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SOA International Experience Survey— Embedded Value Financial Assumptions

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Introduction

In 2004, the Society of Actuaries conducted a survey of the financial assumptions contained in published 2003 embedded value reports.¹ This article presents an update to the survey conducted last year. The Society of Actuaries intends to conduct this survey on an annual basis.

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 19 companies centered in

Australia, Canada and Europe that are active internationally.

Each financial assumption presented in this article is the average value of the assumption reported by all companies in their 2004 embedded value reports. If no companies reported a specific assumption in a given country, then that assumption is labeled “NA,” signifying that data is not available. Some companies vary assumptions by calendar year, while other companies use a single assumption; in the former case, the study was compiled based upon current year data.

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) Equity return – the total return on common stock investments
- 3) Property return – the total return on investments in real estate
- 4) Fixed return – the yield on a corporate bond portfolio held by an insurance company
- 5) Government return – typically the yield on a 10-year bond offered by the local government
- 6) Inflation – the rate used to increase future expenses and, possibly, revalue policy terms
- 7) Tax rates – income tax rates by jurisdiction

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

- Although practices vary, the discount rate is frequently set based on the Capital Asset Pricing Model (CAPM) methodology; in this case, many companies assume that

Companies Included in Survey

Aegon	Allianz
AMP	Aviva
AXA	Fortis
Generali	Hannover Re
ING	Legal & General
Manulife	Munich Re
Old Mutual	Prudential (UK)
Skandia	Sun Life
Swiss Life	Swiss Re
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 may include data from only one company.

1) *International News*, Issue 34, October 2004, Society of Actuaries, page 19, this can be found at <http://library.soa.org/library-pdf/ISN0410.pdf>

their insurance company's volatility matches the 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. Companies may also vary discount rates by product line to reflect the higher Beta associated with riskier business.

- 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 book value, 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.

Finally, it need 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.

2) *ibid*

Countries with Number of Contributing Companies:

Australia (4)	Austria (3)
Belgium (6)	Bulgaria (1)
Canada (5)	Czech Republic (1)
Chile (1)	China (1)
Denmark (1)	Finland (2)
France (10)	Germany (9)
Greece (2)	Hong Kong (3)
Hungary (2)	India (1)
Ireland (4)	Italy (9)
Japan (3)	Luxembourg (5)
Malaysia (1)	Mexico (1)
Netherlands (8)	Norway (1)
New Zealand (1)	Peru (1)
Poland (2)	Portugal (4)
Romania (1)	Russia (1)
South Africa (2)	Slovakia (1)
Spain (10)	South Korea (2)
Switzerland (2)	Sweden (3)
Thailand (1)	Taiwan (2)
United States (13)	United Kingdom (11)

Several observations can be made concerning Table 1 on page 30 when compared to similar data published last year²:

- Return assumptions and discount rates generally declined in North America, South Africa and Western Europe. In North America, the differences in the discount rates and return assumptions between Canada and the United States narrowed. The 10-year government bond yield assumption dropped to an average rate of 3.7 percent in Western Europe from an average of 4.3 percent in 2003.
- Outside of these regions, changes in discount rates and return assumptions were mixed.
- Inflation assumptions generally increased, except in Central Europe, Latin America and South Africa.

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Table 1: Average 2004 Financial Assumptions

Country	Discount Rate	Equity Return	Property Return	Fixed Return	Government Return	Inflation	Tax Rates
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Africa							
South Africa	11.7%	10.3%	9.3%	8.3%	8.1%	5.3%	37.8%
America Latin							
Chile	10.1%	NA	NA	8.4%	6.9%	2.7%	NA
Mexico	15.3%	NA	NA	10.6%	10.4%	4.2%	NA
Peru	NA	NA	NA	NA	3.5%	2.5%	NA
America North							
Canada	7.9%	7.9%	6.5%	6.0%	4.4%	2.5%	34.8%
United States	7.7%	8.0%	7.6%	5.4%	4.4%	2.5%	34.6%
Asia/Pacific							
Australia	8.8%	9.5%	7.4%	5.6%	5.3%	2.5%	30.0%
China	9.2%	10.7%	NA	5.2%	5.2%	3.5%	NA
Hong Kong	8.5%	9.6%	NA	5.8%	4.7%	2.1%	17.5%
India	12.4%	10.0%	NA	6.8%	6.8%	5.0%	NA
Japan	5.7%	5.9%	NA	2.3%	2.1%	0.3%	36.1%
Malaysia	9.5%	7.0%	NA	6.0%	5.6%	2.5%	28.0%
New Zealand	9.0%	9.0%	8.0%	6.5%	6.0%	2.5%	NA
South Korea	8.0%	7.4%	NA	5.0%	4.5%	3.0%	27.5%
Taiwan	7.2%	7.5%	NA	3.8%	3.4%	1.8%	25.0%
Thailand	10.9%	NA	NA	6.0%	5.6%	2.5%	NA
Europe Central							
Bulgaria	11.3%	NA	NA	6.5%	6.5%	4.4%	NA
Czech Republic	8.5%	NA	NA	5.2%	5.2%	3.2%	NA
Greece	7.3%	6.5%	NA	4.4%	4.3%	3.0%	NA
Hungary	10.0%	10.0%	9.0%	6.8%	6.6%	3.7%	16.0%
Poland	10.4%	9.7%	NA	7.3%	6.7%	2.8%	19.0%
Romania	17.2%	14.0%	NA	12.4%	12.4%	9.0%	NA
Russia	12.6%	NA	NA	6.8%	6.8%	9.0%	NA
Slovakia	8.4%	NA	NA	5.1%	5.1%	3.6%	NA
Europe Western							
Austria	6.9%	6.5%	NA	3.9%	3.7%	1.8%	24.3%
Belgium	7.2%	6.9%	5.8%	4.2%	3.9%	1.9%	26.7%
Denmark	6.3%	6.3%	NA	NA	3.7%	3.0%	NA
Finland	6.6%	6.4%	NA	4.0%	3.7%	3.0%	NA
France	6.8%	6.6%	5.4%	3.9%	3.7%	2.1%	34.6%
Germany	6.8%	6.6%	5.0%	3.9%	3.7%	1.9%	38.7%
Ireland	6.7%	6.5%	5.7%	4.0%	3.7%	3.5%	11.3%
Italy	6.7%	6.7%	4.9%	3.9%	3.7%	2.2%	35.1%
Luxembourg	7.3%	6.9%	5.8%	4.1%	4.0%	1.9%	26.7%
Netherlands	7.2%	6.9%	6.0%	4.2%	3.9%	2.0%	30.9%
Norway	6.3%	6.3%	NA	NA	3.7%	3.0%	NA
Portugal	6.7%	6.5%	NA	4.0%	3.7%	2.4%	35.0%
Spain	6.9%	5.7%	5.7%	4.1%	3.8%	2.1%	34.5%
Sweden	6.9%	6.5%	NA	NA	3.8%	2.8%	28.0%
Switzerland	6.3%	5.4%	3.5%	2.5%	2.3%	1.6%	25.0%
United Kingdom	7.5%	7.2%	6.9%	4.9%	4.5%	3.0%	26.5%

The discount rate may be the most subjective financial variable, and yet company discussions on how it is set are generally sparse, at best. Several comments may be made on how this assumption was determined:

- Of the seven companies that thoroughly explained their methodology, five used a weighted average cost of capital (WACC) approach wherein the company determined the cost of capital based upon their mix of debt and equity financing costs. The other two companies used a CAPM methodology.
- For the WACC companies, the cost of equity capital was determined using the CAPM methodology where the company's cost of equity capital is equal to the risk-free rate plus a risk premium.
- The risk premium varied between 3 and 3.5 percent, while the Beta multiplier varied between 0.9 and 1.6.
- One company will change its methodology next year and intends to base their Beta on their insurance profits, resulting in a 35 basis point margin for systematic non-option risk (Beta of 0.1 and a risk premium of 3.5 percent) and a margin for diversifiable risk of 2.5 percent.

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 return on government bonds
- Property premium – the excess yield from investing in real estate over the return on government bonds
- Credit spread – the excess yield from investing in a mix of corporate and government bonds over the return on government bonds

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

- Risk premium – the excess of the embedded value discount rate over the return on government bonds
- Real return – the excess of the government return over inflation

Table 2 presents the marginal relationships derived from Table 1. The column numbering continues the numbering in the prior table.

A few observations can be made when comparing Table 2 to last year's results:

- Risk premiums generally declined, except in Western Europe and Australia, Canada, Mexico, New Zealand and Thailand. In Western Europe risk premiums declined in only four of 16 countries.
- Two-thirds of the time, equity premiums changed in the same direction as risk premiums.
- Property premiums in Western Europe increased in seven countries and decreased in six.
- Outside of Western Europe, credit spreads either decreased or remained constant. In Western Europe, credit spreads most frequently increased.
- Real returns decreased in Western Europe and North America, and generally increased in the rest of the world.

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

Recent Developments

A number of companies have either implemented or are in the process of implementing the European CFO guidelines³ for embedded value calculations. Among the 19 companies surveyed, four companies reported compliance with them, eight additional companies plan to achieve compliance in either 2005 or 2006, and the remaining companies did not

3) See <http://www.cfoforum.nl/> for more information on the European CFO embedded value guidelines

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Table 2: Investment Premiums and Other Marginal Relationships

Country	Risk Premium	Equity Premium	Property Premium	Credit Spread	Real Return
	(8)=(1)-(5)	(9)=(2)-(5)	(10)=(3)-(5)	(11)=(4)-(5)	(12)=(5)-(6)
Africa					
South Africa	3.6%	2.2%	1.2%	0.2%	2.8%
America Latin					
Chile	3.2%			1.5%	4.2%
Mexico	4.9%			0.2%	6.2%
Peru					1.0%
America North					
Canada	3.5%	3.5%	2.1%	1.6%	1.9%
United States	3.4%	3.7%	3.2%	1.0%	1.8%
Asia / Pacific					
Australia	3.5%	4.2%	2.1%	0.3%	2.8%
China	4.0%	5.5%		0.0%	1.7%
Hong Kong	3.8%	4.9%		1.1%	2.6%
India	5.6%	3.2%		0.0%	1.8%
Japan	3.6%	3.8%		0.2%	1.8%
Malaysia	3.9%	1.4%		0.4%	3.1%
New Zealand	3.0%	3.0%	2.0%	0.5%	3.5%
South Korea	3.5%	3.0%		0.6%	1.5%
Taiwan	3.8%	4.1%		0.4%	1.7%
Thailand	5.3%			0.4%	3.1%
Europe Central					
Bulgaria	4.8%				2.1%
Czech Republic	3.3%				2.0%
Greece	3.1%	2.3%		0.2%	1.3%
Hungary	3.4%	3.5%	2.5%	0.3%	2.9%
Poland	3.8%	3.0%		0.6%	3.9%
Romania	4.8%	1.6%			3.4%
Russia	5.8%				-2.2%
Slovakia	3.3%				1.5%
Europe Western					
Austria	3.2%	2.8%		0.2%	1.9%
Belgium	3.3%	3.0%	1.9%	0.3%	2.0%
Denmark	2.5%	2.5%			0.7%
Finland	2.9%	2.7%		0.3%	0.7%
France	3.1%	2.9%	1.7%	0.1%	1.6%
Germany	3.2%	2.9%	1.3%	0.2%	1.8%
Ireland	3.0%	2.8%	2.0%	0.3%	0.2%
Italy	3.0%	3.0%	1.2%	0.2%	1.5%
Luxembourg	3.3%	2.9%	1.9%	0.1%	2.1%
Netherlands	3.3%	3.0%	2.1%	0.3%	1.9%
Norway	3.1%	2.5%			0.7%
Portugal	3.0%	2.8%		0.3%	1.3%
Spain	3.0%	3.1%	1.9%	0.2%	1.7%
Sweden	3.1%	2.6%			1.0%
Switzerland	3.9%	3.1%	1.2%	0.2%	0.7%
United Kingdom	2.9%	2.7%	2.4%	0.4%	1.6%

Table 3: Sample Stochastic Assumptions

	Stock		Property		Bonds		
	Yield	Volatility	Yield	Volatility	Yield	Volatility	Type
Europe	7.50%	20.18%	6.50%	16.20%	4.42%	3.16%	Government
Japan	4.17%	17.43%			1.60%	8.00%	Government
United Kingdom	7.60%	20.00%	6.60%	15.00%	4.60%	2.50%	Government
United States	8.25%	17.00%			5.75%	3.50%	Corporate

Note that Table 3 was created from a small sample.

discuss compliance with European CFO guidelines.

These guidelines require companies to value the cost of options and guarantees contained in their contracts such as guaranteed minimum death benefits and guaranteed minimum interest rates. Six companies reported that they stochastically valued the costs of options and guarantees for their 2004 embedded value. Four companies have begun to report stochastic modeling assumptions.

Averages of several of these assumptions are shown in Table 3 above (volatility may also be referred to as standard deviation).

Summary

The International Experience Study Working Group (IESWG) has published 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. □



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