



Pension Fund Management at the World Bank

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- **Background on World Bank Treasury**

- **Overview of World Bank Pension Fund**

- **Pension Fund Investment Framework**
 - **Governance Structure**
 - **Investment Policy**
 - **Investment Management**
 - **Risk Management**
 - **Performance Measurement**
 - **Accounting & Reporting**
 - **Information Technology**

- **US\$120-140 billion of investment management**
 - 85% managed internally
 - 15% managed externally
 - Full spectrum of assets, from fixed income (bonds) to private equity
 - Includes US\$20 billion of Pension Plan Assets

- **US\$20-40 billion borrowings per year**
 - Frequent international issuer with hundreds of transactions per year
 - Wide variety of products with different maturities, currencies, and structures

- **US\$25-50 billion derivative operations per year**
 - Variety of derivative products for risk management

Overview of WB Pension Fund



- Established in 1948
- Current fund size: USD 20 billion
- Membership: 15000 active staff, 9000 retirees
- Well-funded plan, with assets close to liabilities
- Investments in a wide range of asset classes including equities, bonds, real estate, hedge funds and private equity
- Investment activities overseen by Pension Finance Committee, and managed by qualified professional staff

Policy

HR Policy

- Pension plan design resulting in creation of contractual obligations or liabilities

Overall Policy

- Funded scheme ensures security of entitlement and sustainability

Funding Policy

- Contributions to a funded scheme have to be determined

Investment Policy

- Investment Policy devised for maximizing Plan wealth subject to risk constraints

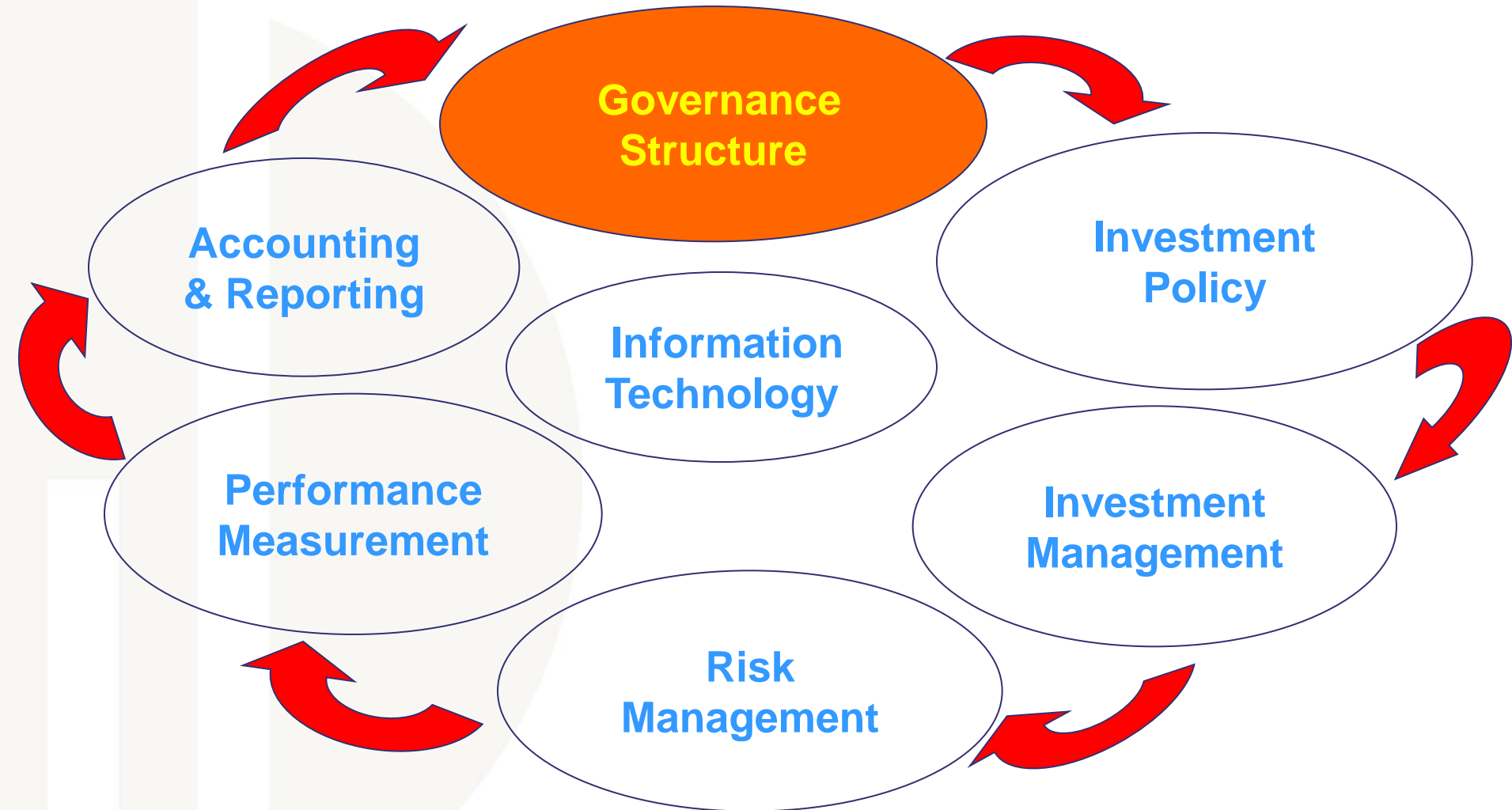
Employer
Pension
Scheme

Funded or Pay
as You Go
(PAYG)
Scheme

Contributions
Participants &
Employer

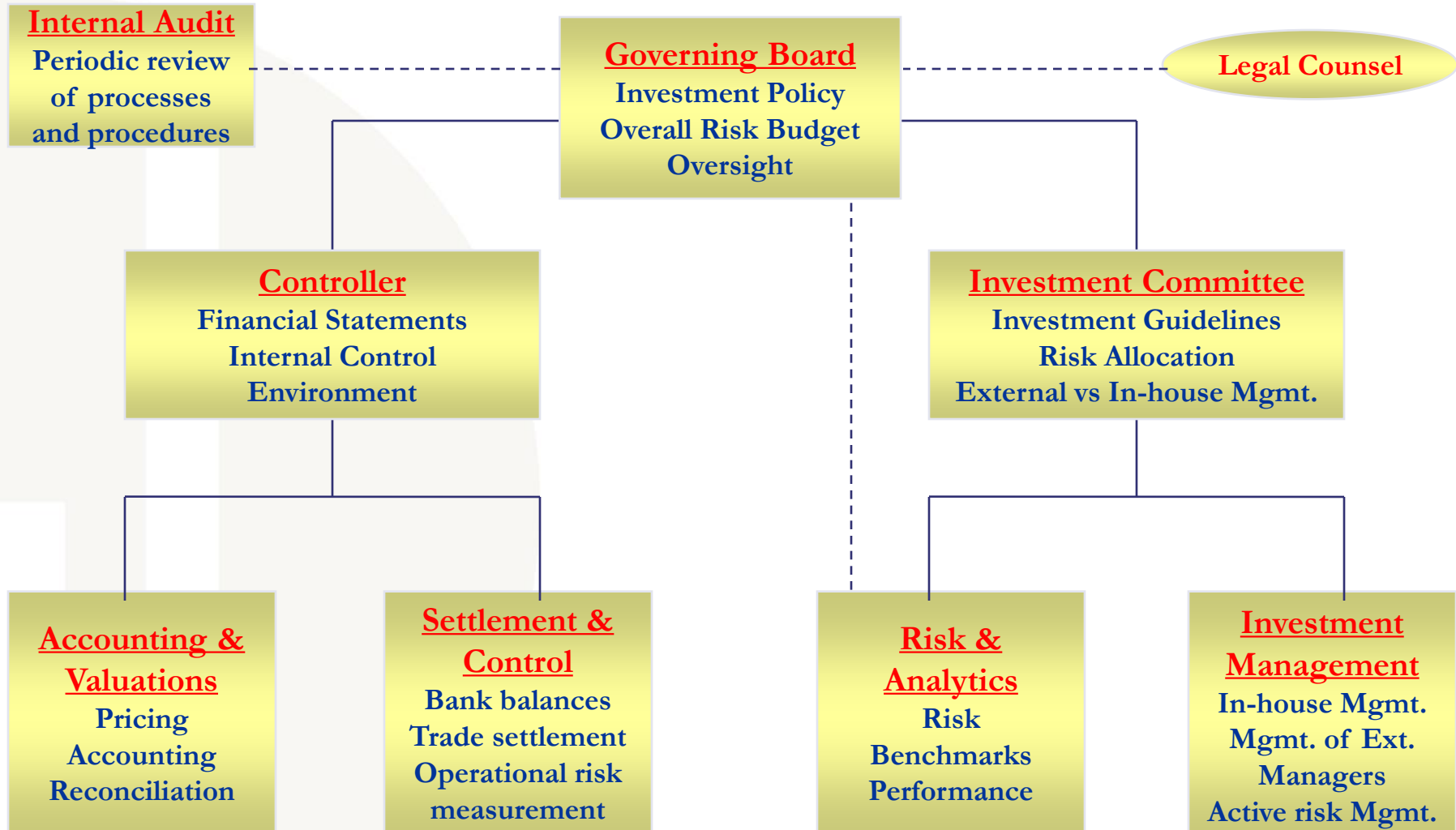
Investment
Process

- Overall goal is to build up and sustain a well-funded pension plan that can meet the contractual pension liabilities over time
- Ultimately, the pension benefit payments have to be met through some combination of contributions from the sponsor and investment returns on plan assets (*Funding Policy and Investment Policy*)
- Critical decision involves making the appropriate tradeoff between return and risk
- A very conservative investment policy could result in meager investment returns, and force the sponsor to make large contributions
- A very aggressive investment policy could make the fund vulnerable to adverse investment outcomes, and jeopardize the financial health and security of the plan



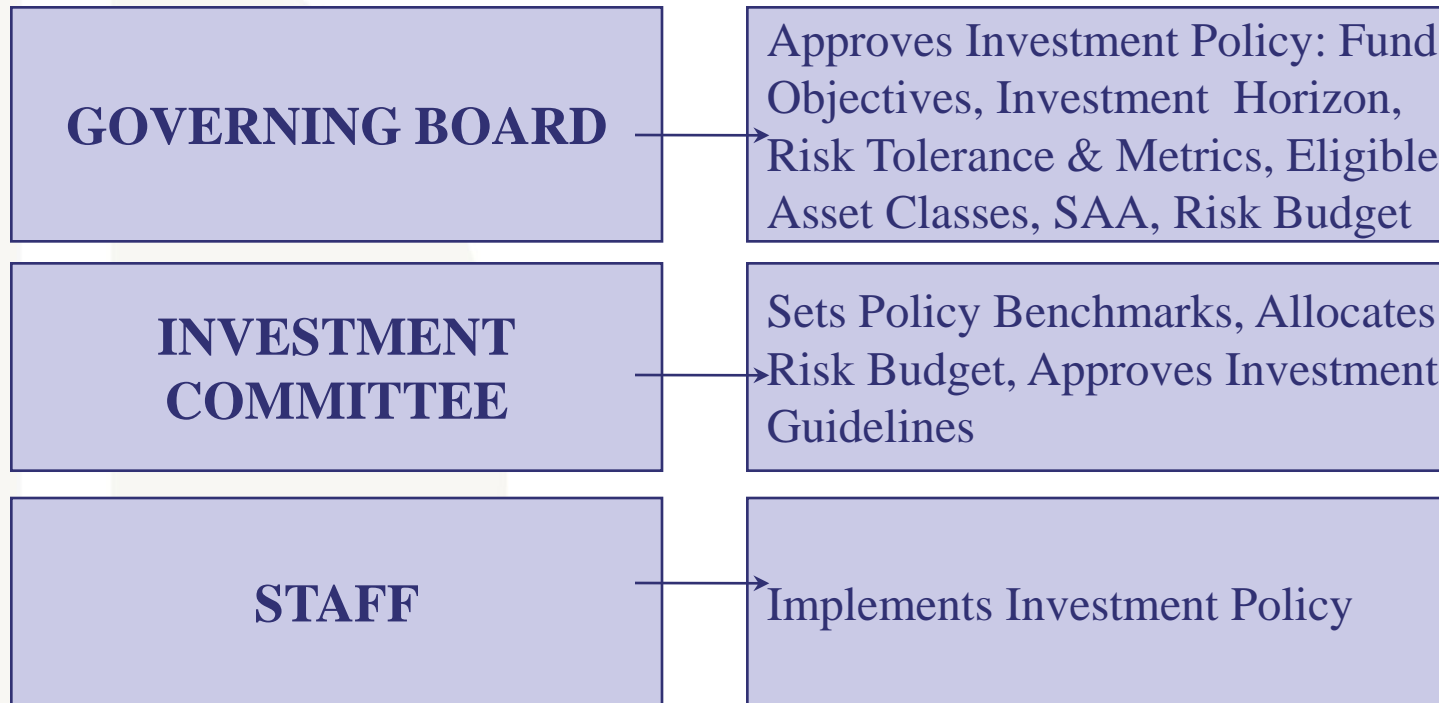
- **Good governance = Clear separation of roles and accountabilities;**
- **Every pension fund has a unique risk profile based on:**
 - **the liability characteristics of the Fund; and**
 - **the size of the Fund relative to its liabilities;**
- **Board should “own” the Fund’s risk profile (both SAA & Risk Budget), and should review it at regular intervals, as well as in response to structural changes (e.g. availability of new asset classes, demographic profile of beneficiaries, cash-flow needs, capacity of domestic markets, ability to hedge currency risk);**
- **Policy decisions need to be clearly articulated and documented;**
- **All other decisions should be delegated to levels where they can be made most effectively, together with enhanced controls which create accountability; and**
- **Risk usage, total return, and performance versus benchmarks, should be monitored and reported regularly with a focus on the Fund’s investment horizon;**

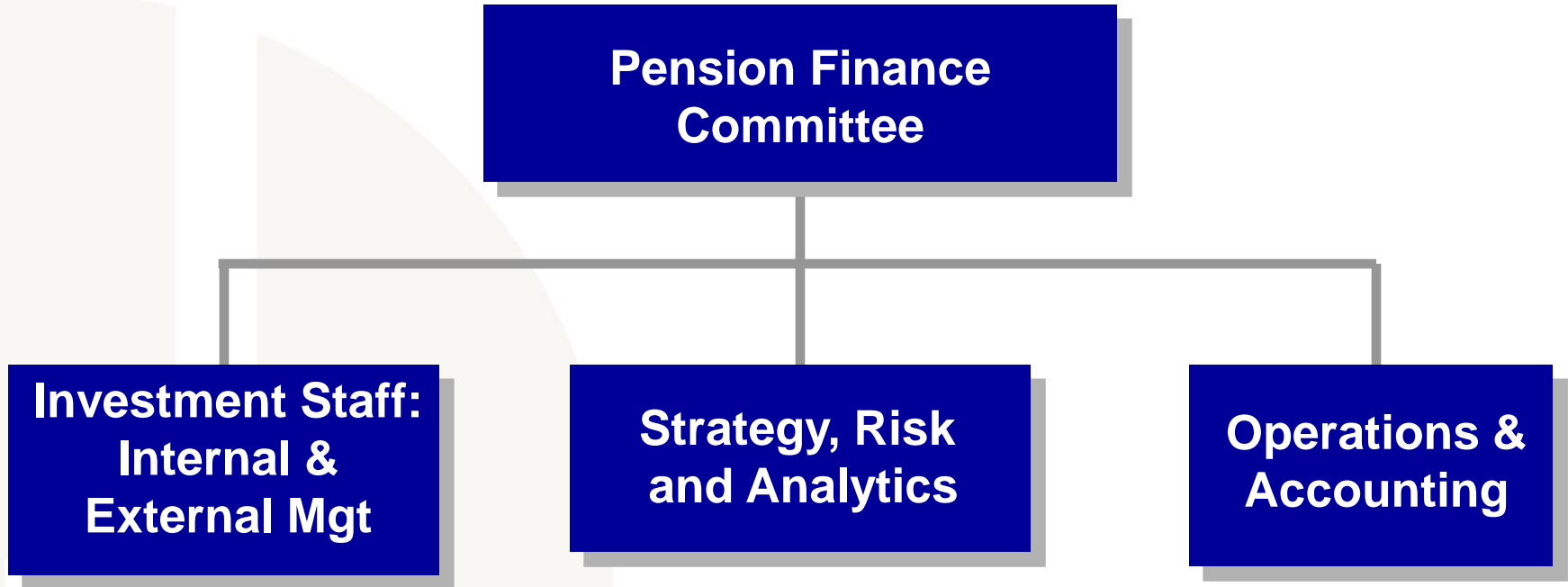
Organizational Structure



Range of required investment-related decisions

- Roles and responsibilities of oversight committee and staff
- Investment philosophy, objectives, investment horizon, and risk tolerance
- Investment policy
 - role of liabilities
 - asset class strategies
 - performance benchmarks
 - risk budget for active management
- Internal versus external management of the pension assets
- Portfolio construction and manager selection
- Engagement of auditors and custodian
- Frequency and content of reporting to – staff, management, investment committee, board, stakeholders
- Budget for investment management





Staff develop, recommend and implement asset allocation, investment management and other policies in a well segregated and specialized institutional environment

Significant delegation of decision-making to staff

- Continuing orientation and education of Board members, both individually and as a group
- Education ensures understanding of fiduciary responsibilities and scope of authority
- Participation by external “experts” in Board meetings as necessary, particularly when specialized topics are being presented by staff
- Ultimate objective is to facilitate the Board’s ability to make necessary decisions, and “own” these decisions

1. What are your Objectives?

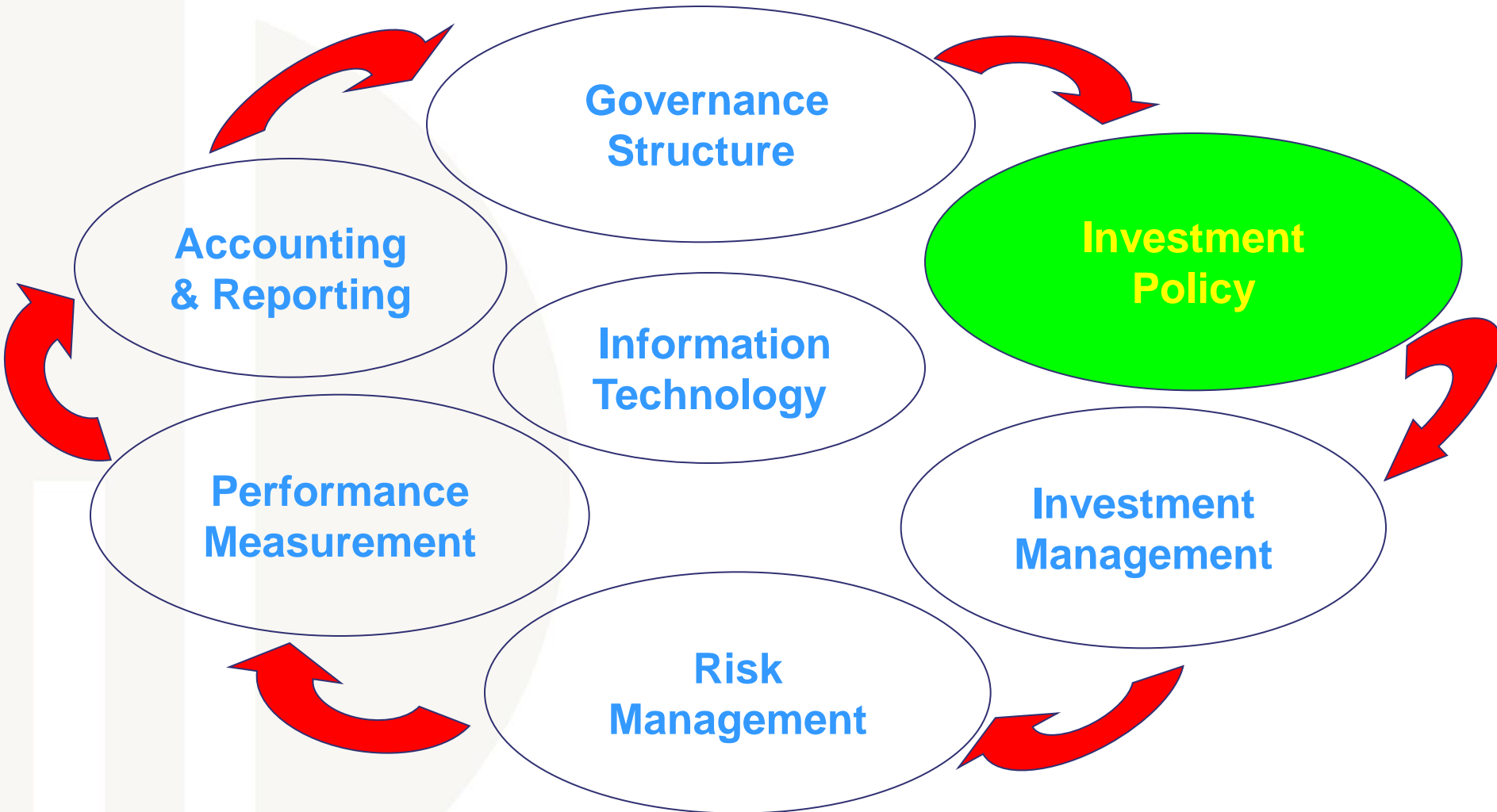
2. Who is your Audience?

**3. What
behavior change
are you
aiming for?**

**4. What Message(s) do
you want to Communicate?**

**5. What Channels can you
use to Communicate?**

6. How do you Measure and Evaluate Results?



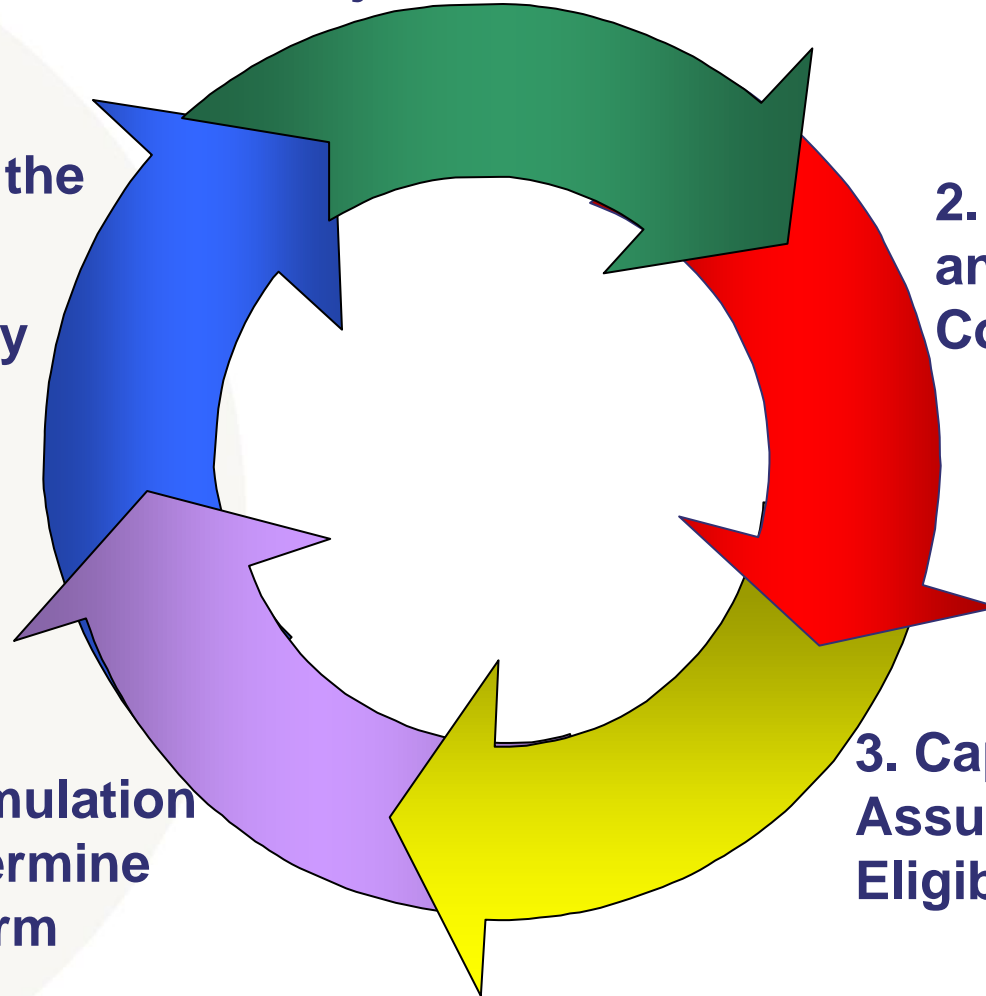
1. Fund Objectives and Investment Horizon

2. Risk Tolerance and Other Constraints

3. Capital Markets Assumptions and Eligible Asset Classes

4. SAA Model
Optimization/simulation methods to determine the best long-term allocation

5. Implementing the SAA
Setting the policy benchmark



Defined Benefit Pension Funds

- **Fund Objectives:**
 - Fund stream of cash outflows in cheapest possible way, given that:
 - cash inflows (e.g. contributions) can be controlled
 - cash outflows (e.g. benefit payments) uncertain and cannot easily be controlled or influenced
- **Investment Horizon:**
 - Typically fairly long, but may be affected by regulatory and accounting factors
- **Risk Tolerance:**
 - Moderate to High, but can vary depending on funded status and demographic profile of beneficiaries

Defined Contribution Pension Funds

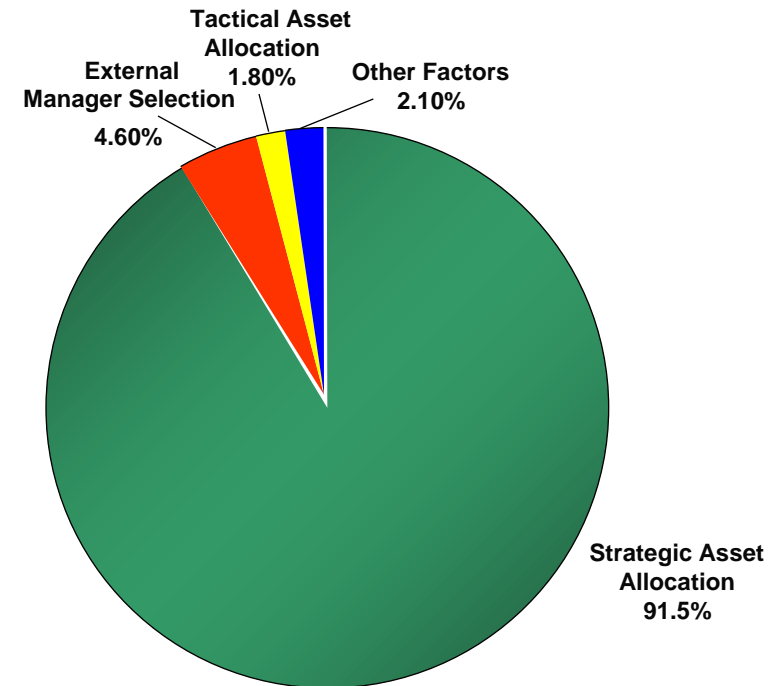
- **Fund Objectives:**
 - Create stable and sufficient retirement income, given that:
 - cash inflows (e.g. contributions) are known
 - cash outflows (e.g. required income in retirement) relatively more uncertain
- **Investment Horizon:**
 - Typically fairly long, but depends on age of individual
- **Risk Tolerance:**
 - Low, Moderate, or High, depending on age and retirement goals of individual

“The process by which an institution determines the appropriate *neutral* asset allocation to achieve its *long-term* investment objectives”

- *SAA is neutral (should not be driven by short-term market views)*
- Objectives are *long-term* and can be varied (help meet certain future payment obligations or liabilities, preserve and grow capital etc.)
- SAA should be reviewed periodically (conditions can change, both internal and external)
- Essentially involves trade-off between return and risk
- Typically SAA seeks to maximize return subject to a set of risk constraints
- *Pension SAA should be liability driven*

Strategic asset allocation is the key driver of long-term investment success:

- defines the overall return-risk profile of the portfolio
- ranks high in the hierarchy of investment decisions
- needs to be owned at the highest level



Source: Brinson, Hood & Beebower. "Determinants of Portfolio Performance" Financial Analysts Journal. May/June 1991.

- Maintain and grow the plan surplus, which is the difference between the value of assets and liabilities
- Maintain and grow the funded ratio, which is the ratio of assets to liabilities
- Liabilities are the key to definition of pension plan investment objectives
- Critical to understand the nature of liabilities (e.g., are they indexed to inflation, etc.) and how they are valued

Measuring Liabilities

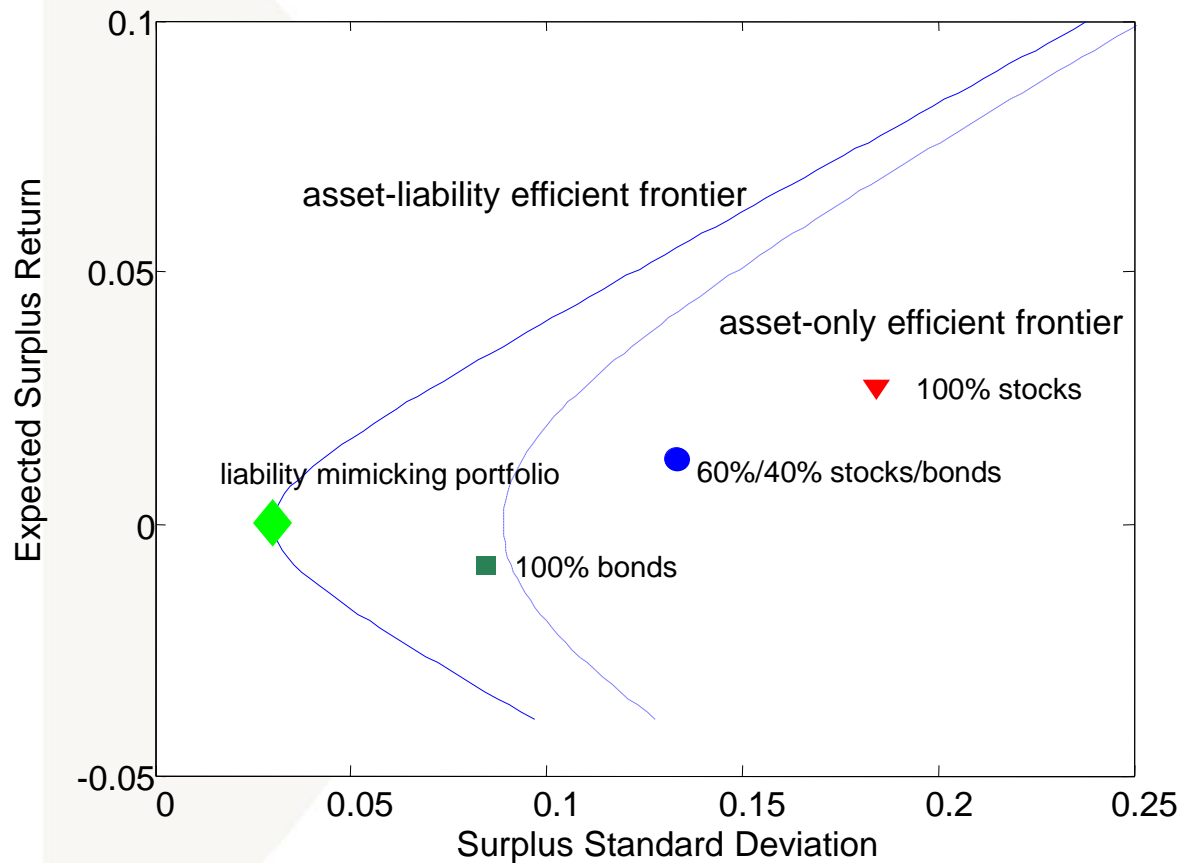
Liabilities are the present value of benefit payments and can be valued using different assumptions and measures

| | Past Service | Future Service | Salary Increase | New Entrants |
|--------------|--------------|----------------|-----------------|--------------|
| ABO | ✓ | | | |
| PBO | ✓ | | ✓ | |
| Closed Group | ✓ | ✓ | ✓ | |
| Open Group | ✓ | ✓ | ✓ | ✓ |

Define key actuarial assumptions such as mortality, termination rates, cost-of-living increases in pensions, investment return, inflation

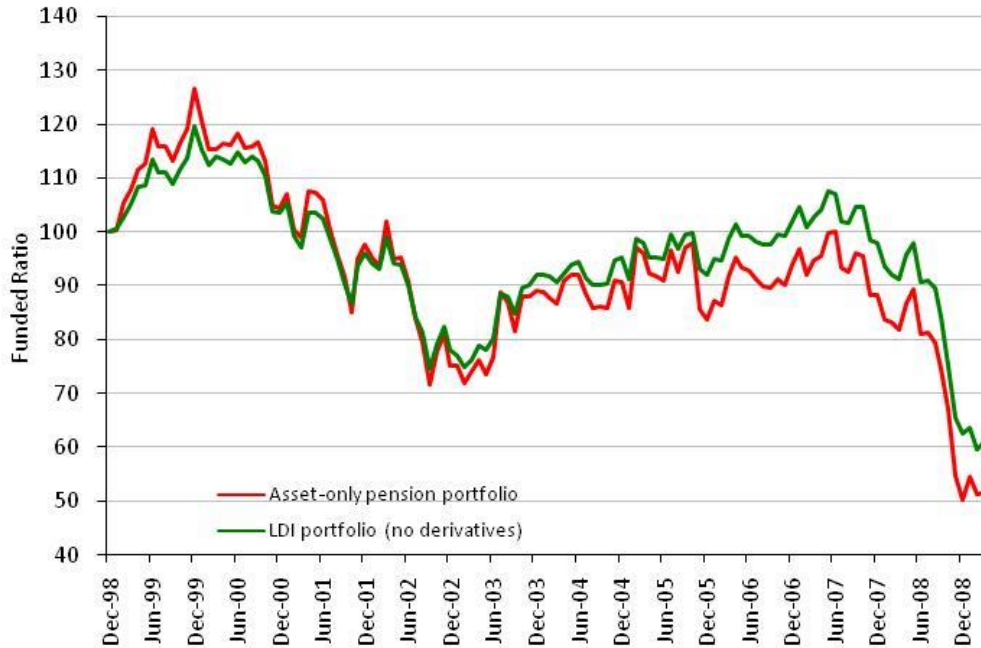
Asset-only versus asset-liability approach

- Portfolios should be constructed on an asset-liability basis
 - Correlations between assets and liabilities matter



Illustrative back-test – liabilities matter

Impact of Fixed Income duration on the Funded Ratio



Asset-only Pension Portfolio

Allocation

| | |
|-----------------------------|-----|
| US Equity | 35% |
| International Equity | 15% |
| Lehman Global Agg. (Hedged) | 40% |
| Real Estate | 10% |

Surplus return -7.1%

Surplus volatility 17.8%

Asset-only volatility 9.5%

LDI Portfolio

Allocation

| | |
|------------------------------|-----|
| US Equity | 35% |
| International Equity | 15% |
| Long maturity Treasury Bonds | 40% |
| Real Estate | 10% |

Surplus return -5.3%

Surplus volatility 13.1%

Asset-only volatility 10.6%

Source: Ryan Labs Liabilities Index, Bloomberg and World Bank Treasury calculations.

Determinants of Institutional Risk Tolerance

Risk Tolerance



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graph TD; RT([Risk Tolerance]) <--> SF[Sponsor Financial Strength]; RT <--> IH[Investment Horizon]; RT <--> FS[Funded Status];
```

Sponsor Financial Strength

- Size of the plan relative to the sponsor
- Financial health of the sponsor

Stronger sponsor implies a higher ability to take risk

Investment Horizon

- Net cash flow profile of the plan
- Demographics of the plan

A longer investment horizon implies a higher ability to take risk

Funded Status

Funded ratio of the plan on mark to market basis

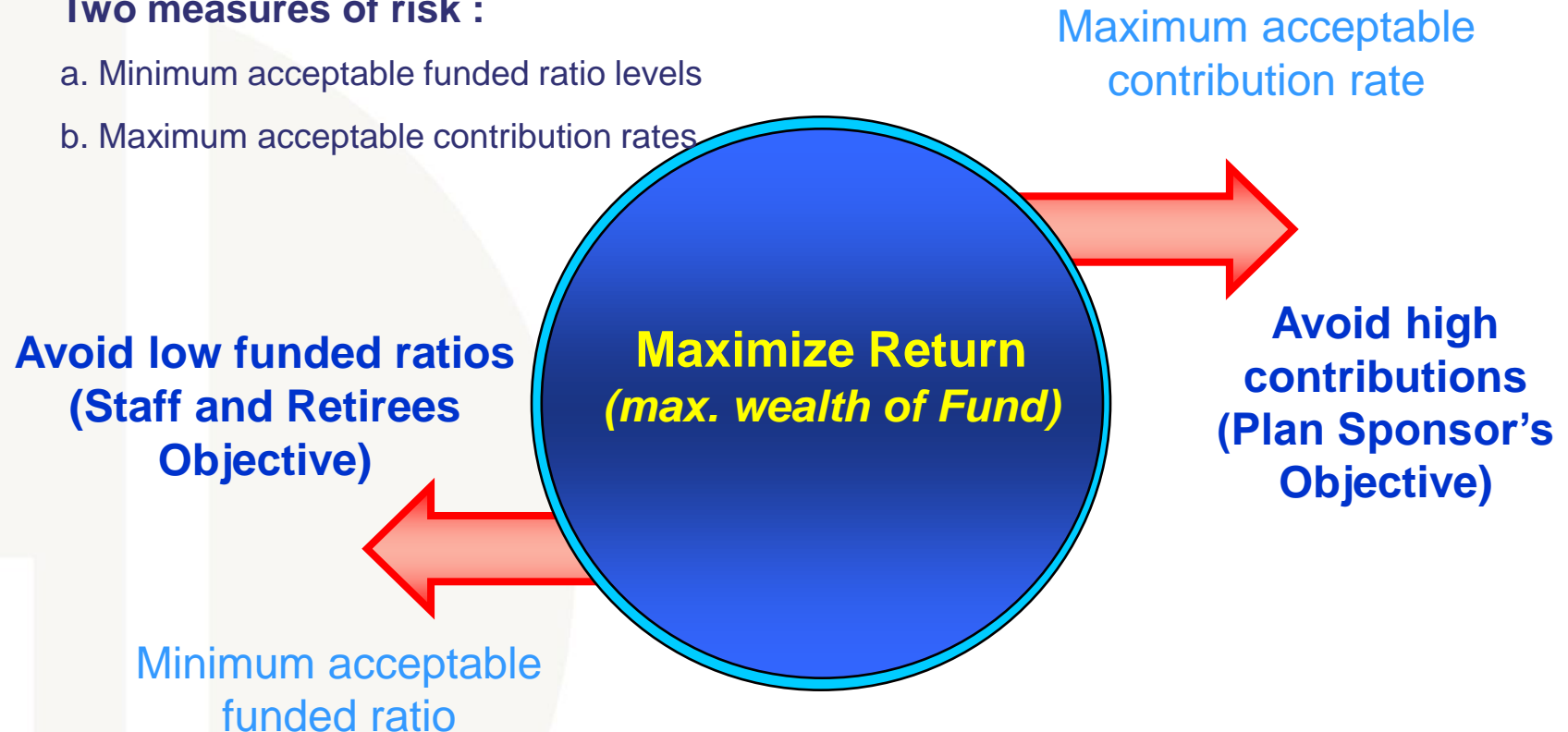
A higher funded ratio implies a higher ability to take risk

Typical Risk Constraints



Two measures of risk :

- a. Minimum acceptable funded ratio levels
- b. Maximum acceptable contribution rates



I. Liquidity Risk

The risk that assets cannot be *converted into cash* in a timely manner or incurring reasonable transaction costs in order to meet any and all forecasted and unpredicted cash flows

II. Market Risk

Potential *change in market value* of assets due to:

- interest rate changes (interest rate risk)
- change in spread to an underlying security (spread risk)
- change in expectations of future earning potential (equity risk)

III. Credit Risk

The risk of *default* on an obligation by the counter-party

Evaluating Eligible Asset Classes

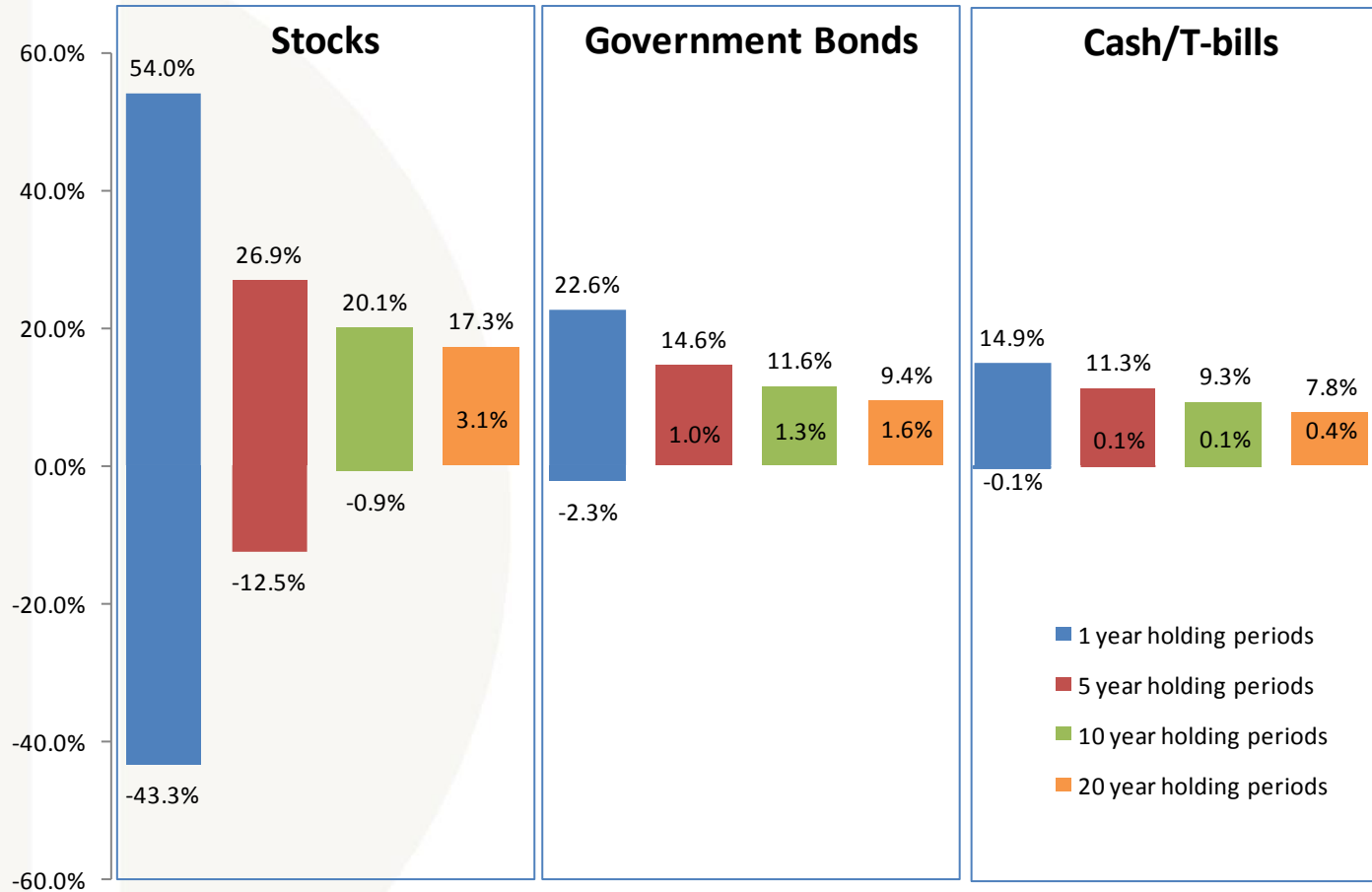


| | Liquidity Risk* | Market Risk* | Credit Risk* | Total Risk Score |
|--|-----------------|--------------|--------------|------------------|
| Government Bonds (Dev. Mkt.) | L | L | L | L |
| Agency Bonds/MBS | L/M | L/M | L | L/M |
| ABS/CMBS | M | M | M | M |
| Corporate Inv. Grade | M/H | M | M | M |
| Equities (Dev. Mkt.) | L | H | M/H | M/H |
| Emerging Market Debt | H | H | H | H |
| Corporate High Yield (junk bonds) | H | H | H | H |
| Emerging Market Equity | H | H | H | H |
| Private Equity | H | H | H | H |
| Real Estate | H | H | H | H |
| Hedge Funds | H | H | H | H |

*L = Low, M = Moderate, H = High

Risk-Return Profile of Different Asset Classes

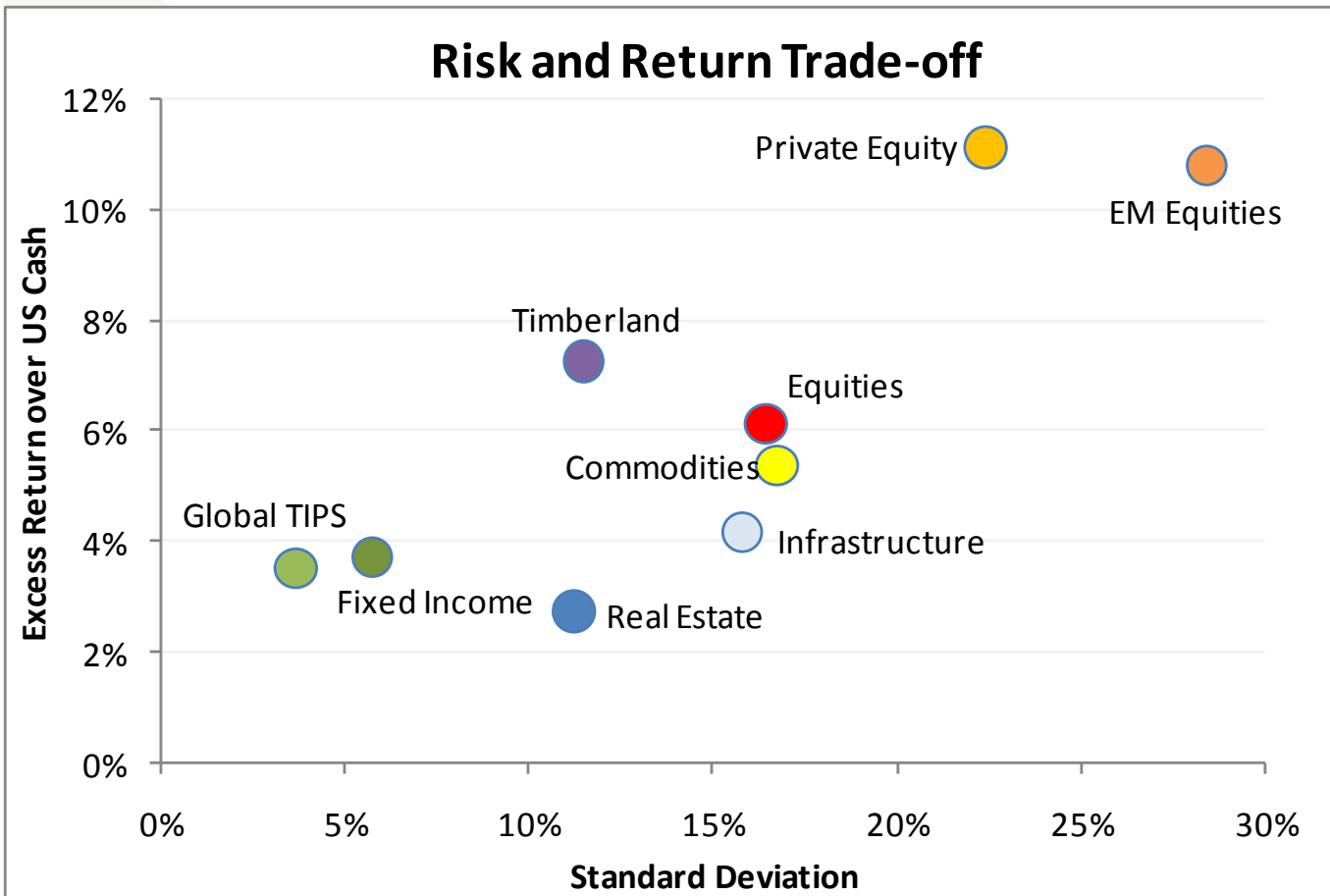
Historical performance of US asset classes (1926-2010): Maximum and Minimum Returns



- **Stocks are much more volatile than bonds or cash investments, especially over short horizons, but can produce higher returns over the long run**

Risk-Return Profile of Different Asset Classes

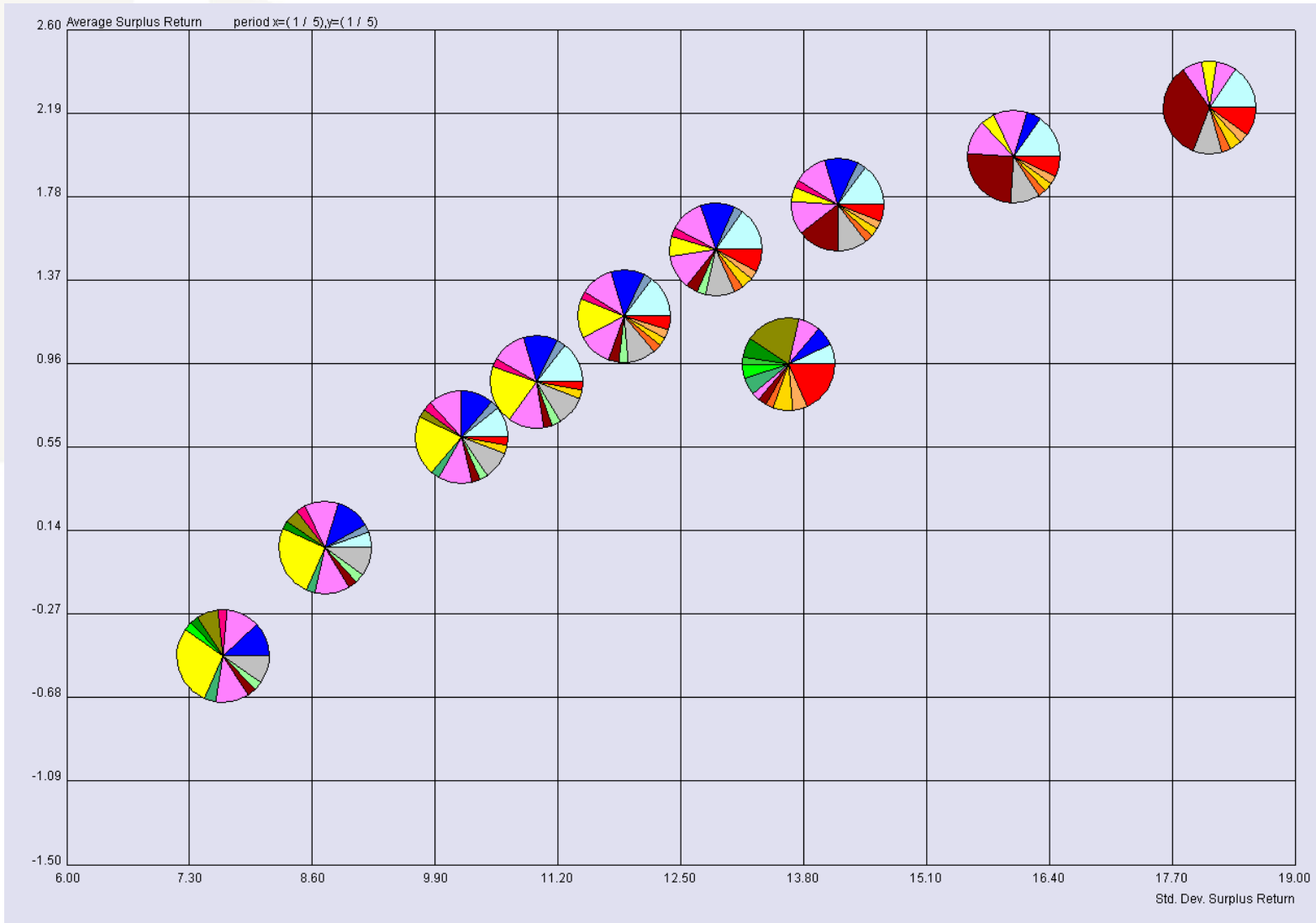
Asset classes are typically evaluated in terms of risk (measured by volatility) and expected return



Historical returns based on quarterly data from 1990 to 2010

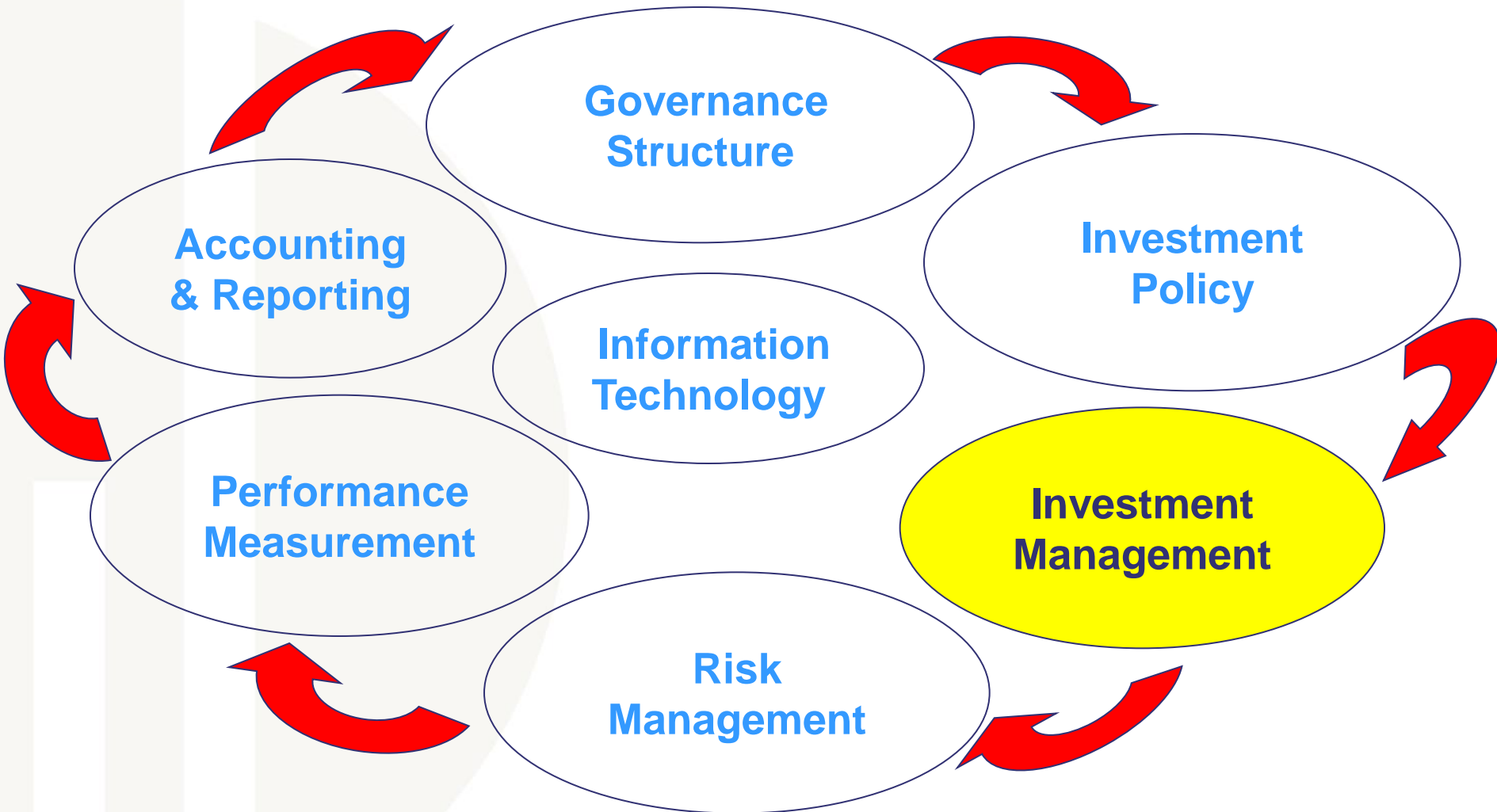
Risk and Return: Efficient Frontier

Expected return versus volatility over next 5 years



Strategic Asset Allocation (SAA) is set by the Pension Finance Committee (PFC) every three years

- We use an *Asset Liability model* to generate multiple future economic scenarios based on asset class risk/return assumptions
- We evaluate different SAA allocations over these scenarios and determine funded ratios and contribution rates under each scenario
- We identify the SAA that meets the PFC's risk criteria and maximizes the Plan's wealth
- We then establish an appropriate benchmark for each of the asset classes in the SAA, which results in a “benchmark” portfolio



■ Benchmark portfolio represents:

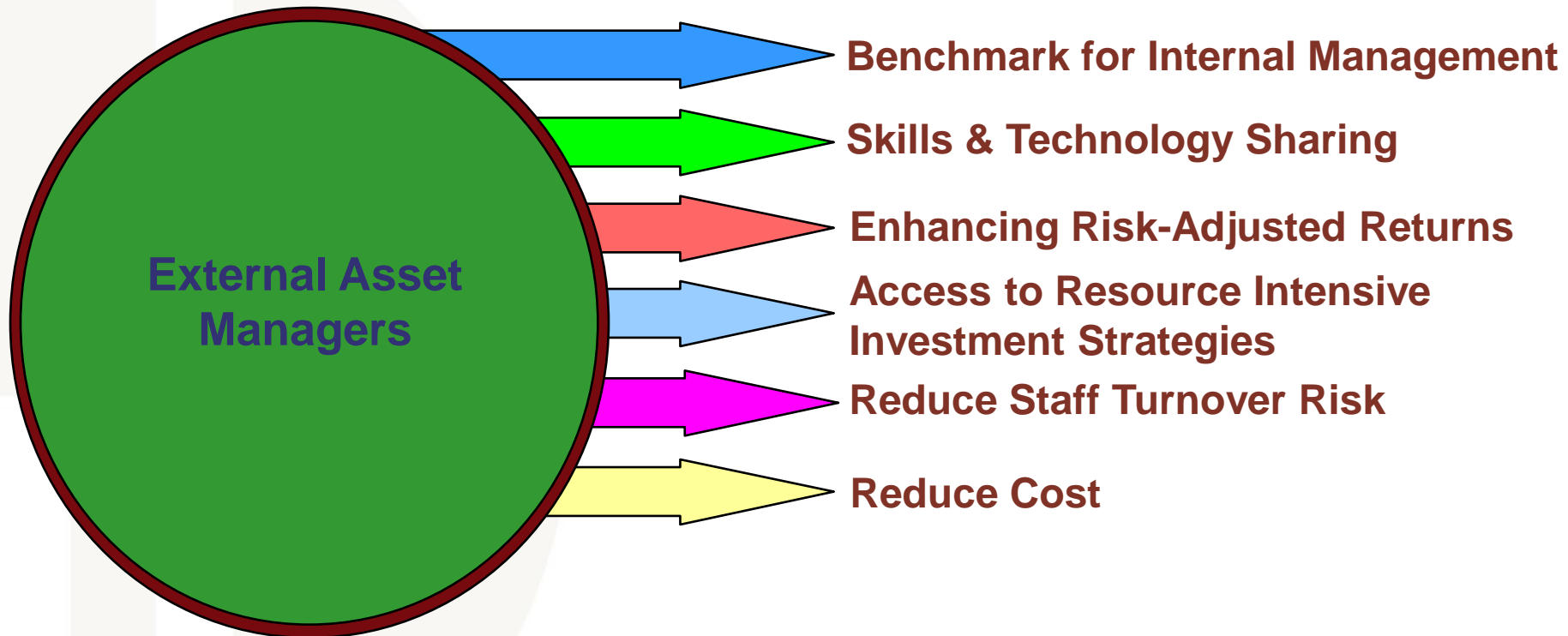
- the “practical” strategic asset allocation
- optimal and feasible portfolio
- reference portfolio to assess added value from active investment management

■ Investment Management may involve:

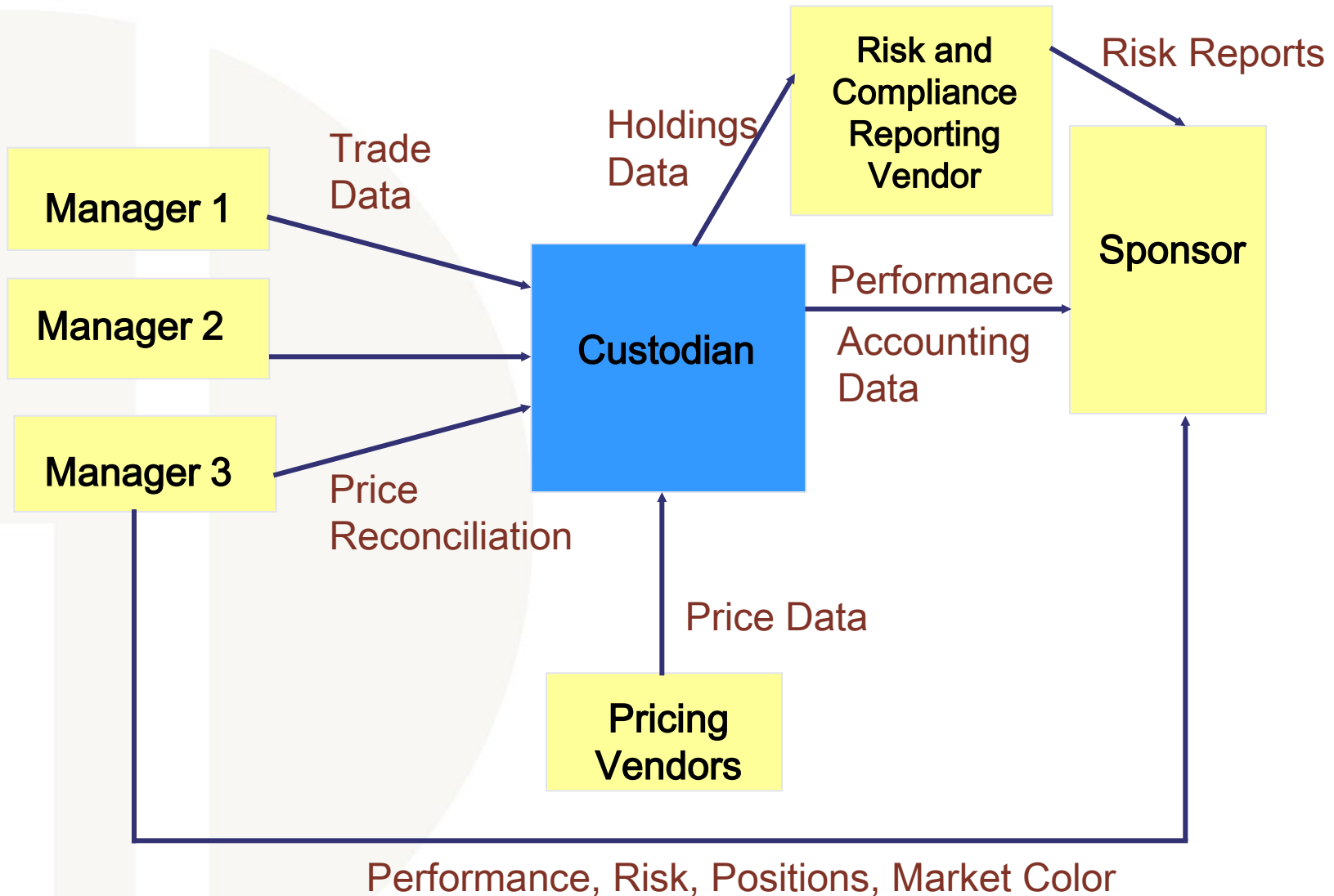
- just a replication of the benchmark (**passive management** or ‘**indexing**’), or
- tactical deviations from benchmark to implement market views with the objective of outperforming the benchmark (**active management**), or
- an intermediate strategy focusing mostly on profiting, within defined risk limits, from arbitrage opportunities thrown up by short-term market conditions (‘**enhanced indexing**’)

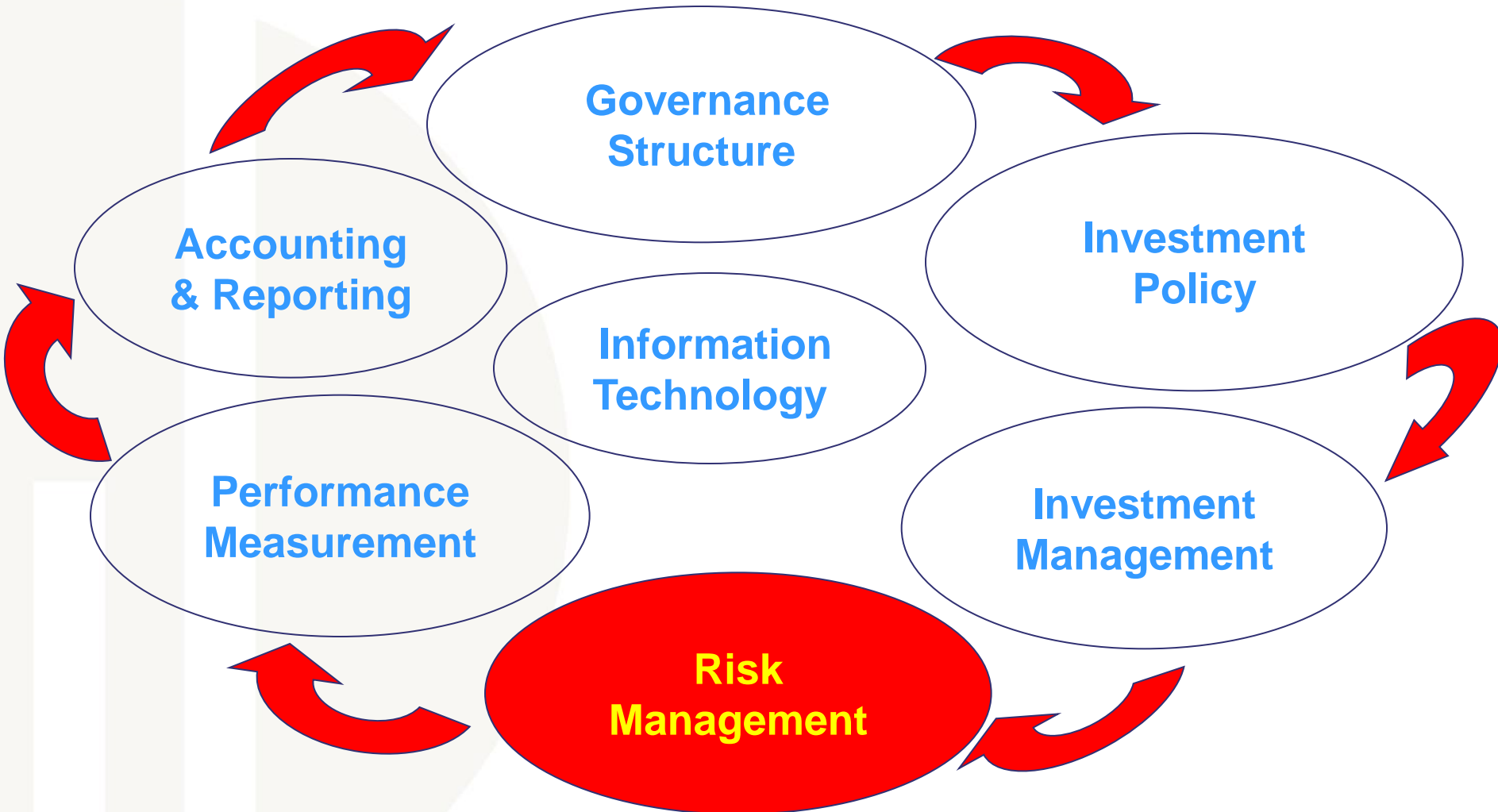
Investment Management Styles: Key Elements

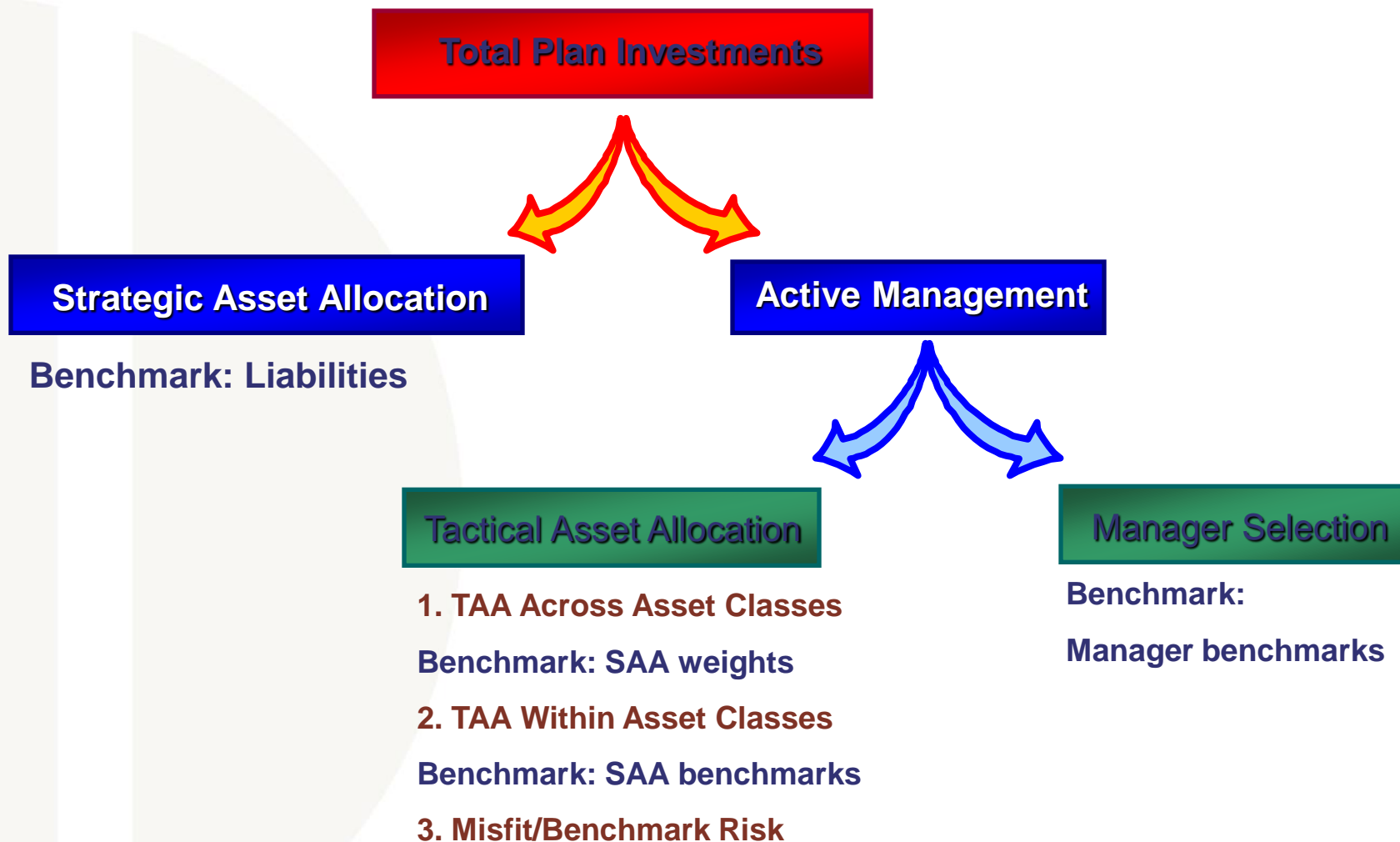
| | Passive Management | Enhanced Indexing | Active Management |
|-----------------------|---|--|--|
| Investment Style | Benchmark Replication | Arbitrage based | Taking Market Views |
| Excess Returns | Low | Moderate | Volatile |
| Risks | Low | Moderate | High |
| Risk Management | Compliance | Basic | Complex |
| Staffing Implications | No Investment Manager Discretion | Investment Managers engaged in market | Investment Managers 100% market focused |



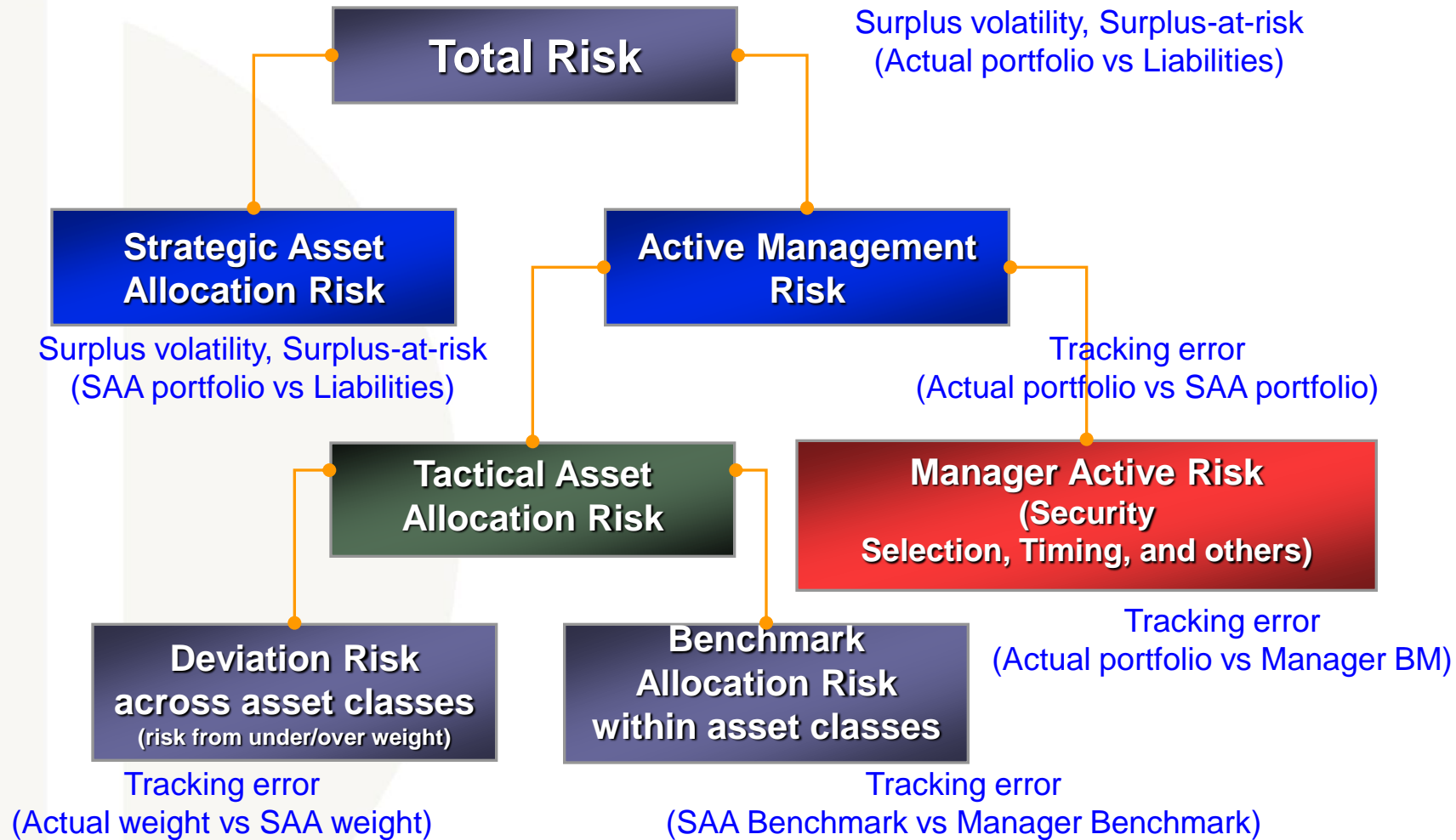
Ongoing Monitoring of Monthly Data Flows







Risk Structure should reflect Governance Structure



Risk structure should reflect governance and responsibility structure of organization (which decision incurs what risk)

II. Risk Attribution

Where does our risk come from?

Which decisions contributed to risk?



I. Risk Measurement

What is our risk?

How do we measure our risk?

III. Risk Allocation

How do we utilize and manage risk going forward?

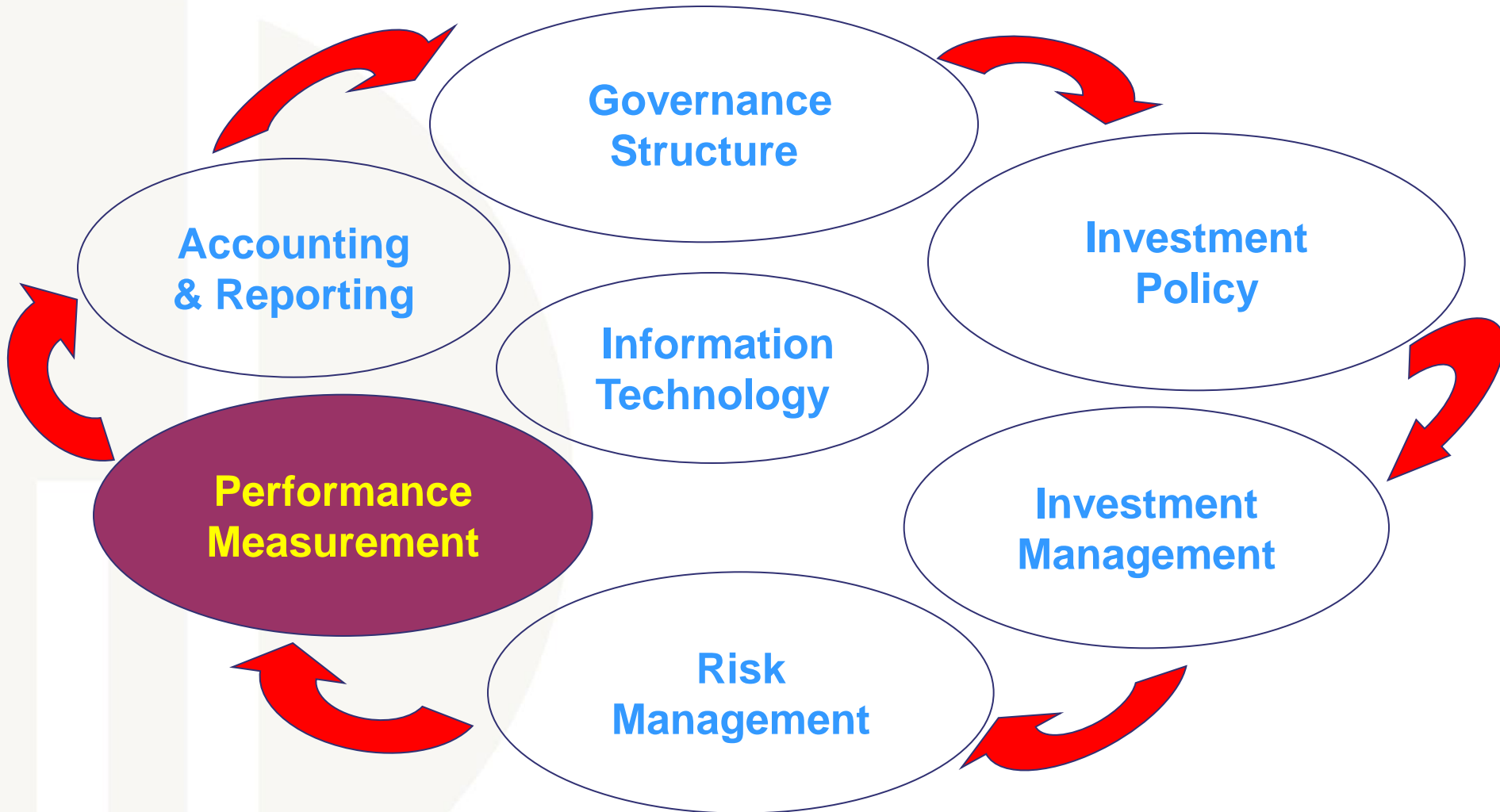
How do we want to allocate risk?

Sample Risk Measurement Report

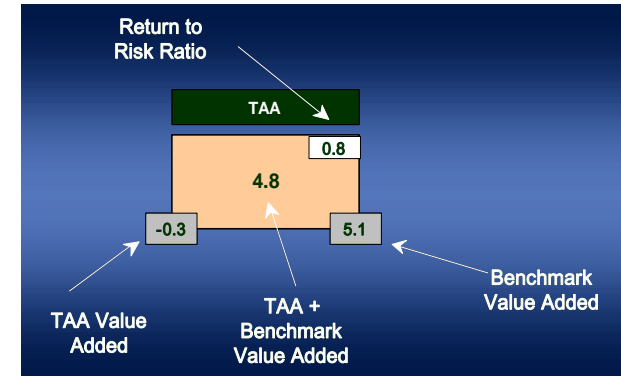
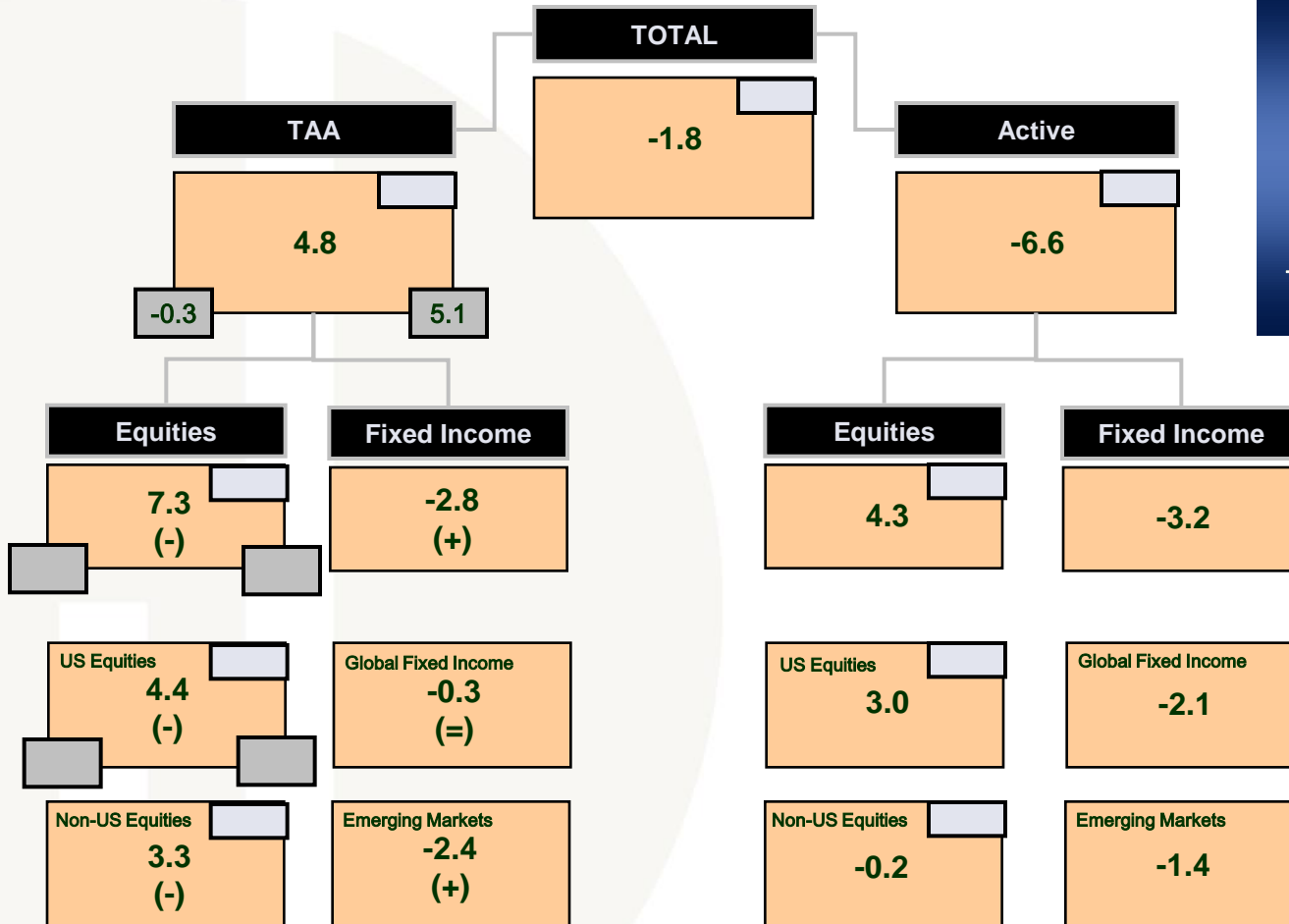
Risk at Asset Class Level

| Asset Classes | EMV Million USD | Policy % | Actual % | TAA Bet | Annualized (in bps) | | | Annualized (in bps) | | | | |
|----------------------------------|--------------------|-------------|-------------|------------|---------------------------------------|--|-------------|---------------------|------------|-----------|--------------|---------------|
| | | | | | Total Absolute Risk (Std. Dev.) | Policy Absolute Risk (Std. Dev.) | Total TE | Total Alpha | IR | TAA TE | Misfit TE | Manager TE |
| US Equities | 2164.46 | 23.0% | 23.0% | 0.0% | 434 | 439 | 10 | 25 | 2.4 | 0 | 6 | 12 |
| NUS Equities | 1586.63 | 16.7% | 16.9% | 0.1% | 285 | 287 | 25 | 68 | 2.8 | 2 | 2 | 25 |
| EM Equities | 196.12 | 2.1% | 2.1% | 0.0% | 55 | 50 | 9 | 5 | -0.6 | 0 | 0 | 9 |
| Hedge Funds | 527.43 | 5.6% | 5.6% | 0.0% | 16 | 3 | 15 | -1 | -0.1 | 0 | 0 | 15 |
| HY | 0.90 | 0.0% | 0.0% | 0.0% | 0 | 0 | 0 | 0 | 0.6 | 0 | 0 | 0 |
| EMFI | 68.53 | 0.0% | 0.7% | 0.7% | 10 | 0 | 10 | 13 | 1.3 | 9 | 0 | 4 |
| USFI | 1176.51 | 13.5% | 12.5% | -1.0% | 39 | 45 | 9 | 4 | -0.5 | 3 | 0 | 7 |
| Global FI | 1143.49 | 12.8% | 12.2% | -0.7% | 37 | 34 | 10 | 4 | 0.4 | 2 | 0 | 11 |
| Currency | 1004.75 | 11.0% | 11.0% | 0.0% | 36 | 39 | 7 | 4 | 0.6 | 0 | 0 | 7 |
| TOTAL PORTFOLIO | 9,408.25 | 100% | 100% | 0% | 750 | 742 | 79 | 191 | 2.4 | 11 | 6 | 78 |
| Risk under No Correlation | | | | | 535 | 544 | 73 | | | 10 | 6 | 73 |

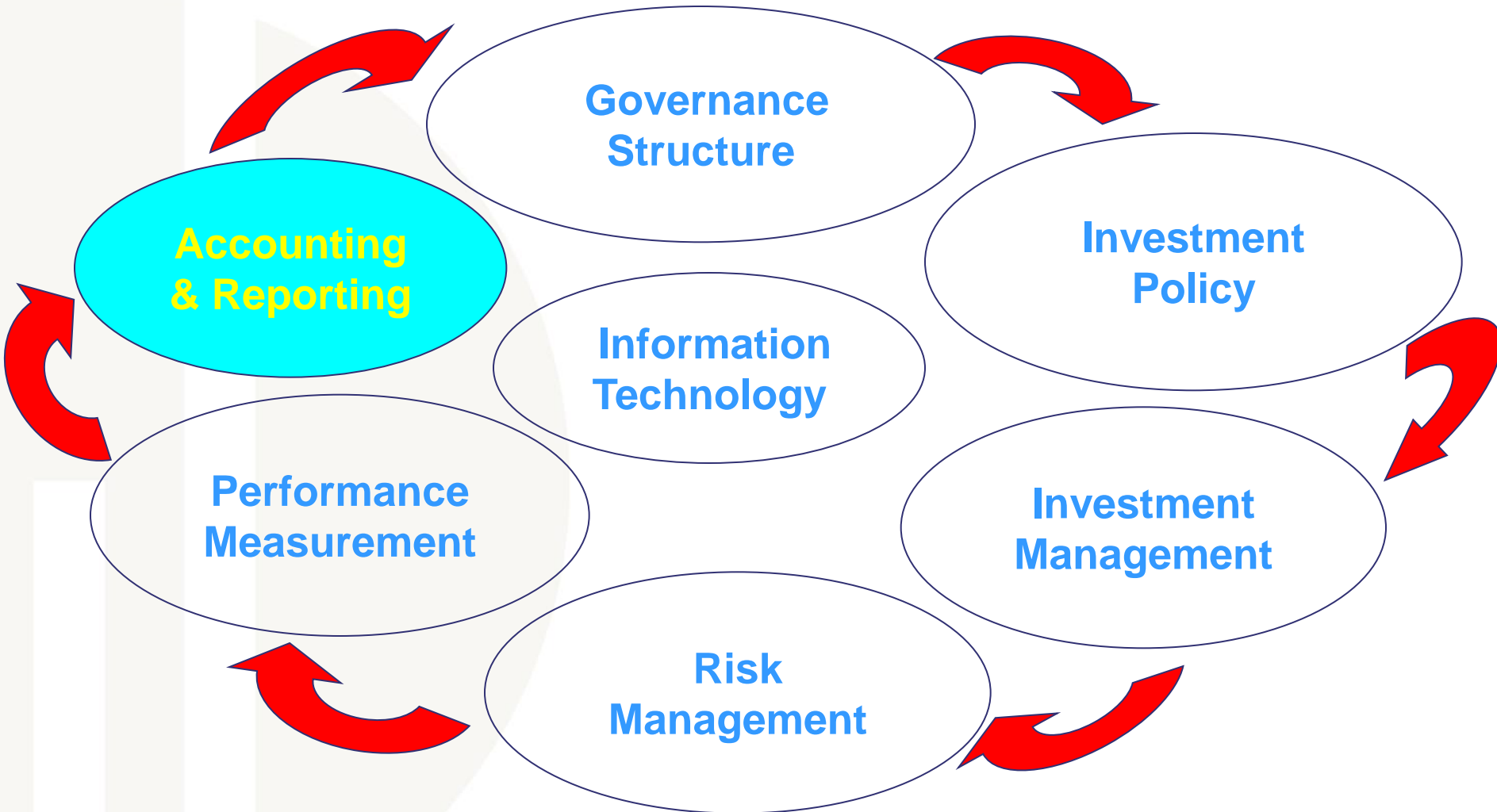
Calculations Based on Historical Data from ... to ...

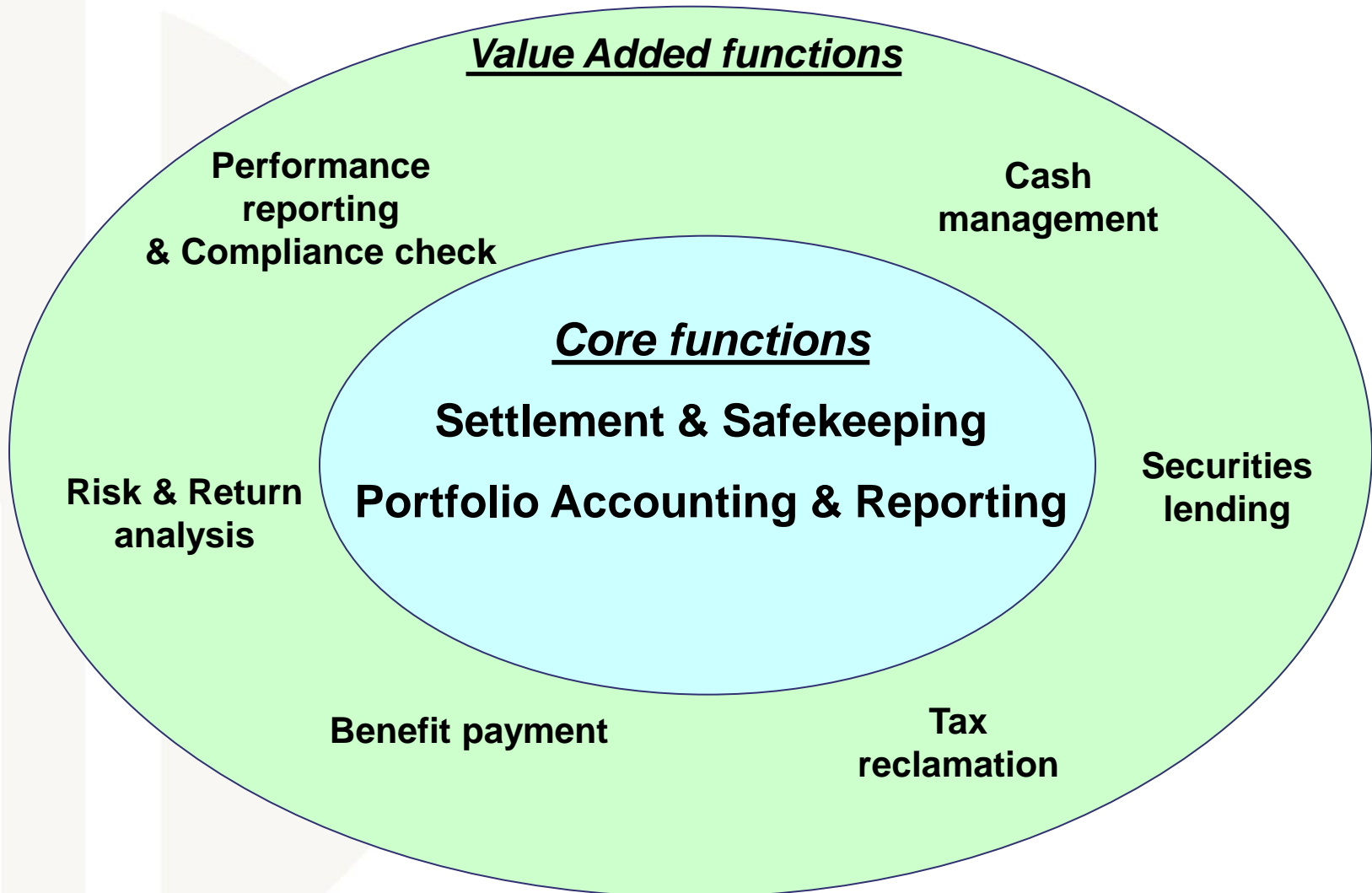


Sample Performance Attribution Report

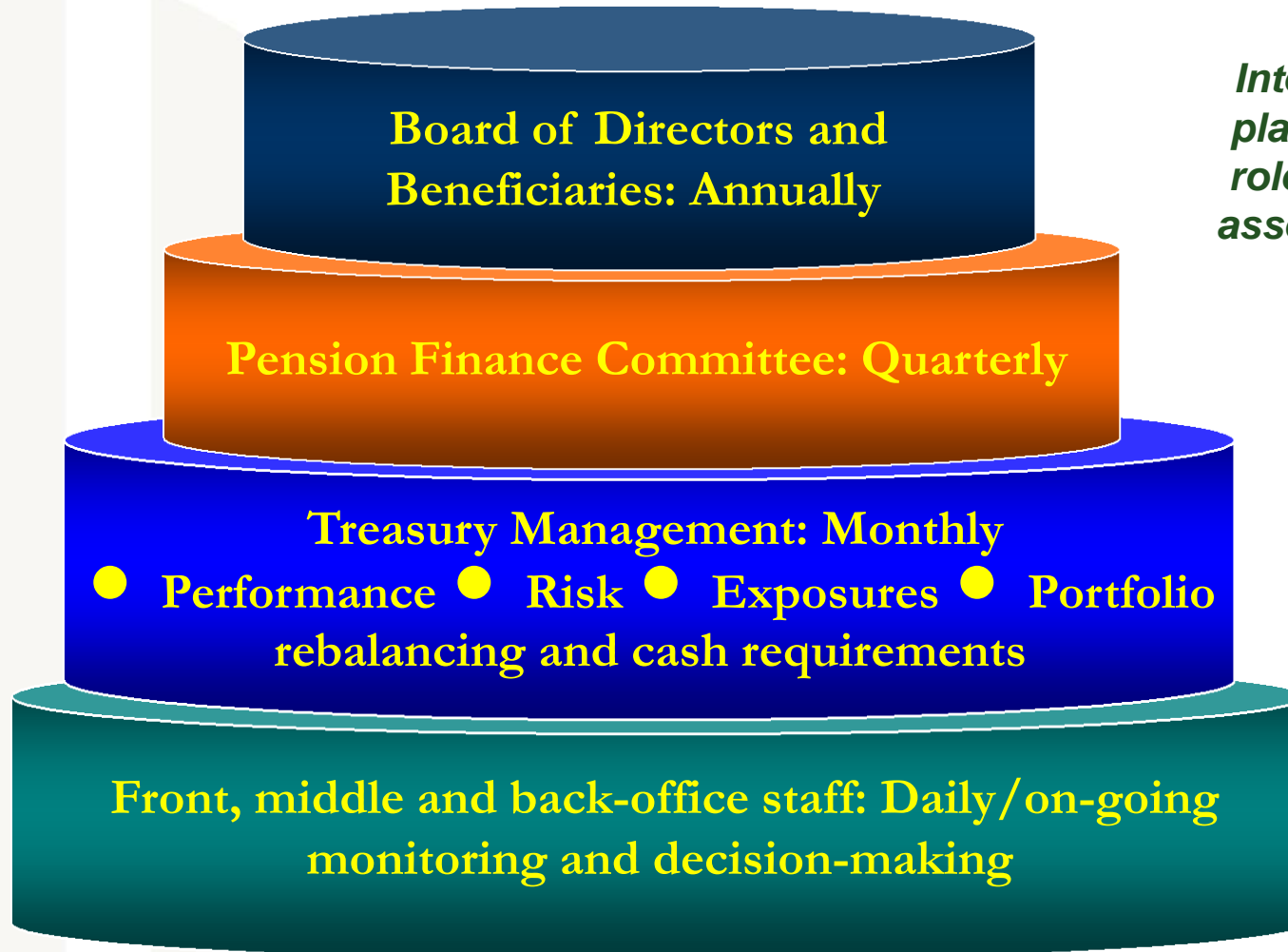


Source RAM2002: excess return

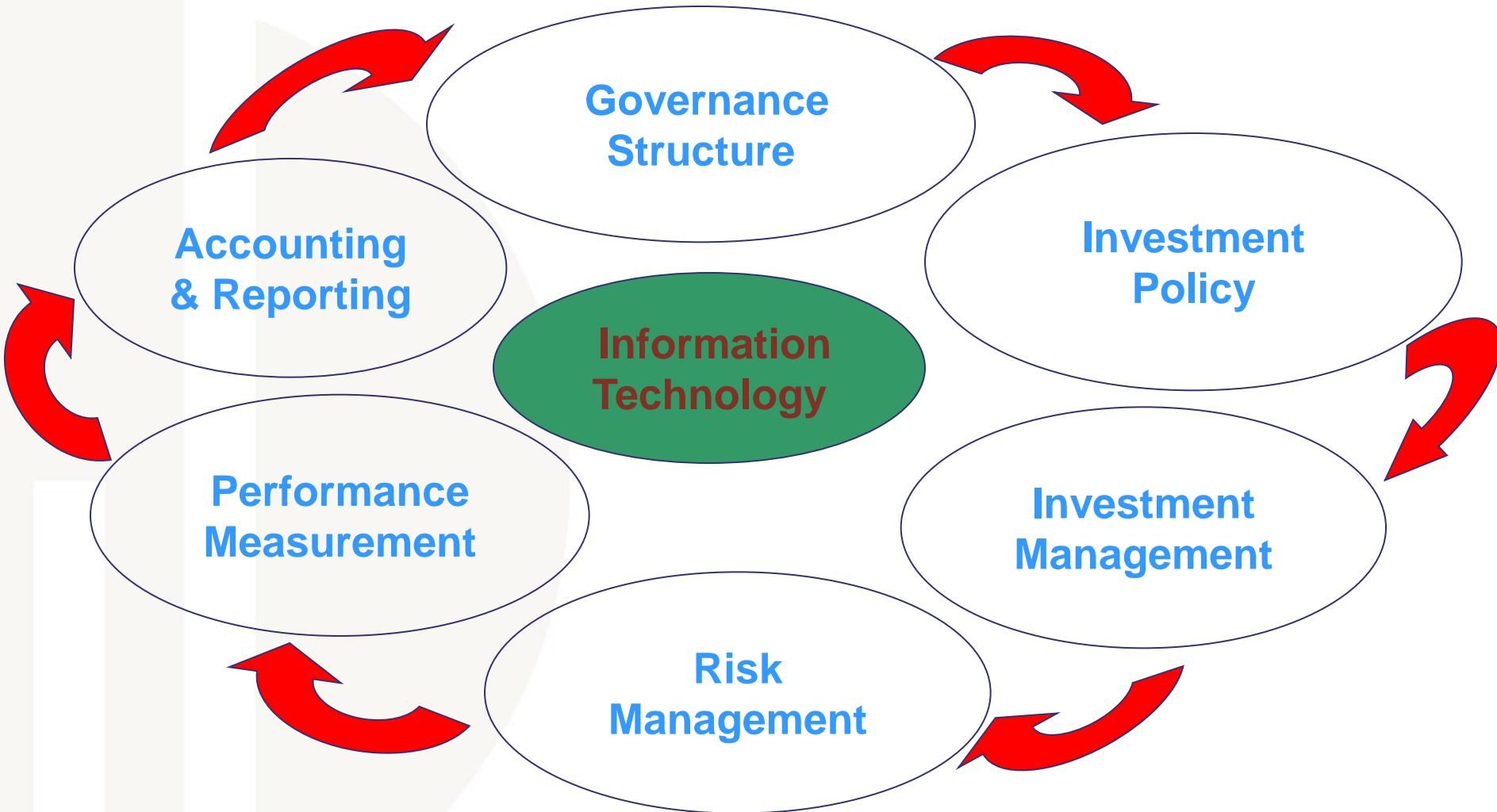




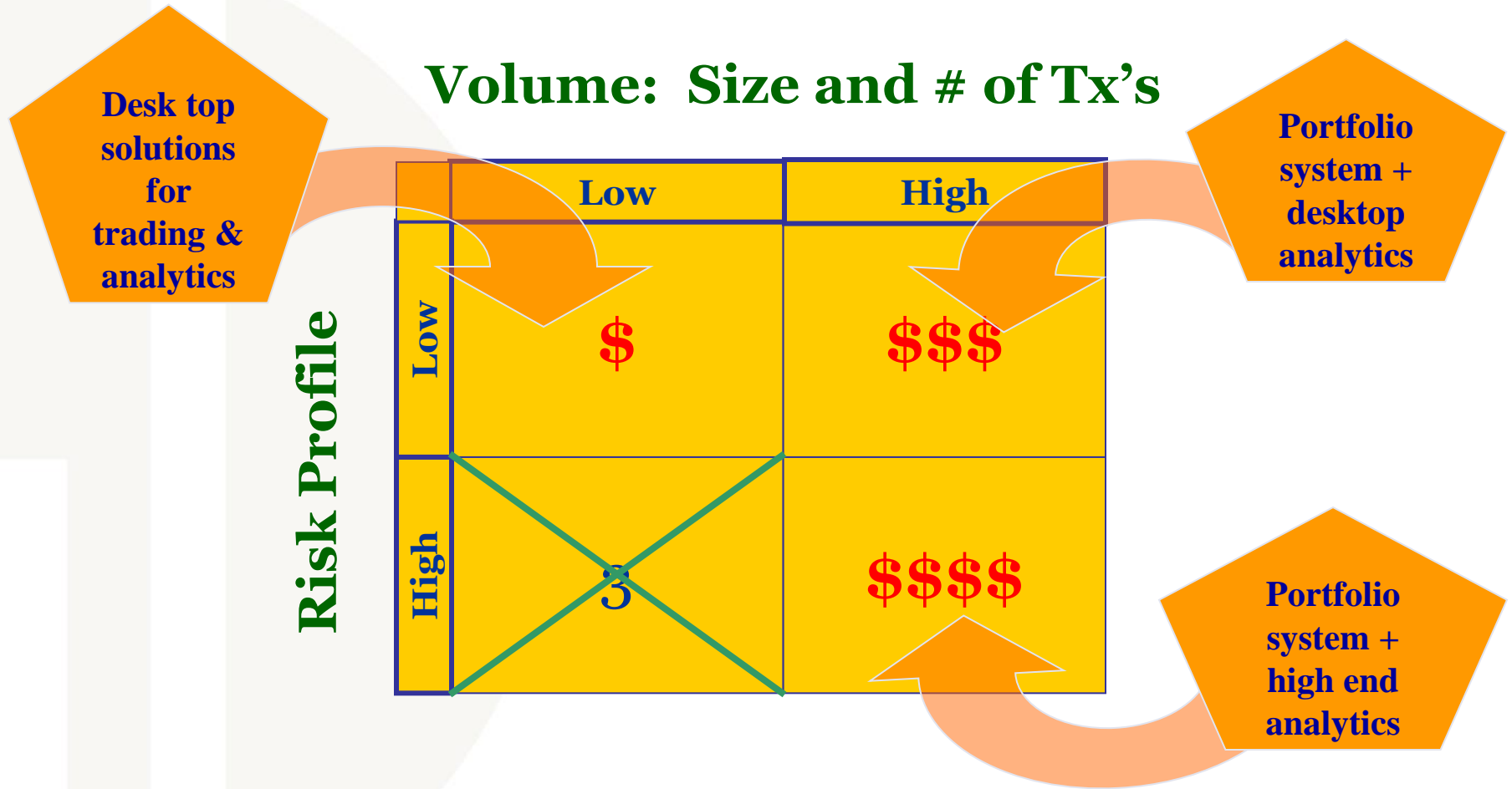
Periodic, relevant and reliable reporting are key to our governance



Internal Audit also plays an important role in the periodic assessment of risks and controls



The risk/volume profile defines IT solutions → which drive costs!



- **Create a governance structure which aligns incentives of fiduciaries with those of stakeholders in the assets and ensures accountability for results**
- **Focus on continuing Board education as well as an explicit strategic communication strategy with all stakeholders.**
- **Define investment objectives and risk tolerance in the context of liability characteristics when setting investment policy.**
- **Evaluate passive versus active management decisions in the context of your risk tolerance and organizational capabilities; recognize that managing external managers requires significant investment in infrastructure.**

- **Understand the linkages between measurement, attribution, and allocation of risk and its impact on effective investment management.**
- **Measure performance regularly as it provides an important check on the quality of investment decisions and serves as an ex-post risk control mechanism.**
- **Select the right custodian as this will determine the quality and timeliness of reporting to the governing board, which in turn will impact the quality of decisions made by the governing board.**
- **Recognize the importance of hiring and retaining qualified professional staff with the right skills mix.**



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