



# Risk Management Framework

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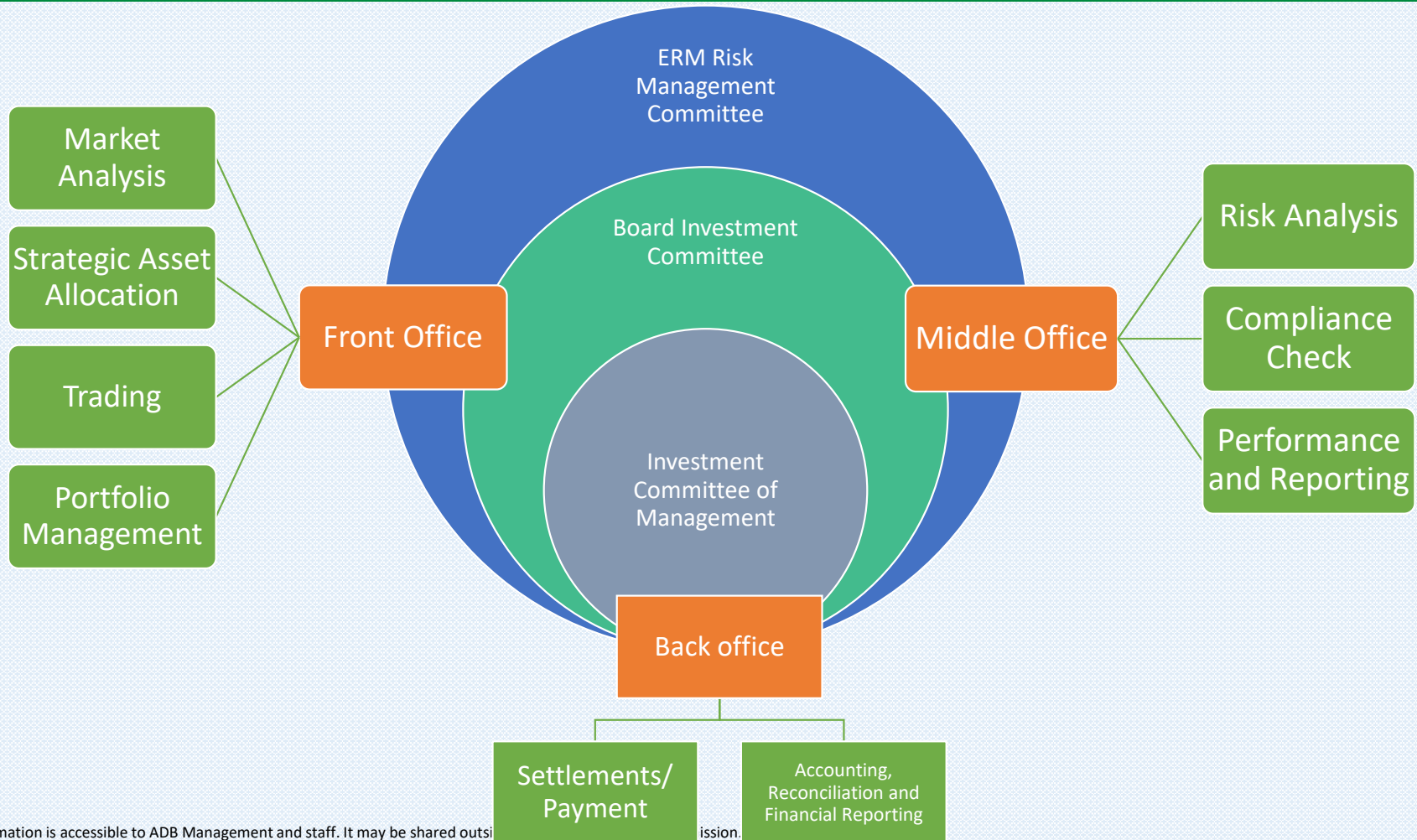
# Outline

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- SBP's Risk Management Governance
- Risk Landscape
- Liquidity Risk Management
- Market Risk Management
- Credit Risk Management
- Cyber Security Risk Management
- Enterprise Risk Management (ERM) Framework



# Risk Management Governance-FX Reserve





# SBP's Reserve Management Governance - Functional Segregation

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## Front Office

- International Market & Investment Department
- Domestic Markets & Monetary Management Department

Reports to Financial Markets and Reserve Management (FMRRM) Group

## Middle Office

- Risk Management Department

## Back Office

- Treasury Operations Department

Both Middle and Back offices reports to Financial Risk Management (FRM) Group



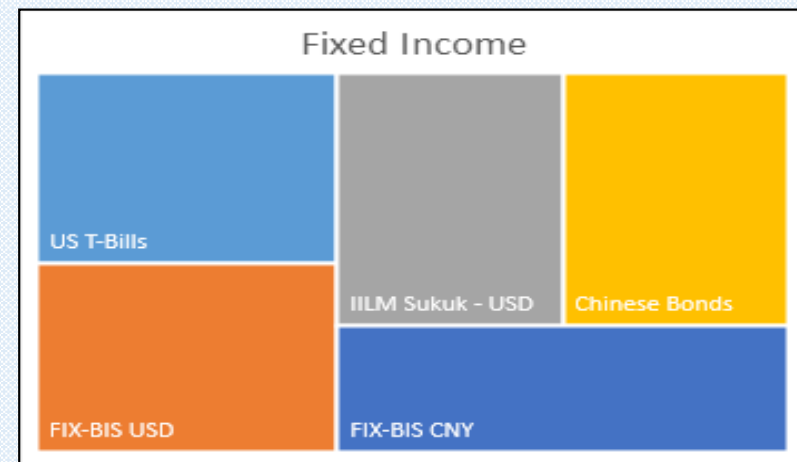
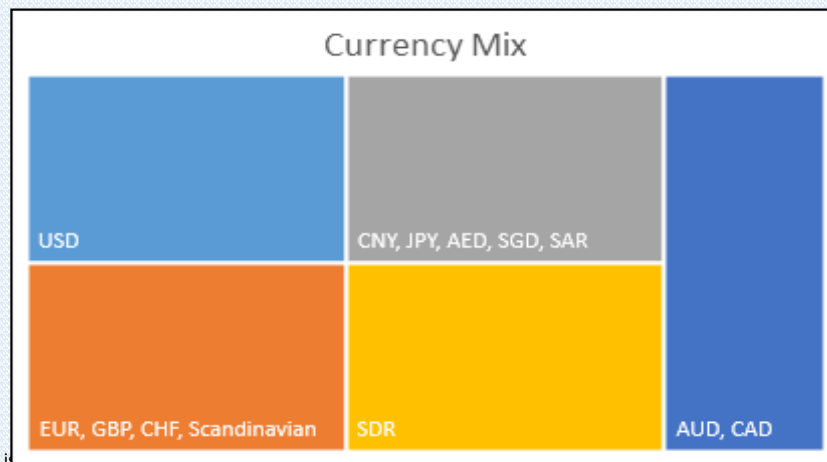
# Risk Landscape



# Liquidity Risk Management

Strategic Asset Allocation process is defined in the Board approved Investment Policy

- Near Cash Tranche
  - Liquid Asset Tranche
  - Return Seeking Tranche
- Defines neutral FX currency composition with broad passive deviation limits approved by the Reserve Management Committee and the board
  - Analyzing FX Liability composition of SBP, Government and Economy
  - Most recent rebalancing – adding limited exposure to CNY
  - Recent exposure include RMB Bonds, SUKKUK, FIXBIS





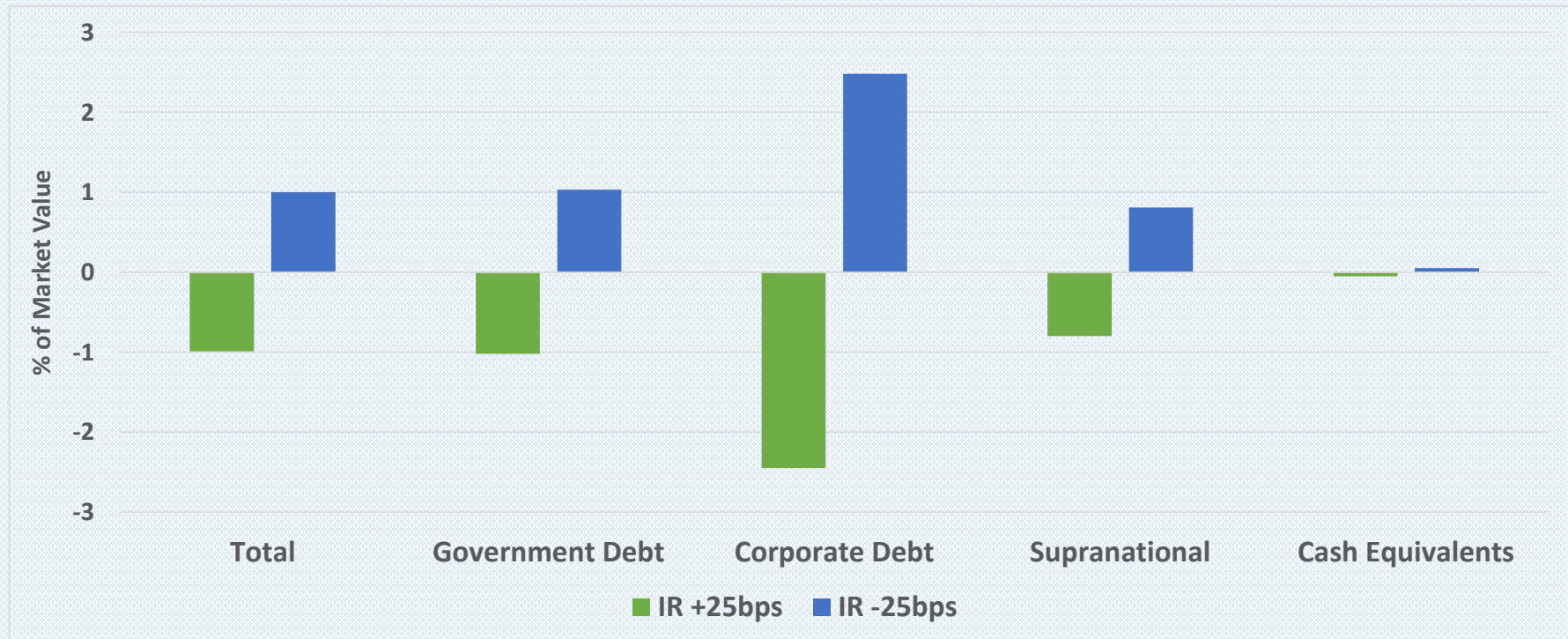
# Market Risk Management

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- Market risk is comprehensively covered in the Investment Policy Statement
- Strategic Benchmarks approved by the Board
- Quarterly Risk reports to monitor impact of market volatility / portfolio duration
  - Define maximum/ minimum portfolio duration limit vs benchmarks
  - Use of futures/options for duration management
- Sensitivity analysis is used by SBP to measure the impact of changes in interest rates
- Performance Measurement of Outsourced Portfolio
  - Fund Manager's Portfolio Return
  - Excess Return vs Benchmark
  - Ex-ante and ex-post tracking error limits
  - Information Ratio.



# Interest Rate Sensitivity Analysis\* – Illustration (25bps)



\* Based on notional exposure

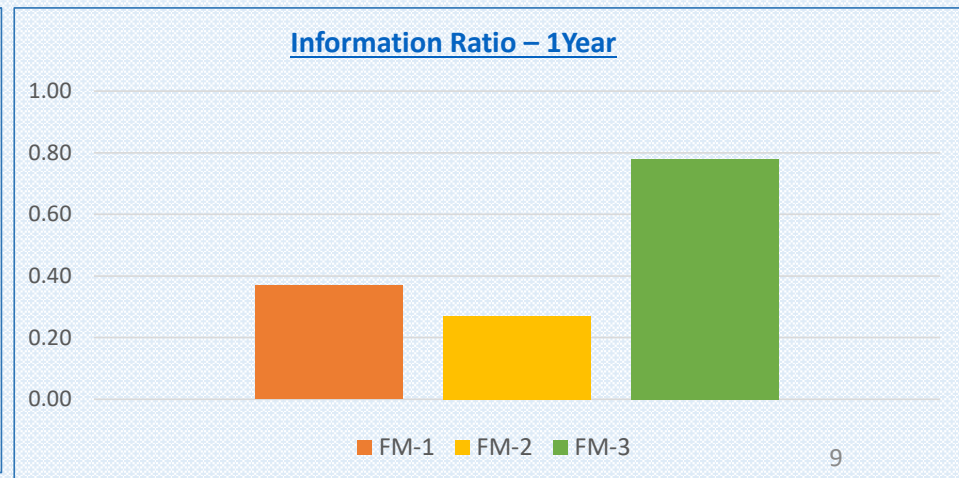
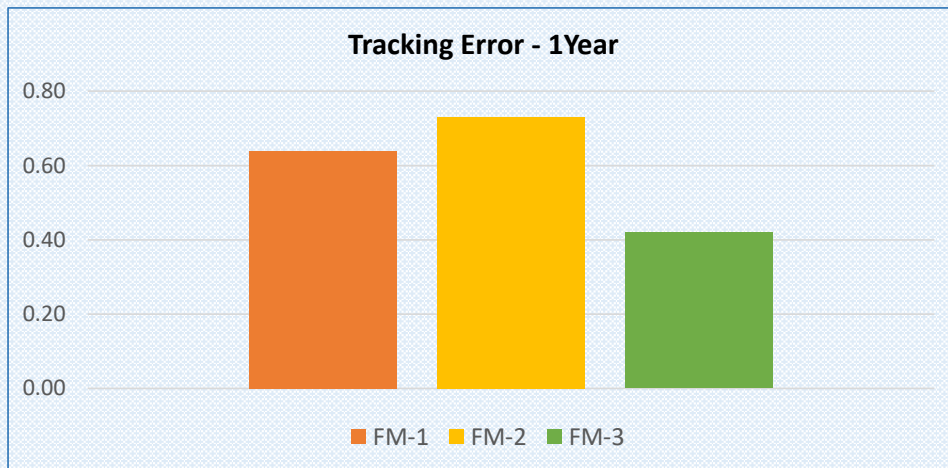
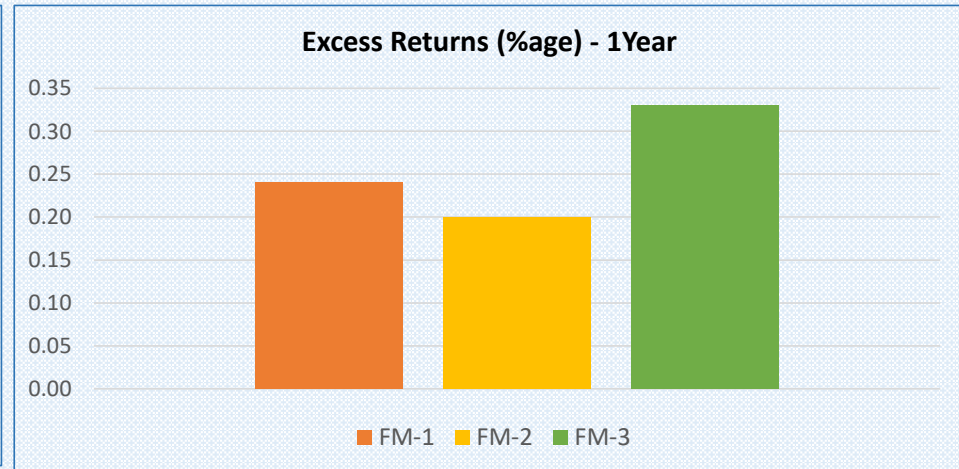
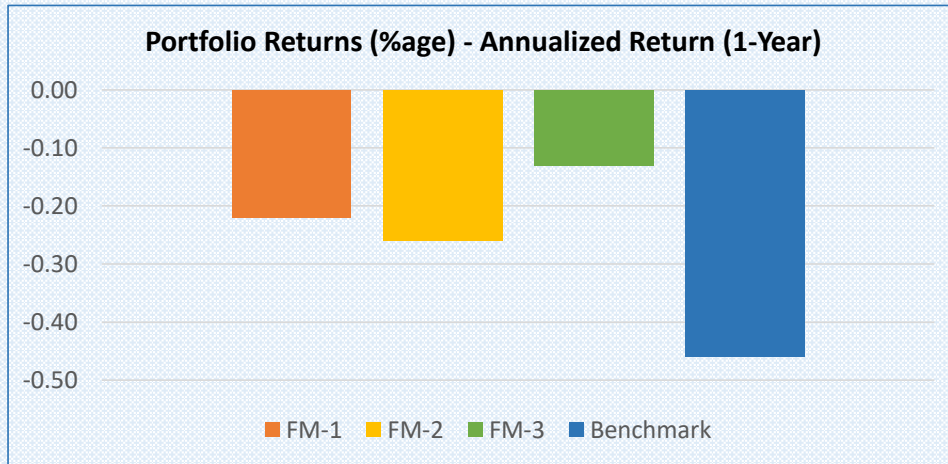
Note: The impact of interest rate shocks is derived after incorporating market expectations.

- **Apart from interest rate sensitivity analysis, RMD also regularly assesses the portfolio based on the historical scenarios / events.**





# Funds Performance – Outsourced Portfolio-Illustration-1 Year





# Credit Risk Management

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- Review & approval of credit exposures
  - Exposure Limits defined of a given rating for given counterparties, asset classes, and geographies
  - Max concertation in a single issuer.
- Monitoring of credit ratings and market data
  - Live alerts for Credit Rating changes
  - Live alerts of significant changes in stock prices, spreads, CDS, Bloomberg score.
- Weighted Average Credit Quality (WA-CQ) vs Weighted Average Probability of Default (WA-PD).



# SBP Portfolio Credit Quality- An Illustration

(Weighted Average Rating Factor Method)

Illustration of Consolidated Portfolio					
Rating Scale (A)	Ratings Grade (B)	PD Scale (C)	Exposure (D)	WA-PD (C x D)	WA-CQ (A x D)
9	AAA	0.01%	27.29%	0.00%	2.46
8	AA+	0.10%	20.56%	0.02%	1.64
7	AA	0.20%	0.31%	0.00%	0.02
6	AA-	0.40%	4.42%	0.02%	0.26
5	A+	0.70%	41.43%	0.29%	2.07
4	A	1.20%	4.46%	0.05%	0.18
3	A-	1.80%	1.40%	0.03%	0.04
2	BBB+	2.60%	0.05%	0.00%	0.00
1	Below BBB+	3.60%	0.08%	0.00%	0.00
				<b>0.41%</b>	<b>6.68</b>

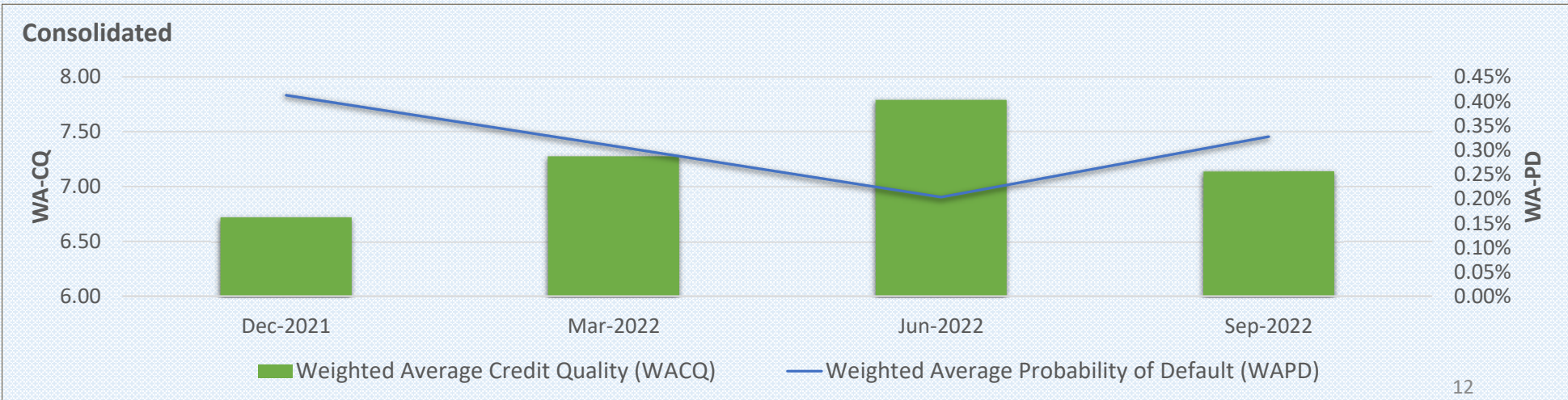
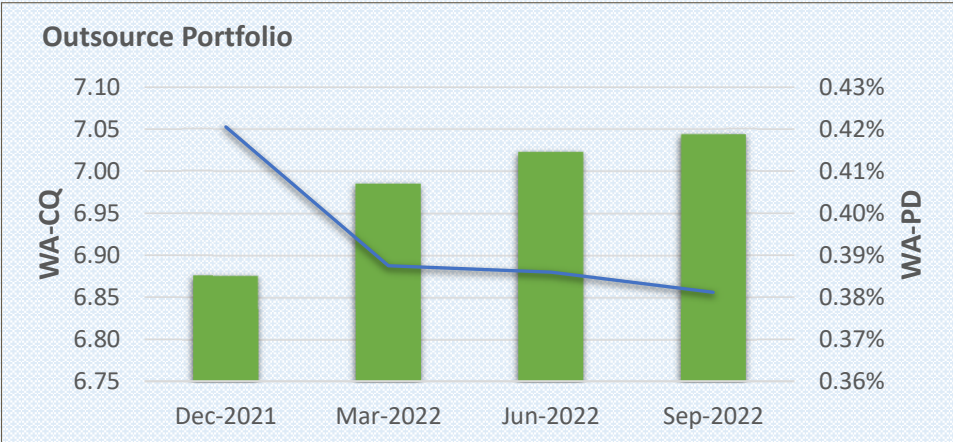
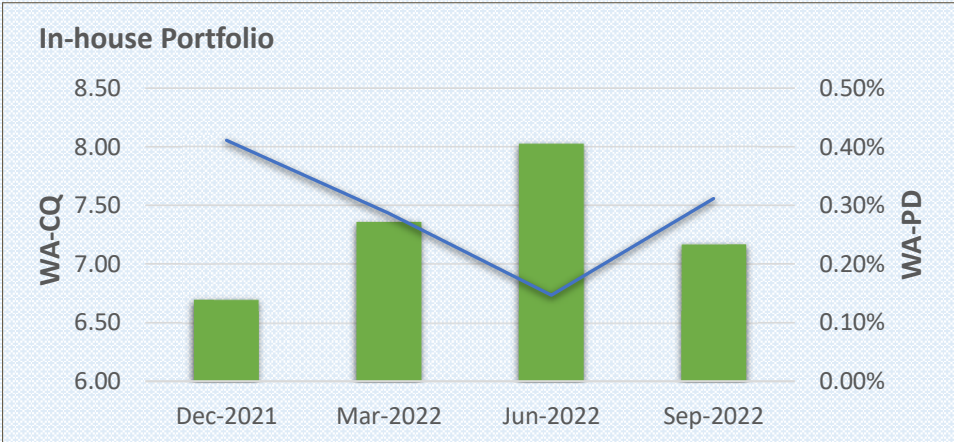
**PD Scale:** PD scale was derived after studying rating migration tables published by rating agencies and then adjusted to reflect SBP conservative approach

**WA-PD:** Weighted Average Probability of Default

**WA-CQ:** Weighted Average Credit Quality



# Portfolio Credit Quality-Illustration





# Counterparty Selection

## Minimum Credit Rating

- Minimum of S&P, Fitch and Moody's long term foreign currency credit ratings

## Counterparty

- Financial Institutions
- Central Banks and
- Supra-National Financial Institutions

## Capital Ratio

- Tier-1 Capital Ratio
- Regulatory Capital Ratio

## Country of Incorporation

- OECD Countries/ Approval by the Board



# Cyber Security Risk

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## Challenges:

- Legacy systems used by central banks
- Cyber attackers use techniques such as social engineering, phishing, malware, Advance Persistent Attacks (ATPs)
- Lack of skilled cybersecurity professionals

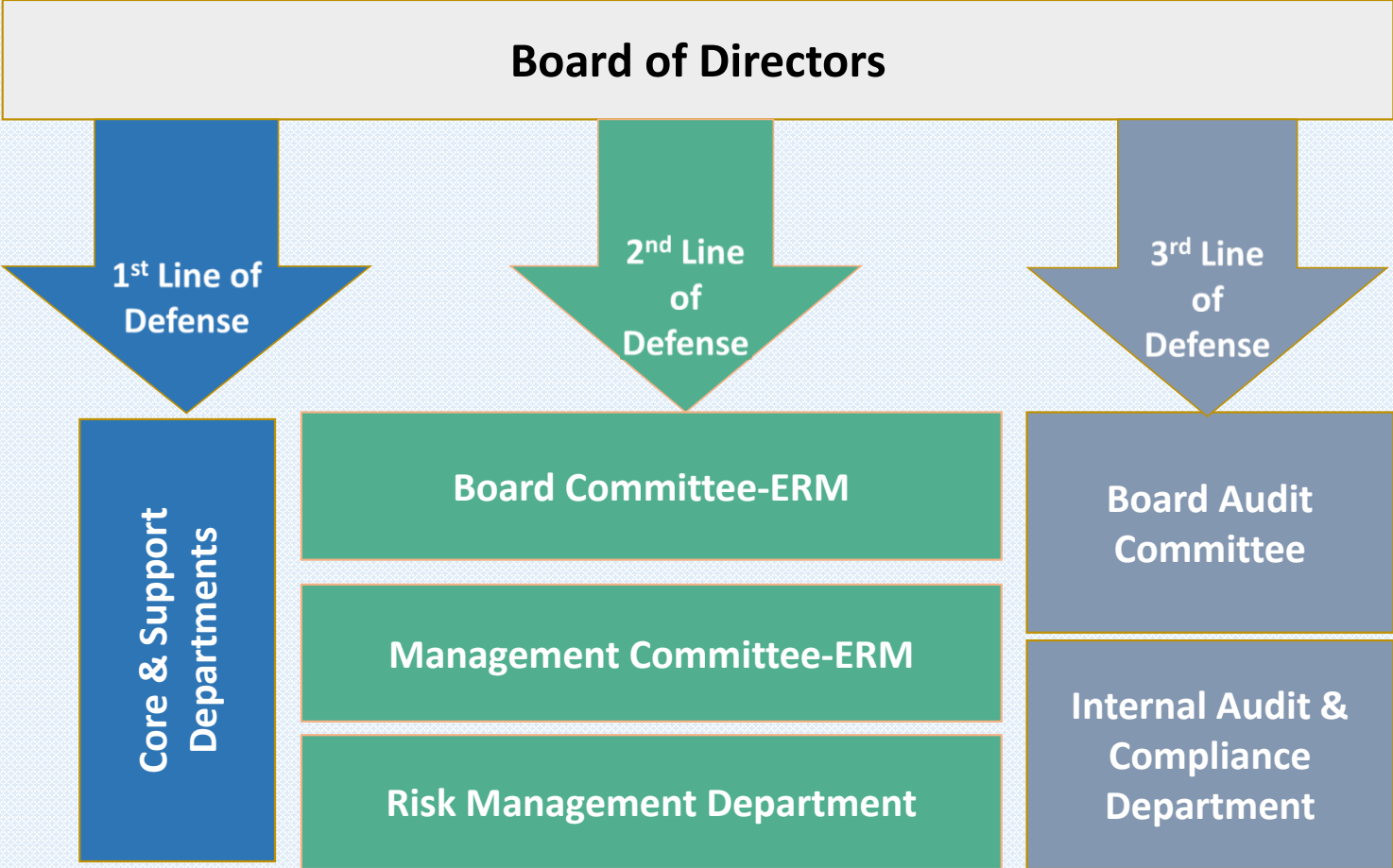
## Actions taken by SBP to enhance Cyber Security Framework:

- Implemented bank-wide IT Security Policy and Cyber Risk Management Framework
  - Regular risk and vulnerability assessments
  - Real-time, proactive security monitoring and detection of cyber threats
- Developed Licensing and Regulatory Framework for Digital Banks





# ERM-Governance Structure



# SBP ERM Framework

## Adoption of COSO ERM Framework

Bank has customization to fit in a central banking model.

### Introduction:

The COSO ERM Framework model is three dimensional cube.







# Components of COSO ERM Framework (SBP Perspective)

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## 1) Internal Environment:

- Operations are being run in a responsible way.
- Organization is adhering to regulatory compliance requirements / internal policies and SOPs.
- Everyone in the bank is familiarized with the importance of risk management.
- Integrity and Ethical Values
- Human Resource Standards.

# Components of COSO ERM Framework (SBP Perspective)

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## 2) Objective Setting:

Strategic objectives are high level goals that are aligned with the Bank's mission and vision statements.

- Enhance the effectiveness of monetary policy
- Strengthen the financial system stability regime
- Improve the efficiency, effectiveness and fairness of the banking system
- Increase financial inclusion
- Develop modern and robust payments systems.

# Components of COSO ERM Framework (SBP Perspective)

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## 3) Risk / Event Identification:

- Identify risks
- Categories of risks / Risk Library
- Incidents and Near Misses also help in this stage.

## 4) Risk Assessment:

- Determining the Likelihood of occurrence of an event/risk
- Determining the Impact of risk (Impact Table)
- Risk Assessment Matrix.



# Risk Assessment of SBP

## Risk Assessment Matrix

Almost Certain	5
Likely	4
Possible	3
Unlikely	2
Rare	1

Likelihood

11	16	20	23	25
7	12	17	21	24
4	8	13	18	22
2	5	9	14	19
1	3	6	10	15

Impact

1	2	3	4	5
Very Low	Low	Medium	High	Very High

	Very High (20 - 25)
	High (15 - 19)

	Medium (7 - 14)
	Low (1 - 6)



# Components of COSO ERM Framework (SBP Perspective)

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## 5) Risk Response:

- Developing Risk Mitigation Strategy
- Risk Avoidance / Elimination
- Risk Transfer
- Risk Acceptance.

## 6) Control Activities:

- Putting Controls to mitigate risk in hand and preclude future risks  
These controls include policies, procedural manuals, exposure limits, delegated authorities etc.



## Components of COSO ERM Framework (SBP Perspective)

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### 7) Risk Monitoring & Review:

- Early warning signals
- Regular update in RCSA.

### 8) Communication:

- RMD will update the management on quarterly basis on the risks
- RMD will communicate risk policies via various means to the employees.



# Risk Control and Self-Assessment (RCSA)

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- Description of Key Risk Factor
- Main Risk (Level 1)
- Key Risk (Level 2)
- Type of Control (Detective, Preventive, Corrective)
- Description of Controls in Place
- Likelihood
- Impact
- Residual Risk Score
- Overall Risk Category
- Target Risk Score
- Risk Response
- Risk Mitigation Plans / Actions
- Action Owner Department
- Target Date for Completion of Risk Mitigation
- Key Risk Indicators (KRIs).

# Thank You





# Risk Adjusted Return Measure: Information Ratio

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The information ratio measures the risk-adjusted returns of a financial asset or portfolio relative to a predefined benchmark. This ratio aims to show excess returns relative to the benchmark, as well as the consistency in generating the excess returns.

- **Uses of the Information Ratio:**

- The information ratio is primarily used as a performance measure by fund managers
- It is frequently used to compare the skills and abilities of fund managers with similar investment strategies
- The ratio provides investors with insights about the ability of a fund manager to sustain the generation of excess, or even abnormal (as in “abnormally high”), returns over time.

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# Formula for Calculating the Information Ratio

The information ratio is calculated using the formula below:

$$\text{Information Ratio} = \frac{\overset{\text{the return of a portfolio}}{E(R_p)} - \overset{\substack{\text{the return of a benchmark} \\ \text{"Short Duration 60USD/15EUR/25GL (1-3Years)"}}}{R_b}}{\underset{\substack{\text{the standard deviation of portfolio} \\ \text{returns from the returns of a} \\ \text{benchmark} \\ \text{(Standard deviation of Excess Returns)}}}{\sigma_{ib}}} = \frac{\text{Excess Return}}{\text{Tracking Error}}$$

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## Information Ratio - Illustration

	ABC Funds	XYZ Funds
Portfolio Return - $R_p$	11%	12%
Benchmark Return - $R_b$	8%	8%
Tracking Error - $\sigma_{ib}$	6%	9%

$$\text{Information Ratio}(ABC) = \frac{11\% - 8\%}{6\%} = 0.5$$

$$\text{Information Ratio}(XYZ) = \frac{12\% - 8\%}{9\%} = 0.44$$

**ABC Fund shows a higher information ratio than the XYZ Fund.** It indicates that the ABC Fund can more consistently generate excess returns, as compared to the XYZ Fund.

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