COMMONWEALTH HORIZON
PLANNING THE FUTURE OF SOVEREIGN DEBT

Managing Sovereign Debt

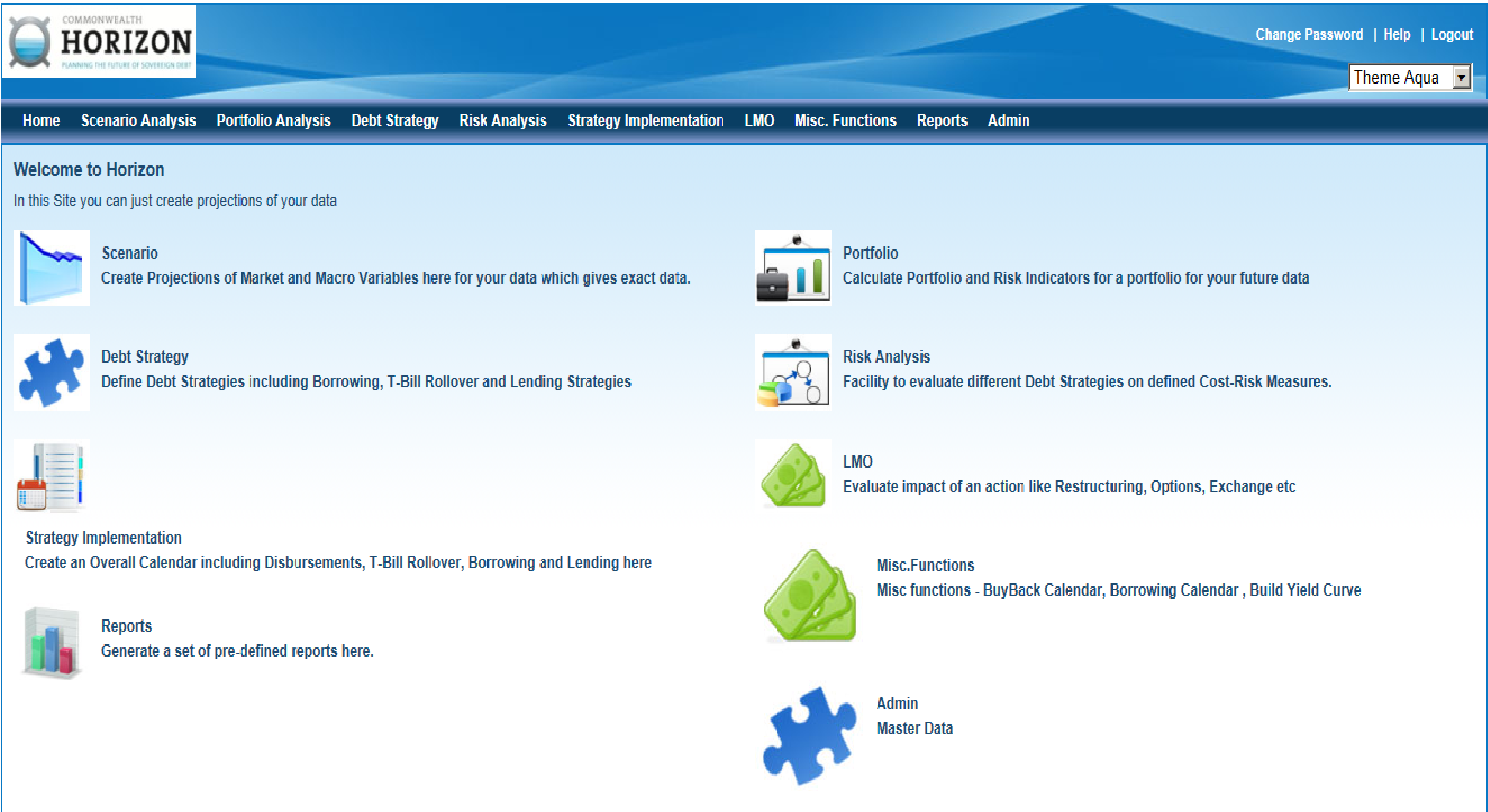
ComSec/CARADEM Forum
June 2013

Strategic Debt Management …

- Management of government debt within a cost-risk framework
- Asset-liability management framework (government fixed-income liability, fixed-income assets)
- Serves as a planning tool for debt strategy formulation and development of borrowing plan (medium term debt strategy, integration of govt cash & debt mgmt, ABP, Issuance Calendar)
- Assess LMO/Restructuring options

Decision support system for debt managers

All the necessary tools for strategy formulation & implementation in one box …



Horizon: A tool for Debt Managers

- Horizon aimed at middle and front office functions
  - Business-friendly, Flexible use
  - Business process cutting across BO, MO and FO

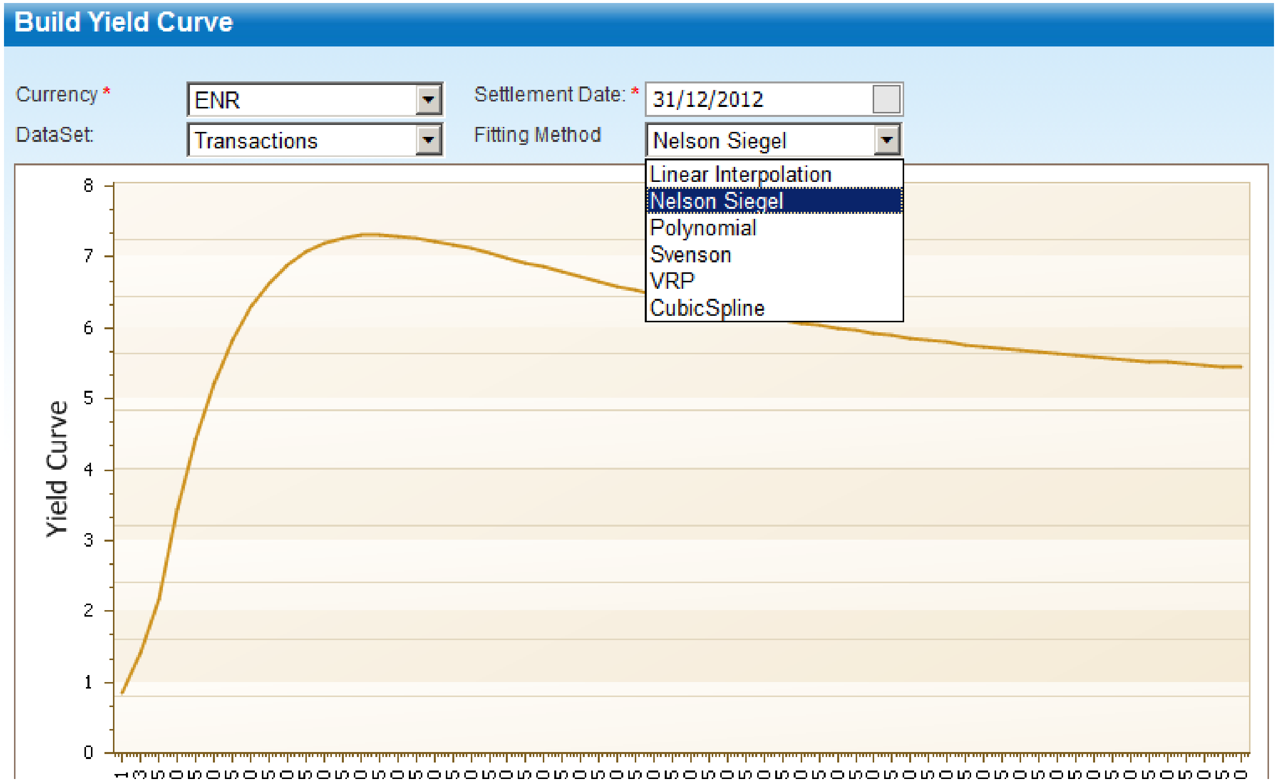
BO	MO	FO
Importing existing debt data into Horizon	Strategy Formulation	ABP
Importing on macro and market data	ABP	Issuance Calendar
	Risk Monitoring	Liability Management Operations

Comprehensive Instrument Coverage in Horizon

- Include fixed-income financial liabilities and assets
- Risk analysis based on Gross Debt or Net Debt concept

Loans	Securities	LM Options/ Instruments
Fixed-rate	Fixed-rate	Buybacks, Switches
Floating-rate	Floating-rate	Put / Call
Embedded Options	Zero Coupons	Swaps / Conversions
	Indexed	Rescheduling / Write Offs

Supports Sophisticated Yield Curve Analysis



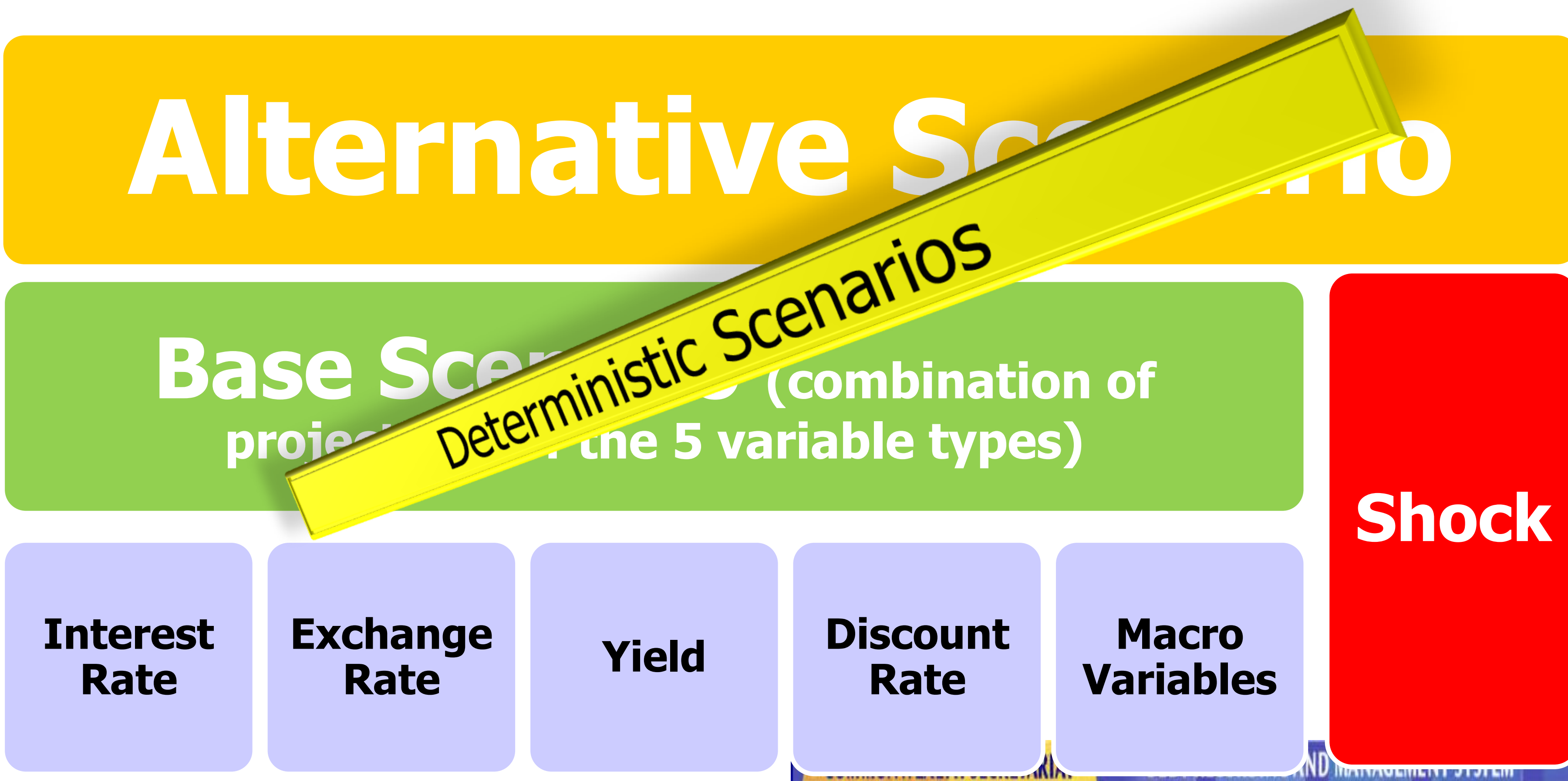
- Generates Spot Curve, Par Yield Curve and Discount Curve
- Includes all of the widely used yield curve fitting methodologies.
  - Based on Local bond transactions or Market prices of other currencies
- Fitted yields can be used scenario projection, valuation of securities, …

Scenario Analysis

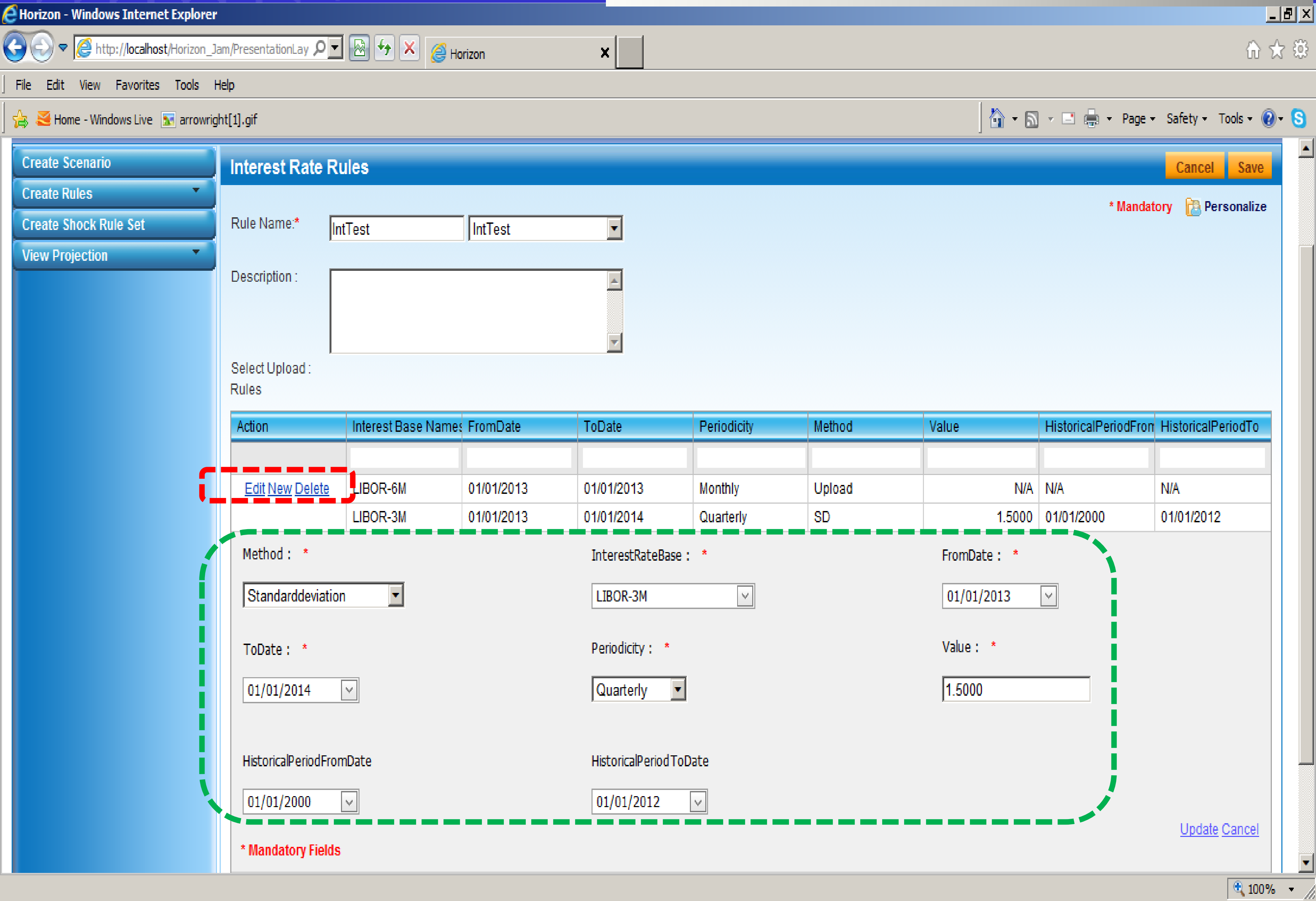
Commonwealth Secretariat

Scenario Analysis

- Future scenarios of market and macro variables
- Impact on the future debt service payments and key debt sustainability ratios



Interest Projection



Scenario Analysis - Projection Rules

Interest Rate	• BP Chg, SD, Yield, Abs Value, Abs Mean Dev.
Exchange Rate	• SD, % Chg, PPP[1], IRP[2], Abs Value, Abs Mean Dev.
Yield	• Parallel Shift[3], Forward Rates[4], Abs Value, Interactive Graph
Discount Rate	• BP Chg, SD, Abs Value, Abs Mean Dev.
Macro Variable	• % Chg, SD, Abs Value, Abs Mean Dev.
SHOCK	• SD, % Chg, Abs Mean Dev.

(1) Inflation series to be available
(2), (3), (4) – Corresponding yield curve to be available

Projections Upload

Create Scenario
Create Rules
Create Shock Rule Set
View Projection
Scenario Projection
Interest Rate Projection
Exchange Rate Projection
Yield Projection
Discount Rate Projection
Macro Variable Projection

Scenario Projection View

Scenario * Projections 2013-2018

* Mandatory

Shock Rule: USD-200bps

From Date * 01/01/2013 To Date * 01/01/2015

View Projection

Exchange | Interest | YieldRate | DiscountRate | MacroVariable

Interest Projection

Quarterly

Export to PDF | Export to XLS

CurrencyName	BaseRate	Jan 2013	Feb 2013	Mar 2013	Apr 2013	May 2013	Jun 2013	Jul 2013
LIBOR-JPK	0.3294	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000
LIBOR-6M	0.7077	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000
LIBOR-3M	0.4183	0.4500	0.4500	0.4500	0.4500	0.4500	0.4500	0.4500

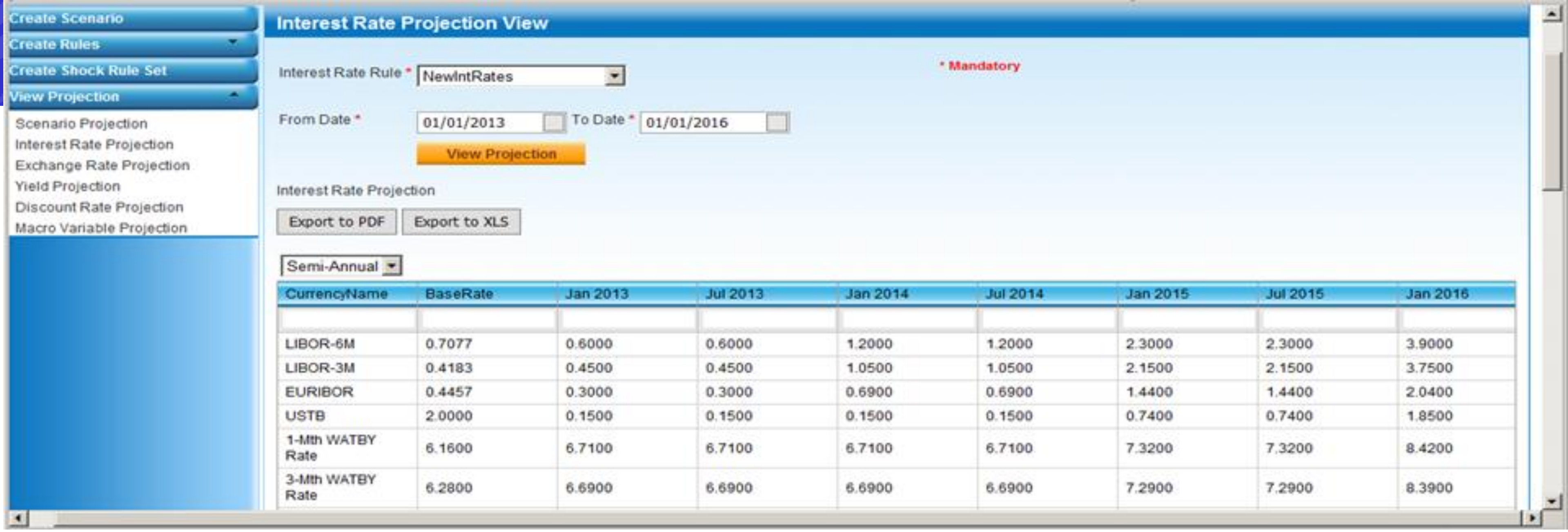
InterestRate Projection with Shock

Monthly

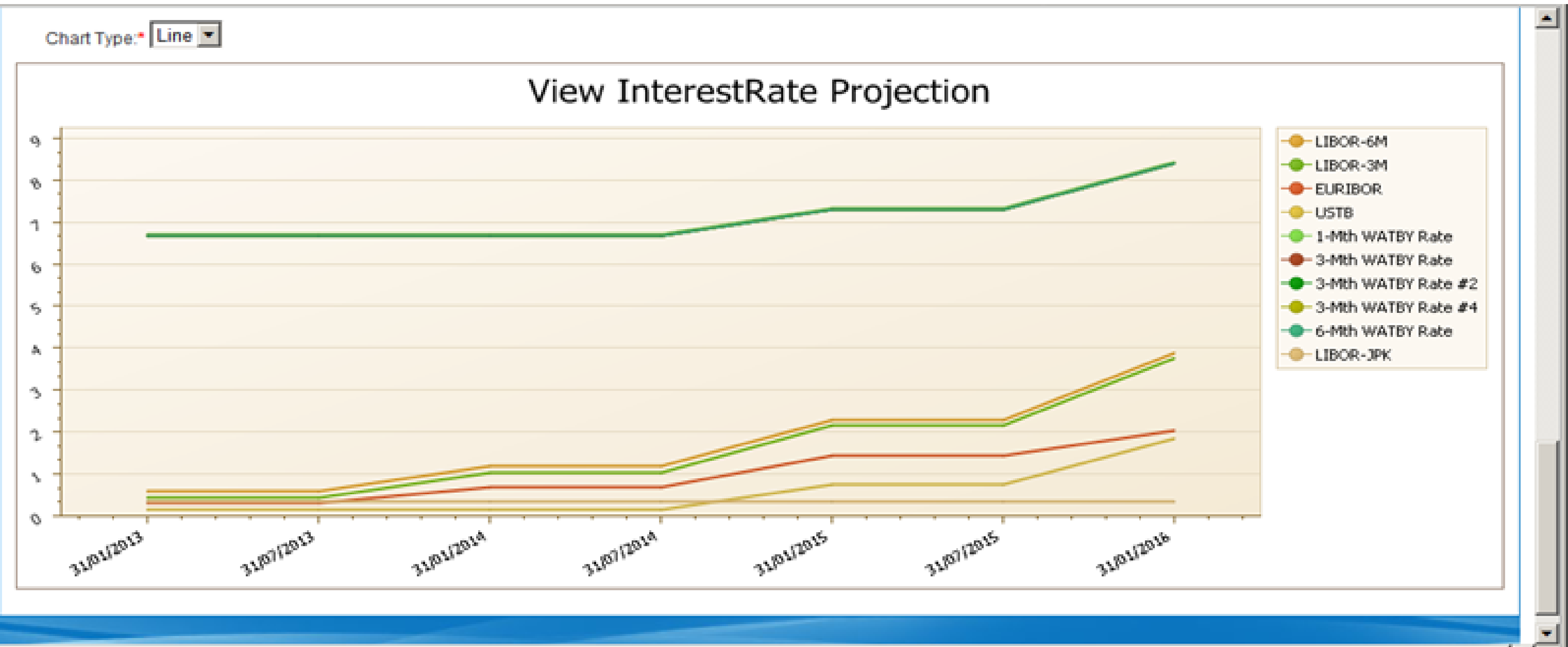
Export to PDF | Export to XLS

CurrencyName	BaseRate	Jan 2013	Feb 2013	Mar 2013	Apr 2013	May 2013	Jun 2013	Jul 2013
LIBOR-JPK	0.3294	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000
LIBOR-6M	0.7077	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000
LIBOR-3M	0.4183	0.4500	0.4500	0.4500	0.4500	0.4500	0.4500	0.4500
EURIBOR	0.4457	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000
USTB	2.0000	0.1500	0.1500	0.1500	0.1500	0.1500	0.1500	0.1500
1-Mth WATBY Rate	6.1600	6.7100	6.7100	6.7100	6.7100	6.7100	6.7100	6.7100
3-Mth WATBY Rate	6.2800	6.0500	6.0500	6.0500	6.0500	6.0500	6.0500	6.0500
3-Mth WATBY Rate #2	6.2100	6.0500	6.0500	6.0500	6.0500	6.0500	6.0500	6.0500
3-Mth WATBY Rate #4	6.2800	6.0500	6.0500	6.0500	6.0500	6.0500	6.0500	6.0500
6-Mth WATBY Rate	6.6300	5.8200	5.8200	5.8200	5.8200	5.8200	5.8200	5.8200
3-Mth WATBY								

100%



CurrencyName	BaseRate	Jan 2013	Jul 2013	Jan 2014	Jul 2014	Jan 2015	Jul 2015	Jan 2016
LIBOR-6M	0.7077	0.6000	0.6000	1.2000	1.2000	2.3000	2.3000	3.9000
LIBOR-3M	0.4183	0.4500	0.4500	1.0500	1.0500	2.1500	2.1500	3.7500
EURIBOR	0.4457	0.3000	0.3000	0.6900	0.6900	1.4400	1.4400	2.0400
USTB	2.0000	0.1500	0.1500	0.1500	0.1500	0.7400	0.7400	1.8500
1-Mth WATBY Rate	6.1600	6.7100	6.7100	6.7100	6.7100	7.3200	7.3200	8.4200
3-Mth WATBY Rate	6.2800	6.6900	6.6900	6.6900	6.6900	7.2900	7.2900	8.3900

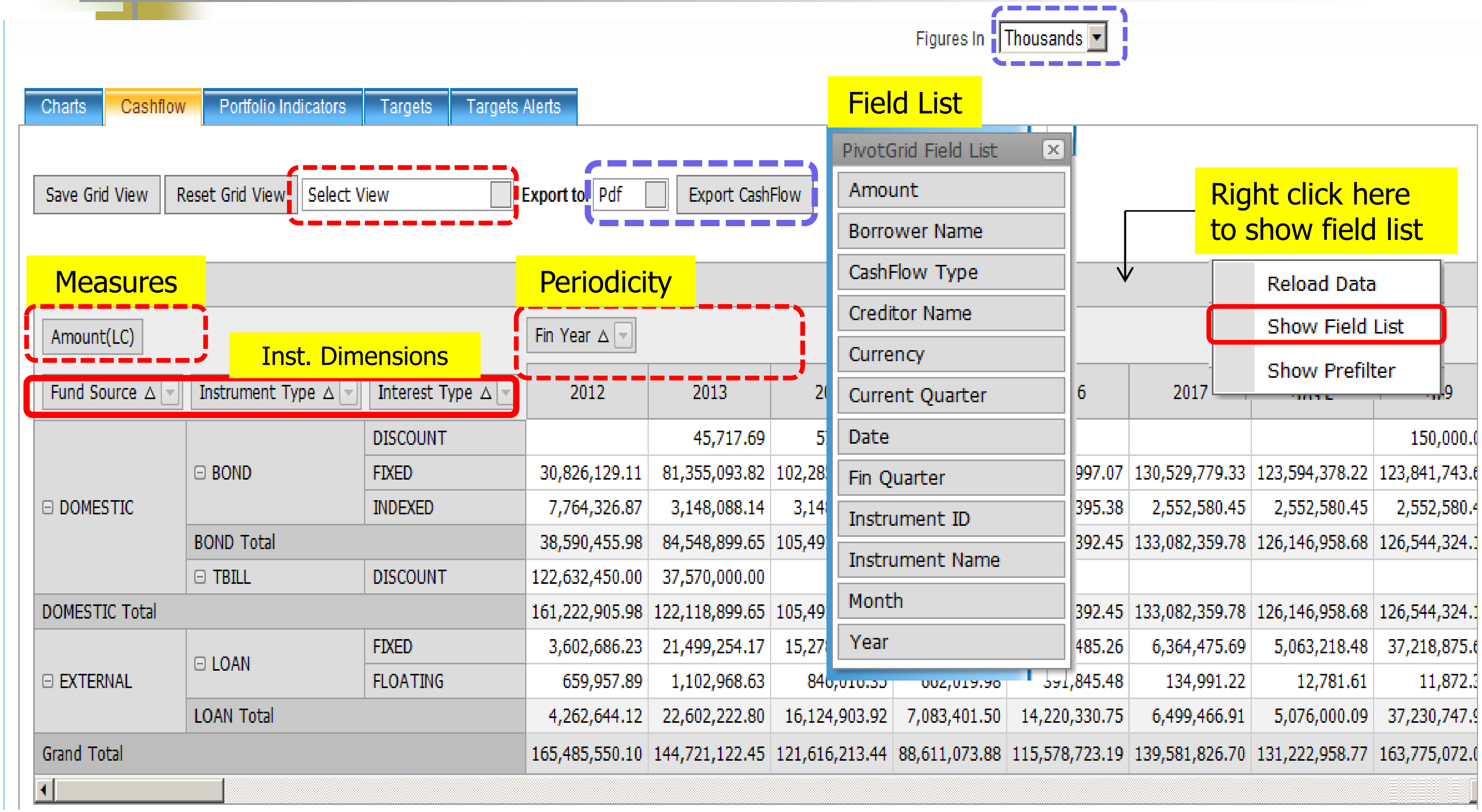


Portfolio Analysis

Portfolio Analysis

- Can slice and dice the entire portfolio across several dimensions – drag & drop
- Cash Flows can be analysed up to maturity on a daily basis
- Portfolio composition and risk indicators can be viewed up to maturity on a monthly basis

Portfolio Analysis - Cashflows



Commonwealth Secretariat

The Commonwealth is a voluntary association of 53 states

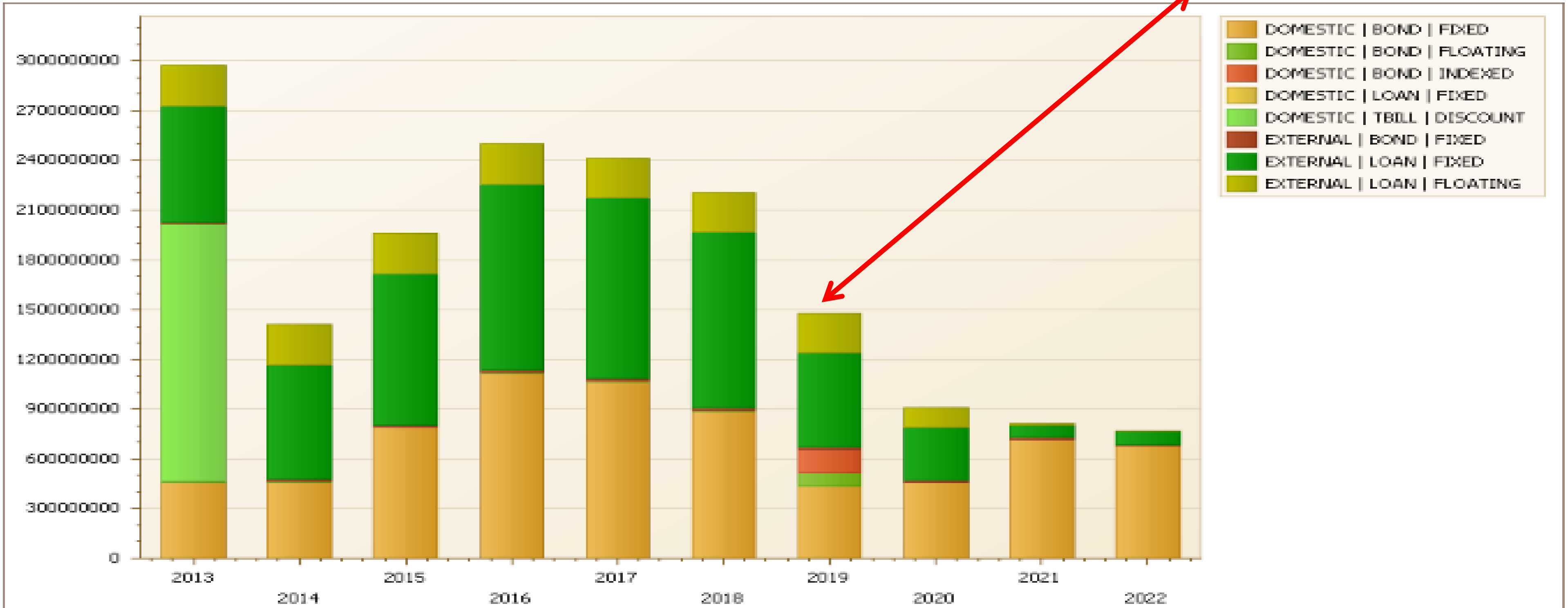
Portfolio Analysis – Cashflow linked Dynamic charts

Drop Filter Fields Here

Amount(LC)

Year

Fund Source	Instrument Type	Interest Type	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
DOMESTIC	BOND	FIXED	458,654.87	458,654.87	788,567.67	1,117,172.31	1,067,971.31	886,969.98	437,990.24	61,535.00	718,927.50	679,590
		FLOATING	4,875.00	4,875.00	4,875.00	4,875.00	4,875.00	4,875.00	77,437.50			
		INDEXED	3,528.32	3,528.32	3,528.32	3,528.32	3,528.32	3,528.32	144,661.17			
	BOND Total		467,058.19	467,058.19	796,970.99	1,125,575.63	1,076,374.63	895,373.30	660,088.92	61,535.00	718,927.50	679,590
	LOAN	FIXED	443.99	443.99	443.99	443.99	443.99	443.99	561.28	556.84	552.40	547
	TBILL	DISCOUNT	1,550,000.00									
DOMESTIC Total			2,017,502.18	467,502.18	797,414.98	1,126,019.62	1,076,818.62	895,817.29	660,650.19	62,091.84	719,479.90	680,137
EXTERNAL	BOND	FIXED	10,740.00	10,740.00	10,740.00	10,740.00	10,740.00	10,740.00	10,740.00	10,740.00	10,740.00	10,740
	LOAN	FIXED	697,967.59	687,374.12	909,888.33	1,119,903.13	1,087,667.32	1,059,028.37	571,992.18	17,908.81	76,505.89	75,441
		FLOATING	244,949.07	243,074.31	241,279.39	239,593.13	238,040.83	236,670.51	235,546.23	20,513.35	7,491.59	4,540
	LOAN Total		942,916.66	930,448.43	1,151,167.72	1,359,496.26	1,325,708.15	1,295,698.88	807,538.41	38,422.16	83,997.47	79,981
EXTERNAL Total			953,656.66	941,188.43	1,161,907.72	1,370,236.26	1,336,448.15	1,306,438.88	818,278.41	49,162.16	94,737.47	90,721
[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]



Identify, Analyse & Quantify a host of risk metrics

- Market & Refinancing risks (Stock, PV, PV01, ATM, ATR, Avg. Interest Rate, accrued interest, Duration, MD, convexity, Avg life, %DM, %DR, …)

Charts | Cashflow | PortfolioIndicators | CostMeasures

Save Gird View | Reset Grid View | Export to: Pdf | Export Indicators

PivotGrid Field List: Convexity, Currency Type, Debt Maturing %, Debt Refix %, DebtService, DebtService(LC)

Drop Filter Fields Here

Stock(LC) | PV(LC) | PV01 | ATM | ATR | Duration | MD

Fin Year: 2012

Shock	Strategy	Source	Instrument Type	Interest Type	tock(LC)	PV(LC)	PV01	ATM	ATR	Duration	MD
Base 2013 -16 - Base	Strategy 3	DOMESTIC	BOND	DISCOUNT	983,515.60	954,269.60	0.03	3.05	3.05	3.05	3.02
				FIXED	,388,635.31	1,199,134,796.13	0.07	9.83	9.83	7.26	7.19
				FLOATING	,358,146.16	23,772,971.33	0.21	34.77	0.25	21.58	21.37
			BOND Total		,730,297.08	1,223,862,037.05	0.07	10.14	9.70	7.44	7.36
			TBILL	DISCOUNT	,370,000.00	86,065,174.83	0.00	0.36	0.36	0.36	0.35
		DOMESTIC Total			,100,297.08	1,309,927,211.88	0.07	9.12	8.72	6.70	6.63
		EXTERNAL	LOAN	FIXED	,867,863.65	947,099,969.31	0.07	7.84	7.84	6.86	6.85
				FLOATING	,262,186.46	3,283,503.88	0.02	1.77	0.10	1.75	1.73
			LOAN Total		,130,050.11	950,383,473.19	0.07	7.81	7.81	6.84	6.83
	Strategy 3 Total				,230,347.18	2,260,310,685.07	0.07	8.51	8.29	6.76	6.72

Portfolio Analysis - Charts

- ✓ Profile – Principal, Interest, Total Debt Service and Debt Stock
- ✓ User defined Benchmarks/Indicators – User defined benchmarks, e.g., Debt/GDP, Duration, Proportion of Floating Rate Debt, etc.
- ✓ Composition – by Currency, Instrument Type, Interest Type, Creditor, fund source, maturity group, etc.

Portfolio Analysis – Targets & Alerts

RED shows targets being breached

Charts | Cashflow | Portfolio Indicators | Targets | Targets Alerts

Benchmark Name	Date	Range From	Range To	Actual Value
Net Debt - GDP	31/12/2010	40.0000	45.0000	65.5061
Net Debt - GDP	31/12/2011	35,000	40,000	59.7638
Duration (Securities)	31/12/2011	9.0000	14.0000	11.3718
PrincipaltoExpenditure	31/12/2010	30.0000	45.0000	60.6580

Charts | Cashflow | Portfolio Indicators | Targets | Targets Alerts

Bench Mark Name	Bench Mark Date	Range From	Date	Actual Value
Net Debt - GDP	31/12/2010	50.0000	31/12/2010	65.5061
Duration (Securities)	31/12/2010	3.0000	31/12/2010	11.9498
Duration (Securities)	01/05/2013	5.0000	31/05/2013	10.2892
Debt to GDP	31/12/2010	55.0000	31/12/2010	65.4579
Modified Duration	31/12/2010	3.0000	31/12/2010	11.5219

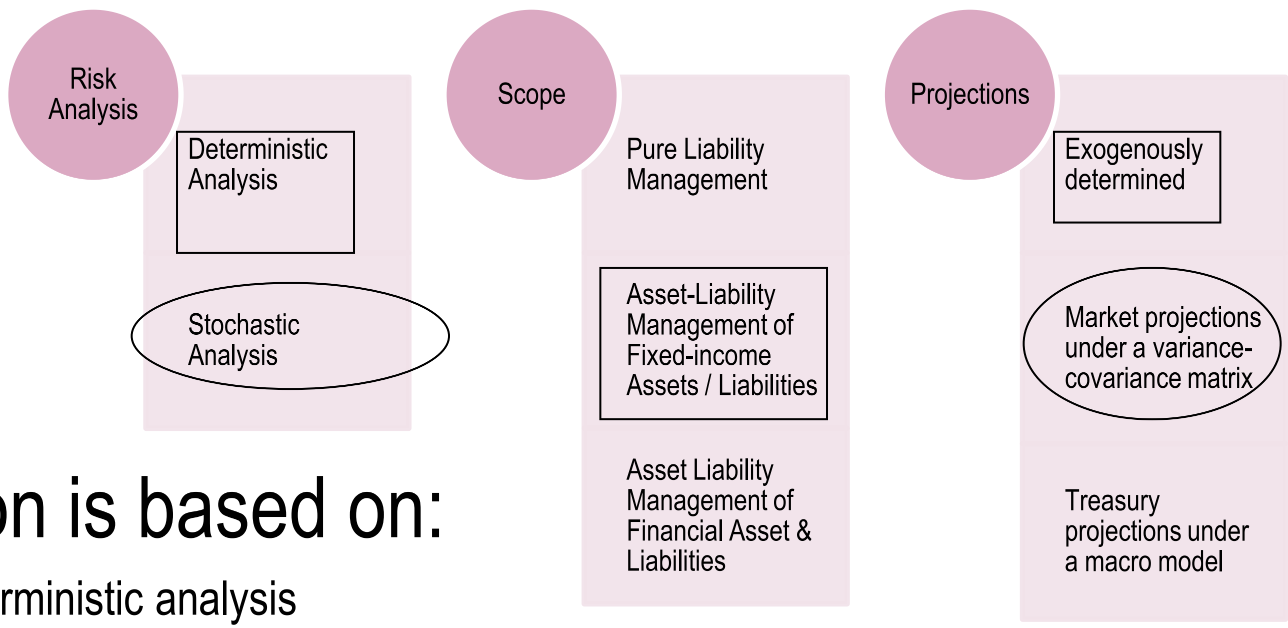
First dates when ongoing Risk limits breached

Debt Mgmt Strategy

Risk Management Framework in Horizon

Compare cost and risk of alternative borrowing strategies in the light of cash requirements, base scenario and possible shocks

- Cost-Risk Trade-off Analysis



- Horizon is based on:
  - a deterministic analysis
  - ALM of stocks of fixed-income financial assets & liabilities
  - can import market projections outside the tool or make exogenous projections within the tool
  - Planned **enhancement to stochastic analysis**

Debt strategy

Stylised instruments

Action	Name	Description	Portfolio Type	Instrument	Source	Currency	MaturityPe	GraceP	Interest Typ	InterestRate /	Floating / IndexVariable
Edit New Delete	IBRD-Prog	IBRD Programme Loan	BORROWING	Loan	External	USD	18	10	FLOATING	0.8000	LIBOR-6M
Edit New Delete	IBRD-Project	IBRD Project Loan	BORROWING	Loan	External	USD	30	5	FLOATING	0.5000	LIBOR-6M
Edit New Delete	IADB-Prog	IADB programme loan	BORROWING	Loan	External	USD	15	5	FLOATING	0.5000	LIBOR-6M
Edit New Delete	IADB-Project	IADB Proejct Loan	BORROWING	Loan	External	USD	16	6	FLOATING	0.0000	LIBOR-6M
Edit New Delete	CDB-1	CDB-1	BORROWING	Loan	External	USD	8	2	FIXED	2.5000	
Edit New Delete	CDB-2	CDB-2	BORROWING	Loan	External	USD	17	5	FIXED	4.8000	
Edit New Delete	OPEC	OPEC	BORROWING	Loan	External	USD	20	5	FIXED	4.5000	
Edit New Delete	China-USD	China- USD	BORROWING	Loan	External	USD	15	5	FIXED	3.0000	
Edit New Delete	China-Yuan	China-Yuan	BORROWING	Loan	External	CNY	20	5	FIXED	2.0000	
Edit New Delete	Global-USD-5Yr	Global USD 5Yr	BORROWING	Bond	External	USD	5	5	FIXED	0.0000	

Strategy

Borrowing

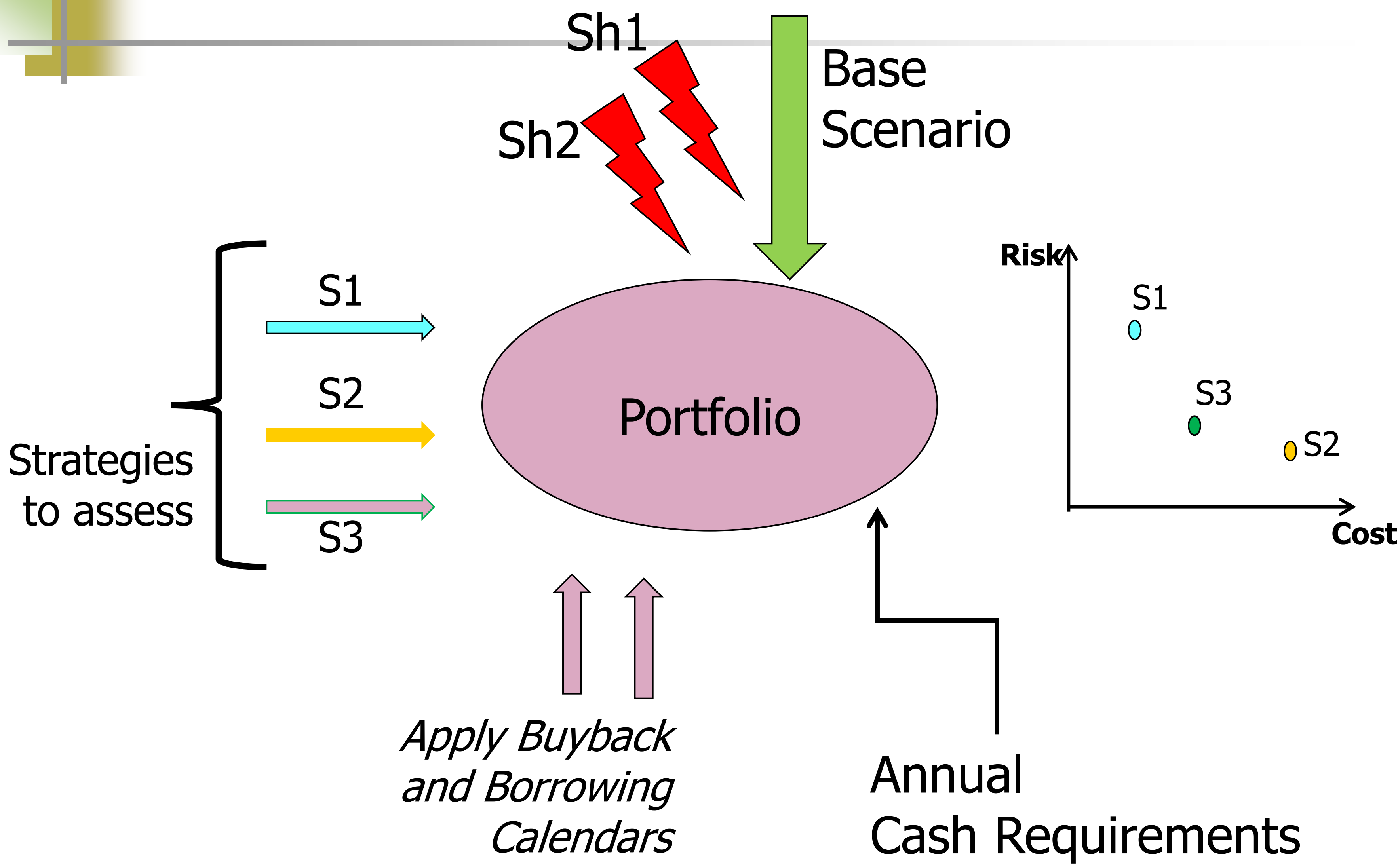
Action	StylizedInstrumentN	2011	2012
Edit New Delete	ML-CONC	20.000000	25.000000
Edit New Delete	ML-NC	30.000000	30.000000
Edit New Delete	10YBond	30.000000	45.000000
Edit New Delete	5YFL-Bond	20.000000	0.000000

Lending

Action	StylizedInstrumentn	2011	2012
Edit New Delete	5YDomLend	100.000000	100.000000

Action	MaturityPeriod	2011 RollOver	2011 StockInc	2012 RollOver	2012 StockInc
Edit New Delete	91	100.000000	20000000.000000	90.000000	0.000000
Edit New Delete	182	80.000000	0.000000	70.000000	0.000000

Risk Analysis Engine



Output – Cashflow/Indicators

Same as Portfolio Analysis

New Tab

Charts | Cashflow | PortfolioIndicators | CostMeasures

Save Gird View | Reset Grid View | Export to: Pdf | Export Indicators

Drop Filter Fields Here

Stock(LC) | PV(LC) | PV01 | ATM | ATR | Duration | MD

Fin Year

Shock | Strategy | Source | Instrument Type | Interest Type

Shock	Strategy	Source	Instrument Type	Interest Type	2013 Stock(LC)	2013 PV(LC)	2013 PV01	2013 ATM	2013 ATR	2013 Duration	2013 MD	2014 Stock(LC)	2014 PV(LC)	2014 PV01	2014 ATM	2014 ATR
Scenario 1 - Base	Strategy1	Domestic	Bond	Fixed	136,882.98	138,144.07	0.06	9.51	9.51	6.71	6.22	216,241.45	215,601.49	0.06	8.88	8.88
				Floating	136,882.98	107,233.84	0.04	4.51	0.00	4.32	4.01	203,015.04	166,988.16	0.03	3.83	0.00
			Bond Total		273,765.95	245,377.91	0.05	7.01	4.76	5.51	5.11	419,256.49	382,589.66	0.05	6.43	4.58
			Loan	Fixed	-50,000.00	-52,805.36						-100,000.00	-105,324.27			
		Domestic Total			223,765.95	192,572.55	0.06	7.96	5.20	6.21	5.76	319,256.49	277,265.39	0.06	7.74	5.31
		DOMESTIC	BOND	FIXED	4,833,920.80	5,405,759.76	0.04	5.98	5.98	4.36	4.07	4,833,920.80	5,282,728.95	0.03	4.98	4.98
				FLOATING	75,000.00	58,607.60	0.04	4.98	0.48	4.68	4.34	75,000.00	61,602.66	0.03	3.98	0.48
			BOND Total		4,908,920.80	5,464,367.37	0.04	5.97	5.90	4.37	4.07	4,908,920.80	5,344,331.60	0.03	4.97	4.91
			LOAN	FIXED	52,900.01	35,591.43	0.12	23.63	23.63	13.20	12.35	52,900.01	34,191.51	0.12	22.63	22.63
			TBILL	DISCOUNT	250,000.00	248,920.48	0.00	0.20	0.20	0.20	0.20	183,636.36	183,261.33	0.00	0.08	0.08
		DOMESTIC Total			5,211,820.81	5,748,879.28	0.04	5.87	5.81	4.26	3.97	5,145,457.18	5,561,784.45	0.03	4.97	4.92
			Bond	Fixed	205,324.46	212,553.14	0.03	4.51	4.51	3.75	3.48	324,362.18	335,482.71	0.03	3.87	3.88

New Dimensions

Charts

New Dimensions

Charts | Cashflow | PortfolioIndicators | CostMeasures

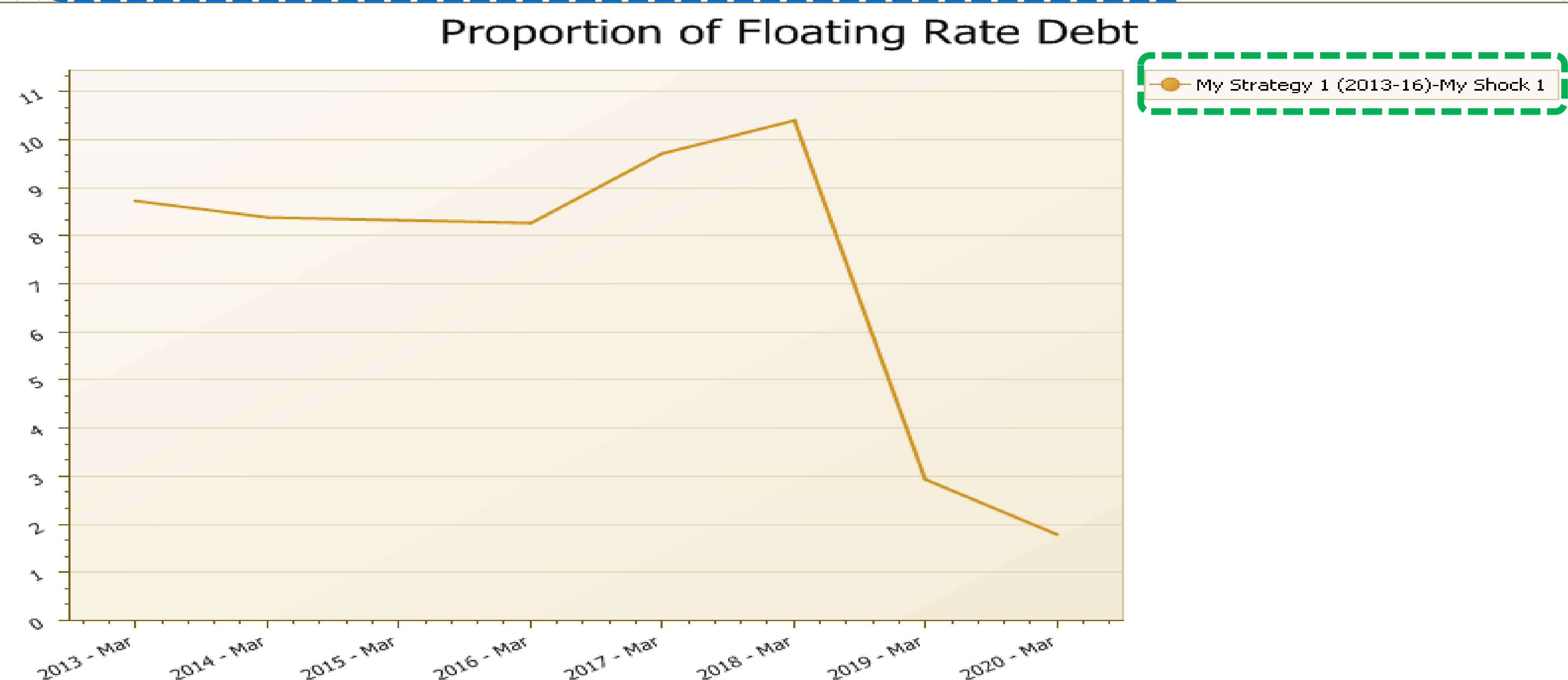
Strategy: My Strategy 1 (2013-16) Scenario/Shock: My Shock 1

Chart Type: Line Periodicity : FY

Indicators | Profile | Composition

Indicators : Proportion of Floating Rate Debt From Year : 2013 To Year : 2020 Get Chart

Same as portfolio analysis



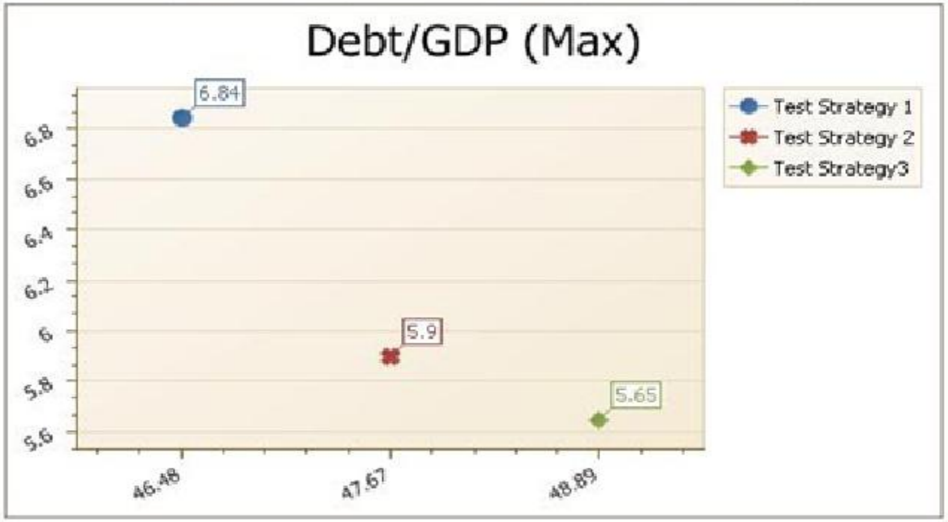
Cost Measures

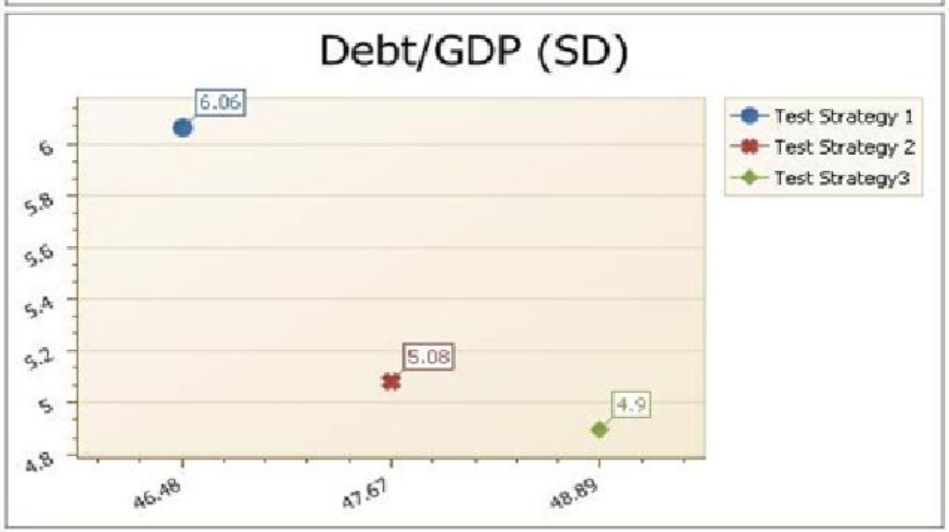
Cashflow | PortfolioIndicators | CostMeasures | Charts

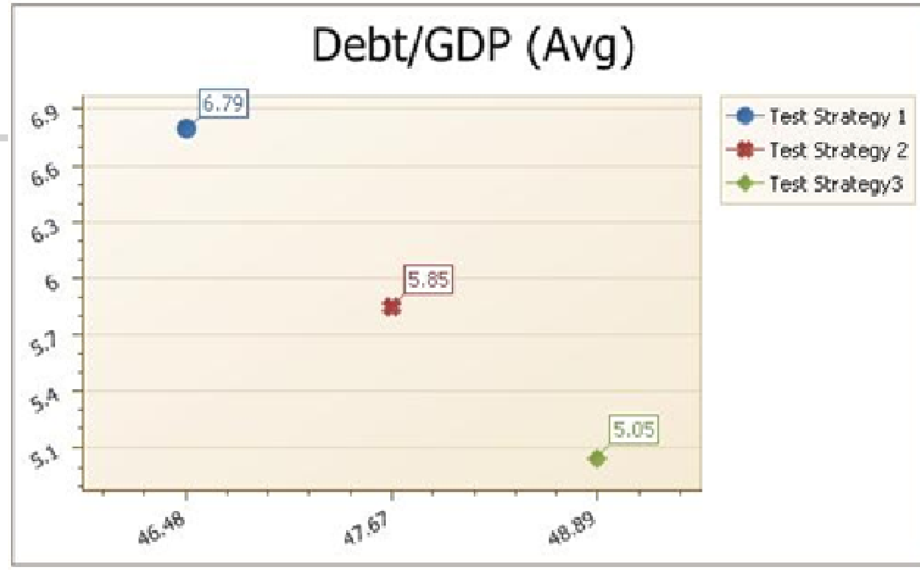
CostRiskName : Debt/GDP

Year : 2012

Strategy	Base	Max	Avg	Std
Test Strategy 1	46.48000	6.84000	6.79000	6.06000
Test Strategy 2	47.67000	5.90000	5.85000	5.08000
Test Strategy3	48.89000	5.65000	5.05000	4.90000

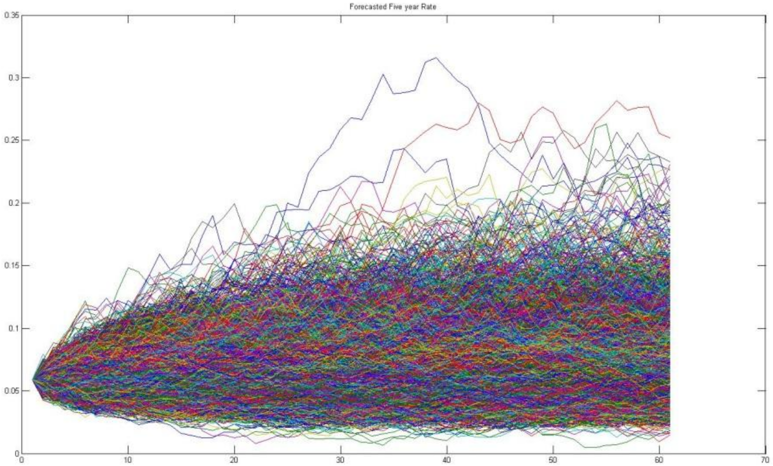




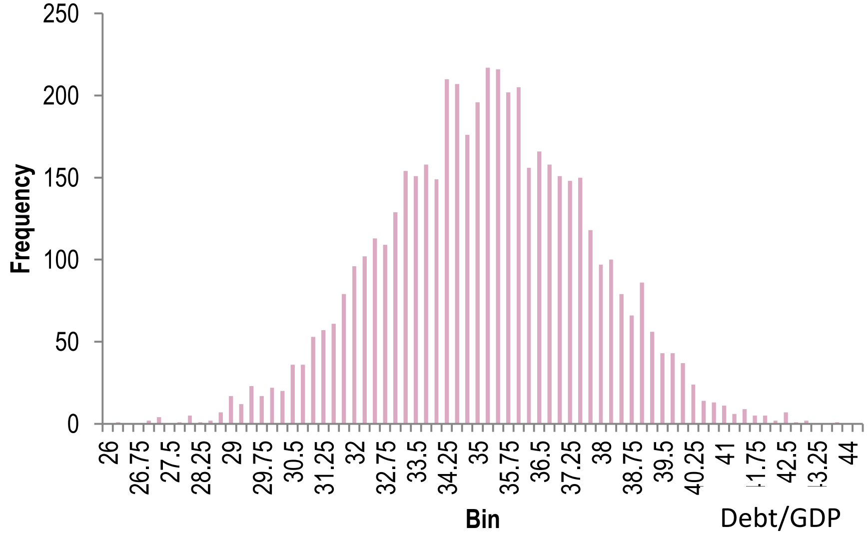


Cost-Risk Trade-off Evaluation informs on preferred Debt Management Strategy

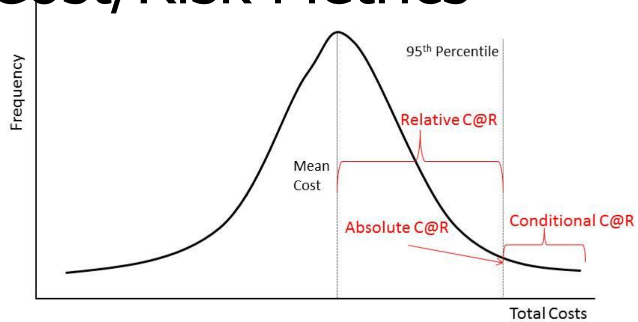
Next Step for Enhancement - Stochastic Simulation



Many thousands forecast paths of different variables…



Cost/Risk Metrics



Implied costs from each simulation path…

Strategy Implementation

Planning Tool for Implementation of Debt Strategy

- Granular analysis helps formulation of an Annual Borrowing Plan
- Integrates Govt. cash flow forecasts with debt management

Cash Requirements | Disbrusement Plan | Lending Plan | Issuance Plan | Issuance Calendar | Overall Calendar | Borrowing Calendar

Cash Requirement

Cash Year	Cash Total	Already
2013	2,632,786.82	
2014	2,035,977.52	
2015	4,019,522.17	

Input ExpenditureRequirement

Expenditure Requirement

Particulars	2013/04/01-2013/04/30	2013/05/01-2013/05/31	2013/06/01-2013/06/30	2013/07/01-2013/07/31	2013/08/01-2013/08/31	2013/09/01-2013/09/30
Addition	4,000.00	4,000.00	4,000.00	4,000.00	4,000.00	4,000.00
Deduction	-8,000.00	-8,000.00	-8,000.00	-8,000.00	-8,000.00	-8,000.00
Default	30,000.00	30,000.00	30,000.00	30,000.00	30,000.00	30,000.00
Net Expenditure Requirement	26,000.00	26,000.00	26,000.00	26,000.00	26,000.00	26,000.00
Principal	319,415.69	400,000.00	689,568.40	14,577.22	0.00	0.00
Interest	8,326.47	2,591.48	131,467.89	38,577.41	6,821.98	153,339.47
Gross Borrowing Requirement	353,742.15	428,591.48	847,036.29	79,154.63	32,821.98	179,339.47

Develop Borrowing Plan

Datewise Inputs

- Expenditure requirements
- Expected disbursements from non-marketable Stylised instruments
- Expected lending (in case strategy includes lending)
- Expected foreign Issuance
- System aggregates figures by periods defined within each year

Cash Requirements | Disbrusement Plan | Lending Plan | Issuance Plan | Issuance Calendar | Overall Calendar | Borrowing Calendar

Cash Requirement

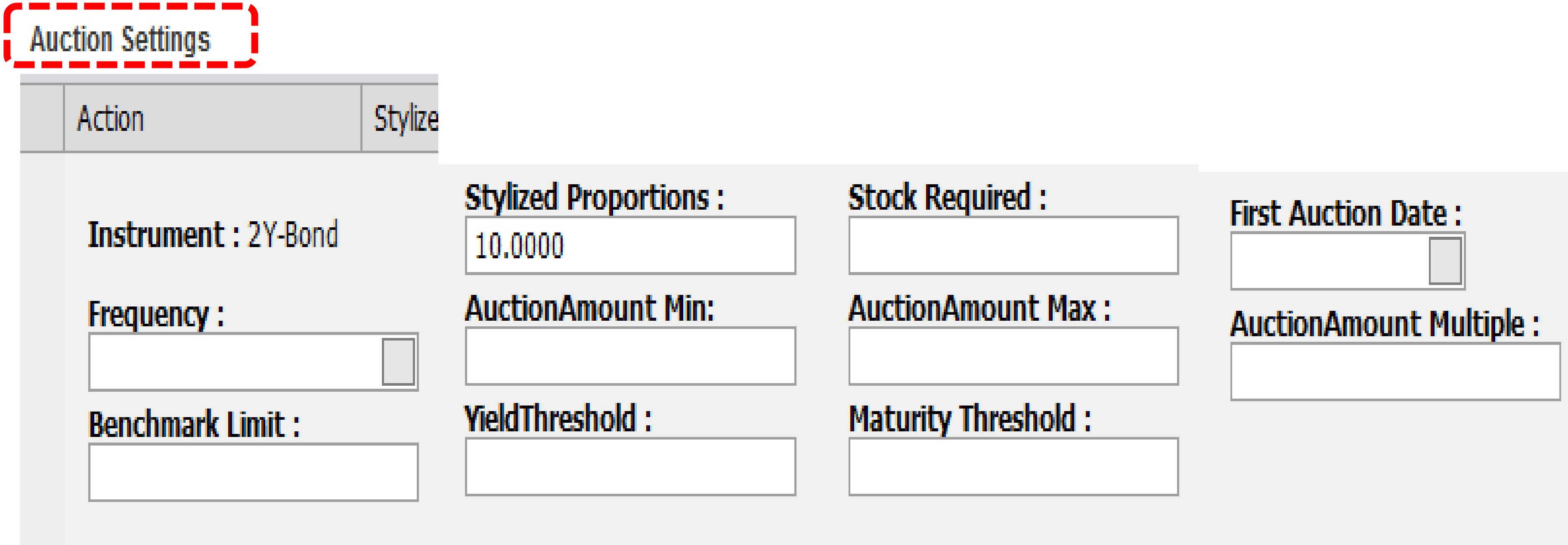
Cash Year	Cash Total	Already Raised	Tobe Raised
2013	0.00	0.00	
2014	0.00	0.00	
2015	0.00	0.00	

Net Cash Requirement

Particulars	2011/04/01-2011/04/15	2011/04/16-2011/04/30	2011/05/01-2011/05/15	2011/05/16-2011/05/31	2011/06/01-2011/06/15	2011/06/16-2011/06/30	2011/07/01-2011/07/31	2011/08/01-2011/08/31
NCR	10,000.00	12,000.00	8,044.40	150,000.00	21,000.00	-136,463.44	21,000.00	30,000.00

No data to display

Simulation Engine uses sound issuance practices



- Simulates an Issuance Calendar
- Based on a stable, predictable and transparent strategy
- Utilizes building of benchmark bonds through re-openings
- Prices bonds based on forecasted yield curve.

Issuance Calendar - *Consistent with Debt Management Strategy*

Borrowing Plan: * Plan 2013-15 | View | ReCalculate | Simulate

Cash Requirements | Disbrusement Plan | Lending Plan | Issuance Plan | Issuance Calendar | Overall Calendar | Borrowing Calendar

Instrument Name	Issuance Date	Issuance Amount	Issuance Price /Cost
Bond 10YR 11-Apr-2011	11/04/2011	10,000.00	9,999.74
Bond 10YR 11-Apr-2011	16/04/2011	10,000.00	9,791.98
FloatingBond 5YR 18-Apr-2011	18/04/2011	8,000.00	7,999.38
Bond 10YR 01-May-2011	01/05/2011	10,000.00	9,999.74
FloatingBond 5YR 01-May-2011	01/05/2011	8,000.00	7,999.38
Bond 10YR 01-May-2011	16/05/2011	25,000.00	23,505.22
Bond 10YR 01-Jun-2011	01/06/2011	10,000.00	9,999.74
FloatingBond 5YR 01-Jun-2011	01/06/2011	8,000.00	7,999.38
Bond 10YR 01-Jun-2011	16/06/2011	10,000.00	9,402.09
Bond 10YR 01-Jul-2011	01/07/2011	10,000.00	9,999.74

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Residual Gap Informs on Cash Management Operations

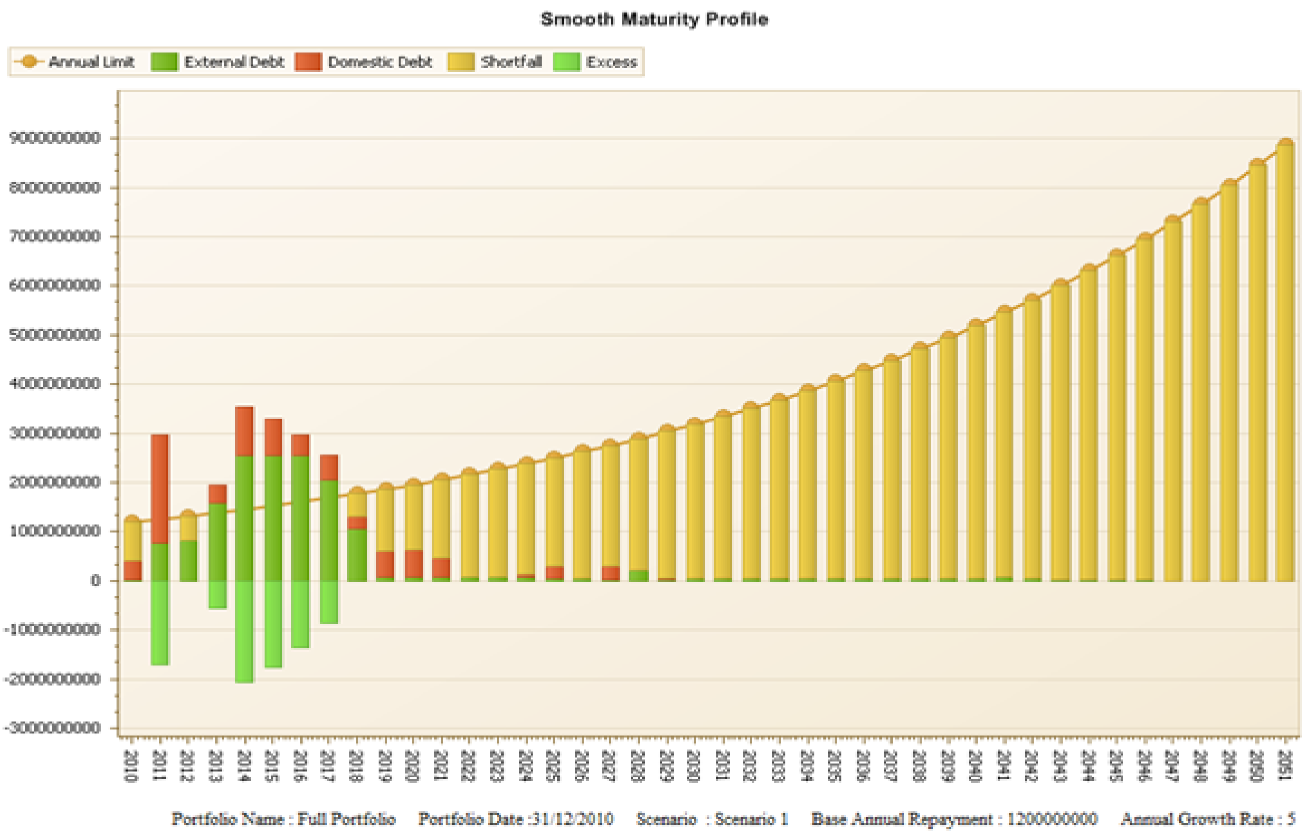
Net Cash Requirement

Particulars	2013/04/01-2013/04/30	2013/05/01-2013/05/31	2013/06/01-2013/06/30	2013/07/01-2013/07/31
NCR	353,742.15	428,031.48	843,264.96	79,204.63
Issuance	376,609.11	454,849.70	831,345.54	100,351.94
Difference	-22,866.96	-26,818.21	11,919.42	-21,147.31

Liability Management Operations

Informs on Potential Liability Management Operations

- Provides early warning information on potential risk management and liquidity enhancing operations (like buybacks or switches) to ensure future issuance space



LMO Impact - Cashflows

Same as Portfolio Analysis

Charts | LMO | Indicators | BenchmarkTargets | Targets Alerts

Save Gird View | Reset Grid View | Select View | Export to: Pdf | Export CashFlow

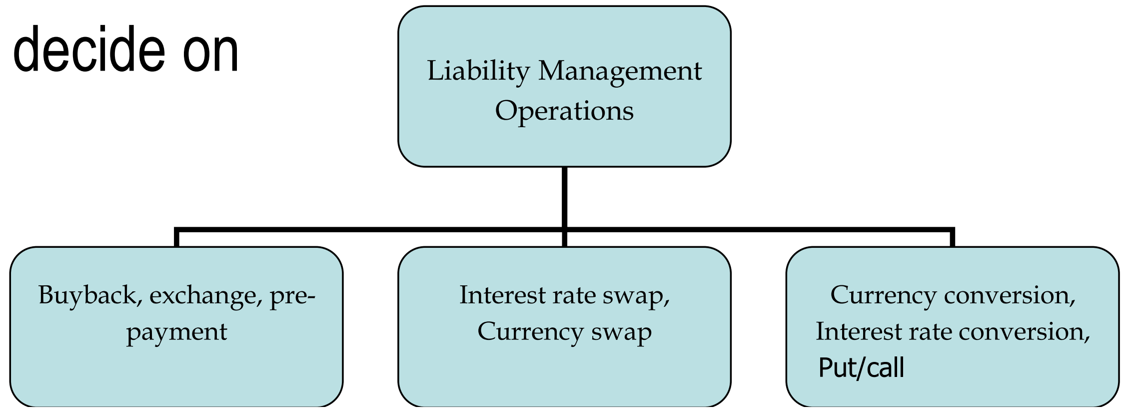
Drop Filter Fields Here

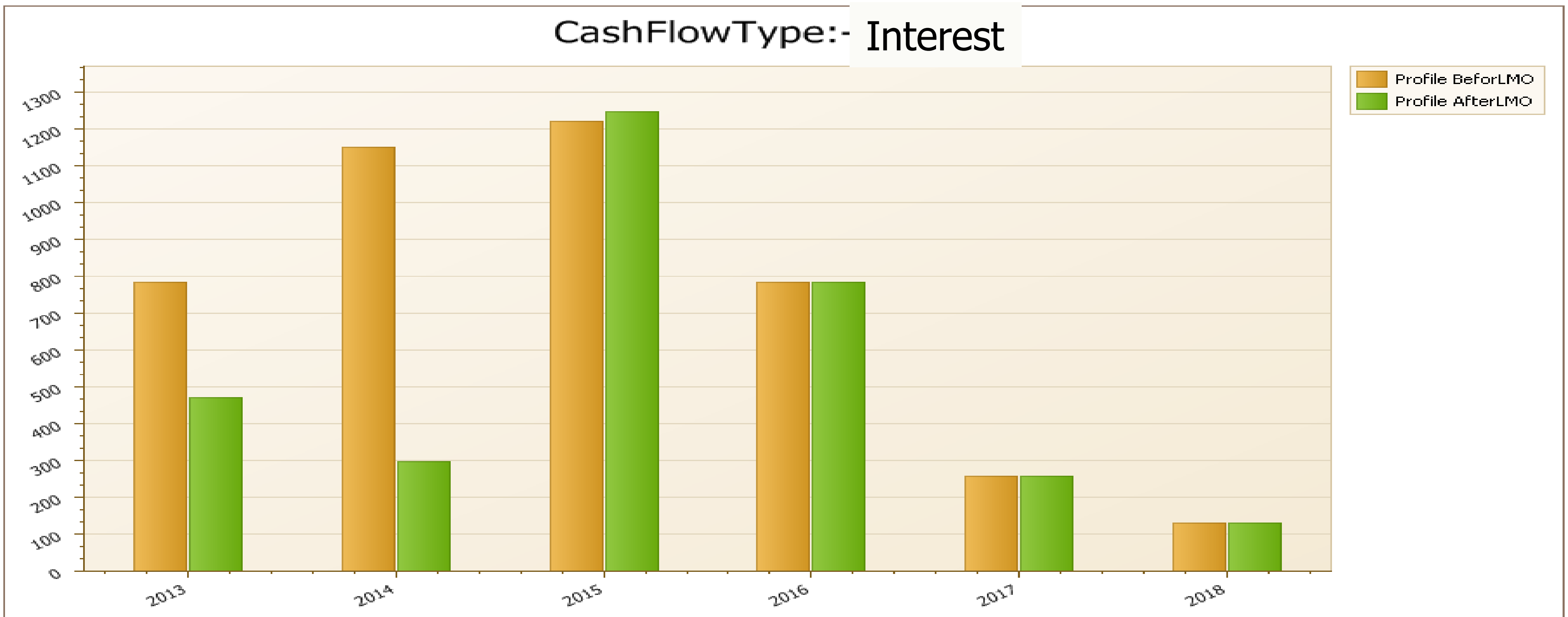
Amount(LC) | Year

Type	Instrument Type	2011	2012	2013	2014	2015	2016	2017	2018	Grand Total
PostLMO	BOND	43,055.66	63,151.28	43,243.16	389,243.16	487,922.16	0.00	0.00	0.00	1,026,615.43
	CCSWAP	0.00	0.00	-116,853.04	-572,514.48	0.00	0.00	0.00	0.00	-689,367.52
	IRSWAP	0.00	0.00	86,781.70	0.00	0.00	0.00	0.00	0.00	86,781.70
	LOAN	728,248.87	472,800.59	497,868.20	511,503.69	820,779.35	808,754.64	271,497.28	131,436.48	4,242,889.09
PostLMO Total		771,304.53	535,951.87	511,040.02	328,232.37	1,308,701.51	808,754.64	271,497.28	131,436.48	4,666,918.70
PreLMO	BOND	43,055.66	43,055.66	43,055.66	409,055.66	461,734.66	0.00	0.00	0.00	999,957.31
	LOAN	738,514.91	782,051.37	812,223.80	824,892.82	822,245.15	809,769.43	272,061.05	131,549.24	5,193,307.76
PreLMO Total		781,570.57	825,107.03	855,279.46	1,233,948.48	1,283,979.81	809,769.43	272,061.05	131,549.24	6,193,265.07
Grand Total		1,552,875.11	1,361,058.90	1,366,319.48	1,562,180.84	2,592,681.32	1,618,524.07	543,558.33	262,985.72	10,860,183.77

Analyse Impact of LMOs for Risk Control

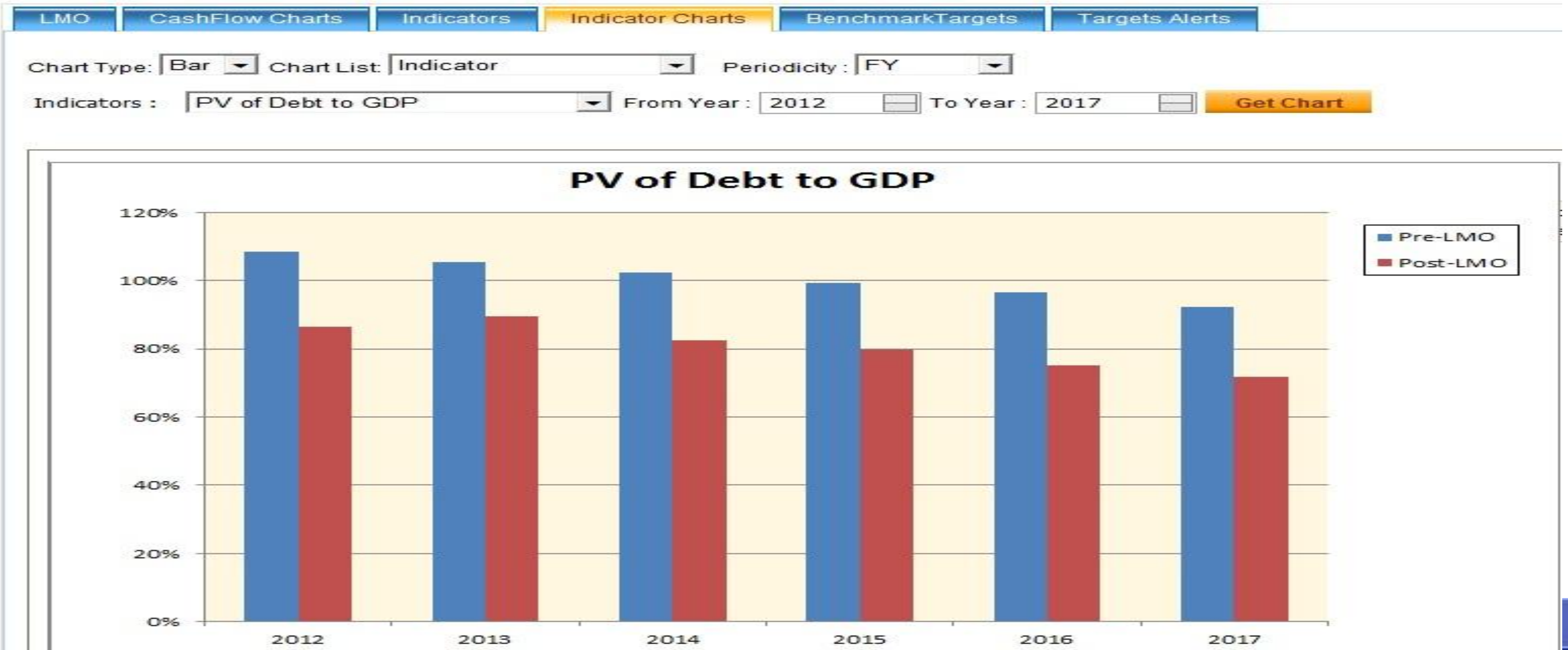
- Useful for sovereigns to decide on
  - market based LMOs
  - lending and hedging products





Provide a Plan for Debt Restructuring to Debt Distressed Sovereigns

- Analyse impact of various restructuring options (pre and post restructuring)
  - Quantify debt relief or hair-cut involved



Platform & Deployment Plan

Robust Technological Platform

- Developed on Microsoft . Net technology – web based
- Supports Oracle and MS SQL server database
- Employs MATLAB as back-end computational engine
- User friendly reporting functionalities
- Seamless interface with external systems
- Multilingual support (presently in English)

Plan for Deployment of Horizon in Countries

- Successfully piloted in South Africa
- Used in Jamaica to inform on the recently executed Debt Exchange
- Organised one global (March 2013) and one regional workshop (June 2013)
- Deployment plan
  - India, Sri Lanka, Kenya, Jamaica in 2013
- Pre-requisites – Server, data preparation (portfolio, cashflow requirements, macro & market data projections, etc.)

Thanks

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