

SOCIETY OF ACTUARIES INTERNATIONAL EXPERIENCE SURVEY

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Abstract. Historically, actuaries practicing in international markets have been challenged by the lack or consistency of data available in emerging and other markets throughout the world. Without such data, it has been difficult for actuaries to price products or evaluate business performance for senior management. This paper is a report of the Society of Actuaries International Experience Survey working group detailing the SOA's efforts to provide its members practicing internationally as well as other interested individuals with practical information to be used to easily compare experience among different countries and help assess market attractiveness. The paper also discusses a software tool and other resources developed to assist in these international experience study efforts as well as illustrate their applicability to performing an internal company or local intercompany study.

Key-words: International Experience Survey, IES, study, Society of Actuaries, SOA

1 Introduction

Historically, actuaries practicing in international markets have been challenged by the lack of data available in developing markets throughout the world. Without such data, it has been difficult to evaluate and illustrate business performance and market attractiveness to senior management. The International Experience Survey (IES) is a pilot study being conducted by the Society of Actuaries to provide actuaries with practical information on experience in emerging and other markets outside of the United States and Canada. Since companies are looking to expand their operations to international markets, companies will be able to use the results of the survey to compare experience among different countries and help them assess market attractiveness. In addition, companies will be able to identify and address uniqueness and abnormalities as well as utilize the information for pricing and financial reporting purposes.

The IES is being directed by the International Experience Survey working group (IESWG), which is composed predominantly of members of contributing companies and other interested individuals. The IESWG has been established to define the project, variables, and countries to be studied, review the research results and methodology and report its findings to the membership. Data compilation is being performed by SOA staff to maintain confidentiality of individual company submissions.

The current survey includes information on mortality, persistency, agent retention and agent productivity. In addition, the survey is compiling limited expense

information to evaluate whether a more extensive expense study is feasible. The desired end result of the data survey is a study by country of:

1. Individual life insurance mortality for policies in force during the 2000 to 2003 experience period;
2. Individual life insurance persistency experience for policies sold during the 1999 to 2002 experience period;
3. Retention of agents hired from 1995 to 2003 and agent production from 1999 to 2003; and
4. Study of total company expenses as compared to standardized expenses for companies of the same size during the period 2000 through 2003

The IESWG would like to report the information by periodic premium products versus single premium products if available.

To accomplish the study goal the IESWG developed a data template in which companies were asked to provide the data fields requested in an Excel format for each country they sell individual life insurance through an agency source. A copy of the requested data fields is found in Appendix A. Because this is a new research endeavor for the Society of Actuaries, summary information was requested instead of policy seriatim data. The IESWG also indicated seriatim data would likely be difficult for some contributors due to limited resources in the emerging markets studied.

To date the focus of the IES has been Mexico, South America and the Pacific Rim countries. The current survey contains data on the following countries:

- Argentina
- Chile
- Malaysia¹
- Mexico
- South Korea
- Taiwan (Republic of China)

Another goal of the pilot study is to generate interest and participation in SOA international experience studies and expand research in this area. It is believed, the pilot study will be followed by a more comprehensive study that involves additional parameters, countries, and contributing companies (including local companies in various countries).

The IESWG is currently exploring contributions by local companies in Brazil and Poland, as well as other countries. Meetings are being held with representatives of the local actuarial societies and local companies in each country. The objective of this initiative (called Phase III) is to recruit additional companies (including local non-international companies) and to expand the study parameters to meet local objectives.

¹ Study contribution provided by the Malaysian Actuarial Association

2 Phase II Results

Survey results were first published at the 2003 SOA annual meeting, which are referred to as Phase I results, and the survey is continuing to evolve based upon the interests and capabilities of the contributing companies. The current survey, referred to as Phase II, has extended the geographical reach to include three additional countries (Argentina, Chile and Malaysia) as well as adding agent retention and productivity to the survey parameters.

In addition to the formal inter-company survey, a survey of international embedded value financial assumptions was performed during the summer of 2004. Results of this research is included as Appendix C to this report, excepted from the article published in the October 2004 edition of *International News*, the newsletter of the Society of Actuaries International Section.

Six companies contributed to the current Phase II survey and are listed in Appendix B. The IES has compiled summary information from the contributing companies rather than seriatim policy information. As such, the evaluation of the quality of this information has been limited to high-level reviews of reasonability.

All of the current contributing companies are multinational operating in many international markets. Thus, a limitation of the survey is that these companies do not necessarily include a large portion of the markets studied that is likely dominated by local insurers. Efforts are ongoing to recruit additional companies, including non-international companies, to participate in the survey.

While the multinational carriers have provided much data for many different countries, it has been difficult to build a large concentration in any one market. Thus, we are unable to report on all the variables for all six markets under study at this time. Because of this, this report will be updated periodically as sufficient data becomes available.

The majority of the contributors have been unable to provide the requested information by premium product type. Therefore, only total product information is reported. The IESWG analysis of the contributed Phase II survey data follows:

General Information

All experience in financial units is presented in local country currency units unless otherwise stated. The currency units and approximate conversion rates to U.S. dollars are listed in the table below:

Table 1: Currency Information (Approximate Conversion Rate during 2003)

	Argentina²	Chile	Malaysia	Mexico	S. Korea	Taiwan
Currency	AR\$	UDF	NA	MN	Won	\$NT
1 \$US =	2.82 AR\$	0.37 UDF	NA	11 MN	1,200 Won	34 NT

² Data provided separately for AR\$ and US dollar (\$US) denominated business. All financial information converted to \$US in the analysis.

The study includes contributions from 6 companies over a 4-year period. If a “data point” is defined as one company contributing 1 year’s data, then the mortality study is based upon 43 data points for mortality and 42 data points for persistency.

Mortality Experience

Actual mortality has been compared against expected mortality where expected mortality is based upon a recognized local country mortality table and, to facilitate comparisons between countries, the 2001 SOA Basic Mortality Table. The results are expressed as an actual to tabular ratio. The study is based upon experience during calendar years 2000 to 2003.

Table 2A: Actual to Tabular Mortality (A/T) by Sum Insured (Currency Amounts in Millions)

	Argentina	Chile	Malaysia	Mexico	S. Korea	Taiwan
Currency	\$US	UF		\$US	Won	1,000 NT
Actual Deaths	16	NA (a)	NA	NA (a)	95	1,599
Expected Deaths	NA (c)	NA (a)	NA	NA (a)	288	4,855
A/T Ratio	NA (c)	NA (a)	NA	NA (a)	33%	33%
Expected Table	1980 CSO	NA (a)	NA	NA (a)	3rd EMT	1989 TSO
2001 SOA A/T Ratio	NA (c)	NA (a)	NA	NA (a)	NA (b)	83%

NA (a) = excluded due to lack of 3 contributing companies

NA (c) = calculation pending clarification concerning data received

Table 2B: Actual to Tabular Mortality (A/T) By Policies

	Argentina	Chile	Malaysia	Mexico	S. Korea	Taiwan
Actual Deaths	315	NA (a)	5,806	NA (a)	NA (b)	NA (b)
Expected Deaths	NA (c)	NA (a)	6,566	NA (a)	NA (b)	NA (b)
A/T Ratio	NA (c)	NA (a)	88%	NA (a)	NA (b)	33%
Expected Table	1980 CSO	NA (a)	Malaysian 1983-88 Male Ordinary	NA (a)	NA (b)	1989 TSO
2001 SOA A/T Ratio	NA (c)	NA (a)	125%	NA (a)	NA (b)	85%

NA (a) = excluded due to lack of 3 contributing companies

NA (b) = excluded due to limited data

NA (c) = calculation pending clarification concerning data received

Note that companies may have contributed to only one of the two tables above, so comparisons between results should be viewed with caution. Additional observations from the study follow:

- Mortality was substantially the same by amount and by policy in Taiwan, while mortality was lower by amount than by policy in South Korea.
- An analysis of the variation in experience between companies and between years was performed. This study indicates the following standard deviations in experience of the sample consisting of one entry for each year of each company's experience:

Table 2C: Mortality Sample Standard Deviation by Amount Insured

Argentina	Chile	Malaysia	Mexico	S. Korea	Taiwan
NA (c)	NA (a)	NA	NA (a)	28%	5%

NA (a) = excluded due to lack of 3 contributing companies

NA (c) = calculation pending clarification concerning data received

The standard deviation reflects variations between years and variations between companies. In general, the variation between companies is about one third smaller than the total variation.

- The estimated exposure to risk over the entire 4 year study period based upon contracts insured is as follows:

Table 2D: Estimated Exposure to Risk

	Units	Argentina	Chile	Malaysia	Mexico	S. Korea	Taiwan
Contracts	1,000's	NA (c)	NA (a)	NA	NA (a)	NA (a)	1,246,364
Currency		\$US	NA (a)	NA	NA (a)	Won	1000\$NT
Insurance	Millions	NA (c)	NA (a)	NA	NA (a)	192,833	2,190

NA (a) = excluded due to lack of 3 contributing companies

NA (c) = calculation pending clarification concerning data received

Persistency Experience

Persistency experience focuses on policies that remain in force for either one or two full years as defined by payment of the first premium due during the second or third policy year, respectively (for single premium products the policy must only remain in force). This is referred to as 13 or 25 month persistency. The study is based upon experience from policies sold during calendar years 1999 to 2002.

Table 3A: 13 and 25 Month Persistency: by Policy, Premium and Insurance

	Persistency Period	Argentina	Chile	Malaysia	Mexico	S.Korea	Taiwan
Policy	13 Month	77%	NA (a)	NA	NA (a)	84%	94%
	25 Month	62%	NA (a)	NA	NA (a)	81%	86%
Premium	13 Month	NA	NA (a)	NA	NA (a)	93%	93%
	25 Month	NA	NA (a)	NA	NA (a)	88%	86%
Insurance	13 Month	NA	NA (a)	NA	NA (a)	90%	92%
	25 Month	NA	NA (a)	NA	NA (a)	85%	85%

NA (a) = excluded due to lack of 3 contributing companies

Note that companies may have contributed to only one of the three types of persistency (policy, premium, insurance) above, so comparisons between results should be viewed with caution. Additional observations from the study follow:

- Argentina information is based solely upon policies, since policy restructurings after the currency crisis made premium and insurance data incomparable between years.
- An analysis of the variation in experience between companies and between years was performed. This study indicates the following standard deviations in experience between companies:

Table 3B: Persistency Standard Deviation, Persistency by Policy

	Argentina	Chile	Malaysia	Mexico	S. Korea	Taiwan
13 month	12%	NA (a)	NA	NA (a)	17%	5%
25 month	16%	NA (a)	NA	NA (a)	19%	4%

NA (a) = excluded due to lack of 3 contributing companies

The standard deviation for the second policy year is generally less than the deviation for the full two years, as can be seen by comparing this table with the table below:

Table 3C: 2nd Year Lapse Rate Standard Deviation, Lapse Rate by Policy

	Argentina	Chile	Malaysia	Mexico	S. Korea	Taiwan
Lapse Rate	21%	NA (a)	NA	NA (a)	13%	8%
S.D.	8%	NA (a)	NA	NA (a)	7%	2%

NA (a) = excluded due to lack of 3 contributing companies

- The persistency standard deviation was highest by policy and lowest by premium in South Korea. In Taiwan the persistency standard deviation by policy, premium and amount was in a narrow band from 4% to 7%.

Agent Retention

Agent retention was studied by comparing the number of agents hired during a calendar year against the number remaining at calendar year end and subsequent calendar year ends. An average annual attrition rate was also calculated for agents with at least five years experience, where attrition is defined as the percentage of agents at leaving during the year.

Table 4: Agent Retention Rate by Time Elapsed from Hire

Average Time Elapsed (years)	Argentina	Chile	Malaysia	Mexico	S. Korea	Taiwan
0.5	76%	NA (a)	NA	NA (a)	NA (a)	NA (a)
1.5	46%	NA (a)	NA	NA (a)	NA (a)	NA (a)
2.5	33%	NA (a)	NA	NA (a)	NA (a)	NA (a)

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Average Time Elapsed (years)	Argentina	Chile	Malaysia	Mexico	S. Korea	Taiwan
3.5	26%	NA (a)	NA	NA (a)	NA (a)	NA (a)
4.5	29%	NA (a)	NA	NA (a)	NA (a)	NA (a)
5.5	26%	NA (a)	NA	NA (a)	NA (a)	NA (a)
Over 5 year attrition rate	20%	NA (a)	NA	NA (a)	NA (a)	NA (a)

NA (a) = excluded due to lack of 3 contributing companies

Additional observations can be made:

- Argentinean experience was influenced strongly by the currency crisis that occurred during the early 2000's and the changes in company practices in response to the crisis.

Agent Productivity

Agent productivity was studied based upon the average sales per annum per agent. Sales are expressed in terms of number of policies, premium and insurance.

Table 5: Average Annual Agent Productivity

Average Productivity	Argentina	Chile	Malaysia	Mexico	S. Korea	Taiwan
Currency	\$US		NA			
Policies	26	NA (a)	NA	NA (a)	NA (a)	NA (a)
Premium	21,200	NA (a)	NA	NA (a)	NA (a)	NA (a)
Insurance (1,000's)	2,359	NA (a)	NA	NA (a)	NA (a)	NA (a)

NA (a) = excluded due to lack of 3 contributing companies

3 Phase III Preparations

To facilitate data gathering and quality control of data submitted especially involving submissions from local companies operating in countries being studied, the SOA is developing software ("tool") that can be used in any country's operation to prepare both mortality and persistency studies. Using this tool, the local actuarial staff would gather historical files from their IT systems and use them to create an actuarial study file. The tool will assist the actuaries in evaluating the quality of their data as well as identifying possible problems.

Once a reasonable quality data file is developed, the "tool" will read the policy records, calculate exposures and claims, and then output summary information, which can be used to populate the IES data template. Besides helping improve the quality of the data submitted for the IES and the compilation process for SOA staff, this tool can be used by local actuaries to perform their own company experience studies.

This tool is currently being beta tested by the Phase II companies with the goal of presenting updated mortality and persistency data results for the 6 Phase II countries at the EAAC and SOA Annual Meeting. Appendix D contains the current software programming specifications.

4 Summary

The SOA International Experience Survey / Study continues to develop interest within the actuarial community practicing in emerging markets. Directed by a working group of international actuaries, it has begun gathering the types of data that both actuaries and managers need to professionally meet their business requirements. Information compiled to date has been helpful for pricing, financial reporting, risk management and competitive benchmarking.

What began as a survey of multi-national company experience in emerging markets is now transforming itself into a true international experience study. Groups of local actuaries in Brazil and Poland are beginning studies of mortality and persistency experience in their countries. Meanwhile, the core group of companies whose interest launched the survey are funding the development of actuarial software that any participating company can use that will both guarantee consistent results and reduce local actuarial workloads. The SOA staff continues to support the efforts of international actuaries by acting as a clearing house to maintain confidentiality of data and by providing technical advice to local actuaries performing experience studies.

The SOA invites additional companies, local actuarial and industry associations and any other interested party to become involved with the SOA International Experience Survey / Study.

Acknowledgment

The SOA would like to thank both the members of the International Experience Study Working Group for all their personal contributions to the study as well as the corporate support that we have received from companies contributing data, funds and the valuable time of their actuarial staff. Without their support the International Experience Survey would never have been possible.

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A Data Fields Requested

Definitions

A. General

Input Fields: All fields in the Excel worksheet that require a company to provide data have a Yellow background. Companies may find that some of the Grey background cells will be useful for checking the reasonability of the data input.

Currency: Please report requested data items in local currency. Please indicate the currency used in your data submission. If policy information is reported in multiple currencies, please use a separate data specification worksheet for each currency.

Currency Name (cell B9): Please provide the currency name

Monetary Units (Cell B13) If a company is unable to provide financial data in single units and a multiple of the local currency unit is used to report the data (for example, 1,000's or millions) please clearly specify the units used.

Conversion Rate (row 10): Please provide the average conversion rate to a US dollar for each year in the period the data was compiled. Conversion rates used for financial reporting purposes and other approximations are acceptable.

Additional Subdivisions: Companies are welcome to provide additional data specification worksheets based upon criteria that they wish to have the study incorporate.

Prepared BY (row 11): Please specify the name of the person that should be contacted to answer questions about the data submitted along with their email address and phone number.

Prepared On (row 12): Please provide the date the company prepared the worksheet

Exceptions: Please describe any exceptions taken from these instructions to compile the data.

B. Actual to Tabular Mortality (rows 16 to 47)

Policies & Insurance: Mortality is studied separately by policies (or contracts) and by insurance (sum assured).

Periodic / Single Premium: Please report actual single premium received and annualized recurrent premium. Please fill in Total rows only if the subdivision is not available.

Policies / Insurance: Only exposure for life risk should be used; do not include additional face amounts for accidental benefits or other non-life risks assumed. Policy counts should similarly exclude riders.

Expected Deaths: To determine “Expected Deaths”, multiply the ultimate mortality rate, “ q_x ”, from the Expected Death Mortality Table by the average exposure. Please do not use select and ultimate mortality.

Actual Deaths: Please include only claims related to death. Accident & sickness claims and additional accidental death benefits should be excluded from the data submitted.

C. Persistency (rows 48 to 75)

Policies / Premium / Insurance: Persistency is studied separately by policies (or contracts) insured, premium and insurance (sum assured). For premium figures, use the original single premium for flexible premium product and use the annualize premium for periodic premium products.

The comments above concerning periodic/single premium subdivisions and exclusion of additional benefits apply to the persistency data as well as mortality data.

D. Agent Retention / Production (rows 76 to 108)

Agent Type (row 78 and 98): Please specify the sales distribution system used in the agent retention study and any differences that exist between the retention and productivity data. Examples of distribution systems include career agents, part-time salesmen, brokers, direct marketing, group insurance, association, etc.

Agent Retention (rows 76 to 95): Please provide the number of agents hired during each of the calendar years 1995 to 2003 as well as the number of agents remaining at December 31 of each year from 1999 to 2003.

Agent Productivity (rows 96 to 108): Please provide the data requested. The average number of agents should be specified for each year as well as the total production. Production figures include the number of policies sold, the amount of premium received (single premium) or to be received during the 1st policy year (annualized periodic premium). Insurance should be the sum assured on the issue date.

The comments above concerning periodic/single premium subdivisions and exclusion of additional benefits apply to the productivity data as well as mortality and persistency data.

E. Expenses (rows 109 to 124)

This data is being obtained solely to conduct a preliminary study of total company expense levels. The intention is to compare total company expenses to the expense level based upon standard expense factors applied to measures of the company’s size and sales. The IESWG will evaluate the results prior to publication and may need to revise the data request finalizing this portion of the study.

Please note that expenses are studied on a total company basis, so figures reported in this section of the study may not equal figures reported earlier.

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Basis (row 109): Since expense accruals are measured under many different bases, please specify the basis used to measure expenses. Statutory expenses may be the preferred methodology since it improves comparability among companies.

Year End Data (columns C and D): Please provide the total number of policies and the insurance in force (sum assured) at each year-end from 1999 to 2003.

Policy Sales (columns E, F, and H): Please provide the number of policies sold (both single and periodic premium combined) as well as the premium received (separately for single and periodic premium). Please provide premiums on a cash received basis and do not annualize premiums.

Total Premium (column I): Please provide the total premium received on a cash basis during the year, regardless of its origin.

Expenses (columns J, K and L): Acquisition costs on a cash basis should be separated into those related to single premium contracts (column J) and periodic premium contracts (column K). Total expenses (column L) include all expenses, regardless of source.

Note – Standard Expenses: Standard expenses are contained in the range from O120 to T121 and are based upon the SOA's 2001 Expense study for permanent insurance. These factors are converted to a local country basis in proportion to the average policy size (see cells O122 to T124).

F. Mortality and Exposure (rows 125 to 253)

Expected Death Mortality Table: For each experience year reported, please provide the mortality table assumed in determining the reported expected death data. Please use a country specific experience table if available. If a country specific experience table is not available, please use a country specific valuation table. Please use ultimate mortality (not select and ultimate). If only one table is reported, the SOA will assume that it was used for all experience years reported.

Distribution of Exposure by Sex and Age: The distribution of insurance in force would ideally be based upon the entire 2000-2003 mortality study period, but a company may provide an alternate distribution (such as the distribution at December 31, 2003) if the ideal data is not readily available. If tabular mortality is measured on a unisex basis, then exposure may be reported on a unisex basis.

B Contributing Companies – Phase II

- American Life Insurance Company
- ING
- MetLife
- New York Life
- Prudential Financial
- Zurich Financial Services

C Embedded Value Financial Assumptions

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Introduction

The Society of Actuaries began its International Experience Survey (IES) in 2003 and presented a pilot study of mortality and persistency experience in three developing markets at the SOA 2003 Annual Meeting in Orlando. The IES was expanded to include a survey of financial assumptions contained in 2003 embedded value reports, the results of which are presented in this article.

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

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 eighteen companies centered in Australia, Canada and Europe that are active internationally.

Each financial assumption presented in this article is the average value of all companies reporting the assumption in their 2003 embedded value report. 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 ultimate data.

Suggestions about additional sources of information and additional companies publishing embedded values are welcome.

Financial Assumptions from 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 ultimate yield on a corporate bond portfolio held by an insurance company
- (5) Government return – typically the

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.

yield on a 10 year bond offered by the local government

- (6) Inflation – 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 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 that these yields may be reported net of investment expenses. Alternatively, equity returns may represent the 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.

Countries with Number of Contributing Companies:	
Argentina (1)	Australia (4)
Austria (3)	Belgium (6)
Bulgaria (1)	Canada (5)
Czech (1)	Chile (1)
China (1)	France (8)
Germany (7)	Greece (1)
Hong Kong (3)	Hungary (2)
India (1)	Ireland (3)
Italy (6)	Japan (3)
Luxembourg (4)	Malaysia (1)
Mexico (1)	Netherlands (7)
New Zealand (1)	Poland (2)
Portugal (2)	Romania (1)
Slovakia (1)	South Africa (2)
South Korea (2)	Spain (6)
Sweden (3)	Switzerland (2)
Taiwan (2)	Thailand (1)
UK (10)	US (10)

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.

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Table 1: Average 2003 Financial Assumptions

<u>Country</u>	Discount Rate	Equity Return	Property Return	Fixed Return	Gov't Return	Inflation	Tax Rates
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Africa							
South Africa	12.7%	11.4%	12.0%	9.4%	9.1%	6.4%	37.8%
America - Latin							
Argentina	16.5%	NA	NA	NA	8.7%	7.0%	NA
Chile	12.6%	NA	NA	NA	8.5%	3.0%	NA
Mexico	13.1%	NA	NA	NA	8.6%	4.0%	NA
America - North							
US	7.8%	8.2%	NA	5.7%	4.5%	2.3%	32.8%
Canada	8.4%	8.3%	NA	6.2%	5.0%	2.0%	32.8%
Asia							
Australia	9.0%	8.9%	7.7%	6.2%	5.6%	2.4%	NA
China	8.6%	12.0%	NA	NA	4.5%	2.5%	NA
Hong Kong	8.9%	9.9%	NA	NA	5.0%	1.3%	NA
India	13.1%	NA	NA	NA	7.0%	4.5%	NA
Japan	5.7%	6.8%	NA	NA	2.0%	NA	36.0%
Malaysia	10.6%	9.0%	NA	NA	6.5%	3.0%	NA
New Zealand	NA	6.3%	8.0%	6.5%	6.0%	2.5%	NA
South Korea	9.7%	9.0%	NA	NA	5.8%	3.0%	NA
Taiwan	8.1%	8.0%	NA	4.4%	4.3%	1.8%	NA
Thailand	10.6%	NA	NA	NA	5.5%	NA	NA
Europe - Central							
Bulgaria	11.1%	NA	NA	NA	5.7%	3.1%	NA
Czech	7.9%	NA	NA	NA	4.8%	3.0%	NA
Hungary	8.7%	9.0%	9.0%	6.6%	5.6%	3.4%	NA
Greece	7.6%	NA	NA	NA	4.5%	2.3%	NA
Poland	10.9%	6.5%	NA	NA	5.6%	3.5%	19.0%
Romania	12.8%	6.5%	NA	NA	7.0%	4.9%	NA
Slovakia	8.2%	NA	NA	NA	5.1%	3.7%	NA
Europe - Western							
Austria	7.5%	7.1%	NA	4.5%	4.3%	1.9%	33.0%
Belgium	7.5%	7.1%	5.8%	4.8%	4.3%	1.9%	NA
France	7.7%	7.0%	5.5%	4.7%	4.3%	2.2%	34.5%
Germany	7.5%	7.2%	5.1%	4.7%	4.3%	1.8%	39.9%
Ireland	8.0%	7.3%	6.0%	4.5%	4.4%	4.0%	38.3%
Italy	7.6%	7.5%	5.9%	4.5%	4.4%	2.7%	35.9%
Luxembourg	7.7%	7.0%	5.1%	4.8%	4.2%	1.6%	NA
Netherlands	7.6%	7.3%	5.9%	4.9%	4.3%	2.1%	25.0%
Portugal	7.6%	7.0%	NA	4.5%	4.3%	NA	NA
Spain	7.6%	7.4%	6.3%	4.7%	4.4%	2.2%	35.0%
Sweden	7.5%	7.1%	NA	4.5%	4.5%	3.1%	NA
Switzerland	7.3%	6.0%	4.5%	4.2%	3.5%	NA	NA
UK	7.7%	7.2%	7.0%	5.4%	4.7%	3.1%	30.0%
Europe - Eastern / Asia - Northern							
Russia	NA	NA	NA	NA	8.5%	NA	NA

Several observations can be made concerning Table 1:

- The discount rate varies within a narrow band in economically developed markets like the United States and Western Europe. The highest discount rates are found in emerging (or unstable) markets in South Africa, Latin America, India and parts of Central Europe.
- Companies may base their discount rate assumption on their equity return assumption (or vice versa) and this may be evident when comparing discount rates and equity returns in the table above. In Western Europe and North America, where the survey has the greatest amount of data, the discount rate is slightly higher than the assumed equity return.
- The practice of investing general account assets property markets is more common outside of the United States and Canada where there may be little or no legal restrictions on investment classes. This is particularly true in Europe and in South Africa, Australia and New Zealand.
- Equity and property returns generally exceed the fixed income returns, as would be expected. An interesting observation is that property returns sometimes exceed equity returns in the Southern hemisphere, while the equity returns exceed property returns in Europe.
- Fixed returns reflect the distribution of fixed income securities in an insurer's portfolio and will tend towards the government return rate as the proportion of securities invested in government bonds increases. Countries with a higher proportion of government bonds will have fixed returns closer to the government returns.
- Government bond returns vary slightly within the European Currency Union (euro zone), possibly indicating that investors see residual country risk even after the adoption of the currency union.

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 both 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.

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Table 2: Investment Premiums and Other Marginal Relationships

	Risk Premium	Equity Premium	Property Premium	Credit Spread	Real Return
<u>Country</u>	(8)=(1)-(5)	(9)=(2)-(5)	(10)=(3)-(5)	(11)=(4)-(5)	(12)=(5)-(6)
Africa					
South Africa	3.6%	2.3%	2.9%	0.3%	2.7%
America - Latin					
Argentina	7.8%				1.7%
Chile	4.1%				5.5%
Mexico	4.5%				4.6%
America - North					
US	3.3%	3.6%		1.2%	2.3%
Canada	3.3%	3.2%		1.2%	3.0%
Asia					
Australia	3.4%	3.3%	2.1%	0.6%	3.3%
China	4.1%	7.5%			2.0%
Hong Kong	3.9%	4.9%			3.8%
India	6.1%				2.5%
Japan	3.7%	4.7%			
Malaysia	4.1%	2.5%			3.5%
New Zealand		0.3%	2.0%	0.5%	3.5%
South Korea	3.9%	3.3%			2.8%
Taiwan	3.8%	3.8%		0.1%	2.5%
Thailand	5.1%				
Europe - Central					
Bulgaria	5.4%				2.6%
Czech	3.1%				1.8%
Hungary	3.1%	3.4%	3.4%	1.0%	2.2%
Greece	3.1%				2.2%
Poland	5.3%	0.9%			2.1%
Romania	5.8%	-0.5%			2.1%
Slovakia	3.1%				1.4%
Europe - Western					
Austria	3.1%	2.7%		0.2%	2.4%
Belgium	3.1%	2.8%	1.4%	0.5%	2.5%
France	3.3%	2.7%	1.1%	0.3%	2.2%
Germany	3.2%	2.9%	0.8%	0.4%	2.5%
Ireland	3.6%	2.9%	1.6%	0.1%	0.4%
Italy	3.2%	3.1%	1.5%	0.1%	1.7%
Luxembourg	3.4%	2.8%	0.9%	0.6%	2.6%
Netherlands	3.3%	2.9%	1.6%	0.5%	2.2%
Portugal	3.3%	2.7%		0.2%	
Spain	3.2%	3.0%	1.9%	0.3%	2.2%
Sweden	3.1%	2.7%		0.0%	1.4%
Switzerland	3.7%	2.5%	1.0%	0.6%	
UK	2.9%	2.5%	2.3%	0.7%	1.6%

A few observations can be made concerning Table 2:

- Risk premiums range from 2.9% in the UK to 7.8% in Argentina with most developed country risk premiums in the 3% to 3.5% range. Argentina appears to be an example where companies increase risk premiums to reflect foreign exchange and political risk.
- Equity premiums have greater variance than risk premiums, ranging from -0.5% in Romania to 7.5% in China; which represents a spread of 8% versus 4.9% for risk premiums.
- Property premiums are generally less than equity premiums, but are greater than credit spreads.
- Credit spreads reflect the proportion of government bonds included in the fixed income portfolio. For example, US investments are predominantly corporate bonds and asset backed securities yielding a 120 basis point (bp) credit spread, while European investments have historically been heavily weighted towards government bonds, which results in a credit spread approximately equal to 50 bp.
- Real returns over inflation on “risk free” government bonds are generally in the 2% to 3% range with significantly higher returns in Chile, Mexico and, to a lesser extent several Asian or Oceanic countries.

Please note that the data is relatively sparse outside the more developed countries in Europe and North America so that the observations and conclusions may change when additional data becomes available.

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.

The IESWG would like to thank Dominique Lebel of Tillinghast-Towers Perrin for his contribution to this study and article.

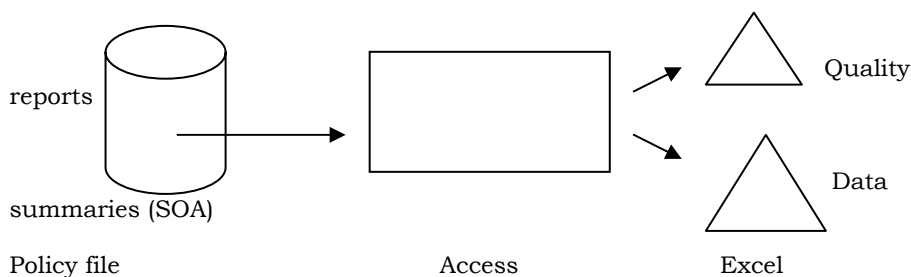
D SOA International Experience Study Software Specifications

I. Overview

The Society of Actuaries (SOA) will construct software to be used by companies in countries that will be contributing data to the SOA International Experience Study (IES) of insured policy mortality and persistency. The software will perform the following functions:

- Input historical information at the policy (contract) level
- Perform edits and other checks to ensure data accuracy
- Output summary information in Excel files

The software will be programmed into a widely available data base program, Microsoft Access, and be provided to each company participating in the SOA IES. It is anticipated that the program will be organized as illustrated below:



A separate document titled “SOA International Experience Study - Country Initiative - Mortality / Persistency Study Specifications” provides additional information concerning the study. This document was prepared to inform participating company actuaries about how a local study can be conducted.

II. Input Data

The SOA will determine the period of time that the study involves and the subdivision of policy types that will be studied. Each company will provide the following input:

- (1) Individual policy file containing the information shown in Attachment A for all policies in force at any time during the study period
- (2) A mapping of policy form codes to SOA study parameters (see Attachment B)
- (3) A list of valid parameters for each policy form described in Attachment C
- (4) Certain financial statement information that will be used to validate the individual policy file, as described in Attachments D and E

It is expected that all of this information will be available electronically (including Excel spreadsheets) or readily convertible into an electronic format by the participating company.

III. Quality Control

The program will need to perform checks and other steps to ensure that the quality of the data provided by a company is sufficient for the purposes at hand. These tests include:

- (1) Tests of the validity or reasonability of data contained in each individual policy file when compared to the parameters described in II. (3) above. An exception report should be prepared by the program for all policies that fail to pass the reasonability tests.
- (2) Totals will be summarized from the policy records and compared to the independent information in II. (4) above which will be input into an Excel spreadsheet. Excel reports and graphs should be prepared that illustrates comparisons.

See Attachments C, D and E for additional information on quality control testing.

IV. Exposure Formulas

The document "SOA International Experience Study - Country Initiative - Mortality / Persistency Study Specifications" provides exposure formulas. The discussion below was summarized from that document.

The SOA international experience survey measures life insurance exposure in terms of policy duration for each issue age. Exposure formulas are defined in terms of the following contract or study variables:

Study Parameters

- S = start date of the study period
- E = end date of the study period

Contract Variables

- x = age at policy issue
- ID = issue date
- TD = termination date
- = E if not terminated

These variables are used to determine each policy's duration at the start and end of the study period. Policy durations are measured in years (or fractions thereof) between two dates:

$$\begin{aligned} \text{DS} &= \text{policy duration at start of study period} \\ &= \text{maximum (ID, S)} - \text{ID} \end{aligned}$$

$$\begin{aligned} \text{DE} &= \text{policy duration at end of study period} \\ &= \text{minimum (E, TD)} - \text{ID} \end{aligned}$$

Note 1: In case of a claim, the policy contributes a full year of exposure in the year of claim, so DE is then rounded up to the next higher integer.

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Exposure is defined as follows:

Let $E(t)$ = exposure contributed to policy year “t” where $t = 1, 2, \dots$ then:

$$\begin{aligned} E(t) &= 0 && \text{if } t \leq DS \text{ or if } t \geq DE + 1 \\ E(t) &= \min(DE, t) - \max(DS, t-1) && \text{otherwise} \end{aligned}$$

We will use the expanded notation $E(x, t)$ to denote the exposure during policy year “t” for insureds aged “x” at policy issue.

Note 2: Policy years are integers, starting with 1 while durations (DS, DE) are fractions starting at 0 (the time when the policy is issued).

Note 3: Separate exposure tables need be created for exposure to the risk of death and lapse.

Note 4: Durations may not be relevant for certain studies, such as studies of group life insurance and immediate annuity mortality where no selection is expected. In this case exposure and deaths are associated with attained ages instead of issue age and duration.

Let $E'(y)$ = exposure to the risk of death at attained age “y” and let “x” continue to represent the age at policy issue, then

If we define $t = (y - x) + 1$, then $E'(y) = E(t)$ in the prior formula

Alternatively, exposure may be calculated by issue age and duration and later summarized in Excel by attained age (this may be the preferred approach since it simplifies Access).

Similarly, persistency studies would not normally be performed for group insurance or immediate annuities.

In cases such as these mentioned the Access program should be able to (a) output mortality data (both exposure and claims) solely by attained age and (b) not perform persistency studies.

Exposure by Amounts

The general formulas above produce exposure by contracts insured. Studies may also reflect the size of the policy, measured either in terms of insurance in force (sum assured), premium or benefits (immediate annuities only). Let:

SA = sum assured (face amount of policy)
P = annualized premium
B = annualized annuity benefit (immediate annuities)

then:

$E^{SA}(t)$ = exposure measured in terms of sum assured = SA * E(t)
 $E^P(t)$ = exposure measured in terms of premium = P * E(t)
 $E^B(t)$ = exposure measured in benefits, B = B * E(t)

Note 5: Premiums and immediate annuity benefits are annualized based upon payment mode:

Annual amount = 2 * semi-annual amount
 = 4 * quarterly amount
 = 12 * monthly amount
 = 24 * biweekly amount
 = 52 * weekly amount

V. Claims

The document “SOA International Experience Study - Country Initiative - Mortality / Persistency Study Specifications” provides information on claims.

For each contract included in the study, the company is responsible for determining the following:

- (1) whether a contract has terminated,
- (2) the reason for termination (e.g. death, lapse, surrender)
- (3) the date of termination (if terminated).

The duration at termination is calculated as time elapsed between the issue date and the termination date:

$$t = TD - ID$$

and is measured in complete years (roundup fractions up to the next higher integer).

VI. Output Specifications

The access program should output an Excel workbook that contains separate pages for exposure and claim matrices. A sample Excel workbook is provided.

The discussion on this topic from the document “SOA International Experience Study - Country Initiative - Mortality / Persistency Study Specifications” is summarized below.

Output from Exposure Calculation

After processing a policy master file and calculating exposures to risk for each contract, the data should be summarized in an “120 x 50” matrix, where the 120 rows represent issue ages (0, 1, 2, ..., 120) and the 50 columns represent policy durations (1, 2, 3, ..., 50) such as the example below:

Duration =	1	2	3	...	50
Age					
0	E(0,1)	E(0,2)	E(1,3)	...	E(1,50)
1	E(1,1)	E(1,2)	E(1,3)	...	E(1,50)
2	E(2,1)	E(2,2)	E(2,3)	...	E(2,50)
...
120	E(120,1)	E(120,2)	E(120,3)	...	E(120,50)

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Separate exposure matrices should be created for deaths and lapses as mentioned in Note 2 above.

Output of Death and Lapse Data

Similar tables for deaths and lapses need also be created.

- Deaths for issue age “x” during policy year “t” may be denoted as $D(x,t)$
- Lapses for issue age “x” during policy year “t” may be denoted as $L(x,t)$

The death matrix would follow the same format as the exposure matrix.

Duration =	1	2	3	...	50
Age					
0	$D(0,1)$	$D(0,2)$	$D(0,3)$...	$D(0,50)$
1	$D(1,1)$	$D(1,2)$	$D(1,3)$...	$D(1,50)$
2	$D(2,1)$	$D(2,2)$	$D(2,3)$...	$D(2,50)$
...
120	$D(120,1)$	$D(120,2)$	$D(120,3)$...	$D(120,50)$

The lapse matrix would be the same with $D(x,t)$ replaced by $L(x,t)$.

Appendix D

Attachment A Individual Policy/Contract Information

The following information should be provided for each policy (contract) included in the study.

Required Data (Sufficient for Study by Contract)

1. Policy Identification Number
 - may be encoded if desired to enhance confidentiality
2. Policy Type
 - The company may use their own coding of policy forms and then provide a mapping of these forms to the subdivisions to be used in the study (see Attachment B), or
 - the company may provide a code for the study subdivisions
3. Insured's Sex
 - Male, female, unisex or unknown (M, F, U, O)
4. Date of Birth
 - Year / month / day
 - Alternatively, if age at issue may be provided, assume 1 July birth date to calculate date of birth
 - Leave blank if unknown
5. Policy Issue Date
 - year/month/day
6. Policy Status
 - in force (IF)
 - lapsed (L)
 - surrendered (S)
 - matured (M)
 - reduced paid up (RPU)
 - extended term (ET)
 - death (D)
 - paid up (PU)
 - additional options may be developed
7. Policy Status Date
 - Year / Month / Day
 - Not required if policy is in force at end of study period

Additional Data – Study by Sum Assured

8. Policy Face Value (sum assured)
 - Options: use either (a) amount at issue or (b) current sum assured
 - Optional: If the sum assured is re-valuable by crediting bonuses, store a value for each policy year included in the study

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9. Benefit Paid
 - If sum assured for exposure is based upon original amount at issue convert to original amount at issue.

Additional Data – Study by Premium

10. Modal Premium Amount
 - Total premiums paid for flexible premium product
 - Modal (weekly, biweekly, monthly, quarterly, annual) for recurrent premium products
11. Premium Mode
 - frequency of payment
 - weekly, biweekly, monthly, quarterly, semi-annual, annual for periodic premium policies (W, B, M, Q, S, A)
 - denote flexible premium otherwise (FP)

Additional Data – Study by Underwriting / Distribution System

12. Underwriting basis
 - Specify whether no underwriting, simplified underwriting or full underwriting
 - Smoking status
 - Other options may be developed
13. Distribution system
 - Agent, independent broker or financial advisor, bancassurance, group insurance, mass marketing etc.
14. Geography

Appendix D

**Attachment B
Mapping Table**

A mapping table should be provided that maps each policy form / type (see Attachment A, item 2) to the SOA policy types.

Policy Form Number	SOA Primary Grouping	SOA Secondary Grouping

The SOA groupings will be set for each study based upon local considerations. For example, a primary grouping may be between savings and risk products with risk products having a secondary grouping based upon underwriting classifications.

Appendix D

Attachment C

Reasonability Tests – Performed on Each Policy/Contract Record

The following tests should be performed on each policy (contract). Exception reports should be produced that present:

- Summaries of exceptions by type of exception
- Details for each contract with an exception

The tests are as follows:

1. Reasonable dates
 - (a) $1875 < \text{Birth date} < \text{Issue Date} < \text{Status Date} < \text{Current Date}$
 - (b) All date fields are valid dates (year / month / day)
2. Reasonable sex
 - (a) Male, Female, Unisex (M, F, U)
3. Reasonable status
 - (a) In force, lapse/surrender/death (IF, LS, D)
4. Reasonable sum assured
 - (b) $0 < \text{Sum Assured} < \text{maximum issue amount}$
5. Reasonable premium amount
 - (c) $0 < \text{Modal Premium} < \text{maximum issue amount}$
6. Reasonable premium mode
 - (d) Flexible premium (includes single premium), FP
 - (e) Recurrent premium (weekly, biweekly, monthly, quarterly, semi-annual, annual), W, B, M, Q, S, A

Note: Company must provide

- *Maximum insurance issued*
- *Maximum premium issued*

Appendix D

Attachment D

Data Reasonability Tests Performed at Aggregate Level Tests Against Independent Company Data

These tests are performed by comparing

- against
- (a) data compiled from the policy records in Access
 - (b) information independently provided by the company.

A test is passed if the two figures are identical. A test is failed if the two figures are substantially different.

Reports should be created that provides these comparisons including the values, the differences between values and the difference as a percentage of the independent information:

Year End Reports

- (1) Sum assured
 - a. New policies
 - b. Policies in force at prior year end
- (2) Policy Count
 - a. New policies
 - b. Policies in force at prior year end
- (3) Premiums In Force
 - a. Flexible premium
 - i. New policies
 - ii. Policies in force at prior year end
 - b. Periodic (recurrent) premium
 - i. New policies
 - ii. Policies in force at prior year end
- (4) Policy Reserve (optional)

Calendar Year Reports

- (1) Policy Counts
 - a. In force at beginning of year
 - b. Sales
 - c. Deaths
 - d. Surrenders
 - e. In force at end of year (hopefully $a+b-c-d = e$)
- (2) Premiums received
 - a. New policies
 - b. Policies in force at prior year end (renewal premium)
- (3) Benefits paid
 - a. Death benefits
 - i. Original sum assured
 - b. Surrender benefits

Reports should be prepared for each year during the study period as well as a summary of all years within the study period.

Appendix D

Attachment E

Reports used to Test without comparison to separate information

Reports should be created and graphs created for each test

1. Distributions by age
 - a. Provided at calendar year for each contract in force (number of contracts, sum assured, annual premium, flexible premium)
 - b. Provided for each calendar year for deaths and lapse / surrender
 - c. May be grouped into quinquennial or decennial age groups
2. Distributions by amount or annualized premium or benefits (immediate annuities)
 - a. Same as above
3. Claim rates
 - a. Calculated for quinquennial or decennial age groups for both mortality and persistency
 - b. Also calculate the natural log of the mortality claim rate
 - c. Mortality may be expressed as a ratio of a "standard" mortality table. Separate "standard" tables may be required for:
 - a. Underwritten life insurance (select & ultimate)
 - b. Non underwritten life insurance (e.g. group insurance)
 - c. Immediate (in payment) annuitie