Slide 1

Sanwa International Plc
Marc Lore, Managing Director
Sanwa International
Founder and Executive Director, GARP
(Global Association of Risk Professionals)
Strategic Risk Management
Strategic Risk Vision
Calculation of Economic Capital
Setting Performance Targets
Managing Economic Capital
Allocating Economic Capital
Measuring Performance
Risk Management Department

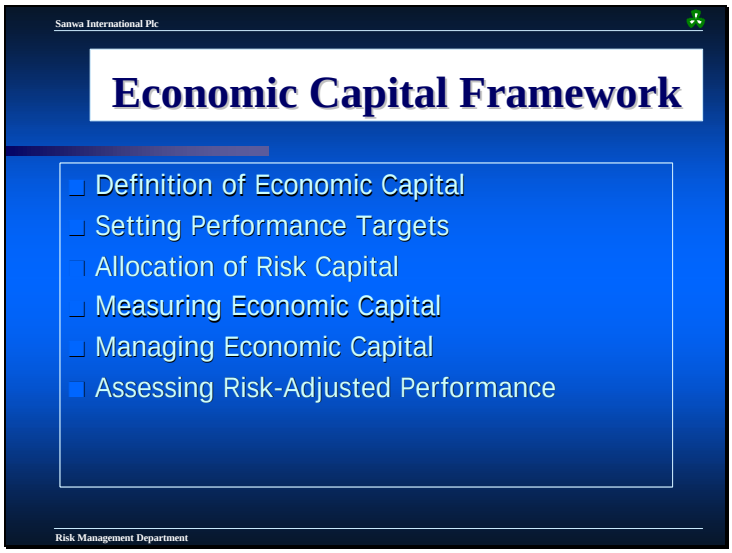
Slide 2

Sanwa International Plc
Strategic Risk Vision
Increase Shareholder Value
Instill Confidence in the Market Place
Alleviate Regulatory Constraints
To Provide Senior Management with World Class Risk Management Tools
Risk Management Department

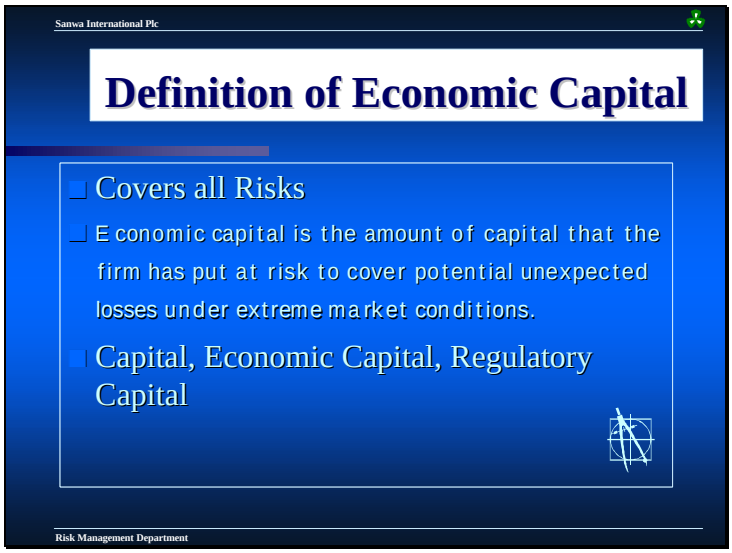
Slide 3

Sanwa International Plc
Achieving the Risk Vision
Capital Preservation
Capital Optimization
Risk Management Department

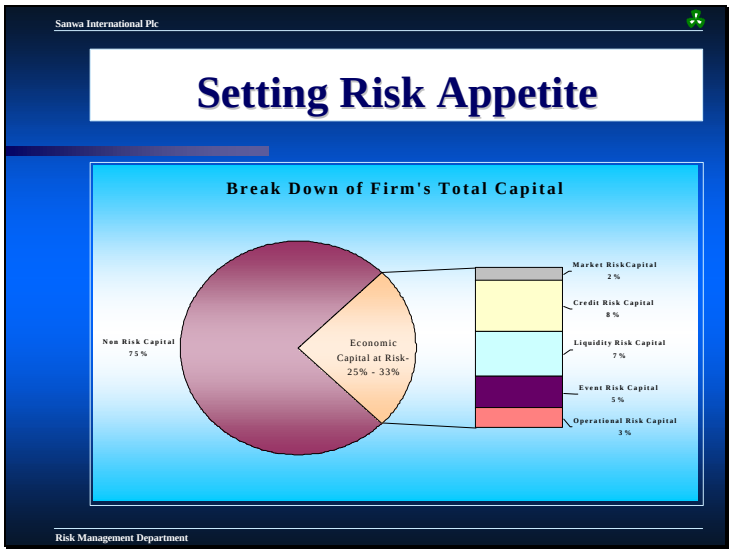
Slide 4


Sanwa International Plc
Economic Capital Framework
Definition of Economic Capital
Setting Performance Targets
Allocation of Risk Capital
Measuring Economic Capital
Managing Economic Capital
Assessing Risk-Adjusted Performance
Risk Management Department

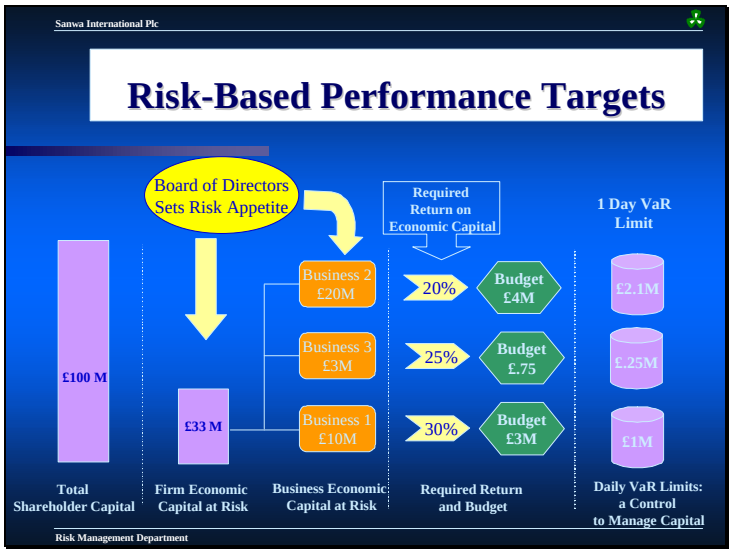
Slide 5


Sanwa International Plc
Definition of Economic Capital
Covers all Risks
Economic capital is the amount of capital that the firm has put at risk to cover potential unexpected losses under extreme market conditions.
Capital, Economic Capital, Regulatory Capital
Risk Management Department

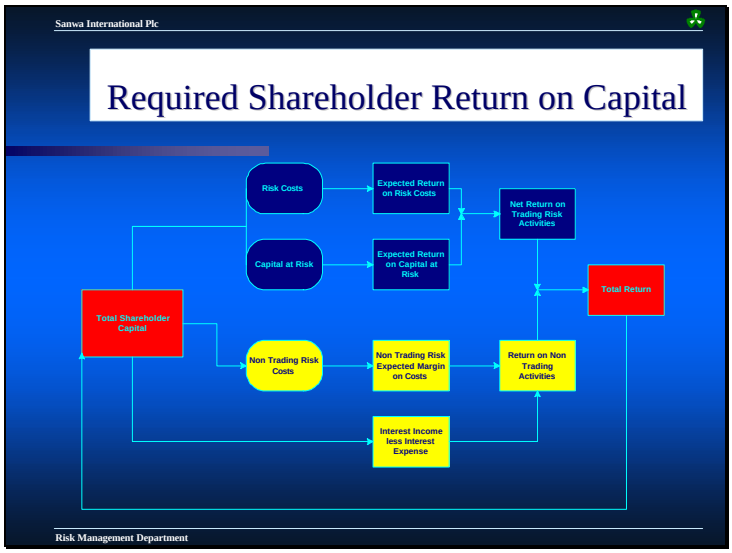
Slide 6


Sanwa International Plc
Setting Risk Appetite
Break Down of Firm's Total Capital
Non Risk Capital
75%
Economic
Capital at Risk-
25% - 33%
Market RiskCapital
2%
Credit Risk Capital
8%
Liquidity Risk Capital
7%
Event Risk Capital
5%
Operational Risk Capital
3%
Risk Management Department

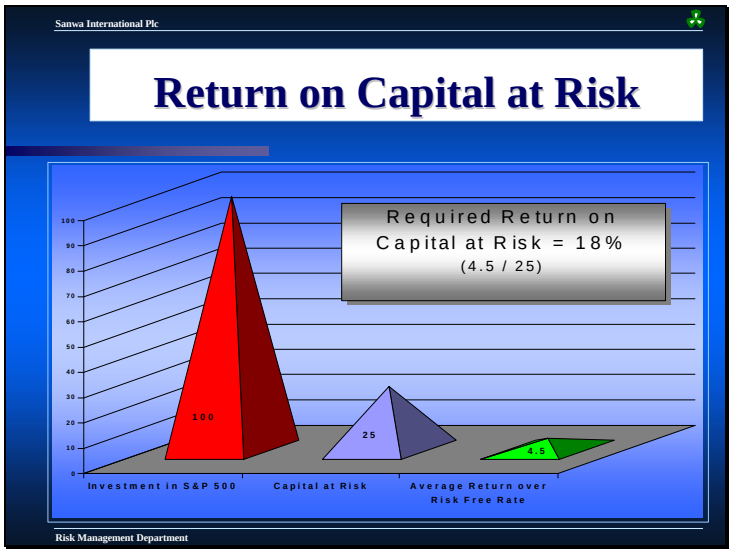
Slide 7


Sanwa International Plc
Risk-Based Performance Targets
Board of Directors Sets Risk Appetite
Required Return on Economic Capital
1 Day VaR Limit
£100 M
£33 M
Business 2 £20M
Business 3 £3M
Business 1 £10M
20%
25%
30%
Budget £4M
Budget £.75
Budget £3M
£2.1M
£.25M
£1M
Total Shareholder Capital
Firm Economic Capital at Risk
Business Economic Capital at Risk
Required Return and Budget
Daily VaR Limits: a Control to Manage Capital
Risk Management Department

Slide 8


Sanwa International Plc
Required Shareholder Return on Capital
Risk Costs
Expected Return on Risk Costs
Net Return on Trading Risk Activities
Capital at Risk
Expected Return on Capital at Risk
Total Return
Total Shareholder Capital
Non Trading Risk Costs
Non Trading Risk Expected Margin on Costs
Return on Non Trading Activities
Interest Income less Interest Expense
Risk Management Department

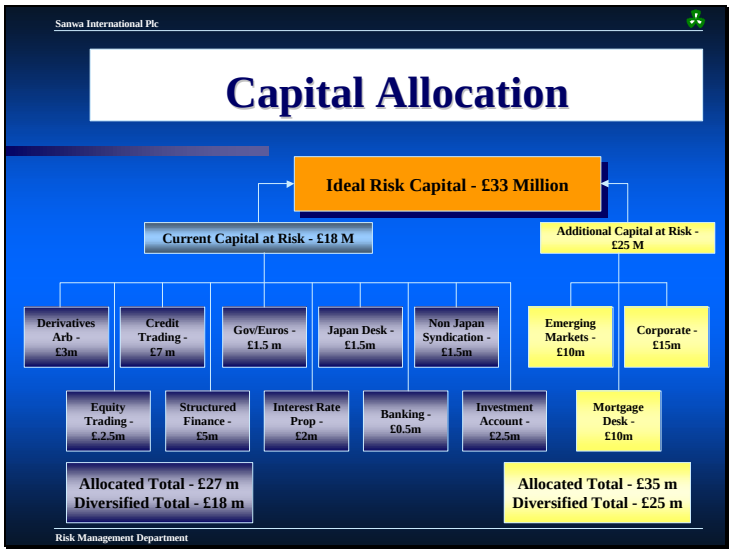
Slide 9


Sanwa International Plc
Return on Capital at Risk
Required Return on
Capital at Risk = 18%
(4.5 / 25)
100
90
80
70
60
50
40
30
20
10
0
100
25
4.5
Investment in S&P 500
Capital at Risk
Average Return over
Risk Free Rate
Risk Management Department

Slide 10

Sanwa International Plc
Allocation of Economic Capital
Business Profitability
Diversification Benefits of Business
Franchise Value of Business
Risk Management Department

Slide 11


Sanwa International Plc
Capital Allocation
Ideal Risk Capital - £33 Million
Current Capital at Risk - £18 M
Additional Capital at Risk - £25 M
Derivatives Arb - £3m
Credit Trading - £7 m
Gov/Euros - £1.5 m
Japan Desk - £1.5m
Non Japan Syndication - £1.5m
Emerging Markets - £10m
Corporate - £15m
Equity Trading - £2.5m
Structured Finance - £5m
Interest Rate Prop - £2m
Banking - £0.5m
Investment Account - £2.5m
Mortgage Desk - £10m
Allocated Total - £27 m
Diversified Total - £18 m
Allocated Total - £35 m
Diversified Total - £25 m
Risk Management Department

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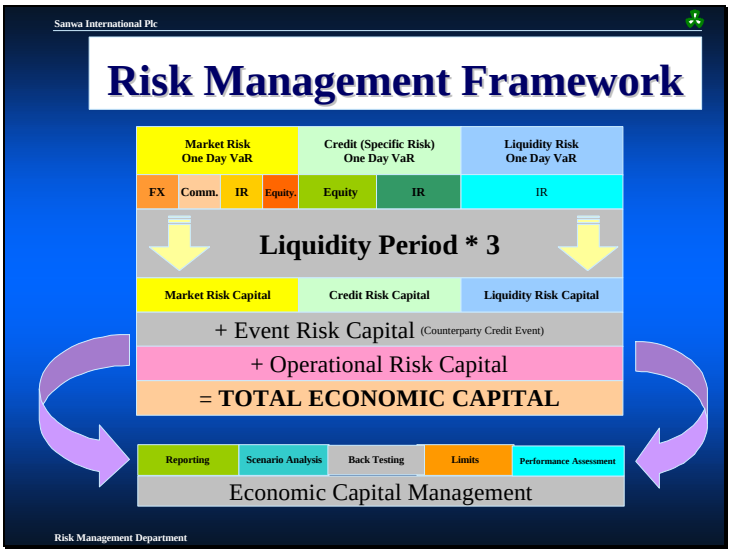
Diversification Factor

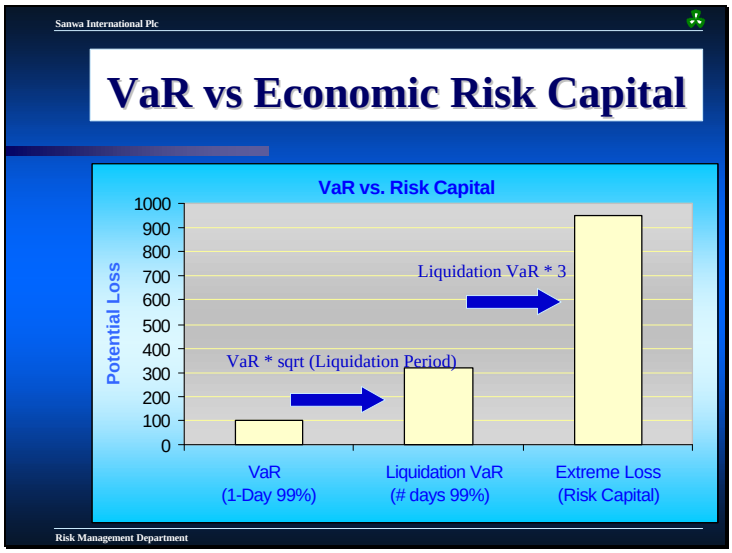
Calculation for Two Businesses	
Equity Desk	Governments/Eurobonds
Risk Capital - £2.5m	Risk Capital - £1.5m
Correlation Factor = 0.1	
Risk = $\sqrt{a^2 + b^2 + 2abr}$	
Risk = $\sqrt{2.5^2 + 1.5^2 + 2*2.5*1.5*0.1}$ = £3m	

Risk Capital of £4m = Risk of £3m = Factor of *1.33*

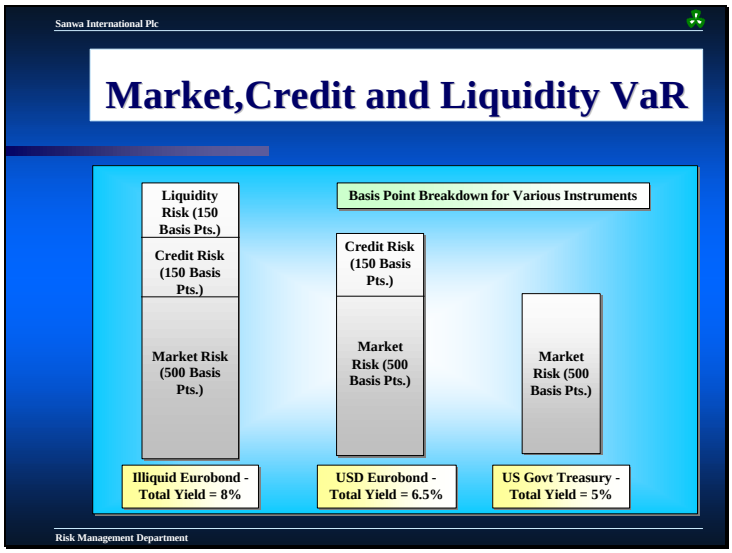
Slide 13


Sanwa International Plc
Risk Management Framework
Market Risk One Day VaR
Credit (Specific Risk) One Day VaR
Liquidity Risk One Day VaR
FX
Comm.
IR
Equity.
Equity
IR
IR
Liquidity Period * 3
Market Risk Capital
Credit Risk Capital
Liquidity Risk Capital
+ Event Risk Capital (Counterparty Credit Event)
+ Operational Risk Capital
= TOTAL ECONOMIC CAPITAL
Reporting
Scenario Analysis
Back Testing
Limits
Performance Assessment
Economic Capital Management
Risk Management Department

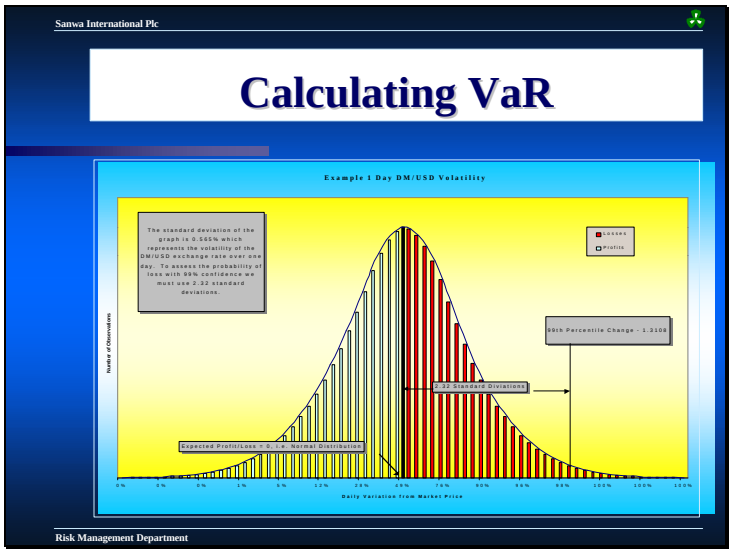
Slide 14


Sanwa International Plc
VaR vs Economic Risk Capital
VaR vs. Risk Capital
Potential Loss
1000
900
800
700
600
500
400
300
200
100
0
Liquidation VaR * 3
VaR * sqrt (Liquidation Period)
VaR
(1-Day 99%)
Liquidation VaR
(# days 99%)
Extreme Loss
(Risk Capital)
Risk Management Department

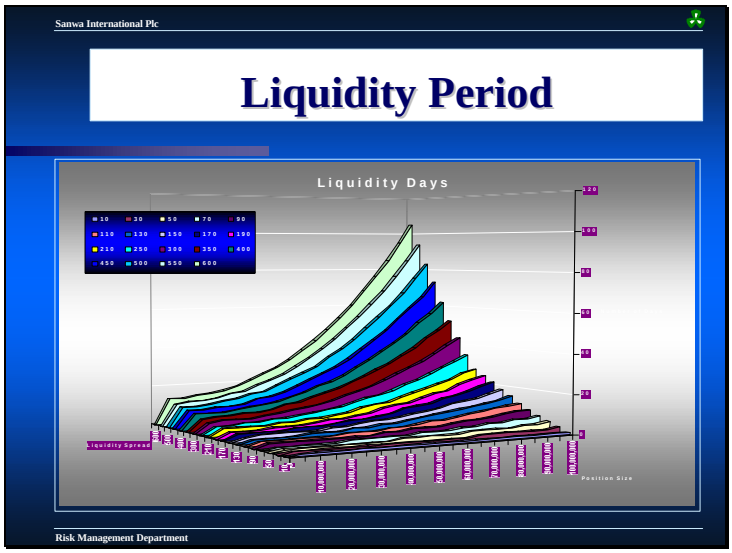
Slide 15


Sanwa International Plc
Market,Credit and Liquidity VaR
Basis Point Breakdown for Various Instruments
Liquidity Risk (150 Basis Pts.)
Credit Risk (150 Basis Pts.)
Market Risk (500 Basis Pts.)
Credit Risk (150 Basis Pts.)
Market Risk (500 Basis Pts.)
Market Risk (500 Basis Pts.)
Illiquid Eurobond - Total Yield = 8%
USD Eurobond - Total Yield = 6.5%
US Govt Treasury - Total Yield = 5%
Risk Management Department

Slide 16


Sanwa International Plc
Calculating VaR
Example 1 Day DM/USD Volatility
The standard deviation of the graph is 0.565% which represents the volatility of the DM/USD exchange rate over one day. To assess the probability of loss with 99% confidence we must use 2.32 standard deviations.
Losses
Profits
99th Percentile Change - 1.3108
2.32 Standard Deviations
Expected Profit/Loss = 0, i.e. Normal Distribution
Number of Observations
Daily Variation from Market Price
Risk Management Department

Slide 17


Sanwa International Plc
Liquidity Period
Liquidity Days
Liquidity Spread
Position Size
Risk Management Department

Slide 18

Sanwa International Plc
Counterparty Event Risk
Loan Equivalent Exposure
Ratings
Default Probabilities
Recovery Values
Risk Management Department

Slide 19

Cumulative Probability of Default

	1	2	3	4	5	6	7	8	9	10
AAA	.009	.026	.05	.09	.15	.22	.33	.45	.58	.73
AA	.022	.10	.22	.34	.48	.60	.71	.82	.95	1.10
A	.06	.15	.30	.48	.72	.92	1.07	1.32	1.62	1.97
BBB	.16	.52	.92	1.5	2.0	2.5	3.1	3.8	4.4	5.0
BB	1.8	4.4	6.9	9.4	11.8	13.8	15.3	16.7	18.1	19.5
B	8.3	14.8	20.4	24.8	28	31.9	34.3	36.7	38.4	40.0

Slide 20

Recovery Values

Class of Debt	Average	Standard Deviation
Senior Secured Bank Loan	71.2	21.
Senior Secured Public Debt	63.5	26.2
Senior Unsecured Public Debt	47.5	26.3
Senior Subordinated Public Debt	38.3	24.7
Subordinated Public Debt	28.3	20.0
Junior Subordinated Public Debt	14.7	8.7

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Sanwa International Plc

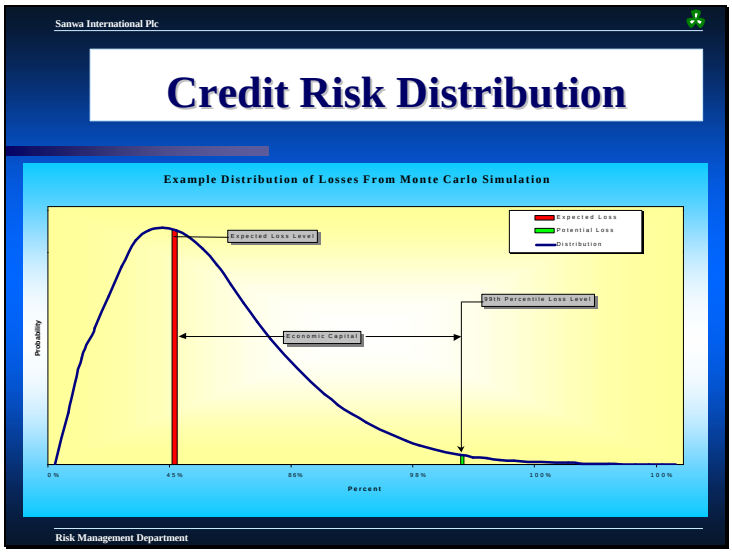
Year 1 of Monte Carlo Simulation

Unsecured Public Debt	Amount	Rating	Probability of Default	Randon Number	Default Y/N	Recovery Value	Loss Amount
Abbey National	10M	AA	.02%	10%	No	47.5%	0
Gazprom	10M	B+	**6.5%**	**3.5%**	**Yes**	47.5%	5.25M
Hanil Bank	5M	BB-	2.5%	57%	No	47.5%	0
KDB Bank	15M	BB	2.3%	35%	No	47.5%	0
Swiss Air	50M	A+	.05%	89%	No	47.5%	0
Lehman Brothers	10M	BBB+	.14%	2%	No	47.5%	0
Total							**5.25M**

Graph Year 1 Total ……. Year 100,000 Total

Risk Management Department

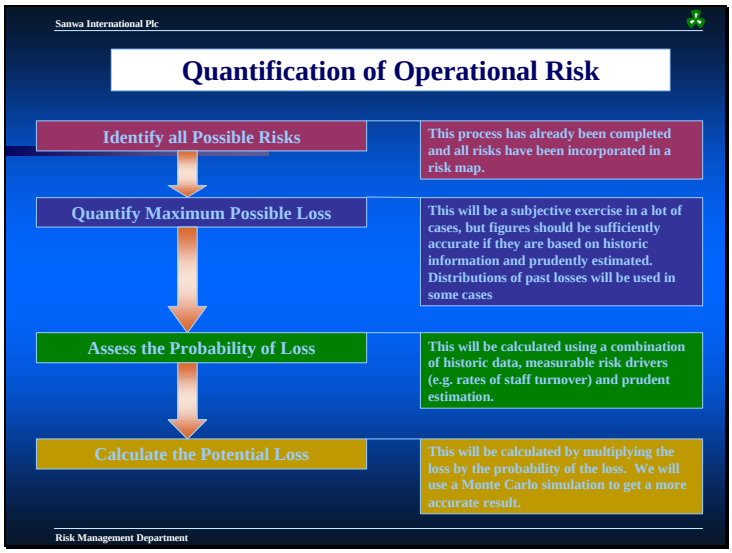
Slide 22


Sanwa International Plc
Credit Risk Distribution
Example Distribution of Losses From Monte Carlo Simulation
Expected Loss
Potential Loss
Distribution
Expected Loss Level
99th Percentile Loss Level
Economic Capital
Probability
0%
45%
86%
98%
100%
100%
Percent
Risk Management Department

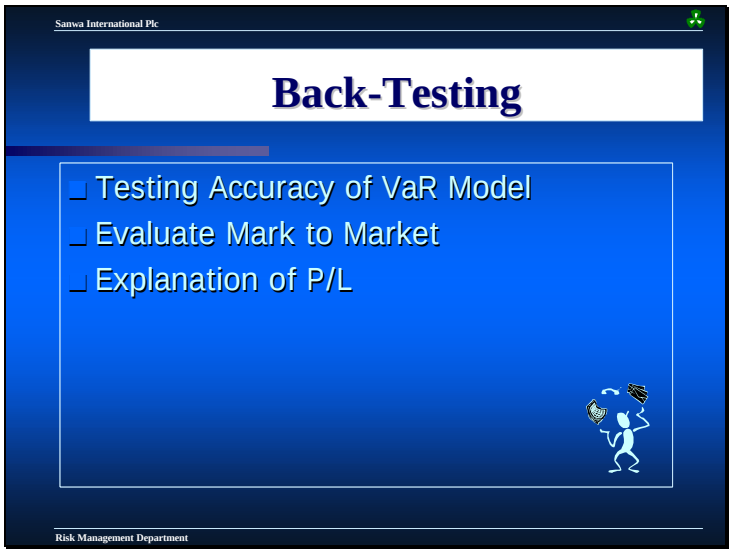
Slide 23

Sanwa International Plc
Operational Risk Capital
Audit Rating
Transaction Volume
Product Specific
Subjective Factors
Risk Management Department

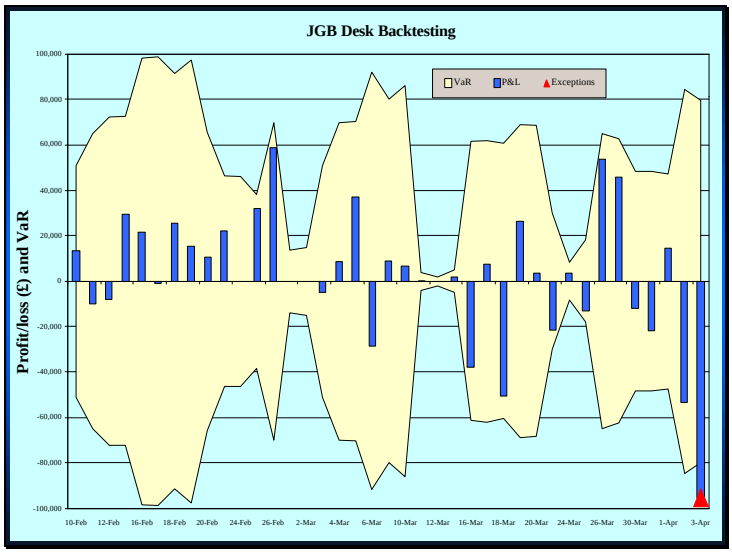
Slide 24


Sanwa International Plc
Quantification of Operational Risk
Identify all Possible Risks
This process has already been completed and all risks have been incorporated in a risk map.
Quantify Maximum Possible Loss
This will be a subjective exercise in a lot of cases, but figures should be sufficiently accurate if they are based on historic information and prudently estimated. Distributions of past losses will be used in some cases
Assess the Probability of Loss
This will be calculated using a combination of historic data, measurable risk drivers (e.g. rates of staff turnover) and prudent estimation.
Calculate the Potential Loss
This will be calculated by multiplying the loss by the probability of the loss. We will use a Monte Carlo simulation to get a more accurate result.
Risk Management Department

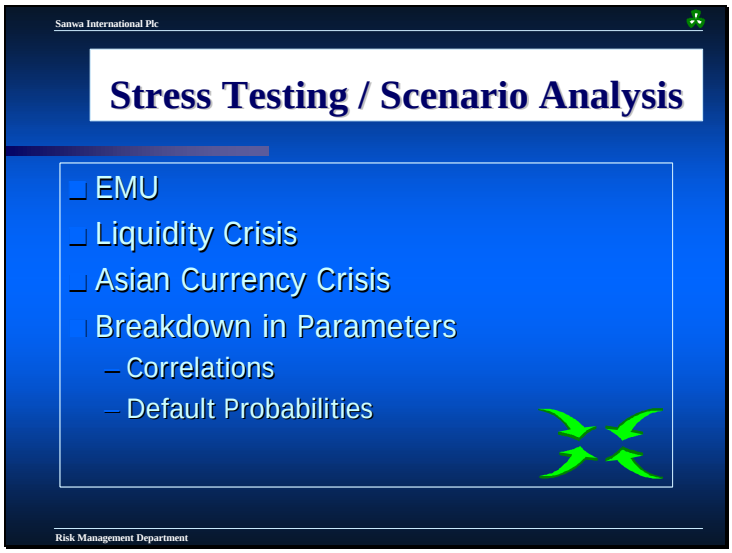
Slide 25


Sanwa International Plc
Back-Testing
Testing Accuracy of VaR Model
Evaluate Mark to Market
Explanation of P/L
Risk Management Department

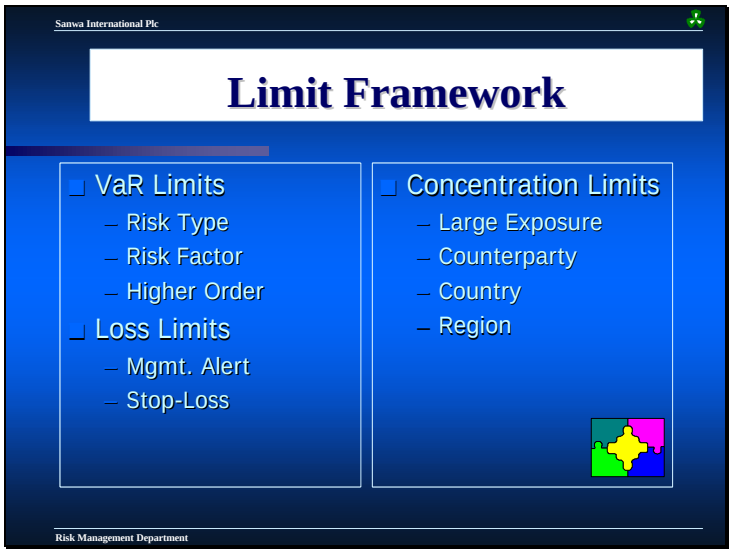
Slide 26


JGB Desk Backtesting
VaR
P&L
Exceptions
Profit/loss (£) and VaR
100,000
80,000
60,000
40,000
20,000
0
-20,000
-40,000
-60,000
-80,000
-100,000
10-Feb
12-Feb
16-Feb
18-Feb
20-Feb
24-Feb
26-Feb
2-Mar
4-Mar
6-Mar
10-Mar
12-Mar
16-Mar
18-Mar
20-Mar
24-Mar
26-Mar
30-Mar
1-Apr
3-Apr

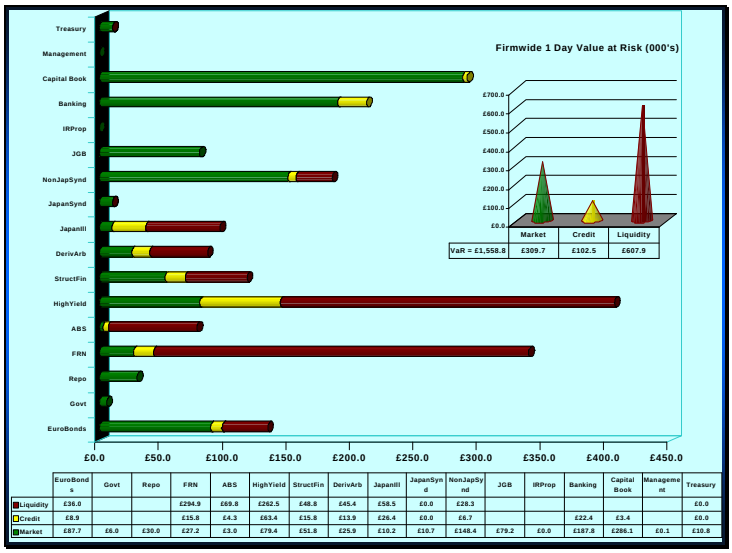
Slide 27


Sanwa International Plc
Stress Testing / Scenario Analysis
EMU
Liquidity Crisis
Asian Currency Crisis
Breakdown in Parameters
Correlations
Default Probabilities
Risk Management Department

Slide 28

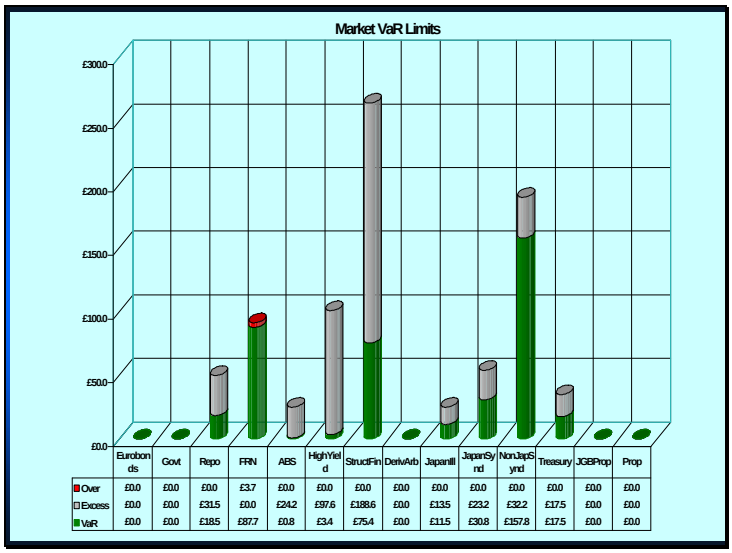

Sanwa International Plc
Limit Framework
VaR Limits
Risk Type
Risk Factor
Higher Order
Loss Limits
Mgmt. Alert
Stop-Loss
Concentration Limits
Large Exposure
Counterparty
Country
Region
Risk Management Department

Slide 29



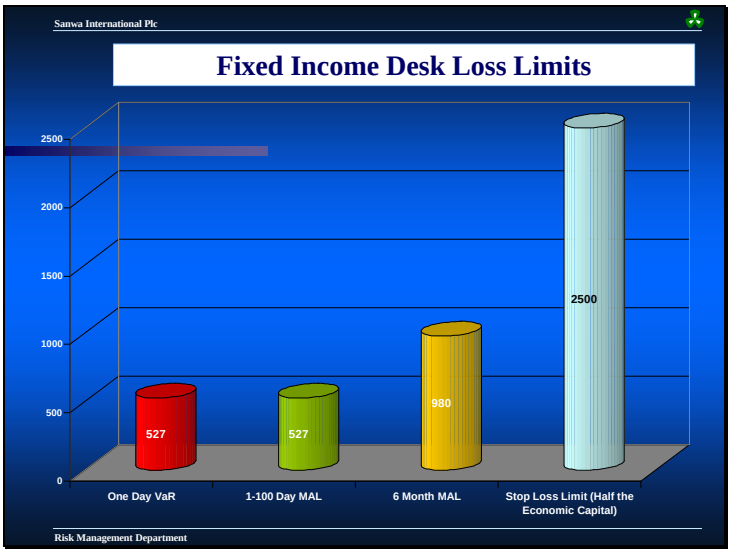
	EuroBonds	Govt	Repo	FRN	ABS	HighYield	StructFin	DerivArb	JapanIII	JapanSynd	NonJapSynd	JGB	IRProp	Banking	Capital Book	Management	Treasury
Liquidity	£36.0			£294.9	£69.8	£262.5	£48.8	£45.4	£58.5	£0.0	£28.3						£0.0
Credit	£8.9			£15.8	£4.3	£63.4	£15.8	£13.9	£26.4	£0.0	£6.7			£22.4	£3.4		£0.0
Market	£87.7	£6.0	£30.0	£27.2	£3.0	£79.4	£51.8	£25.9	£10.2	£10.7	£148.4	£79.2	£0.0	£187.8	£286.1	£0.1	£10.8

Slide 30



	Eurobonds	Govt	Repo	FRN	ABS	HighYield	StructFin	DerivArb	JapanIll	JapanSynd	NonJapSynd	Treasury	JGBProp	Prop
Over	£0.0	£0.0	£0.0	£3.7	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0
Excess	£0.0	£0.0	£31.5	£0.0	£24.2	£97.6	£188.6	£0.0	£13.5	£23.2	£32.2	£17.5	£0.0	£0.0
VaR	£0.0	£0.0	£18.5	£87.7	£0.8	£3.4	£75.4	£0.0	£11.5	£30.8	£157.8	£17.5	£0.0	£0.0

Slide 31


Sanwa International Plc
Fixed Income Desk Loss Limits
2500
2000
1500
1000
500
0
527
527
980
2500
One Day VaR
1-100 Day MAL
6 Month MAL
Stop Loss Limit (Half the Economic Capital)
Risk Management Department

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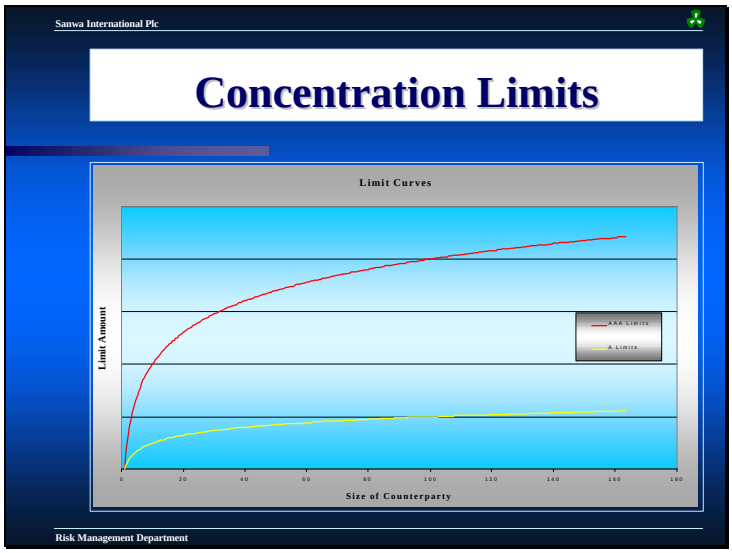
Sanwa International Plc
Concentration Limits
Limit Curves
Limit Amount
AAA Limits
A Limits
0
20
40
60
80
100
120
140
160
180
Size of Counterparty
Risk Management Department

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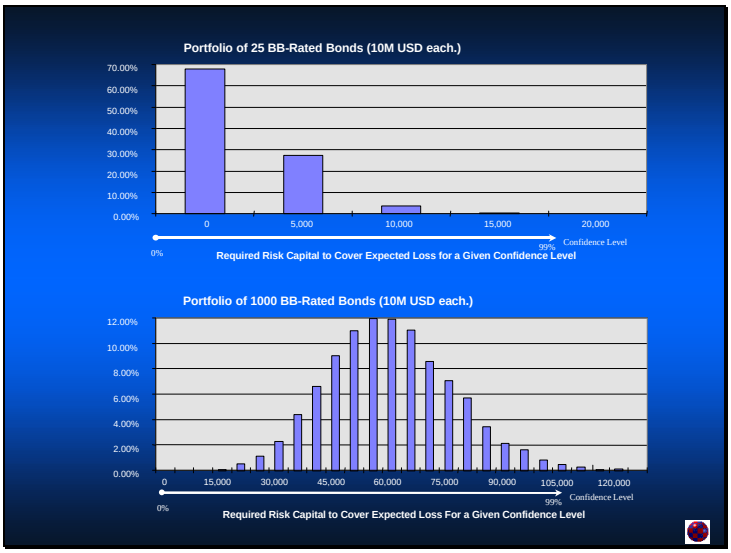
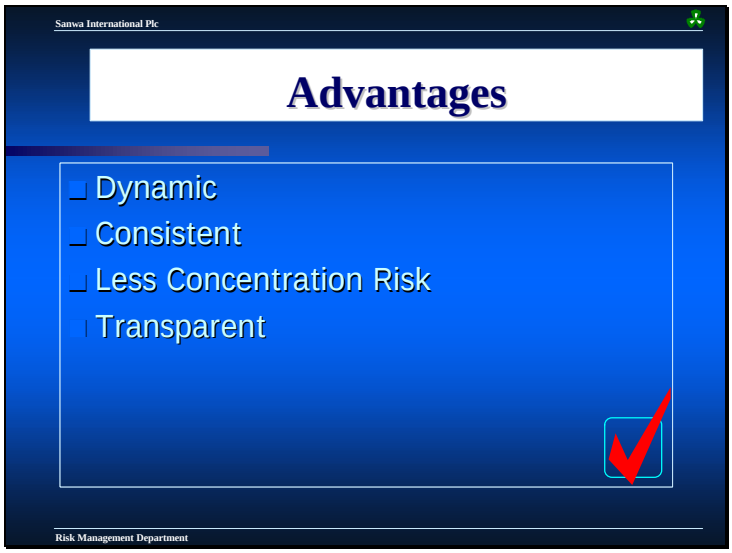
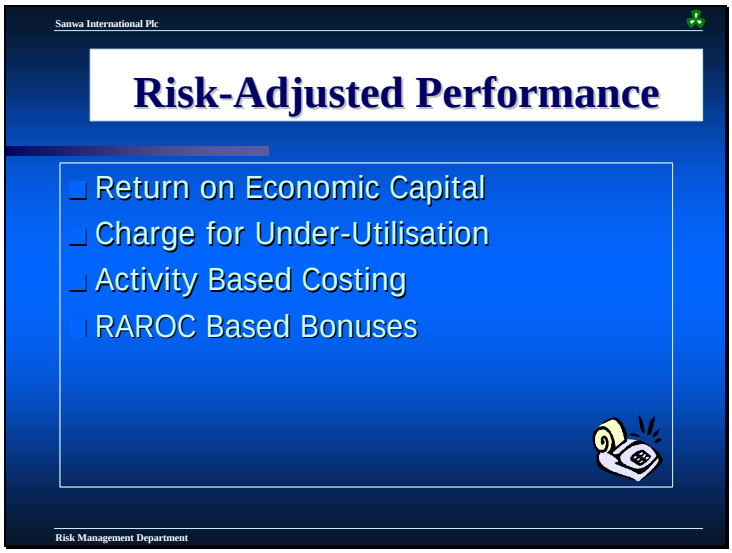

Portfolio of 25 BB-Rated Bonds (10M USD each.)
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
0
5,000
10,000
15,000
20,000
0%
99%
Confidence Level
Required Risk Capital to Cover Expected Loss for a Given Confidence Level
Portfolio of 1000 BB-Rated Bonds (10M USD each.)
12.00%
10.00%
8.00%
6.00%
4.00%
2.00%
0.00%
0
15,000
30,000
45,000
60,000
75,000
90,000
105,000
120,000
0%
99%
Confidence Level
Required Risk Capital to Cover Expected Loss For a Given Confidence Level

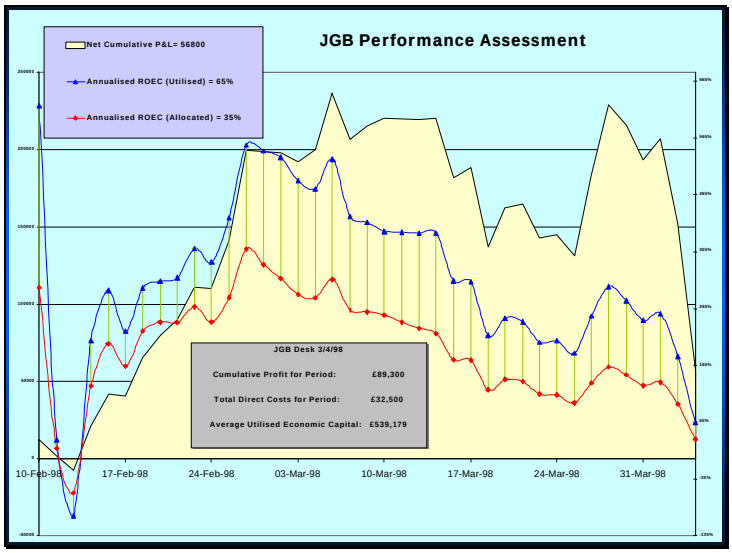
Slide 34


Sanwa International Plc
Advantages
Dynamic
Consistent
Less Concentration Risk
Transparent
Risk Management Department

Slide 35


Sanwa International Plc
Risk-Adjusted Performance
Return on Economic Capital
Charge for Under-Utilisation
Activity Based Costing
RAROC Based Bonuses
Risk Management Department

Slide 36


JGB Performance Assessment
Net Cumulative P&L= 56800
Annualised ROEC (Utilised) = 65%
Annualised ROEC (Allocated) = 35%
JGB Desk 3/4/98
Cumulative Profit for Period: £89,300
Total Direct Costs for Period: £32,500
Average Utilised Economic Capital: £539,179
10-Feb-98
17-Feb-98
24-Feb-98
03-Mar-98
10-Mar-98
17-Mar-98
24-Mar-98
31-Mar-98

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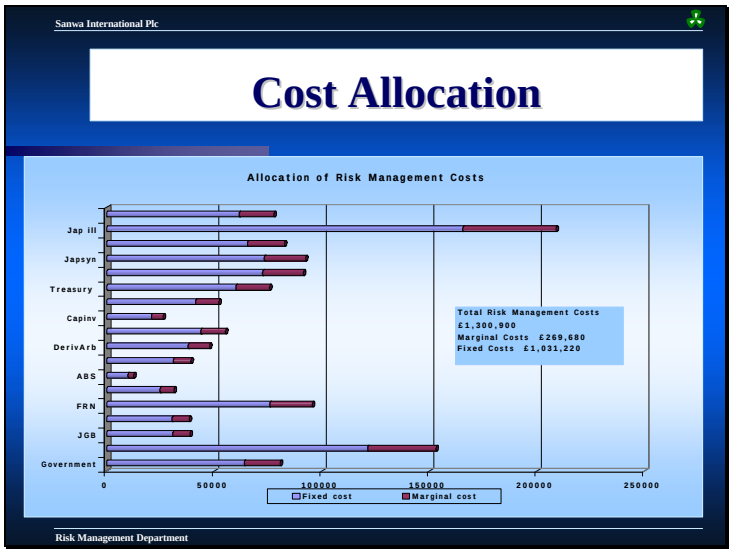
Sanwa International Plc
Cost Allocation
Allocation of Risk Management Costs
Jap ill
Japsyn
Treasury
Capinv
DerivArb
ABS
FRN
JGB
Government
0
50000
100000
150000
200000
250000
Fixed cost
Marginal cost
Total Risk Management Costs
£1,300,900
Marginal Costs £269,680
Fixed Costs £1,031,220
Risk Management Department

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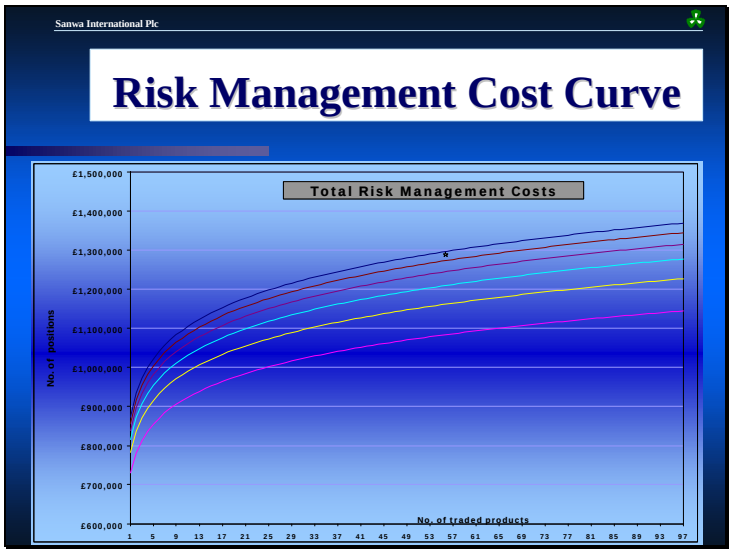
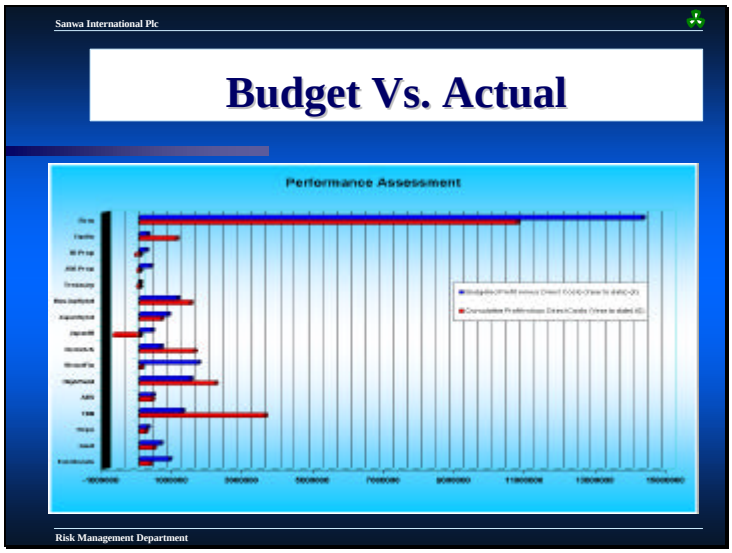

Sanwa International Plc
Risk Management Cost Curve
Total Risk Management Costs
£1,500,000
£1,400,000
£1,300,000
£1,200,000
£1,100,000
£1,000,000
£900,000
£800,000
£700,000
£600,000
No. of positions
No. of traded products
1 5 9 13 17 21 25 29 33 37 41 45 49 53 57 61 65 69 73 77 81 85 89 93 97

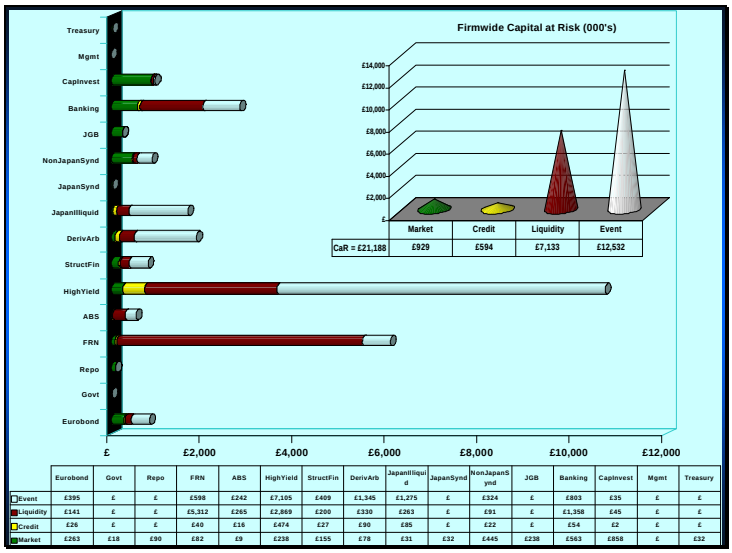
Slide 39

Sanwa International Plc
Return on Capital at Risk
Performance Assessment
Return on Economic Capital
Risk Management Department

Slide 40


Sanwa International Plc
Budget Vs. Actual
Performance Assessment
Risk Management Department

Slide 41



	Eurobond	Govt	Repo	FRN	ABS	HighYield	StructFin	DerivArb	JapanIlliquid	JapanSynd	NonJapanSynd	JGB	Banking	CapInvest	Mgmt	Treasury
Event	£395	£	£	£598	£242	£7,105	£409	£1,345	£1,275	£	£324	£	£803	£35	£	£
Liquidity	£141	£	£	£5,312	£265	£2,869	£200	£330	£263	£	£91	£	£1,358	£45	£	£
Credit	£26	£	£	£40	£16	£474	£27	£90	£85	£	£22	£	£54	£2	£	£
Market	£263	£18	£90	£82	£9	£238	£155	£78	£31	£32	£445	£238	£563	£858	£	£32

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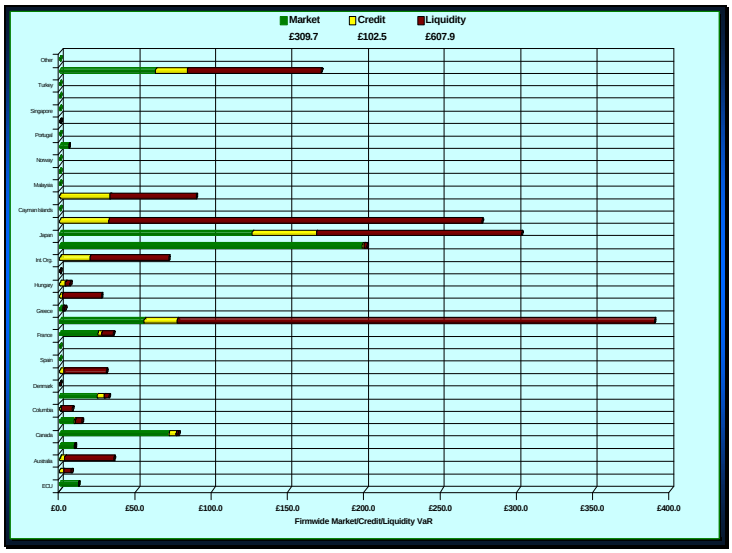
Market
Credit
Liquidity
£309.7
£102.5
£607.9
Other
Turkey
Singapore
Portugal
Norway
Malaysia
Cayman Islands
Japan
Int Org
Hungary
Greece
France
Spain
Denmark
Columbia
Canada
Australia
ECU
£0.0
£50.0
£100.0
£150.0
£200.0
£250.0
£300.0
£350.0
£400.0
Firmwide Market/Credit/Liquidity VaR