

Risk Management at the Point of Sale – Market Consistent Pricing

Actuaries' Club of Hartford and Springfield Spring Meeting

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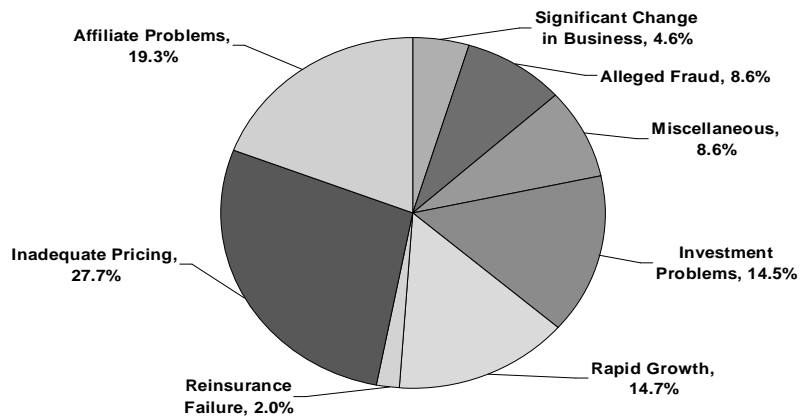
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Inadequate Pricing and Investment Problems Have Caused About 42% of Life/Health Impairments in the Last 30 Years

Primary Causes of Life/Health Impairments (1976 to 2008)



Source: A.M. Best Co.

Note: Breakout is only on companies where the cause of impairment was identified.

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Shortcomings of traditional pricing methods

- | Most common pricing measure is statutory internal rate of return (IRR)
 - | Pricing objective is based on achieving a rate of return in excess of the company's hurdle rate
 - | Hurdle rate often based on company's overall cost of capital
 - | Hurdle rate typically does not vary by product
 - | But different products have different levels of risk
- | A product with a higher pricing IRR does not necessarily create more shareholder value than a product with a lower pricing IRR
 - | Depends on risks inherent in each product

Shortcomings of traditional pricing methods

- | Products are priced under the implicit assumption that arbitrage opportunities exist
 - | Asset risk premiums are capitalized during pricing
 - | These risk premiums are passed to policyholders before insurers are released from risk
 - | If insurers believe that these arbitrage opportunities exist, why not just borrow at the insurer's credit rating and invest in riskier assets rather than manufacture and distribute insurance products?

Consideration should also be given to pricing products such that all risks undertaken are measured in an objective and consistent way

The bar is rising in all areas of risk management

- | The mark-to-market value of a liability is calculated by constructing a portfolio of assets (the replicating portfolio) with cash flows that perfectly match the liability cash flows in all circumstances (aside from nonhedgeable risk fluctuations, such as mortality)
 - | The value of the liabilities must then equal the value of the replicating portfolio
- | Changing the constituents of the replicating portfolio should not change the value
 - | If there are two replicating portfolios that produce exactly the same cash flows but have different prices, then there is clearly a (risk-free) profit opportunity to be had by selling the more expensive and buying the less expensive
 - | This is the principle of no arbitrage
- | Many insurance companies actually hold corporate bonds to match their general account liabilities
 - | Not a replicating portfolio as corporate bonds are exposed to credit risk
- | If product charges are set to produce a shareholder value greater than 0 under a market consistent basis then the insurance company could purchase assets to lock in that value (aside from nonhedgeable risk fluctuations)
 - | A shareholder value less than 0 implies that the insurer is depending on extra risky returns (e.g., by taking on credit risk) to generate a value greater than 0
- | Market consistent valuations highlight, among other things, the asset bets that an insurer is making
- | This is important information in current times because the bar is rising in all areas of risk management

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Typically, for each product, a value of new business (“VNB”) is determined which reflects the value to shareholders created through the activity of writing new business

- | VNB = Present value of future profits after tax
 - Time value of financial options and guarantees
 - Frictional costs of required capital
 - Cost of non hedgeable risks
- | Common metric is the profit margin: VNB / present value of premiums
- | Implied discount rate is the discount rate such that the discounted traditional VNB cash flows (i.e., with asset risk premiums included) will equal the market consistent VNB
 - | Sometimes used to compare the relative level of risk between products
 - | The higher the implied discount rate, the higher the level of risk
 - | Good tool to communicate market consistent pricing results to senior management
- | VNB should be large enough to support franchise value of insurer
- | Market consistent pricing can be used as an additional pricing tool in combination with traditional internal rate of return and profit margin metrics

Market consistent pricing provides a robust, transparent and objective economic perspective on new business profitability that is consistent across products. If the VNB is greater than zero, the return is greater than the market price of the risks undertaken. A VNB less than zero reduces shareholder value.

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Implications for North American products and companies are numerous

- | Market consistent pricing can have significantly different impacts by company depending on several factors including:
 - | Product mix
 - | Split of fixed vs. variable/segregated fund business
 - | Level of guarantees
 - | Amount of asset risk (e.g., credit quality of assets)
 - | Treatment of future flexible policyholder credited rates
- | Everything else being equal (e.g., assuming the same product charges), a product (Product A) with more guarantees, more asset risk and without management levers to mitigate adverse experience ought to be considered more risky than a similar product (Product B) with opposite characteristics
 - | The pricing metric used should show a less favorable result for Product A relative to Product B
 - | This is the case under a market consistent pricing framework

Comparison of market consistent vs. traditional profit margins (positive figure indicates market consistent greater than traditional)

ILLUSTRATIVE

Product	Company A	Company B	Company C
Term Insurance (short term)	2.3%	1.4%	N/A
Universal Life/Variable UL	2.7%	-9.1% to +1.4%	N/A
Fixed Annuities	-4.1%	-3.6% to -0.5%	-1.0%
Payout Annuities	-4.9%	-7.6%	-6.1%
VAs/Segregated Funds	0.0%	N/A	-1.8%
Fixed Indexed Annuities	N/A	-5.3% to -3.9%	N/A
Critical Illness	1.0%	N/A	N/A
Group Life & Health/Employee Benefits	1.1%	N/A	1.9%

Published information shows that Market Consistent Pricing can have significantly different impacts on VNB margins by company

Comparison of Market Consistent vs. Traditional European Embedded Value Profit Margins

Company	Year	Value of New Business Profit Margin		
		Traditional	Market Consistent	Difference
Allianz US	2005	1.9%	2.5%	0.6%
Aviva US*	2007 / 2008	1.9% / 2.0%	0.9% / -0.2%	-1.0% / -2.2%
AXA US	2004	1.8%	1.3%	-0.5%
Old Mutual US	2007	2.3%	1.0%	-1.3%
Zurich/Farmers	2005	4.4%	6.6%	2.2%

*Aviva 2008 results as of June 30; Aviva results include adjustments for liquidity premium
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Typical Implied Discount Rates Relative to Typical Internal Rates of Return Used to Price Common Products

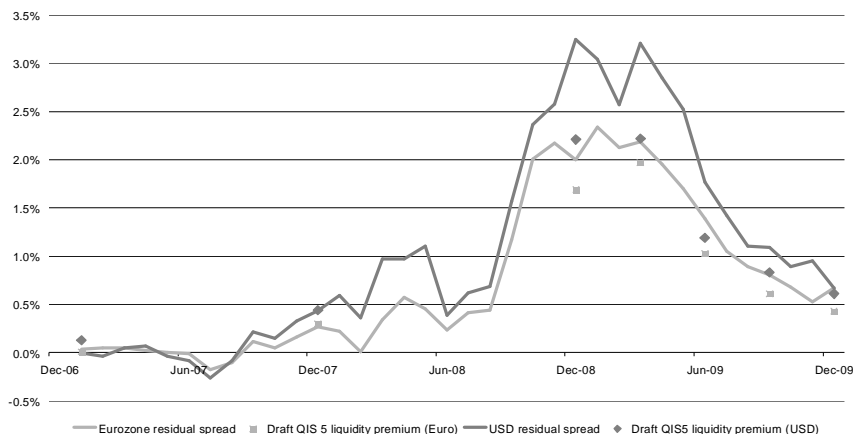
Product	Typical Implied Discount Rate
Term Insurance (short term)	Lower than typical IRR used
Universal Life/Variable UL	Varies
Fixed Annuities	Varies, but generally higher
Payout Annuities	Higher than typical IRR used
VAs/Segregated Funds	Varies, but generally higher
Fixed Indexed Annuities	Higher than typical IRR used
Critical Illness	Lower than typical IRR used
Group Life & Health/Employee Benefits	Lower than typical IRR used

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Adding liquidity premiums to the risk free rate for illiquid products is improving market consistent pricing results

Eurozone and USD illustrative residual spreads over swaps (average up to 10 years) and draft QIS5 liquidity premium



Source: Towers Watson analysis of Bloomberg and Markit data; April 2010 draft QIS5 technical specification

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Current market conditions support the use of a “liquidity premium” in pricing predictable liability cash flows

- ┆ Corporate bond spreads have risen sharply
 - ┆ Part of this is an increased perception of default risk
 - ┆ However, this component can be measured to some degree by CDS spreads
 - ┆ The remainder includes a liquidity premium and any unexplained components
- ┆ Replicating portfolios are a common technique used to calculate market consistent values
 - ┆ Liability cash flows are replicated using a theoretical, easy-to-value portfolio of assets
- ┆ In a perfect market, all replicating portfolios for a liability will have the same value. In practice they do not due to market imperfections and other characteristics (e.g., liquidity)
- ┆ Where there are alternative replicating portfolios, the cheapest portfolio could be used to value liabilities

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'Cheapest replicating portfolio' in mark-to-market valuations

- | For example, payout annuities have largely predictable cash flows over long terms
- | Provided an annuity writer is protected against defaults, it will have no need to trade the investments and is unaffected by market value fluctuations
- | Pricing should report sales of payout annuities as profitable if they are priced with an interest rate up to
 - | Risk free rates, plus
 - | The residual corporate bond spread over the CDS spread

Liquidity Premiums - MCEV Principles and Solvency II

- | On October 20, 2009, the CFO Forum published a press release announcing changes to the MCEV Principles to permit the inclusion of a liquidity premium
 - | MCEV Principles now differentiate between liabilities which are 'liquid' and liabilities which are not 'liquid'
 - A swap yield curve should still be used where possible for 'liquid' liabilities
 - A swap yield curve with the inclusion of a liquidity premium (where appropriate) should be used for liabilities which are not 'liquid'
 - A liability is liquid if the liability cash flows are not reasonably predictable
- | Draft QIS 5 Specifications
 - | Illiquidity premium allowed:
 - 100% illiquidity premium for immediate annuities
 - 0% illiquidity premium for business with contract term less than 1 year
 - 50% illiquidity premium for all other business

Summary of Economic Calibration Approaches – CFO Forum market-consistent publications only, Year-End 2009 EV

Company	EEV or MCEV Principles	Calibration of implied equity option and swaption volatilities	Reference rates
Allianz	MCEV P	End December 2009	Swaps, unadjusted, except Korea where government yields are used
Aviva	MCEV P	End December 2009	Swaps, increased for some European contracts and all US contracts. Increase of 100 bps in the UK, 30 bps in France and Spain, 15 bps for Delta Lloyd, 65 bps for US immediate annuities and 55 bps for deferred annuities and all other contracts in the US, unadjusted for other business
Axa	EEV P	End December 2009	Swaps, increased by 50 bps in the UK, 30 bps in Europe, 50 bps in the US, 30 bps in Switzerland and 20 bps in Japan
CNP	MCEV P	End December 2009	Swaps, increased by 16 bps for Euros savings and retirement business and annuities. Unadjusted swaps for other business
Fortis	EEV P	End December 2009	Swaps, increased by 20 bps for Euro denominated liabilities and 50 bps for USD and HK\$.
Generali	EEV P	End December 2009	Swaps increased by 20 bps for Euro denominated liabilities (60 bps adjustment for Spanish annuity business), 10 bps for SFR and 30 bps for USD. Government yields for Israel and the Czech Republic.
Hannover Re	MCEV P	End December 2009	Swaps, unadjusted
Munich Re	MCEV P	End December 2009	Swaps, unadjusted
Old Mutual	MCEV P	End December 2009	Swaps, increased by 100 bps for the US business and 50 bps for the OMSA business; unadjusted for other business
Prudential	EEV P	N/A	MCEV approach used for UK annuities only: Reference rate set to swaps plus 104 bps.
Scottish Widows	EEV P	End December 2009	Reference rate set to gilts; for UK annuities set to gilts plus [75] bps
Standard Life	EEV P	End December 2009	Reference rate set 4.11% based on gilts; for UK annuities investment return set to 5.36%
Zurich	MCEV P	End December 2009	Swaps, unadjusted

Source: Towers Watson analysis of CFO Forum year end 2009 EEV/MCEV publications
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Theory also supports the inclusion of an “own credit risk” adjustment in mark-to-market valuations

- ┆ MCEV Principles treat guaranteed liabilities as being certain to be paid. In reality, there is a chance of default and this should theoretically reduce the value of the liabilities held
- ┆ Until recently, the impact was small
- ┆ When credit spreads are wide, the economic impact of allowing for own credit risk is very significant
 - ┆ The impact is of the same order of magnitude as the liquidity premium
 - ┆ Upper bound is spread on debt issued by insurer as policyholders usually rank above debt holders in the event of default

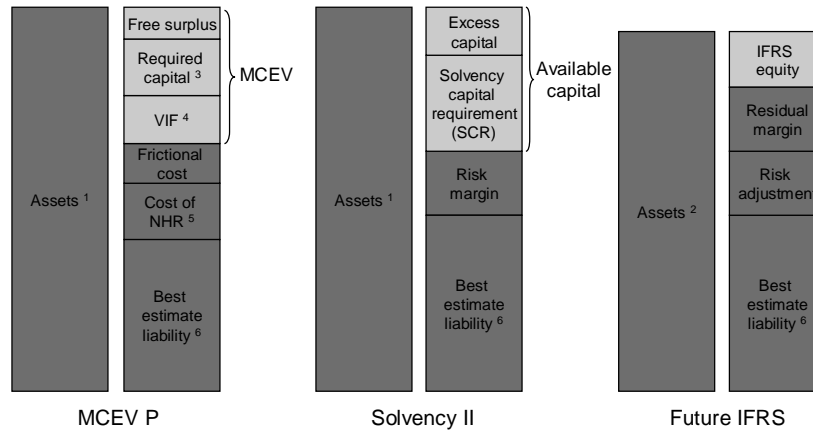
Market consistent pricing is increasingly being used

- | Market consistent techniques are making/have made their way into a wide range of applications
 - | VA/segregated fund guarantees are typically based on the costs of hedging the guarantee
 - | US GAAP (FAS 157 and 159)
 - | The European Insurance CFO Forum MCEV Principles
 - | Many companies, domestic and international, are using market consistent methodologies to determine economic capital (a la Solvency II)
 - | More and more merger and acquisition and securitization transactions are being valued using both traditional and market consistent techniques
 - | Some companies are embracing market consistent techniques because they believe these methods provide useful insights into asset-liability management
 - | Others use market consistent pricing for incentive compensation to align compensation with the risks undertaken

Market consistent pricing is increasingly being used (cont'd)

- | The above developments have motivated many companies to look at the profitability of their products using market consistent techniques
- | Some of these companies have made or are in the process of making changes to their products and/or pricing
- | Other companies have embraced market consistent pricing for its own sake
- | IFRS Phase II, which is based on a fair value approach, could become required in 2014 in the US and Canada
- | Consequently, the use of market consistent pricing should continue to increase in North America

Balance sheet comparison



¹ Assets measured at market value

³ Required capital often is the greater of regulatory and internal capital

⁴ Cost of residual non-hedgeable risks

² Assets measured at amortised cost or fair value, depending on asset type (IFRS 9)

⁴ VIF after allowing for frictional cost and cost of non-hedgeable risks

⁶ Best estimate liabilities might differ under the three approaches

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Summary of the reporting bases

	Future IFRS	Solvency II	Future MCEV
Valuation concept	Hybrid approach combining economic and non-economic elements	Economic valuation	Economic valuation
Valuation of assets (MCV)	Amortised cost or fair value (market value)	Market value	Market value
Valuation of liabilities (measurement approach)	Current fulfilment value	Current exit value (transfer value)	Fulfilment value (going concern)
Discount rate or reference rate	Discount rate that matches the characteristics of the insurance contract	Government bonds (CEIOPS advice) Strong industry lobbying towards swap rates	Swap rates
Liquidity premium	Ongoing discussion, potentially allowed if it matches the characteristics of the insurance liability	Ongoing discussion	Allowance
Own credit risk	Ongoing discussion	No adjustment	No direct restriction
Allowance for TVOG	Implied volatilities	Implied volatilities	Implied volatilities

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Summary of the reporting bases (contd.)

	Future IFRS	Solvency II	Future MCEV
Non-economic assumptions	Entity-specific	Entity-specific (CEIPOS advice)	Entity-specific
Margins	Risk adjustment and a residual margin	Risk margin	Frictional costs and cost of residual non hedgeable risks
Future premiums and renewals	Partially included	Partially included (most prudent one!)	Fully included (for existing business)
Participating business	To be decided	Expected discretionary bonuses fully included	Expected discretionary bonuses fully included
Unit of account	To be decided	Policy-by policy in principle; grouping allowed if it does not change the results materially	Policy-by policy in principle; grouping allowed if it does not change the results materially
Diversification	Only within portfolios. Diversification between portfolios are not allowed	Potentially not between prescribed lines of business	Between lines of business and across geographies (Only affects CRNHR)

Those that act early can gain a competitive advantage

- | Market consistent pricing could be used to develop strategic options
 - | Companies could target products where current product charges are greater than prices required by the market
 - | Companies moving first would gain leverage by targeting profitable products
 - | Eventually inefficiencies will be corrected as competitors catch up

Those that act early can gain a competitive advantage (cont'd)

- | Companies could also use market consistent pricing analyses to better understand the relative risks of their products
 - | Depending on a company's risk appetite, measures could then be taken to de-risk certain products by increasing product charges or making changes to the product design
 - | Product design changes could include
 - decreasing interest rate guarantees
 - making variable annuity/segregated fund guarantees less rich
 - introducing market value adjustments upon surrender
 - changing premiums from a guaranteed basis to an adjustable basis
- | Companies could use market consistent pricing techniques to protect themselves against similar tactics used by competitors

Responses to Typical Objections to Market Consistent Approaches

Objection	Response
<p>What is the benefit of using market consistent approaches as opposed to traditional accounting measures?</p> <p>We only need to report on US GAAP and/or statutory - why should we use market consistent approaches?</p>	<p>Market consistent approaches value assets and liabilities using similar principles so that a consistent view of the net capital/surplus position, i.e., assets less liabilities, is portrayed. This is typically not the case for usual accounting measures, such as statutory accounting or US GAAP.</p> <p>Market consistent valuation techniques can be applied consistently across businesses and regions.</p> <p>Market consistent approaches provide explicit information on the cost of hedging and transferring risks.</p>
<p>Assumptions are subjective</p>	<p>Economic assumptions are based on market conditions at the valuation date and assume that no arbitrage opportunities exist.</p> <p>Liabilities are valued in a manner that is consistent with how financial markets would value them.</p>
<p>Market consistent approaches produce volatile results</p>	<p>Contrary to other accounting systems, market consistent approaches do not smooth the impact of changes in economic conditions.</p> <p>Volatile market consistent results are caused by asset and liability mismatches due to lack of hedging.</p> <p>Sensitivity analyses of market consistent results provide a better understanding of the market's impact on value.</p>

Market consistent pricing provides important information about the risks embedded in products

- 1 Market consistent pricing addresses some of the shortcomings of traditional pricing methods and highlights risk exposures on different product features, including asset risks, which is critical in current times because the bar has risen in all areas of risk management
- 2 The use of market consistent pricing has recently extended beyond VA/seg fund guarantees to a wide range of life, health and annuity products
- 3 Appropriate adjustments to the risk free rate to reflect liquidity premiums and own credit risk improves market consistent results
- 4 More and more companies are looking at the profitability of their business using market consistent approaches motivated by FAS 157 and 159, MCEV Principles, economic capital calculations/Solvency II, mergers and acquisitions and securitization transactions, asset-liability management, incentive compensation and IFRS Phase II
- 5 Companies that are among the first to take action may benefit

Thank You

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