

Accidental Death and Dismemberment Rider Re-Rating

Sponsored by Unum Insurance

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Abstract

This project reviewed and refreshed the base rates for Unum's Accidental Death and Dismemberment insurance rider. To execute this research, we suggested new SIC code groupings and conducted an Actual to Expected (A/E) claim cost study, which then motivated the creation of preliminary rates. Next, we conducted a credibility study and calculated weightings to arrive at final refreshed rates. Upon analyzing these final refreshed rates, we conclude that the rates could be [REDACTED], subject to additional considerations.

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I. Background

1.1 Introduction

Accidental Death and Dismemberment Insurance (AD&D) is a rider or buy-up option available as additional coverage to augment traditional life insurance. As the name implies, AD&D provides coverage for death, dismemberment, or paralysis caused by an accident. In cases where a person has both traditional life insurance and AD&D coverage, their beneficiaries could be paid double in the case of an accidental death; for this reason AD&D is often referred to as double indemnity insurance. There are many coverage restrictions depending on the nature of the accident and the length of time between an accident and the death. For example, many policies will not cover accidents that result from "risky" behavior (i.e. skydiving, acts of war) or death due to surgery or drug overdose.

Accident policies began gaining a foothold in the market in the late 1800s and the product offering and popularity has grown from there. The characteristics that made accident insurance attractive in the 1800s still hold true today: "it is easy to understand. It's easy to underwrite...it's an easy product to mass market...and it's an easy product to afford because the unit rates are quite low" (Skwire, as cited in Koll 3).

The sponsor for this project, Unum US, offers AD&D coverage as a rider on group life policies. Unum is a competitive player in the US group life market, where they are ranked fifth based on inforce premium and second based on inforce cases, according to recent GenRe studies (GenRe 2010 and 2015). Provident Life and Accident Company, the first of Unum's merged companies to offer accident protection, was founded in 1887, so the Unum umbrella has had a long history in the accident market.

This project aims to update the Unum's AD&D rate manual to best reflect claim experience. The classic challenge of creating rating algorithms for AD&D products is endemic to the very nature of the product; that is, AD&D has very low frequency but high severity of claims. This makes for scarce claim

data on which to assume credibility and fit trends. To combat this issue, it is necessary to look beyond Unum experience data to broader trends in the AD&D market.

1.2 AD&D Market

The group life market has recently been plagued by low interest rates and increased premiums, leading to relatively negligible growth of 2%, according to a 2004-2013 GenRe study. Over that same study period, AD&D rate of sales growth, which has been historically volatile, "declined by 11% after showing an increase in 2012" (GenRe 9). If we examine inforce premium growth over the same time period, there was a 2% decline in 2013 (GenRe 8). Interestingly, in 2009, directly after the market correction, inforce growth saw a sharp decline whereas sales growth reversed the decline it had been experiencing prior to the correction. Looking at data from 2011 to 2016 gathered by the IBIS World Industry Review, 0.6% annual growth (\$23 billion) can be seen. Since the economy has turned around post-recession, the value proposition made by AD&D coverage is proving to be powerful. Employers see it as a recruiting and retention tool for their top employees given the low unit costs and high potential payouts.

In 2010, Unum was one of 32 companies offering AD&D coverage, whether as a stand-alone product or as a life insurance rider. When market share is measured by premium, Aflac is the most dominant company in the AD&D space with 64.6% market share. Aflac is distantly followed by Allstate (5.9%), Consecro (4.9%), and Torchmark Co. (4.1%). Unum was among the 28 companies making up the remaining 20% of the market (Burton and Lazich).

According to Unum's 2016 2nd Quarter Earnings Statement Statistical Supplement, AD&D persistency has been high over the past year at 89.4%, which is indicative of the value consumers see in an AD&D product. Looking at year end data, Unum's premium income in 2015 was 131.7 million dollars compared to 129.5 million dollars in 2014.

1.3 AD&D Distribution Channels

Generally, a distribution channel is how a good or service will reach the end consumer. There are many different types of distribution channels which are categorized into direct or indirect forms. Direct channels are when the consumer can purchase the good from the manufacturer, while indirect channels are when the consumer purchases from a wholesaler or retailer. Within insurance, typical distribution channels include direct online, and various levels of indirect channels include employer plans, independent agents, third-party companies, or brokers.

AD&D coverage is typically supplementary to a life policy, so depending on a company's strategy, any of these channels could be used. However, there are a few types of AD&D coverage that determine how it may be purchased. Unum sells AD&D through a rider on their Group Life policies and it is offered on their traditional, voluntary, and flex products. The product type dictates the funding method: employee paid (EE), employer paid (ER), or employee and employer paid (mixed). The traditional product is either ER or mixed, the voluntary product is typically EE, and the flex product is mixed, as the employer pays for the base amount and the employee has the option to buy additional coverage (Bowden). Regardless of the product type, all employees who fall within the eligibility group of their company can receive coverage from the AD&D rider. For example, one eligibility group provision may require employees to work a minimum number of hours per week to be qualified (Unum 1).

Unum sells AD&D because of its profitability and favorable loss ratio. It has been sold as a stand-alone product before, but it is currently sold as a rider to their group life policies.

1.4 Occupational Factors Affecting Rating

The rating of AD&D coverage is often split between occupational and non-occupational coverage. If an employee has non-occupational coverage, then they are covered for accidental death or dismemberment for incidents that occur only outside of a work environment. Often, this type of coverage is chosen if an employee also has worker's compensation insurance that covers at-work

injuries. If someone has occupational coverage, then they are covered at all times, including while at work. For this reason, occupational coverage rates vary across industries and occupations. Higher rates are seen in industries that tend to have riskier jobs, such as mechanical, chemical, or machinery operation (Insurance.com, 2016). Rates for non-occupational coverage are lower and more consistent across all industries.

1.5 Specifications of Unum AD&D

The specifications for the AD&D rider vary by the preference of the employer and by the product type, as discussed in the previous sections. The AD&D face amount can be the same for all eligible employees, or could be based on the annual salary of each employee. There are typically coverage reductions applied as employees reach age 65. Furthermore, some contracts allow employees to obtain coverage for their spouse as well as their dependents (Unum 9-10). The Unum AD&D rider is portable. This means that an employee can continue being covered even if they leave their employer, retire, or work less than the minimum required number of hours per week. In the event of the employee's death, the spouse can determine if they would like to port their policy as well as their children's policies (Unum 45).

The AD&D rider provides several standard benefits:

- Repatriation: Funding for transportation and preparation of a body if death occurs 100 miles from individual's principal place of residence.
- Education: Qualified children receive college tuition assistance upon death of employee
- Seatbelt and airbag: Additional coverage in the case that death occurs when wearing a seatbelt or in a seat equipped with an airbag. (Unum 10)

The AD&D rider also provides several optional benefits:

- Paralysis: Benefit if individual sustains total and irreversible paralysis.
- Burn: Benefit if individual sustains third degree burns.

- Coma: Benefit if individual's injury leads to a coma.
- Spouse retraining: Benefit for spouse to receive trade school training.
- Child care: Provides child care upon death of insured or spouse.
- Felonious assault: Benefit if loss caused by felonious act of violence.
- HIV: Benefit if insured tests positive for HIV due to occupational injury.
- Hepatitis: Benefit if insured tests positive for hepatitis due to occupational injury.
- Rehab and physical therapy: Benefit for rehabilitation expenses due to dismemberment or paralysis.
- Common carrier excluding motor vehicle: Benefit if death results from traveling in common public passenger carrier excluding motor vehicle accident.
- Common carrier including motor vehicle: Benefit if death results from traveling in common public passenger carrier or a motor vehicle accident. (Unum2 32)

1.6 Overview of Current Unum Rating Algorithm

Currently, Unum calculates base rate adjustments on the basis of state, occupation, and gender factors. Additional adjustments are made based on benefit exclusions, optional exclusions, product adjustment factors, waiver of premium, spouse and child AD&D, and SIC factor. Final rates are adjusted at the discretion of the underwriter.

These rates were determined by conducting a study spanning the experience period of 1996-2000. Unum experience data was augmented by exposure and claims data from CFIS and LifeClaims Datamart, respectively.

II. Methodology

2.1 Data Organization

Unum data was received in four different files, with various layouts and purposes.

- The General Exposure Data file included all AD&D policies from 2005 to 2015. This file had detail on each of the policies, including the subproduct, Standard Industrial Classification (SIC) code, limited information about lives, volume, claims, and several optional benefits.
- The Rider Exposure file showed what years each policy was active for and what benefits were on the policy in those years.
- The Claim Detail file gave further detail about policies in which a claim was paid.
- And finally, the Yearly Exposure file broke each policy into the individual years and had data regarding lives and benefits on the policy.

In order to do meaningful analysis, mapping from file to file was necessary.

Our goal with mapping the Yearly Exposure and Rider Exposure files was to determine whether each policy in the Yearly Exposure file was occupational or non-occupational and to see what percentage of each policy type existed. Non-occupational was correctly expected to be a very small percentage of the total policies, and should be excluded or separated from analysis on base rates, since the non-occupational rates are very different from occupational rates.

In order to compare Unum incidence to industry data, we had to convert from NAICS codes to SIC codes. NAICS is the North American Industry Classification System, which is a newer way of classifying and separating industries. Unum uses SIC codes to separate the industries. Therefore, in order to compare the two, the industry data was first mapped to SIC codes.

2.2 SIC Code Analysis

SIC codes are a useful tool when grouping industries into broader classes. Each four-digit code indicates a specific industry and is universally recognized. Generally, the first two digits indicate the major industry sector and the latter two digits describe greater industry detail. Currently, Unum rates are organized by individual SIC codes, which range from 0001 to 9999 (although not every four-digit code within that range is utilized). While some groupings of SIC codes do have the same rate, each rate is listed individually. This is a cumbersome system and Unum indicated that they would appreciate a more streamlined approach to SIC code groupings, such as the one their life products used. Initially, groupings of thousand SIC codes were suggested, but these groupings were determined to be too broad (see section 3.1). Several alternatives were explored, including the groupings currently used for the group life product, which varied in size but were generally smaller than thousand SIC codes in each group, and groupings of hundreds. The image below shows an example of how the rate manual displayed its rates.

AD&D RATES TABLE A-1

	<u>SIC CODE</u>	<u>OCC</u>	<u>NON-OCC</u>
<u>AGRICULTURE PRODUCTION CROPS</u>	0100		
WHEAT	0111		
RICE	0112		
CORN	0115		
SOYBEANS	0116		
CASH GRAINS, N.E.C.	0119		
COTTON	0131		
TOBACCO	0132		
SUGAR CROPS	0133		
IRISH POTATOES	0134		

Figure 2.2.1: Example of Rate Manual

The first step in our analysis of the SIC code base rates was to determine frequency and severity. These graphs can be found in the results section. Note that this data does not include rider claims or volume, meaning that only the base AD&D exposure and claims were used. One of our goals in looking

at frequency and severity was to check the accuracy of the current base rates and then note those industries that may be performing better or worse than expected.

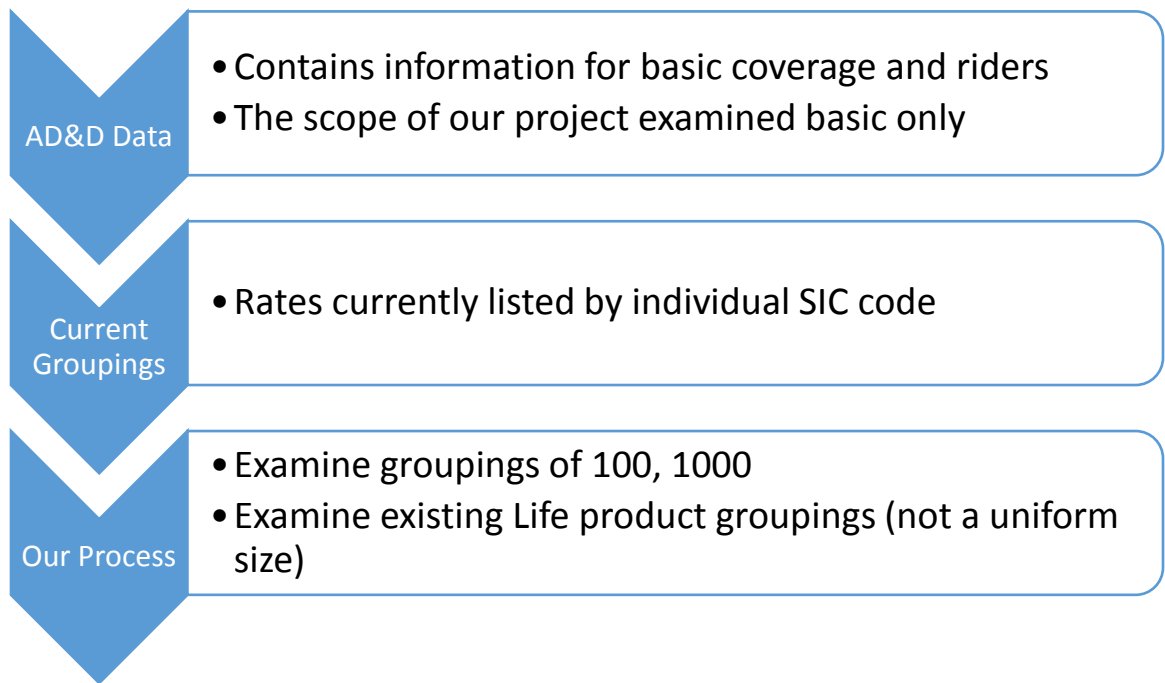


Figure 2.2.2: SIC Grouping Methodology Flow Chart

According to the original rating manual, a company receives its base rate based on its SIC code and whether it is an occupational or non-occupational plan. For the updated rating algorithm, a similar process was followed. However, the rates used were generated for specific ranges of SIC codes. The specific range of SIC codes were determined by using ranges already used by for the group life product. The benefit of this is that the AD&D product will more closely coincide with the life product. The main drawback of this process is that the two products are different and thus may have varying industry dependencies. It is also important to note that there are a small portion of AD&D policies that have SIC codes that do not fall in the life product SIC groupings. Through further investigation, it was found that these SIC codes were not valid and are not in current use. These policies were excluded when determining the rating algorithms.

2.3 A/E Study and Rate Refresh

In order to assess the performance of the original rating algorithm, a traditional actual over expected (A/E) analysis was executed. To gain an understanding of the foundational performance of the AD&D product, only the basic AD&D component of a claim was taken into account. All claims attributed to riders, totaling to 9.2% of the total claims and approximately \$12,139,000, were excluded. Data references were broken down by policy and year using the Yearly Exposure file. Specific data of interest included:

- Total lives and total volume from the Yearly Exposure file
- Actual (basic) claim cost from the Claim Detail file
- SIC code, state, and product type from the Exposure Data - General file
- Female volume percentage from the Yearly Gender Split Data file
- Occupational or non-occupational status from the A/E and Additional Analysis file

The actual in the A/E study was the actual basic claim cost. In order to calculate the expected claim cost, the original AD&D Manual rates were utilized. The needed rates and multiplier factors to perform the A/E analysis on the overall product included:

- Table A-1, Employee AD&D, has occupational and non-occupational base rates for individual SIC codes
- Table B-1, State Factor, has rate adjustment factors by state
- Table B-2, Gender Factor, has rate adjustment factors by gender volume percentage
- Table B-7, Product Adjustment Factor, has rate adjustment factors by product type (note: flex and traditional had the same factor)

In order to calculate the "expected" in the A/E study, the corresponding company identifiers were mapped to the four tables listed above. Approximately 0.06% of policies (50 of 80,596) were

excluded from the A/E study due to the fact that the SIC codes recorded for those policies were invalid. This is likely due to a manual entry error at the time of enrollment. The ultimate rate is the product of the base rate and the three other rate adjustment factors listed above. The annual premium was calculated by taking the product of the total volume and rate, multiplying by 12 in order to annualize the premium, and dividing by 1000 since base rates are per \$1,000. Finally, the expected claim cost was determined by multiplying the annual premium by a tolerable loss ratio of [REDACTED], which is the percentage of premium that is expected to be paid in claims.

Through the use of a pivot table, the A/E claim costs were calculated using the ratio of actual basic claim cost to the expected basic claim cost.

The A/E study was then leveraged to refresh the rates to reflect recent experience. The A/Es were multiplied by the current rate in place to calculate a new rate, which would theoretically yield an updated A/E of hundred percent. These rates were then segmented by important characteristics (i.e., state, year, and SIC code) so that trends could be identified. Section 2.4 outlines the credibility strategy used to ensure that the conclusions drawn from evaluating these segments are reasonable.

2.4 Credibility Study

The Bühlmann-Straub model, a generalization of the simple Bühlmann model, was the first credibility method attempted. The Bühlmann model, unfortunately, lacks the ability to allow different amounts of exposure units or different distributions of claim sizes across past policy years. The Bühlmann-Straub model addresses this deficiency because it could, for example, handle changes in the number of insured members in the group over multiple observation periods. This is highly important within our analysis since reporting on credibility with the inclusion of differences between exposure years is extremely relevant. However, because of the nature of AD&D with low frequency and high severity claims, this method was ineffective. The formula nested into the Bühlmann-Straub method

creates undesirable results when the mean is small and the variance is high. Therefore, this method would not work (Herzog 113).

Next, a credibility formula that was used for AD&D at Unum previously was utilized. This formula is displayed below.

$$Credibility = \sqrt{\frac{\# \text{ of claims}}{40}}$$

Figure 2.4.1: Unum's Credibility Formula

With this formula, the credibility factors for each of the life product SIC code groups were determined, which had been decided to use from earlier SIC code analysis.

2.5 Final Rates

Once credibility factors were determined, updated rates were able to be calculated. The updated rates are a mixture of the old rates given in the previous manual and the new rates calculated from the more recent data received. The credibility factor is the weight given to the new rate and its complement is the weight given to the prior rate. The summation of these two values gives the final rates. In this way, it can be ensured that the suggested new rates are both conservatively safe and credibly sound.

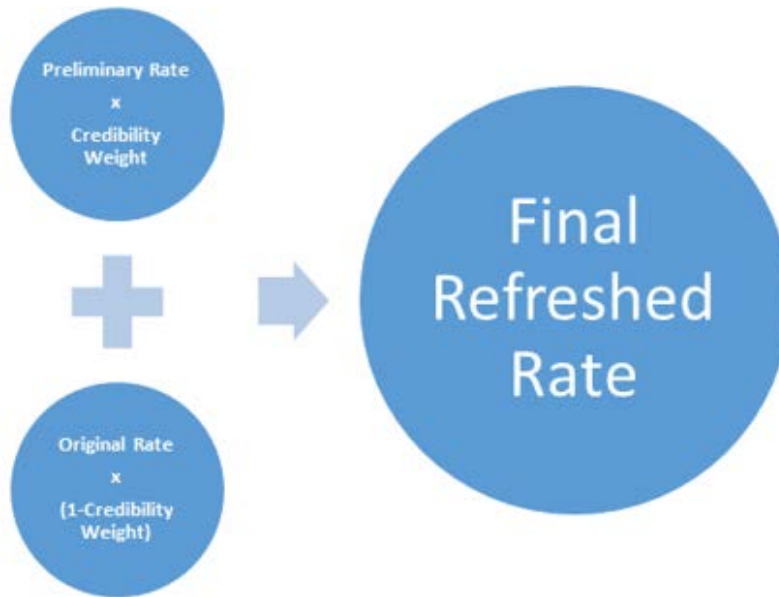


Figure 2.5.1: Final Rates Weighting Process

The updated rating method was also applied to a group of quote data to find what the final rates for these policies might be compared to what the algorithm would have previously suggested.

2.6 Factor Analysis

Upon the completion of the A/E analysis and credibility study, the experience of the key factors was analyzed. The key factors included those used when pricing the basic component of the product: state, gender, product type, and occupational and non-occupational status. First, the percentage of total lives, total volume, and total claim costs were used to determine which segments had the most experience. Additionally, to analyze the experience of the factors, the A/Es were used to find the segments of each factor that had better or worse performance. An A/E analysis was done both before and after the credibility weighting. The pre-credibility A/E analysis describes the experience under the current algorithm structure, whereas the post-credibility A/E analysis depicts the experience with a blend of the current algorithm and updated algorithm in mind. Ultimately, this analysis can be leveraged to determine if the distribution of each factor's rate adjustment is representative of Unum's experience.

III. Analysis and Results

3.1 Rate Groupings

The manual Unum previously used for their base rates had rates assigned for each SIC code. Each SIC code was assigned an individual rate; however, several SIC codes had the same rates. It was difficult to see which groupings, if any, were used to develop these rates or if each industry was analyzed individually. Non-occupational rates were always lower than the occupational rate for any given SIC code, but the non-occupational rate fluctuated much less than the occupational rates. Figure 3.1.1 shows the frequency by individual SIC code and Figure 3.1.2 shows the severity by individual SIC code. Upon analysis of the data for each SIC code, it was determined that there were not enough policies per SIC code to come up with ratings individually. Instead, groupings of SIC codes that had similar frequency and incidence and were similar in industry were evaluated in order to group them together.



Figure 3.1.1: Frequency by SIC Code



Figure 3.1.2: Average Basic Claim Cost per Claim (Severity) by SIC Code

The first grouping examined was a grouping provided by Unum that is used throughout their company for various products. This grouping strategy created broad groupings of SIC codes, which became narrower as the SIC number increased. There were only fourteen total groups for codes 0001 to 9999. When these broad groupings were analyzed, it was noticed that the variation seen in the frequency and severity of individual SIC codes was no longer captured. The frequency and severity graphs for these broad groupings can be seen in Figure 3.1.3 and Figure 3.1.4 below. Due to this variation, and the large number of SIC codes in each grouping, it would be difficult to assign just one base rate to each group with any accuracy. Therefore, we decided that a less general method for grouping, but more condensed than the current method, would be needed.



Figure 3.1.3: Average Frequency Across SIC Groupings of 1000

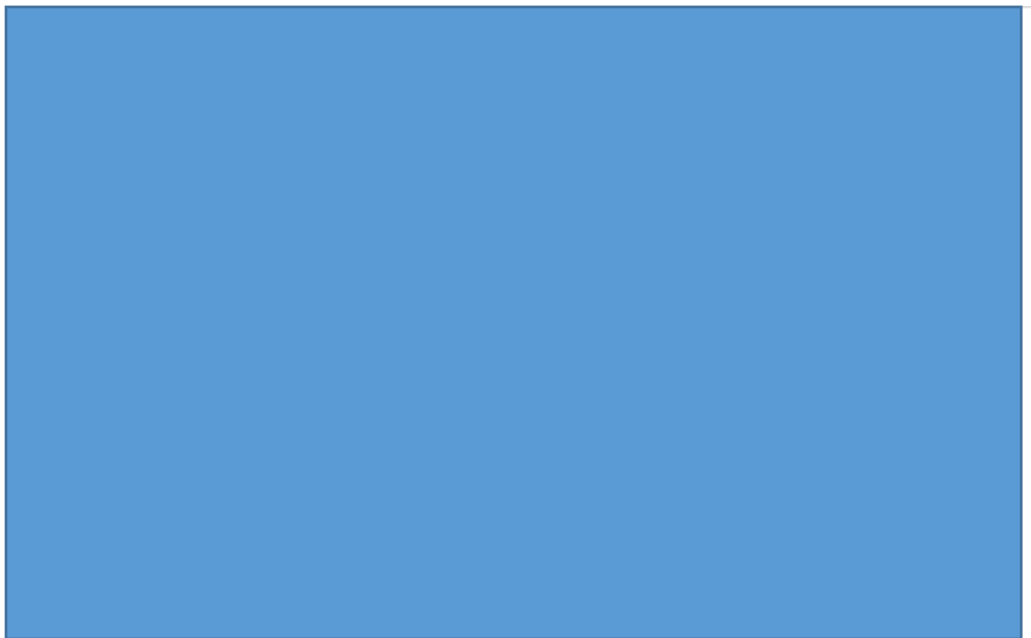


Figure 3.1.4: Average Basic Claim Cost per Claim by SIC Grouping by 1000

Next, Unum was able to provide us with the groupings currently used for the base group life product. As AD&D is a rider to the group life product, it would be logical if the groupings were consistent

among the two. These groupings, used for Unum's base group life product, were decided to be the best groupings for the AD&D product.

3.2 A/E Study

Ultimately, the overall A/E claim cost was calculated to be [REDACTED]. The following analysis was completed by utilizing pivot tables to calculate the A/E claim cost for various segments in the "AtoE and Additional Analysis" Excel file. Most significantly, there has been a downward trend in the A/E claim cost since 2005. This can be seen in the illustration below:

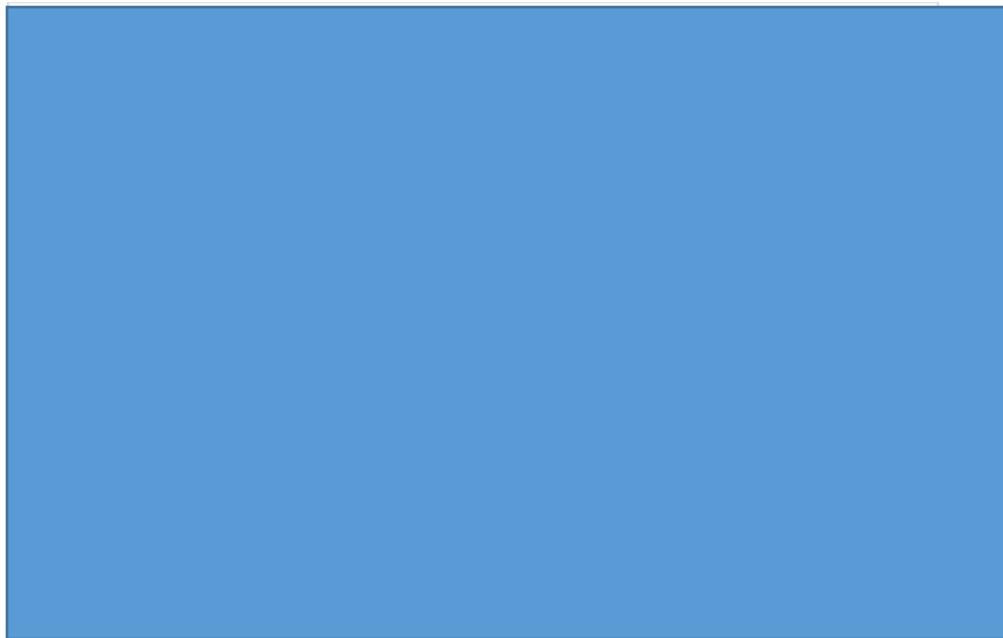


Figure 3.2.1: A/E Claims by Year

The downward trend shows that there has been less actual claim cost over time than expected claim cost. There are two main implications of this trend. First, this shows that the original algorithm is less applicable to the data with time. Second, this provides support for the potential opportunity to lower rates in the future. It is also important to mention that although the A/E claim cost generally decreases year-to-year, the business has grown over time as shown by Figure 3.2.2 (i.e., lives and volume

percentages have increased). However, business has grown more aggressively than the increasing claim percentage, which has led to the A/E claim cost generally decreasing since 2005.

It is noteworthy to compare the A/E claim cost by year to the lives percentage of total lives, volume percentage of total volume, and claim cost percentage of total claim cost by year. The following table goes into further detail of the percentage of total metrics by calendar year (Figure 3.2.2). As expected, the business has grown over time (i.e., lives and volume percentage have increased). However, business growth has grown at a higher rate than the increasing claim percentage, which has led to the A/E claim cost generally decreasing since 2005.

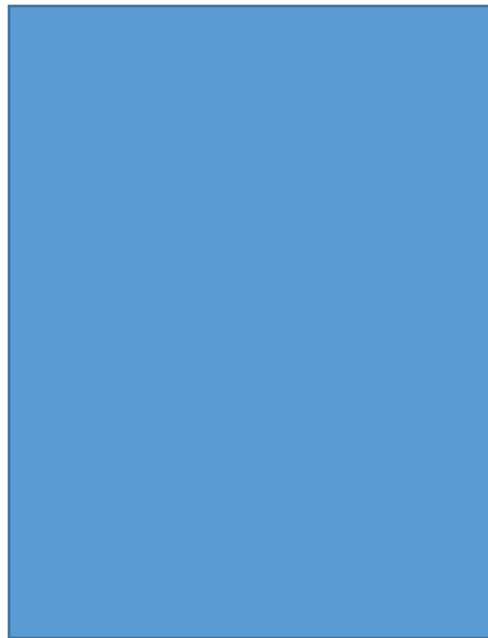


Figure 3.2.2: Breakdown by Calendar Year

3.3 Preliminary Rates

To achieve preliminary updated occupational rates, the A/E for each SIC code grouping was multiplied by its respective original rate. Therefore, the preliminary rates would reach a theoretical A/E of one hundred percent and the new rates would more accurately reflect recent claim experience within each SIC code grouping. The trends in the new rates were then analyzed based on various segments.

However, before the rates became finalized, credibility analysis was necessary to assign weighting to new rates versus the original rates.

Overall, the new rates appear to be generally lower than previous rates, which is reasonable given Unum's recent favorable experience. The average rate across all SIC groups is [REDACTED]. Figure 3.3.1 demonstrates that while several pockets of business were underpriced, generally the pre-credibility refreshed rates are lower than current base rates. Initial analysis indicates that the pockets of underpriced SIC codes had higher preliminary rates driven by both frequency and severity. However, this dynamic merits further investigation in the future.

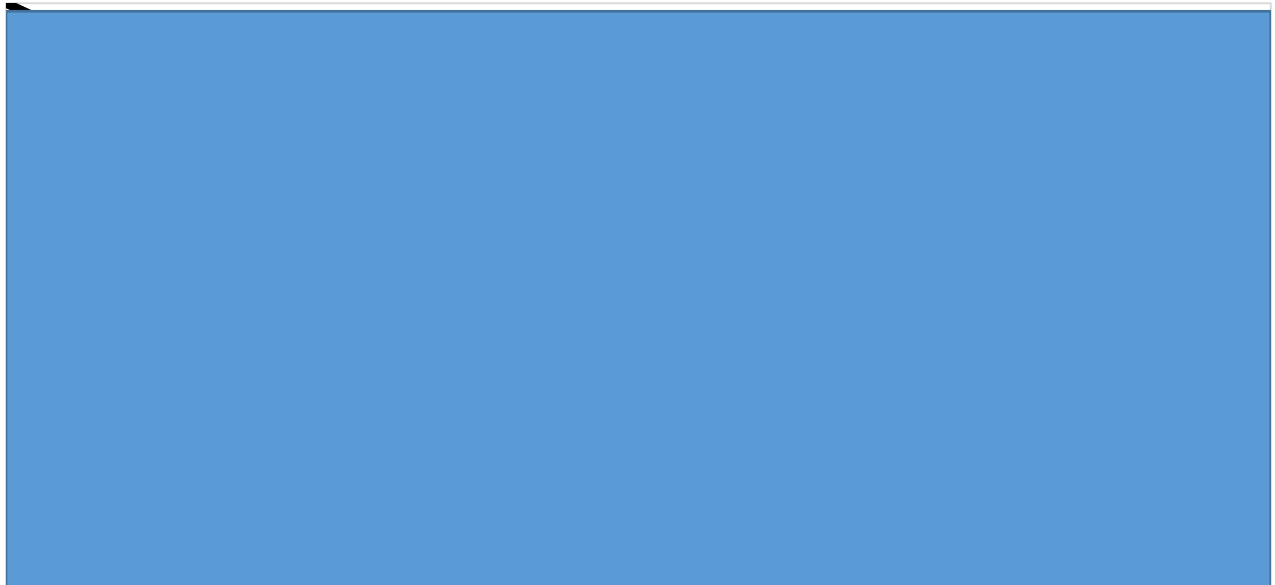


Figure 3.3.1: Prices by SIC Groupings

While it stands to reason that industry is a primary indicator for accidental death, rates by states and regions were also examined. These rates were developed prior to the credibility weighting and therefore trends may not be reliable. While there are no significant, observable conclusions available from these graphs, it underscores the impression that the preliminary occupational rates are generally lower than the original rates.

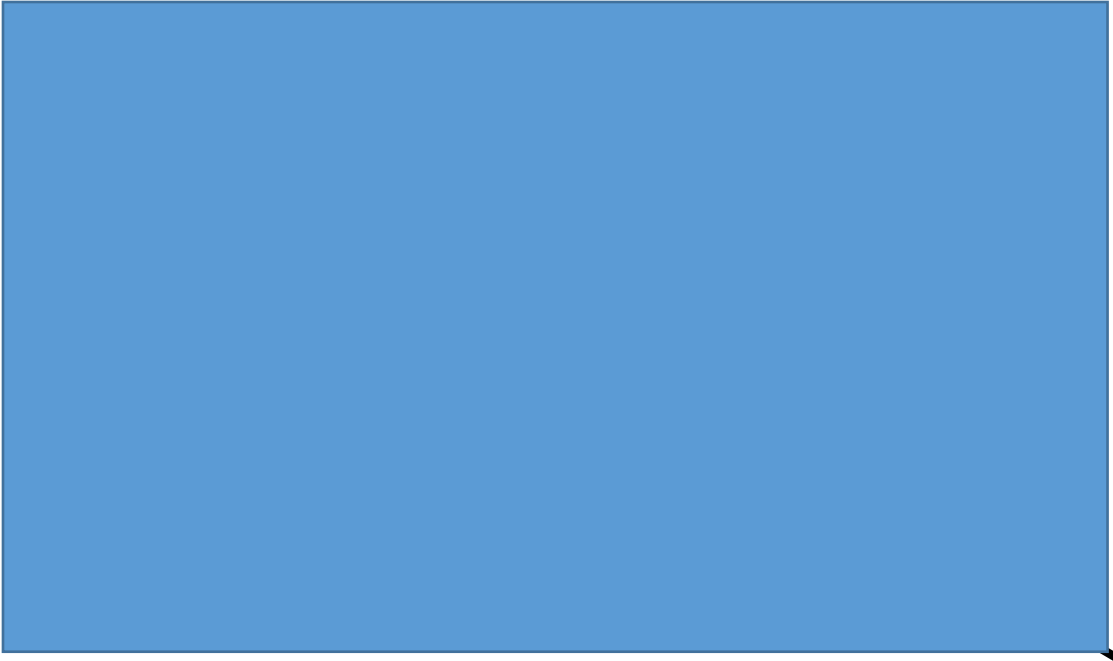


Figure 3.3.2: Average Rate by State



Figure 3.3.3: Average Rate by Region

3.4 Credibility Study

Final rates were developed using the credibility weighting as described in section 2.5. Therefore, preliminary rates with insufficient claim experience were combined with the original rates to avoid drastic unjustified price changes in those instances. It was decided to weight with previous rates instead of industry rates due to the nature of Unum's business. Over the previous experience period, Unum AD&D had more favorable claim experience than the broader industry based on data compiled by the Society of Actuaries (SOA). However, if Unum intends to change its business mix moving forward, this may merit further research.

3.5 Final Rates

Upon credibility-weighting our preliminary refreshed rates, we were able to arrive at final rates. Since the credibility of the preliminary rates were generally high, the distribution of the final rates were not shocking. Figures 3.5.1 depicts this information. As you can see, our previous hypotheses are supported; [REDACTED]

[REDACTED]



Figure 3.5.1: Final Refreshed Rates for SIC Life Groupings

To evaluate the realistic implications of these new rates, we also ran realistic quote data through our final refreshed rates (as well as through the original rates for comparison). This quote data contained 99,143 policies. It should be noted that a state factor of one was assumed for every policy because state was not provided in the data. The results of this run are summarized in the Figure below, and these results support the overall trends observed thus far in the relationship between original and refreshed rates.

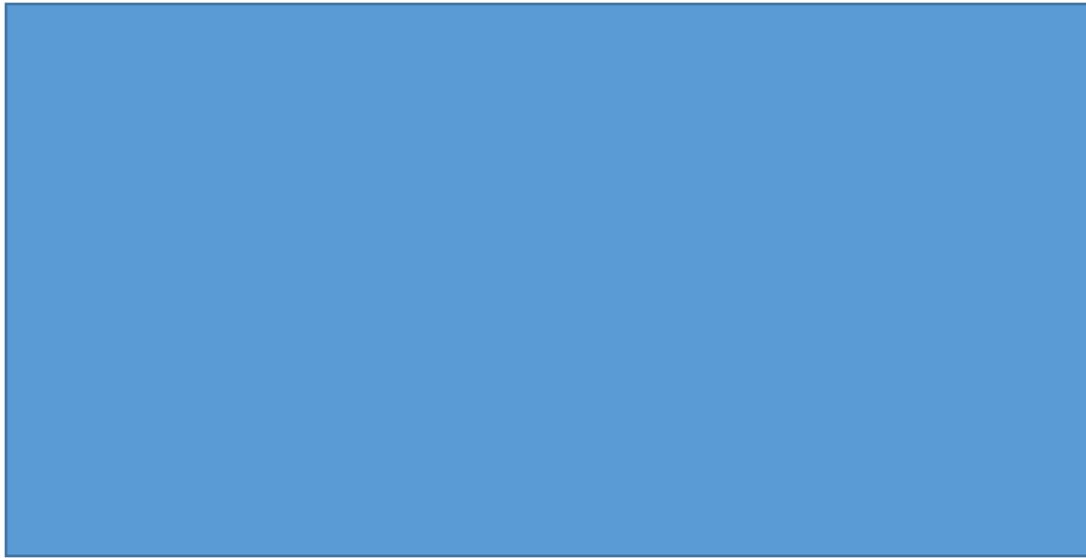


Figure 3.5.2: Key Statistics of Final Refreshed Rate

3.6 Factor Analysis

The following section is organized in such a way to explore the following factors: state, gender, product type, and occupational/non-occupational status. It is noteworthy to compare the original rates with the respective segments' percentage of total lives, volume percentage of total volume, and claim cost percentage of total claim cost. Most importantly it is important to compare the A/E claim cost across each factor.

State

In order to obtain credible results for state, the states were grouped by region. The region factor is the weighted state factor average. Comparing Figures 3.6.2 and 3.6.3, the credibility study improves

the A/E claim cost across all segments. Thus the credibility study will be used in the analysis. The key observation is that the average A/E claim cost for policyholders in the Southwest region have a high A/E of [REDACTED]. Thus, it may warrant consideration to increase the factor for the Southwest region. Alaska and Hawaii are likely statistically too small to make generalizations.

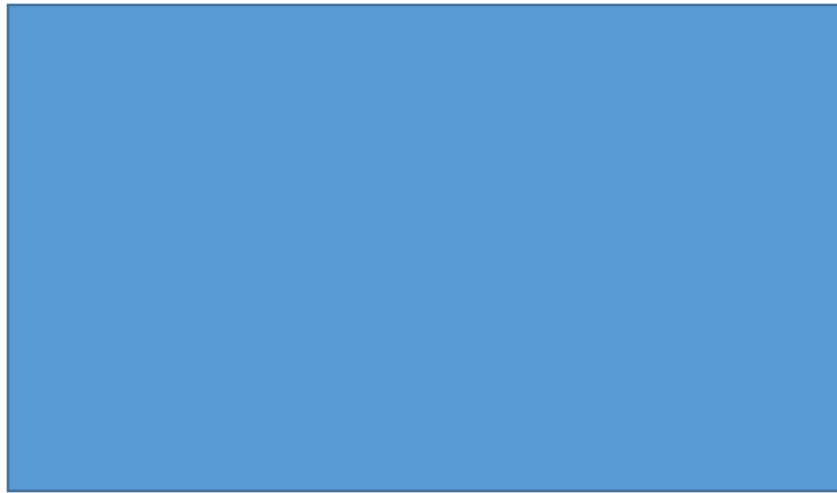


Figure 3.6.1: Tabular Breakdown by Region



Figure 3.6.2: A/E Claim Cost by Region (pre-credibility)

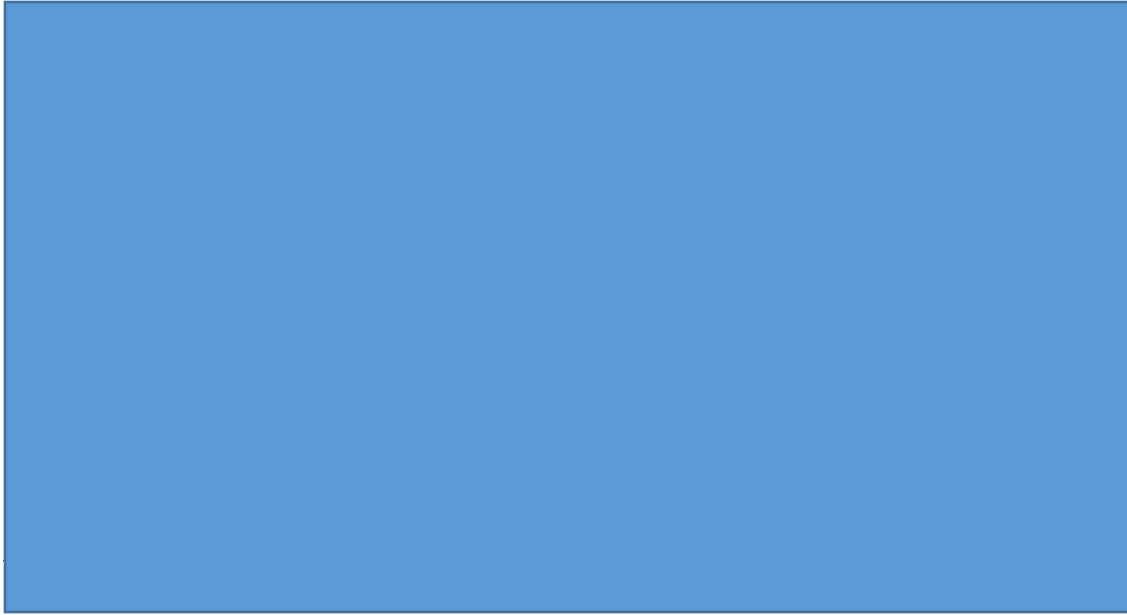


Figure 3.6.3: A/E Claim Cost by Region (post-credibility)

Gender

The gender volume bands have interesting results and implications, seen in Figure 3.6.4. Comparing Figures 3.6.5 and 3.6.6, the credibility study improves the A/E claim cost across all segments. Thus, the credibility study will be used in the analysis. The majority of lives and volume fall between 20% and 90% with the A/E claim cost ranging from [REDACTED] to [REDACTED] before the credibility study. However, with policies where there were less than 20% males or greater than 90% males, the A/E claim cost ranged from [REDACTED] to [REDACTED]. This could lead to rates being raised at the extreme ends of the gender bands (i.e., the risk of less gender-diverse policyholders was underestimated). Though it is important to consider that this is only a small portion of the entire basic AD&D business (about 17% of lives and 13% of volume).



Figure 3.6.4: Breakdown by Gender

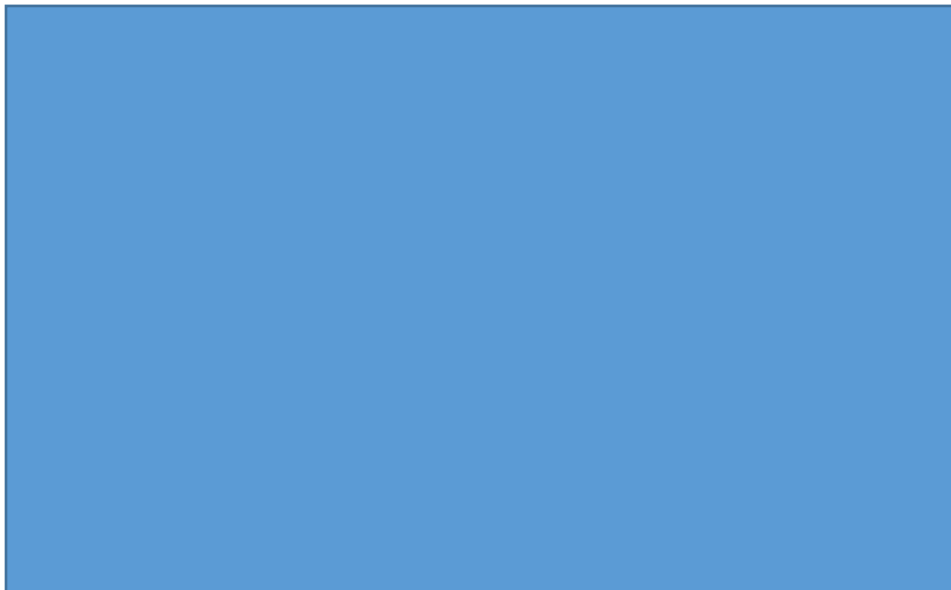


Figure 3.6.5: A/E Claim Cost by Gender (pre-credibility)

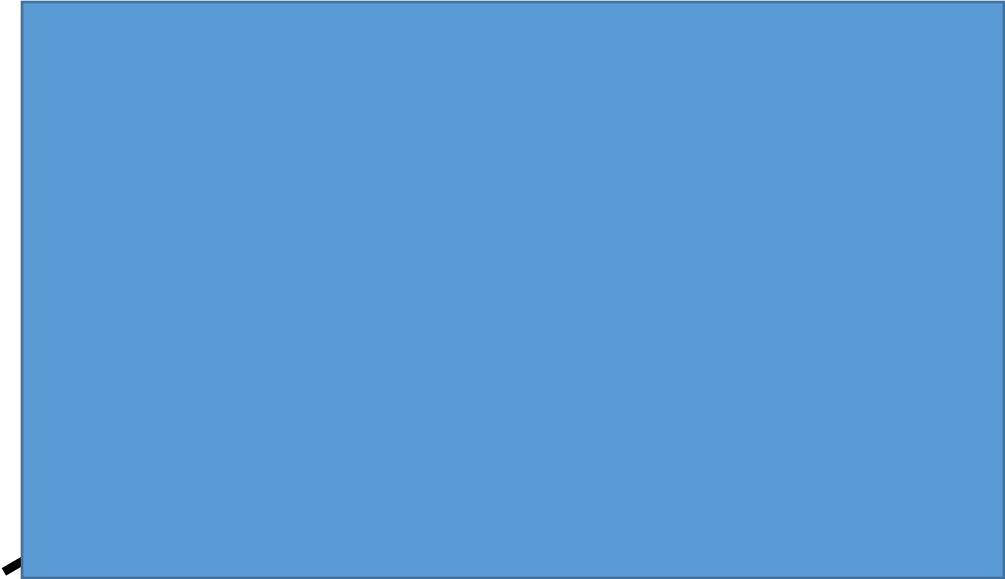


Figure 3.6.6: A/E Claim Cost by Gender (post-credibility)

Product Type

Comparing Figures 3.6.8 and 3.6.9, the credibility study improves the A/E claim cost across each segment. Thus the credibility study will be used in the analysis. For product type, it was believed that voluntary business would be riskier (see Figure 3.6.7). However, the data showed that this was not only true but that the A/E experience was significantly higher than the traditional product type (■■■ compared to ■■■). It is key to note that the original rates for the traditional product type and flex product type were equal.

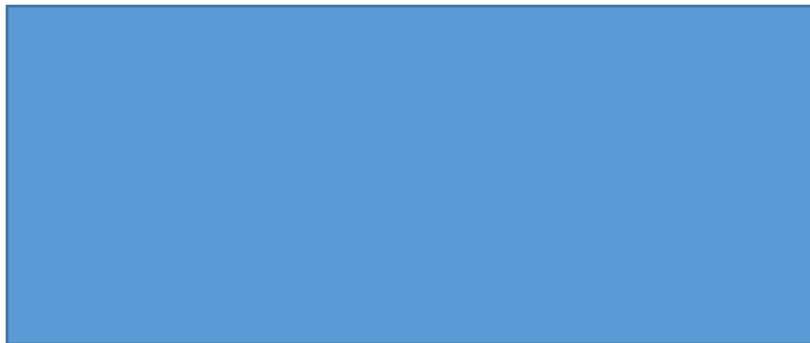


Figure 3.6.7: Breakdown by Product Type



Figure 3.6.8: A/E Claim Cost by Product Type (pre-credibility)



Figure 3.6.9: A/E Claim Cost by Product Type (post-credibility)

Occupational/Non-Occupational Status

Comparing Figures 3.6.11 and 3.6.12, the credibility weighting improves the A/E claim cost for both segments. Thus, the credibility study will be used in the analysis. Similar to product type, it was hypothesized that occupational status business would be riskier than non-occupational business since it

offered more coverage for policyholders. Ultimately, it was found that the occupational business A/E claim cost was significantly greater than the non-occupational business A/E claim cost.



Figure 3.6.10: Breakdown by OCC/Non-OCC Status

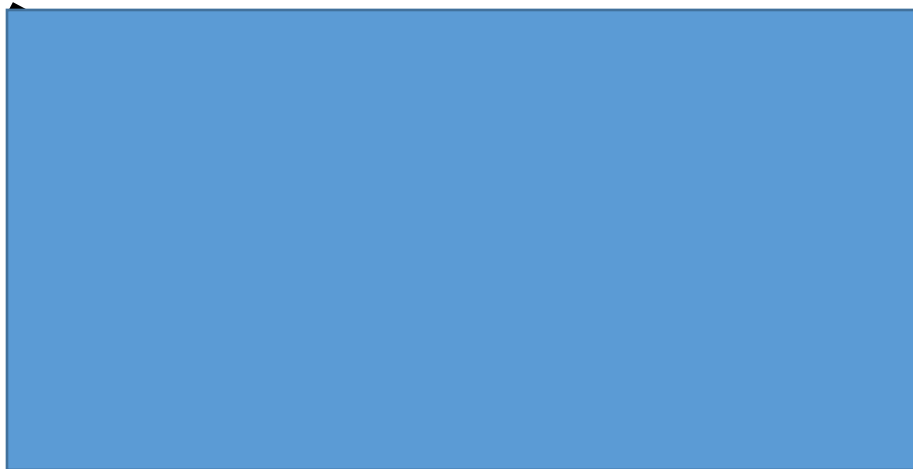


Figure 3.6.11: A/E Claim Cost by OCC/Non-OCC Status (pre-credibility)



Figure 3.6.12: A/E Claim Cost by OCC/Non-OCC Status (post-credibility)

IV. Conclusions and Recommendations

1. Groupings by SIC code and state

- We recommend changing the rating system to reflect SIC code groupings identical to those utilized in the base life product. Employing these groupings simplifies the manual, and combining data creates higher credibility when performing analysis. However, these groupings are still narrow enough to be sensitive to volatility among the SIC groups.
- When evaluating the geographic impacts on rates, it is clear that not all states have sufficient experience to be credible. Therefore, when performing this analysis we would recommend grouping the states into geographic regions (Northeast, Southeast, South, Midwest, West, Alaska, and Hawaii).

2. Consider pricing changes for basic AD&D

- Year-to-year A/E claim cost has progressively decreased. This could be due to fewer claims over time, more unclaimed business, noncurrent data, or the decreasing applicability of historic data over time. Therefore, a case could be made for decreasing rates.
- Unum's incidence is more favorable than SOA industry incidence. Therefore, if Unum intends to change its business mix an argument could be made against decreasing rates.

3. Readjust factors to bring A/Es closer to 1 across the key respective segments (i.e., states, product type, gender)

- Specifically, increase rate factor adjustment for less gender-diverse policyholders (i.e., policies where there were less than 20% males or greater than 90% males).

4. Next steps

- Apply credibility to other factor splits (i.e. region, gender, etc.)

- Apply similar analysis to the additional riders
- Compare SIC Life Groupings with groupings by credibility factor

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