



SOCIETY OF ACTUARIES

**Market-Consistent Embedded Value Seminar
December 2008**

Session 1: Introduction to MCEV Concepts
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Introduction to MCEV Concepts

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Market-Consistent Embedded Value
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Agenda

- History of Embedded Value Reporting
- Components of MCEV
- Basic Balance Sheet and Movement Analysis
- Simple Example

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Evolution of Embedded Value Reporting

- Criticisms of Traditional Embedded Value
 - Guarantees and options becoming more onerous – not clear how these are reflected in the traditional approach
 - Subjectivity of risk discount rate
 - Potential bias towards riskier assets – increases expected return, may not increase RDR (sufficiently)
 - More sophisticated projection / modelling available
- EEV Principles released in 2004 to address criticisms
 - Goal to increased transparency and consistency
 - Added explicit Cost of Financial Options and Guarantees
 - Additional guidance on risk discount rate
 - Increased disclosure

Evolution of Embedded Value Reporting

- Problems with EEV
 - The market consistent cost of options and guarantees are not necessarily fully recognized. They are not valued in line with market value of available tradable instruments.
 - Economic assumptions
 - Earned rates reflect management expectations
 - Too often, risks are not adequately allowed for
 - The risk premium in the discount rate is subjective
 - Capitalization of risk margins before earned
 - Equity returns and bond spreads
 - A decrease in asset quality will increase EV
 - Inconsistent assumptions and methodology across companies, particularly allowance for risk, making comparisons difficult
 - Still subjectivity in determining risk margin

Evolution of Embedded Value Reporting

- MCEV Principles released June 2008, adoption required by 2009
- Market Consistent Embedded Value (MCEV) is intended to provide a shareholder's perspective on value. This is the present value of future cash flows available to the shareholder, adjusted for the risks of those cash flows
- One definition of Fair value accounting (different than US GAAP or IFRS)
 - Traded assets are valued at market value
 - Liabilities with no optionality valued at risk-free rates
 - Elements with optionality valued using option pricing techniques
- Intended to explicitly quantify all risks
- 'Certainty equivalent' principle - Rather than discounting risky cash flows at a risk rate, discount risk adjusted cash flows at risk free rate
- The allowance for risks is calibrated to match market price for risk where such price is reliably observable

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Components of MCEV

MCEV = Adjusted Net Worth (ANW)
+ Value of Inforce Business (VIF)

VIF = Present Value of Future Profits

- Cost of Non-Hedgeable Risks
- Frictional Costs
- Time Value of Options and Guarantees

Adjusted Net Worth

- Allocated statutory balance sheet (or any other basis balance sheet)
 - Modeled assets and liabilities
 - Non-modeled assets and liabilities
 - Surplus assets

- ANW: Market value of assets supporting surplus
 - Required capital
 - Free Capital
 - Excludes impact of debt at market value

- Need to eliminate assets where cash flows are already captured in PVFP (e.g., all or part of deferred tax asset)

Present Value of Future Profits (PVFP)

- Deterministic projection of distributable cash flow
- Assets in excess of statutory reserves are assumed to be distributed
- Calculated with market consistent assumptions
 - Asset cash flow assumes market consistent defaults (i.e., PV asset cash flow at swap rate = asset MV)
 - G12.3 – ‘Asset values on which to base MCEV calculations must be consistent with values observable in investment markets and not be smoothed.’
 - Best estimate liability assumptions
- Discounted at the risk free rate defined to be the swap curve

Time Value of Options and Guarantees (TVOG)

- PVFP reflects intrinsic value of embedded options and guarantees; TVOG reflects time value
- Based on market consistent stochastic scenarios
 - Market implied volatility
 - G15.3 - 'Where there are concerns over the depth or liquidity of the market or if the market displays unusual characteristics as at the valuation then less recently observed measures and expert opinion should be considered.'
- Need to model expected management action and policyholder behavior
- Need to prove convergence of results

Frictional Cost

- Intended to reflect additional costs borne by investor to hold assets in an insurance company rather than directly
 - Double taxation on investment earnings on surplus
 - Investment management fees
- Does not include other frictional costs such as agency cost

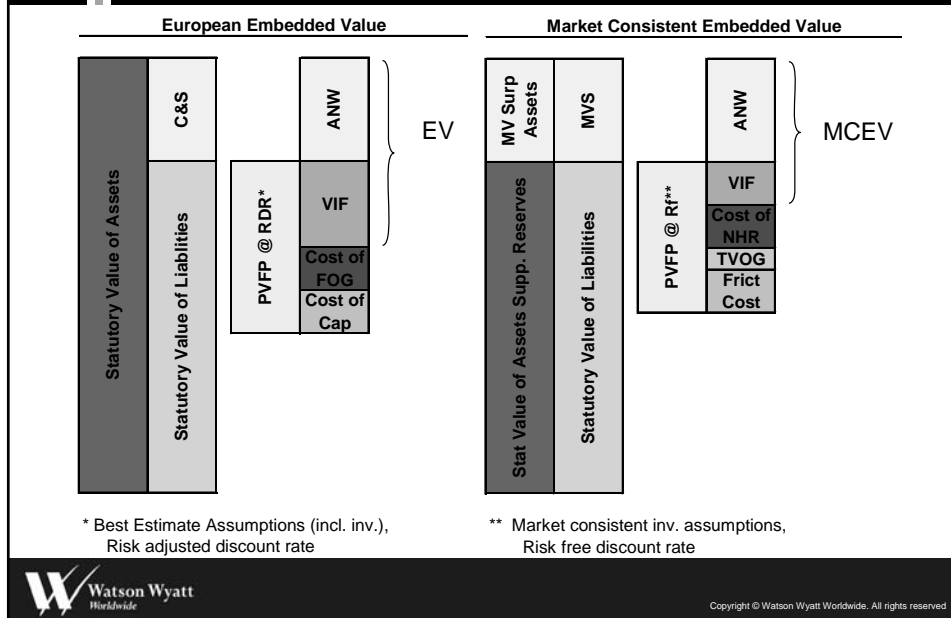
Cost of Non-Hedgeable Risk (CNHR)

- Intended to account for non-hedgeable financial risk as well as non-financial risks not taken into account in the PVFP or TVOG
- Market value margin using top down/cost of capital approach
 - PV of Capital Charge x Economic capital for NHR
 - PV discounted at risk free rate
 - Economic capital at 99.5% confidence level over a 1 year time horizon
 - Allow for diversification of NHR, but exclude diversification of Hedgeable and Non-hedgeable and covered and non-covered business
 - Subjectivity with respect to capital charge
- Bottom up approach stresses the model assumptions to quantify the non-hedgeable risks investors are exposed to (e.g., quantify potential losses)

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EEV vs MCEV

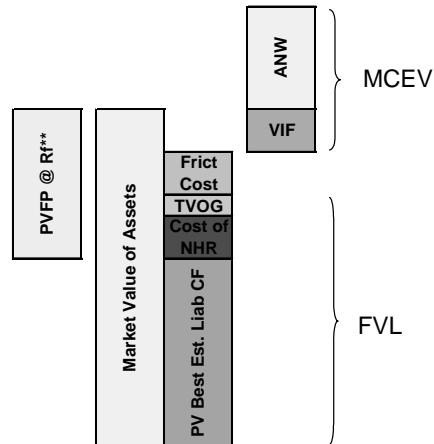


Consistent with Fair Value Balance Sheet

- PVFP calculated with best estimate liability assumptions, but market consistent (certainly equivalent) assumptions
- Assets in excess of reserves distributed
- $PVFP = PVACF - PVLCF = MVA - BEL$
 - Critical Check in Validating Models!!!!
- Further allowance for FC and CNHR (can be thought of as market value margin on liability)
- TVOG to allow for asymmetry based in market consistent scenarios

Consistent with Fair Value Balance Sheet

Market Consistent Embedded Value



** Market consistent inv. assumptions,
Risk free discount rate

Movement Analysis

Opening MCEV

New Business Value

+ Expected EB Cont. (reference rate)

+ Expected EB Cont. (excess of reference rate)

+ Experience Variance

+ Assumption Changes

+ Other Operating Variance

= Operating MCEV Earnings

+ Economic Variances

+ Other Non-operating variances

= Total MCEV Earnings

Closing MCEV

Note: Each component of movement must be split between free surplus, required capital and VIF

Value of New Business (VNB)

- Calculated on a post-tax basis
- Done *after* value of FOG, frictional cost of capital, cost of non-hedgible risks and net of minority interest
- When disclosed, New Business Margins are calculated as ratio of VNB to PVNBP. PVNBP should;
 - Calculated consistent with VNB,
 - Premiums are before reinsurance,
 - Calculated at point of sale.

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Modeling under Certainly Equivalent Approach: Simple Example (1 of 7)

	<u>Asset 1</u>	<u>Asset 2</u>
Book Yield	5.0%	5.0%
Market Yield	6.0%	6.0%
Par Yield	5.0%	5.0%
Risk Free	4.0%	4.0%
Maturity	1 Year	2 Year
Par Value	500.00	500.00

Modeling under Certainly Equivalent Approach: Simple Example (2 of 7)

Traditional Asset Valuation

	<u>0</u>	<u>1</u>	<u>2</u>
<u>Asset 1</u>			
Cash Flow		525.00	
MV=PV @ Market Rate	495.28		
<u>Asset 2</u>			
Cash Flow		25.00	525.00
MV=PV @ Market Rate	490.83		

Modeling under Certainly Equivalent Approach: Simple Example (3 of 7)

'Certainly Equivalent' Asset Valuation

	<u>0</u>	<u>1</u>	<u>2</u>
<u>Asset 1</u>			
Cash Flow		525.00	
Risk Adjustment*		(9.91)	
Risk Adjusted CF		515.09	
MV=PV @ Risk Free	495.28		
<u>Asset 2</u>			
Cash Flow		25.00	525.00
Risk Adjustment*		(0.47)	(19.62)
Risk Adjusted CF		24.53	505.38
MV=PV @ Risk Free	490.83		

* Default rate = $1 - (1 + RFR) / (1 + MY) = 1.89\%$

Modeling under Certainly Equivalent Approach: Simple Example (4 of 7)

Traditional EV (no defaults. RDR=8%)

	<u>0</u>	<u>1</u>	<u>2</u>
Investment Income		50.00	26.20
Defaults		-	-
Benefits		515.00	530.45
Increase in Reserve		(485.00)	(515.00)
Book Profits		20.00	10.75
PVFP	27.73		
Assets	1,000.00	515.00	-
Liabs	1,000.00	515.00	-

Modeling under Certainly Equivalent Approach: Simple Example (5 of 7)

Market Consistent Defaults, Risk Free Discounting

	<u>0</u>	<u>1</u>	<u>2</u>
Investment Income		49.06	25.04
Defaults		18.87	9.26
Benefits		515.00	530.45
Increase in Reserve		(485.00)	(515.00)
Book Profits		0.19	0.34
PVFP	0.49		
Assets	1,000.00	515.00	-
Liabs	1,000.00	515.00	-

Modeling under Certainly Equivalent Approach: Simple Example (6 of 7)

	<u>0</u>	<u>1</u>	<u>2</u>
<u>Existing Assets</u>			
Coupon		49.06	24.07
Maturity		490.57	481.31
Existing Asset CF		539.62	505.38
MV Ex (PV CF @ Rf)	986.12	485.94	-
Par Value	1,000.00	490.57	-
Book Value	1,000.00	490.57	-
<u>New Assets</u>			
Purchased		24.43	-
Inv Inc/Coupon		-	0.98
Maturities		-	24.43
New Asset CF		(24.43)	25.41
PV New Assets @ Rf)	-		

Modeling under Certainly Equivalent Approach: Simple Example (7 of 7)

	<u>0</u>	<u>1</u>	<u>2</u>
<u>Liabilities</u>			
Liabs (BOP)		1,000.00	510.00
Credited Interest		30.00	15.30
Release on Benefit		520.00	525.30
Liabs (EOP)	1,000.00	510.00	-
Liab CF		515.00	530.45
PV Liab CF	985.62		
PV Asset CF = MV Assets	986.12		
FV Equity = PVDE		0.49	
ChkPVDE - FV Equity		(0.00)	

Presenter's Contact Details

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Introduction to MCEV Concepts Some in Practice Problems and Solutions

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ING. Your future. Made easier.™

Our Consumer Value Proposition Has Not Changed, As We Measure Cost of Goods More Accurately.



• **Point of sale MCVNB will change daily. Does this make any sense?**

➤ *Ability to reset contract elements more frequently more highly valued, leading to improved risk management via product design.*

• **Should “rational” consumer behavior be reflected and how?**

➤ *Technically, the same dynamic formulas should be used for risk neutral and real world valuations because risk neutral valuation is a translation of probabilities of events. Using Behavioral Finance’s heuristics and biases approach makes the most sense.*

• **Do we create shareholder profit, over direct capital markets investments (e.g. stock)?**

➤ *There is irrefutably profit in underwriting/risk pooling insurance risks. For wealth accumulation vehicles, are we providing financial products (commodities) or financial services (value added)? Over time, our own market actions and those of substitute products will tell.*

• **How well do existing target setting / benchmarking measures work?**

➤ *IRR’s known problems (e.g. multiple routes) occur more frequently. MCVNB does replace traditional VNB nicely. Since earnings including risk spreads are important to most of us, pro forma with real world returns are still needed. VNB is a sensible alternative until you get all the required infrastructure in place. Use multiple metrics to triangulate on the truth.*

The consumer’s benefit is not equal to our cost, even under MCEV.

There Seems to Be Some Predictable Winners and Losers In Everyone's Product Portfolio Under MCEV.

- **Variable products will be seen as more expensive due to Time Value of Options and Guarantees.**

➤ Pricing for the capital markets price of variable product guarantees is already very common in the US, perhaps because of our awareness from hedge programs.

- **Products with fixed guarantees will be seen as less profitable due to spreads anticipated in rate setting.**

➤ Our US style portfolio average credit rate products are somewhat unique. The consensus for reporting may turn out to be a grading approach.

- **Tax differences will measure as more significant.**

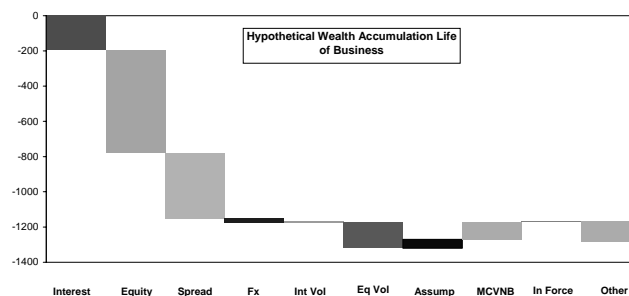
➤ As an example, popular financial engineering to reduce XXX/AXXX yields dramatic MC gains. Make sure that you are treating taxes like any other cash flow and that you are set up to understand how your taxes aggregate across lines.

- **Products with significant late cash flows will be punished by lower discount rates.**

➤ Some find this "wrong" because it promotes products with shorter lives, increasing the need to generate new sales. Each new sale can be offered in that market, which reduces risk – fixed cost / stranded expense risk notwithstanding.

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MCEV Income Is More Volatile Due to Economic Variances. Enhanced Disclosures / Consideration Required.



Other Observations:

- New business de-emphasized since MCVNB is generally lower than VNB
- Frictional cost of capital generally less important than traditional EV cost of capital
- Overhead / fixed costs get more attention because covering them requires earning risk margins.
- In-force decisions simpler because valuation of assets and liabilities are generally separated.
- More incentive for dynamic ALM/hedging due to the stronger link to economics.

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CFO Forum Statement Discloses Available Risk Margins and Distinguishes Operating vs. Non-Operating Income

- New business valued at the reference rate (risk free rate).
- Management's best-estimate of earnings (Expected Earnings on Business In Force in Excess of Reference Rate) separated from reference rate.
- Operating Earnings Separated from Non-Operating, with Economic Variances as Non-Operating.
- This past quarter the CFO Forum advocated disclosure of liability valuation including issuer spreads.

	Earnings on MCEV analysis			
	Free Surplus	Required Capital	VIF	MCEV
Opening MCEV				
Opening adjustments				
Adjusted opening MCEV				
New business value				
Expected existing business contribution (reference rate) ^{(1) (2)}				
Expected existing business contribution (in excess of reference rate) ^{(1) (2)}				
Transfers from VIF and required capital to free surplus				
Experience variances				
Assumption changes				
Other operating variance				
Operating MCEV earnings				
Economic variances				
Other non operating variance				
Total MCEV earnings				
Closing adjustments				
Closing MCEV				

⁽¹⁾This represents the following two components:
 • Expected earnings on free surplus and required capital; and
 • Expected change in VIF.

⁽²⁾The earnings assuming assets earn the beginning of period reference rate.

⁽³⁾The earnings is the component in excess of the reference rate reflecting the additional return consistent with the expectation of management for the business.