors, frequent trading and tactical allocation shifts in an attempt at market timings. Investors who successfully predict a market reversal, believe that they can perform valuation correctly.
- Institutional investors who believe that their internal resources are superior and give them opportunity for active security selection or the selection of active investment managers.
- Excessive trading, above average use of leverage or short selling
- Reducing or eliminating asset classes based on non-consensus risk or return forecasts of one or few members of a committee, who believe that they have better information than the market.
- Concentrated positions that expose the portfolio to diversifiable risk.
- Investors who think that they have better information than others, inadequately diversify their portfolios or have concentrated portfolios with oversized exposures to one or two minor asset classes.

**Corrective Action:**

To help investors overcome illusion of control use global market portfolio as a starting point in developing the asset allocation. Global market portfolio is based on CAPM mean-variance framework and is considered to be a well-constructed benchmark for asset allocation. Deviations from this baseline portfolio should be subject to logically evaluated policies.

## 3. Mental Accounting

Mental accounting is an information-processing bias in which investors categorize assets and liabilities into arbitrary groups subjectively and the resultant asset allocation is often sub-optimal.

Goal-based investing incorporates mental accounting by linking each goal with a separate sub-portfolio.

Another common mental accounting issue with respect to asset allocation is '**Concentrated stock positions**', which is further reinforced by the '**Endowment Effect**'.

For example, entrepreneurs often retain a large portion of their wealth in single company that they found, which is more often the effect of psychological loyalty to that company though there may be rational reasons such as ownership control, tax considerations, information advantages etc.

**Corrective Action:**

To overcome this bias, assign concentrated assets to meet less important goals.

## 4. Representative Bias

Representative or recency bias is a tendency to give more weight to recent observations and information as compared to long-term observations and information.

Investors with recency bias end up having sub-optimal portfolios as they typically shift asset allocation in response to recent news/events or overweight asset classes that have performed well lately.

**Corrective Action:**

Objective asset allocation policy with pre-specified allowable ranges and strong governance framework with competent staff and well-documented investment beliefs can help overcome representative bias.

## 5. Framing Bias

Framing bias is an information processing bias in which a person's response is dependent on how the question is framed. In asset allocation, investor's choice is dependent on how the investment's risk and return are presented, e.g. gain/loss outlined in money terms versus percentages, investment risk presented in volatility (standard deviation) or tail risk.

Portfolio evaluation process is often performed using expected return with standard deviation. Some other risk measures helpful in some specific investments are:

- VaR is a probability based measure of minimum loss over some period.
- CVaR is the probability-weighted average of losses when the VaR threshold is breached.
- Shortfall probability is the probability of failing to meet a goal or liability.

Note: VaR and CVaR are Downside (tail) risk measures.

#### Corrective Action:

The best approach to scale down the effects of framing bias is to provide multiple perspectives on the risk/return trade-off by supplementing the traditional risk measures with additional measures such as shortfall probability and tail measures (e.g., VaR and CVaR).

### 6. Availability Bias

Availability bias is an information processing bias in which people estimate the probability of outcome based on how easily they can recall the outcome e.g., recent events or events that strongly influence investors.

For example, in 2008 financial crises, private equity investors faced a substantial liquidity squeeze due to falling value of their public investments coupled with commitments to contribute capital to private equity. These investors may have strong preference for liquid investments and may not prefer to invest in private equity again.

In asset allocation, two biases stem from availability biases are:

- Familiarity bias, in which investors tend to favor familiar over unfamiliar.
- Home bias – investors prefer investments of their home country and build less diversified portfolio.

#### Corrective Action:

Familiarity and home bias can be mitigated by:

- using the global portfolio as a starting point and all deviations must be considered after proper evaluation.
- avoiding comparison of investment returns or asset allocation decisions with others.

To moderate the effects of behavioral biases, the primary step is to incorporate strong governance structure in the asset allocation process. Other steps include, providing a full range of relevant information, stating investment goals clearly and committing to achieve those goals.

Six important features of effective investment governance are:

#### Effective Investment Governance

1. Clearly stated long-term and short-term investment objectives.
2. Allocation of rights and duties in the governance hierarchy based on their knowledge, expertise and designation.
3. Articulate procedures for developing and approving the IPS.
4. Articulate procedures for developing and approving the strategic asset allocation.
5. A reporting framework to monitor the performance for attaining the goals and objectives.
6. Periodic governance audits.

**Practice:** Example 8 from the CFA Institute's Curriculum.



**Practice:** End of Chapter Questions CFA Institute's Curriculum and FinQuiz Question-bank (Item-sets + Questions).

