Value and Capital Management

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Session 2: From RAPM to Valuation

Managing capital and value:
3 core skills from a Finance & Risk perspective

Better Information – What gets measured, gets managed

- How to value risk-based, capital intensive businesses?
- How to link management actions, risk adjusted performance measures (RAPMs) and other, Key Performance Indicators to value?

Better Insights – How to create value through operations

- What "rules of the game" (or generic strategies) create value in each business segment?
- What core skills are required in each segment?

Better Decisions – How Finance & Risk creates value

- Strategic planning and capital allocation
- Balance sheet, asset/liability and liquidity management
- Risk management and risk underwriting

Contents

Multiple Approach: illustrative example

	Company	P/E (2014e)	Consensus earnings[1] (2014e)	Implied value based on		Share Price[1] (as of 03.2014)
				Company P/E	Average P/E	
1.	**Allianz**	9.0	13.55	121.95	147.70	122.70
2.	**ACE**	11.4	8.67	98.84	94.50	99.06
3.	**AIG**	11.7	4.30	50.31	46.87	50.01
4.	**AXA**	9.0	2.06	18.54	22.45	18.87
5.	**Generali**	11.4	1.39	15.85	15.15	16.18
6.	**MetLife**	9.2	5.69	52.35	62.02	52.80
7.	**Ping An Insurance**	12.0	4.28	51.36	46.65	64.30
8.	**Prudential**	13.2	100	1,320	1,090	1,269
9.	**Zurich**	11.3	27,5	310.75	299.75	271.40
	Average:	10.9				

1) In local currency

Source: Bloomberg

The simplest outside-in valuation requires only a projection of earnings and an average P/E multiple (or book equity and an average M/B ratio)

Multiple Approach: Estimating Sector Multiples

	Global insurers	Universal Banks
General comparables	▪ Aegon ▪ AIG ▪ Allianz ▪ Aviva ▪ Axa ▪ Generali ▪ Zurich Financial Services	▪ Bank of America ▪ Barclays Bank ▪ Citi Group ▪ Credit Suisse ▪ Deutsche Bank ▪ JP Morgan ▪ Union Bank of Switzerland
Specialists	▪ ACE – Commercial ▪ Manulife – Life ▪ Munich Re – Commercial, reinsurance ▪ Prudential UK – Life, growth markets ▪ Prudential US – Life US ▪ Swiss Re – Commercial, reinsurance ▪ Travelers Insurance - Commercial US ▪ XL Capital – Commercial	▪ Bank Julius Baer – Private banking ▪ Coutts – Private banking ▪ Goldman Sachs – Investment Banking ▪ HSBC – Growth markets ▪ LGT Bank – Private banking ▪ Morgan Stanley – Investment banking ▪ Sal Openheim – Private banking ▪ Standard Chartered – Growth markets ▪ Bank of New York - Custody ▪ State Street – Custody

Estimation of sector valuation multiples using:

$$\frac{P}{E_i} = \sum_j \left(\frac{P}{E_j}\right) * \left(\frac{E_{ij}}{E_i}\right) + \varepsilon_i$$

$$\frac{M}{B_i} = \sum_j \left(\frac{M}{B_j}\right) * \left(\frac{B_{ij}}{B_j}\right) + \varepsilon_i$$

Avg European sector P/BV: ~ 1x

Sector* Multiples	PC	LH
Market P/BV	1,12	0,78
Market P/NAV	1,36	0,88
Market P/EV	1,31	0,47

Own analysis based on JPM 2012 Insurance Sector Report, June

Using multiples for business / strategy steering

P/E

$$V = \frac{P}{E} * E$$

- Marginal capital investment: €10
- Return: €0,10 or 1%
- Cost of Capital: 10%

- The alternative is to return capital to shareholders
- The investment increases earnings, but it destroys value
- While the drivers of earnings may be clear (e.g. revenue growth and operating efficiency), P/E silent on capital and risk

P/E multiples cannot be used as a "rule of thumb" for value management because they are "silent" on the role of risk and capital

M/B

$$V = \frac{M}{B} * B$$

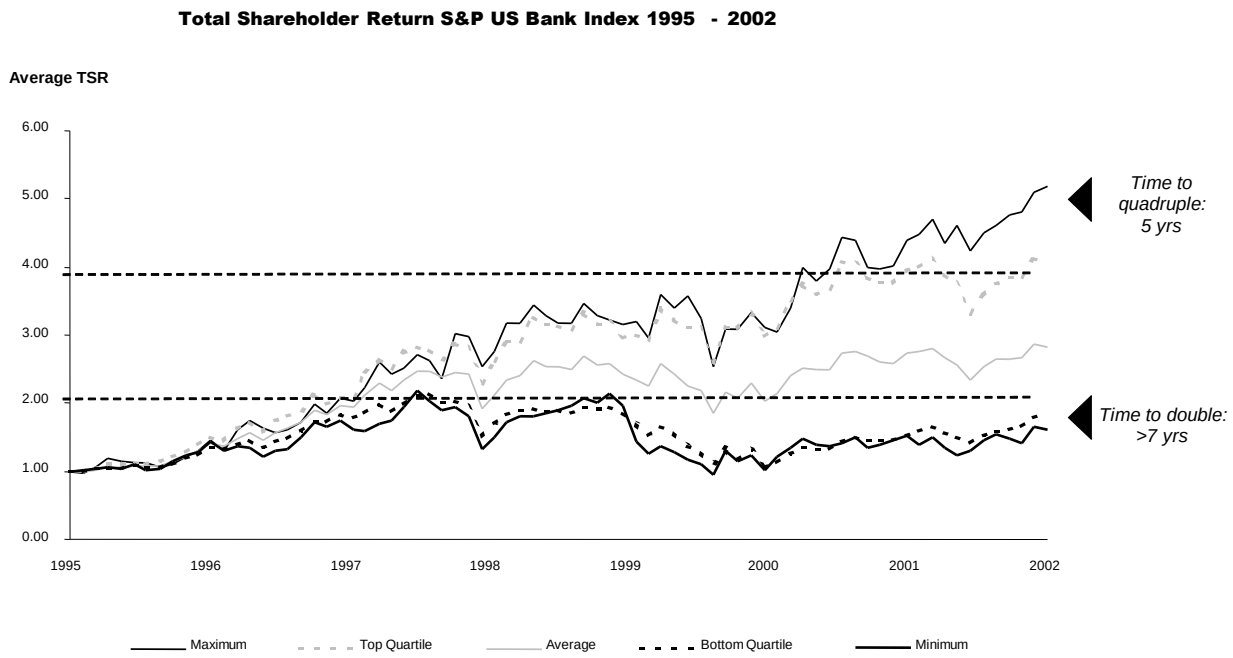
- Marginal capital investment: €10
- Implied value based on 2012 avg market multiples, 1x for industry, 1.3x PC and 0,8x LH
  - Experiment 1: Balanced growth
  - Experiment 2: Retain earnings in PC to purchase traded securities
  - Experiment 3: Grow PC, return excess to shareholders

- Investment may create value…depending upon where it is made
- While the total investment may be clear, empirical M/B ratios are silent on how growth, operating efficiency, underwriting effectiveness and capital efficiency affect value

M/B multiples cannot be used as a "rule of thumb" for value management because they do not link operating performance to value creation

What we are trying to explain…

Different Performance



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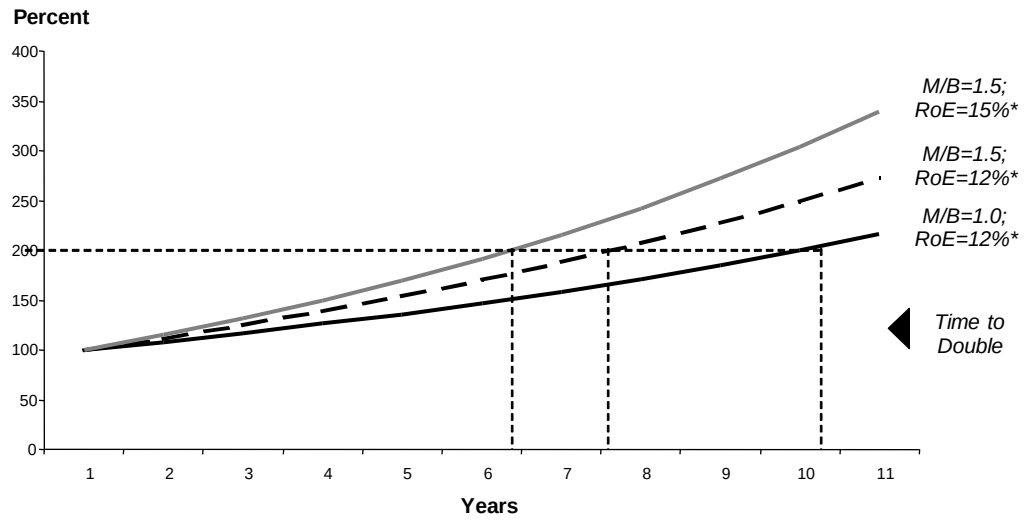
What drives a continuous outperformance in share value?

…is trivial at a conceptual level…

Value Driven at a High Level by RoE, retained earnings, M/B Multiple

Shareholder Value Model



* Assumes 33% dividend rate

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Understanding share performance requires an understanding of three inter-related variables: RoE, M/B multiple and dividend policy

…but begs the question, how are M/B values determined?

Dividend Discount Model (DDM)

From the Dividend Discount Model…

$$V_0 = D_0 + \frac{\hat{D}_1}{(1+CoC)} + \frac{\hat{D}_2}{(1+CoC)^2} + \frac{\hat{D}_3}{(1+CoC)^3} + \ldots$$

V_0 ~ Current market value of equity of the firm

$\hat{D}_t$ ~ Expected dividend to be received at time t

$$V_0 = B_0 + \frac{\hat{E}_1 - CoC * B_0}{(1+CoC)} + \frac{\hat{E}_2 - CoC * \hat{B}_1}{(1+CoC)^2} + \frac{\hat{E}_3 - CoC * \hat{B}_2}{(1+CoC)^3} + \ldots$$

$\hat{B}_t$ ~ Expected book equity at the end of year t

$\hat{E}_t$ ~ Expected after-tax earnings in year t

d ~ Dividend payout ratio

$$V_0 = B_0 + B_0 \sum_{t=1}^{\infty} \left[\prod_{s=1}^{t-1} \left(1 + RoE_s \left(1-d\right)\right) \right] \frac{RoE_t - CoC}{\left(1+CoC\right)^t}$$

To the Edwards-Bell-Ohlson (EBO) Steady State M/B Multiple

$$\frac{V_0}{B_0} = 1 + \frac{(RoE - CoC)}{(CoC - g)}$$

Rearranging using:

- The book value of the firm evolves according to:

$$B_{t+1} - B_t = E_{t+1} - D_{t+1}$$

- Define Return on Equity as: $RoE_t = E_t / B_{t-1}$
- Expected Future Economic Profit: $B_{t-1}(RoE_t - CoC)$
- Book Equity evolves according to: $B_t = B_{t-1} + E_t(1-d)$

$$B_t = B_{t-1} * \left(1 + RoE_t * \left(1-d\right)\right)$$

- Steady state assumption: $RoE_t = RoE$ for all t
- Constant growth: $g = RoE * (1-d)$

Multiple challenges to applying this approach in practice:

- Balance sheet changes are not always reflected in earnings
- Calculating the current value of portfolios using a single CoC
- Multitude of different local accounting regimes

Source: Edwards and Bell (1961), Ohlson (1995)

Discounted Free Cash Flow (DFCF) Approach

DFCF Intrinsic Value (*IV*)

$$IV_0 = FCF_0 + \frac{FCF_1}{(1+WACC)} + \frac{FCF_2}{(1+WACC)^2} + \ldots$$

FCF_t ~ Distributable free cash flow at time t

$WACC$ ~ Weighted Average Cost of Capital

$NOPLAT$ ~ Net cash operating profit less adjusted taxes

Forecasting Free Cash Flow: 4 Steps

1. Identify components of free cash flow
2. Develop integrated historical perspective
3. Determine forecast assumptions and scenarios
4. Calculate and evaluate the forecast

Steady State DFCF M/B Ratio

$$\frac{IV}{IC} = 1 + \frac{(ROIC - WACC)}{(WACC - g)}$$

Rearranging using:

- Invested Capital (*IC*) evolves according to:

$$IC_{t+1} - IC_t = NOPLAT_{t+1} - FCF_{t+1}$$

- Defining Return on Invested Capital (*ROIC*) as:

$$ROIC_t = \frac{NOPLAT_t}{IC_t}$$

Step 1: Free Cash Flow Components

Earnings Before Interest and Taxes (EBIT)

- Taxes on EBIT

+ Change in deferred taxes

= Net Operating Profit Less Adjusted Taxes (NOPLAT)

+ Depreciation

= **Gross Cash Flow**

- Gross Investment =

= Free Cash Flow from operations

+ Nonoperating Cash Flow

= Total Cash Flow before financing

Increase in working capital

+ Capital Expenditures

+ Investment in Goodwill

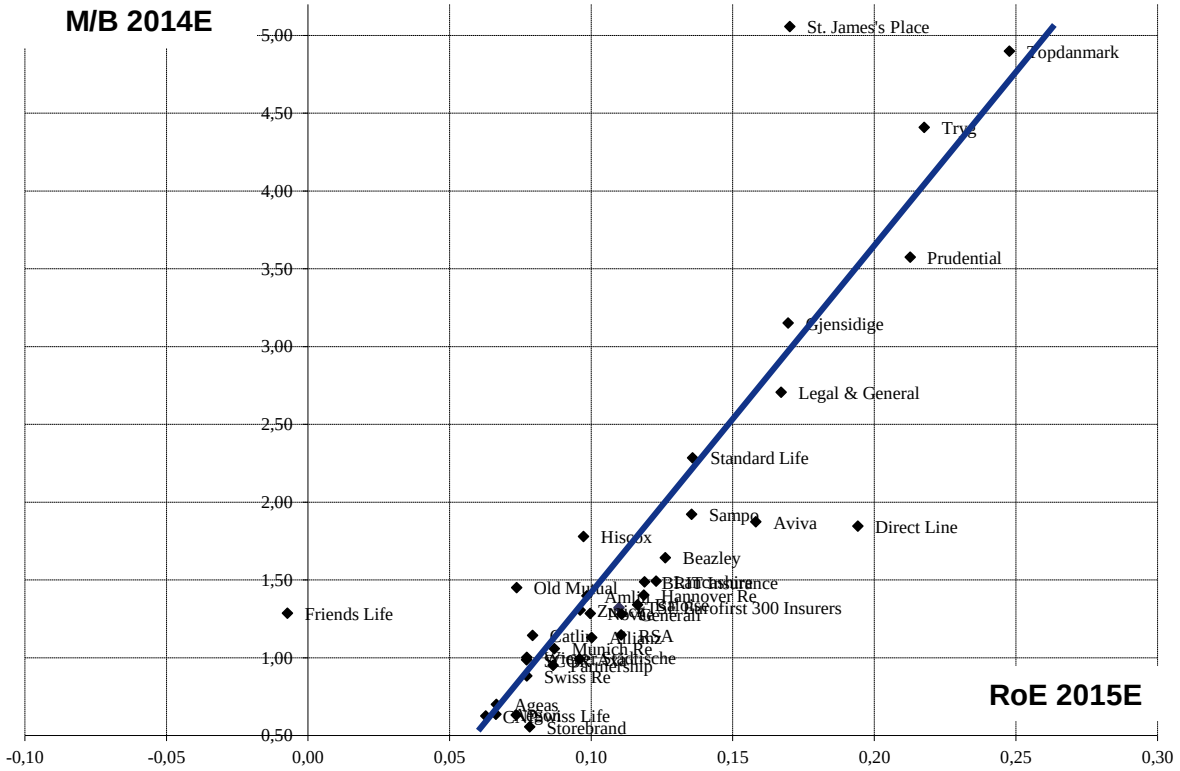
+ Increase in net other assets

Source: Copeland et al., 1990

Change in accounting basis

	Accounting	DFCF Approach – Entity	Market Value	Economic Capital
Description	• Focus on dividend distribution to shareholders, funded out of accounting earnings • Discounted using the cost of equity • Track accounting earnings and book equity	• Focuses on cash distributable to financiers of the firm (share holders and debt holders) • Discounted using the weighted average cost of capital, including debt and equity • Adjust accounting earnings to reflect operating cash flows, independent of financing decisions	• Focus on dividend distribution to shareholders, which can be funded out of operating profit or net asset value • Discounted using the cost of equity • Track mark-to-market earnings and market value balance sheet	• Focus on dividend distribution to shareholders, which can be funded out of operating profit or net asset value • Discounted using the cost of equity • Track mark-to-market earnings and market value balance sheet
Distribution basis to shareholders	D = Dividends to shareholders	FCF = Free cash flow to financiers	D = Dividends to shareholders	D = Dividends to shareholders
"Earnings" basis	E = Accounting earnings	NOPLAT = Net Operating Income Less Adjusted Taxes	MVE = Market value earnings, including value of new business + realized & unrealized gains/losses	MVE = Market value earnings, including value of new business + realized & unrealized gains/losses
"Balance sheet" basis	B = Book equity	IC = Invested Capital (in operating assets)	MVS = Market value surplus	EC = Economic Capital
"Balance sheet" evolution	$B_{t+1} - B_t = E_t - D_t$	$IC_{t+1} - IC_t = NOPLAT_t - FCF_t$	$MVS_{t+1} - MVS_t = MVE_t - D_t$	$EC_{t+1} - EC_t = ECE_t - D_t$ (assumes full utilization and CER=1)
Cost of Capital	CoC = Cost of equity capital	WACC = Weighted Average Cost of Capital, including leverage	CoC = Risk appropriate cost of market value surplus	CoEC = Cost of economic capital
Steady state valuation equation	$\frac{V}{B} = 1 + \frac{RoE - CoC}{CoC - g}$	$\frac{V}{IC} = 1 + \frac{(RoIC - WACC)}{(WACC - g)}$	$\frac{V}{MVS} = 1 + \frac{(RoMVS - CoC)}{(CoC - g)}$	$\frac{V}{EC} = 1 + \frac{(RoEC - CoEC)}{(CoEC - g)}$

The theory works in practice



Source: KBW Insurance Overview, 2014

$$\frac{M}{B}_{i,t} = \beta_0 + \beta_1 ROE_{i,t} + \beta_2 g_{i,t} + \varepsilon_{i,t}$$

	M/B Multiple	Adjusted-R^2 (F-Statistic)	Constant β_0	RoE β_1	Growth β_2
All firms		84.5% (60.64***)	-0.39 (-0.37)	16.84 (1.81***)	5.76 (0.79***)
Banks only		85.4% (67.37***)	-1.08 (-0.42**)	19.16 (2.07***)	6.57 (0.87***)
Insurers only		78.9% (4.36**)	1.33 (0.77*)	10.97 (3.72**)	3.13 (1.89*)

* = *Significant at the 95% level*

** = *Significant at the 99% level*

*** = *Significant at the 99.9% level*

Wilson, T., 2015, Value and Capital Management: A Handbook for Finance & Risk Professionals, John Wiley & Sons, Forthcoming

Contents

Comparison of valuation approaches

Approach	Value	Starting Capital	Excess returns from existing portfolio	Excess returns from future business
		Closed block, going concern value		**"Franchise value"**
Accounting	$V =$	$E_0 +$	$\sum_{t=1}^{\infty} \frac{E_t^{EP}\left(RoE_t^{EP} - CoE\right)}{\left(1+CoE\right)^t} +$	$\sum_{t=1}^{\infty} \frac{E_t^{NB}\left(RoE_t^{NB} - CoE\right)}{\left(1+CoE\right)^t}$
Distributable Free Cash Flow	$V =$	$IC_0 +$	$\sum_{t=1}^{\infty} \frac{IC_t^{EP}\left(RoIC_t^{EP} - CoIC\right)}{\left(1+CoIC\right)^t} +$	$\sum_{t=1}^{\infty} \frac{IC_t^{NB}\left(RoIC_t^{NB} - CoIC\right)}{\left(1+CoIC\right)^t}$
Business RAPM	$V =$	$EC_0 +$	$\sum_{t=1}^{\infty} \frac{EC_t^{EP}\left(RoEC_t^{EP} - CoEC\right)}{\left(1+CoEC\right)^t} +$	$\sum_{t=1}^{\infty} \frac{EC_t^{NB}\left(RoEC_t^{NB} - CoEC\right)}{\left(1+CoEC\right)^t}$
Market consistent	$V =$	$MVS_0 +$		$\sum_{t=1}^{\infty} \frac{MVS_t^{NB}\left(RoMVS_t^{NB} - CoMVS\right)}{\left(1+CoMVS\right)^t}$

E = accounting book value of equity
IC = adjusted book value (e.g. removing goodwill and other intangibles, including pension obligations, etc.)
EC = debtholders' version of economic capital driven by the risk of the business
MVS = Market Value Surplus, equal to the market consistent value of existing assets and liabilities

Comparison of valuation approaches: Focus on in-force value

Approach	Value	Starting Capital	Excess returns from existing portfolio	Excess returns from future business
		Closed block, going concern value		"Franchise value"
Accounting	$V =$	$E_0 +$	$\sum_{t=1}^{\infty} \frac{E_t^{EP}\left(RoE_t^{EP} - CoE\right)}{\left(1+CoE\right)^t} +$	$\sum_{t=1}^{\infty} \frac{E_t^{NB}\left(RoE_t^{NB} - CoE\right)}{\left(1+CoE\right)^t}$
Distributable Free Cash Flow	$V =$	$IC_0 +$	$\sum_{t=1}^{\infty} \frac{IC_t^{EP}\left(RoIC_t^{EP} - CoIC\right)}{\left(1+CoIC\right)^t} +$	$\sum_{t=1}^{\infty} \frac{IC_t^{NB}\left(RoIC_t^{NB} - CoIC\right)}{\left(1+CoIC\right)^t}$
Business RAPM	$V =$	$EC_0 +$	$\sum_{t=1}^{\infty} \frac{EC_t^{EP}\left(RoEC_t^{EP} - CoEC\right)}{\left(1+CoEC\right)^t} +$	$\sum_{t=1}^{\infty} \frac{EC_t^{NB}\left(RoEC_t^{NB} - CoEC\right)}{\left(1+CoEC\right)^t}$
Market consistent	$V =$	$MVS_0 +$		$\sum_{t=1}^{\infty} \frac{MVS_t^{NB}\left(RoMVS_t^{NB} - CoMVS\right)}{\left(1+CoMVS\right)^t}$

- *If each approach were correctly calibrated and applied then each of the approaches should give the same, identical value for the existing book of assets and liabilities* (assuming that there is a unique value of the firm's existing assets and liabilities).
- *This value is the market value surplus by definition*: the MVS is defined as the market value of existing assets and liabilities, including the value that the market would be willing to pay for all of the returns, both "normal" and excess, embedded in the portfolio.
- MVS is difficult to calculate in the first place; adding a „trailing tail" of accounting excess returns does not help the situation.

Why market consistent valuation?

The “techy” answer

- As a reminder, the accounting- and DFCF-approaches project the *expected future cash flows* of complex financial instruments and “value” them with a ***unique risk-adjusted discount rate***. This process is applied both to the existing portfolio of assets and liabilities as well as for future new business.
- This asks a lot from a single discount rate: to accurately value a complex portfolio of market-, credit- and insurance-risky positions with highly uncertain future cash flow patterns using a single discount rate applied against the certainty equivalent cash flow profile.
- Under certain regularity conditions it is possible to find such a unique discount rate for a given portfolio. Unfortunately, this has to be done through ***backwards induction***, e.g. starting with the market consistent value and back-solving to the unique discount rate, which will change in complex ways as the portfolio and market conditions change, making value management impossible.
- In contrast, the ***mark-to-market approach*** simply takes the *value* of the current portfolio or new business, based on the risk specific to each product, as the starting point. This is a far easier (and more accurate) place to start from. In addition, the market consistent approach fully aligns with the New Business RAPMs used in banks and insurers for product pricing decisions. In other words, the value of your business is being built, ground-up.

Comparison of valuation approaches: Focus on franchise value of new business

Approach	Value	Starting Capital	Excess returns from existing portfolio	Excess returns from future business
		Closed block, going concern value		"Franchise value"
Accounting	$V =$	$E_0 +$	$\sum_{t=1}^{\infty} \frac{E_t^{EP}\left(RoE_t^{EP} - CoE\right)}{\left(1+CoE\right)^t} +$	$\sum_{t=1}^{\infty} \frac{E_t^{NB}\left(RoE_t^{NB} - CoE\right)}{\left(1+CoE\right)^t}$
Distributable Free Cash Flow	$V =$	$IC_0 +$	$\sum_{t=1}^{\infty} \frac{IC_t^{EP}\left(RoIC_t^{EP} - CoIC\right)}{\left(1+CoIC\right)^t} +$	$\sum_{t=1}^{\infty} \frac{IC_t^{NB}\left(RoIC_t^{NB} - CoIC\right)}{\left(1+CoIC\right)^t}$
Business RAPM	$V =$	$EC_0 +$	$\sum_{t=1}^{\infty} \frac{EC_t^{EP}\left(RoEC_t^{EP} - CoEC\right)}{\left(1+CoEC\right)^t} +$	$\sum_{t=1}^{\infty} \frac{EC_t^{NB}\left(RoEC_t^{NB} - CoEC\right)}{\left(1+CoEC\right)^t}$
Market consistent	$V =$	$MVS_0 +$		$\sum_{t=1}^{\infty} \frac{MVS_t^{NB}\left(RoMVS_t^{NB} - CoMVS\right)}{\left(1+CoMVS\right)^t}$ $\sum_{t=1}^{\infty} \frac{NewBusinessEP + InvestmentEP}{\left(1+CoMVS\right)^t}$

- Franchise value defined by new business and investment economic profit, implying a direct link between RAPMs and shareholder value
- Link is only possible if we recognize the principles for an accurate RAPM, e.g. no frictional cost of capital, no non-economic distortions (yield curve anchoring, volatility adjuster, etc.)

How to measure value for financial services

Market consistent valuation

$$V = MVS_0 + \sum_{t=1}^{\infty} \frac{NewBusinessEP + InvestmentEP}{(1+CoMVS)^t}$$

Share Value = **Net Asset Value** + **Franchise Value linked to Operational Levers**

	Growth	Operating Efficiency	Underwriting Effectivness	Capital Efficiency	Financial Market Alpha
New Business RAPM – U/W risks	☑	☑	☑	☑	
Investment RAPM – market risks				☑	☑
	Growth in premium, assets or loan volumes	**Expense ratio or Cost Income Ratio**	• **Expected Loss Ratio** • **Economic Capital Intensity** • **Cost of under-writing capital**	**Capital Efficiency Ratio**	**Cost of capital for risk-appropriate benchmark**

☑ Source of value creation

Value should be based on:

- The market value of the existing portfolio, or the "Going Concern, Closed Book" value
- Plus the value of profitable future new business, or the Franchise Value

Managing for value should focus on the five fundaments which influence the multiple share-holders are willing to pay for the invested capital:

- Profitable growth
- Operating efficiency
- Underwriting effectiveness
- Capital efficiency and
- Investment alpha

Contents

Market Consistency / fair valuation: Industry bane or savior?

The criticism of market consistent valuation

*"We need to kill mark to market accounting before it eats us alive. These accounting rules are like The Blob, an alien life form that consumes everything in its path as it grows and grows… (M)ark to market rules distort financial results and business decisions under the false cloak of conservatism. The rules make little sense, produce inconsistent results, lack a basis in reality and provide lots of room for abuse**…** Mark to market rules are one of the worst manifestations of the "trader" mentality that spread from Wall Street to the rest of the country. Wall Street traders with severe attention deficit must have drafted these accounting rules because they push valuations and reporting of business decisions into the "moment" (which is worse than the short term) and use the equivalent of "financial sound bites" to determine value."*

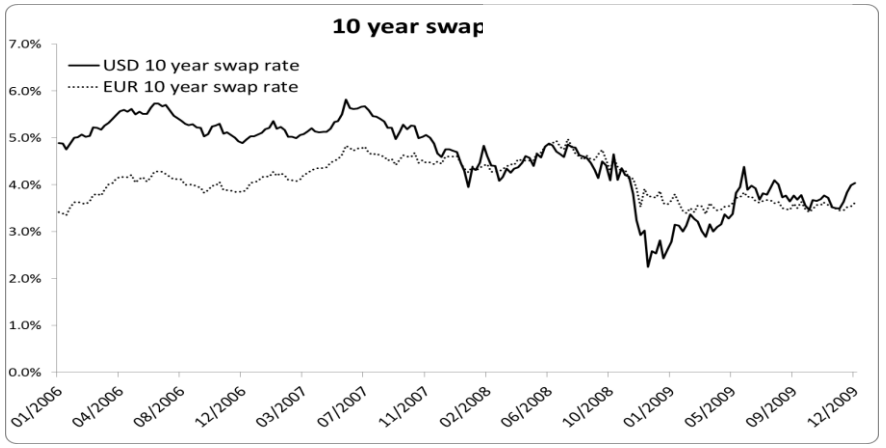
M. Sunshine, co-CEO of Veritas Financial Partners

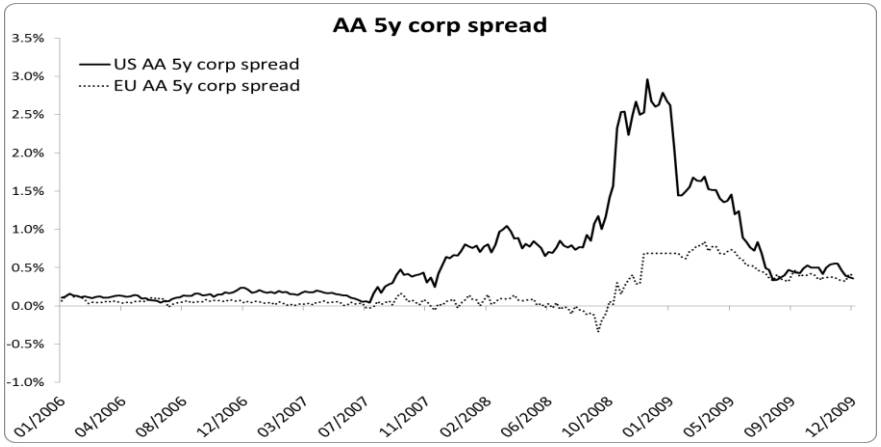
"Critics of this brand of "fair value" accounting… say it's crippled the banking system, forcing firms to continually write down the value of assets in the worst possible market conditions, regardless of whether or not they're for sale. This, in turn, has put tremendous strain on balance sheets, forcing financial companies to hunt for new capital to make up for paper losses at a time when few investors are willing to put money into banks. The spiral devastated the industry. As Forbes chairman and editor-in-chief Steve Forbes has noted in repeatedly calling for ending mark-to-market rules, of the more than $700 billion that financial institutions have written off, almost all of it has been book write-downs, not actual cash losses."

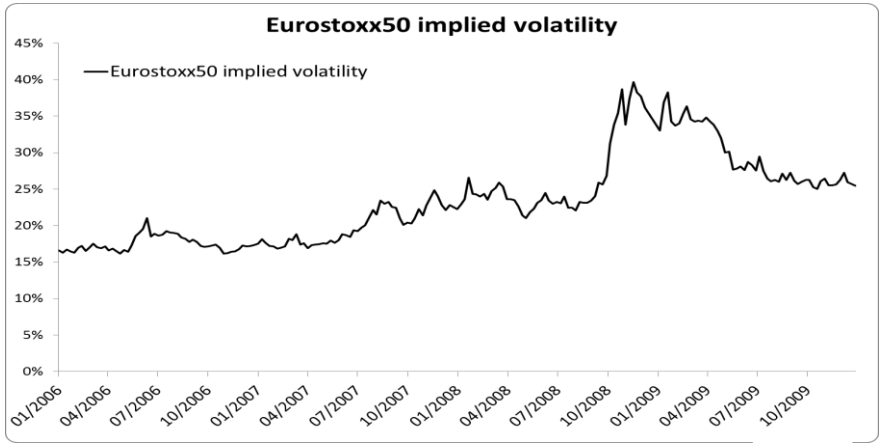
Forbes, 2009

It is important to note that these critiques have to do with the consequences of market consistent approaches and not whether they accurately reflect the share value of the firm. Even if we do not like the consequences, we still need to answer the question of whether they better reflect our share price and, if so, we should use them to manage our business.

Event Study:
Financial Market Development (2007-2009)







Source: Author's analysis, Bloomberg

Event Study:
European Insurance Valuations (2007-2008)

	Metric	% Change, 2007-08	Comments
MCEV reporting companies: Allianz, Aviva, AXA, Ergo, Swiss Life, ZFS	Shareholder Equity[1)]	- 24,2 %	
	MCEV[1)]	- 32,0 %	
		- 39,8 %	"Clean" or adj MCEV estimated, w/o illiquidity premium used by AXA, Aviva
	SoP valuation[2)]	- 50,0 %	
	Shareprice change	- 45,5%	
EEV reporting companies: Aegon, Generali, ING	Shareholder Equity[1)]	- 28,6 %	
	Traditional EEV[1)]	- 13,3 %	
	SoP valuation[2)]	- 64,4 %	
	Shareprice change	- 57,7%	
European Insurance Industry	Eurostoxx Insurance Index[3)]	- 62,5 %	

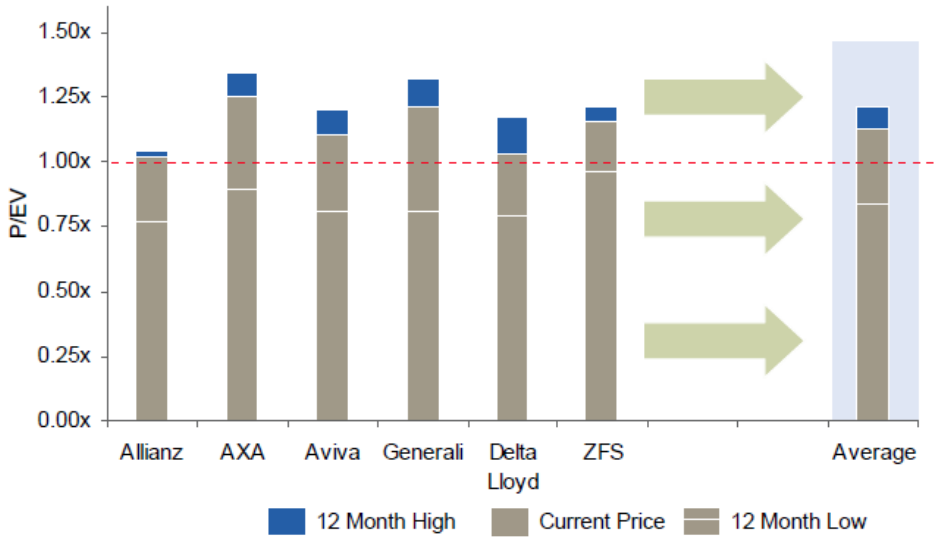
1) *Change in Shareholder Equity, MCEV and EEV based on annual disclosures, 2007& 2008 year-end.*
2) *Merrill Lynch, "Not out of the woods" May 22, 2008; "Pausing the roller coaster to look at valuations June 23, 2009. Total firm SoP for AXA, Aegon, Aviva, Generali, ING, Swiss Life.*
3) *Eurostoxx insurance index level, average values, August 2008 to March 2009.*

Source: Author's analysis

Static Comparison:
Evidence from the Insurance Industry

Comparison of valuation multiples, European Insurers

Intrinsic Valuation Trading Multiples (P/Adj. MCEV)[6]



Intrinsic Valuation Calculation

- Allianz's peer group have traded broadly in-line with their adjusted MCEV
- An adjusted MCEV represents an 'exit value' approach using the risk-free (removing illiquidity premium) to setting technical provisions

Static Comparison:
Evidence from the Insurance Industry

Comparison, MCEV vs. TNAV and Market Capitalization

Company	2009	2010	2011	2012	2013
1. Allianz	✓	✓			✓
2. Aviva	✓			✓	✓
3. Axa	✓	✓	✓	✓	✓
4. CNP			✓	✓	
5. Generali	✓	✓	✓	✓	✓
6. Prudential	✓	✓	✓	✓	✓
7. Zurich	✓	✓	✓	✓	✓

✓MCEV closer than TNAV to the Market Capitalization of the firm at year-end.
Source: Wilson and Hristova, 2014, *Value relevance of market consistency: A useful management tool or a volatile distraction?*

Comparison, adj MCEV vs. reported MCEV and Market Capitalization

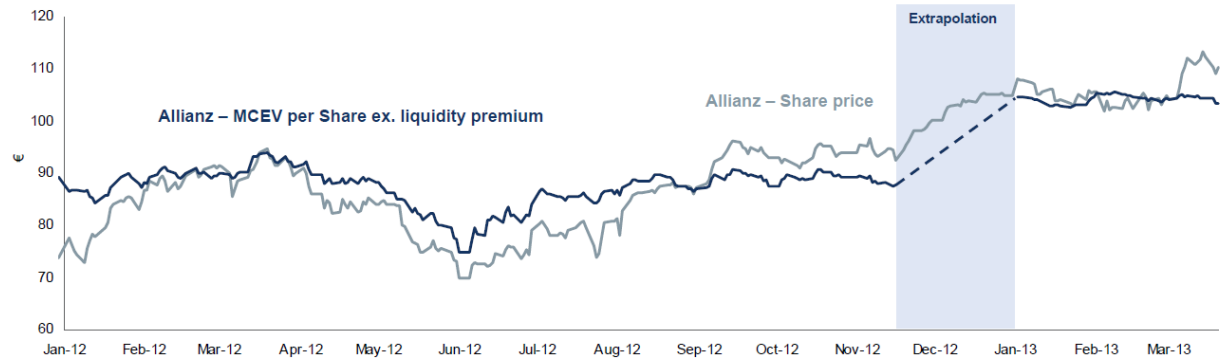
Company	2009	2010	2011	2012	2013
1. Allianz	✓	✓	✓	✓	
2. Aviva	✓	✓	✓	✓	
3. Axa	✓		✓		✓
4. CNP	✓	✓	✓	✓	✓
5. Generali		✓			
6. Prudential	✓				✓
7. Zurich	✓			✓	✓

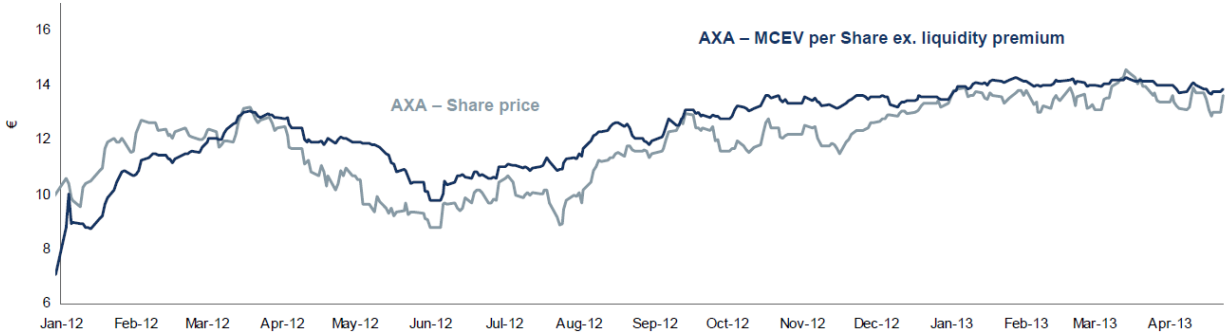
✓"Clean" MCEV closer than unadjusted MCEV to Market Capitalization.
Source: Wilson and Hristova, 2014, *Value relevance of market consistency: A useful management tool or a volatile distraction?*

Roll-Forward Analysis:
Evidence from the Insurance Industry

Share price versus MCEV Roll-forward, AXA and Allianz 2012

MCEV / Economic Capital as Driver of Value?





27 *Source: Capital IQ, Bloomberg, disclosed MCEV sensitivities and RBC estimates*

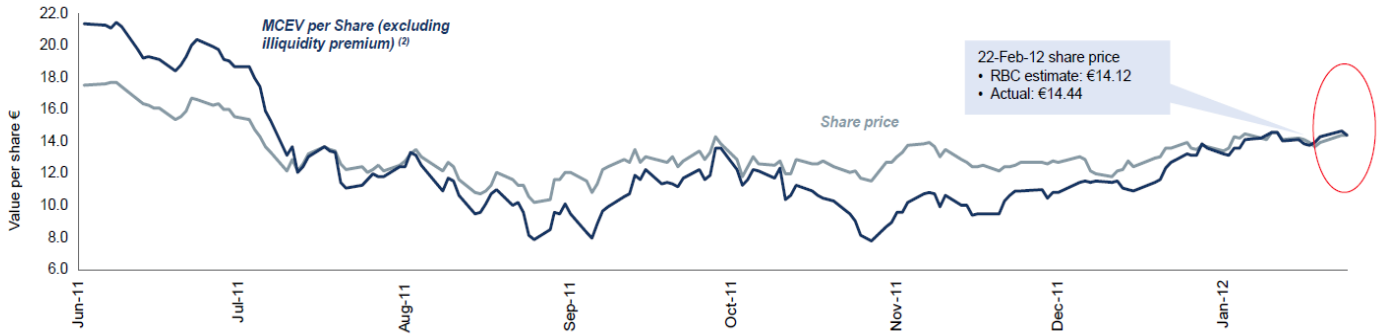
RBC Capital Markets®

Roll-Forward Analysis: Evidence from the Insurance Industry

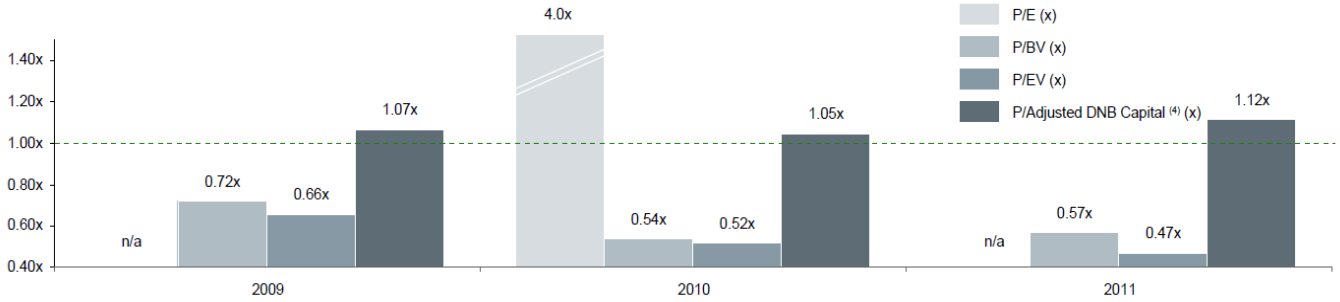
Comparison of different valuation basis

Establishing Value of European Business – DNB Capital a Realistic Measure

Delta Lloyd: P/MCEV (Adjusted: Excluding Illiquidity Premium) – Calculated on a Rolling Basis (1)



Alternative Valuation Metrics (3)



Source: Bloomberg (16/08/2012), company reports and accounts. (1) Calculation of rolling MCEV is performed using the Delta Lloyd's disclosed 1H11 MCEV. MCEV priced daily using Aviva's 2010 MCEV sensitivity disclosures: Euro 10 Year swap yield as risk-free rate; Iboxx corporate bond yields is used to calculate the corporate bond spread; AEX movement used for changes in equities; and the VIX index used to measure volatility. (2) Illiquidity premium is calculated using the disclosed CFO/CRO proposed formula and the risk-free rate sensitivities as per the 2010 Aviva report. (3) Calculated as closing price for the year divided by stated IFRS/Embedded Value metric for the relevant financial year. (4) RBC estimate of MCEV

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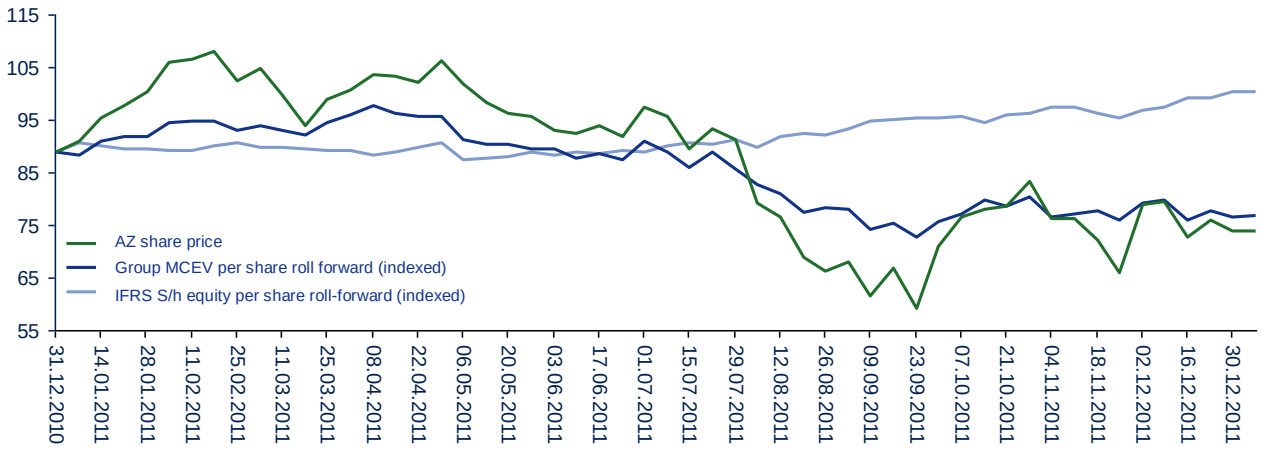
Roll-Forward Analysis: Evidence from the Insurance Industry

Allianz MCEV versus IFRS Net Asset Value roll-forward, 2011

Value view is better linked to our share price, but volatile due to our current market risk exposure

Linkage between share price and performance views

AZ share price vs. economic & IFRS roll-forward[1] (EUR)



- Economic view clearly outperforms IFRS metric in tracking our share price, both visually and statistically.
  - Comparison of regression R-Squareds, share price-to-MCEV versus share price-to-IFRS: 94% vs 72%!
  - Sign of correlation and regression coefficient also supports: Share price increases with MCEV roll-forward values (positive coefficient) but decreases with IFRS shareholders' equity (negative coefficient)!
- Higher reflection of sensitivity to major risk exposures like interest rate and credit spread environment

1) Roll-forward based on 2010 year-end Group MCEV and IFRS S/h equity and disclosed sensitivities (i.e. equities & rates) but without quarterly rebalancing.

Roll-Forward Analysis:
Evidence from the Insurance Industry

Comparison, adjusted MCEV Roll-Forward vs. ΔTNAV and ΔShare Price

Company	2009	2010	2011	2012	2013
1. Allianz		✓	✓		✓
2. Aviva	✓	✓	✓	✓	✓
3. Axa	✓	✓	✓	✓	✓
4. CNP	✓	✓	✓	✓	✓
5. Generali		✓		✓	
6. Prudential	✓	✓	✓	✓	✓
7. Zurich	✓	✓	✓	✓	✓

✓*Adjusted MCEV Roll-Forward closer to ΔShare Price than ΔTNAV.*

Source: Wilson and Hristova, 2014, *Value relevance of market consistency: A useful management tool or a volatile distraction?*

Better in 86%
of the cases
(99.9% confidence)

Adjusted MCEV Roll-Forward vs. unadjusted MCEV Roll-Forward

Company	2009	2010	2011	2012	2013
1. Allianz	✓	✓	✓		✓
2. Aviva	✓	✓	✓	✓	✓
3. Axa	✓			✓	✓
4. CNP	✓	✓		✓	✓
5. Generali	✓	✓		✓	✓
6. Prudential	✓	✓		✓	
7. Zurich	✓		✓	✓	

✓*Adjusted MCEV Roll-Forward closer to ΔShare Price than the unadjusted MCEV Roll-Forward.*

Source: Wilson and Hristova, 2014, *Value relevance of market consistency: A useful management tool or a volatile distraction?*

Better in 75%
of the cases
(99.9% confidence)

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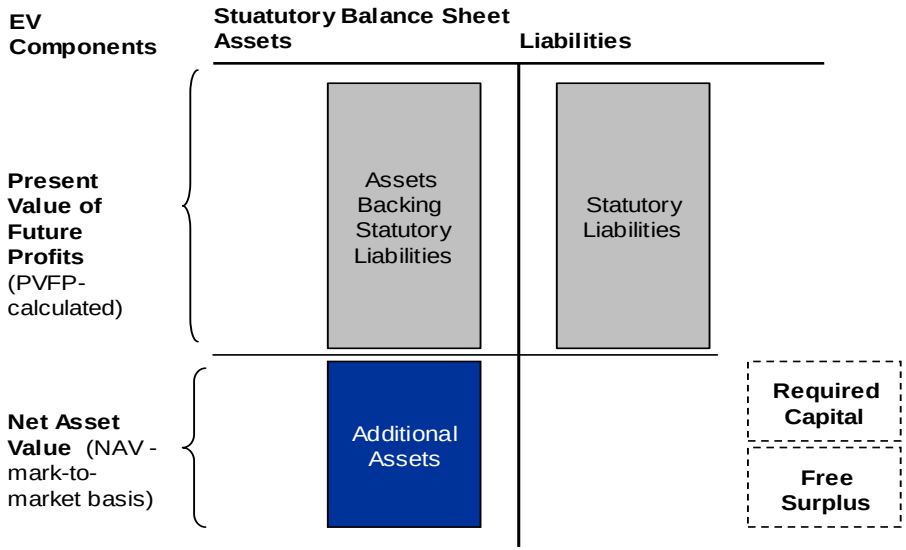
EV Statutory Balance Sheet Decomposition:



Calculation of the Present Value of Future Profits:

$$PVFP = \sum_{t=0}^{\infty} \frac{CF_t}{(1+rdr)^t}$$

CF_t ~ statutory profits generated by the existing book of business which are distributable to shareholders at time t

rdr ~ appropriate risk discount rate

Best estimate statutory Cash Flows from Covered business:

$\mathbf{CF_t} = P_t$	Premium received at t
$+ R_{t-1} - R_t$	Change in reserves
$- C_t$	Policy holder claims
$- E_t$	Expenses
$+ I_t$	Investment income
$- T_t$	Taxes

From traditional Embedded Value to MCEV

Traditional Embedded Value

The traditional Embedded Value (EV) concept attempts to measure the value of shareholders' interest in the *existing portfolio* by valuing the distributable free cash flows to shareholders after allowance for the aggregate risks in the business. Developed during period of demutualization and take-overs.

Critic:

- large degree of management discretion in selecting parameters for the valuing the financial assets backing reserves and the liabilities
- failure to value the risk of embedded options and guarantees in LH asset accumulation and savings products
- the use of a single risk discount rate derived from historical share price developments is inappropriate for any portfolio of complex asset accumulation and savings products

European Embedded Value: initiated in 2004

Developed to address perceived „valuation discount" of Life businesses

Advances relative to the traditional EV:

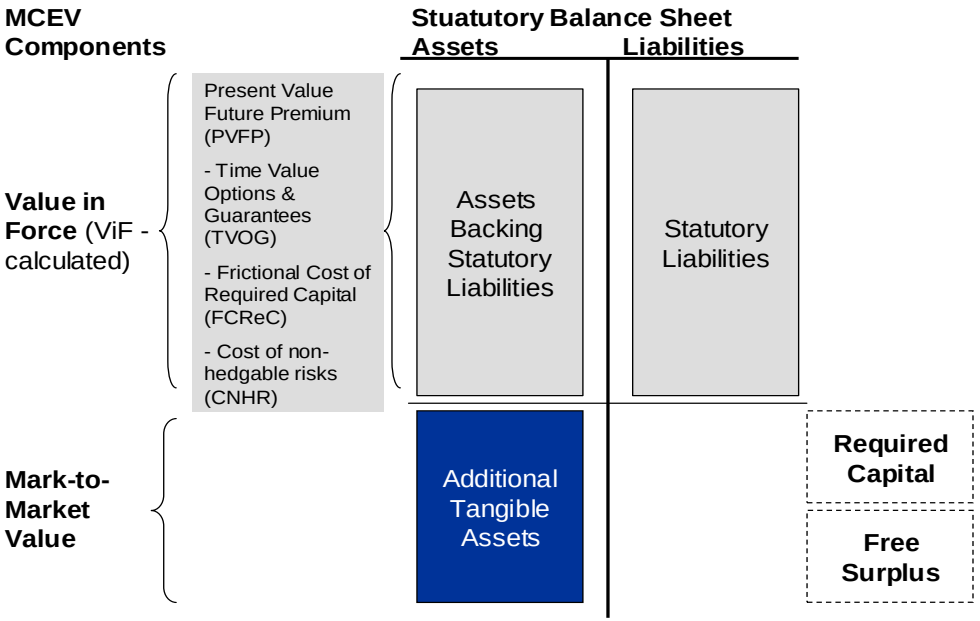
- discounting of simulated, real world stochastic cash flows in stead of management's best estimate or certainty equivalent cash flows capture of some of the possible adverse profit developments in falling markets when guarantees might become binding and shareholder funds might be required to make up the difference
- requirement that management and policy holder options are explicitly modeled within the new, stochastic framework
- additional explicit guidance on the setting of financial markets expectations or assumptions and their disclosure

Critic:

- the new Principles allowed for a sufficient degree of management discretion in setting the underlying valuation parameters and assumptions so that disclosures across companies still varied widely
- the EEV approach did not ensure that the assets backing life businesses or the options and guarantees embedded in life insurance products were correctly or fairly valued in a manner consistent with the valuation of options and guarantees in the broader financial markets
- a single, top-down risk adjusted discount rate was still used to value different portfolios

Market Consistent Embedded Value

MCEV Statutory Balance Sheet Decomposition:



Caveats:

- Cost of Required Capital: frictional cost perspective
- Cost of non-hedgable risks: financial market risks
- Economic distortions: Illiquidity premium, ultimate forward rate for extrapolation
- Allocated capital, including capital required for financial market risks

The MCEV PVFP is calculated in a similar manner as the EEV PVFP with few important exceptions:

1. Real world expected asset returns are replaced by risk neutral, risk free expected returns for all assets consistent with implied forward risk free investment rates and,
2. The cash flows are discounted at the risk free term structure of interest rates. This in principle ensures that the market value of all current *linear* assets and liabilities (e.g. without embedded options) are correctly reflected in the MCEV calculation.
3. All options and guarantees embedded in both assets and liabilities are incorporated in TVOG using appropriate option pricing techniques
4. Market consistent value of net asset position is equal to PVFP+TVOG

From traditional Embedded Value to MCEV

Market Consistent Embedded Value: initiated in 2009

Advances relative to the EEV:

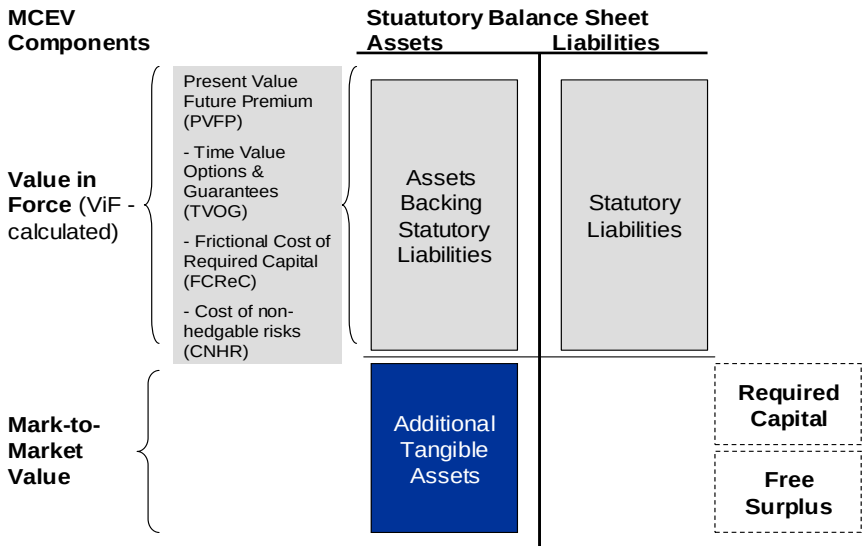
The MCEV Framework defined a full mark-to-model approach which was broadly consistent with the valuation of financial products in banks. This was accomplished by making advances in three specific areas:

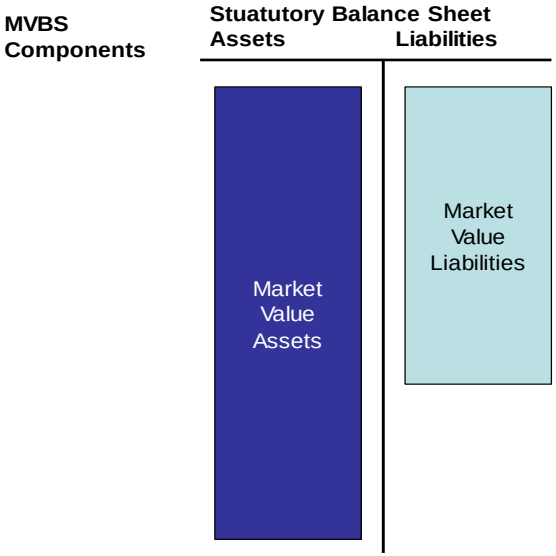
1. by defining mark-to-market valuation principles for *hedgable risks*, or financial market risks, from the firm's assets and liabilities in a manner consistent with capital market valuation approaches used for financial securities and derivatives;
2. by defining mark-to-model valuation principles for *non-hedgable risks*, or risks which arise due to the uncertainty around best estimates for non-financial risks such as insurance premium & reserve risks, mortality / longevity risks, expense risks, operational risks, etc.; and,
3. by providing supplemental disclosures to provide greater insights to the analyst community.

Critic:

- Still some discretion by management is allowed – modelling of behaviour (own and policy holder's)
- Uneconomic assumptions: Illiquidity premium, ultimate forward rate (UFR)
- Low frequency of disclosure
- Pro-cyclical
- Trade-off between growth and cash flow

From MCEV to Market Value Balance Sheet





- MCEV, post-tax for ViF, pre-tax for additional assets. MVBS, all assets and liabilities are pre-tax
- No non-balance sheet items
  - Cost of Required Capital: Not included on balance sheet, neither implicitly nor explicitly
  - Cost of non-hedgable risks: Included as risk margin on liabilities (except as included in technical margin for market value of liabilities)
- Economic distortions should, in principle, be eliminated: Illiquidity premium, ultimate forward rate for extrapolation