SOCIETY OF ACTUARIES

Article from:

Product Matters!

June 2010 – Issue 77

SOA International Experience Survey— Embedded Value Financial Assumptions

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Editor's Note: This article was originally published in the December 2009 issue of International News.

Starting in 2003, the Society of Actuaries International Experience Study Working Group has been conducting surveys of published embedded value (EV) financial assumptions.[2] This article updates the survey with 2008 data.

The purpose of this survey is to provide international actuaries with benchmark assumption data. Since many companies make this information publicly available, no formal data request was issued. Instead, the survey was based on reports published on the Internet by 23 companies centered in Asia, Australia, Canada and Europe, many of which are active internationally.

Each financial assumption presented in this article is the average value of the assumption reported by all companies in their 2008 embedded value reports. If no companies reported a specific assumption in a given country, then that assumption is labeled "NA" to signify that data is not available. Some companies vary assumptions by calendar year, while other companies use a single assumption; if a company varies an assumption by calendar year, the value for the earliest period is used in this study.

Financial Assumptions from the Survey

Financial assumptions presented in this article include:

1. Discount rate—the rate used to calculate the present value of future distributable earnings.
2. Implied discount rate—for companies with market consistent embedded value (MCEV) calculations, the traditional embedded value (TEV) discount rate that when used to discount "real world" cash flows, would produce the MCEV.
3. Equity return[3]—the total return on common stock investments.
4. Property return[3]—the total return on investments in real estate.
5. Fixed return[3]—the yield on corporate bonds portfolio held by an insurance company.
6. Risk free return—typically the yield on a 10 year bond offered by the local government or the 10 year swap rate (swap rates are commonly used as risk free yields for MCEV purposes).
7. Inflation—the rate used to increase future expenses

COMPANIES INCLUDED IN SURVEY

Aegon	Allianz
AMP	Aviva
AXA	CNP
Fortis	Friends Provident
Generali	Hannover Re
HBOS	Industrial Alliance
ING	Irish Life & Perm.
Legal & Gen	Lloyds TSB
ManuLife	Munich Re
Old Mutual	Prudential UK
Standard Life	Swiss Life
Zurich	

LIMITATIONS

Readers should use judgment when interpreting the results of the survey and note that:

- When comparing one assumption to another, it should be noted that different companies might be contributing data to different assumptions, so that differences between variables may reflect differences between companies, rather than differences between the assumptions.
- Some cells include data from many companies, while others include data from as few as one company.

[1] Dominique would like to thank Erin Ingalls for her assistance in gathering the data for this article.

[2] *International News*, Issue 34, October 2004, Society of Actuaries, pp 19 *http://www.soa.org/library/newsletters/international-section-news/2004/october/isn0410.pdf*, *International News*, Issue 36, July 2005, Society of Actuaries, pp 28 *http://www.soa.org/library/newsletters/international-section-news/2005/july/isn-2005-iss36-horbatt-lebel.pdf* and *International News*, Issue 40, November 2006, Society of Actuaries, pp 8 *http://www.soa.org/library/newsletters/international-section-news/2006/november/isn-2006-iss40.pdf, International News, Issue 43, November 2007, pp 22 http://www.soa.org/library/newsletters/international-section-news/2007/november/isn-2007-iss43.pdf, International News*, Issue 46, December 2008, Society of Actuaries, pp 7 *http://www.soa.org/library/newsletters/international-section-news/2008/december/isn-2008-iss46.pdf*

[3] Note that for companies on an MCEV basis the expected returns on assets are those that are used to derive the implied discount rate.

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"Traditional discount rates generally increased from last year as did implied discount rates."

and, possibly, revalue policy terms that are tied to inflation.

8. Tax rates—income tax rates by jurisdiction.

These results are presented in two separate tables. Table 1 provides the number of companies contributing data as well as discount rates for TEV companies and the implied discount rates for MCEV companies. Table 2 contains the rest of the financial data.

When reading Table 1, several thoughts should be kept in mind:

- The methodologies followed by the companies to determine discount rates were as follows:

Methodology	Number of Companies
MCEV	16
CAPM	4
WACC	2
Other/Unknown	1

- A methodology is considered market consistent if each cash flow is valued consistently with traded instruments that display similar risks. Thus under the MCEV approach each cash flow is discounted using a risk discount rate (RDR) appropriate for valuing similar cash flows in the market.
- Companies following MCEV strictly speaking do not have risk discount rates that are comparable to those used by companies employing a more traditional approach. For companies employing an MCEV methodology, discount rates in the table above are the RDR inferred from the MCEV calculation. That is, they are discount rates that would develop the MCEV value using TEV techniques and assumptions.
- Companies that explicitly set risk discount rates are referred to as calculating traditional embedded values (TEV). Two common methods used by them to set the risk discount rate are the capital asset pricing model (CAPM) and the company's own weighted average cost of capital (WACC).
- Under CAPM many companies assume a level of volatility that matches the broad market (i.e., Beta is equal to 1), which results in a discount rate that is equal to the risk free rate plus an average equity risk premium. Other companies employing CAPM methodology may vary discount rates by product line and/or territory to reflect the higher Beta associated with riskier business.

When reading this and other tables, it should be noted that some companies use identical assumptions for multiple countries (on the basis that this results in immaterial differences), and this practice would tend to dampen differences between countries.

Several observations can be made concerning Table 1 when compared to similar data published last year[4]:

- Traditional discount rates generally increased from last year as did implied discount rates.
- The number of companies reporting traditional discount rates decreased from last year, which is consistent with the fact that several companies moved from a TEV to an MCEV basis.

[4] ibid

Table 1: Average 2008 Explicit and Implicit Discount Rates (cont.)

Country	Companies	Traditional Discount Rate (1)	Companies	(In Force) (2)	(New Business) (3)
America Latin					
Argentina	1	27.8%	0	NA	NA
Chile	1	10.6%	0	NA	NA
Colombia	1	16.6%	0	NA	NA
Mexico	2	13.1%	0	NA	NA
Peru	1	14.2%	0	NA	NA
Uruguay	1	16.7%	0	NA	NA
America North					
Canada	3	6.9%	1	6.6%	6.6%
US	6	6.4%	1	17.1%	11.0%
Asia / Pacific					
Australia	2	7.6%	2	7.3%	6.7%
China	3	9.7%	0	NA	NA
Hong Kong	3	5.7%	1	9.1%	6.9%
Indonesia	1	15.3%	0	NA	NA
Japan	4	5.4%	1	6.7%	3.1%
Malaysia	2	8.9%	0	NA	NA
New Zealand	2	8.9%	1	6.8%	5.6%
Philippines	1	15.8%	0	NA	NA
Singapore	1	6.9%	0	NA	NA
South Korea	3	8.6%	0	NA	NA
Taiwan	4	6.9%	0	NA	NA
Turkey	1	22.9%	0	NA	NA
Europe Central					
Bulgaria	1	11.0%	0	NA	NA
Czech	3	7.9%	0	NA	NA
Greece *	1	7.3%	0	NA	NA
Hungary	3	12.0%	0	NA	NA
Poland	3	9.0%	1	6.0%	6.0%
Romania	2	12.9%	0	NA	NA
Russia	1	15.9%	0	NA	NA
Slovakia	3	8.3%	0	NA	NA

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Table 1: Average 2008 Explicit and Implicit Discount Rates (cont.)

Country	Companies	Traditional Discount Rate (1)	Companies	(In Force) (2)	(New Business) (3)
Europe Western					
Austria *	1	7.4%	0	NA	NA
Belgium *	2	7.3%	1	9.4%	9.6%
France *	3	7.8%	3	8.1%	7.0%
Germany *	1	7.4%	3	6.6%	5.5%
Ireland *	2	7.2%	2	5.3%	5.3%
Italy *	1	7.4%	2	6.8%	6.4%
Luxembourg *	1	7.3%	1	6.7%	6.2%
Netherlands *	4	7.4%	0	NA	NA
Portugal *	1	7.4%	0	NA	NA
Spain *	3	7.6%	1	9.7%	9.7%
Switzerland	1	6.3%	1	7.1%	6.0%
UK	3	7.7%	4	7.9%	7.0%

* euro currency zone

- However, not all of the companies on an MCEV basis disclosed their implied discount rates.
- Implied discount rates for new business are generally lower than those for the in force portfolios, due to the lowering of interest rate and other guarantees for new business.

The second table presents the balance of the financial assumptions used in embedded value calculations. Note that:

- Equity and property returns normally include both cash income (that is, stockholder dividends and rental payments) and asset value appreciation (or depreciation), and these yields may be reported net of investment expenses. Alternatively, equity returns may represent a fund appreciation prior to any fees or charges made against the fund. In all cases, equity and property returns will be influenced by company investment strategy.
- Fixed returns reflect the investments in an insurer's bond portfolio. Amortized book yields are typically used in countries where book profits are based on amortized cost while current market redemption yields are used when profits are calculated using market values. Companies generally do not disclose whether the fixed income returns are net of defaults or investment expenses.
- The inflation assumption may differ from general inflation (for example, the increase in a consumer price index).
- Tax rates are dependent upon individual company circumstances (for example, the existence of tax loss carry forwards) and thus these rates cannot necessarily be applied to other companies.

Table 2: Average 2008 Financial Assumptions

	Country	Companies	Equity Return (4)	Property Return (5)	Fixed Return (6)	Government Return (7)	Inflation (8)	Income Tax Rates (9)
America Latin								
	Argentina	1	26.2%	NA	21.7%	21.7%	NA	NA
	Brazil	1	NA	NA	NA	NA	NA	40.0%
	Chile	1	11.0%	NA	7.2%	6.5%	NA	NA
	Colombia	1	15.0%	NA	10.5%	10.5%	NA	NA
	Mexico	2	12.6%	NA	9.2%	8.3%	4.0%	40.0%
	Peru	1	12.6%	NA	8.3%	8.1%	NA	NA
	Uruguay	1	15.1%	NA	10.6%	10.6%	NA	NA
America North								
	Canada	5	7.6%	8.6%	5.2%	2.9%	1.6%	29.3%
	US	13	7.1%	5.0%	7.0%	2.5%	1.4%	34.9%
Asia / Pacific								
	Australia	5	8.8%	6.9%	4.7%	4.9%	2.8%	30.0%
	China	3	8.8%	NA	3.7%	4.8%	3.5%	25.0%
	Hong Kong	6	6.9%	NA	4.7%	1.9%	2.3%	16.5%
	Indonesia	1	NA	NA	NA	10.3%	6.0%	NA
	Japan	5	5.8%	1.5%	2.8%	1.5%	0.6%	36.0%
	Malaysia	3	10.6%	5.5%	4.5%	5.4%	NA	26.0%
	New Zealand	3	9.2%	6.7%	5.6%	5.4%	3.0%	NA
	Philippines	1	NA	NA	NA	9.3%	5.0%	NA
	Singapore	1	10.2%	NA	NA	4.3%	1.8%	NA
	South Korea	3	9.1%	5.5%	6.0%	4.7%	2.8%	22.0%
	Taiwan	4	6.2%	1.8%	3.6%	2.6%	2.1%	25.0%
	Thailand	3	7.6%	2.9%	4.5%	4.5%	3.0%	NA
	Vietnam	1	NA	NA	NA	10.3%	6.0%	NA
Asia / Mid East								
	India	2	12.3%	NA	8.8%	8.5%	5.0%	NA
	Turkey	1	21.3%	NA	16.8%	16.8%	NA	NA
Europe Central								
	Bulgaria	1	11.4%	NA	7.3%	6.9%	NA	NA
	Croatia	1	NA	0.0%	NA	NA	NA	NA
	Czech	4	8.2%	6.3%	4.3%	4.1%	3.0%	19.0%
	Greece *	1	6.8%	NA	3.2%	3.2%	NA	NA
	Hungary	3	12.3%	9.8%	8.8%	8.1%	3.0%	20.0%
	Poland	4	8.9%	5.8%	5.3%	4.9%	3.0%	19.0%
	Romania	2	13.1%	NA	8.7%	8.6%	5.0%	16.0%
	Russia	1	15.8%	NA	11.3%	11.3%	NA	NA
	Slovakia	3	8.6%	5.6%	4.6%	4.2%	3.0%	19.0%

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Table 2: Average 2008 Financial Assumptions (cont.)

	Country	Companies	Equity Return (4)	Property Return (5)	Fixed Return (6)	Government Return (7)	Inflation (8)	Income Tax Rates (9)
Europe Western								
	Austria *	2	7.8%	4.5%	NA	3.8%	NA	NA
	Belgium *	6	7.3%	5.6%	4.3%	3.7%	1.4%	34.0%
	France *	10	7.1%	5.6%	5.2%	3.7%	1.7%	34.3%
	Germany *	8	6.9%	5.0%	5.6%	3.6%	1.7%	30.3%
	Ireland *	5	6.7%	5.0%	NA	3.7%	2.4%	12.5%
	Italy *	7	6.5%	4.4%	NA	3.9%	2.6%	32.3%
	Luxembourg *	5	6.9%	5.7%	4.3%	3.7%	2.0%	25.8%
	Netherlands *	8	6.9%	5.5%	6.0%	3.6%	1.7%	25.5%
	Portugal *	2	7.8%	4.5%	NA	3.8%	NA	NA
	Spain *	7	7.1%	5.7%	4.2%	3.6%	2.4%	30.0%
	Sweden	2	6.2%	5.2%	NA	3.5%	1.8%	28.0%
	Switzerland	5	6.6%	4.1%	3.0%	2.6%	1.4%	22.1%
	UK	13	7.1%	5.9%	5.8%	3.6%	3.0%	28.1%

* euro currency zone

Several observations can be made concerning Table 2 when compared to similar data published last year[5]:

- Investment yields generally decreased across all investment classes as did inflation.
- Investment yield increases were found in some South American and Eastern European countries.
- Most of the decreases are attributable to decreases in swap or government bond yields.

It should be noted that several companies calculating MCEVs as of year-end 2008 adjusted their risk free rates by including an illiquidity premium adjustment resulting in a higher risk free return. These illiquidity premiums were not included in any of the analyses contained in this article.

Investment Premiums and Other Marginal Relationships

Investment premiums are the additional yield an investor is expected to receive by purchasing an asset other than a government bond.

- Equity Premium—the excess yield from investing in common stock over the risk free return.
- Property Premium—the excess yield from investing in real estate over the risk free return.
- Credit spread—the excess yield from investing in a mix of corporate and government bonds over the risk free return.

In addition the following two marginal relationships may be of interest:

- Risk premium—the excess of the embedded value discount rate over the risk free return
- Real return—the excess of the risk free return over inflation

Table 3 presents the marginal relationships derived from Table 2. The column numbering continues the numbering in the prior table.

[5] ibid

Table 3: Investment Premiums and Other Marginal Relationships

Country	Traditional Risk Premium (10)=(1)-(7)**	Equity Premium (11)=(4)-(7)**	Property Premium (12)=(5)-(7)**	Credit Spread (13)=(6)-(7)**	Real Return (14)=(7)-(8)**
America Latin					
Argentina	6.1%	4.5%	NA	0.0%	NA
Chile	4.1%	4.5%	NA	0.7%	NA
Colombia	6.1%	4.5%	NA	0.0%	NA
Mexico	4.8%	4.5%	NA	1.1%	4.5%
Peru	6.1%	4.5%	NA	0.2%	NA
Uruguay	6.1%	4.5%	NA	0.0%	NA
America North					
Canada	3.9%	4.8%	5.5%	2.6%	1.4%
US	3.6%	4.6%	2.8%	5.1%	-0.1%
Asia / Pacific					
Australia	3.6%	3.8%	1.8%	-0.4%	2.9%
China	4.9%	5.8%	NA	0.7%	2.1%
Hong Kong	3.6%	5.0%	NA	3.0%	-0.4%
Indonesia	5.0%	NA	NA	NA	4.3%
Japan	4.0%	4.3%	0.2%	1.1%	0.8%
Malaysia	3.6%	5.3%	1.3%	0.3%	NA
New Zealand	3.6%	3.8%	2.0%	0.3%	1.7%
Philippines	6.5%	NA	NA	NA	4.3%
Singapore	2.6%	6.0%	NA	NA	2.5%
South Korea	3.9%	4.3%	0.9%	0.8%	1.6%
Taiwan	4.3%	4.5%	0.3%	1.8%	1.5%
Thailand	5.0%	4.3%	0.5%	0.2%	3.8%
Vietnam	6.5%	NA	NA	NA	4.3%
Asia / Mid East					
India	5.1%	4.5%	NA	1.0%	4.3%

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Table 3: Investment Premiums and Other Marginal Relationships (cont.)

Country	Traditional Risk Premium (10)=(1)-(7)**	Equity Premium (11)=(4)-(7)**	Property Premium (12)=(5)-(7)**	Credit Spread (13)=(6)-(7)**	Real Return (14)=(7)-(8)**
Europe Central					
Bulgaria	4.1%	4.5%	NA	0.4%	NA
Czech	3.9%	4.2%	2.3%	0.0%	1.5%
Greece *	4.1%	3.6%	NA	0.0%	NA
Hungary	3.9%	4.2%	2.7%	0.2%	4.0%
Poland	3.9%	4.1%	1.5%	0.0%	1.9%
Romania	4.3%	4.5%	NA	0.0%	3.5%
Russia	4.6%	4.5%	NA	0.0%	NA
Slovakia	4.1%	4.4%	0.9%	0.0%	0.4%
Europe Western					
Austria *	3.6%	4.0%	0.8%	NA	NA
Belgium *	3.9%	3.7%	1.8%	0.8%	2.4%
France *	4.2%	3.4%	1.9%	1.6%	2.0%
Germany *	3.6%	3.5%	1.6%	1.8%	1.8%
Ireland *	3.3%	3.1%	1.4%	NA	1.2%
Italy *	3.6%	2.5%	0.4%	NA	1.3%
Luxembourg *	4.1%	3.2%	2.0%	0.6%	2.0%
Netherlands *	4.0%	3.3%	1.9%	2.7%	1.9%
Portugal *	3.6%	4.0%	0.8%	NA	NA
Spain *	4.1%	3.5%	2.0%	0.9%	1.3%
Sweden	NA	3.0%	2.0%	NA	1.4%
Switzerland	3.6%	3.9%	1.4%	0.4%	1.2%
UK	4.0%	3.5%	2.4%	2.2%	0.6%

* = euro zone
** = calculated including only companies with complete data

A few observations can be made when comparing Table 3 to last year's results:

- Credit spreads between non risk-free asset classes and risk-free yields generally increased, reflecting the turmoil in the financial markets.
- Some of the largest spread increases occurred in North America where risk free yields decreased the most.
- Spread decreases were scattered and primarily occurred in Europe and Asia.

Please note that the data is relatively sparse outside of Western Europe and North America, so observations and conclusions could be different if additional data was available.

Stochastic Market Assumptions

A number of European companies are calculating the values of options and guarantees following stochastic approaches in order to comply with European CFO

Forum guidelines[6] for embedded value calculations. Fourteen of the 23 companies surveyed disclosed fairly detailed stochastic market assumptions in their 2008 European embedded value (EEV) reports. Averages of several of these assumptions are shown in Table 4 (Note that some companies refer to volatility as standard deviation).

Note that some companies reported volatility without reporting yields. Some companies determined volatilities from historical market experience while others measured the implied volatility in current derivative prices, which may result in significant differences between companies.

Some observations can be made regarding stochastic and other elements of EV calculations this year:

- More companies are disclosing stochastic assumptions as they deal with calculating the value of options.
- Prior to year end 2008, most companies calculating MCEVs used implied volatilities as of the valuation date. At year end 2008 however, due to the high implied volatilities observed, a wide range of implied volatility assumptions were used including using implied volatilities as of end of June, August or September of 2008 or using average volatilities during 2008.

Summary

The SOA International Experience Study Working Group (IESWG) publishes this survey to enhance the knowledge of actuaries about current international market conditions and practices. Practices continue to evolve and we wish to encourage an open discussion on appropriate methodologies and further disclosure of both assumptions and the thoughts behind their formulation.

The IESWG intends to update this survey annually. We invite additional companies to provide data, on a confidential basis, to be included in this and future surveys. Please contact Ronora Stryker *(rstryker@soa.org)* or Jack Luff *(jluff@soa.org)* at the Society of Actuaries for further information. □

[6] See *http://www.cfoforum.nl/* for more information on the European CFO Embedded Value and Market Consistent Embedded Value Guidelines

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Table 4: Sample Stochastic Assumptions

		Stock		Property		Bonds		
	Companies	Yield	Volatility	Yield	Volatility	Yield	Volatility	Type
Australia	2					4.4%		Swap
Czech	2		24.6%			3.7%	11.6%	Swap/Government
Europe	12	6.7%	27.8%	5.7%	13.9%	3.9%	11.6%	Swap/Government
Hong Kong	1		39.7%		21.9.%			
Japan	4	4.9%	30.4%			1.7%	8.5%	Swap/Government
So. Africa	2		29.2%		15.6%	7.7%	25.9%	Swap
So. Korea	2		36.4%			4.6%	11.8%	Government
Switzerland	5		26.7%		16.4%	2.6%	13.7%	Swap
UK	9	5.8%	30.0%	5.8%	15.6%	3.5%	9.6%	Swap/Government
US	11	7.1%	27.0%		16.9%	3.0%	17.2%	Swap/Government