



18TH EAST ASIAN ACTUARIAL CONFERENCE

12-15 October 2014

Taipei International Convention Center in Taipei Taiwan

Recent Development of Variable Products and Financial Risk Management

Rikiya Ino, FIAJ
Principal and Senior Consultant
Milliman Tokyo



Agenda

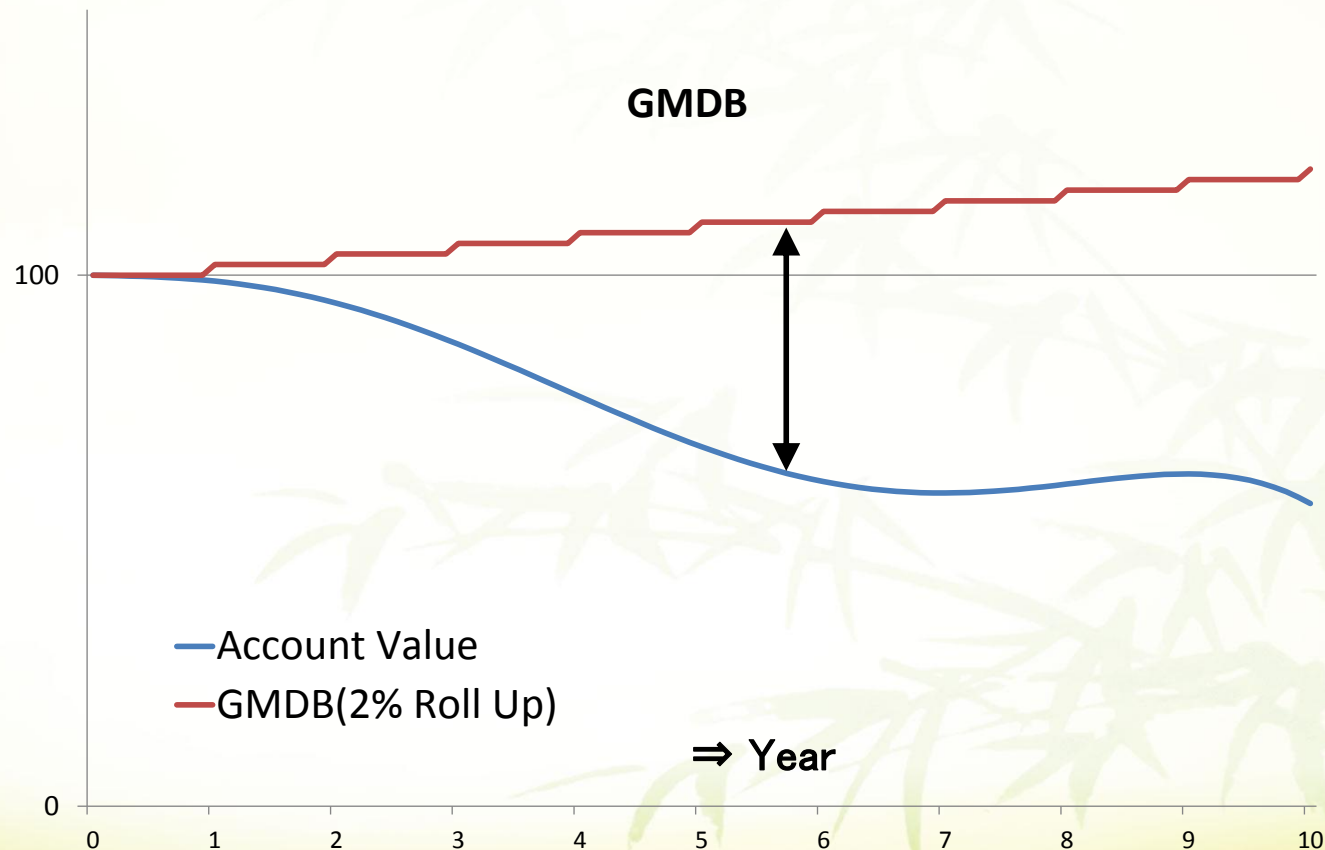
- Variable Annuity (VA) Market Overview
- VA Product Trend
- VA Risk Management
- Managed Fund

Minimum Guarantee

- GMDB: Guaranteed Minimum Death Benefits
 - Guarantee of death benefit, maximum of account value and guarantee value
- GMAB: Guaranteed Minimum Accumulation Benefits
 - Guarantee at maturity
- GMIB: Guaranteed Minimum Income Benefits
 - Guarantee of (fixed) annuity income
- GMWB: Guaranteed Minimum Withdrawal Benefits
 - allow policyholder to withdraw a certain amount of assets at certain dates
 - GLWB guarantees life-time withdrawal
- Guarantee may be roll-up, ratchet, reset, etc

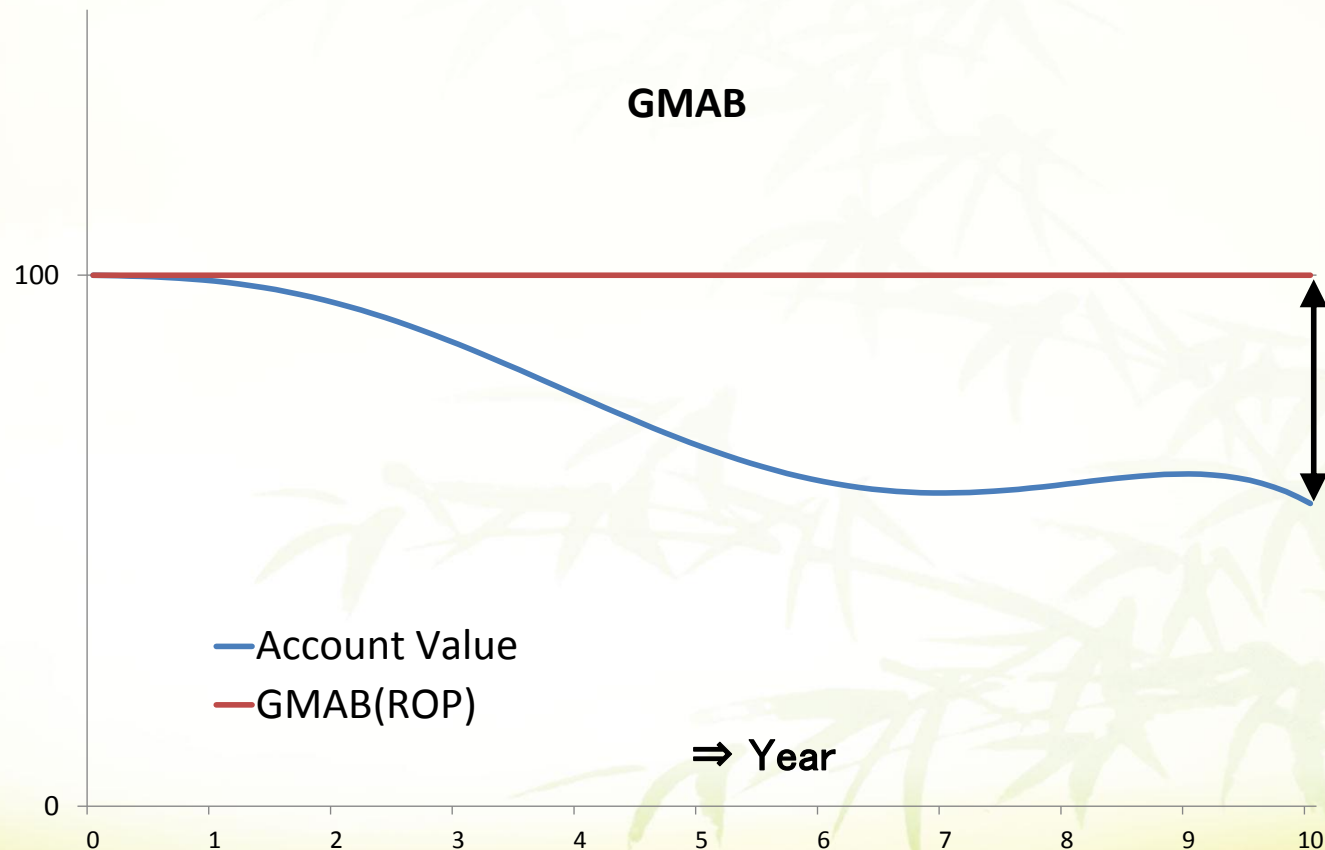
Minimum Guarantee

- GMDB



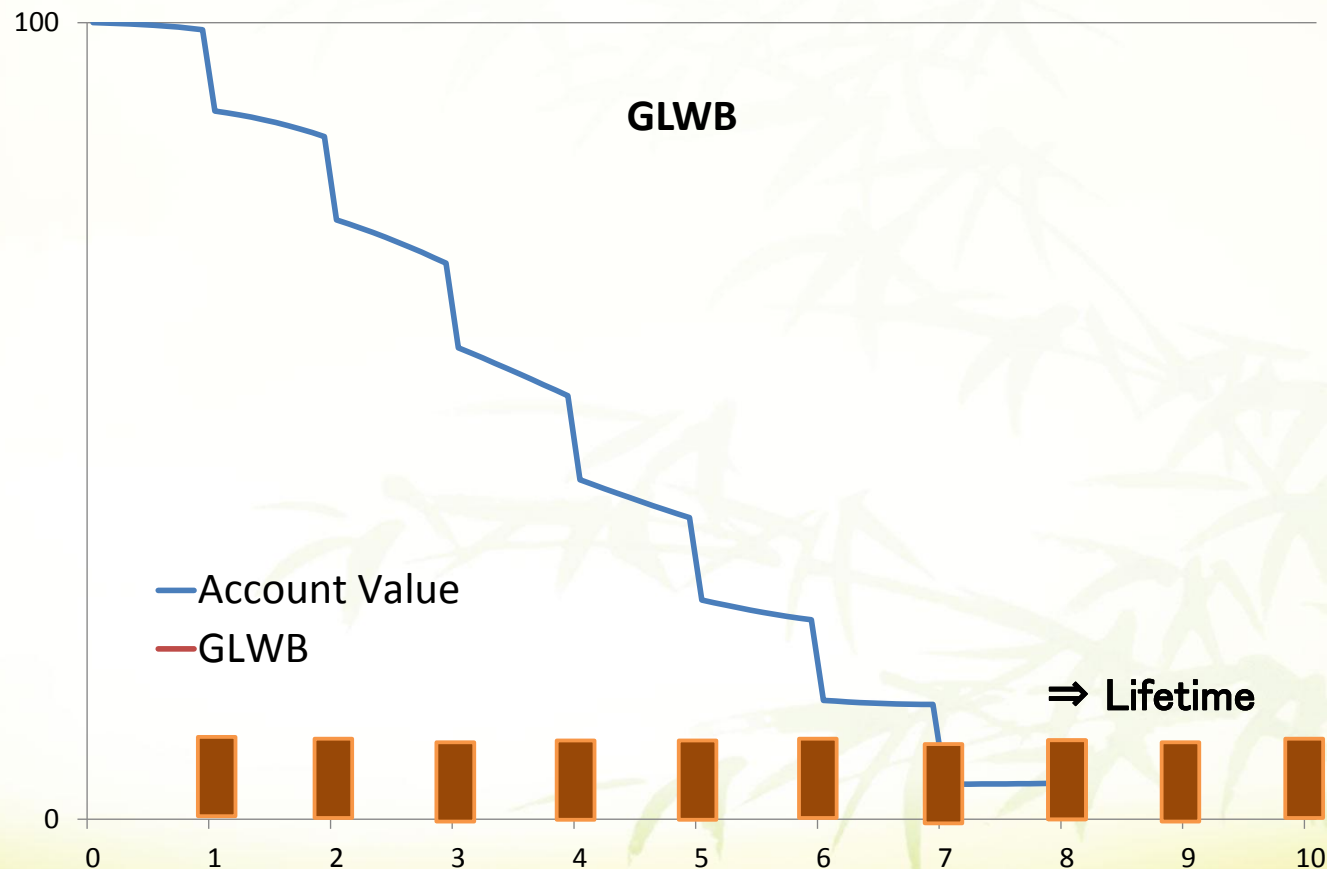
Minimum Guarantee

- GMAB



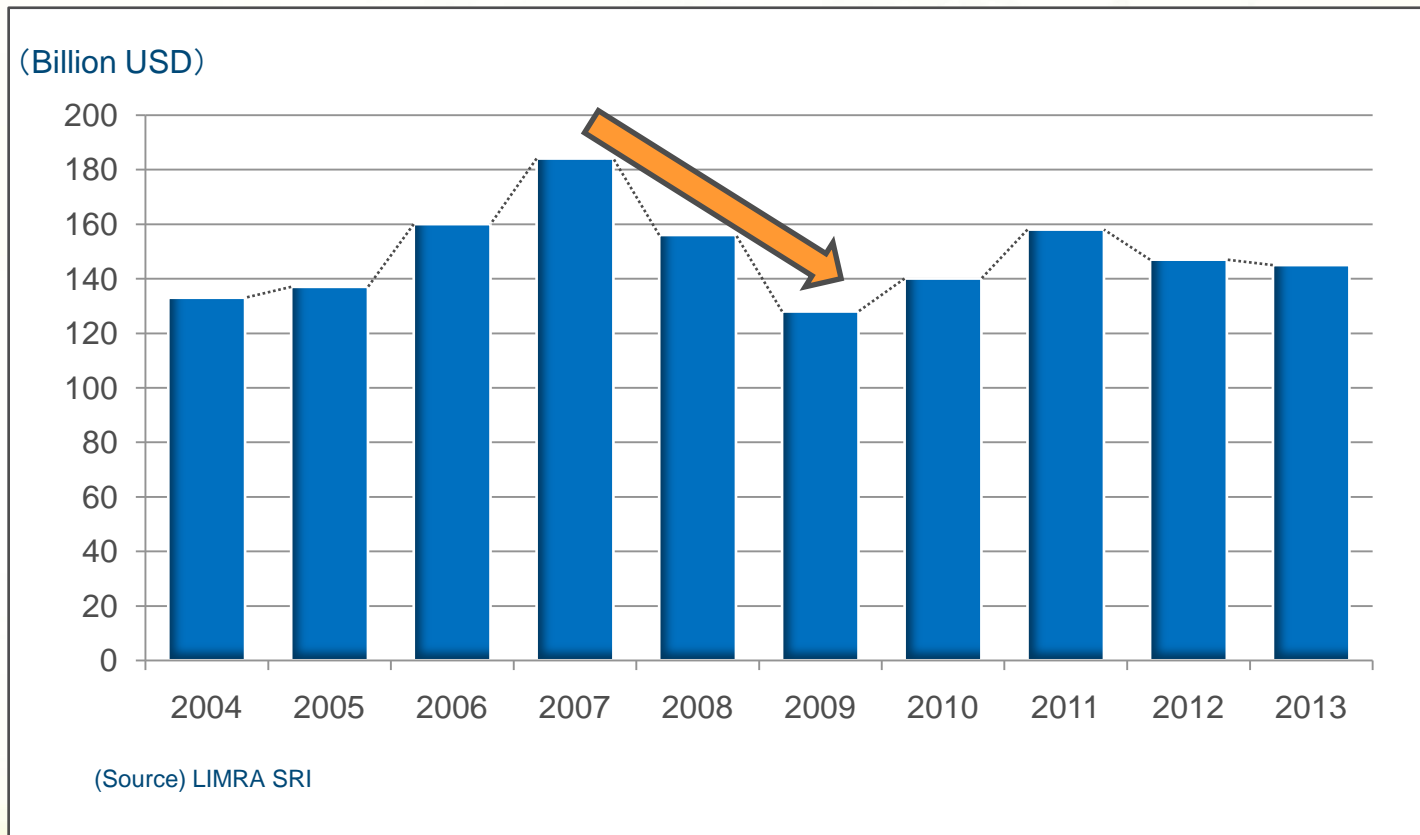
Minimum Guarantee

- GLWB



VA Market Overview

- US New Business Volume



VA Market Overview

- US VA New Business by company

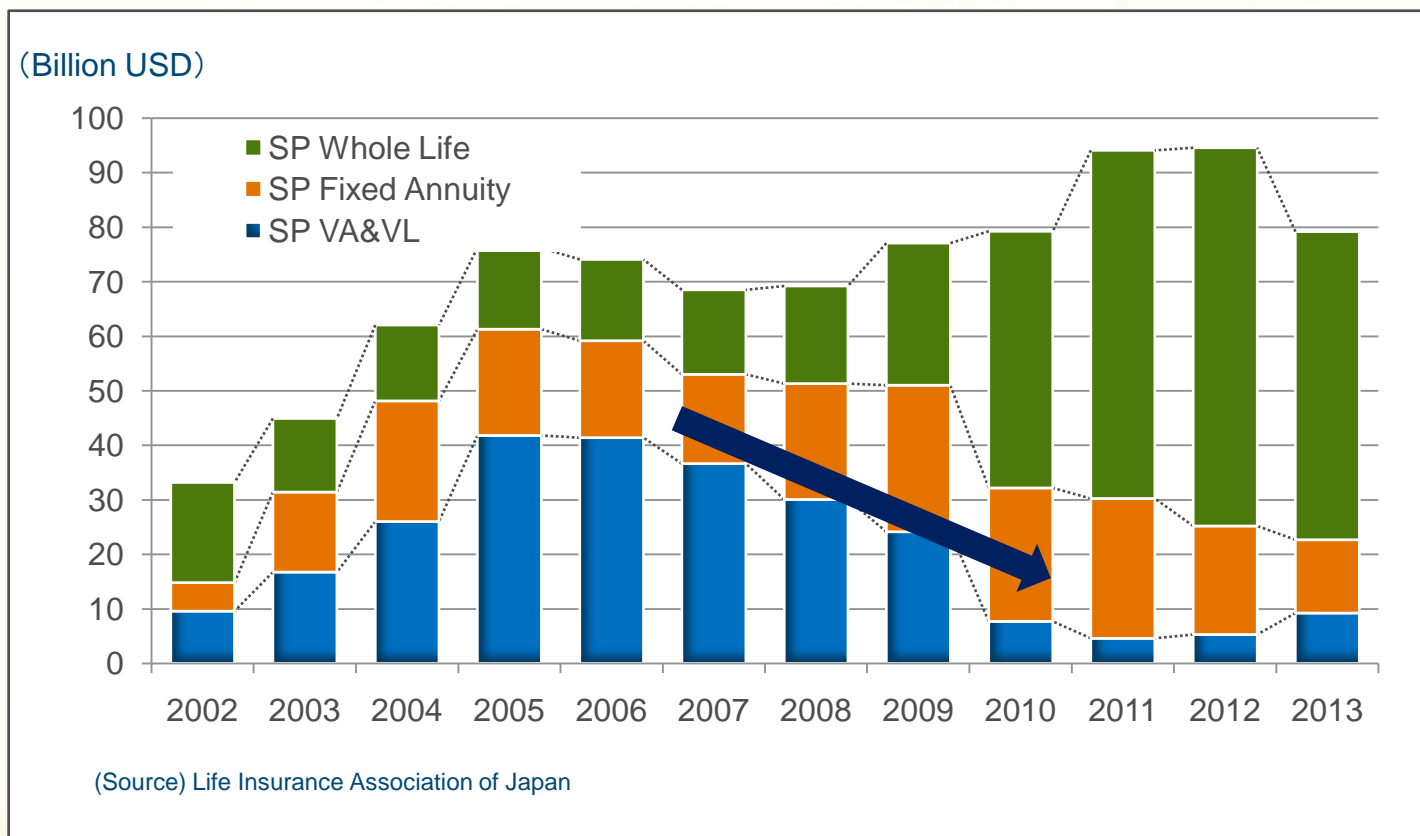
(Billion USD)

Company	2013	2012	Change	Note
Jackson National	20.9	19.7	+6%	In 2014Q1 sales, GLBs were elected 79% (dropped from 90% in 2009)
Lincoln Financial Group	14.4	10.4	+38%	
TIAA-CREF	13.9	14.1	-1%	
AIG Companies	12.3	8.8	+40%	
Prudential Financial	11.4	20.0	-43%	
MetLife	10.6	17.7	-40%	GLWB 65%
AXA Equitable	9.7	8.8	+10%	GMIB 10%
AEGON/Transamerica	8.4	5.3	+58%	GMAB 2%
Others	43.7	42.6		GMWB 1%
Total	145.3	147.4	-1%	

(Source) Disclosure material

VA Market Overview

- Japan New Business Premium of SP Products



VA Market Overview

- Japan VA/VL AuM by company

(Billion USD)

Major VA Writer	Account Value (June 2014)	Note
MSPPrimary	25.7	
Tokio Marine	20.4	Stopped new business in July 2012
ING	20.2	Stopped VA sales in Aug 2009
Sumitomo	19.6	Stopped SPVA sales in Oct 2009
Daiichi Frontier	18.7	
Hartford	16.7	Stopped new business in June 2009
ManuLife	12.3	
AXA	9.3	
Mitsui	5.0	Stopped VA sales in April 2009
T&D Financial	4.4	Stopped VA sales in April 2010

(Source) Disclosure material

VA Market Overview

- Industry Trend

Issues Facing VA Writers

- Low interest rate environment
- Earnings volatility
- Managing legacy in-force
- Emerging discrepancy of actual/expected policyholder behavior

Company's Action

- Exit the market
- Buyback legacy block
- Continue with the status quo
 - Increase market share
- Product de-risking

VA Market Overview

- Buy-Back Program
 - AXA
 - September 2012 GMDB/EEB buyback
 - July 2013 GMIB/EEB buyback
 - September 2013 GLWB/GMDB buyback
 - Hartford
 - 2Q 2012 GMWB cash buyout
 - Policyholders can fully surrender their policy in exchange for an “Enhanced Surrender Value”
 - the greater of AV, or if AV is underwater, the AV + 20% of the benefit base (capped at 90% of the benefit base)
 - Higher acceptance rate than anticipated
 - Aegon/Transamerica
 - 3Q2012 Pays 80% of GMIB Benefit base
 - 12% of initial eligible policyholders took the offer

Product Trend

- Product De-Risking (US)
 - Increased fee
 - Reduced guaranteed benefits
 - DB only products
 - Withdrawal rate reduction
 - Investment restrictions
 - Embedded risk management features to reduce capital market risk
 - Managed funds
 - Interest rate linked guarantees

Product Trend

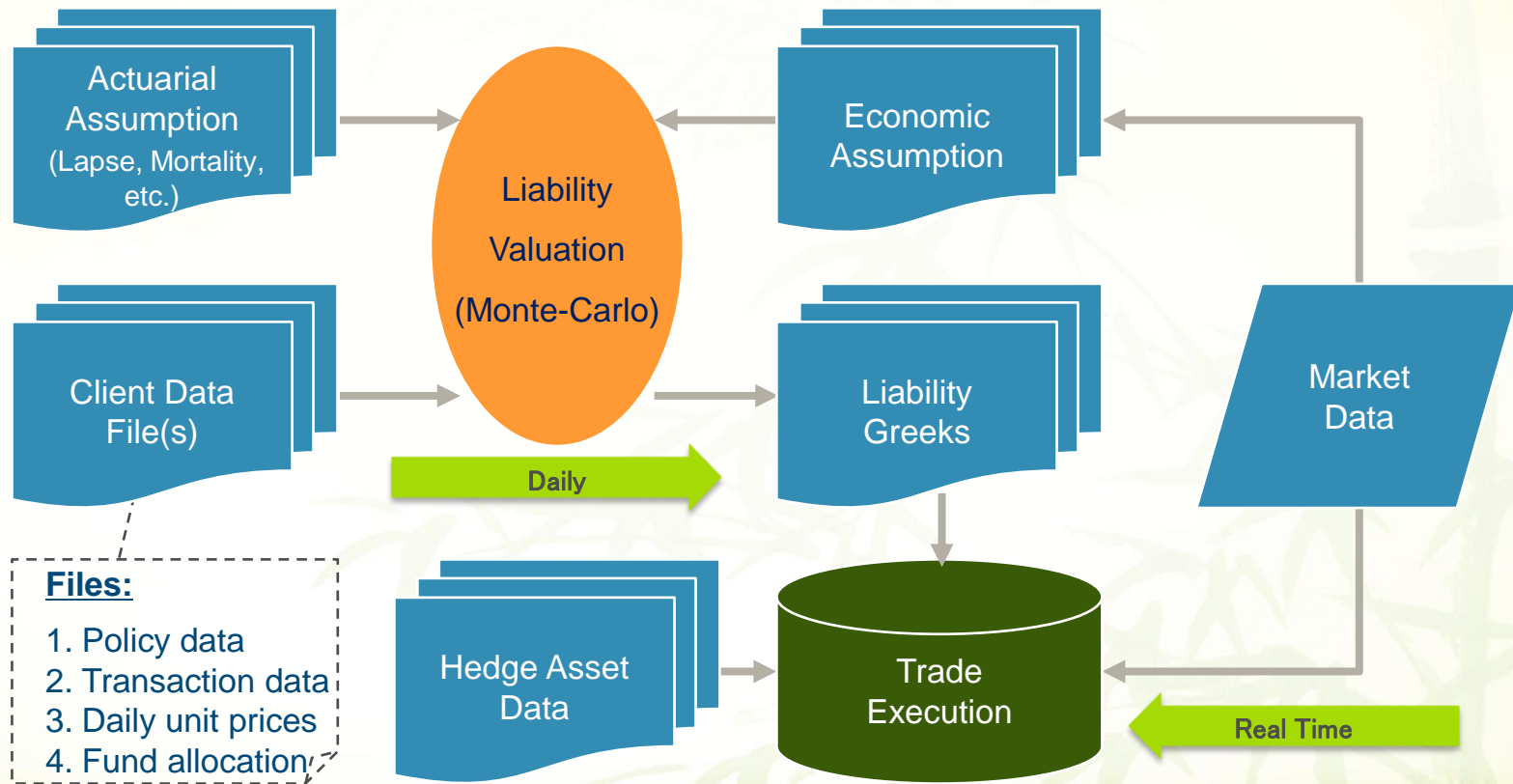
- Product De-Risking (Japan)
 - DB only products
 - Hybrid product with general account (bond only) and separate account
 - General account guarantees maturity benefit
 - Volatility control fund
 - Fixed asset allocation of index funds has been common
 - Future contract is becoming popular to avoid basis risk
 - Volatility control fund is de-facto standard
 - First product launched in 2009

VA Risk Management

- Risk management strategies have been stabilized
 - Dynamic hedging of Delta / Rho with future/swap
 - Highly robust operational processes
- Hedge objectives moving towards Economic basis
 - Increased hedging of guarantees that are not fair valued
 - GMDB and life-contingent portion of GLB
 - Historic long term volatility versus market based volatility
 - Long term options are illiquid
 - Companies have reduced the amount of Vega hedging, use of historic volatility aligns better with actual hedge strategy

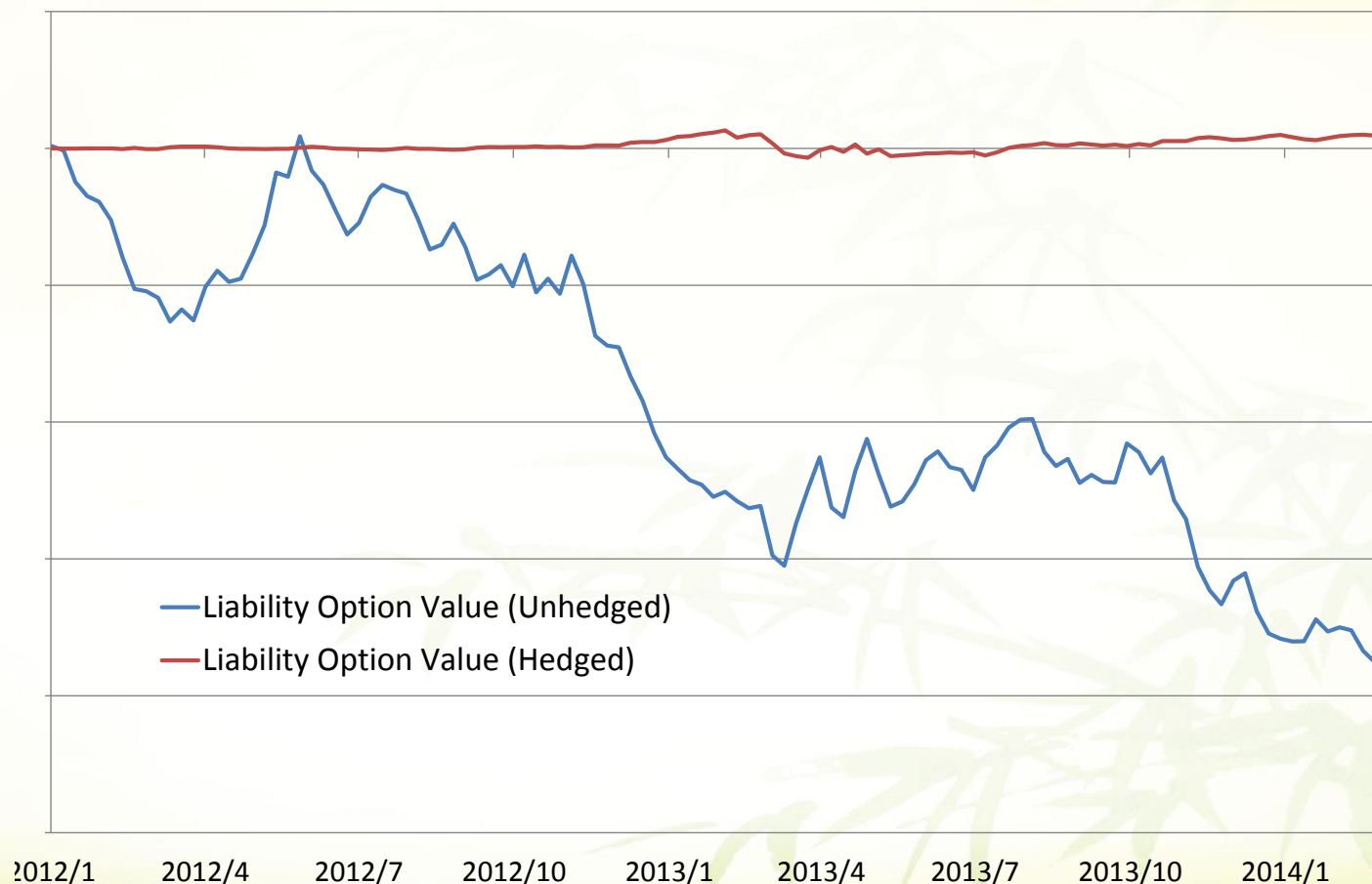
VA Risk Management

• Hedge Program Operation



VA Risk Management

- Hedge performance of Japanese companies



Liability option value reflects hedgeable components only. Unhedgeable components such as basis risk and actuarial risks are not reflected.

Managed Fund

- Technique of hedging is applied to fund management
 - Managed fund is becoming popular as de-risking of new products and existing policies

Benefit for Insurer

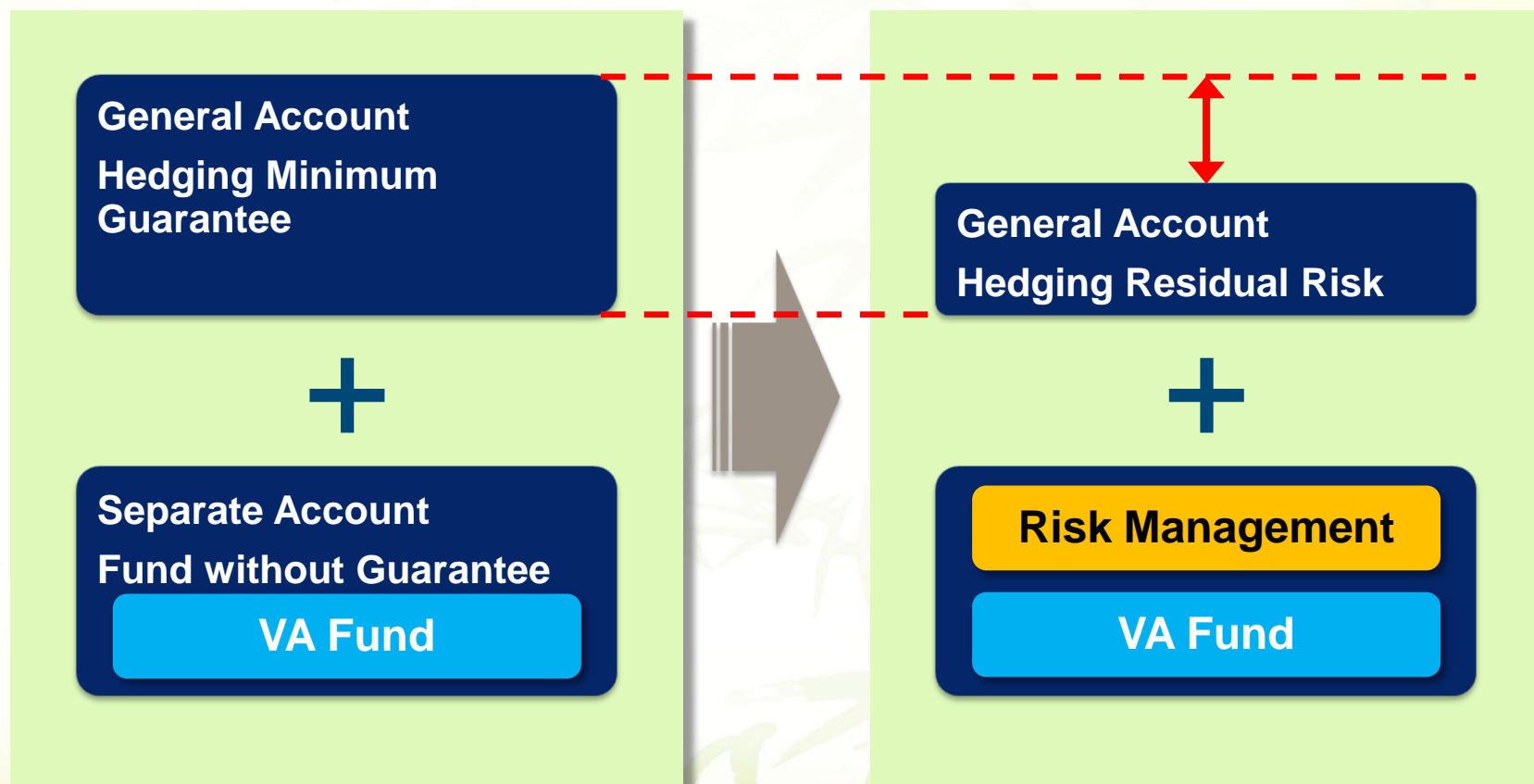
- Reduced guarantee risk and hedge cost
- Reduced earning volatility
- Reduced policyholder behavior risk

Benefit for Customer

- Access to cash value

Managed Fund

- Hedging is embedded in fund management



Managed Fund

- Strategy
 - Variety of managed fund strategies
 - Common to use future contracts to control risk profile of underlying assets
 - Timely rebalance of future position is a key of effective management

Managed Fund

- Comparison with CPPI
 - Constant proportion portfolio insurance (CPPI) provides participation to the performance of the equity market by employing a dynamic trading strategy

**Upward Trending
Market**

Increasing Equity Allocation

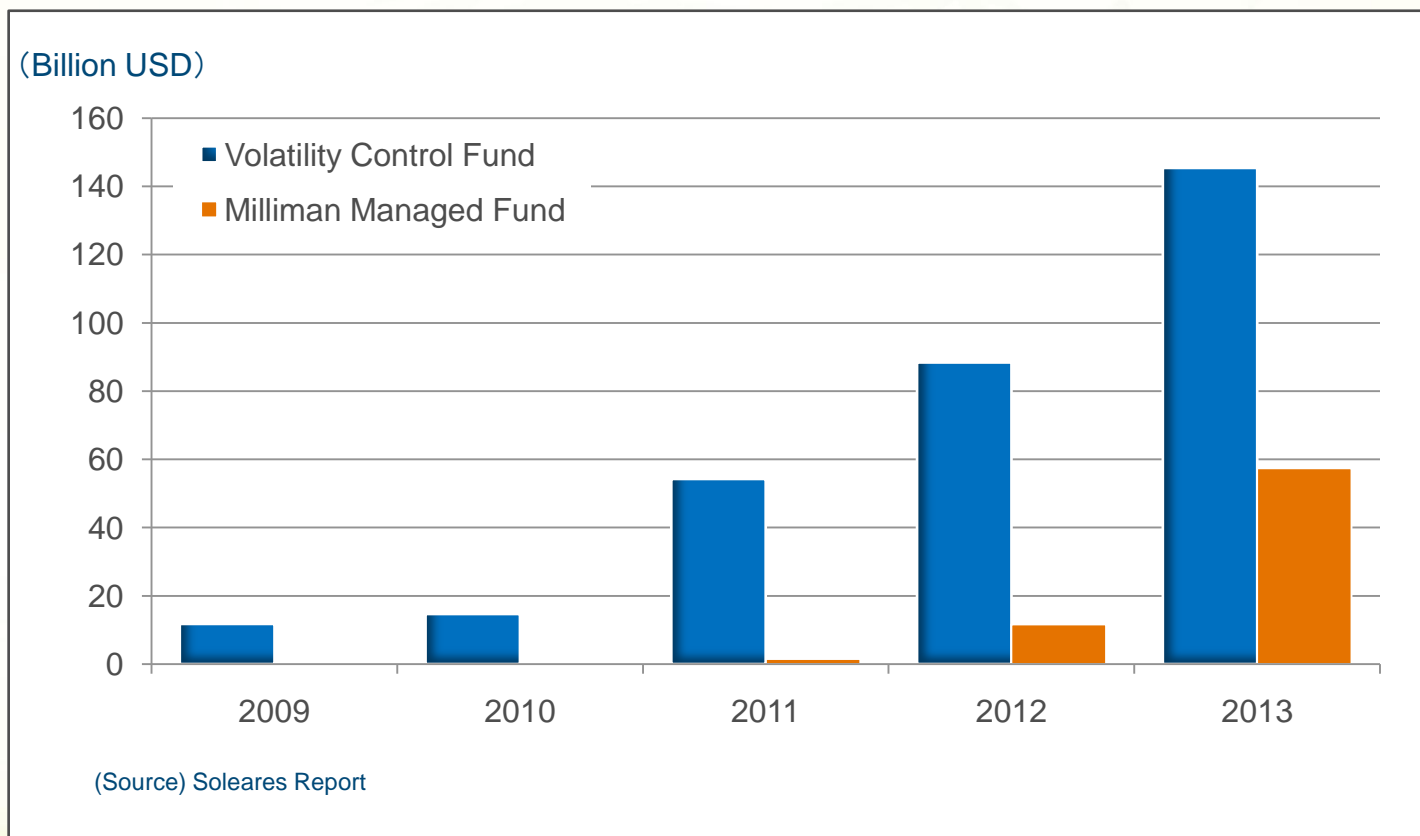
**Downward Trending
Market**

Increasing Bond Allocation

- Downside market movement may lead to “cash-lock” of CPPI fund

Managed Fund

- Managed Fund AuM (Billion USD)



Managed Fund (Example)

- Hedge cost is reduced by the introduction of managed fund

Two Risk Management Techniques Combined

Volatility Control

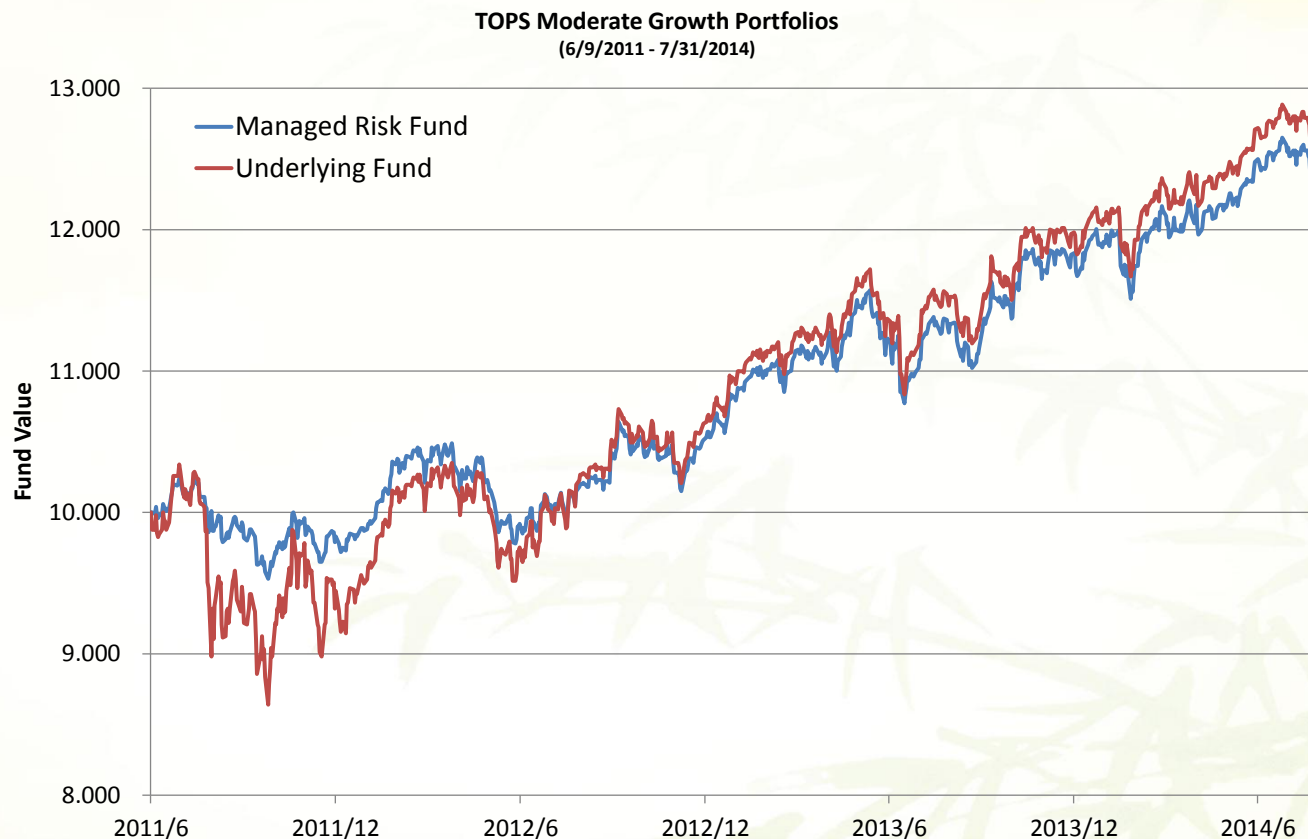
- Traditional asset allocation
 - Target a specific equity allocation (i.e., 50%) as a proxy for risk
 - Maintain constant equity allocation regardless of market conditions
- Target volatility asset allocation
 - Targets a specific volatility level
 - Prevents portfolio volatility from dramatically increasing during crises

Capital Protection

- Cushion losses
 - Explicitly cushion losses in market downturns
 - Amount of cushion customizable to plan needs
- Keep protection relevant
 - Ratchet protection level up to preserve gains
 - Reset protection level down after extreme market declines to harvest gains

Managed Fund (Example)

- Actual Performance of Managed Fund Example



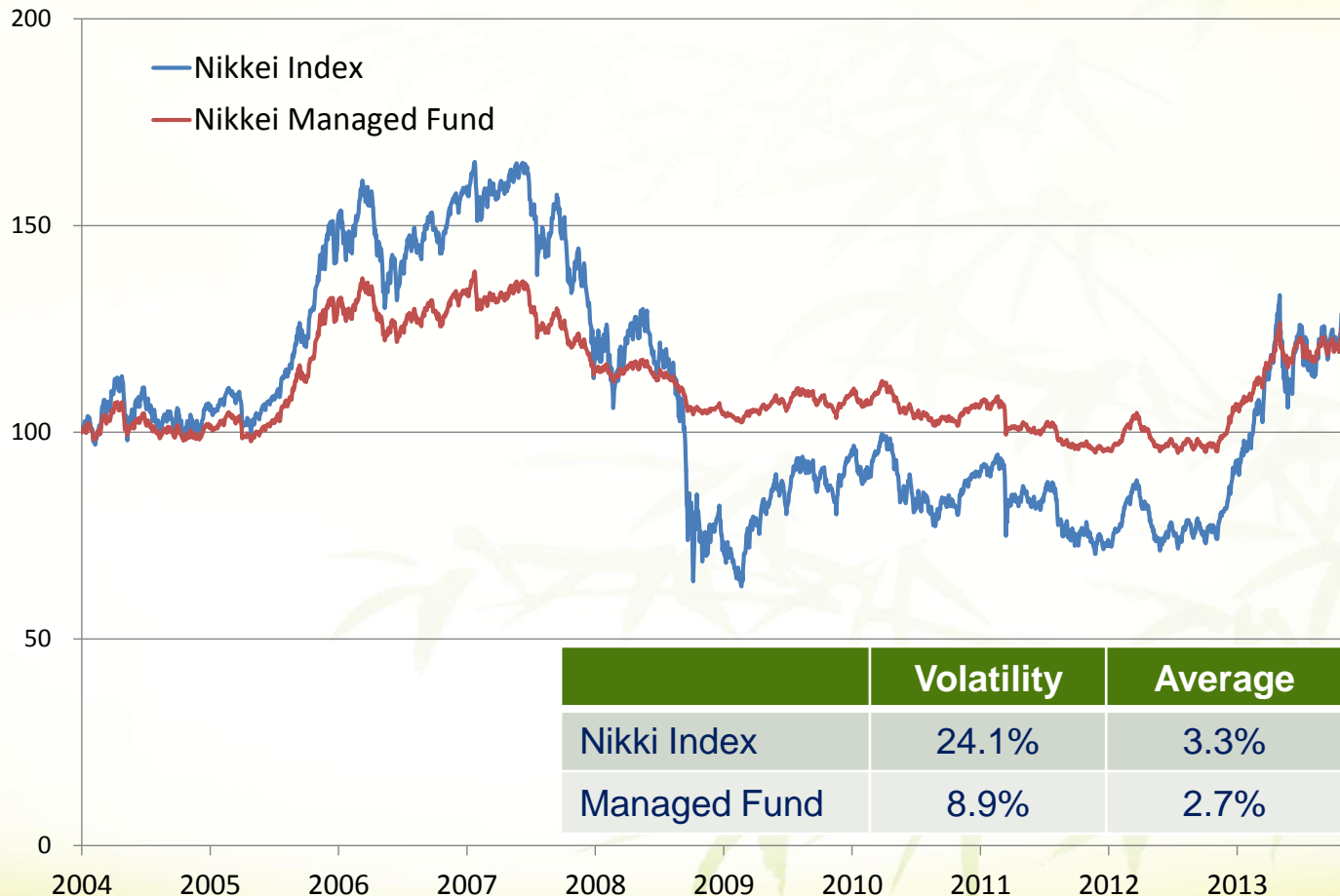
Figures shown are past results and are not predictive of results in future periods. Current and future results may be lower or higher than those shown. Unit prices and returns will vary, so investors may lose money. Investing for short periods makes losses more likely. The variable annuities and life insurance contracts that use the series' funds contain certain fees and expenses not reflected here.

Managed Fund (Example)

- Back testing of domestic and global equity funds in Japan
 - Strategy
 - Volatility Control + Capital Protection
 - Target volatility 10%
 - Capital protection
 - Replicating a 5-year rolling maturity put option
 - Ratchet protection level up to preserve gains
 - Reset protection level down after extreme market decline to harvest hedge gain

Managed Fund (Example)

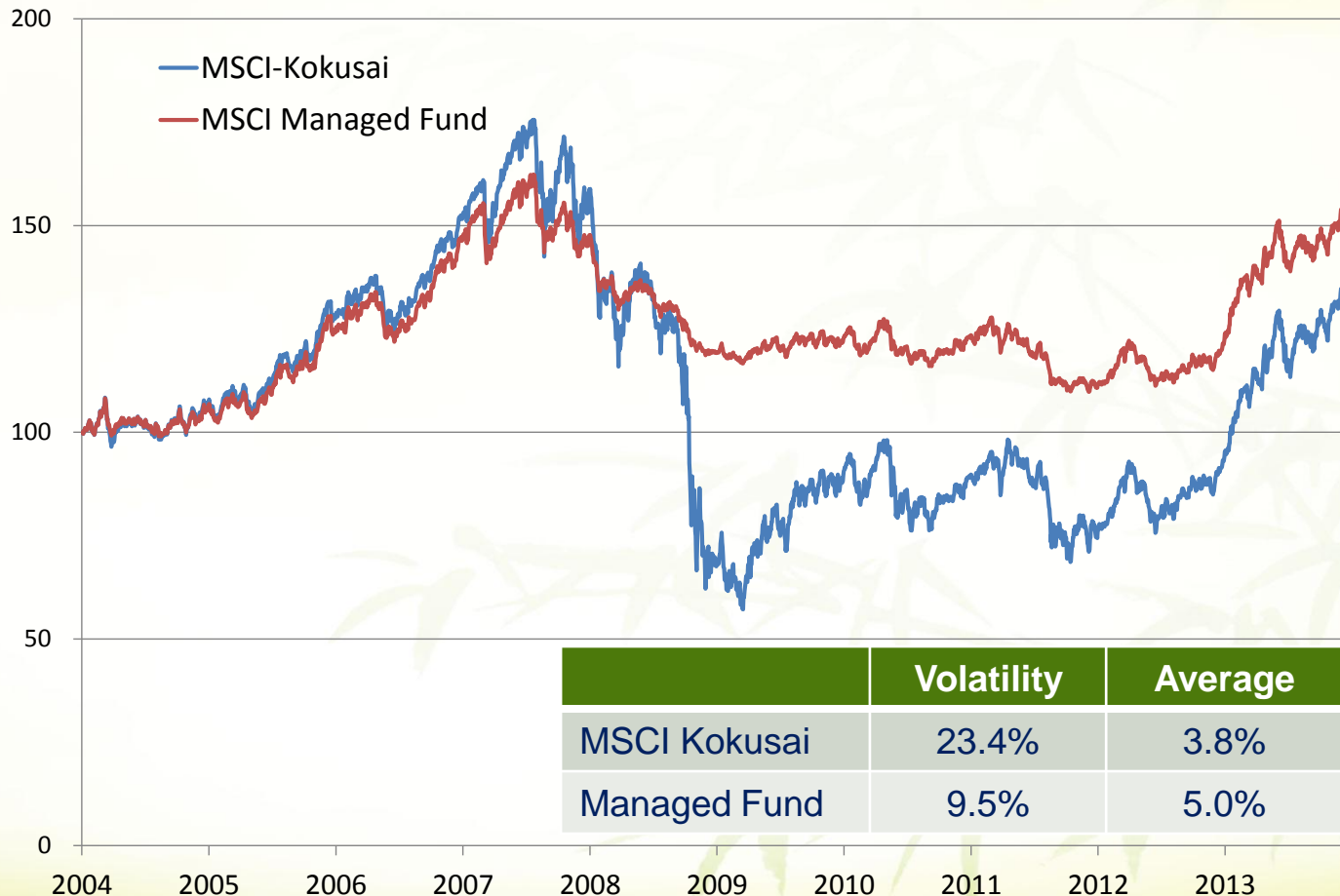
- Japanese equity fund



The rates of return are hypothetical historical illustrations and do not represent the returns of any particular investment portfolio. There is no assurance that the investment process will consistently lead to successful investing.

Managed Fund (Example)

- Global Equity Fund in Japan



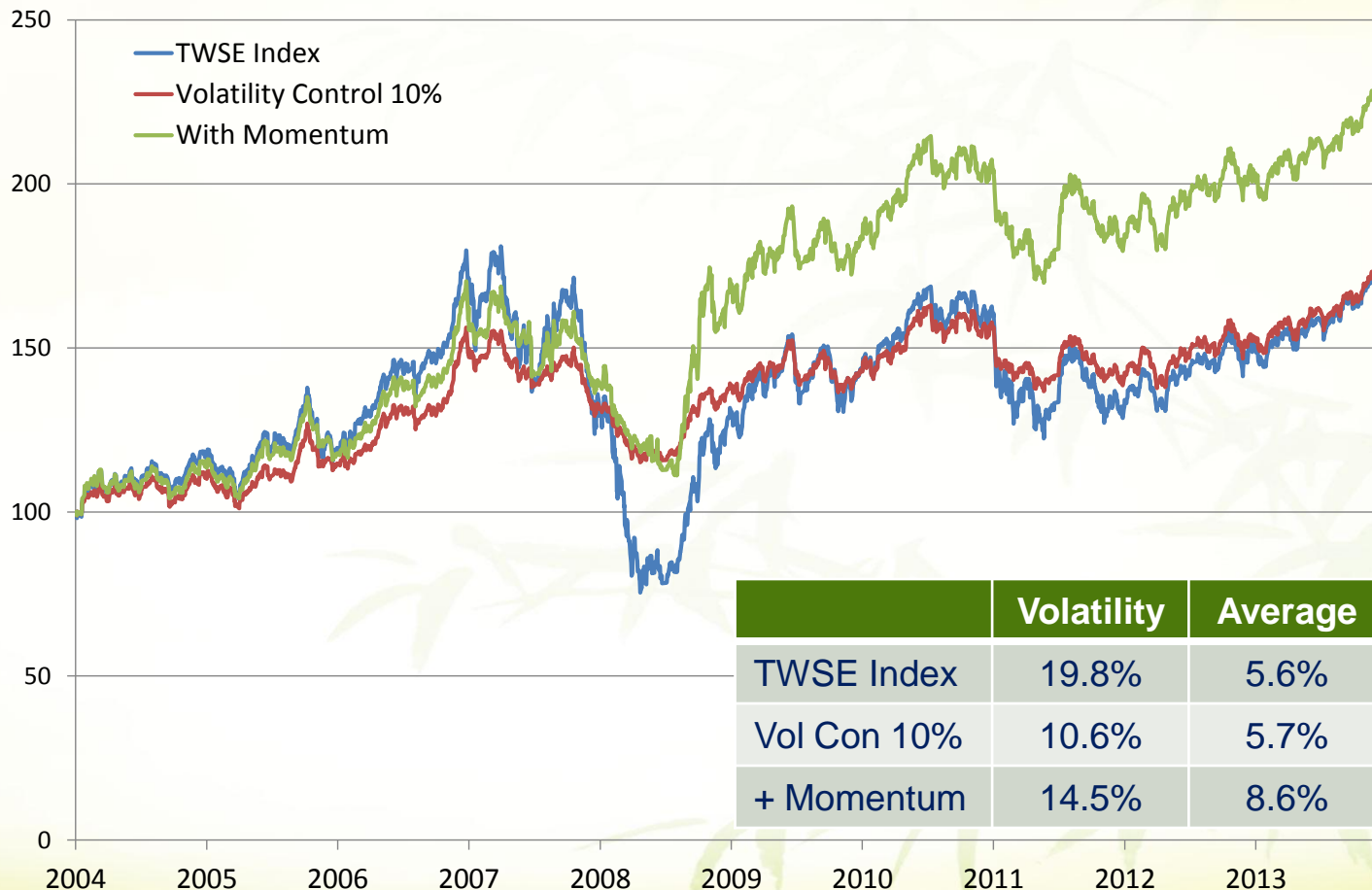
*The rates of return are hypothetical historical illustrations and do not represent the returns of any particular investment portfolio.
There is no assurance that the investment process will consistently lead to successful investing.*

Managed Fund (Example)

- Back testing of Taiwan and Hong Kong equity funds
 - Strategy 1
 - Volatility Control
 - Target volatility 10%
 - Strategy 2
 - Volatility Control + Momentum
 - Volatility control is applied only when historical trend is downward

Managed Fund (Example)

- Taiwan equity



The rates of return are hypothetical historical illustrations and do not represent the returns of any particular investment portfolio. There is no assurance that the investment process will consistently lead to successful investing.

Managed Fund (Example)

- Hong Kong equity



The rates of return are hypothetical historical illustrations and do not represent the returns of any particular investment portfolio. There is no assurance that the investment process will consistently lead to successful investing.

Summary

- VA products are redesigned to be more effective from risk management perspective.
- Introduction of managed fund is a remarkable trend in recent years.
- Fund management as well as risk management expertise is a key of success in VA and unit linked business.