SOA International Experience Survey – Embedded Value Financial Assumptions

By Charles Carroll[1], William Horbatt and Dominique Lebel[2]

Starting in 2003, the Society of Actuaries International Experience Study Working Group has been conducting surveys of published embedded value (EV) financial assumptions.[3] This article updates the survey with 2011 data.

Companies Included in Survey

Aegon	Ageas
Allianz	AMP
Aviva	AXA
Chesnara	CNP
Dai-Ichi	Delta Lloyd
Achmea	Generali
Hannover Re	Himawari
Ind. Alliance	Irish Life & Perm
Legal & Gen	ManuLife
Mediolanum	Mitsui
Munich Re	Old Mutual
Prudential UK	Royal London
SCOR	SJP
SNS Real	SONY
Standard Life	Swiss Life
T&D	Uniqa
Vienna	Zurich

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 34 companies centered in Asia, Australia, Canada and Europe, many of which are active internationally. This compares with 38 companies that were included in last year's study. Four companies that published results for 2010 did not do so for 2011.

Each financial assumption presented in this article is the average value of the assumption reported by all companies in their 2011 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.

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.

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[1] Charles would like to thank Peter Duran for his assistance in interpreting the EV report for Mitsui Life.
[2] Dominique would like to thank Ricardo Obasare and Yutong Qin for their assistance in gathering the data for this article.
[3] All prior articles can be found on the SOA website.

Financial Assumptions from Survey

Financial assumptions presented in this article include:

1. Discount rate—for companies with traditional embedded value (TEV) calculations, 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 TEV discount rate that when used to discount "real world" cash flows, would produce the MCEV;
3. Equity return[4]—the total return on common stock investments;
4. Property return[4]—the total return on investments in real estate;
5. Fixed return[4]—the yield on a corporate bond portfolio held by an insurance company;
6. Government 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 and, possibly, revalue policy terms that are tied to inflation;
8. Tax rates—income tax rates by jurisdiction;
9. Reference rate— a rate used in MCEV calculations to (a) discount future cash flows and (b) determine the assumed earnings on assets. The reference rate is typically equal to the risk free rate adjusted for a liquidity premium; and
10. Volatility— a measure of the relative magnitude of changes in a financial parameter, such as interest rates or market returns.

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 except for reference rate and stochastic data which are presented later.

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	25
WACC	9

- A methodology is considered market consistent if, conceptually, each cash flow is valued consistently with traded instruments that display similar risks. Thus, under

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

the MCEV approach, each cash flow is theoretically discounted using a risk discount rate (RDR) appropriate for valuing similar cash flows in the market.

- Companies following MCEV typically 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 Table 1 are the RDRs inferred from the MCEV calculation. That is, they are discount rates that would develop the MCEV value using TEV techniques and assumptions. Many companies that publish MCEV results do not publish implied discount rates.

- Companies that explicitly set risk discount rates are referred to as calculating traditional embedded values. A common method used by these companies is to set the risk discount rate equal to the company's own weighted average cost of capital (WACC).

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); this practice would tend to dampen differences between countries.

Table 1: Average 2011 Explicit and Implicit Discount Rates

		Companies	Traditional Discount Rate		Companies	Implied Discount Rate	
						(In Force)	(New Business)
	Country						
			(1)			(2)	(3)
America Latin							
	Brazil	1	11.3%		0	NA	NA
	Mexico	1	11.4%		0	NA	NA
America North							
	Canada	3	7.1%		1	6.7%	5.3%
	US	4	6.9%		1	42.2%	8.1%
Asia / Pacific							
	Australia	1	7.6%		0	NA	NA
	China	2	10.4%		0	NA	NA
	Hong Kong	2	6.5%		2	5.8%	5.5%
	Indonesia	1	11.2%		0	NA	NA
	Japan	2	5.5%		1	6.2%	3.3%
	Malaysia	1	6.5%		0	NA	NA
	New Zealand	1	7.1%		0	NA	NA
	Philippines	1	12.2%		0	NA	NA
	Singapore	1	4.7%		0	NA	NA
	South Korea	1	7.1%		0	NA	NA
	Taiwan	1	5.0%		0	NA	NA
	Thailand	1	10.1%		0	NA	NA
	Vietnam	1	19.6%		0	NA	NA
Asia / Mideast							

	India	1	13.8%		0	NA	NA
	Turkey	1	16.8%		0	NA	NA
Europe Central							
	Croatia	0	NA		1	4.9%	3.5%
	Czech	1	8.9%		2	5.9%	4.8%
	Greece *	1	10.3%		0	NA	NA
	Hungary	1	14.7%		1	4.9%	3.5%
	Poland	1	10.8%		2	5.7%	5.0%
	Romania	2	12.1%		1	4.9%	3.5%
	Slovakia	2	8.4%		1	4.9%	3.5%
Europe Western							
	Austria *	0	NA		1	6.5%	6.2%
	Belgium *	1	7.0%		1	9.9%	6.4%
	France *	2	7.2%		4	7.6%	6.7%
	Germany *	1	7.0%		4	4.7%	4.8%
	Ireland *	2	6.6%		3	4.3%	4.6%
	Italy *	0	NA		3	11.6%	7.2%
	Netherlands *	5	7.0%		0	NA	NA
	Portugal *	0	NA		1	8.1%	8.1%
	Spain *	1	9.1%		3	9.6%	9.6%
	Switzerland	0	NA		1	3.9%	4.0%
	UK	4	6.2%		3	6.3%	7.0%
	* euro currency zone						

A few observations can be made concerning Table 1 when compared to similar data published last year:

- Due to the four companies that are no longer publishing EV results, there are a few countries where there was some data for 2010 but no data for 2011.
- With regard to traditional discount rates, the situation varies by territory with Asia, North America and Western Europe generally reporting lower discount rates than last year and Eastern Europe and the Middle East higher rates.
- With respect to implied discount rates, discount rates applied to the VIF were higher on average, while discount rates applied to new business were slightly lower on average. The data for implied discount rates is particularly sparse, so drawing any conclusions from the averages is not meaningful.
- The implied discount rate for the United States appears to be an outlier, similar to the situation last year. This is either an indication of the riskiness of U.S. products or an indication of the issues involved in applying market consistent methods to U.S. style products with book value guarantees.

The second table presents many of the other 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 investments are accounted for on an amortized cost basis, while current market redemption yields are used when investments are accounted for on a market value basis. 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 2011 Financial Assumptions

		Companies	Equity Return	Property Return	Fixed Return	Government Return	Inflation	Income Tax Rates
	Country							
			(4)	(5)	(6)	(7)	(8)	(9)
Africa								
	South Africa	2	11.6%	9.6%	NA	8.1%	7.7%	32.1%
America Latin								
	Brazil	1	NA	NA	8.0%	NA	4.7%	40.0%
	Mexico	1	NA	NA	NA	4.5%	3.5%	40.0%
America North								
	Canada	6	7.5%	6.9%	3.5%	2.8%	1.4%	26.0%
	US	17	6.2%	4.9%	4.8%	2.4%	2.3%	33.7%
Asia / Pacific								
	Australia	3	8.7%	6.2%	4.5%	3.7%	2.9%	30.0%
	China	3	10.8%	NA	5.1%	3.6%	3.3%	25.0%
	Hong Kong	6	6.7%	5.4%	4.9%	2.4%	2.4%	16.5%
	Indonesia	1	NA	NA	NA	6.1%	5.0%	NA
	Japan	10	4.3%	3.4%	1.7%	1.4%	0.3%	32.0%
	Malaysia	2	9.7%	NA	NA	3.7%	2.5%	25.0%
	New Zealand	1	8.3%	6.3%	4.6%	3.8%	3.0%	28.0%
	Philippines	1	NA	NA	NA	5.4%	4.0%	NA
	Singapore	2	7.7%	NA	NA	1.6%	2.0%	18.0%
	South Korea	3	6.8%	4.6%	NA	3.8%	3.0%	23.1%
	Taiwan	2	NA	NA	NA	1.3%	1.0%	NA
	Thailand	2	NA	NA	NA	3.3%	3.0%	NA
	Vietnam	1	NA	NA	NA	12.9%	6.5%	NA
Asia / Mideast								
	India	1	NA	NA	NA	8.8%	4.0%	NA

	Turkey	1	16.8%	NA	NA	9.9%	5.0%	20.0%
Europe Central								
	Croatia	1	NA	NA	NA	NA	NA	20.0%
	Czech	6	7.0%	5.7%	4.4%	3.9%	2.0%	18.6%
	Greece *	1	9.7%	8.7%	6.7%	NA	3.3%	20.0%
	Hungary	4	14.7%	14.7%	NA	9.8%	3.0%	19.8%
	Poland	5	9.7%	7.0%	NA	5.5%	3.0%	19.0%
	Romania	3	11.3%	9.6%	7.6%	7.1%	3.8%	16.0%
	Slovakia	4	7.9%	6.7%	4.7%	2.7%	2.7%	19.0%
Europe Western								
	Austria *	2	NA	NA	NA	NA	2.0%	25.0%
	Belgium *	3	6.0%	5.2%	4.0%	2.4%	2.1%	34.0%
	France *	11	6.0%	4.6%	3.9%	2.7%	1.9%	34.8%
	Germany *	12	5.7%	4.1%	4.1%	2.0%	1.7%	31.4%
	Ireland *	8	6.0%	5.0%	4.8%	2.6%	2.6%	12.5%
	Italy *	8	5.5%	4.0%	3.0%	5.4%	1.8%	34.3%
	Lichtenstein	1	6.7%	4.7%	NA	NA	1.6%	13.0%
	Luxembourg *	1	6.7%	4.7%	NA	NA	1.6%	22.0%
	Netherlands *	6	6.2%	5.0%	4.5%	2.6%	2.0%	24.3%
	Portugal *	2	4.9%	4.4%	NA	14.2%	NA	29.0%
	Spain *	6	6.2%	5.8%	4.0%	3.3%	1.8%	30.0%
	Sweden	3	5.5%	4.5%	NA	2.5%	2.4%	26.3%
	Switzerland	5	4.8%	2.8%	3.7%	NA	1.5%	21.0%
	UK	17	6.0%	5.0%	3.9%	2.3%	3.1%	23.0%
	* euro currency zone							

A few observations can be made concerning Table 2 when compared to similar data published last year:

- Average 2011 government return assumptions generally decreased again this year as they did from 2009 to 2010. Government returns for Australia, Indonesia, New Zealand and the United Kingdom were at least 1.5 percent lower than last year, the most significant declines noted this year.

- Returns on other asset classes showed similar reductions from 2010 levels except for Central Europe and the Middle East which is consistent with the observation on traditional discount rates.

- Tax rates were slightly lower on average, with declines of 2 percent or more in Greece, New Zealand, South Africa and the United Kingdom.

It should be noted that several companies calculating MCEVs as of year-end 2011 adjusted their risk-free rates by including an illiquidity premium adjustment resulting in a higher risk-free return.

Investment Premiums and Other Marginal Relationships

Investment premiums are the additional yields an investor is expected to receive above the reference rate. If a reference rate is not specified, Table 3 reflects the excess yield over the return on a government bond, if this rate is specified.[5]

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

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

- Risk premium—the excess of the traditional embedded value discount rate over the reference rate or the government return,
- Sovereign spread – the excess of the government return over the reference rate, and
- Real return—the excess of the reference rate or the government return over inflation.

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

Table 3: 2011 Investment Premiums and Other Marginal Relationships

		Ref Rate Basis	Reference Rate (Govt if RR is NA)	Traditional Risk Premium	Equity Premium	Property Premium	Credit Spread	Sovereign Spread	Real Return
	Country								
			(10)	(11)=(1)-RR	(12)=(4)-RR	(13)=(5)-RR	(15)=(6)-RR	(16)=(7)-RR	(17)=RR-(8)
Africa									
	South Africa	Ref	7.6%	NA	4.0%	2.0%	NA	0.5%	-0.1%
America Latin									
	Mexico	Govt	4.5%	6.9%	NA	NA	NA	NA	1.0%
America North									
	Canada	Ref	2.4%	4.7%	5.2%	4.6%	1.1%	0.4%	1.0%
	US	Ref	2.2%	4.7%	4.0%	2.7%	2.6%	0.2%	-0.1%
Asia / Pacific									
	Australia	Ref	4.7%	2.9%	3.9%	1.5%	-0.2%	-1.0%	1.9%

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[5] Note that in last year's article the premiums in Table 3 reflected the yield in excess of the government return.

	China	Govt	3.6%	6.9%	7.3%	NA	1.6%	NA	0.3%
	Hong Kong	Ref	1.9%	4.6%	4.8%	3.5%	3.0%	0.6%	-0.6%
	Indonesia	Govt	6.1%	5.1%	NA	NA	NA	NA	1.1%
	Japan	Ref	0.9%	4.5%	3.4%	2.4%	0.8%	0.5%	0.7%
	Malaysia	Govt	3.7%	2.8%	6.0%	NA	NA	NA	1.2%
	New Zealand	Govt	3.8%	3.3%	4.5%	2.5%	0.8%	NA	0.8%
	Philippines	Govt	5.4%	6.8%	NA	NA	NA	NA	1.4%
	Singapore	Govt	1.6%	3.1%	6.1%	NA	NA	NA	-0.4%
	South Korea	Ref	3.8%	3.3%	3.0%	0.8%	NA	0.0%	0.8%
	Taiwan	Ref	1.3%	3.7%	NA	NA	NA	0.0%	0.3%
	Thailand	Ref	3.8%	6.4%	NA	NA	NA	-0.5%	0.8%
	Vietnam	Govt	12.9%	6.7%	NA	NA	NA	NA	6.4%
Asia / Mideast									
	India	Govt	8.8%	5.0%	NA	NA	NA	NA	4.8%
	Turkey	Govt	9.9%	6.9%	6.9%	NA	NA	NA	4.9%
Europe Central									
	Czech	Ref	2.8%	6.2%	4.2%	3.0%	1.7%	1.2%	0.8%
	Hungary	Ref	7.9%	6.8%	6.8%	6.8%	NA	1.9%	4.9%
	Poland	Ref	5.1%	5.7%	4.5%	1.9%	NA	0.3%	2.2%
	Romania	Ref	5.9%	6.2%	5.4%	3.7%	1.7%	1.2%	2.1%
	Slovakia	Ref	2.3%	6.1%	5.6%	4.4%	2.4%	0.4%	-0.3%
Europe Western									
	Austria *	Ref	2.9%	NA	NA	NA	NA	NA	0.9%
	Belgium *	Ref	2.4%	4.6%	3.6%	2.9%	1.7%	0.0%	0.3%
	France *	Ref	2.5%	4.7%	3.5%	2.2%	1.4%	0.3%	0.6%
	Germany *	Ref	2.6%	4.4%	3.2%	1.6%	1.5%	-0.5%	0.9%
	Ireland *	Ref	2.7%	3.9%	3.3%	2.3%	2.1%	-0.1%	0.1%
	Italy *	Ref	2.4%	NA	3.1%	1.6%	0.6%	2.9%	0.6%
	Lichtenstein	Ref	2.7%	NA	4.0%	2.0%	NA	NA	1.1%
	Luxembourg *	Ref	2.7%	NA	4.0%	2.0%	NA	NA	1.1%
	Netherlands *	Ref	3.2%	3.8%	3.0%	1.8%	1.3%	-0.6%	1.3%
	Portugal *	Ref	2.4%	NA	2.5%	2.0%	NA	11.8%	NA
	Spain *	Ref	2.4%	6.7%	3.8%	3.3%	1.5%	0.9%	0.6%
	Sweden	Ref	2.4%	NA	3.1%	2.1%	NA	0.1%	0.0%
	Switzerland	Ref	1.3%	NA	3.5%	1.5%	2.4%	NA	-0.2%
	UK	Ref	2.3%	3.9%	3.7%	2.7%	1.6%	0.0%	-0.8%
	* = euro zone			** = calculated including only companies with complete data					

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

- While the traditional risk premium increased from last year, the average equity premium declined slightly.
- Property premiums declined on average by the same amount as equity premiums.
- Credit spreads increased on average.
- Real returns were lower on average than last year.
- As one might expect, sovereign spreads were high for Portugal and Italy. Sovereign spreads were not considered in last year's article.

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 companies are calculating the values of options and guarantees following stochastic approaches. Thirty of the 34 companies surveyed disclosed some level of stochastic market assumptions in their 2011 embedded value reports. Averages of several of these assumptions are shown in Table 4 (volatility may also be referred to as standard deviation).

Table 4: 2011 Sample Stochastic Assumptions

| | Country | Count | Reference Rate | | Equity | | Property | | Liquidity |
			Rate	Volatility	Rate	Volatility	Rate	Volatility	Premium
Africa									
	South Africa	2	7.6%	31.9%	11.6%	26.6%	9.6%	NA	0.50%
America North									
	Canada	3	2.4%	NA	6.7%	NA	NA	NA	NA
	US	15	2.2%	25.4%	6.5%	27.2%	7.0%	13.7%	0.79%
Asia / Pacific									
	Australia	2	4.7%	13.9%	NA	NA	NA	NA	NA
	Hong Kong	2	1.9%	29.7%	9.0%	26.6%	NA	29.9%	0.68%
	Japan	8	0.9%	26.2%	3.9%	22.5%	3.4%	24.3%	0.00%
	South Korea	1	3.8%	12.4%	NA	24.7%	NA	13.8%	NA
	Taiwan	1	1.3%	NA	NA	NA	NA	NA	NA
	Thailand	1	3.8%	NA	NA	NA	NA	NA	0.18%
Asia / Mideast									
	Isreal	1	2.2%	NA	NA	NA	NA	NA	NA
Europe Central									
	Croatia	1	9.7%	NA	NA	NA	NA	NA	NA
	Czech	5	2.8%	26.0%	6.4%	26.0%	2.4%	NA	0.38%
	Hungary	3	7.9%	NA	NA	NA	NA	NA	0.38%

	Poland	4	5.1%	19.2%	NA	27.6%	NA	NA	0.38%
	Romania	1	5.9%	NA	NA	NA	NA	NA	NA
	Slovakia	1	2.3%	25.5%	NA	29.2%	NA	NA	1.18%
Europe Western									
	Austria *	2	2.9%	25.4%	NA	26.3%	NA	NA	1.18%
	Belgium *	3	2.4%	25.4%	6.3%	20.8%	5.7%	12.6%	0.42%
	France *	10	2.5%	24.4%	5.7%	25.7%	4.8%	13.6%	0.91%
	Germany *	10	2.6%	26.3%	6.2%	27.1%	4.9%	14.1%	0.68%
	Ireland *	5	2.7%	19.3%	4.6%	27.8%	3.7%	18.0%	NA
	Italy *	8	2.4%	27.4%	4.9%	28.8%	4.4%	14.6%	0.92%
	Lichtenstein	1	2.7%	28.7%	6.7%	27.2%	4.7%	13.0%	NA
	Luxembourg *	1	2.7%	28.7%	6.7%	27.2%	4.7%	13.0%	NA
	Netherlands *	5	3.2%	1.8%	6.9%	19.7%	6.2%	16.1%	NA
	Portugal *	2	2.4%	27.1%	4.4%	21.0%	4.4%	13.8%	0.78%
	Spain *	4	2.4%	27.2%	5.0%	29.2%	4.4%	14.9%	0.65%
	Sweden	3	2.4%	NA	5.5%	NA	4.5%	NA	NA
	Switzerland	5	1.3%	43.6%	5.0%	21.7%	6.9%	10.9%	0.19%
	UK	16	2.3%	10.8%	5.2%	25.0%	4.8%	15.2%	0.94%
	* = euro zone		** = calculated including only companies with complete data						

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.

New Developments in 2011

It has been our practice to comment on new developments each year. Last year the article addressed liquidity premiums assumed by companies in determining the reference rate for MCEV calculations. 2011 practices were largely consistent with 2010 practices. Last year's article also addressed disclosures by companies regarding the emergence of embedded value over time. For 2011, a number of companies made disclosures along the lines of what was discussed in last year's article. There were no other major developments in EV disclosures for 2011.

Summary

The SOA International Experience Study Working Group (IESWG) has published this survey to enhance the knowledge of actuaries about current international market conditions and practices. The authors believe that the information has become less useful over the years due to a number of factors, including the fact that more companies are reporting on a MCEV basis, fewer companies are disclosing EV assumptions and the

assumption data that is disclosed is often not on a comparable basis from company to company.

The authors will be retiring from this project after this year and we would like to thank our readers for their interest over the past decade.

Charles Carroll, FSA, is consultant for New York Life Insurance Company. He can be contacted at ccactuary@gmail.com.

William Horbatt, FSA, is consulting actuary for ACTMASOL He can be contacted at horbatt@actmasol.com.

Dominique Lebel, FSA, is director and leader of Towers Watson's Life Practice in Hartford, CT. He can be contacted at dominique.lebel@towerswatson.com.