Credit Risk Programme

Module 6
Risk Appetite and Profitability

Learning Objectives

At the end of this module, you will understand and demonstrate:

- The importance of managing Risk Weighted Assets (RWA)
- RWA derivation and its components
- SCB's Risk Appetite Approach, RB's risk-return framework, and how Return on Risk Weighted Assets (RoRWA) fits within the framework.
- Business and risk levers which are used to manage the risk-return metrics.

Why manage to Return on RWA?

1. Linked to RB Performance Management

- SCB adopted an enhanced business performance management and compensation framework focused on return on risk capital to drive shareholder value

2. Linked to Return on Equity (ROE)

- Market investment on ROE (return on equity or capital) on banks' valuation and performance measurement.
- Return on RWA can be transformed and linked to ROE

2. Linked to Return on Equity (ROE)

- BWA determines the regulatory capital requirements
- Booking assets increases RWA and capital requirement; focus on our ability to self-fund growth through strong revenue and retained earnings
- Regulation is changing - phasing in higher capital ratios and tighter restrictions on what counts as capital'. In a capital constrained environment, business units will have to compete for capital

Link to RB Performance Management

1 Linked to RB Performance Management

RB Performance Management and Compensation framework enhanced to include:

RCAP: Risk Adjusted Capital Profit

Performance Criteria for Countries

Risk Capital Adjusted Profit (RCAP)

(+) Revenue

(-) Direct Cost (excludes allocations)

(-) Internal Expected Loss EL

(50% Good book EL, 50% LI)

(-) Net Cost of Capital

(= 8.5%❶ * 8%❷ Avg. RWA) = RCAP

❶ 8.5% = 12% cost of capital (-) 3.5% equity credit

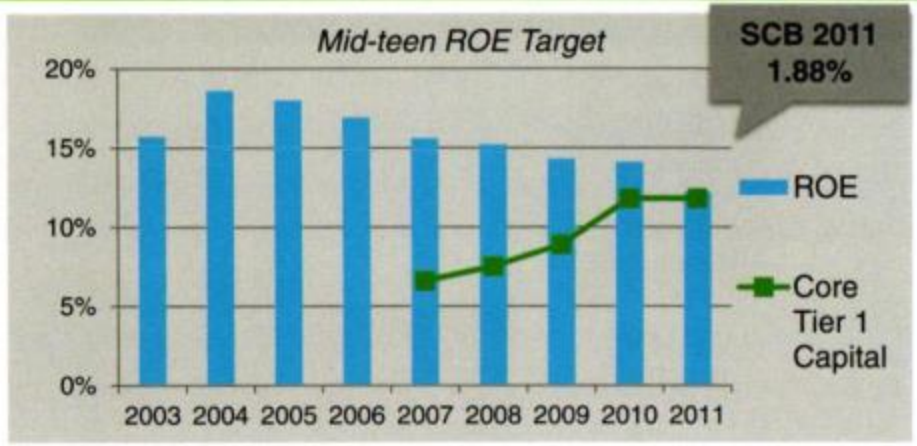
❷ 8% = Minimum Regulatory Management requirement

→ Maximize Working Profit to improve RCAP

→ Loss is measured as a mixture of realized losses and future losses. Action taken to improve portfolio in downturn is recognized

→ Optimize returns on RWA to maximize RCAP

Link to ROE and Growth



Total Grp RWA $ bn	185	189	214	245	271
TotalGrpAssets $ bn	330	435	437	517	599

SCB 2011: RWA grew by 10% YoY

2 Linked to Return on Equity (ROE)

Suppose:

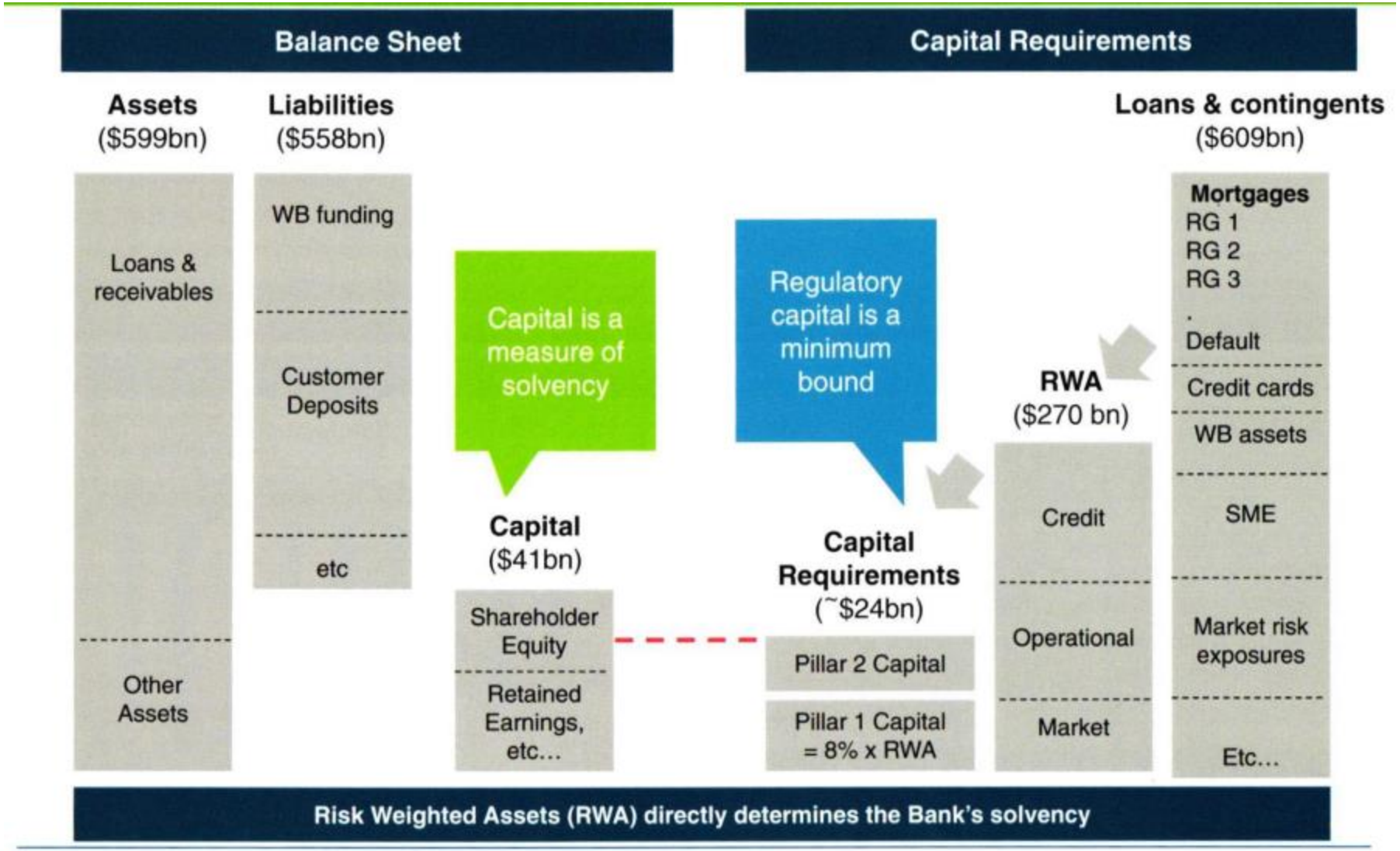
- We target a 15% ROE
- We want to maintain a capital/RWA ratio of 11.8%
- Equity relative to Capital = 112% (capital < equity)
- **Minimum return required** to meet these aspirations (simplified):
- **Post tax RoRWA**

  = 15% * 11.8% * 112% = 2%

3 Linked to Capital Requirement Ratios (hence ability to grow sustainably)

- RoRWA also determines ***organic RWA growth*** rate ceiling (i.e. without the need to raise new equity). Example - Consider a Bank with:
- Average RWA of $258bn
- Capital $31.9bn (capital ratio = 11.8%)
- Dividend pay-out ratio of 24% (of PAT)
- Post-tax RoRWA = 2%
- … will support ***sustainable RWA growth*** of up to about **11% per year**
- …maintaining the same capital ratio, dividend pay-out ratio and average risk-weight

What is RWA?


Balance Sheet
Capital Requirements
Assets
($599bn)
Liabilities
($558bn)
Loans & contingents
($609bn)
Loans & receivables
WB funding
Customer Deposits
etc
Other Assets
Capital is a measure of solvency
Capital
($41bn)
Shareholder Equity
Retained Earnings, etc…
Regulatory capital is a minimum bound
Capital Requirements
(~$24bn)
Pillar 2 Capital
Pillar 1 Capital = 8% x RWA
RWA
($270 bn)
Credit
Operational
Market
Mortgages
RG 1
RG 2
RG 3
.
Default
Credit cards
WB assets
SME
Market risk exposures
Etc…
Risk Weighted Assets (RWA) directly determines the Bank's solvency

Composition of RWA?

Credit RWA (87%)

Two ways to calculate Credit RWA

1. Internal Ratings Based Approach to Credit RWA (IRB)

- Most risk sensitive approach
- Requires us to model:

Components of EL

  - Probability of Default (PD)
  - Loss Given Default (LGD)
  - Exposure at Default (EAD)

- Risk Weight is determined by a formula with above inputs

2. Standardized Approach to Credit RWA (STA)

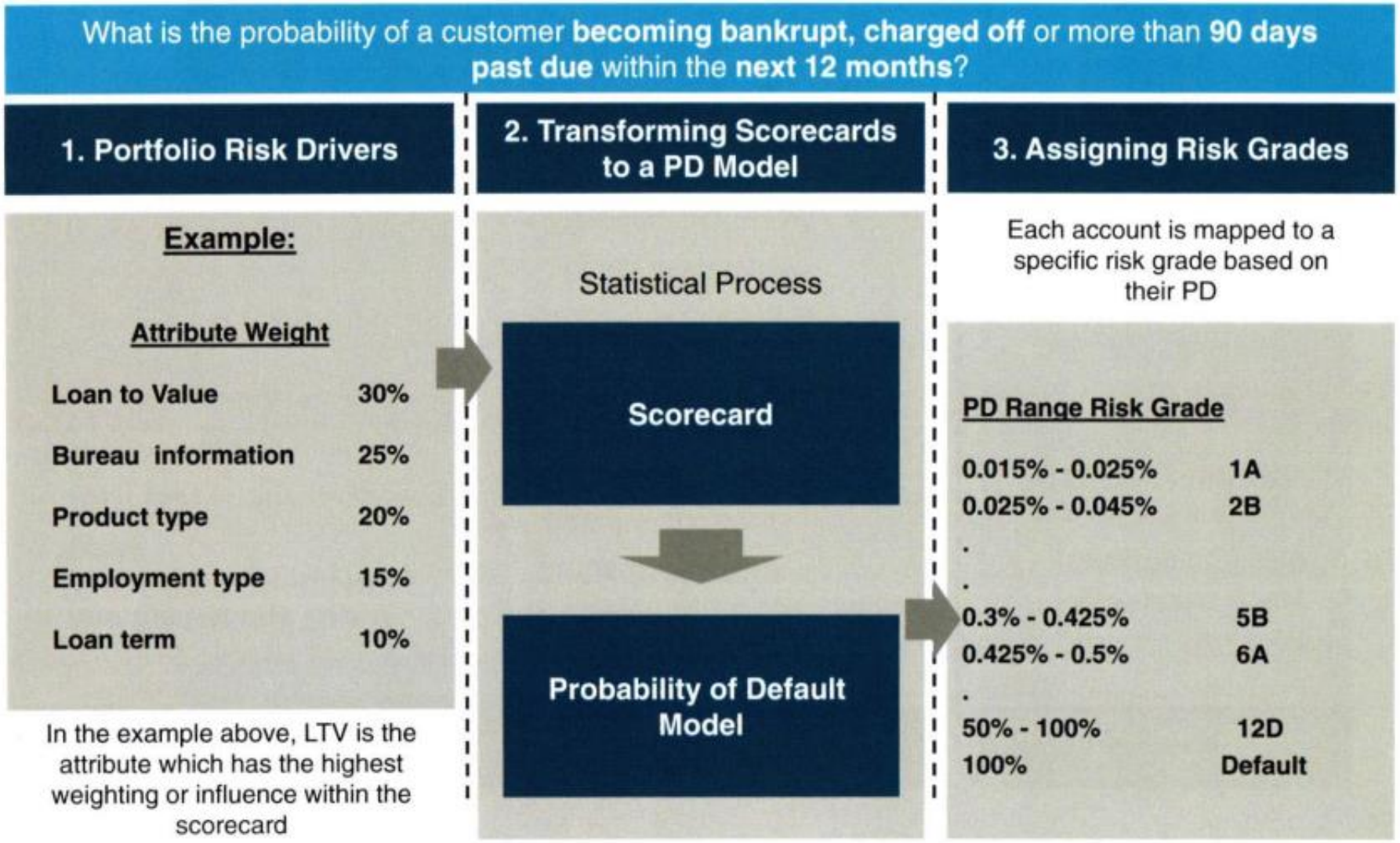
- Less risk sensitive
- Prescribed risk weights for different portfolio segments applied to exposure
- Risk Weight varies from 35% to 150% according to:
  - Basel asset class
  - Delinquency status
  - Provision levels
  - LTV, etc

Operational Risk RWA (13%)

"The Standardized Approach" (TSA)

- Prescribed risk weights by business line
- 12% of RB revenue
- Applied to average income over last 3 calendar years

Components of a Generic PD Model



Components of a Generic EAD Model

At the time of default, what is the expected exposure? (i.e. will the customer drawdown on a limit, or pay down, will we increase limits, etc?)

1. Mortgages and Personal Loans (Fixed installments)

The EAD is taken as the Current outstanding balance.

2. Revolving Products

The EAD is calculated as follows:

Current outstanding balance +
(Unutilised Credit limited * Expected drawdown at default)

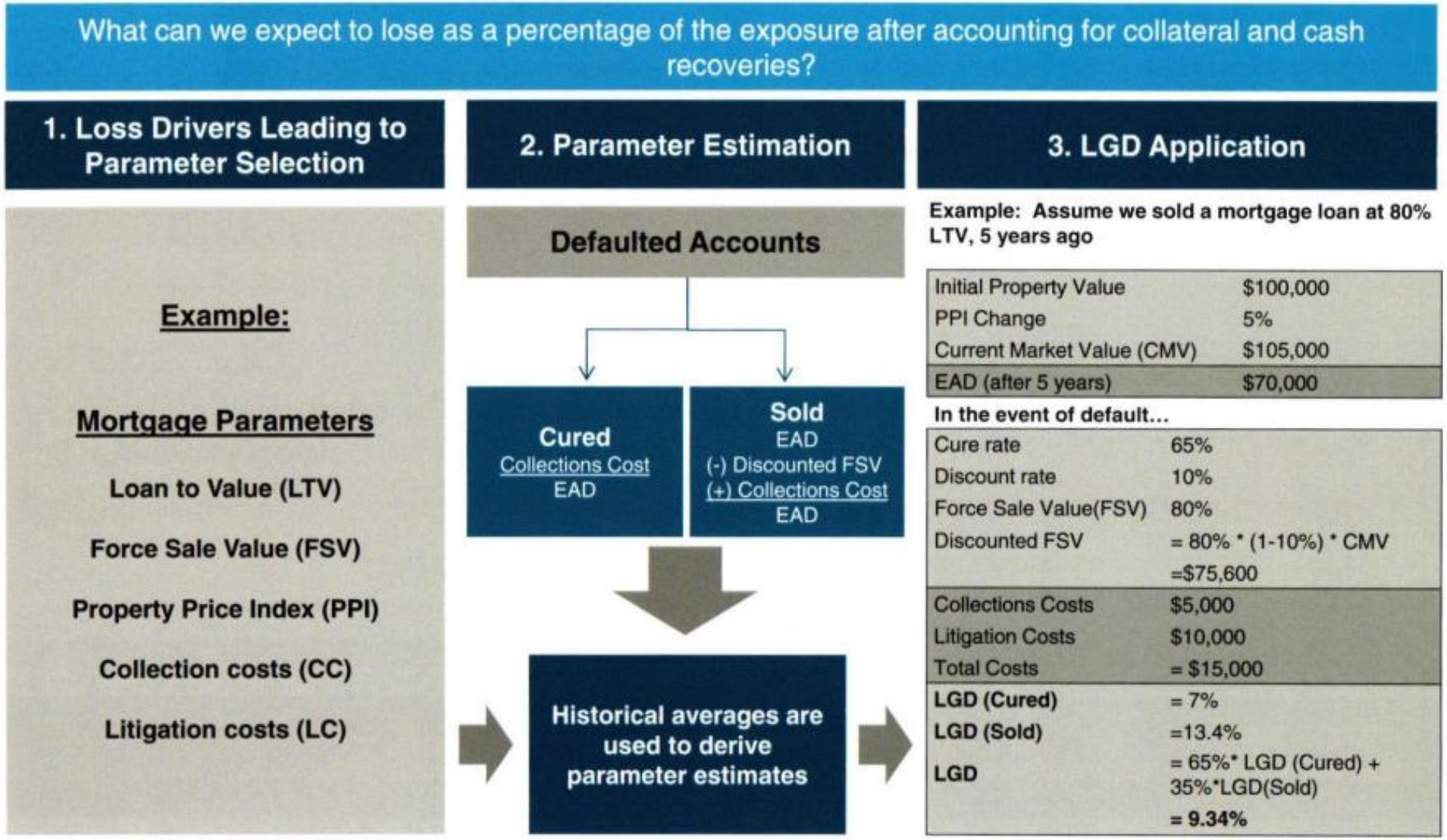
Example: Consider a customer with:

- Outstanding balance of $100
- Available unutilised credit limit of $200.
- Expected drawdown at default is 90%.

EAD would be calculated as $100+ ($200.90%)= $280

Components of a Generic LGD Model

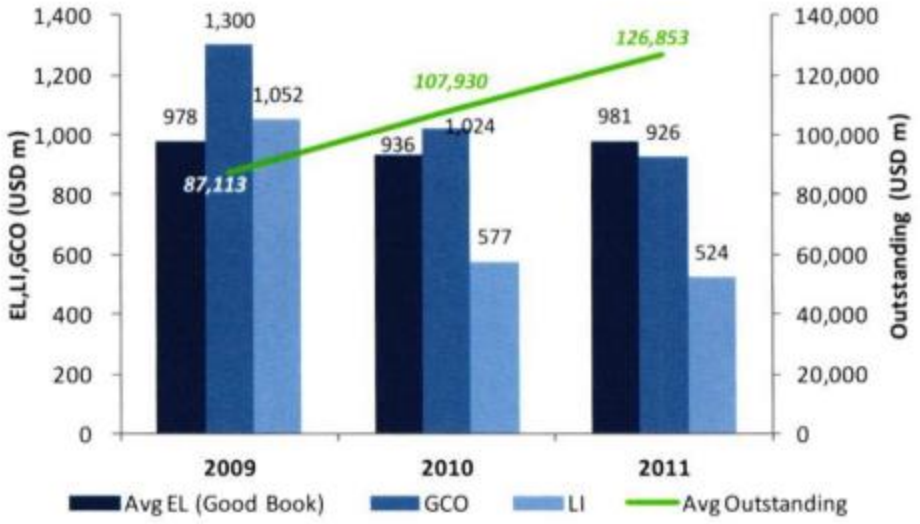
(Example: Mortgage Portfolio)



Expected Loss and its Components

Example : Customer with PD=3%, LGD=10% and EAD=$30,000 USD

Expected Loss (EL)	=	PD (%)	x	LGD (%)	x	EAD ($)
EL $90	=	PD 3%	x	LGD 10%	x	EAD $30,000



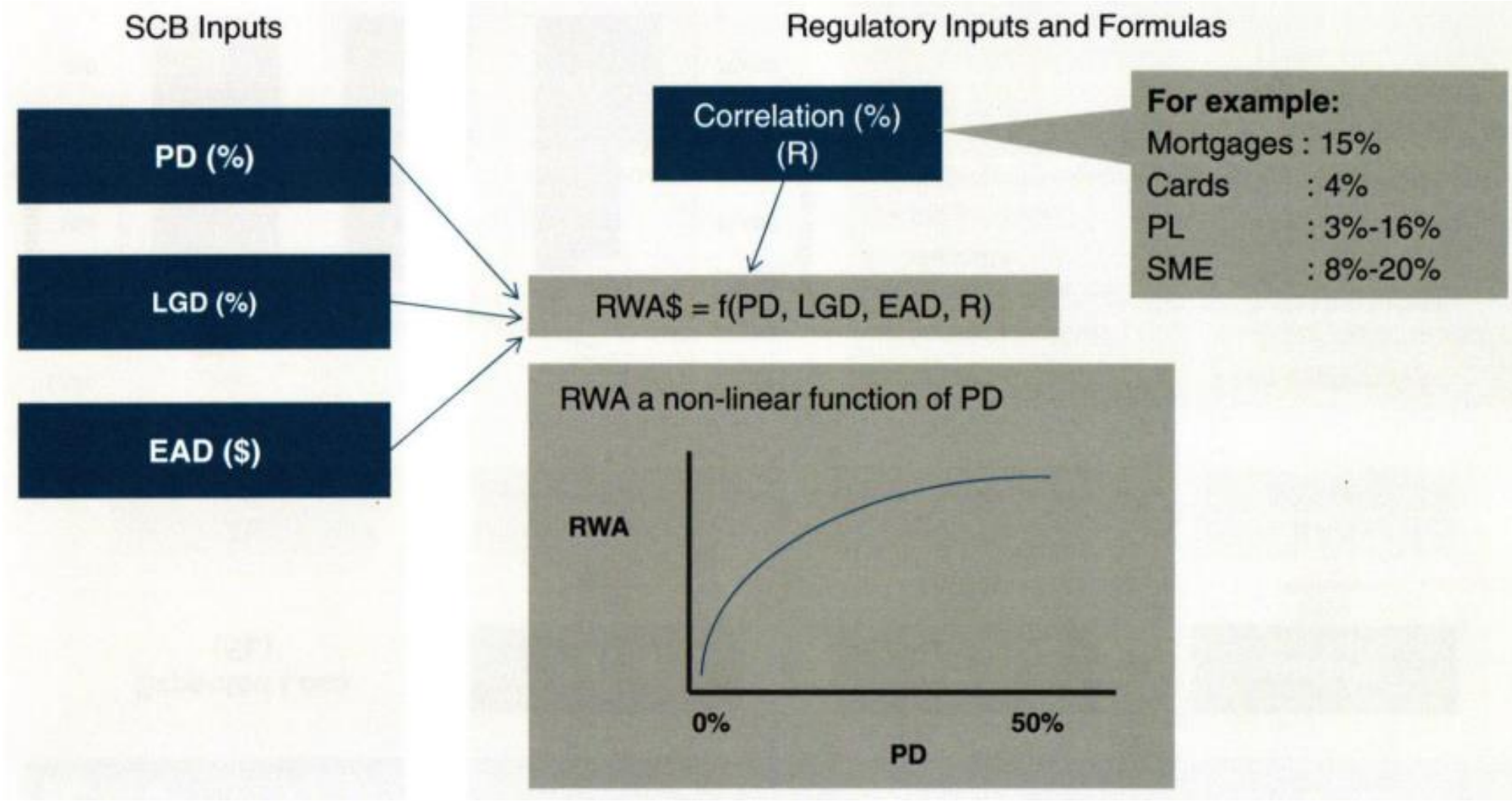
Expected Loss

- Forward looking
- Through the cycle measure
- For portfolio management require an economic measure loss i.e. EL

Loan Impairment

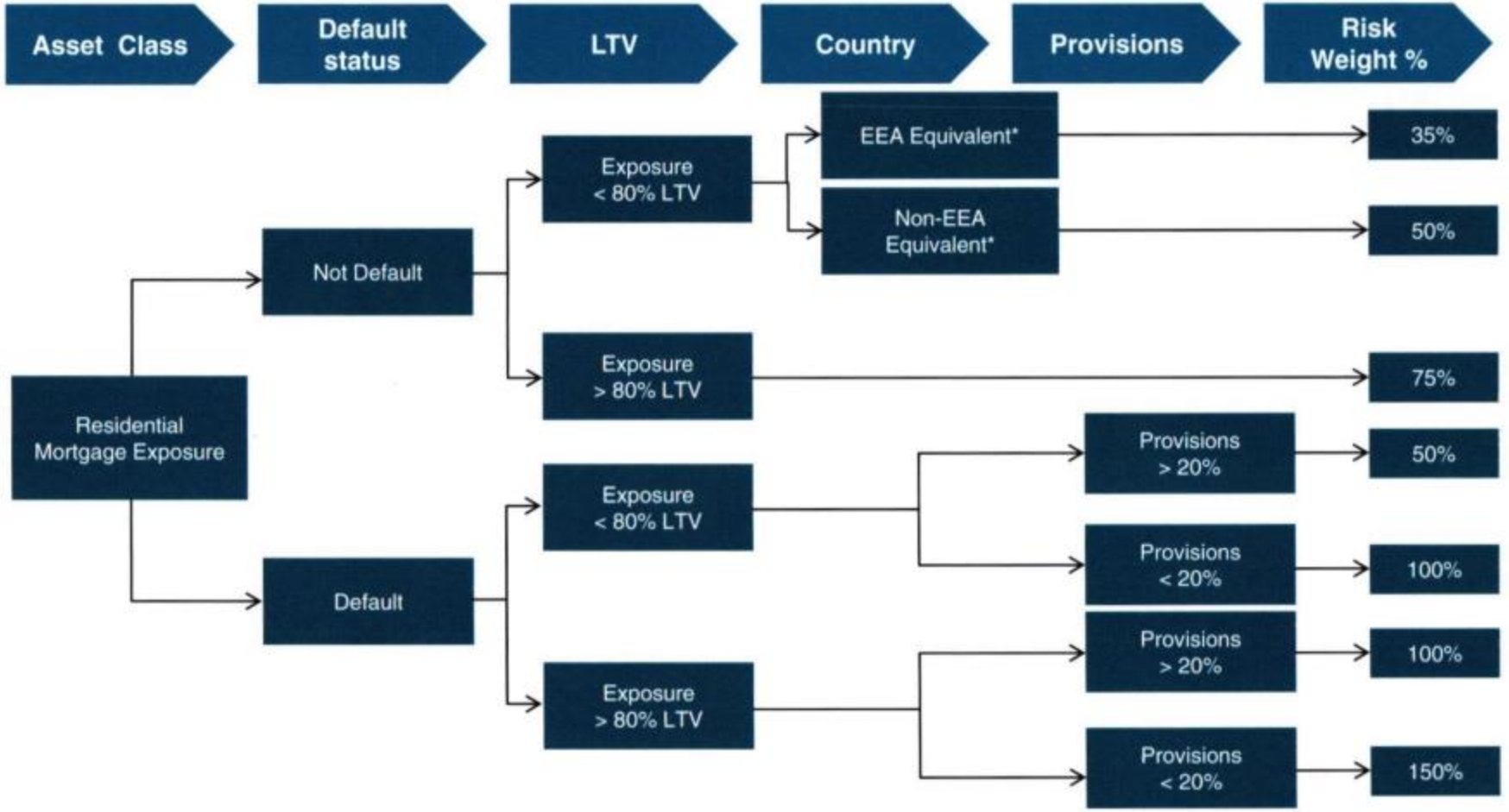
- Actual credit losses reflecting recent experience
- Point in time, measure
- Impacts the P&L
- Used to manage the back book

Credit RWA IRB Approach



Credit RWA Standardised Approach

Ex. Residential Mortgages - Basel ll Assignment of Risk Weights



*EEA (European Economic Area) equivalent regulators are considered as peers to EEA regulators, include Hong Kong, Singapore, India and South Africa for credit risk

STA vs. IRB Sensitivity

Mortgage example

Note: Numbers are for illustration purposes only.

Standardized RWA

	LTV<80%	LTV >80%	Overall Portfolio
Risk Weight%	35%	75%	41%
EAD	$6,000m	$ 1,000m	$7,000m
RWA = (RW * EAD)	2,100	750	2,850

- Standardized RWA less sensitive to risk
- Risk weight based on LTV, etc

IRB RWA

EAD		$7,000m
LGD		19.5%
PD (Non-defaults)		1.06%
Risk Weight%		11.8%
RWA (RW * EAD)	=	$826m

- IRB RWA is more sensitive to the portfolio's risk profile
- Calculate the PD, LGD and EAD at account level

Generally, upon moving to IRB, mortgages receive a RWA benefit

STA vs. IRB Sensitivity

Personal Loans example

Note: Numbers are for illustration purposes only.

Standardized RWA

	Good Book	Default Book	Overall Portfolio
Risk Weight%	75%	100%	80%
EAD	$725m	$ 175m	$900m
RWA = (EAD * RW)	544	175	719

- Standardized RWA less sensitive to risk
- Risk weight primarily based on delinquency status

IRB RWA

EAD	=	$900m
LGD	=	89%
PD (Non-defaults)	=	3.5%
Risk Weight%	=	120.6%
RWA (RW * EAD)	=	$1085m

- IRB RWA is more sensitive to the portfolio's risk profile
- Calculate the PD, LGD and EAD at account level

Generally, upon moving to IRB, PL receive higher RWA

STA vs. IRB Sensitivity

Personal Loans example

Note: Numbers are for illustration purposes only.

Standardized RWA

	Good Book	Default Book	Overall Portfolio
Risk Weight%	75%	100%	80%
EAD	$725m	$ 175m	$900m
RWA = (EAD * RW)	544	175	719

- Standardized RWA less sensitive to risk
- Risk weight primarily based on delinquency status

IRB RWA

EAD	=	$900m
LGD	=	89%
PD (Non-defaults)	=	3.5%
Risk Weight%	=	120.6%
RWA (RW * EAD)	=	$1085m

- IRB RWA is more sensitive to the portfolio's risk profile
- Calculate the PD, LGD and EAD at account level

Generally, upon moving to IRB, PL receive higher RWA

STA vs. IRB Sensitivity

Credit Cards example

Note: Numbers are for illustration purposes only.

Standardized RWA

	Good Book	Default Book	Overall Portfolio
Credit Limit	3,500	500	4,000
Outstanding	$725m	$ 175m	$900
EAD	$725m	$ 175m	$900m
Risk Weight % EAD	75%	150%	**90%**
RWA (EAD * RW)	$544m	$263m	$806m

- Standardized RWA less sensitive to risk.
- Risk weight primarily based on delinquency status

IRB RWA

Credit Limit	=	4,000
Outstanding	=	$900
EAD	=	$2,895m
LGD	=	85%
PD (Non-defaults)	=	11%
Risk Weight % EAD	=	**55%**
RWA (RW * EAD)	=	$1,592m

- IRB RWA is more sensitive to the portfolio's risk profile.
- Calculate the PD, LGD and EAD at account level.

Generally, upon moving to IRB, CC receives a higher RWA

SCB Group Risk Appetite Statement

- The Group's pursuit of its strategic goals, and pursuit of financial performance, is **constrained** by a *risk appetite statement*.
- The statement does not advise what to do, just the boundary of risk taking behaviour.

Key Risk Appetite Message

The Group manages its risks to build a sustainable franchise in the interests of all of its stakeholders

In deep recessionary conditions, the Group should be able (but not obliged) to pay at least the prior year's dividend out of current year's profit

The Group should be able to maintain a prudent buffer over the minimum regulatory capital requirements without recourse to external sources

The Group should be able to meet its payment and collateral obligations under extreme but plausible liquidity stress scenarios without recourse to extraordinary central bank support

The Group will protect its reputation to ensure that there is no material damage to the Group's franchise

How Risk Appetite is Assessed and Monitored at the Group Level

An Economic Cycle Stress Test – "Deep Recession"

1 *Deep Recessionary Environment*

- **Test ability to pay dividends**
  - What would be the Group's PAT?
- **Test ability to maintain a prudent capital buffer**
  - What would be the Group's capital resources?
  - What would be the regulatory capital requirement?

2 *Requires Modelling*

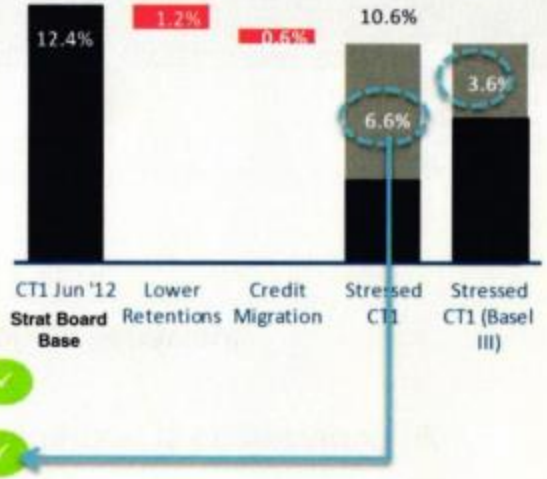
- Credit grade migration and hence credit RWA, loan impairments
- Changes in business volumes – e.g., Financial Markets, originations in RB
- Movements in interest rates, and hence net interest margins
- Offsetting actions taken by management – such as changes in originations volumes

3

Ability to Pay Dividends

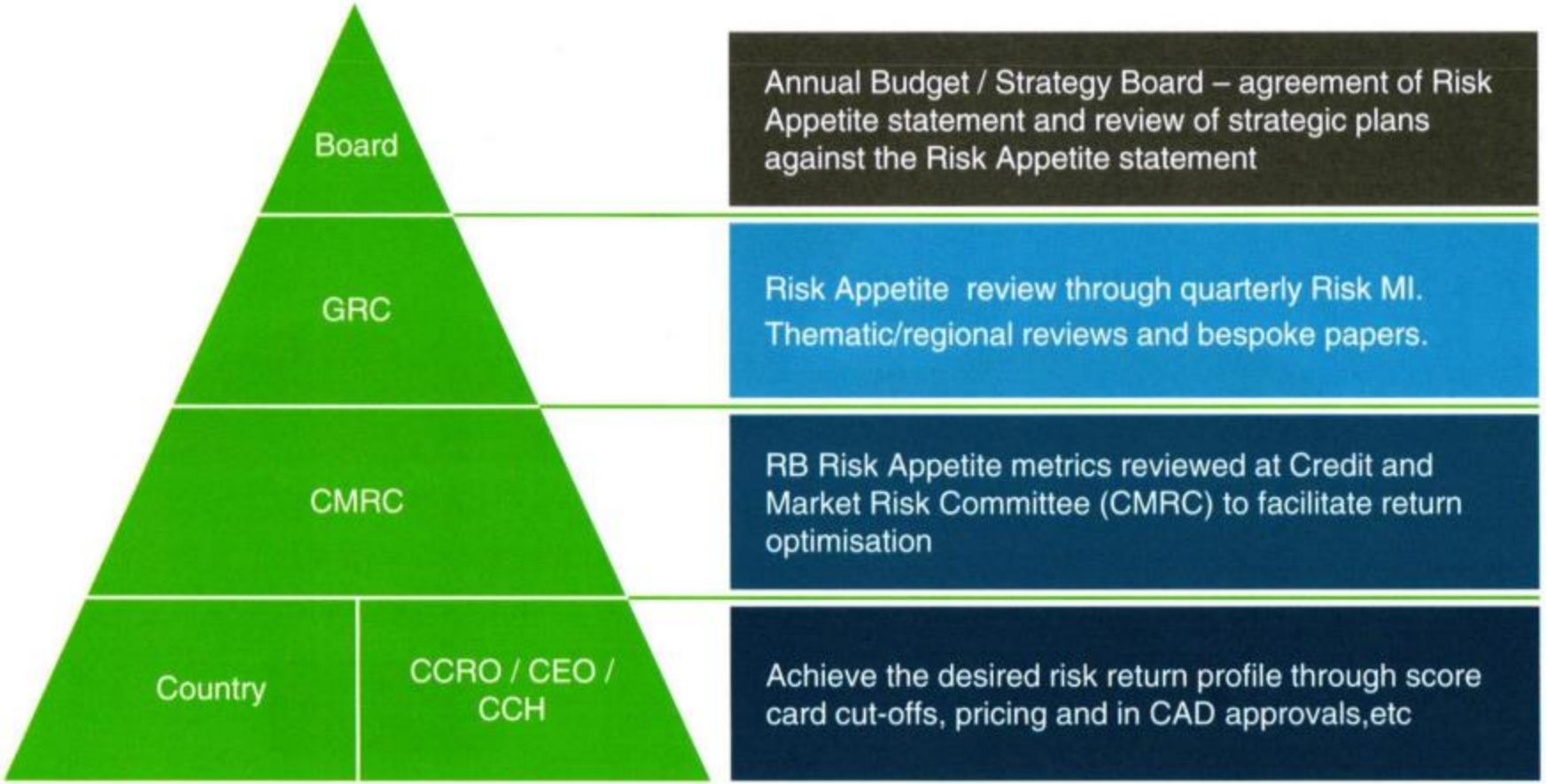
$1.65bn dividend

Ability to Maintain a Prudent Capital Buffer

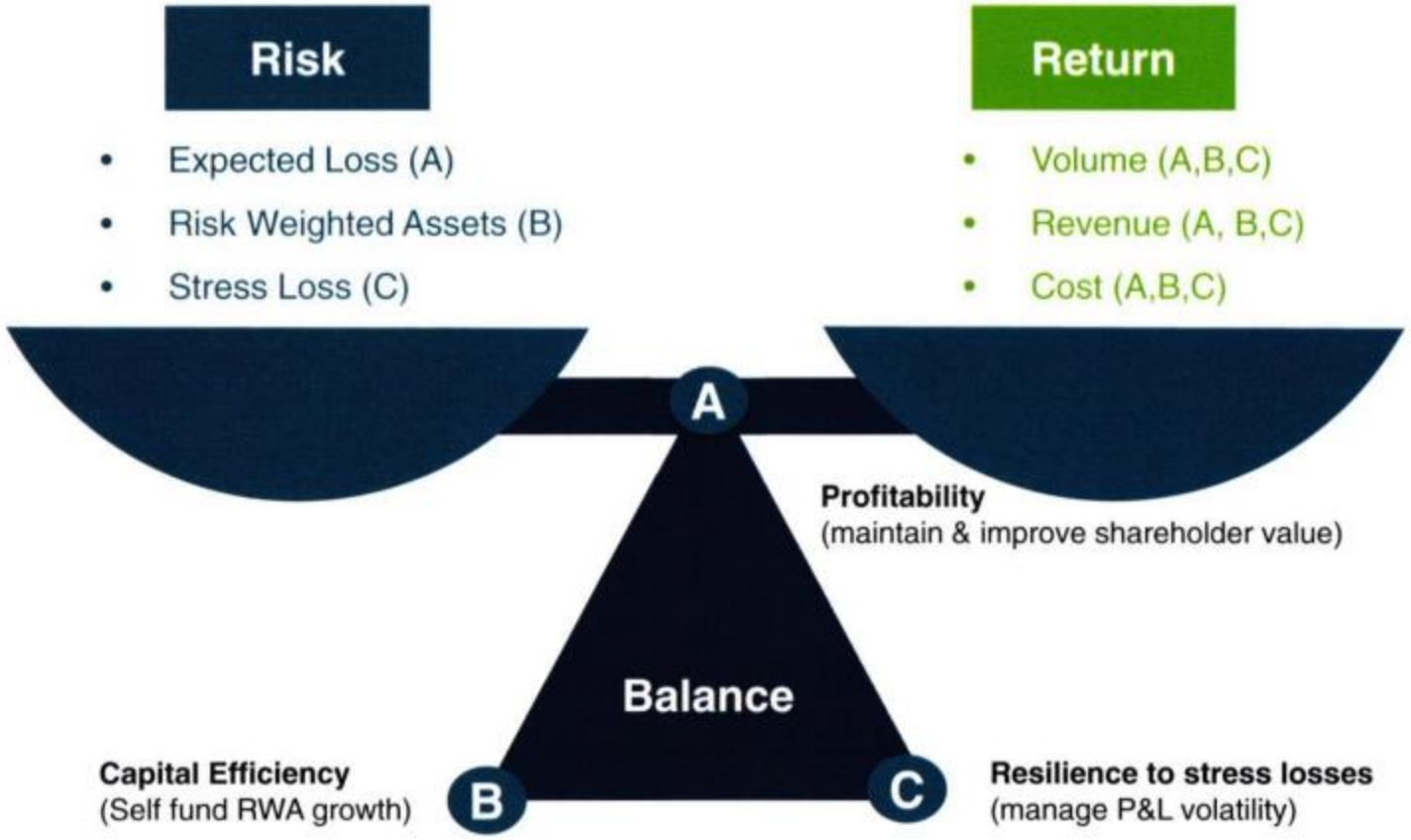


- **USD 888m PAT after dividends in stress**
- **6.6% (under Basel II) capital buffer in stress**
  < 3.6% (under Basel III) capital buffer in stress

How Risk Appetite is Assessed and Monitored at the Group Level



RB Risk and Return Framework Balancing metrics



Key Metrics for Portfolio Management

Key Principles	A Country Level Measure	A Product / Segment Level Measure	
A Profitability	1) Economic Profit (EP)	1) Economic Contribution	**Remarks** Country level metrics includes all costs and LI to reflect holistic performance of the business Product and segment level metrics are on an economic basis with incremental costs to support decisions on pricing, risk actions and incremental volume
A Capital Efficiency	1) Income RoRWA 2) Risk Adjusted RoRWA 3) OP RoRWA	1) Income RoRWA 2) Risk Adjusted RoRWA	
A Resilience to Stress Losses	1) Recession Loss Multiplier (WP RLM)	1) Recession Loss Multiplier (WP RLM)	

Levers to Manage Risk Appetite

Level 1	Line Optimisation
Level 2	Credit Quality Mix
Level 3	Pricing and Scorecard Cut-off
Level 4	Impact of Cost

Note!

- Assumptions are made to mute certain business dynamics to more clearly make a point.
- We will mention these assumptions as we discuss the levers
- Ultimately any strategy will involve a number of business and risk dynamics which you would need to capture by working with Risk, Product and Marketing Analytics teams

Lever 1 – Line Optimization

Sensitivity Analysis

Limits drive EAD and hence capital requirements.
Which line management strategy would you take to optimise your RWA usage?

- Strategy 1: Increase lines 20% on RG 1 – 5 (low risk grades) - no impact to utilization (@ 14%)
- Strategy 2: Increase lines 20% on RG 1 – 5 (low risk grades) - drive spend to increase utilization to 20%
- Strategy 3: Decrease lines by 20% in RG 8-12 (high risk grades) with no impact to revenue

	Revenue (USD m)	Limit (USD m)	Outstanding (USD m)	EAD (USD m)	Utilization	EL (USD m)	RWA (USD m)	Economic Contribution(USD m) (A)	Risk Adj RoRWA (B)	Revenue RLM (C)
Base	185	12,224	1,697	7,462	14%	68	1,839	118	6.40%	0.74
Strategy 1	185	14,189	1,697	8,481 (a)	12%	69	1,917 (b)	116	6.07%	0.76
Strategy 2	242	14,189	2,826	9,026	20%	70	1,953	239	9.04%	0.58
Strategy 3	185 (c)	12,024	1,697	7,276	14.11%	58	1,634	127	7.78%	0.64

Points to Note:

a) A proportion of unused lines is included in EAD and hence in RWA & EL. EAD model re-calibration will recognize good line management strategies and will reward with lower RWA

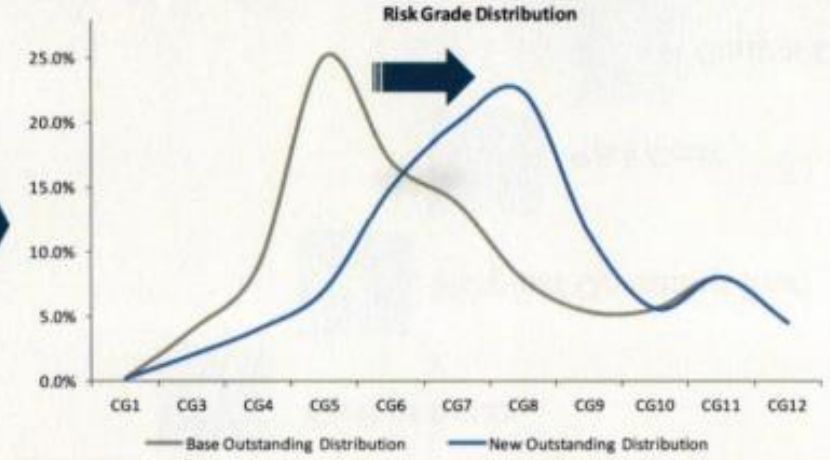
b) It's okay to increase lines in the right segments - encourage line usage

c) Model impacts to revenue and attrition through tests. Ultimately, a line decrease strategy should also look at more segments than just Risk Grade including revolver vs. transactor, active vs. inactive, etc.

Lever 2 – Credit Quality Mix

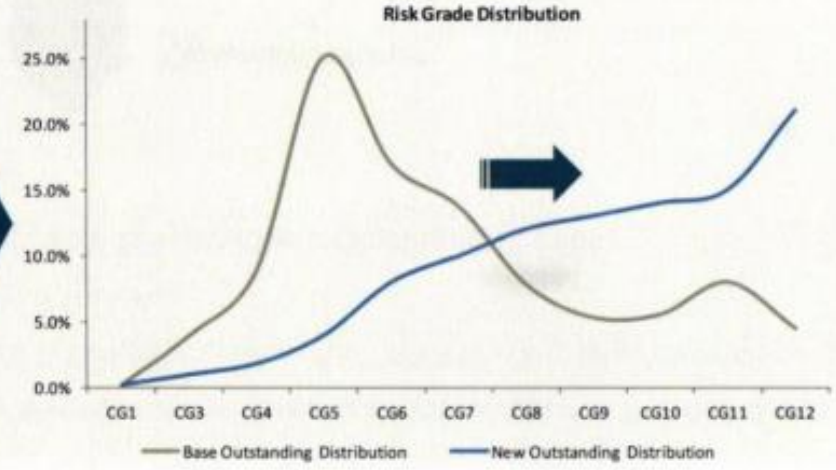
The quality of assets drives capital required – hence return on RWA.
Which portfolio mix maximises revenue within RoRWA and RLM guardrails?
Assume we budgeted for 6% RoRWA and 0.8x RLM

Shift Assets to Medium Risk Grade



		Base	Scenario 1
A	Economic Contribution(USD m)	45	63
B	Risk Adj RoRWA	7.4%	6.8%
C	RevenueRLM	0.7x	0.8x

Shift Assets to High Risk Grade



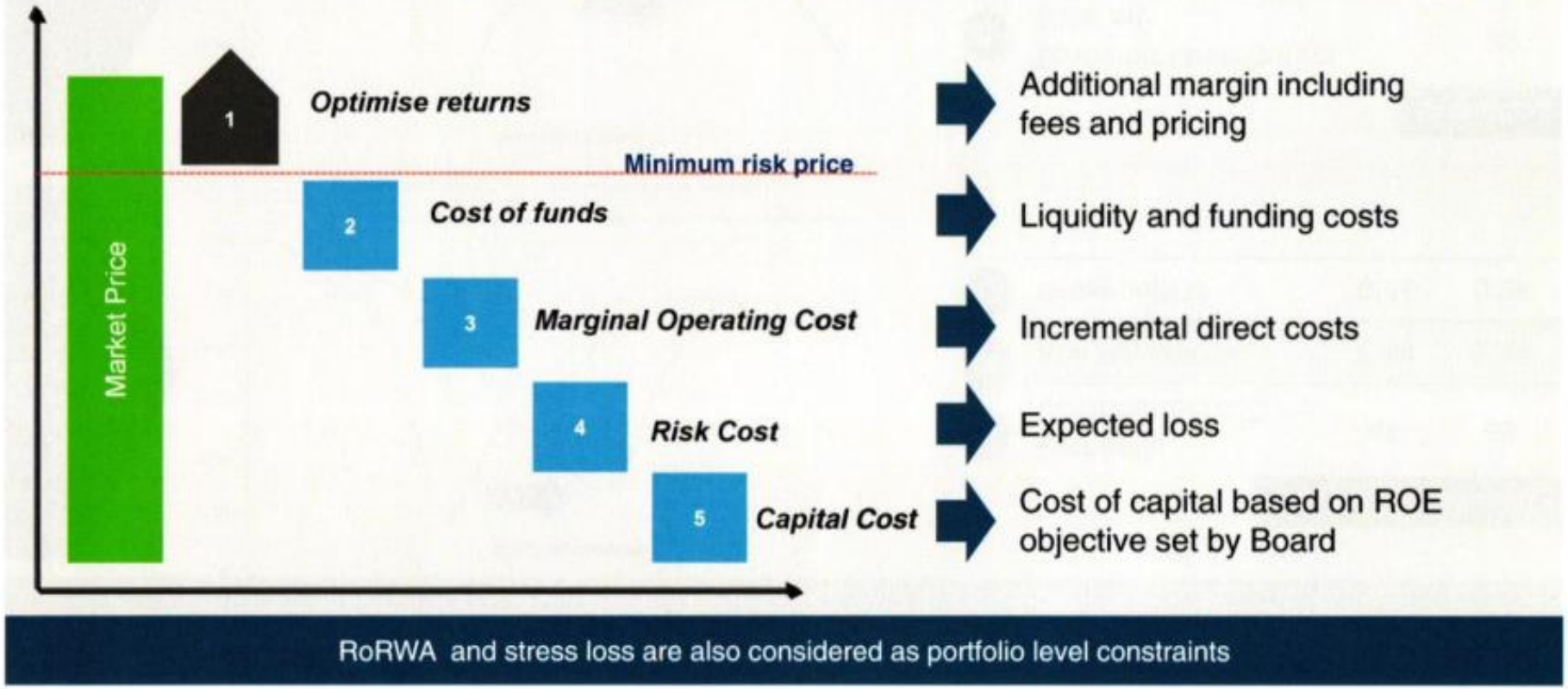
		Scenario 2
A	Economic Contribution (USD m)	47
B	Risk Adj RoRWA	4.2%
C	RevenueRLM	1.0x

For Simulation purpose only. Not based on actual data!

RLM = Recession Loss/Revenue
Risk Adj RoRWA = (Revenue-EL)/CRWA

Lever 3 – Customer & Product Pricing Framework

- Pricing consists of volume & market considerations (1) & risk based pricing elements (2-5)
- Returns are optimised considering : market price, regulatory caps, customer sensitivity, strategy, volume, relationship & rewards
- The aggregate of 2-5 provides a minimum risk price



RoRWA and stress loss are also considered as portfolio level constraints

Lever 3 – Risk-Based Pricing and Scorecard Cut-Off

Example

Before Pricing Change

1. Cut-of at Risk Grade F (85% of TTD Volume)
2. Low EP, RoRWA and high RLM

After Pricing Change

3. Pricing leads to portfolio optimization
   EP% positive with improvement in RoRWA and RLM
4. The new pricing strategy resulted in expanding the target segment to additional risk grade. (93% of TTD volume)

Existing Pricing	A (Low risk)	B	.....	F	G	H (high risk)	Total @ cutoff
Outstanding%	10%	14%	.....	7%	8%	6%	85%
Revenue %*	5.4%	5.5%	.....	9.5%	11%	15%	9.5%
A EP%*	2.1%	1.4%	.....	1.2%	1.1%	1.4%	1.2%
B Risk AdjRoRWA (cumulative)	6.4%	4.6%	.....	3.4%	3.3%	3.3%	3.4%
C RLM (cumulative)	.5x	.7x	.....	1.1x	1.2x	1.2x	1.1x

Proposed Pricing	A (Low risk)	B	.....	F	G	H (high risk)	Total @ cutoff
Outstanding%	10%	14%	.....	7%	8%	6%	93%
Revenue (%)*	5.1%	5.2%	.....	12.0%	15.0%	17.0%	15%
EP%*	1.9%	1.2%	.....	3.0%	3.9%	2.8%	3.9%
Risk AdjRoRWA (cumulative)	6.0%	4.5%	.....	4.2%	4.3%	4.3%	4.3%
RLM (cumulative)	.5x	.7x	.....	0.9X	0.9x	0.9x	0.9x

Three Things to Watch

- Avoid adverse selection on high risk customers
- Avoid changing customer behavior by changing the APR
- Avoid a reduction in response rates

Test and Learn

* As a percentage of outstanding

Lever 4 – Impact of Cost

However, bear in mind 3 things...

1. Cost is a component of OP RoRWA which is a country level measure.
2. Tight cost management creates capacity to absorb losses.
3. Cost is not a component of segment and product level metrics - hence should not influence trade-off decisions at that level.

	OPRoRWA			Cost/Income		
	2010 A	2011 A	2012 B	2010 A	2011 A	2012 B
RB	2.37%	2.15 %	2.39%	70%	70%	66%
Korea	1.13%	-0.38%	1.24%	75%	90%	68%

Korea - Cost Restructuring Improves Returns

Points to Remember

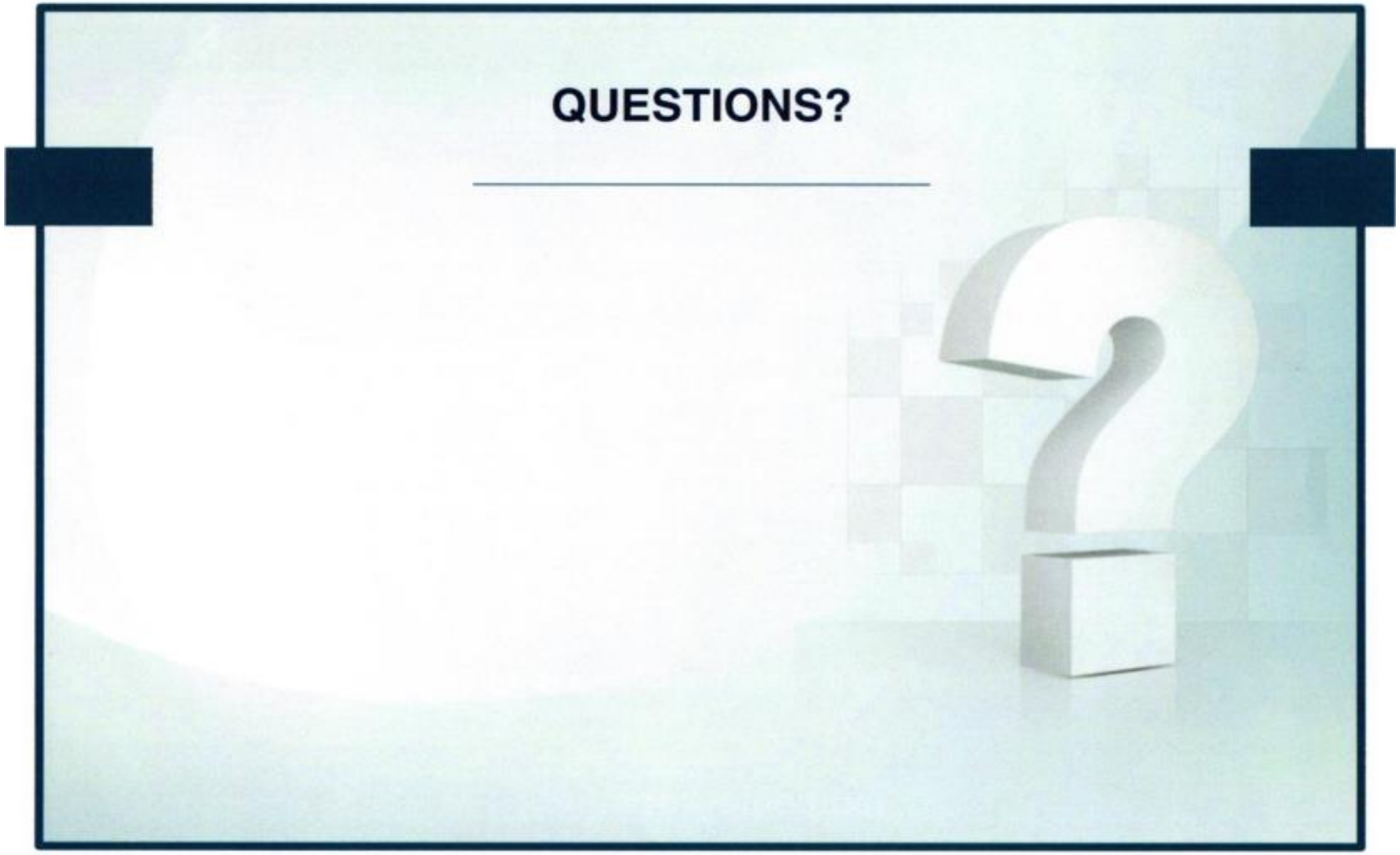
Let's revisit some of the most important points in this sections

- Driving return on RWA is consistent with driving ROE and capital ratios and in turn optimizes RCAP.
- IRB approach to RWA is more risk-sensitive and supported by internally developed and FSA approved models for PD, LGD, and EAD.
- Standardised approach to RWA is less risk-sensitive – but we may use internal models of PD, LGD, EAD to determine EL.
- Three measures for portfolio management:
    A. EP – marginal EP positive
    B. RORWA – Improve return on RWA
    C. RLM – Control loss volatility
- Optimize Risk Based pricing & scorecard cut-offs, line strategies, etc by understanding trade-offs between metrics across the portfolio

Points to Remember continued

- Checklist to help manage RCAP and RORWA.
- Review risk appetite metrics regularly – do you have an operating rhythm in place?
- Review your Portfolio Mix (credit quality, product, etc.) monthly.
- Review the EL on your TTD population monthly, and monthly vintage trends.
- Review RWA monthly to understand trends.
- Have you optimized Risk Based Pricing?
- Review model performance
- Review Collections staffing and effectiveness

Questions



Notes