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DRIP

Derivatives for Retail Investment Products

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Discussion Outline

- Derivatives to manage investment risk
 - Types of risks
 - Comparison of risk management techniques
- Derivatives to manufacture returns
 - Introduction – purpose and constraints
 - Building block approach
 - Examples



Two uses of Derivatives

	Manage Risk	Manufacture Returns
Underlying Investment	<ul style="list-style-type: none">• Range of asset classes• Investor choice• Ability to switch	<ul style="list-style-type: none">• Defined by structure• Different type of choice• Limited ability to switch
Investment Guarantee	<ul style="list-style-type: none">• Usually simple structure• VA, e.g. AXA North	<ul style="list-style-type: none">• Can be complicated• Leveraged products
Derivative Purpose	<ul style="list-style-type: none">• Hedge the investment risk taken on by the product manufacturer	<ul style="list-style-type: none">• Provide the returns as per the product structure
Product Manufacturer	<ul style="list-style-type: none">• Ongoing risk management• Exposed to hedge slippage	<ul style="list-style-type: none">• Limited ongoing risk management• Limited investment risk exposure



Derivatives to Manage Risk

Major risks introduced by investment guarantees

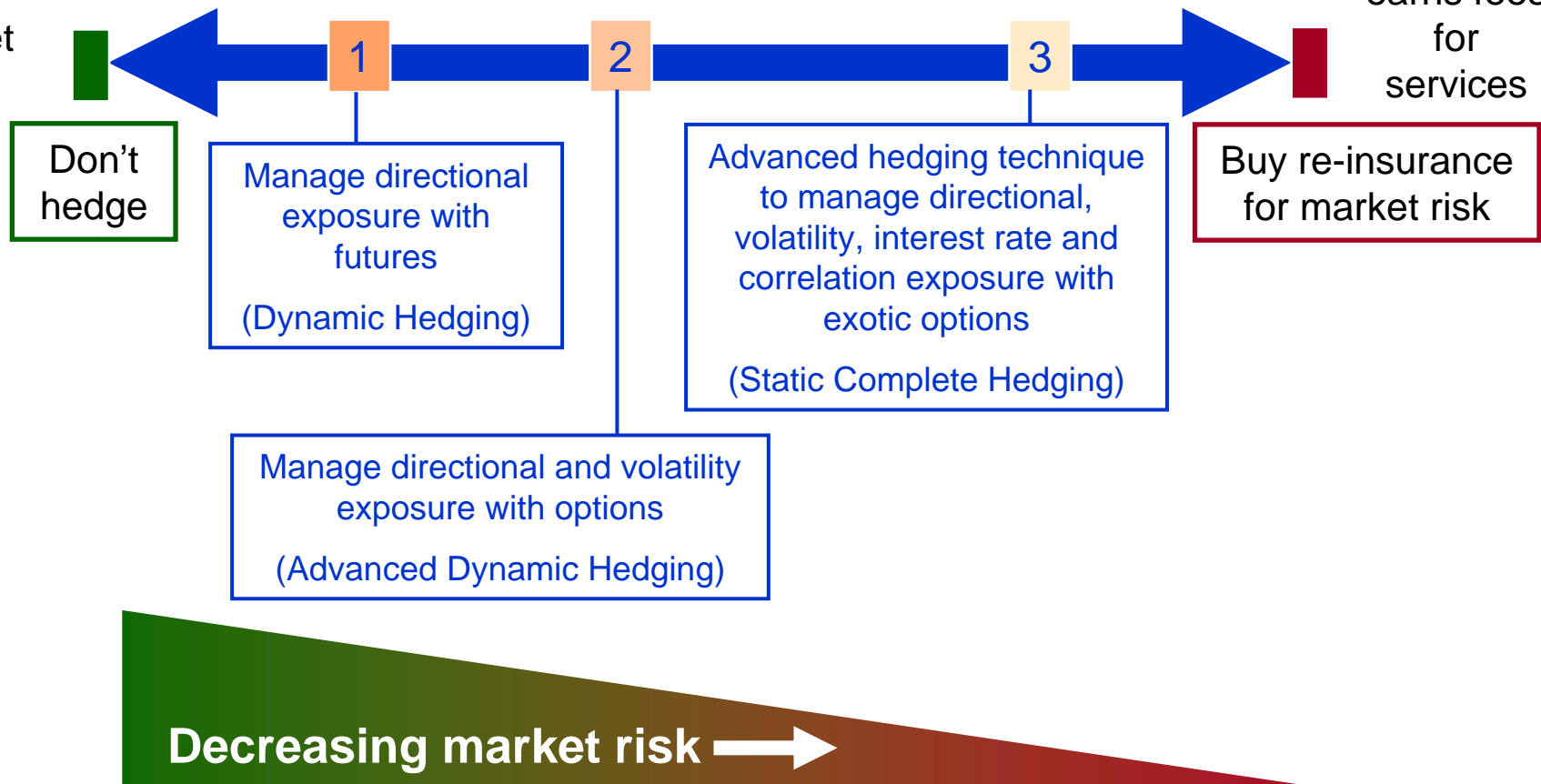
- **Balance Sheet Risk**
 - Risk that the investment risk management will be inadequate, exposing the provider to balance sheet losses
- **Profit Volatility Risk**
 - Risk that the hedging cost will vary with markets, introducing profit volatility
- **Decrement Risk**
 - Risk that the product design will encourage policyholder behaviour that has an asymmetric impact on the provider



Risk Management Techniques

Insurer takes market bets

Insurer earns fees for services





Cost of External Guarantees

Term	10 years, SP
Guarantee Type	GMAB
Asset Mix 1 No Alternatives	25% Aust Equ 25% Int'l Equ 25% Aust FI 25% Int'l FI
Asset Mix 2 With Alternatives	20% Aust Equ 20% Int'l Equ 20% Aust FI 20% Int'l FI 20% Alternatives

Static Hedge : Indicative Cost (% p.a. * NAV)		
	Asset Mix 1	Asset Mix 2
Annual Ratchet	1.25%	1.06%
0.0% Accumulation	0.42%	
2.5% Accumulation	0.77%	0.68%
3.5% Accumulation	1.08%	



Are External Guarantees Expensive?

- AXA North 10 yr guarantee cost = 1.25%
 - Investment strategy 1, draw-down product
- Similar external guarantee cost = 1.8%
 - Guarantee design stronger than AXA North
 - Including alternative assets decreases cost
- Appears expensive because
 - AXA cost excludes investment management fee
 - Price based on implied volatility
 - Paying cost of hedging all risks

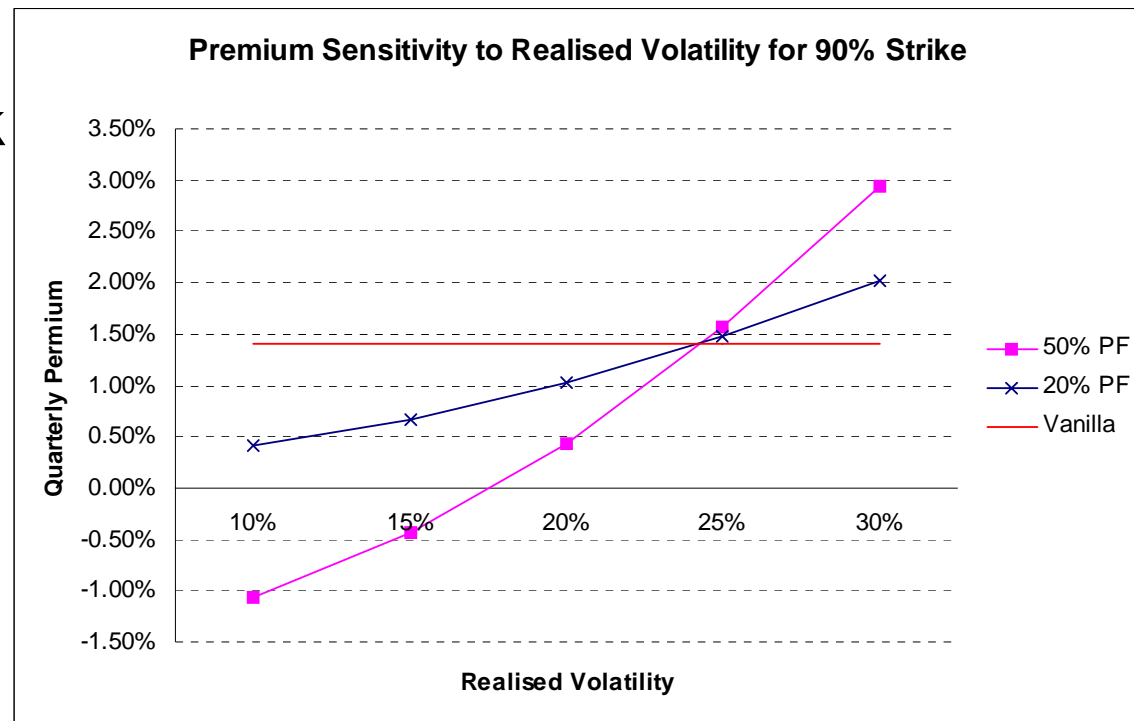


Removing Implied Volatility Cost

Static protection with price based on realised volatility

$$\text{Premium} + \text{PF} \left(\frac{252}{N} \sum_{t=1}^N \ln \left(\frac{\text{Underlying } t}{\text{Underlying } t-1} \right)^2 - \text{VolStrike}^2 \right)$$

- Remove BS Risk
- Retain Profit Vol Risk
- Lower expected cost
- Can set volatility sensitivity
- 90% strike 1 year ASX 200 option





Hedging all the Risks

- Internal hedging – you choose – delta only?
- How much risk to retain? % of expected profit

Risk Name	Description	Hedging Instruments
Delta	Change in value for a small movement in underlying	Underlying Stock, Futures
Rho (by term)	Change in value for a small shift in yield curve	Futures, Swaps
Gamma	Change in value of Delta for a small movement in underlying	Options
Vega	Change in value for a 1 point shift in implied volatilities	Options, Variance Swaps, Forward Starting Variance Swaps, Options on Volatility
Correl	Change in value for a 1 point shift in correlations	Correlation Swaps
Gap Risk	Large market movements	External Guarantee



Derivatives to Manufacture Returns

- Purpose
 - Create broader set of risk units for investors
- Constraints
 - Easy for investors to understand
 - Not loaded with fees
- Growing Popularity
 - Investors can access alternative pay-offs
 - Without providers taking on investment risk



Building Block Approach

Underlying

Stocks

Indices

Proprietary Indices

ETFs

Managed Funds

Alternative Assets

Payoff

Long Only

Long-Short

Simple Derivative

Complex Derivative

Indiv Capped Basket

CPPI

Asset Allocation

Fixed

Asset Manager

Momentum

Volatility Target

Markowitz

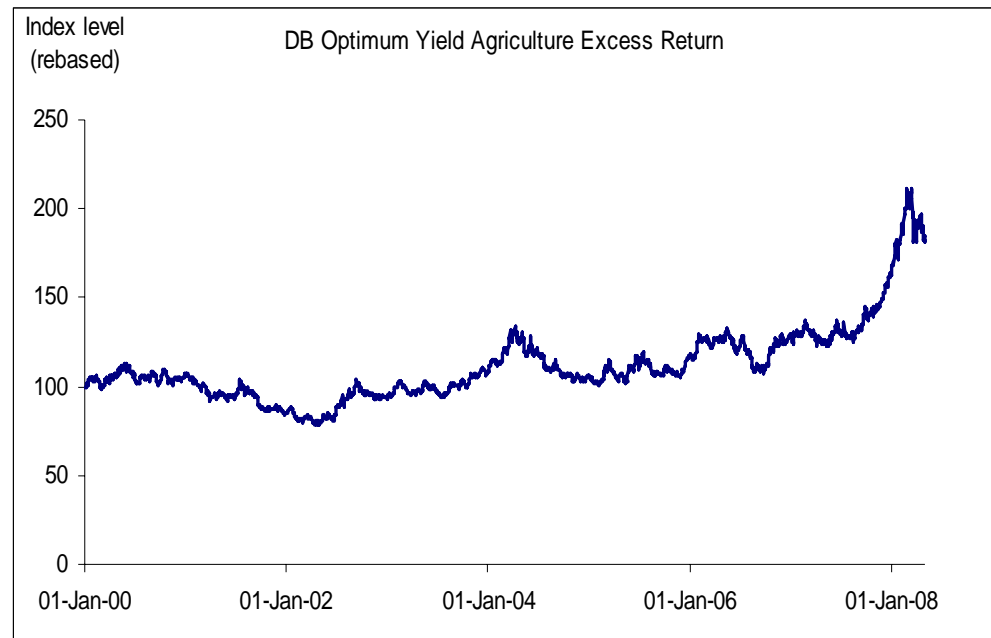
Black Litterman



Guaranteed Commodity Fund

- Cap guarantee with reduced upside participation
- Bond + Call option

- Example:
 - Agricultural Index
 - 4yr term
 - Cap guarantee
 - AUD format
 - ...gives 80% participation on underlying





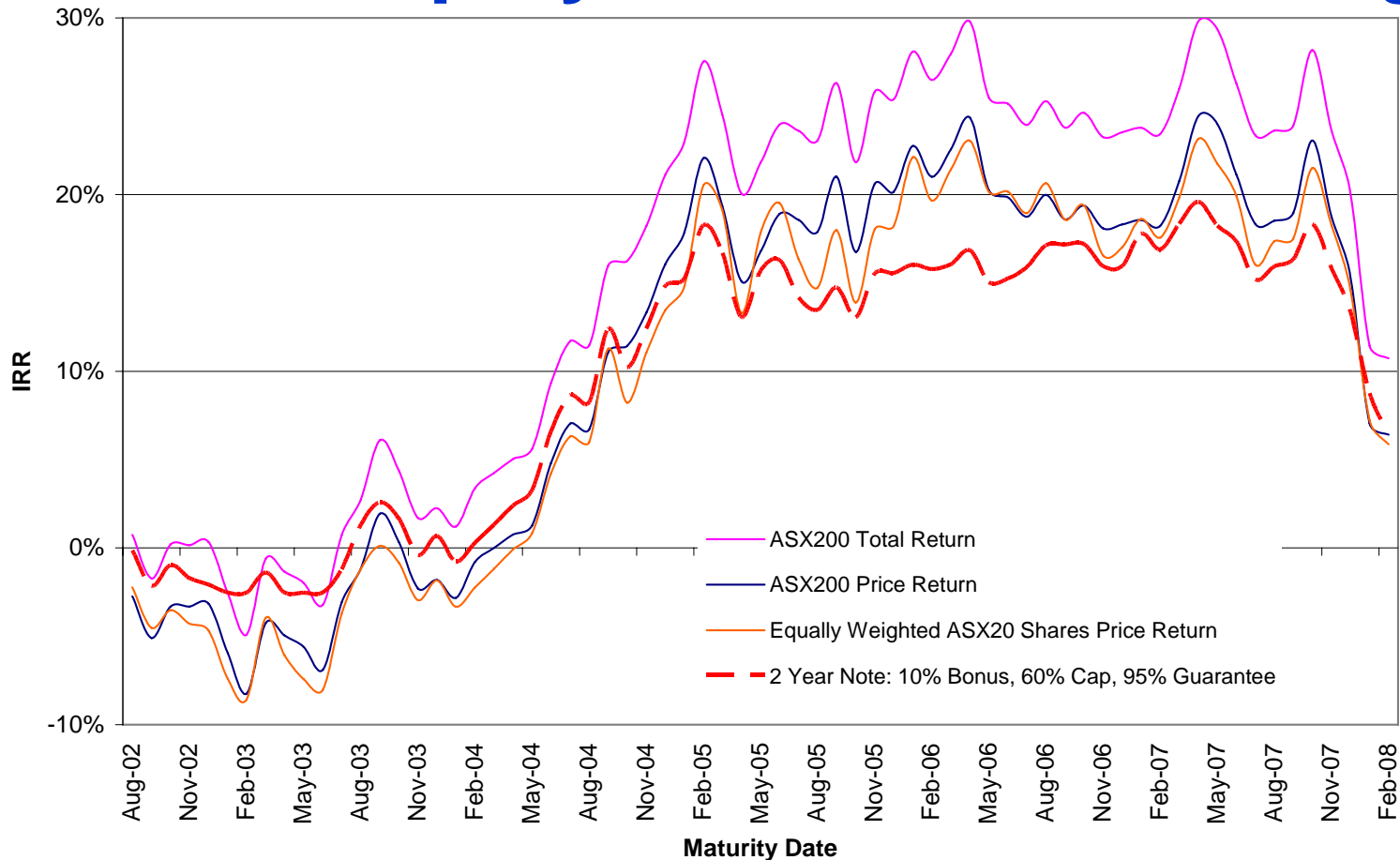
Structured Equity: 2 Year Note

- Example underlying: ASX 20
- 95% Capital Guarantee
- High upside participation
- Individual caps
- 2 year note with no coupons
 - Payout = Notional * [95% + max (0%, Basket Performance)]
- Basket performance
 - All shares contribute actual price performance + Bonus, up to a maximum of the Cap
 - Performance calculated since inception

ASX 20 Indicative Pricing	
Cap	Bonus
60%	10%



2 Year Equity Note: Back-Testing



- Calculations are approximate and ignore corporate actions
- Source: S&P for ASX 20 composition, Bloomberg for month end closing prices

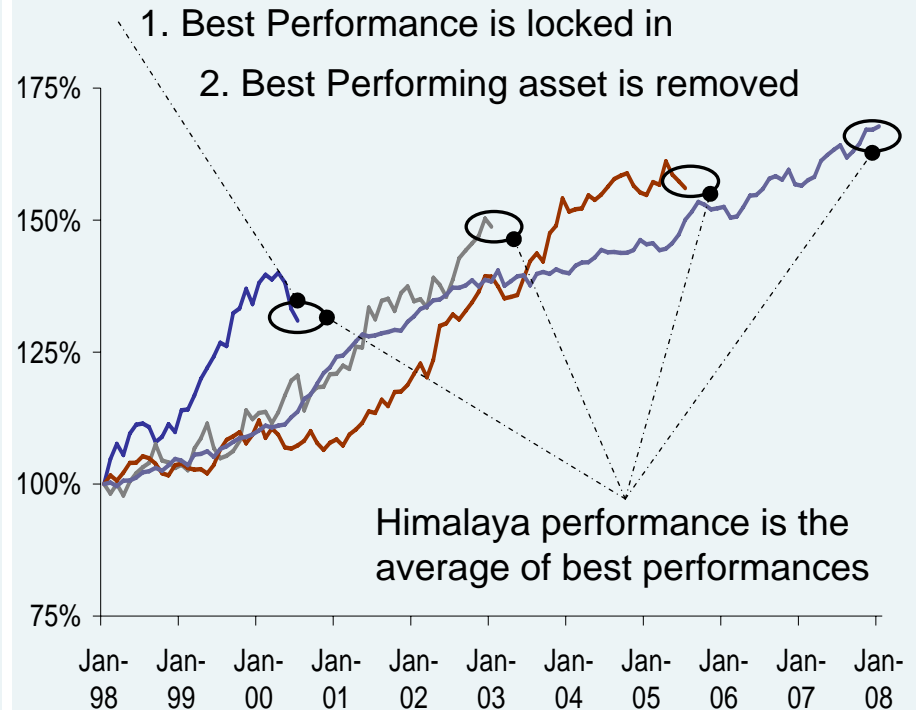


Structure Example: Himalaya Call

What is a Himalaya Call option?

- applied to a basket of underlyings
- performance of the best performing underlying is locked-in for basket performance calculation at maturity
- best-performing underlying is removed after each lock-in
- Himalaya performance is the average of these best performances
- Low vol, high corr, high yielding option currency => good pricing

Mechanism Illustration



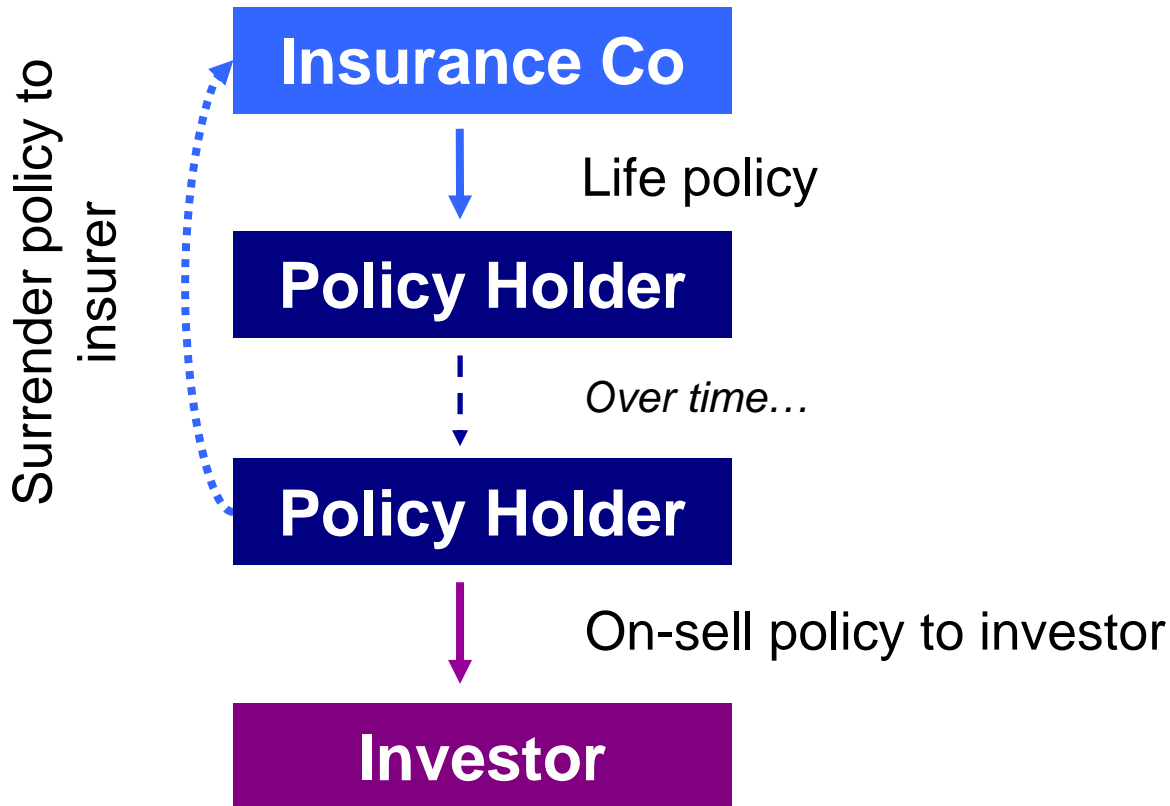


Himalaya Call: The 4 Golds

- Equal basket of:
 - Merrill Lynch IIF World Gold Fund
 - SAM Sustainable Water Fund
 - Merrill Lynch IIF World Energy Fund
 - Pictet Clean Energy Fund
- Research suggests strong supply/demand imbalances but growth cycles uncertain
 - => **Himalaya to lock-in growth**
- 4yr AUD
- Annual observations, 100% lock-ins of performance



Underlying: Longevity Beta





Payoff: 7 Year Note (USD)

	Savings	Income	Protected Income
Coupon	Zero	7.35% (LIBOR + 3.5%)	5.85% (LIBOR + 2%)
Minimum Redemption	Zero	Zero	59% (LIBOR + 0%)
Maximum Redemption	221% (LIBOR + 8%)	109% (LIBOR + 4.5%)	100% (LIBOR + 2%)
Expected Redemption	221% (LIBOR + 8%)	109% (LIBOR + 4.5%)	100% (LIBOR + 2%)

Spreads are similar for AUD structures



Summary

- Know the full spectrum of risks to manage
- Managing investment risk can be complicated
- Alternative approach is to use derivatives to manufacture returns
- Goal is to create broader set of risk units
- Products should be easy to understand and not loaded with fees



Questions

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