

Report On Premium Persistency Assumptions Study Of Flexible Premium Universal Life Products

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Project Overview

Milliman was retained by the SOA to conduct research relative to premium persistency assumptions for flexible premium universal life (FPUL) products. The scope of the research included assumptions used in pricing and cash flow testing (CFT), and for U.S. Generally Accepted Accounting Principles (GAAP)/International Financial Reporting Standards (IFRS) purposes.

A survey was conducted of FPUL companies regarding their premium persistency assumptions. Questions were jointly developed by Milliman and the Project Oversight Group. The survey included a general section that applied to all FPUL products, as well as product specific questions.

Responses were received from 29 companies, regarding 83 products. This report includes a summary of the results based on the following product categories:

- Universal life with secondary guarantees (ULSG)
- Cash accumulation universal life (AccumUL)
- Current assumption universal life (CAUL)
- Indexed universal life (IUL)
- Variable universal life (VUL)

A list of the 29 participants can be found in Appendix A.
A glossary of terms may be found in Appendix B.

Introduction

The focus of the survey was on premium persistency assumptions used in pricing FPUL products. Key differences in such assumptions used for cash flow testing and GAAP/IFRS purposes were also requested and reported. There is an interest in assumptions used throughout the life insurance industry as actuaries design new products and also as they prepare for a principle-based approach, which requires determination of reserves and capital and policyholder behavior assumptions.

This report summarizes the responses received from the 29 survey participants. An executive summary is included to cover the highlights of the responses, as well as commentary and analysis relative to the responses.

The survey included a general section with a number of questions that covered an array of topics across product category lines. Following the executive summary, there is a summation of the responses to these general issues.

Survey participants were asked to provide responses to product-specific questions for their most popular FPUL products issued from 2007 through 2010, which include:

Universal Life

- Universal life with secondary guarantees
- Survivorship life UL with secondary guarantees
- Cash accumulation UL
- Current assumption UL
- Survivorship current assumption UL

Indexed Universal Life

- Indexed UL with secondary guarantees
- Survivorship indexed UL with secondary guarantees
- Cash accumulation indexed UL
- Survivorship cash accumulation indexed UL
- Current assumption indexed UL

Variable Universal Life

- Variable UL with secondary guarantees
- Survivorship variable UL with secondary guarantees
- Cash accumulation variable UL
- Protection focused variable UL

Following the general issues section, there is a summary of the product-specific responses. Since the number of responses for survivorship UL product categories was small, these responses were combined with the corresponding single life product category in the analysis. Similarly, the number of responses within each of the indexed and variable UL product categories was small. Therefore, responses were combined and analysis was based on a single category for indexed UL products and a single category for VUL products.

The survey allowed for the submission of more than one product within a particular product category. Only four of the 29 participants submitted responses for multiple products within a category. To ensure that undue weight was not given to the responses of these participants, we made the following assumptions in our analysis:

- Where responses for multiple products from the same participant were essentially the same, we treated them as one product.
- If both a survivorship life and single life version of a product were submitted, we included the survivorship life version as a separate product only to the extent that the survivorship life response was different from that of the single life version. Otherwise, we treated the survivorship life and single life versions as one product.
- Sales were combined for any products that were consolidated.
- No more than two “consolidated” products were included for any one participant within a particular product category. We included the top two products based on 2010 sales.

Note that in some cases, respondents left a question blank, so the total of such responses may not equal the total number of participants or the total number of products, as applicable, within a particular product category.

When comparing the data in the graphs and charts, it is important to note that the underlying responses may not be consistent for different product types and/or for different functions (pricing, cash flow testing, GAAP/IFRS). For example, there are five products that have premium persistency factors for ULSG pricing that do not equal 100 percent, but there are nine such products for ULSG cash flow testing. Also, the group of participants that provided responses for one product type is different than the groups that provided responses for other product types. Persistency assumptions by participant vary widely and as these groupings change, comparisons of patterns may appear counterintuitive.

The average premium persistency factors included in the charts within each section were determined by calculating a straight average of the responses submitted for the specific product and function. It is important to note that the survey requested premium persistency assumptions be expressed as a percent of the original premium on the premium funding basis reported by the participant. Therefore, the premium persistency factors do not apply to a common base. For some participants, the original premium may refer to target premium, but for others, it may be the single premium to fund the secondary guarantee to maturity. For example, one participant may report a first-year premium persistency factor equal to 200 percent (applicable to the target premium) and another may report a first-year factor of 90 percent (applicable to billed premium). The researchers did not have the actual numbers per \$1,000 or try to work with commissionable target premiums. Since the average factors do not apply to the same base, it may be more important to focus on the pattern of the factors than the values.

Details regarding funding pattern assumptions by distribution channel and average premium persistency factors may be found in the addendum to this report.

Executive Summary

Responses to the FPUL Premium Persistency Study from 29 participants were compiled and analyzed. Following are some key findings that reflect the researchers' observations. Unless stated otherwise, observations refer to all products and/or all functions (pricing, cash flow testing, GAAP/IFRS).

Key Findings

- Many participants assume 100 percent premium persistency, but more detailed analysis reveals this assumption is applied separately by different funding pattern scenarios. This may seem surprising since we do not believe many companies are experiencing 100 percent persistency for all patterns.
- The implication of a 100 percent premium persistency assumption for multiple premium funding patterns is a declining overall premium funding pattern as a percent of a common, standardized premium. Refer to the example at the bottom of page 10.
- It is common to price using multiple premium funding patterns. Twenty-three of the 27 ULSG products are priced assuming multiple premium funding patterns rather than a single pattern.
- A significant percentage of ULSG participants (48 percent) reported adjusting the premium persistency assumption in pricing to ensure the policy doesn't lapse. The adjustment is more common in pricing than it is for cash flow testing and GAAP/IFRS purposes, which raises some questions as to why inconsistencies should exist. Modeling constraints may be more likely to occur when analyzing large in-force blocks of business for CFT and GAAP/IFRS purposes. Such constraints may not be present when pricing is based on a limited number of pricing cells and often does not include real assets.
- Participants recognize various funding patterns by modeling multiple premium funding patterns for pricing purposes, but not as many model multiple patterns for CFT or GAAP/IFRS purposes. It appears a simplified approach is used for CFT and GAAP/IFRS purposes. Perhaps companies

choose the most conservative pattern or the most frequent pattern actually seen. Also, as mentioned above, modeling constraints may occur when analyzing large in-force blocks of business.

- Premium persistency factors for FPUL products generally vary by duration but not by issue age. It is also not common to vary FPUL premium persistency factors by gender.
- Dynamic premium persistency assumptions, where premium persistency varies depending on the interest rate environment, are rare.

Additional highlights are shown below, as are further details about the key points listed above.

General Questions

Basis of Premium Persistency Assumptions

- Seventy-six percent of participating companies indicate utilizing company data to develop their premium persistency assumptions for FPUL products.
- Many participants assume 100 percent premium persistency. This may seem surprising since we do not believe many companies are experiencing level premium patterns. This might be explained in part by the fact that some companies are using both internal and external data. Second, the survey suggests many companies are realizing their products are sold in a variety of ways (e.g., some buyers pay single premiums only, some pay level premiums, and others pay on a limited pay basis). A 100 percent premium persistency assumption used for each of these sales types would produce an aggregate premium payment pattern stream that would appear to be nonlevel and generally declining as a percent of a standard premium per \$1,000. For example, assume the following premium payment scenarios:

1. Single premium: one premium of \$50,000
2. Ten-pay premium: 10 premiums of \$5,000 per year
3. Lifetime premium: lifetime premiums of \$1,000 per year

If each of the scenarios is equally weighted, the aggregate pattern is:

1. \$18,667 ($\$56,000 \div 3$) in year one
2. \$2,000 ($\$6,000 \div 3$) in years two through 10
3. \$333 ($\$1,000 \div 3$) thereafter

The result is a declining overall premium payment pattern.

- Sixty-three percent (10 out of 16) use the same basis (e.g., company data, actuarial judgment) for determining the premium persistency assumption for all functions (pricing, cash flow testing or GAAP/IFRS).

Rolling Commission Target Premiums

It is rare for premium persistency assumptions to differ from standard assumptions if there is a rolling commission target premium versus a standard commissionable target premium.

Secondary Guarantee Product Issues

- A significant percentage of ULSG participants (48 percent) reported adjusting the premium persistency assumption in pricing to ensure the policy doesn't lapse. The adjustment is more common in pricing than it is for cash flow testing and GAAP/IFRS purposes, which raises some questions as to why inconsistencies should exist. The adjustments reported primarily fall into one of three categories:

- Assume minimum premiums are paid
- Assume 100 percent premium persistency
- Force a catch-up premium

All of the above can have significant profitability implications based on the product design, especially for payment of catch-up premiums.

- Most participants do not reflect catch-up provisions in premium persistency assumptions and the majority responded they do not specifically test the catch-up provision.

Lapse Support Test

For products subject to the Illustration Testing Model Regulation, all participants indicated premium persistency assumptions did not vary from pricing.

FPUL Product Specific Questions

Premium Funding Patterns

- The most common premium funding patterns modeled for ULSG pricing purposes are level premium, single premium and limited pay (10-year and 20-year). Twenty-three of the 27 ULSG products are priced assuming multiple premium funding patterns rather than a single pattern. Ten are priced by modeling the multiple patterns assuming a weighted average of the premium persistency factors for each of the funding patterns assumed. The use of a weighted average can produce profit results dramatically different than those produced by modeling each premium payment pattern separately. For example, if a company offers a dial-a-guarantee structure and assumes some of its sales are in a carry-to-age-70 scenario, a weighted average could result in an overall average premium that carries the total liability only to age 90. This would eliminate the tail liabilities at attained ages beyond that point. Also, as one participant noted, reserve patterns can vary dramatically using weighted averages versus pattern-by-pattern values.
- The most common premium funding pattern modeled for the remaining four FPUL product types (AccumUL, CAUL, IUL and VUL) is a level premium funding pattern.
- The majority of AccumUL products are priced based on only one funding pattern, typically a level premium funding pattern.
- Nearly all CAUL products are priced assuming multiple premium funding patterns similar to ULSG products.

- All IUL products are priced based on multiple funding patterns.
- There is an even split between the use of multiple premium funding patterns and only one funding pattern for VUL products.
- The number of different premium funding patterns modeled for ULSG, AccumUL and VUL CFT purposes is greater than the number of different funding patterns modeled in pricing for these products. This may be explained by the fact that when CFT is performed, additional information about the policyholder is available to develop premium persistency assumptions. For example, the planned periodic premium is known for in-force policies and billing history is also available.
- CFT is primarily based on percent of billed premium funding for CAUL products.
- Premium funding patterns for IUL cash flow testing purposes are primarily based on a level premium or an other scenario.
- Participants recognize various funding patterns by modeling multiple premium funding patterns for pricing purposes but not as many model multiple patterns for CFT or GAAP/IFRS purposes. For ULSG and VUL CFT purposes, it is nearly evenly split between products modeled assuming only one premium funding pattern versus multiple patterns. For AccumUL, CAUL and IUL cash flow testing purposes, the majority of products within each category are modeled assuming only one premium funding pattern. It is interesting that participants recognize the need to analyze different funding patterns for pricing purposes, and that fewer do so for cash flow testing and GAAP/IFRS purposes. It appears a simplified approach is used for CFT and GAAP/IFRS premium persistency assumptions. Perhaps companies choose the most conservative pattern or the most frequent pattern actually seen. Also, modeling constraints may be more likely to occur when analyzing large in-force blocks of business for CFT and GAAP/IFRS purposes. Such constraints may not be present when pricing based on a limited number of pricing cells and often does not include real assets.

- The distribution channel does not appear to be a key factor used to categorize premium funding assumptions for FPUL products.

Premium Persistency Assumptions

- In general, premium persistency assumptions assumed in modeling ULSG products (all functions) are equal to 100 percent in all durations. This is also true for current assumption UL and VUL pricing but is not the case for CAUL and VUL CFT and GAAP/IFRS purposes. For AccumUL and IUL products, at least half include premium persistency assumptions that do not equal 100 percent (for all functions). For those products where the factor is not equal to 100 percent, there is generally little variation in the rate after the first year.
- For all FPUL UL product types except VUL, the same premium funding patterns and persistency factors are often assumed for CFT and GAAP/IFRS, but pricing frequently utilizes different assumptions due to the inclusion of more types of funding patterns or more emphasis on specific funding patterns.
- For VUL, the responses are fairly evenly split between those participants that use the same premium funding patterns and persistency factors for CFT and GAAP/IFRS and those that use different funding patterns and persistency factors for CFT and GAAP/IFRS. VUL pricing typically utilizes different assumptions than those used for CFT and GAAP/IFRS.
- Premium persistency factors for FPUL products generally vary by duration but not by issue age. It is also not common to vary FPUL premium persistency factors by gender.

Dynamic Assumptions

Dynamic premium persistency assumptions, where premium persistency varies depending on the interest rate environment, are rare. This raises questions as to companies' views of policyholder objectives and actions in, for example, a declining interest rate environment, as has been seen for some time. If companies are keeping their policyholders informed with respect to future projected values as interest rates have dropped from original illustrated values, one might expect policyholders to increase their premiums to achieve

their original objectives (e.g., funding the policy to endow or carry to a certain age, such as 100).

Sensitivity Testing

Sensitivity testing of premium persistency assumptions is also rare, which seems inconsistent with the potential effect premium persistency can have on product performance. Participants may be indirectly testing premium persistency through lapse assumptions or other means without directly stressing this assumption, especially since many participants are assuming 100 percent premium persistency. The use of multiple premium funding patterns may also be a means of sensitivity testing.

General Issues: All Product Categories

The FPUL premium persistency assumptions survey included questions that crossed product categories. A summary of these general issues is included in this section.

Basis of Premium Persistency Assumptions

Survey participants were asked to describe the basis used to develop premium persistency assumptions for FPUL products. Twenty-two of the 29 (76 percent) participating companies reported they utilize company data to develop their assumptions. Of the 22, 10 participants combine such data with actuarial judgment. Other responses included the use of consultants' recommendations and industry data. Four participants reported they simply assume 100 percent premium persistency for all modeled premium payment methods.

Not all participants indicated if the basis of their assumptions varied by function, i.e., for pricing, cash flow testing and GAAP/IFRS purposes. Of those that responded, 63 percent (10 out of 16) use the same basis (e.g., company data, actuarial judgment) for all functions. The remaining 38 percent (six out of 16) reported the basis differs by function.

Rolling Commission Target Premiums

Responses to the survey suggest it is rare for premium persistency assumptions to vary if there is a rolling commission target premium. Only two participants reported varying such an assumption for pricing, and none for cash flow testing and GAAP/IFRS purposes. Variations assumed in pricing included lower funding to reflect the impact of the rolling commission and modeling a specific scenario to capture the highest cost of rolling targets (assumed for some products).

Questions Applicable to Secondary Guarantee Products Only

A. Adjustment to premium persistency assumption to ensure the policy doesn't lapse

A significant percentage of ULSG participants (48 percent) reported adjusting the premium persistency assumption in pricing to ensure the policy doesn't lapse. The adjustment is more common in pricing than it is for cash flow testing and GAAP/IFRS purposes. Thirty-eight percent of those participants reporting data for secondary guarantee UL products reported adjusting the assumption for CFT purposes and 27 percent adjust it for GAAP/IFRS purposes.

The adjustments made to premium persistency assumptions to ensure the policy doesn't lapse are quite varied. The adjustments reported primarily fall into one of the following categories, ranked in the order of frequency from most responses to least:

1. Assume minimum premiums are paid
2. Assume 100 percent premium persistency
3. Force a catch-up premium

In another approach used for cash flow testing and GAAP/IFRS purposes, the premium persistency assumption is not adjusted, but lapses are overridden to keep the policy in force until the secondary guarantee expires.

B. Catch-up provisions

Of the 25 distinct UL with secondary guarantee products, 11 include lifetime catch-up provisions, eight include limited catch-up provisions and six contain no catch-up provisions.

The length of the limited catch-up provisions ranged from three months to 10 years. Of the 15 participants that reported how catch-up provisions are reflected in premium persistency assumptions, 10 do not reflect such a provision in premium persistency assumptions. Four participants accommodate the catch-up provision outside premium persistency but did

not describe how this is done. Few participants reported they reflect such a provision in premium persistency assumptions. The majority of ULSG participants (14) do not specifically test the catch-up provision.

A catch-up provision could dramatically and adversely impact profitability on a product due to reserve patterns and increased liabilities triggered by premium deposits just sufficient to keep the secondary guarantee in effect.

Lapse Support Test for Illustration Regulation Testing

When doing the lapse support test for illustration regulation testing (for nonvariable flexible premium universal life products), all participants indicated they do not change premium persistency assumptions from that used in pricing. This may indicate that for those participants that assume less than 100 percent premium persistency, the assumption is not generally changed for illustration testing purposes.

Product-Specific Questions

Universal Life with Secondary Guarantees (ULSG)

Responses to the survey were the greatest for ULSG products. Twenty-two participants reported assumptions for single life ULSG products, with five of the 22 also reporting assumptions for survivorship life ULSG products. The single life and survivorship life responses were analyzed on a combined basis, considering 27 separate products.

1. Product Details

Sales

A summary of 2010 sales volumes for the reported ULSG products is shown in Chart 1. We included those responses that reported sales on both an annualized premium basis and face amount basis (25 distinct products).

Chart 1					
Sales Measure	2010 Sales Volume of ULSG Products				
	Total	Average by Product	Median	Minimum	Maximum
Annualized Premium (000s)	\$994,837	\$39,793	\$21,000	\$1,655	\$194,477
Face Amount (\$M)	\$41,581	\$1,663	\$1,052	\$70	\$8,044

Following is a tally of the responses from 20 participants that expressed the sales of the products they reported as a percentage of 2010 ULSG sales.

Chart 2	
Percentage of the Participant's 2010 ULSG Sales	Number of Participants
100	12
At least 70, but less than 100	5
Less than 70	3

Product Characteristics

The characteristics of the ULSG products reported were varied. Secondary guarantee designs are reported below.

- Seventy-eight percent (18 of 23) of the products included a secondary guarantee based on a shadow account design. Of those, there was a 61 percent/39 percent mix between shadow accounts with a single fund and those with multiple funds, respectively.
- Thirteen percent (three products) of the ULSG products included a secondary guarantee based on accumulated premiums.
- Other designs included a hybrid annual renewable term (ART) scale accumulated with interest and premium loads and a design described as a no-lapse balance with factors that vary by stratified premium (but without expenses or cost-of-insurance charges like shadow accounts).

The remaining products did not specify the secondary guarantee premium design. Of those responding, 68 percent of the products (15 of 22) included a lifetime secondary guarantee and 32 percent (seven of 22) included a dial-a-guarantee.

Chart 3 includes a summary of the responses received regarding distribution channels used for ULSG products. It was most common for the reported products to be sold through two distribution channels. The broker, personal-producing general agent (PPGA) and agency-building channels were the most common channels through which the reported ULSG products were sold.

Chart 3				
ULSG: Distribution Channels				
Number of Channels Where Sold	Number of Products		Channel Where Sold	Number of Products
None reported	4		None reported	4
1	7		Broker	17
2	9		Agency Building	10
3	4		PPGA	10

Chart 3			
ULSG: Distribution Channels			
Number of Channels Where Sold	Number of Products	Channel Where Sold	Number of Products
4	3	Stockbroker	4
		Banks & Financial Institutions	3
		Multiple-Line Exclusive Agents (MLEA)	2
		Other	3

The participants that included a response (23 out of 27) indicated all products were fully underwritten. The primary target markets reported for ULSG products were high net worth, middle market and older age.

2. *Funding Patterns*

Funding patterns assumed by survey participants for ULSG modeling purposes are quite varied but can be grouped into high level categories.

Pricing

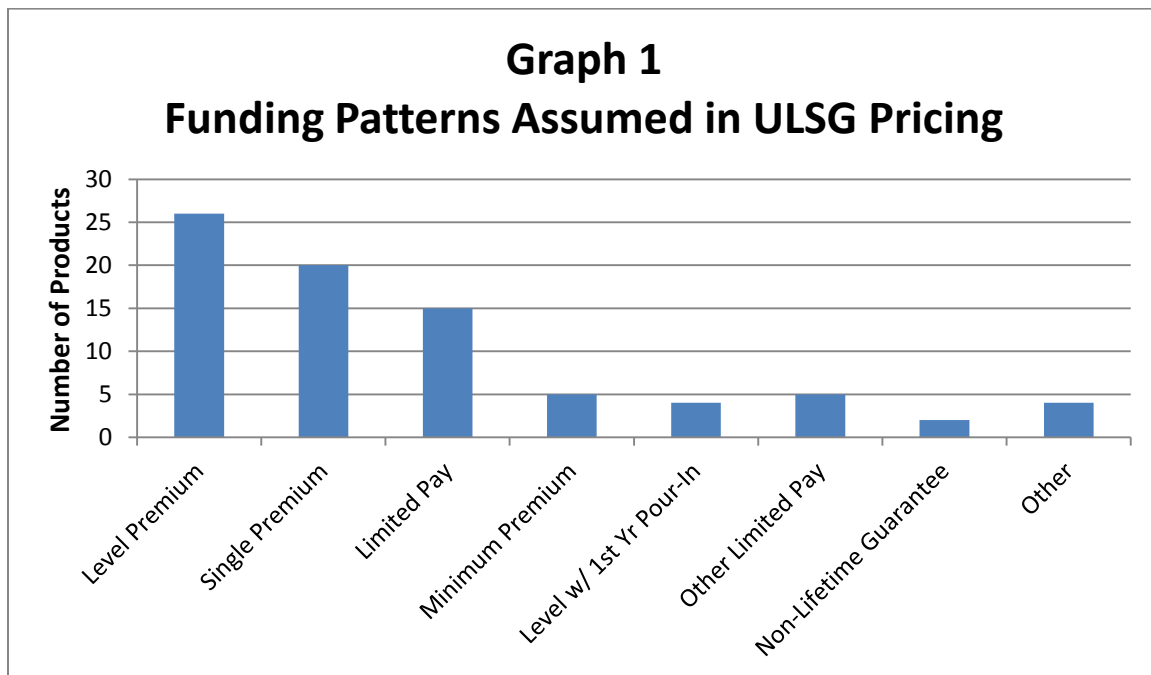
For pricing purposes, funding patterns typically fall into the following categories:

- Level premium
- Single premium
- Limited pay (10-pay or 20-pay)
- Minimum premium
- Level with first-year pour-in
- Other limited pay
- Nonlifetime guarantee
- Other

Funding patterns that fall into the other category include those where the description was somewhat generic, such as a low, medium or high premium level assumption. One item of note is that it was reported a level pay to endow

scenario and a single pay to endow scenario were assumed in pricing ULSG products. Based on the researchers' experience, this is not typical for the pricing or sales of ULSG products. Most ULSG sales are intended to maximize death benefit to lifetime premium relationships, not to build up cash values. As such, care should be taken in pricing conducted assuming an endowment scenario as there is potential to overstate the income to the company and the profitability of the product.

Graph 1 shows the distribution of funding patterns assumed in ULSG pricing. Note that the results sum up to more than the number of ULSG products reported in the survey due to the modeling of multiple patterns for some products. By far the most common patterns modeled for ULSG pricing purposes are level premium, single premium and limited pay (10-year and 20-year).



Twenty-three of the 27 ULSG products are priced assuming multiple premium funding patterns rather than a single pattern. Of these 23 products, 10 are priced by modeling the multiple patterns assuming a weighted average of the premium persistency factors for each of the funding patterns assumed. The remaining 13 products appear to be priced with each of the patterns modeled separately. We believe the use of a weighted average of premium persistency factors can produce profit results dramatically different than those produced

by modeling each premium payment pattern separately. For example, if a company offers a dial-a-guarantee structure and assumes some of its sales are in a carry-to-70 scenario, it could result in an overall average premium that carries the coverage for the weighted average scenario only to age 90, which would eliminate the tail liabilities at attained ages beyond that point. Also, as one participant noted, reserve patterns can vary dramatically using weighted averages versus scenario-by-scenario values.

The variation in funding pattern assumptions by distribution channel for pricing purposes was analyzed. Chart 4 shows the different ULSG distribution channels and the associated funding pattern(s) assumed in pricing ULSG products. Premium funding patterns were not reported separately by distribution channel by survey participants. The results in Chart 4 and other similar charts throughout this report are a function of which channels the participants sell through. Survey responses did not reveal that any carriers varied premium funding patterns by distribution channel. Note that each funding pattern may be used in a number of different distribution channels for each product and each product may be priced based on a number of different funding patterns within the same high level category. Therefore, the total number of products shown in the following chart will not agree with the total shown in the chart above. If we focus on the three primary premium funding assumptions used in ULSG pricing—level premium, single premium and limited pay—it does not appear that distribution channel is a key factor relative to this assumption. Distribution channel is also not a key factor for CFT or GAAP/IFRS premium persistency assumptions. This is true for all FPUL product types and functions. Further details regarding funding pattern assumptions by distribution channel may be found in the addendum to this report.

Chart 4								
Distribution Channel by Premium Funding Assumption Used in ULSG Pricing								
Premium Funding Assumption	Number of Products							
	Broker	PPGA	Agency	Banks	Brokerage General Agency	Stock-broker	MLEA	Direct
Level Premium	17	11	7	4	1	6	1	1
Single Premium	13	10	6	3	2	4	2	1
Limited Pay	8	6	4	2	2	1	1	1
Minimum Premium	5	1	2	1		1	1	
Level with First-Year Pour-in	2	3	1	1		1	1	
Other Limited Pay	4	4	1	1	1	2	1	
Nonlifetime Guarantee		2	1					
Other	4		4					

Cash Flow Testing and GAAP/IFRS

Many similarities between premium funding assumptions for cash flow testing and for GAAP/IFRS purposes were reported by survey participants. Comments in this report have been consolidated for these functions, with any differences noted. For CFT and GAAP/IFRS purposes, funding patterns are similar to those assumed in pricing, with a few additional categories as shown below:

- Level premium
- Single premium
- Limited pay (10-pay or 20-pay)
- Percent of billed premium to fund the secondary guarantee
- Percent of billed premium
- Minimum premium
- Level with first-year pour-in

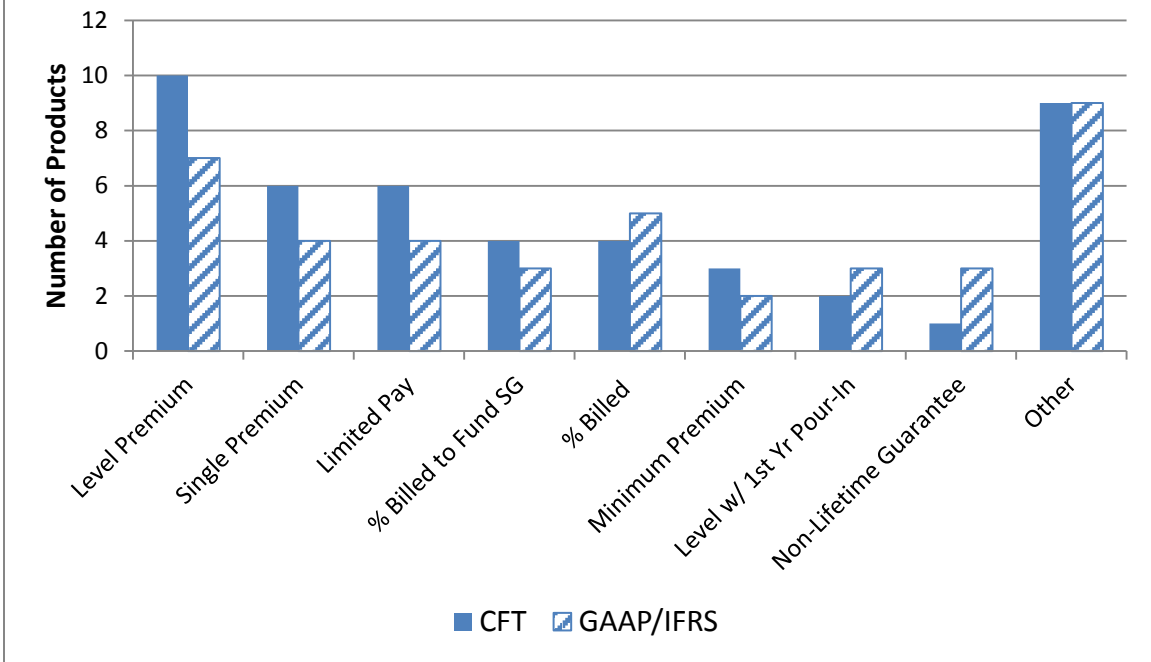
- Nonlifetime guarantee
- Other

The other category includes the following funding patterns.

- Assume 100 percent of paid premiums in the last 12 months if the policy is in the second duration and assume the target premium if it is in the first duration. The fund level is split between high, medium and low based on a comparison of the fund value to the accumulated target premium.
- Assume 100 percent of paid premiums in the last 12 months but capped at the planned periodic premium (billed premium). If the current account value is funded to maturity at the current interest rate, then no further premiums are assumed.
- Assume payments that balance to an overall funding assumption expressed as a percent of target premium.
- An aggregate assumption is used.
- Assume premiums stop when the guarantee is fully funded.

Graph 2 shows the distribution of funding patterns assumed for ULSG CFT and GAAP/IFRS purposes. Multiple patterns are also modeled for these functions so the results may sum up to more than the number of ULSG products reporting such assumptions. The funding patterns modeled for ULSG CFT purposes are more diverse than those assumed in ULSG pricing. Level premium, single premium and limited pay (10-year and 20-year) scenarios are the most common for CFT purposes. The percentage of billed premium in addition to those listed for CFT are the most common funding patterns assumed for GAAP/IFRS purposes. The premium funding patterns assumed for GAAP/IFRS purposes are more evenly distributed among the various funding patterns utilized than for pricing and CFT purposes. The increase in billed premium funding patterns assumed for GAAP/IFRS purposes may be a result of the use of actual data, which differs from the funding pattern mix assumed in pricing.

Graph 2
Funding Patterns Assumed in ULSG
CFT and GAAP/IFRS



For both CFT and GAAP/IFRS purposes, it is nearly evenly split between the ULSG products that are modeled assuming only one premium funding pattern versus multiple patterns. All products that are modeled assuming more than one funding pattern do so explicitly, with the exception of one product using a weighted average basis for CFT. It is interesting that survey participants recognize the need to analyze different funding patterns in the pricing process and that fewer do so for cash flow testing or for GAAP/IFRS purposes. For ULSG products, of those participants that model multiple funding patterns for pricing and only one funding pattern for CFT, 75 percent (six of eight) model only a level premium pattern for CFT. Similarly, 80 percent (four of five) model only a level premium scenario for GAAP/IFRS purposes. It appears a simplified approach is used for premium persistency assumptions for these functions. Perhaps companies choose the most conservative pattern or the most frequent pattern experienced. If companies are simplifying these assumptions, they should verify that the simplification does not materially misrepresent the business. As noted previously, the use of a single funding pattern may be explained by the fact that when cash flow testing or GAAP/IFRS analysis is

performed, there is additional information about the policyholder available to develop premium persistency assumptions (e.g., planned periodic premium is known and billing history is available). Another consideration is that modeling constraints may be more likely to occur when analyzing large in-force blocks of business for CFT and GAAP/IFRS purposes. Such constraints may not be present when pricing based on a limited number of pricing cells.

Use of More than One Funding Pattern

Eleven survey respondents provided responses to the question of why more than one funding pattern is assumed in modeling ULSG products as follows.

- Five of the 11 use multiple funding patterns to capture the different ways the product is marketed and sold.
- Three additional participants use multiple funding patterns to reflect actual experience.
- The remaining participants assume more than one funding pattern to reflect different anticipated policyholder behavior or to refine the pricing of ULSG products, including the recognition of dramatically different reserve patterns for the different funding patterns.

3. Premium Persistency Assumptions

By far the most common premium persistency assumptions used in modeling ULSG products are equal to 100 percent in all durations. Participants in the survey tend to model various funding patterns, rather than varying the premium persistency factors. Of the 22 participants that reported assumptions for ULSG products, eight reported premium persistency assumptions that were not equal to 100 percent in all durations. Also, it is rare to vary premium persistency factors by gender. None of the ULSG survey participants reported different premium persistency factors for males and females.

A comparison is shown of premium funding patterns and premium persistency factors used in pricing and cash flow testing, and for GAAP/IFRS purposes in Chart 5. For ULSG products, the most common response was that the same funding patterns and factors are assumed for cash flow testing and GAAP/IFRS but pricing uses different assumptions.

Chart 5	
Comparison	Number of ULSG Products
Pricing \neq CFT = GAAP/IFRS	12
All different	6
All equal	3
Pricing = GAAP/IFRS \neq CFT	2
Other	2

More details about premium persistency factors by function are described below.

Pricing

Participants that reported ULSG premium persistency factors for limited pay plans (10-year and 20-year), nonlifetime guarantees and other limited pay plans assumed 100 percent persistency in all years for pricing purposes. The exceptions to the 100 percent assumption for other funding patterns are described below.

For pricing purposes, five participants (five products) reported premium persistency factors that did not equal 100 percent. The majority reported multiple funding patterns and the associated weights they assume in pricing the product. We calculated the average premium persistency factors based on the reported weights for these participants merely for the purposes of this presentation but do not recommend this approach. For the other participants, pricing is based on multiple funding patterns but aggregate premium persistency factors were reported. We determined the average factors over all five participants by issue age category and duration. Chart 6 shows the resulting averages. Average premium persistency factors for all product types and all functions may also be found in the addendum to this report.

Chart 6								
Average Premium Persistency Factors for ULSG Pricing								
Duration	Issue Age Range							
	<20	20-29	30-39	40-49	50-59	60-69	70-79	80+
1	153%	240%	348%	456%	456%	510%	770%	770%
2	81	85	85	85	85	85	76	76
3-5	80	84	84	85	85	85	76	76
6-10	80	84	85	85	85	85	76	76
11-15	77	81	82	82	80	80	70	68
16-20	77	81	82	82	80	80	68	68

Two of the five participants reported first-year premium persistency factors that exceed 100 percent for dump-in with level premium funding patterns. There is little variation in the level of premium persistency factors after the first year. Factors for duration one include single premium and rollover business. The higher factors at the older ages are likely due to the greater availability of funds at the older issue ages. The drop in factors from years 10 to 11 is a reflection of the 10-pay funding scenarios.

Cash Flow Testing and GAAP/IFRS

Like premium funding patterns, there are many similarities between premium persistency factors for CFT and GAAP/IFRS. Comments in this report have been consolidated for these functions, with any differences noted. For both CFT and GAAP/IFRS purposes, 100 percent premium persistency was assumed in all years for the following premium funding patterns reported by survey participants:

- Percent of billed premium to fund the secondary guarantee
- Percent of billed premium
- Nonlifetime guarantee

For CFT purposes, premium persistency factors that did not equal 100 percent were reported for nine products. The same premium persistency factors were reported for CFT and GAAP/IFRS for eight of the nine products. For five of the nine products, the CFT factors were reported on an aggregate basis, reported

for multiple funding patterns along with the associated weights they assume in CFT, or equal for the multiple funding patterns reported.

Note that only one of the products varied its premium persistency factors for CFT by issue age.

In addition to the eight products with the same factors for CFT and GAAP/IFRS, three additional products include premium persistency factors that did not equal 100 percent for GAAP/IFRS purposes. For five of the 11 products, the factors were reported on an aggregate basis and did not vary by issue age. Two additional products included factors for multiple funding patterns along with the associated weights assumed for GAAP/IFRS purposes. The factors reported for these two products varied by issue age and duration.

For both CFT and GAAP/IFRS, the funding patterns for the remaining four products were described in generic terms, such as highly, medium and low funded. The average of the reported premium persistency factors was determined based on an equal weighting for each funding category.

We determined the average factors over all products with premium persistency factors that did not equal 100 percent by issue age range and duration. Charts 7 and 8 show the resulting averages for CFT and GAAP/IFRS, respectively.

Chart 7								
Average Premium Persistency Factors for ULSG CFT								
Duration	Issue Age Range							
	<20	20-29	30-39	40-49	50-59	60-69	70-79	80+
1	136%	136%	136%	136%	136%	136%	136%	136%
2	66	66	66	66	67	66	66	66
3	64	64	64	64	64	64	64	64
4	63	63	63	63	64	64	63	63
5	62	62	63	63	63	63	63	63
6	62	62	62	62	63	63	62	62
7	62	62	62	62	62	62	62	62
8	61	61	62	62	62	62	62	62
9	61	61	61	62	62	62	61	62
10	61	61	61	61	62	62	61	61
11	61	61	61	61	60	60	59	57
12	61	61	61	61	60	60	59	57
13	60	61	61	61	60	60	59	57
14	60	60	61	61	60	60	59	57
15	60	60	60	61	60	60	59	57
16	60	60	60	61	59	59	57	57
17-20	60	60	60	60	59	59	57	57

Chart 8								
Average Premium Persistency Factors for ULSG GAAP/IFRS Purposes								
Duration	Issue Age Range							
	<20	20-29	30-39	40-49	50-59	60-69	70-79	80+
1	163%	163%	172%	181%	181%	185%	201%	201%
2	67	71	71	72	72	72	66	66
3	65	69	69	69	70	70	64	64
4	64	68	68	68	69	69	63	63
5	62	67	67	67	68	68	62	62
6	62	66	66	67	67	67	61	61
7	61	66	66	66	66	66	60	60
8	60	65	65	65	66	66	60	60
9	60	65	65	65	65	65	59	59
10	59	64	64	65	65	65	59	59
11	59	64	64	64	63	63	57	55
12	58	63	64	64	63	63	56	55
13	58	63	63	63	62	62	56	55
14	57	63	63	63	62	62	56	54
15	57	62	63	63	62	62	55	54
16	57	62	62	62	62	62	54	54
17	57	62	62	62	61	61	54	54
18	57	62	62	62	61	61	54	54
19	56	62	62	62	61	61	53	53
20	56	61	61	61	61	61	53	53

As evidenced in the tables above, premium persistency factors used for CFT and GAAP/IFRS purposes typically drop after the first year and are fairly level thereafter.

4. *Dynamic Assumptions*

Dynamic premium persistency assumptions are rare for ULSG pricing, cash flow testing and GAAP/IFRS purposes. Two of the 22 survey participants include such assumptions for all three purposes. Three additional participants include dynamic assumptions for CFT only.

The basis of dynamic premium persistency assumptions are described by participants below.

- Lapse and premium formulas are based on the difference in market rates and current rates.
- The payment of premiums and level of premiums paid are based on the probability of lapsation.
- Premiums are stopped if the surrender value falls below a specified multiple of the death benefit, but the policy stays in force as long as the shadow account keeps it in force.
- Persistency is such that no excess shadow account remains at age 121.

Based on our experience, it may be more likely companies are using dynamic lapse assumptions based on the secondary guarantee being in effect while the current account value is not positive, rather than tying dynamic lapses to the interest rate environment or linking them to premium persistency.

5. *Sensitivity Testing of Premium Persistency Assumptions*

Sensitivity testing of premium persistency assumptions is also rare for ULSG products. Twenty out of the 27 products (74 percent) did *not* include sensitivity testing for pricing purposes. This percentage increased to 96 percent for CFT, and up to 100 percent for GAAP/IFRS purposes. Lack of sensitivity testing may be because ULSG products have very little cash value and decreasing the premium persistency would likely lead to lapse of the policy, which would often increase overall profitability for the product. However, since many participants that reported doing sensitivity testing indicated the impact is significant, others may want to reconsider testing this assumption.

Comments relative to the extent of sensitivity testing will be confined to those done in pricing since this is the area where participants reported the most sensitivity testing is done. The most common response (five products) was that different premium payment patterns are tested to determine the sensitivity of premium persistency assumptions. All other responses were based on sensitivity testing reported for one product each as follows.

- A 10 percent increase and 10 percent decrease in premium persistency is tested.

- No premiums are assumed after age 100.
- There is a mix of business. (The pricing model contains cells representing the different funding scenarios assumed. Sensitivities are done based on a distribution of overall business that differs from the baseline assumption.)
- Life expectancy funding is tested.
- When developing the pricing assumptions that reflect the patterns of premiums for large in-force policies, the ways the policyholder can select against the company are reviewed and one of the least profitable premium payment patterns is tested.
- Pricing assumes that if the surrender value is less than some multiple of the present value of death benefits, the policyholder stops paying premiums but the policy stays in force as long as the shadow account balance keeps the policy in force. Sensitivity testing is done assuming different multiples of the present value of death benefits.

Of the products where the measurement of the impact of sensitivity testing on pricing was reported (seven responses), 57 percent look at the impact based on two measures, 29 percent look at one measure and 14 percent look at three measures. All seven reported measuring the impact on the internal rate of return (IRR)/return on equity (ROE), three reported economic value, two reported measuring based on the present value of distributable earnings, and one reported profit margin as a measure. Responses to the question regarding the impact of changes in premium persistency on the product were categorized as:

- Significant (five products)
- More sensitive to older age persistency (four products)
- Minimal (three products)
- More sensitive to short pay premium persistency than level pay (two products)

Sensitivity tests of premium persistency assumptions for ULSG products are performed for a number of reasons. The only reason given for more than one product was that previous products have set a pattern precedent. Other reasons are shown below.

- The conservativeness of existing reserves is tested. The impact of greater premiums is studied when pricing margins may *not* be achieved.
- Results by funding scenario indicate the importance of the mix of business assumption.
- Sensitivity within profit limits needs to be decreased.
- Sensitivity tests are based on actual sales where other premium payment patterns have been observed.
- The premium funding patterns that represent actual sales are modeled.
- The sensitivity of shadow account extended term insurance (ETI) needs to be understood.

Cash Accumulation Universal Life (AccumUL)

Eleven participants reported assumptions for single life cash accumulation UL products. All participants reported assumptions for a single product only. No responses were submitted for survivorship life AccumUL products.

1. Product Details

Sales

A summary of 2010 sales volumes for the reported AccumUL products is shown in Chart 9. We included those responses that reported sales on both an annualized premium basis and face amount basis (10 of the 11 products).

Chart 9					
Sales Measure	2010 Sales Volume of AccumUL Products				
	Total	Average by Product	Median	Minimum	Maximum
Annualized Premium (000s)	\$302,287	\$30,229	\$16,050	\$2,562	\$138,356
Face Amount (\$M)	\$14,777	\$1,478	\$356	\$78	\$8,226

Following is a tally of the responses from 10 participants that expressed the sales of the products they reported as a percentage of 2010 AccumUL sales (based on annualized premium).

Chart 10	
Percentage of the Participant's 2010 AccumUL Sales	Number of Participants
100	5
At least 70, but less than 100	3
Less than 70	2

Product Characteristics

Chart 11 includes a summary of the responses received regarding distribution channels used for AccumUL products. It was most common for the reported products to be sold through one or two distribution channels. The agency-building, broker and PPGA channels were the top three channels through which the reported AccumUL products were sold.

Chart 11			
AccumUL: Distribution Channels			
Number of Channels Where Sold	Number of Participants	Channel Where Sold	Number of Participants
1	4	Agency Building	7
2	5	Broker	6
3	3	PPGA	4
		Stockbroker	1
		Banks & Financial Institutions	1
		MLEA	1

All except one of the 11 products are fully underwritten. The remaining product is underwritten on a guaranteed issue basis. The target markets reported for AccumUL products were quite diverse, as shown in Chart 12 below. Note that multiple markets were reported by four participants.

Chart 12	
Target Market	Number of Participants
Middle Market	5
Higher Net Worth	4
Middle to Upper Market	2
Ages 25 to 60	1
Small Business Corporate-Owned Life Insurance	1
Premium Financing	1
Other	1

2. *Funding Patterns*

Similar to the reporting for ULSG, funding patterns assumed by survey participants for AccumUL modeling purposes were grouped into high level categories. Note that some participants reported multiple premium funding patterns that fall into the same high level category.

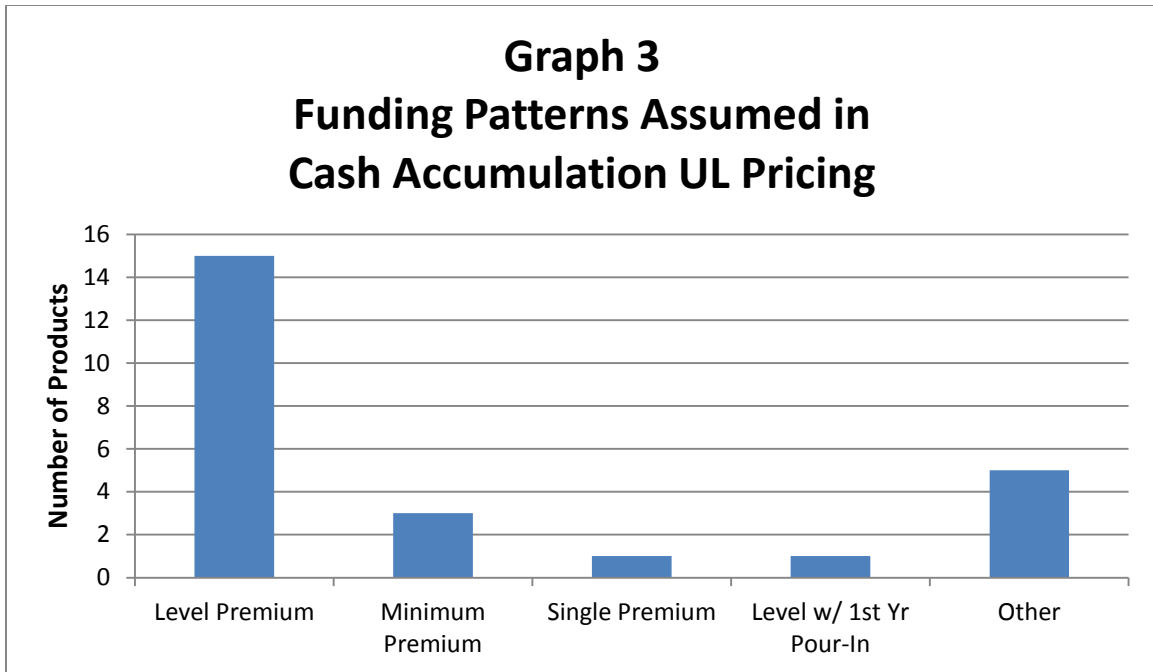
Pricing

For pricing purposes, funding patterns typically fall into the following categories:

- Level premium
- Single premium
- Minimum premium
- Level with first-year pour-in
- Other

Funding patterns that fall into the other category include those where the description was somewhat generic, such as a low, medium or high premium level assumption, historical premium pattern and modified endowment contract (MEC).

Graph 3 shows the distribution of funding patterns assumed in AccumUL pricing. Note that the results sum up to more than the number of AccumUL products reported in the survey due to the modeling of multiple patterns for some products. By far the most common pattern modeled for AccumUL pricing purposes is level premium.



Ten of the 11 participants reported premium persistency factors assumed in pricing. Six of these 10 AccumUL products are priced assuming a single funding pattern rather than multiple premium funding patterns. The remaining participants price AccumUL products based on multiple premium funding patterns, with some modeling the premium persistency factors applicable to each funding pattern explicitly and others assuming a weighted average of the premium persistency factors for each of the funding patterns assumed. This is different from ULSG products where pricing based on multiple premium funding patterns is common.

Cash Flow Testing and GAAP/IFRS

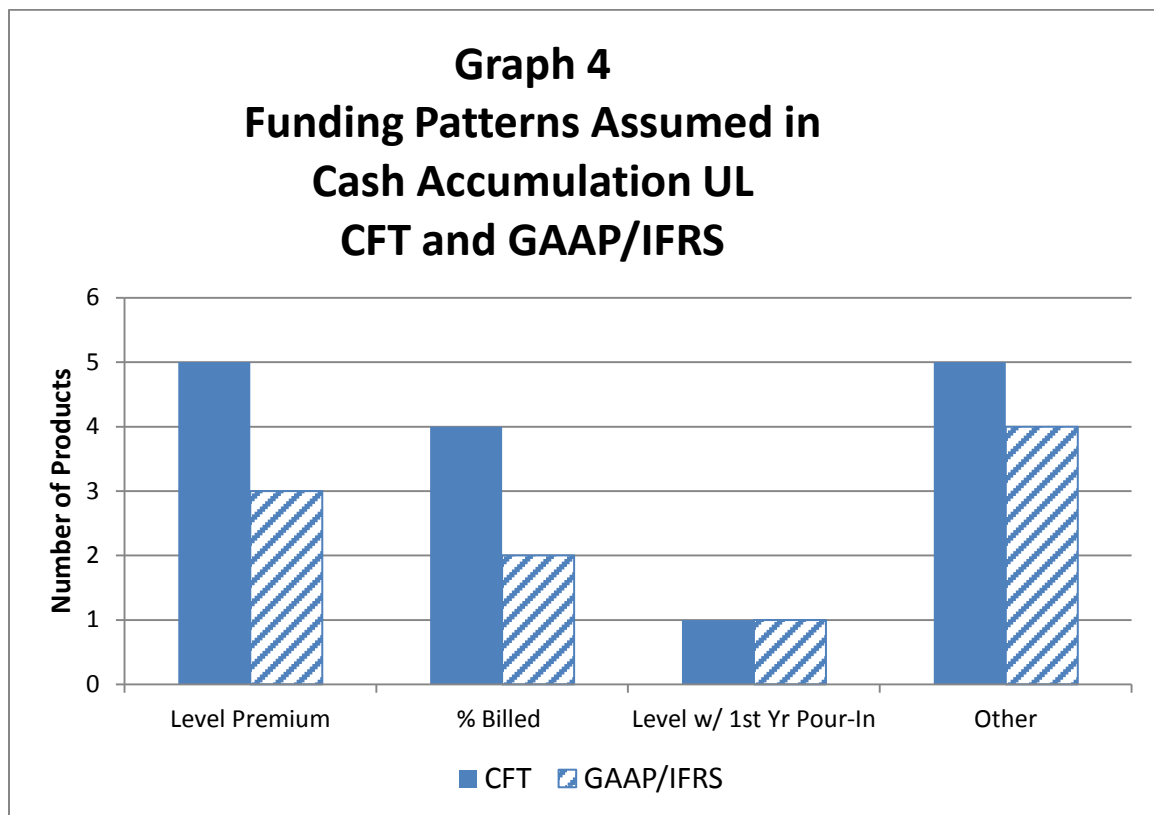
The following premium funding patterns for AccumUL products were reported by survey participants for cash flow testing and for GAAP/IFRS purposes:

- Level premium
- Percent of billed premium
- Level with first-year pour-in
- Other

The other category includes the following funding patterns.

- Assume 100 percent of paid premiums in the last 12 months but capped at the planned periodic premium (billed premium). If the current account value is funded to maturity at the current interest rate, then no further premiums are assumed.
- The assumption is based on experience studies.
- An aggregate assumption is used.
- The premium duration is dynamically adjusted based on the premium history of the policy.
- The assumption is based on historical level premium.

Note that three of the 11 AccumUL participants did not report assumptions on a GAAP/IFRS basis. Graph 4 shows the distribution of funding patterns assumed for AccumUL cash flow testing and GAAP/IFRS purposes. Multiple patterns are modeled so the results may sum up to more than the number of AccumUL products reporting such assumptions. Level premium and percent of billed premium are the most common patterns for CFT and GAAP/IFRS purposes. For the eight participants reporting GAAP/IFRS assumptions, the funding patterns are the same as those reported for CFT purposes.



For CFT purposes, the split between the AccumUL products modeled assuming only one premium funding pattern versus multiple premium funding patterns is similar to that for AccumUL pricing purposes. Seven participants reported they assume a single scenario and three assume more than one scenario. The 11th participant reported its premium persistency assumption for CFT purposes is based on experience studies but provided no further details. Only three of the first 10 participants assume more than one premium funding pattern in both pricing and CFT for AccumUL products.

Similar to CFT, the majority of AccumUL participants (six) model only one premium funding pattern versus multiple premium funding patterns for GAAP/IFRS purposes.

Use of More than One Funding Pattern

Three participants reported that more than one funding pattern is assumed in modeling AccumUL products to reflect actual experience.

3. Premium Persistency Assumptions

Unlike ULSG modeling, premium persistency assumptions assumed in modeling AccumUL products generally do not equal 100 percent in all durations. Of the 11 participants that reported assumptions for AccumUL products, eight reported premium persistency assumptions that were not equal to 100 percent in all durations. It is not common to vary premium persistency factors by gender; however, one participant does so in pricing its AccumUL product. A second participant varies its premium persistency factors by gender for pricing and CFT.

A comparison is shown of premium funding patterns and premium persistency factors used in pricing, in cash flow testing and for GAAP/IFRS purposes in Chart 13. Similar to ULSG products, the most common response was that the same funding patterns and factors are assumed for cash flow testing and GAAP/IFRS but pricing has different assumptions.

Chart 13	
Comparison	Number of AccumUL Products
Pricing \neq CFT = GAAP/IFRS	5
All equal	2
Pricing \neq CFT	2
All different	1
Pricing = CFT	1

More details about premium persistency factors by function are described below.

Pricing

Participants that reported AccumUL premium persistency factors for single premium and minimum premium funding patterns assumed 100 percent persistency in all years for pricing purposes. The exceptions to the 100 percent assumption for other funding patterns are described below.

For pricing purposes, six participants reported premium persistency factors that did not equal 100 percent. One of the six reported multiple funding patterns and the associated weights it assumes in pricing the product. We calculated the average premium persistency factors based on the reported weights for this participant. Two of the six participants reported factors that differed slightly for males and females. Another two participants did not vary their premium persistency factors by issue age. We determined the average factors over all six participants by issue age category, duration and gender. The resulting sex-distinct averages were similar, so we assumed equal weighting for the male/female premium persistency factors reported when calculating the overall averages shown below in Chart 14.

Chart 14								
Average Premium Persistency Factors for AccumUL Pricing								
Duration	Issue Age Range							
	<20	20-29	30-39	40-49	50-59	60-69	70-79	80+
1	150%	162%	164%	175%	199%	206%	212%	271%
2	83	88	90	82	77	69	60	56
3	87	92	91	86	83	76	74	52
4	93	90	90	84	82	74	67	54
5	87	89	88	83	82	75	72	53
6	85	89	88	82	82	76	72	57
7	83	89	89	83	82	75	72	59
8	86	88	89	83	81	74	72	56
9	85	87	88	82	80	74	71	68
10	88	87	88	82	79	75	70	54
11	83	85	85	79	77	72	68	50
12	83	84	84	78	77	72	68	55
13	82	83	84	78	78	73	68	60
14	81	83	83	79	79	73	68	58
15	79	82	83	79	79	73	70	50
16	76	83	83	80	79	74	69	49
17	75	82	84	80	80	73	74	50
18	73	82	83	79	79	74	72	50
19	72	81	82	79	78	74	71	49
20	72	81	83	79	79	73	71	49

The primary differences seen in premium persistency factors between males and females are found in the first year and at the youngest and oldest age ranges. (Note that the maximum issue age range reported by the two participants that assume sex-distinct factors was 70 to 79.) It is difficult to make general statements about the patterns of premium persistency factors reported for AccumUL products since they varied considerably by participant.

Cash Flow Testing and GAAP/IFRS

For cash flow testing purposes, each of the reported premium funding patterns assumed by survey participants included premium persistency factors that did not equal 100 percent in all years.

Premium persistency factors assumed in CFT that did not equal 100 percent were reported for eight products. All but one participant did not vary factors by gender. The differences by gender reported by the one participant were isolated to the first five durations and were generally less than 0.5 percent with the exception of the older ages. Note that this participant did not report factors for issue ages above 79. Another participant reported premium persistency factors for multiple funding patterns but did not report the associated weights it assumes in CFT. We calculated the average premium persistency factors based on equal weights for this participant.

Two of the eight participants did not report premium persistency factors for GAAP/IFRS purposes. Factors for four of the six participants were the same for cash flow testing and GAAP/IFRS. All six participants reported premium persistency factors that did not equal 100 percent. Four of the six did not vary factors by issues age and none of the six varied such factors by gender.

The average premium persistency factors over all participants by issue age range, duration and gender, if applicable, were determined. Similar to pricing, differences between the sex-distinct average factors were not significant, so we assumed equal weighting for the male/female premium persistency factors reported when calculating the overall averages shown below in Chart 15. Note that more participants reported premium persistency factors that did not vary by issue age for CFT and GAAP/IFRS relative to those for pricing. Four participants reported factors that were the same regardless of issue age. Charts 15 and 16 show the resulting averages for CFT and GAAP/IFRS, respectively.

Chart 15								
Average Premium Persistency Factors for AccumUL CFT								
Duration	Issue Age Range							
	<20	20-29	30-39	40-49	50-59	60-69	70-79	80+
1	175%	182%	185%	194%	212%	215%	218%	252%
2	81	86	86	81	77	70	63	62
3	84	88	86	82	80	74	71	60
4	89	87	87	82	81	75	74	61
5	84	86	84	80	80	75	72	60
6	83	86	85	80	80	75	73	62
7	82	86	86	81	80	75	73	64
8	84	85	86	81	79	74	73	62
9	83	85	85	81	79	74	73	70
10	86	85	85	81	79	75	72	60
11	84	84	84	80	78	74	72	60
12	84	83	83	79	78	74	71	63
13	82	83	83	79	79	74	72	66
14	82	82	82	79	79	74	72	64
15	80	82	82	79	79	75	73	59
16	78	82	82	79	79	75	72	58
17	77	82	82	79	80	74	76	59
18	76	81	82	79	79	75	74	59
19	75	81	82	79	79	75	73	59
20	75	81	82	79	79	74	73	58

Chart 16								
Average Premium Persistency Factors for AccumUL GAAP/IFRS Purposes								
Duration	Issue Age Range							
	<20	20-29	30-39	40-49	50-59	60-69	70-79	80+
1	201%	212%	216%	226%	250%	254%	254%	287%
2	93	88	89	87	83	81	75	67
3	96	89	88	86	82	77	75	64
4	102	88	88	85	82	79	74	65
5	95	86	84	82	80	77	73	64
6	93	86	84	80	79	76	73	66
7	90	85	84	80	77	74	71	68
8	91	82	82	77	74	71	70	66
9	94	85	85	81	77	75	73	75
10	98	85	85	81	77	76	73	64
11	95	86	84	81	77	75	72	64
12	95	84	84	80	78	75	72	68
13	94	84	83	80	78	76	73	72
14	93	83	82	80	79	76	73	70
15	91	83	82	80	79	77	75	64
16	88	83	82	81	79	78	74	64
17	87	82	82	80	79	77	79	64
18	85	82	81	80	79	78	77	64
19	84	81	81	80	78	78	75	64
20	84	81	81	80	78	77	76	64

Similar to pricing, it is difficult to make general statements about the pattern of premium persistency factors assumed in cash flow testing of AccumUL products since the patterns are unique for each participant. Premium persistency assumptions used for GAAP/IFRS purposes typically drop after the first year and are fairly level thereafter.

4. *Dynamic Assumptions*

Dynamic premium persistency assumptions are rare for AccumUL pricing, cash flow testing and GAAP/IFRS purposes. One of the 11 survey participants includes dynamic assumptions for pricing purposes. Another participant

includes such assumptions for CFT and GAAP/IFRS purposes, and two additional participants include dynamic assumptions for CFT only.

The basis of dynamic premium persistency assumptions was described by participants as follows.

- Lapse and/or premium formulas are based on the difference in market rates and current rates and, in some cases, the presence of a surrender charge.
- Dynamic adjustment of the premium duration is based on the premium history of the policy.

5. *Sensitivity Testing of Premium Persistency Assumptions*

Sensitivity testing of premium persistency assumptions is more common for AccumUL products than for ULSG products. Six of the 11 products (55 percent) did *not* include sensitivity testing for pricing purposes. (This compares to 74 percent for pricing of ULSG products.) The percentage increased to 64 percent for CFT and to 100 percent for GAAP/IFRS purposes for AccumUL products.

Five of the 11 participants conduct sensitivity testing in pricing via different premium payment patterns. A description of the different patterns tested includes:

- Level premium assumption
- Level premium needed to fund the contract based on guaranteed interest, current loads and 110 percent of current cost-of-insurance rates
- 100 percent of target premium in all years
- Guideline level premium in all years
- Dump-in premium assumption
- Higher first-year premium
- Extreme premium scenarios
- Different weights on premium patterns

Testing of the payment of the minimum level premium required for the initial five-year no-lapse guarantee period was mentioned as a sensitivity test involving a decrease in the premium persistency in pricing.

Sensitivity testing in CFT of AccumUL products includes testing different premium payment patterns, such as assuming no future premiums. Increasing and decreasing premium persistency and assuming additional premium when competitive are other sensitivity tests mentioned.

Of the participants where the measurement of the impact of sensitivity testing on pricing was reported (five responses), it was most common to look at the impact based on two measures. All five reported measuring the impact on the IRR/ROE, and one each for breakeven year, profit margin, economic value and present value of distributable earnings.

Two participants reported measuring the impact of sensitivity testing on CFT via asset adequacy pass or fail, and one additional participant looks at the change in the present value of ending surplus.

Responses to the question regarding the impact of changes in premium persistency on AccumUL products were categorized as:

- Minimal (five products)
- Significant (two products)
- More sensitive to short pay premium persistency than level pay (one product)
- More sensitive to lower face amount persistency (one product)

Sensitivity tests of premium persistency assumptions for AccumUL products are performed for the reasons shown below. The responses were received from one participant each, with the exception of the first reason shown.

- Previous products have set a pattern precedent. (two responses)
- Certain distribution channels have indicated a pattern.
- Consultant recommended testing. The conservativeness of existing reserves is tested. The impact of greater premiums is studied when pricing margins may not be achieved.
- Actuarial judgment is used to determine the necessity of testing.
- A large block of business with high minimum guarantee rates displayed a large influx of premium in the prior year.

Sensitivity testing is a regulatory requirement. Current Assumption Universal Life (CAUL)

Eleven participants reported assumptions for one or more single life current assumption UL products, with one of the 11 also reporting assumptions for survivorship life CAUL. The single life and survivorship life responses were analyzed on a combined basis, considering 14 separate products.

1. Product Details

Sales

A summary of 2010 sales volumes for the reported CAUL products is shown in Chart 17. We included those responses that reported sales on both an annualized premium basis and face amount basis (11 of the 14 products).

Chart 17					
Sales Measure	2010 Sales Volume of CAUL Products				
	Total	Average by Product	Median	Minimum	Maximum
Annualized Premium (000s)	\$248,981	\$22,635	\$11,400	\$1,491	\$75,000
Face Amount (\$M)	\$11,889	\$1,081	\$411	\$3	\$3,469

Following is a tally of the responses from the 11 participants that expressed the sales of the products they reported as a percentage of 2010 CAUL sales (based on annualized premium).

Chart 18	
Percentage of the Participant's 2010 CAUL Sales	Number of Participants
100	7
At least 70, but less than 100	2
Less than 70	2

Product Characteristics

Chart 19 includes a summary of the responses received regarding distribution channels used for CAUL products. It was most common for the reported products to be sold through two distribution channels. The broker, agency-building and PPGA channels were the top three channels through which the reported CAUL products were sold.

Chart 19			
CAUL: Distribution Channels			
Number of Channels Where Sold	Number of Participants	Channel Where Sold	Number of Participants
1	4	Broker	8
2	7	Agency Building	6
3	1	PPGA	6
4	1	Stockbroker	2
		Banks & Financial Institutions	1
		MLEA	1
		Worksite	1

Twelve of the 14 products are fully underwritten. One product is underwritten on a guaranteed issue basis and another on a simplified issue basis. The target markets reported for CAUL products were quite diverse, as shown in Chart 20 below. Note that multiple markets were reported by three participants.

Chart 20	
Target Market	Number of Participants
Higher Net Worth	6
Middle Market	5
Middle to Upper Market	1
Lower to Middle Market	1
Older Ages	1
Premium Financing	1

Chart 20	
Target Market	Number of Participants
Business Sales	1
Mortgage Insurance for Middle-Income Homeowners	1
Term UL	1

2. Funding Patterns

Funding patterns assumed by survey participants for CAUL modeling purposes were grouped into high level categories. Note that some participants reported multiple premium funding patterns that fall into the same high level category.

Pricing

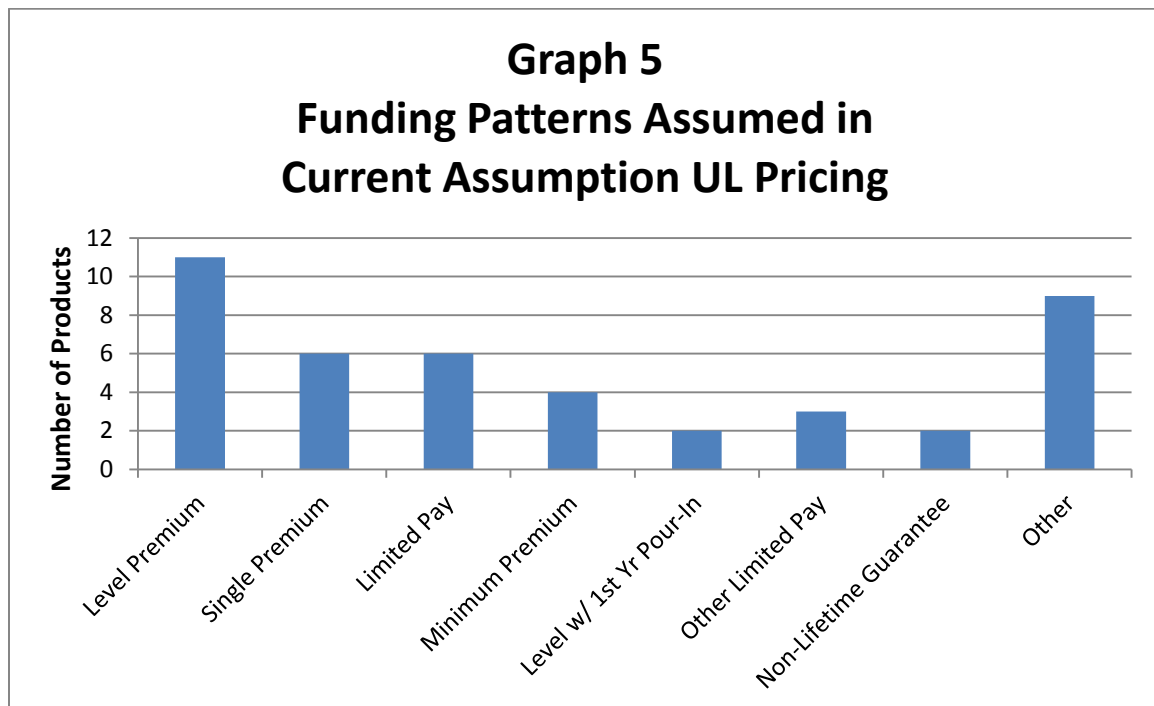
For pricing purposes, funding patterns typically fall into the following categories:

- Level premium
- Single premium
- Limited pay (10-pay or 20-pay)
- Minimum premium
- Level with first-year pour-in
- Other limited pay
- Nonlifetime guarantee
- Other

Four participants reported funding patterns that fall into the other category. This category includes those where the description was somewhat generic, such as a low, medium or high premium level assumption, or lightly funded. Others include 30-year term, 30-year coverage where target account value at the end of 30 years is the sum of premiums paid, and 1035 exchange with no additional premium.

Graph 5 shows the distribution of funding patterns assumed in CAUL pricing. Note that the results sum up to more than the number of CAUL products reported in the survey due to the modeling of multiple patterns for some

products. The most common patterns modeled for CAUL pricing purposes are level premium, single premium and limited pay (10-year and 20-year).



Premium persistency factors assumed in pricing CAUL were reported for 13 of the 14 products. Twelve of these 13 CAUL products are priced assuming multiple premium funding patterns, with the majority modeling each of the patterns separately and the remainder assuming a weighted average of the premium persistency factors for each of the funding patterns assumed. This is similar to ULSG products where pricing based on multiple premium funding patterns is common.

Cash Flow Testing and GAAP/IFRS

The following premium funding patterns for CAUL products were reported by survey participants for cash flow testing and for GAAP/IFRS purposes:

- Level premium
- Percent of billed premium
- Minimum premium
- Nonlifetime guarantee

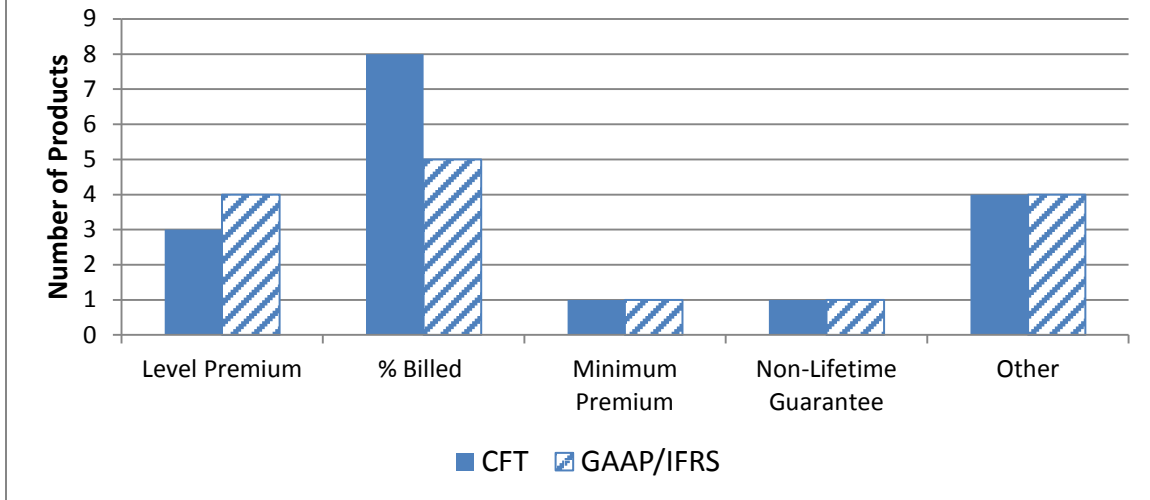
- Other

The following funding patterns were included in the other category.

- Assume 100 percent of paid premiums in the last 12 months but capped at the planned periodic premium (billed premium). If the current account value is funded to maturity at the current interest rate, then no further premiums are assumed.
- Assume 100 percent of paid premiums in the last 12 months if the policy is in the second duration and assume the target premium if it is in the first duration. The fund level is split between high, medium and low based on a comparison of the fund value to the accumulated target premium.

Note that GAAP/IFRS assumptions were not reported for three of the 14 CAUL products. Graph 6 shows the distribution of funding patterns assumed for CAUL CFT and GAAP/IFRS purposes. Multiple patterns are modeled so the results may sum up to more than the number of CAUL products reporting such assumptions. By far, percent of billed premium is the most common pattern for CFT purposes and is also the most common funding pattern reported for GAAP/IFRS purposes. For eight products, GAAP/IFRS funding patterns were the same as reported for CFT purposes. For an additional two products, the average billed premium per \$1,000 per cell is assumed for CFT purposes, but the actual billed premium per policy is assumed for GAAP/IFRS purposes. The funding pattern for a third product was reported for GAAP/IFRS purposes but not for CFT purposes.

Graph 6
Funding Patterns Assumed in
Current Assumption UL
CFT and GAAP/IFRS



For CAUL cash flow testing purposes, the modeling of a single funding pattern is more common than modeling multiple patterns. Of the 13 products for which CFT assumptions were reported, 10 assume a single funding pattern and three assume more than one funding pattern. Only one of the 10 participants assumes only one premium funding pattern in both pricing and CFT for CAUL products. For CAUL products, of those participants that model multiple scenarios for pricing and only one scenario for CFT, 89 percent (eight of nine) model only a percent of billed premium scenario for CFT. The rationale cited for modeling a single funding pattern for ULSG products for CFT also applies here. It appears a simplified approach is used for CFT premium persistency assumptions. Perhaps companies choose the most conservative pattern or the most frequent pattern actually experienced. If companies are simplifying CFT assumptions, they should verify that the simplification does not materially misrepresent the business. Also, the use of a single funding pattern may be explained by the fact that when CFT is performed, there is additional information about the policyholder available to develop premium persistency assumptions (e.g., planned periodic premium is known and billing history is available).

Similar to CFT, only one premium funding pattern is modeled for the majority of CAUL products (10) for GAAP/IFRS purposes rather than multiple premium funding patterns.

Use of More than One Premium Funding Pattern

Five participants reported the reason more than one premium funding pattern is assumed in modeling CAUL products. Three of the five reported the use of multiple funding patterns to reflect actual experience, and the final two reflect multiple funding patterns to capture the different ways products are sold.

3. *Premium Persistency Assumptions*

Premium persistency assumptions assumed in modeling CAUL products vary by function between those that do not equal 100 percent in all durations and those that do. Of the 14 products for which assumptions were reported, only three reported premium persistency assumptions equal to 100 percent in all durations for all functions.

A comparison is shown of premium funding patterns and premium persistency factors used in pricing, in CFT and for GAAP/IFRS purposes in Chart 21. The most common response was that the same funding patterns and factors are assumed for cash flow testing and GAAP/IFRS but pricing has different assumptions.

Chart 21	
Comparison	Number of CAUL Products
Pricing ≠ CFT = GAAP/IFRS	6
All equal	3
All different	3
Pricing = CFT	1
Only reported GAAP/IFRS	1

More details about premium persistency factors by function are described below.

Pricing

Participants that reported CAUL premium persistency factors for single premium and nonlifetime guarantee funding patterns assumed 100 percent persistency in all years for pricing purposes. The exceptions to the 100 percent assumption for other funding patterns are described below.

For pricing purposes, premium persistency factors for three products did not equal 100 percent. One of the three reported multiple funding patterns and the associated weights it assumes in pricing the product. We calculated the average premium persistency factors based on the reported weights for this participant. The second of the two did not provide the weights, but we calculated the average premium persistency factors assuming equal weighting of the funding patterns. The third reported one set of factors that was not equal to 100 percent. We determined the average factors over all three participants by issue age, category and duration. Chart 22 shows the resulting averages.

Chart 22								
Average Premium Persistency Factors for CAUL Pricing								
Duration	Issue Age Range							
	<20	20-29	30-39	40-49	50-59	60-69	70- 79	80+
1	133%	133%	133%	133%	133%	133%	133%	133%
2-10	71	71	71	70	70	70	70	70
11-20	62	62	62	62	62	62	62	62

The pattern of premium persistency factors shown above seems reasonable given the inclusion of 10-pay and dump-in with level premium funding patterns. There is less variation in the factors by issue age and duration relative to factors reported previously for ULSG and AccumUL products.

Cash Flow Testing and GAAP/IFRS

For CFT purposes, premium persistency factors did not equal 100 percent in all years for all but four of the products where such factors were reported.

Participants reported CFT premium persistency factors for nine products that did not equal 100 percent. For one of the nine products, a formula was reported rather than actual premium persistency factors for both CFT and GAAP/IFRS. The formula varies the factors based on the duration of the contract at the start of the projection. We did not include these factors in our calculation of the average premium persistency factors.

Of the remaining eight products, the CFT premium persistency factors for three products were reported separately for annual mode and monthly mode business. Our summaries reflect the annual mode premium persistency factors. Premium persistency factors for one product were reported for multiple funding patterns, along with the respective weights. We calculated the average premium persistency factors based on the reported weights for this participant. The funding patterns for another product were described in generic terms, such as high-, medium- and low-funded policies. The average of the reported premium persistency factors was determined based on an equal weighting for each funding category. For three remaining products, a single scenario was reported with factors that do not equal 100 percent in all durations. None of the eight reported CFT premium persistency factors that vary by issue age.

Seven of the eight CAUL products for which CFT factors were reported also reported premium persistency factors for GAAP/IFRS purposes. GAAP/IFRS factors were reported for one additional product, as well. Premium persistency factors for five of the seven products were the same for cash flow testing and GAAP/IFRS. All eight products included premium persistency factors for GAAP/IFRS that did not equal 100 percent and none varied the factors by issue age.

The average premium persistency factors over all products by issue age range and duration were determined. Charts 23 and 24 show the resulting averages for CFT and GAAP/IFRS, respectively.

Chart 23								
Average Premium Persistency Factors for CAUL CFT								
Duration	Issue Age Range							
	<20	20-29	30-39	40-49	50-59	60-69	70-79	80+
1	94%	94%	94%	94%	94%	94%	94%	94%
2	74	74	74	74	74	74	74	74
3	71	71	71	71	71	71	71	71
4-5	67	67	67	67	67	67	67	67
6-7	66	66	66	66	66	66	66	66
8	68	68	68	68	68	68	68	68
9-10	67	67	67	67	67	67	67	67
11-12	66	66	66	66	66	66	66	66
13-15	67	67	67	67	67	67	67	67
16-20	66	66	66	66	66	66	66	66

Chart 24								
Average Premium Persistency Factors for CAUL GAAP/IFRS Purposes								
Duration	Issue Age Range							
	<20	20-29	30-39	40-49	50-59	60-69	70-79	80+
1	94%	94%	94%	94%	94%	94%	94%	94%
2	79	79	79	79	79	79	79	79
3	74	74	74	74	74	74	74	74
4	71	71	71	71	71	71	71	71
5	69	69	69	69	69	69	69	69
6	68	68	68	68	68	68	68	68
7	66	66	66	66	66	66	66	66
8	65	65	65	65	65	65	65	65
9	64	64	64	64	64	64	64	64
10	63	63	63	63	63	63	63	63
11	62	62	62	62	62	62	62	62
12-13	61	61	61	61	61	61	61	61
14-15	60	60	60	60	60	60	60	60
16-17	59	59	59	59	59	59	59	59
18-19	58	58	58	58	58	58	58	58
20	57	57	57	57	57	57	57	57

Similar to other premium persistency patterns, there is little variation in CAUL premium persistency factors after the first year. The average factors in the above charts also show little variation by issue age. For two of the CAUL products, it was reported that premium persistency factors for GAAP/IFRS purposes continue to drop by 5 percent per year for years 20 and thereafter.

4. *Dynamic Assumptions*

Dynamic premium persistency assumptions are rare for CAUL pricing, CFT and GAAP/IFRS purposes. One of the 11 participants includes dynamic assumptions for pricing, CFT and GAAP/IFRS purposes. An additional participant includes such assumptions for CFT purposes only.

The basis of dynamic premium persistency assumptions was described by this participant as follows.

- Assume a percentage of policyholders below a specified age will pay an ART premium (for pricing) or at least the minimum premium (for CFT and GAAP/IFRS purposes) to keep the policy in force. The percentage increases for policyholders over an older specified age.
- A multiplicative factor is applied to the premium persistency factor, dependent on the difference between the credited rate and that of competitors.

In the researchers' experience, this type of assumption seems to be more appropriate for an AccumUL product than a CAUL product.

5. *Sensitivity Testing of Premium Persistency Assumptions*

Sensitivity testing of premium persistency assumptions is not common for CAUL products. Twelve of the 14 products (86 percent) did *not* include sensitivity testing for pricing. This percentage increased to 93 percent for CFT purposes. No sensitivity testing was reported for CAUL products for GAAP/IFRS purposes.

Two participants conduct sensitivity testing in pricing via different premium payment patterns. One of the two reported looking at extreme premium scenarios, as well as different weights on premium funding patterns. A third participant did not report doing sensitivity testing but noted that each funding

scenario used in pricing was looked at separately to ensure shifts in the mix of scenarios assumed in the pricing model would have little impact in overall profitability.

One participant reported additional sensitivity tests in pricing of:

- Increasing premium persistency by 100 percent of the ART premium
- Decreased premium persistency by two times the target premium in year one only (a funding pattern of the level minimum premium with target in year one and premium persistency factors of 200 percent in year one and 84 percent thereafter is assumed)
- No premiums after 20 years
- ART funding in all years after the current premium is insufficient
- High net amount at risk in the tail
- Low net amount at risk in the tail

One participant reported sensitivity testing for CFT of CAUL products as decreased premium persistency (the premium suspension rate is doubled) and insufficient ART funding in all years after the current premium.

Of the participants where the measurement of the impact of sensitivity testing on pricing was reported (two participants), one looks at two measures and the second looks at one measure. For pricing purposes, the impact is measured based on the IRR, economic value and new business value. For CFT purposes, the impact is measured based on the present value of surplus.

The impact of changes in premium persistency on CAUL products was categorized as minimal by two participants and as significant by one participant.

Sensitivity tests of premium persistency assumptions for CAUL products are performed for the reasons shown below:

- Previous products have set pattern precedent (two responses)
- Anticipation of adverse selling patterns (one response)

Indexed Universal Life (IUL)

Nine participants reported assumptions for single life IUL products, with two of the nine submitting responses for survivorship life IUL products. Survey participants submitted the following IUL product types:

IUL Product Type	Number of Products
Cash Accumulation IUL	7
IUL with Secondary Guarantees	2
Survivorship IUL with Secondary Guarantees	2
Current Assumption IUL	1
Survivorship Cash Accumulation IUL	1

Summaries are based on all IUL product types combined, with 12 distinct products included. (Since the response for one survivorship product was essentially the same as that submitted for the single life version, we treated them as one product.) In general, combining the responses for all product types does not mask significant differences by IUL product type, but any differences of note are reported below. Variations by participant are more significant than variations by IUL product type.

1. Product Details

Sales

A summary of 2010 sales volumes for the reported IUL products is shown in Chart 25. Sales were reported on both an annualized premium basis and face amount basis for all 12 products.

Chart 25					
Sales Measure	2010 Sales Volume of Indexed UL Products				
	Total	Average by Product	Median	Minimum	Maximum
Annualized Premium (000s)	\$256,901	\$21,408	\$13,610	\$2,800	\$61,000
Face Amount (\$M)	\$16,667	\$1,389	\$911	\$109	\$5,090

All products in the survivorship IUL with secondary guarantee, survivorship cash accumulation IUL and current assumption IUL categories represented 100 percent of sales for each of the participants reporting sales in those categories. Chart 26 includes a tally of the sales for cash accumulation IUL and indexed UL with secondary guarantee as a percentage of 2010 sales (based on annualized premium).

Chart 26		
Percentage of the Participant's 2010 Sales	Number of Products	
	Cash Accumulation IUL	IUL with Secondary Guarantee
100	4	1
At least 70, but less than 100	1	1
Less than 70	2	

Product Characteristics

Chart 27 includes a summary of the responses received regarding distribution channels used for IUL products. It was most common for the reported products to be sold through one or two distribution channels. The PPGA and agency-building channels are the top two channels through which the reported IUL products were sold.

Chart 27				
IUL: Distribution Channels				
Number of Channels Where Sold	Number of Products		Channel Where Sold	Number of Products
1	5		PPGA	8
2	4		Agency Building	6
3	2		Broker	4
			Independent Marketing Organization	1

Underwriting was reported for 11 of the 12 products and all of those 11 are fully underwritten. The target markets reported for IUL products were fairly similar, as shown in Chart 28 below. Note that only one product was reported to be sold via multiple markets.

Chart 28	
Target Market	Number of Products
High Net Worth	5
Middle Market	4
Middle to Upper Market	2
Affluent	1

2. Funding Patterns

Funding patterns assumed by survey participants for IUL modeling purposes were grouped into high level categories. Note that some participants reported multiple premium funding patterns that fall into the same high level category.

Pricing

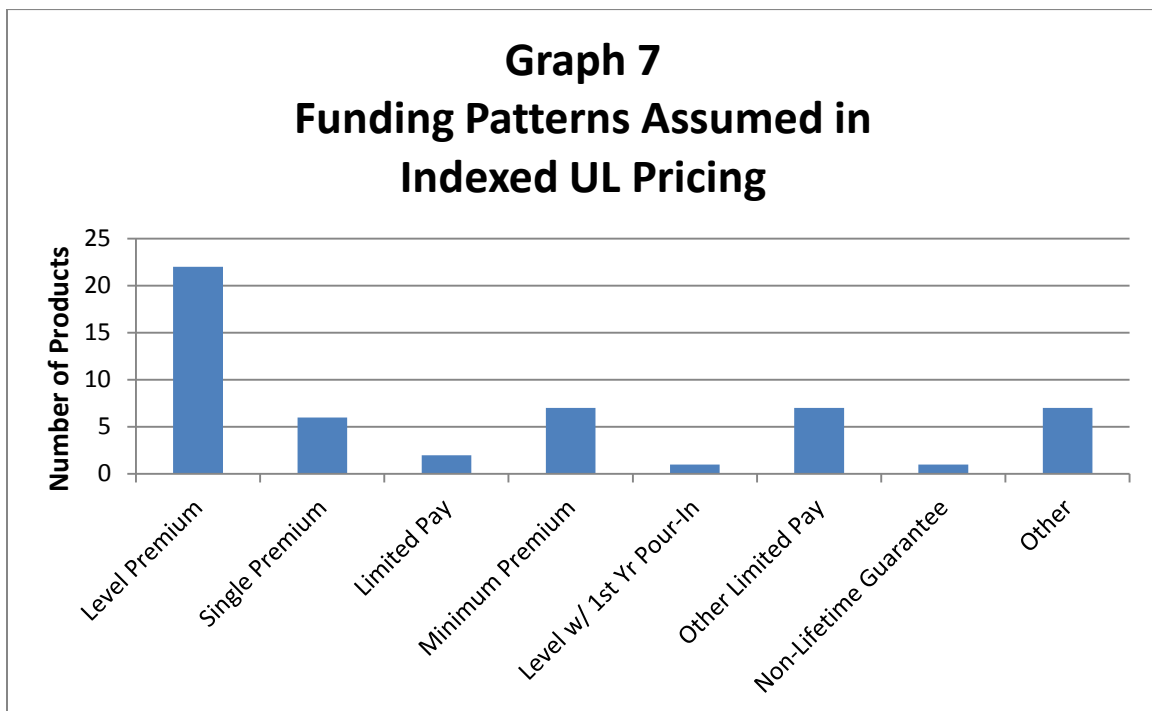
For pricing purposes, funding patterns typically fall into the following categories:

- Level premium
- Single premium
- Limited pay (10-pay or 20-pay) (IUL secondary guarantee products only)

- Minimum premium
- Level with first-year pour-in (cash accumulation IUL only)
- Other limited pay
- Nonlifetime guarantee (IUL secondary guarantee products only)
- Other

Funding patterns that fall into the other category include maximum premium and MEC. Four participants reported funding patterns that fall into this category.

Graph 7 shows the distribution of funding patterns assumed in IUL pricing. Note that the results sum up to more than the number of IUL products reported in the survey due to the modeling of multiple patterns for some products. By far the most common pattern modeled for IUL pricing purposes is level premium.



Premium persistency factors assumed in pricing were reported for all IUL products. All 12 IUL products are priced assuming multiple premium funding patterns, with seven of the 12 assuming a weighted average of the premium persistency factors for each of the funding patterns assumed.

Cash Flow Testing and GAAP/IFRS

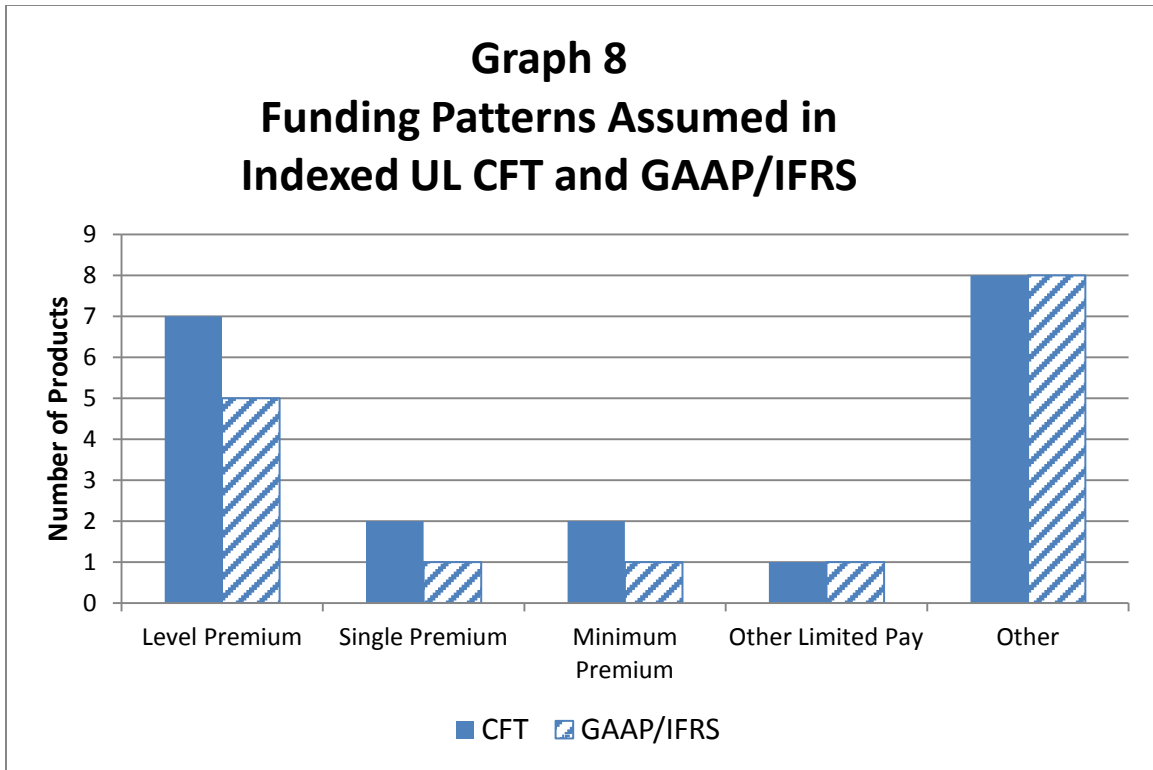
The following premium funding patterns for indexed UL products were reported by survey participants for cash flow testing and for GAAP/IFRS purposes:

- Level premium
- Single premium
- Percent of billed premium
- Minimum premium
- Other limited pay (cash accumulation IUL only)
- Other

The other category includes the following funding patterns.

- Assume 100 percent of paid premiums in the last 12 months but capped at the planned periodic premium (billed premium). If the current account value is funded to maturity at the current interest rate, then no further premiums are assumed.
- Assume 100 percent of paid premiums in the last 12 months if the policy is in the second duration and assume the target premium if it is in the first duration. The fund level is split between high, medium and low based on a comparison of the fund value to the accumulated target premium.
- Assume maximum premiums.
- An aggregate assumption is used.

Graph 8 shows the distribution of funding patterns assumed in indexed UL cash flow testing. Multiple patterns are modeled so the results may sum up to more than the number of IUL products reporting such assumptions. By far, level premium funding is the most common pattern for CFT and GAAP/IFRS purposes for IUL products. For the 10 products for which GAAP/IFRS assumptions were reported, the funding patterns are the same as those reported for CFT purposes.



Unlike modeling of IUL products for pricing purposes, only three of the 12 IUL products include modeling of more than one premium funding pattern for CFT and GAAP/IFRS purposes. Seven participants reported they assume a single funding pattern. Premium persistency assumptions for CFT and GAAP/IFRS purposes were not reported for the final two products.

Use of More than One Funding Pattern

Five participants reported the following reasons why more than one funding pattern is assumed in modeling indexed UL products:

- To capture the different ways the product is marketed and sold
- To reflect experience, market research and historical premium studies
- To reflect different anticipated policyholder behavior
- To refine the pricing of IUL products
- To determine profit sensitivity to premium patterns

3. Premium Persistency Assumptions

Premium persistency assumptions assumed in modeling IUL products are split between those that do and those that do not equal 100 percent in all durations. Of the 12 products for which assumptions were reported, only one included assumptions equal to 100 percent in all durations for all functions (pricing, CFT and GAAP/IFRS). There is considerable variation in the IUL premium persistency factors reported by participant, rather than variation by IUL product type.

Chart 29 shows a comparison of premium funding patterns and premium persistency factors used in pricing and cash flow testing, and for GAAP/IFRS purposes. Similar to ULSG products, the most common response was that the same funding patterns and factors are assumed for cash flow testing and GAAP/IFRS but pricing has different assumptions.

Chart 29	
Comparison	Number of IUL Products
Pricing \neq CFT = GAAP/IFRS	8
All equal	2
Pricing \neq CFT	1
Reported Pricing Assumptions Only	1

More details about premium persistency factors by function are described below.

Pricing

For pricing purposes, premium persistency factors for seven products did not equal 100 percent and for five products did equal 100 percent in all durations. Six of the seven included multiple funding patterns. The associated weights assumed in pricing the IUL product were reported for five of these six products and we calculated the average premium persistency factors based on the reported weights for these participants. We assumed equal weighting of persistency factors for the multiple funding patterns reported for the sixth product. The seventh product included factors for only one premium funding pattern. One of the seven products included factors that differed slightly for

males and females. Premium persistency factors for five of the remaining six products did not vary by issue age. We determined the average factors over all seven products by issue age category, duration and gender. The resulting sex-distinct averages were similar, so we assumed equal weighting for the male/female premium persistency factors reported when calculating the overall averages shown below in Chart 30.

Chart 30								
Average Premium Persistency Factors for IUL Pricing								
Duration	Issue Age Range							
	<20	20-29	30-39	40-49	50-59	60-69	70-79	80+
1	99%	98%	99%	99%	99%	99%	99%	99%
2	80	79	80	80	80	81	81	81
3	78	77	78	79	79	80	80	80
4	77	75	77	78	78	78	78	78
5	71	69	71	72	72	72	72	72
6	66	64	65	66	66	67	67	67
7	65	63	65	66	66	66	66	66
8	62	60	62	62	62	63	63	63
9	61	60	61	62	62	62	62	62
10	61	59	61	61	62	62	62	62
11	59	57	58	59	59	60	60	60
12	58	57	58	59	59	59	59	59
13	58	57	58	58	58	59	59	59
14	58	56	57	58	58	58	58	58
15	57	56	57	58	58	58	58	58
16	57	56	57	57	51	51	51	51
17	57	55	56	57	51	51	51	51
18	56	55	56	57	50	51	51	51
19	56	55	56	56	50	50	50	50
20	56	55	55	56	50	50	50	50

Small differences are seen in premium persistency factors between males and females in all cells, with the largest differences seen in the issue age 60-69 range. The average premium persistency factors for IUL products are generally lower than those reported for ULSG, AccumUL and CAUL products. These values may look lower merely because average target premiums on IUL are

higher than for other FPUL products. However, the pattern of premium persistency factors for years one and two suggests some real differences, such as limited single pay or high short pay.

Cash Flow Testing and GAAP/IFRS

For CFT purposes, seven of the 11 reported products included premium persistency factors that did not equal 100 percent in all years. Only two products included multiple funding patterns, with one of the two including the associated weights it assumes in CFT. We weighted the premium persistency factors equally for the second of the two.

For GAAP/IFRS purposes, premium persistency factors were reported for six products and were equal to those reported for CFT purposes. For both CFT and GAAP/IFRS, factors did not vary by gender for any of the products and only one product includes premium persistency factors that vary by issue age.

The average premium persistency factors over all participants by issue age range and duration were determined. Charts 31 and 32 show the resulting averages for CFT and GAAP/IFRS, respectively.

Chart 31								
Average Premium Persistency Factors for IUL CFT								
Duration	Issue Age Range							
	<20	20-29	30-39	40-49	50-59	60-69	70-79	80+
1	99%	98%	99%	99%	99%	99%	99%	99%
2	61	60	61	61	61	62	62	62
3	57	56	57	58	58	58	58	58
4	55	53	55	56	56	56	56	56
5	54	51	53	54	54	54	54	54
6	53	51	52	53	53	53	53	53
7	51	49	51	52	52	52	52	52
8	50	49	50	51	51	51	51	51
9	50	48	50	50	50	51	51	51
10	49	48	49	50	50	50	50	50
11	49	47	48	49	49	49	49	49
12	48	47	48	49	49	49	49	49
13	48	46	48	48	48	48	48	48
14	47	46	47	48	48	48	48	48
15	47	46	47	47	47	48	48	48
16	47	45	46	47	47	47	47	47
17	46	45	46	46	46	47	47	47
18	46	45	46	46	46	46	46	46
19	45	44	45	46	46	46	46	46
20	45	44	45	45	45	45	45	45

Chart 32								
Average Premium Persistency Factors for IUL GAAP/IFRS Purposes								
Duration	Issue Age Range							
	<20	20-29	30-39	40-49	50-59	60-69	70-79	80+
1	99%	98%	99%	99%	99%	99%	99%	99%
2	57	56	57	58	58	58	58	58
3	54	52	54	55	55	55	55	55
4	52	50	52	53	53	53	53	53
5	51	49	50	51	51	52	52	52
6	50	47	49	50	50	51	51	51
7	48	46	48	49	49	49	49	49
8	47	45	47	48	48	48	48	48
9	47	45	46	47	47	48	48	48
10	46	44	46	46	46	47	47	47
11	45	44	45	46	46	46	46	46
12	45	43	44	45	45	46	46	46
13	44	43	44	45	45	45	45	45
14	44	42	43	44	44	44	44	44
15	43	42	43	44	44	44	44	44
16	43	41	42	43	43	43	43	43
17	42	41	42	43	43	43	43	43
18	42	40	42	42	42	42	42	42
19	41	40	41	42	42	42	42	42
20	41	40	41	41	41	42	42	42

Similar to pricing, the average premium persistency factors assumed in cash flow testing of indexed UL products are generally lower than those reported for other FPUL products. The averages reported for GAAP/IFRS purposes were lower than those reported for CFT purposes.

4. *Dynamic Assumptions*

Dynamic premium persistency assumptions are rare for indexed UL pricing, cash flow testing and GAAP/IFRS purposes. One of the nine survey participants includes dynamic assumptions for pricing purposes but provided no details. Another participant includes such assumptions for CFT purposes. This participant described the basis of its dynamic premium persistency assumption

as an interest rate basis used along with a formula that incorporates the effect of the difference in market rates and the current crediting rate.

5. *Sensitivity Testing of Premium Persistency Assumptions*

Sensitivity testing of premium persistency assumptions is more common for indexed UL products than for other FPUL products. Five of the 12 products include sensitivity testing in pricing of IUL products, with an additional product including such testing for CFT purposes. None of the IUL products are sensitivity tested for GAAP/IFRS purposes for IUL products.

All three participants conduct sensitivity testing in pricing via different premium payment patterns. One participant commented that it looks at extreme scenarios, as well as different weights on the premium funding patterns. A second participant noted that using different premium funding patterns is the way it measures sensitivity to premium persistency.

Increasing and decreasing premium persistency was reported by one participant for both pricing and CFT purposes. An increase/decrease of 0.5 percent in the premium suspension rate in all years is tested for CFT purposes, but no amount was reported for sensitivity testing for pricing purposes.

A fourth participant noted it modifies policy persistency to the extent that premium patterns indicate they should change.

Of the participants where the measurement of the impact of sensitivity testing on pricing was reported (four responses), two look at the impact based on three measures, one participant looks at two measures, and the last participant looks at one profit measure. All four reported measuring the impact on the IRR, two for profit margin, and one each for ROE, economic value and market consistent embedded value.

One participant reported it measures the impact of sensitivity testing on CFT via asset adequacy pass or fail.

Responses to the question regarding the impact of changes in premium persistency on IUL products were categorized as:

- Minimal (two responses)
- Significant (two responses)
- More sensitive to short pay premium persistency than level pay (one response)
- More sensitive to older age persistency (one response)
- Lower funding levels are generally less profitably than higher funding levels (one response)

Sensitivity tests of premium persistency assumptions for indexed UL products are performed for the reasons shown below. Responses were received from one participant each, with the exception of the first reason shown.

- Previous products have set pattern precedent. (three responses)
- Certain distribution channels have indicated a pattern.
- The company mandates a specific test.
- The impact of producer behavior in selling premium flexibility is measured.

Variable Universal Life (VUL)

Five participants reported assumptions for single life and survivorship variable UL products. Survey participants submitted the following VUL product types.

VUL Product Type	Number of Products
Cash Accumulation VUL	5
VUL with Secondary Guarantees	1
Survivorship VUL with Secondary Guarantees	2
Protection Focused VUL	1

Summaries are based on all VUL product types combined, with nine distinct products included. In general, combining the responses for all product types does not mask significant differences by VUL product type, but any differences of note are reported below. Variations by participant are more significant than variations by VUL product type.

1. Product Details

Sales

Chart 33 shows a summary of 2010 sales volumes for the reported VUL products. Sales were reported on both an annualized premium basis and face amount basis for all nine products.

Chart 33					
Sales Measure	2010 Sales Volume of VUL Products				
	Total	Average by Product	Median	Minimum	Maximum
Annualized Premium (000s)	\$55,591	\$6,177	\$6,200	\$580	\$11,900
Face Amount (\$M)	\$3,663	\$407	\$300	\$46	\$1,300

All VUL product types that were reported other than cash accumulation VUL represented 100 percent of sales. One product represented 99 percent of its cash accumulation VUL sales on an annualized premium and face amount basis. A second product represented 66 percent of its cash accumulation VUL sales on an annualized premium basis and 71 percent on a face amount basis. The remaining three products represented 100 percent of cash accumulation VUL sales.

Product Characteristics

Chart 34 includes a summary of the responses received regarding distribution channels used for VUL products. It was most common for the reported products to be sold through two or four distribution channels. The PPGA and broker channels are the top two channels through which the reported VUL products were sold.

Chart 34				
VUL: Distribution Channels				
Number of Channels Where Sold	Number of Products		Channel Where Sold	Number of Products
2	3		PPGA	4
4	2		Broker	4
			Agency Building	2
			Stockbroker	2
			Banks & Financial Institutions	2

All nine VUL products are fully underwritten. The target markets reported for VUL products are shown in Chart 35 below. The high net worth market was the most common target market reported. Note that two products were reported to be sold via multiple markets.

Chart 35	
Target Market	Number of Products
High Net Worth	7
Higher Income Wage Earners	2
Middle Market	1
Business Sales	1
Small Business Owners	1

2. Funding Patterns

Funding patterns assumed by survey participants for VUL modeling purposes were grouped into high level categories. Unlike the fixed FPUL products, only one of the VUL products includes multiple premium funding patterns that fall into the same high level category. Differences in the use of a single funding pattern versus multiple patterns for pricing, CFT and GAAP/IFRS varies more by participant than by VUL product type.

Pricing

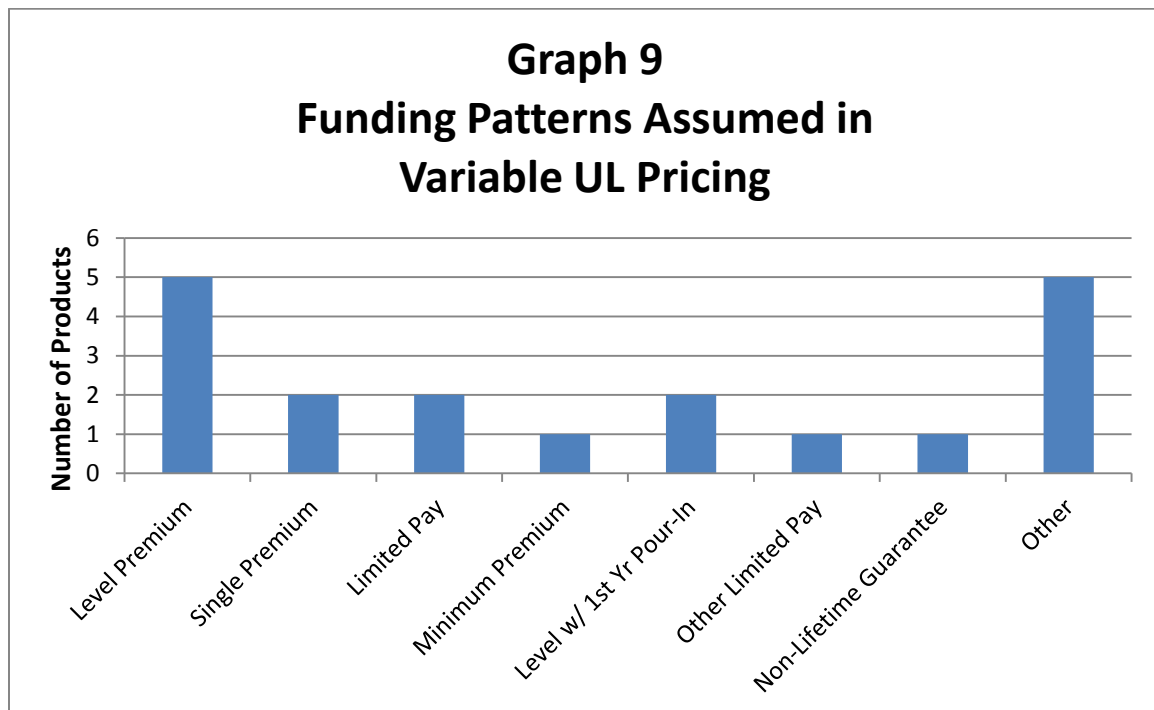
For pricing purposes, funding patterns typically fall into the following categories:

- Level premium
- Single premium
- Limited pay (10-pay or 20-pay)
- Minimum premium (cash accumulation VUL only)
- Level with first-year pour-in
- Other limited pay (cash accumulation VUL only)
- Nonlifetime guarantee (cash accumulation VUL only)
- Other

Funding patterns that fall into the other category include maximum funding and no funding pattern differentiation for premium persistency assumptions. Two participants reported funding patterns that fall into this category.

Graph 9 shows the distribution of funding patterns assumed in VUL pricing. Note that the results sum up to more than the number of VUL products reported in the survey due to the modeling of multiple patterns for some

products. The most common patterns modeled for VUL pricing purposes are level premium and other.



Premium persistency factors assumed in pricing were reported for all but one of the nine VUL products. It is evenly split between the VUL products priced assuming multiple premium funding patterns and those that assume only one scenario in pricing. One of the four products with multiple premium funding patterns assumes a weighted average of the premium persistency factors for each of the funding patterns assumed.

Cash Flow Testing

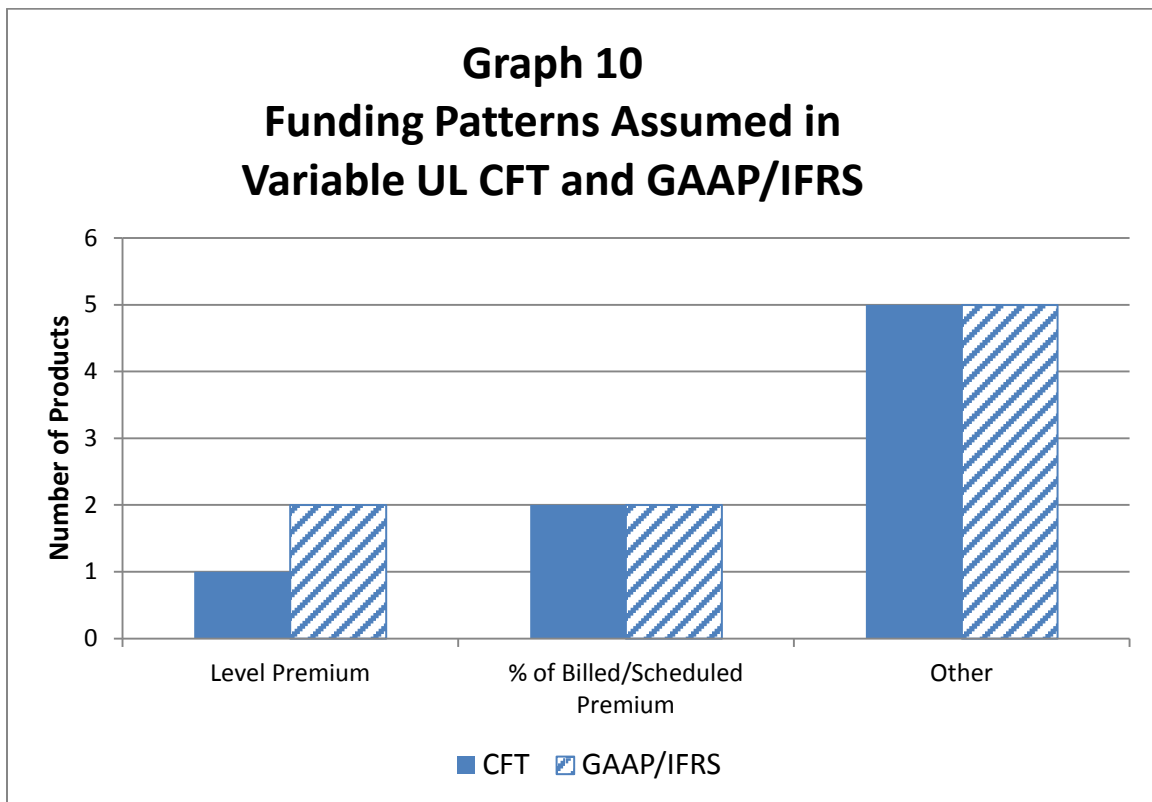
The following premium funding patterns for VUL products were reported by survey participants for cash flow testing and GAAP/IFRS purposes:

- Level premium
- Percent of billed premium
- Other

The other category includes the following funding patterns.

- Assume 100 percent of paid premiums in the last 12 months but capped at the planned periodic premium (billed premium). If the current account value is funded to maturity at the current credited interest rate, then no further premiums are assumed.
- Assume 100 percent of paid premiums in the last 12 months if the policy is in the second duration and assume the target premium if it is in the first duration. The fund level is split between high, medium and low based on a comparison of the fund value to the accumulated target premium.

Graph 10 shows the distribution of funding patterns assumed in VUL cash flow testing and for GAAP/IFRS purposes. Each participant reported a different premium funding pattern for cash flow testing of VUL products. Four of the eight products for which both CFT and GAAP/IFRS assumptions were reported included the same funding patterns for both functions.



Premium persistency factors assumed for CFT purposes were reported for all but one of the nine VUL products. For the eight products where both CFT and GAAP/IFRS assumptions were reported, it is evenly split between the VUL products that test based on multiple premium funding patterns and those that assume a single funding pattern in CFT. It is interesting that the four products using multiple funding patterns in pricing, use only one scenario for CFT purposes, and the four products that use a single funding pattern for pricing, use multiple funding patterns for CFT. A single scenario was reported for the ninth product relative to GAAP/IFRS premium funding patterns assumptions.

Use of More than One Funding Pattern

Three participants reported the following reasons why more than one funding pattern is assumed in modeling VUL products:

- To capture the different ways the product is marketed and sold
- To reflect experience, market research and historical premium studies
- To reflect different anticipated policyholder behavior

3. Premium Persistency Assumptions

Premium persistency assumptions assumed in modeling VUL products are split between those that do and those that do not equal 100 percent in all durations. Of the nine products for which assumptions were reported, only one included assumptions equal to 100 percent in all durations for all functions (pricing, CFT and GAAP/IFRS). There is considerable variation in the VUL premium persistency factors reported by participant, rather than variation by VUL product type.

Chart 36 shows a comparison of premium funding patterns and premium persistency factors used in pricing and cash flow testing, and for GAAP/IFRS purposes. Similar to ULSG products, the most common response was that the same funding patterns and factors are assumed for cash flow testing and GAAP/IFRS but pricing has different assumptions.

Chart 36	
Comparison	Number of VUL Products
Pricing ≠ CFT = GAAP/IFRS	2
All different	6
Reported GAAP/IFRS Assumptions Only	1

More details about premium persistency factors by function are described below.

Pricing

For pricing purposes, premium persistency factors for three products did not equal 100 percent in all durations and for five products did equal 100 percent in all durations. All eight products included multiple funding patterns. The associated weights applied to the funding patterns assumed in pricing the VUL product were reported for one product and we calculated the average premium persistency factors based on the reported weights for this product. We assumed equal weighting of persistency factors for the multiple funding patterns reported for the other two products with factors that were not equal to 100 percent. Premium persistency factors for one of these three products did not vary by issue age. One participant noted that it reported premium persistency factors for its level death benefit option. The premium persistency factors for its return of account value death benefit option follow the same pattern, but the absolute level of the factors differs. We determined the average factors for three products by issue age category and duration. Chart 37 shows the resulting averages.

Chart 37								
Average Premium Persistency Factors for VUL Pricing								
Duration	Issue Age Range							
	<20	20-29	30-39	40-49	50-59	60-69	70-79	80+
1	181%	181%	181%	181%	181%	198%	198%	198%
2-10	78	78	78	78	77	73	73	73
11-15	48	48	48	48	41	30	30	30
16-20	48	48	48	48	31	30	30	30

Cash Flow Testing and GAAP/IFRS

For CFT purposes, six of the eight products included premium persistency factors that did not equal 100 percent in all years. Four of the six included multiple funding patterns that we weighted equally to determine the average premium persistency factors. The remaining two products included only one premium funding pattern with factors that did not equal 100 percent. None of the six products include premium persistency factors that vary by issue age for CFT.

For GAAP/IFRS purposes, premium persistency factors reported for seven of nine products did not equal 100 percent. None of the seven products include factors that vary by issue age. Premium persistency factors for three of the seven products were based on a single funding pattern. Equal weighting was assumed to determine the average factors for those products that reported multiple funding patterns. Note that premium persistency factors for six of the products were different for cash flow testing and GAAP/IFRS purposes. Factors were only reported for GAAP/IFRS purposes for the seventh participant.

The average premium persistency factors over all products by issue age range and duration were determined. The resulting averages are shown in charts 38 and 39 for CFT and GAAP/IFRS, respectively.

Chart 38								
Average Premium Persistency Factors for VUL CFT								
Duration	Issue Age Range							
	<20	20-29	30-39	40-49	50-59	60-69	70-79	80+
1	131%	131%	131%	131%	131%	131%	131%	131%
2	80	80	80	80	80	80	80	80
3	63	63	63	63	63	63	63	63
4	58	58	58	58	58	58	58	58
5	54	54	54	54	54	54	54	54
6	47	47	47	47	47	47	47	47
7	45	45	45	45	45	45	45	45
8	43	43	43	43	43	43	43	43
9	41	41	41	41	41	41	41	41
10	40	40	40	40	40	40	40	40
11-12	39	39	39	39	39	39	39	39

Chart 38								
Average Premium Persistency Factors for VUL CFT								
Duration	Issue Age Range							
	<20	20-29	30-39	40-49	50-59	60-69	70-79	80+
13	38	38	38	38	38	38	38	38
14-15	37	37	37	37	37	37	37	37
16-17	36	36	36	36	36	36	36	36
18-19	35	35	35	35	35	35	35	35
20	34	34	34	34	34	34	34	34

Chart 39								
Average Premium Persistency Factors for VUL GAAP/IFRS Purposes								
Duration	Issue Age Range							
	<20	20-29	30-39	40-49	50-59	60-69	70-79	80+
1	100%	100%	100%	100%	100%	100%	100%	100%
2	97	97	97	97	97	97	97	97
3	88	88	88	88	88	88	88	88
4	82	82	82	82	82	82	82	82
5	79	79	79	79	79	79	79	79
6	73	73	73	73	73	73	73	73
7	72	72	72	72	72	72	72	72
8	71	71	71	71	71	71	71	71
9+	70	70	70	70	70	70	70	70

Premium persistency factors used for GAAP/IFRS purposes typically drop after the first year and are fairly level thereafter. The same is not true for factors assumed for CFT purposes, where they exhibit a declining pattern after the first year. Also, average factors reported for GAAP/IFRS purposes are higher than those reported for CFT purposes in all durations.

4. *Dynamic Assumptions*

Dynamic premium persistency assumptions were not reported by any of the survey participants for VUL pricing, cash flow testing and GAAP/IFRS purposes.

5. *Sensitivity Testing of Premium Persistency Assumptions*

Sensitivity testing of premium persistency assumptions is not common for VUL products. Two of the nine products include sensitivity testing in pricing of VUL products, with none including such testing for CFT or GAAP/IFRS purposes.

Both products include sensitivity testing in pricing via different premium payment patterns. The first participant commented that it looks at extreme scenarios, as well as different weights on the premium funding patterns. The second participant noted that using different premium funding patterns is the way it measures sensitivity to premium persistency. These participants both look at the impact of sensitivity testing on pricing based on the IRR, with one of the two also looking at the economic value.

Responses to the question regarding the impact of changes in premium persistency on VUL products were categorized as:

- Minimal (two responses)
- Significant (one response)
- More sensitive to short pay premium persistency than level pay (one response)
- More sensitive to older age persistency (one response)
- Lower funding levels are generally less profitable than higher funding levels (one response)

Sensitivity tests of premium persistency assumptions for VUL products are performed for the two reasons shown below. The first reason was provided by two participants and the second by one of the two.

- Previous products have set a pattern precedent.
- Certain distribution channels have indicated a pattern.

Appendix A: Survey Participants

Allianz Life Insurance Co.
Allstate Financial
Aviva USA
AXA Equitable Life Insurance Co.
Bankers Life
Cincinnati Financial
Farm Bureau Life of Michigan
Fidelity & Guaranty Life
Genworth Financial
Guardian Life Insurance Co.
ING Life Group – U.S.
Kansas City Life Insurance Co.
Legal and General America
Lincoln Financial Group
Midland National Life Insurance Co.

Modern Woodman of the World
Mutual of Omaha Insurance Co.
Nationwide Financial
New York Life Insurance Co.
Penn Mutual Life Insurance Co.
Protective Life Insurance Co.
Prudential Insurance Co.
Securian Financial Group
State Farm Life Insurance Co.
Sun Life Financial
The Hartford Life Insurance Cos.
Thrivent Financial for Lutherans
Transamerica Insurance & Investments
Western & Southern Financial Group

Appendix B: Glossary of Terms

Note that the definitions of distribution systems and product types shown below are consistent with definitions typically used by LIMRA International.

Agency Building A distribution system also known as career agents. Affiliated agents who sell/service life, health, annuities and group insurance, and equity products.

Annual renewable term (ART) A type of life insurance with annually increasing premiums that vary by attained age.

Banks & Financial Institutions A distribution system that sells insurance products through banks, savings and loans, credit unions, thrifts, etc.

Billed Premium Scheduled premium, or the planned periodic premium retained on the administration system used for billing purposes.

Broker A producer without an exclusive contract with one company. No overrides are paid on personally produced business.

Cash Accumulation Universal Life (AccumUL) A universal life product designed specifically for the accumulation-oriented market, where cash accumulation and efficient distribution are the primary concerns of the buyer. Within this category are products that allow for high-early cash value accumulation, typically through the election of an accelerated cash value rider.

Cash Flow Testing (CFT) A projection of cash flows that considers the timing of asset and liability cash flows according to statutory accounting requirements.

Catch-up Provision A feature that allows the policyowner to make up missed premiums to restore the death benefit guarantee.

Current Assumption Universal Life (CAUL) A UL product designed to offer the lowest cost death benefit coverage without death benefit guarantees. Within this

category are products sometimes referred to as dollar-solve or term-alternative products.

Dial-a-Guarantee A feature within a universal life product that allows the policyowner to customize the death benefit guarantee. For example, the policyowner may select coverage to any age, such as 90, 95 or 100.

Direct Response A distribution system where the buyer initiates the purchase in response to offerings through mail or media advertising or telemarketing efforts.

Economic Value A profit measure representing the present value of future profits. This can be calculated in a number of ways, under a range of discount rates.

Flexible Premium Universal Life (FPUL) In this paper, the term collectively refers to universal life with secondary guarantee, cash accumulation universal life, current assumption universal life, indexed universal life and variable universal life products.

Function In this paper, the term is used to identify either pricing, cash flow testing or GAAP/IFRS purposes.

Generally Accepted Accounting Principles (GAAP) Accounting standards followed in the United States for the preparation of financial statements.

Home Service A distribution system utilizing affiliated agents who sell individual life, health, or property and casualty products in an assigned territory. Agents may be responsible for home collection of premiums.

Indexed Universal Life (IUL) A universal life product where the interest credited to the cash value is linked to an equity index, such as the Standard & Poor's 500 Index or the Dow Jones industrial average. An IUL product can fall into any of the three universal life product types.

Internal Rate of Return (IRR) The rate of return realized on the capital invested into a business or product, generally reflecting statutory earnings plus the changes in capital requirements from year to year.

International Financial Reporting Standards (IFRS) The financial reporting standards adopted by the International Financial Accounting Standards Board. IFRS is a set of globally accepted accounting rules. Currently, consideration is being given for the existing United States financial reporting system to adopt IFRS.

Multiple-Line Exclusive Agents (MLEA) Affiliated agents licensed to sell/service individual life, health and annuity products, as well as property and casualty products.

Personal-Producing General Agents (PPGA) Full-time life producer who receives overrides on personally produced business and on business sold by subproducers. May have affiliations with more than one company but usually has a primary affiliation with one company.

Return on Equity (ROE) A GAAP measure equal to GAAP income divided by shareholder equity.

Rolling Commission Target Premiums A commission option that allows first-year compensation to apply to premiums paid during a specified number of years (e.g., two years), in case the premium paid in the first year is less than the target premium.

Stockbroker Largest full-service broker-dealers with an extensive branch network system.

Survivorship Life Universal Life A universal life product that insures the lives of two people.

Universal Life (UL) A flexible-premium permanent contract that credits the cash value with current interest rates and deducts mortality and expense charges from the cash values. A UL policy can fall into any of three product types: UL with secondary guarantees, indexed UL or current assumption UL.

Universal Life with Secondary Guarantees (ULSG) A UL product designed specifically for the death benefit guarantee market that features long-term (lifetime or near lifetime) no-lapse guarantees either through a rider or as part of the base policy.

Variable Universal Life (VUL) A UL product where the cash value may be invested in a variety of separate accounts similar to mutual funds, at the direction of the contract owner. A VUL product can fall into any of the three UL product types.

Worksite Marketing Individual insurance products sold via the worksite. Commissioned agents/brokers line up the sponsoring employer and/or solicit individual employee enrollment.