



# Preferred Class Structure Report

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## Preamble

This report presents a preliminary analysis of preferred class structures from statistical agent data. This material is being presented at the 2015 SOA Annual Meeting. A number of areas for further analysis were identified in preparing this report. We expect other areas to be identified as a result of this presentation and in reaction to this report. This additional analysis will be reflected in a second version of this report.

## Introduction

There are two sections to this report. The first examines the progression of preferred class structures by number of companies essentially from the time preferred class structures were introduced to the present time. The second section examines the pattern of actual-to-expected mortality results for each of the structures.

The data used in this report is a subset of the data submitted to New York State in the Statistical Agent submissions of 2010 to 2012. It also includes similar data submitted to the State of Kansas for 2011 and 2012 and additional data submitted by certain Kansas companies for 2010. Details on these submissions are provided in Appendix A.

With the New York State data, only companies that submitted data for each of the three years have been included. Kansas companies that submitted data for both 2011 and 2012 are included. (Note: The New York and Kansas data submissions involved different companies, with the Kansas submissions beginning in 2011.) The New York State data initially included 2009 experience, but this data was subsequently excluded because a number of companies made errors in their 2009 submissions, which were corrected in the following years.

Only data identified as having at least two preferred classes is included in this report. Policies included in the report had to be in force at the start of 2010. Thus, policies issued and terminated prior to 2010 are not included in any of the analyses.

Additional requirements are:

- The face amount of the policy is at least \$100,000.
- The issue age of the policy is at least 18.
- The policy is issued in 1981 or later.
- Single life issues
- Standard issues
- Exclude term conversions (ideally)

Supplementary analysis may be performed later, relaxing these requirements.

## Preferred Class Structure Analysis

The preferred class approach was a refinement to the traditional smoking status distinction. The intention was to further differentiate risks within a smoking status by taking more underwriting information into account. The degree of distinction, as represented by the number of preferred classes, generally progressed over time. However, it is known that one company had eight preferred class structure nonsmoker distinctions in the past and another had six, but these companies are not reflected in this data.

Data supporting this preferred structure analysis can be found in a set of three Excel spreadsheets accompanying the report. These are:

- SOA Preferred Co x Structure 082515.xlsx (Company)
- SOA Preferred Exposure x Structure 082515.xlsx (Exposure)
- SOA Preferred Policy Claims x Class 082515.xlsx (Claims)

The tabs of the Company spreadsheet give the number of companies with policies in a particular category, with each category giving results by year of issue. The other spreadsheets give similar information for exposure and number of claims.

Specific tabs of a spreadsheet are referenced in the analysis below.

## Overall Results

The overall results are given in the ALL PLANS tab. The following points should be noted:

- There were some companies that reported preferred business prior to 1981. These are not included in the Excel tables or any analysis because of the 1981 issue requirement mentioned above.
- Some, or even all, of the preferred class business issued in the early years of this analysis was not issued with underwriting requirements similar to those in place today. There is no way to make this distinction in this dataset.
- There were a small number of companies (less than five) that issued business with three nonsmoker preferred classes prior to 1985.
- Similarly, there was a small number of companies (less than five) that issued business with four nonsmoker preferred classes prior to 1999.
- There were a small number of companies (less than five) that issued business with five nonsmoker preferred classes (and none in this set of data that issued business with more than five nonsmoker preferred classes).
- Similarly, there were a few companies (less than five) that issued business with three smoker preferred classes (and none with more than three smoker preferred classes).
- Where the count is less than five, they are not shown in the Excel tables and have not been included in any subsequent analysis.
- It is interesting that such a large number of companies (9) issued business with four nonsmoker preferred classes starting in 1999.

Except for the NT-2 (2 class, nontobacco) values, there is a reasonably steady increase in the number of companies issuing business with a particular number of preferred classes as time progressed. This is the expected pattern. The fall off in the values

in the NT-2 column in recent years is thought to be the result of companies going fully to a three and/or four-class structure. (There is a small decrease in the number of companies in the NT-3 and NT-4 categories in the latest years presented. It is not clear why this occurred.)

However, when measured by exposure, the NT-2 issues increased noticeably starting in 1987. (The fall off in exposure after 2010 is because there is less than a full three years of issues in this data.) On this basis, the NT-3 became significant in 1997 and 1998, whereas the NT-4 issues started in full force in 1999. The Tob-2 issues also become significant in 1987 to 1999.

The NT-3 exposure data for the year 1999 is anomalous. Ten companies had a very significant increase in sales volume in this one year. It has been suggested it is a result of the pre-XXX “fire sale” that occurred at that time.

The actual number of claims provided in the Claims spreadsheet gives a further indication of the significance of the preferred issues over time.

The limited exposure in the early and middle 1980’s does indicate that companies were, perhaps, “experimenting” with preferred class structures in a very limited way at that time and that, as noted above, these early preferred structures may not have been consistent with subsequent structures. As well, it may have been that some of these early 2-class structures were, in fact, nonsmoker / smoker structures, where nonsmoker and smoker business was considered a two-class preferred structure.

## Gender Results

Separate results for males and females are also found on these spreadsheets. As might be expected, the results are similar between males and females.

The male and female company counts are not exactly the same, probably reflecting a higher volume of male sales, different lapse patterns and mortality differences.

## Policy Size Results

Conventional wisdom has been that companies generally started issuing preferred products, and a higher number of preferred classes, for larger amounts and introduced them for smaller amounts later. The initial introduction for higher amounts is not evident when comparing across the various face amount range tabs (100K-249K, etc.) of the Company spreadsheet. Comparing the tabs for the 100K and 250K bands, for both the NT-2 values and the Tob-2 values, the number of 100K companies is almost always equal to or greater than the number of 250K companies.

For the NT-3 and NT-4 values, however, the values are a bit higher in the 250K sheets than the 100K sheet in the most recent years.

Both similar patterns are seen when comparing the 100K and 500K amount bands. However, when comparing the higher amount bands to the 100K band, the values in the 100K sheet are noticeably higher for the NT-2 and Tob-2 columns and not much different for the NT-3 and NT-4 columns.

These conclusions are supported in the Exposure spreadsheet. In the NT-2 class, the 100K amounts are greater than the 250K amounts until 1998 and, in the Tob-2 class, the crossover does not occur until 2003. This occurs in spite of the higher size policies in the 250K band. However, for the NT-3 and NT-4 classes, the 250K exposures are greater from the start.

## Plan Code Results

As expected, the values in the TERM tab of the Company spreadsheet, when compared to the PERM tab, show quicker movement to preferred classes, and a higher number of preferred classes for term insurance over permanent insurance. The more mixed pattern in the 1980's is probably the result of term expiries and surrenders prior to 2010, the first experience year for this analysis.

There is a noteworthy movement to the NT-3 class for permanent insurance in the last four years, but very little use of the NT-4 class.

For term insurance, there was a sharp movement to the NT-3 class, and even the NT-4 class, over the last ten years.

The permanent insurance exposure amounts are greater than the term insurance amounts until 1994 for the NT-2 class, but this is probably a result of the older term insurance fall off noted. There is a similar result for the NT-3 class, with the crossover occurring in 1995 (and the term exposure increasing sharply thereafter). For the NT-4 class, only minimal exposure amounts are found for permanent insurance.

For the Tob-2 class, the crossover point is 1995 with a significant increase in the term exposure thereafter.

The variable life (VL tab) results are quite similar to the permanent insurance results, especially in the movement to the NT-3 class in the past four years and in little use of the NT-4 class.

The universal life results (UL tab) are similar to the term insurance results for NT-2 and Tob-2 classes. There is a similar movement to the NT-3 class over the past ten years, but relatively little use of it previously. There is a movement to the NT-4 class over the recent few years.

In this analysis, universal life with secondary guarantees (ULSG worksheet) first appeared in 1990 and became significant by the later 1990's. From this point, the pattern was similar to universal life for the NT-2, NT-3 and Tob-2 classes, but showed a significant movement into the NT-4 class over the last seven years, somewhat similar to term insurance.

Variable life with secondary guarantees first appeared in 1994 and also became significant by the end of the 1990's. It showed a movement to the NT-3 class over the recent years and less significant use of the NT-4 class.

The exposure values for the other coverages generally support the count conclusions given above.

**NOTE:** The ALL PLANS worksheets includes two plan situations (reduced paid up and extended term insurance) not otherwise split out.

## Preferred Class Structure Actual to Expected Ratios

The other analysis of the preferred class structure data that was performed was an analysis of mortality results. Actual mortality was measured relative to that expected by the Smoker/Nonsmoker 2008 VBT mortality tables. Separate results were developed by both number of policies and amount of insurance. Results are given by policy duration and issue year groups.

Results by policy duration group and issue year group are given by gender and for both genders combined for each preferred structure, smoking status and risk class combination. For each breakdown, the overall actual to expected ratio is given, as well as A/E ratios for the 25th, 50th and 75th percentiles of the individual company results underlying that breakdown.

For this analysis, five companies, each with less than 100 claims in total, were excluded. However, for the remaining companies, no attempt was made to require a minimum amount of data in a cell.

The following Excel spreadsheets give the detail of this analysis:

- SOA Preferred AE Policy x Class Issue Year Group 090415.xlsx (Policy Year)
- SOA Preferred AE Policy x Class Duration Group 090415.xlsx (Policy Duration)
- SOA Preferred AE Amount x Class Issue Year Group 090415.xlsx (Amount Year)
- SOA Preferred AE Amount x Class Duration Group 090415.xlsx (Amount Duration)

## Post Level Term Data

In this analysis, the data following the level premium period for term insurance has NOT been excluded. The experience associated with this period of coverage has had high A/E ratios in other studies and this does affect the TERM and ALL PLANS results to some extent, as well as the experience by face amount band. This will be addressed in a revised version of this report.

This effect shows up most significantly in the TERM tab of the Amount Duration spreadsheet for the NT-2 and Tob-2 class Structures. For the NT-2 class 1 experience for both genders, the Overall A/E ratios increase steadily across the duration groupings. For class 2, the ratios for the last two duration groups are noticeably higher than the first three.

For the Tob-2 class 1, the ratios increase steadily after the first two duration groups. For class 2, a somewhat different increasing pattern is evident.

For the NT-3 and NT-4 class structures, this effect is not evident, probably a result of these being more recent issues with fewer cases beyond the level premium period.

These patterns are mirrored to a fair extent in the TERM tab of the Policy Duration spreadsheet.

## ALL PLANS Results by Duration

For each of the preferred structures by Policy, for both genders combined, the overall ratio increased as the class increased, i.e., as the risk class became less preferred. The only exception was in the NT-3 data for the highest duration group shown. This pattern was also true for each gender separately, with a couple of exceptions for the highest duration groups shown. By Amount, that pattern was generally true, with only a few exceptions. Likewise, the pattern is generally, but not universally, true when the 50th percentile values by Policy are considered.

Even at the ALL PLANS level where all of the data is included, the percentile data is not that useful in many instances. A company was included in a particular cell (e.g., Male, Dur 16-20, Class 1 of 3-NS class business) if it had any exposure, no matter how small, and may have had no claims. This has even resulted in some 50th percentile values being 0%, meaning that at least half of the companies in that analysis had no claims.



## ALL PLANS Results by Calendar Year

As was expected, the results by Calendar Year mirror those by Duration. The Overall ratios by Policy almost always increase with increasing class. The Overall ratios by Amount and the 50th percentile values by policy generally follow the same pattern.

## Size Band Results by Duration

For the Class 1 data by policy, for all three NT preferred structures, the A/E ratios decrease as the Amount Band increases, except for some of the highest Amount Bands. This is true for each duration group shown and for both males and females. For the Tob-2 structure, that pattern is true for the first Duration Group, but is mixed, i.e., no consistent pattern for the other duration groups.

For the NT-2 class 2 data, the pattern is mixed, but with each duration group after the first having similar A/E ratios through the first four Amount Groups. For NT-3 classes 2 and 3, the pattern is mixed across the amount bands and hard to summarize. For the NT-4 class 2 data, the values are similar across the first four amount bands and mixed for the other two classes.

For the Tob-2 data, the decreasing pattern holds for durations 1-5 and there is a nearly level pattern for durations 6-10. The pattern is mixed for the higher duration data.

## Size Band by Issue Year

Generally similar conclusions arise from the size band by issue year data.

## Plan Type by Duration

Permanent: For males (and both genders) for the three preferred classes with significant exposure, the A/E ratios by policy increased as the class increased in each duration group. This was true for females for the NT-2 class, but the pattern was mixed (no consistent pattern) for the other two classes.

By amount, the increasing pattern was true for both males and females for the NT-2 class and nearly so for the Tob-2 class. The pattern was quite mixed for the NT-3 class.

Term: The term insurance situation is described above.

Universal Life: With exceptions in the highest duration group for the Tob-2 class, the increasing pattern was true for both males and females for the NT-2 and Tob-2 classes. For the NT-3 structure, the pattern was mixed, probably because of limited exposure. Values are also given for the NT-4 structure, but the pattern is quite mixed.

By amount, the increasing pattern was true for the NT-2 class for both genders and the TOB-2 class for females. The pattern was mixed for males in the Tob-2 class. Results are shown for both the NT-3 and NT-4 classes, but the patterns are mixed.

Universal Life with Secondary Guarantees: The increasing pattern was true for the NT-2 class for both males and females and generally true for the Tob-2 class. For the NT-3 class, the pattern was repeated with one exception. The increasing pattern is true for males in the NT-4 class, but mixed for females.

By amount, the increasing pattern is generally, but not universally, true for the NT-2 and Tob-2 classes. In the NT-3 class, the increasing pattern holds for males, but not for females. In the NT-4 class, the increasing pattern is generally true for males and mixed for females.

Variable Life: The increasing pattern held for males for the NT-2 class and generally held for the Tob-2 class. For females, the pattern generally held for the Tob-2 class, but the results for the NT-2 class were mixed. For the NT-3 class, the increasing pattern held, except for males in the highest duration group shown.

By amount, the increasing patterns generally, but not universally, held.

Variable Life with Secondary Guarantees: The increasing pattern is true for males for the three preferred classes shown, but only for the NT-2 class for females.

By amount, the increasing pattern generally did not hold.

## Plan Type by Issue Year

As previously, there were similar patterns by policy year.

## Acknowledgments

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## Appendix A

Fifty-six companies contributed experience for at least one of the years 2009-2012 in the New York State statistical agent submissions. Out of these 56 companies, there were 40 companies with usable preferred data in all three study years 2010, 2011 and 2012. Only the data of these 40 companies was used for this report. The 2009 statistical agent submission for NY was excluded from the study because the previous ILEC study covered 2009 and also because a number of companies did not submit data in a format usable for the study.

Thirty-four companies contributed to at least one year of the Kansas Statistical agent submissions. Out of these 34 companies, there were 18 companies with usable preferred data in both study years 2011 and 2012. Only data for those 18 companies was included in this report.

Larger companies, which had contributed data to the most recent (2008-2009) SOA Individual Life Experience Study and which also contributed data to the State of Kansas, were asked to contribute 2009 and 2010 data in the same format. Eleven companies made this contribution. The 2010 data of these 11 companies was included in the report. All of these companies contributed 2011 and 2012 data to the State of Kansas.

## About The Society of Actuaries

The Society of Actuaries (SOA), formed in 1949, is one of the largest actuarial professional organizations in the world dedicated to serving 24,000 actuarial members and the public in the United States, Canada and worldwide. In line with the SOA Vision Statement, actuaries act as business leaders who develop and use mathematical models to measure and manage risk in support of financial security for individuals, organizations and the public.

The SOA supports actuaries and advances knowledge through research and education. As part of its work, the SOA seeks to inform public policy development and public understanding through research. The SOA aspires to be a trusted source of objective, data-driven research and analysis with an actuarial perspective for its members, industry, policymakers and the public. This distinct perspective comes from the SOA as an association of actuaries, who have a rigorous formal education and direct experience as practitioners as they perform applied research. The SOA also welcomes the opportunity to partner with other organizations in our work where appropriate.

The SOA has a history of working with public policymakers and regulators in developing historical experience studies and projection techniques as well as individual reports on health care, retirement, and other topics. The SOA's research is intended to aid the work of policymakers and regulators and follow certain core principles:

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**Relevance:** The SOA provides timely research on public policy issues. Our research advances actuarial knowledge while providing critical insights on key policy issues, and thereby provides value to stakeholders and decision makers.

**Quantification:** The SOA leverages the diverse skill sets of actuaries to provide research and findings that are driven by the best available data and methods. Actuaries use detailed modeling to analyze financial risk and provide distinct insight and quantification. Further, actuarial standards require transparency and the disclosure of the assumptions and analytic approach underlying the work.

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