

Implementing the S&P FPC Model at ING Institutional Markets

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Learning Objective:

- At the conclusion of this session, attendees will have learned:
 - How ING Institutional Markets manages interest rate risk
 - How the S&P FPC model was implemented at ING Institutional Markets
 - Ways to leverage the FPC model for more proactive risk management

ING Institutional Markets

- “GIC Business”
 - At year-end 2001, \$8.4 billion balance sheet size
 - Liabilities are stable value GICs, funding agreements, and municipality contracts
 - Assets are corporate bonds, collateralized mortgage obligation(CMO's), commercial mortgages, and private placements

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Maximizing Risk-Adjusted Returns

- The objective of the business unit is to maximize risk-adjusted returns on required capital
- Therefore, it is important to understand, assess, quantify and evaluate all pertinent risks to which the business unit is exposed
 - Interest rate risk
 - Credit risk
 - Liquidity risk
 - Operational risk

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Interest Rate Risk Within ING IM

- Interest rate risk is evaluated on a weekly basis
 - Risk due to the variations in the value of the portfolio due to changes in interest rates
 - Interest rate risk is quantified and analyzed using key-rate duration:
 - Ability to understand, quantify and manage the market value gain or loss due to overall movements in the level and shape of the yield curve (twisting, steepening and flattening)
 - Ability to assess the weekly movement in assets, liabilities and derivatives' market value sensitivities as a result of changes in key yield curve points
 - As well, other traditional duration calculations are performed on the portfolio (parallel shocks)
- Our business unit manages its portfolio on a floating rate basis:
 - Assets and liabilities are swapped back to 1 or 3 month Libor

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Interest Rate Risk Management Tools

- QRM system (Quantitative Risk Management)
 - ALM system producing market value changes under parallel and key rate interest rate shocks
 - “valuation mode” within QRM
 - ALM system producing projected income over specified horizon
 - “planning mode” within QRM
- INTEX database for interest sensitive assets such as CMO's and ABS
- Bloomberg
- ING internal network of information
 - Weekly trading report
 - Investment Management group

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Weekly Risk Management

- Model all asset, derivative and liability movement
 - Check key rate sensitivities with associated matching derivative to ensure hedge effectiveness at inception
 - Calculate key rate duration using +/-10 bps at each of 10 yield curve points for weekly trades as well as for the entire portfolio
 - Evaluate the impact of changes in the swap curve, aging in the portfolio and prepayments on the key-rate durations of our portfolio
 - Calculate duration under different parallel shifts (+/- 10, 50, 100, 200, 250 and 300 bps)
 - Calculate FPC delta and gamma components (MR-1 ,MR-2)
 - Calculate mark-to-model on portfolio

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Monthly Risk Management

- Reconcile weekly movement to monthly actual inforce for assets, liabilities, and derivatives
- Update relevant information – Examples: prepayments and maturity date on ABS
- Summarize the change in duration and convexity over the month and analyze the movement
- Compare projection of income and prepayments to what actually occurred

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Quarterly Risk Management

- Provide information to regional ALCO
 - Future income and embedded value under 100 ALM scenarios, as well as other information needed for the analysis of our portfolio
- Provide information to S&P for FPC model
 - Market value change under 10 key rate points (Delta capital)
 - Market value change under parallel shocks (Gamma capital)
 - Credit risk capital on assets and derivatives
 - Benefit responsive risk on pension GICs

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Financial Market Risk Capital in the FPC Model

- Determine the capital based upon the largest loss in market value resulting from interest rate changes over a given time period
- Sub-components:
 - Interest rate delta
 - MV change at 10 key rate points of yield curve (1-month Libor – 30-year swap) under +1bp shift
 - The 1bps shift will then be multiplied by a factor to reflect approximately a 1-year extreme movement in rates at a 99.5% confidence level based on ING's AA+ rating
 - Interest rate gamma credit/charge
 - MV change at parallel shifts to current yield curve under +1 and +/- 50, 100, 200 and 250 bps
 - Option risk charge on liabilities
 - Debt Service, Acquisition and Construction GICs (Muni's)
 - Pension GIC benefit responsiveness

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Why Manage Interest Rate Risk Along Key Rate Points?

➤ Example:

- 12/31/2000 interest rates
- 10 year amortizing bond with duration = 4.4 years
- Swap fixed rate bond to floating rate to match durations
 - Hedge parallel duration or key rate duration?
 - Non-Amortizing Swap with Maturity of 5.2 years
 - Amortizing Swap with Maturity of 10 Years
- MR-1 capital (based on year-end 2000 rates)
 - Bond + Non-Amortizing 5.2 Year Swap
 - Delta Capital =1.73%
 - Duration matched under parallel shocks, yet significant curve risk
 - Bond + Amortizing 10 year Swap
 - Delta Capital = 0.20%
 - Mitigated interest rate curve risk, as well as interest rate risk under parallel shocks

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QRM Market Value Shocks Report “Market Value Change”

SUBACCOUNT	Bond Amortizing	Bullet Swap	Amortizing Swap	Bond+ 5.25 Yr Swap	Bond + Amort 10 Yr Swap
	10 YEAR	5.25 Year	10 Year		
Face Amount	100,000,000	(100,000,000)	(100,000,000)		
Market Value	100,000,000	-	-		
MVC - DOWN 10	444,000	(440,000)	(435,000)	4,000	9,000
MVC - UP 10	(440,000)	437,000	432,000	(3,000)	(8,000)
MVC - KRD-1	-	(5,000)	(8,000)	(5,000)	(8,000)
MVC - KRD-3	-	(11,000)	-	(11,000)	-
MVC - KRD-6	(1,000)	1,000	1,000	-	-
MVC - KRD-12	(13,000)	5,000	14,000	(8,000)	1,000
MVC - KRD-24	(25,000)	10,000	26,000	(15,000)	1,000
MVC - KRD-36	(58,000)	24,000	57,000	(34,000)	(1,000)
MVC - KRD-60	(96,000)	348,000	96,000	252,000	-
MVC - KRD-84	(136,000)	65,000	136,000	(71,000)	-
MVC - KRD-120	(111,000)	-	110,000	(111,000)	(1,000)
MVC - KRD-360	-	-	-	-	-
Total Key Rate MVC	(440,000)	437,000	432,000	(3,000)	(8,000)
Duration	4.4			0.0	0.1
MR-1 "Delta" Capital				\$ 1,730,500	\$ 200,593

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Interest Rates Move to December 31, 2001 Levels

- Yield curve steepens (2000 to 2001)
 - Increase of \$3.6 million in Bond market value
 - Decrease of \$4.5 million in 5.2 Year Swap Market Value
 - Decrease of \$3.6 million in 10 Amortizing Swap Market Value

- Summary of market value change due to yield curve
 - Net effect of bond + amortizing swap is \$0 gain/loss
 - Net effect of duration matched swap is approximately 1% loss in value

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Why Hedge Negative Convexity Risk?

- Bond:
 - 5 year non-callable bond
- Convex Asset:
 - 5 year callable bond hedged with a call option on a swap

	5 Year Bond Non-Callable	5 Year Bond Callable in 2 Years	Call Option on Swap (Rec Fix)	Net Effect Callabe Bond + Option
MVC - 250	+11.4	+6.2	+5.5	+11.7
MVC +250	-10.0	-8.9	-1.4	-10.3
MR-2 "Gamma" Capital	0.20% Credit	1.6% Charge		0.05% Credit
	Due to positive Convexity	Due to negative Convexity		

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Are you Spending Option Premium Effectively?

- MR-2 (Convexity) capital savings = 1.65%
- Cost of call option on swap to hedge callable bond
 - Cost of call option = \$1.5 mm initial premium
 - Capital savings = \$1.65 mm annually

- Based on hurdle ROE's, what is the end conclusion?

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Summary:

- The FPC model is an effective tool to measure risk and assign capital
- ING-IM implemented model relatively easy once the risk management system was in place
- FPC model can help lead towards optimal capital deployment for shareholders

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