

State of Missouri  
Workers Compensation Insurance

Actuarial Review of  
NCCI Voluntary Market Advisory Loss Cost Filing  
Effective January 1, 2016

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December 2015

Prepared by:



STATE OF MISSOURI  
WORKERS COMPENSATION INSURANCE

ACTUARIAL REVIEW OF  
NCCI VOLUNTARY MARKET ADVISORY LOSS COST FILING  
EFFECTIVE JANUARY 1, 2016

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STATE OF MISSOURI  
WORKERS COMPENSATION INSURANCE

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EXECUTIVE SUMMARY

**A. Introduction/Scope**

Actuarial Solutions has been engaged by the Missouri Department of Insurance, Financial Institutions and Professional Registration (the “Department”) to conduct an independent actuarial review of the National Council on Compensation Insurance’s (NCCI) Missouri workers compensation voluntary market advisory loss cost filing with a January 1, 2016 effective date.

We were asked by the Department to:

- review the NCCI’s ratemaking data, methods and assumptions to determine if the proposed loss costs meet the requirements of Missouri law and are actuarially sound;
- identify the effect on the filed loss costs if the NCCI had excluded assigned risk loss experience;
- evaluate the impact on the filed loss costs if the loss adjustment expense (LAE) experience of Missouri Employers Mutual (MEM) is considered in selecting the LAE provisions; and
- conduct an independent analysis of the Missouri loss costs and recommend an alternative overall loss cost change, if warranted by our findings.

**B. Summary of the NCCI Filing**

The NCCI has filed an overall decrease in loss costs of 2.4% effective January 1, 2016. This decrease is slightly smaller than the 3.7% decrease filed effective January 1, 2015. These two consecutive decreases offset a large portion of the experience increase (+7.5%)<sup>1</sup> included in the loss costs effective January 1, 2014.

The 2.4% decrease filed by the NCCI is comprised of several items, including changes in experience, trend and LAE, as well as changes in Missouri workers compensation benefit levels. The NCCI’s filed change in the Missouri LAE provision accounts for 0.3% of the overall decrease. The effect of the July 1, 2014 Missouri benefit change causes an increase of 0.2% in the loss costs. Roughly half of the remaining decrease of approximately 2.3% is caused by a decrease in the medical loss ratio trend, while the other half reflects changes due to the loss

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<sup>1</sup> The total filed increase effective January 1, 2014 was +11.6% of which +3.8% is attributed to the impact of Senate Bill 1 (SB1).

experience. Additionally, it is important to note that the NCCI's estimated effect of SB1<sup>2</sup> is reflected in this filing, however it will be several years before the actual effect of this law change fully manifests in insurers' historical experience. The NCCI noted to the Department that such effects appear to be taking longer to show up in the data than was expected.

In its presentation to the Department, the NCCI indicated that the large loss experience for the half-policy year 2014 as of December 31, 2014 is much higher than that observed for each of the five previous policy years at the same maturity. While this data does not directly impact the January 1, 2016 indication, it could be indicative of worsening severity for Missouri large claims, which will be quantified in future filings.

### C. Overall Findings

We find the NCCI's calculations to be actuarially sound. Two areas in which we differ in judgment are trend and LAE.

We believe that the NCCI's calculation of the countrywide provision for loss adjustment expense (LAE) overstates the ultimate projections. More specifically, the NCCI's selections result in a Missouri LAE provision of 19.4%, while we recommend a Missouri LAE provision of 18.5%. Changing only the Missouri LAE provision decreases the indication by 0.7% from -2.4% to -3.1%.

With respect to trend, we would have selected -2.5% as compared to the NCCI's selected annual indemnity loss ratio trend of -3.0%; additionally, we would have selected an annual medical loss ratio trend of -0.2% as compared to the NCCI's selection of 0.0%. The impact of changing the annual trend factors is an increase in the loss cost indication of 0.5% (from -2.4% to -1.9%), all else equal. The combined impact of our LAE and trend selections is an indication of -2.6%.

As calculated by the NCCI, excluding data for the assigned risk market from the experience decreases the indicated loss cost change to -4.4%. However, we believe it is appropriate to include the assigned risk data and, therefore, would not modify the NCCI's January 1, 2016 Missouri filing to exclude the assigned risk market.

Including MEM's DCCE experience in the calculation of the LAE provision decreases the NCCI's indicated loss cost change from -2.4% to -3.0%, all else equal. However, we believe that if MEM's DCCE data is to be reflected, then consideration should also be given to MEM's AOE experience. Additionally, as the filed loss costs will be used by the commercial carriers who write voluntary business in Missouri and not by MEM, it would be reasonable to establish a proper LAE provision without consideration of MEM LAE experience. Given that MEM's combined DCCE and AOE ratios are not materially different than the countrywide combined LAE ratios used by the NCCI,

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<sup>2</sup> SB1 shifted a substantial portion of losses previously covered by the Second Injury Fund (SIF) to the insurance system. Its estimated effect is also reflected in the NCCI's January 1, 2014 and January 1, 2015 loss cost filings.

the impact of either including both the DCCE and the AOE experience for MEM or excluding MEM's LAE experience entirely should produce similar results.

Taking into consideration all elements reviewed, as discussed herein, we recommend an indicated Missouri voluntary market advisory loss cost change of -2.6% effective January 1, 2016.

STATE OF MISSOURI  
WORKERS COMPENSATION INSURANCE

ACTUARIAL REVIEW OF  
NCCI VOLUNTARY MARKET ADVISORY LOSS COST FILING  
EFFECTIVE JANUARY 1, 2016

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REPORT

I. INTRODUCTION

Annually, the National Council on Compensation Insurance (NCCI) files workers compensation voluntary market advisory loss costs in Missouri to be effective January 1 of the upcoming year. These loss costs are available for use by carriers writing workers compensation policies with Missouri exposure under Missouri's file-and-use statute. Actuarial & Technical Solutions, Inc. (Actuarial Solutions) has been retained by the Missouri Department of Insurance, Financial Institutions and Professional Registration (the "Department") to review the Missouri workers compensation loss cost filing submitted by the NCCI to be effective on January 1, 2016.

This report serves as documentation of that review. Where appropriate, we have recommended changes and have calculated the impact of such recommendations on the loss cost indication. Additionally, as requested by the Department, we have: identified the effect on the filed indication of including Missouri Employers Mutual (MEM) loss adjustment expense experience, and considered whether it is appropriate to include data for the assigned risk market in determining the filed indication.

## II. OVERVIEW OF FILING

The NCCI filed a -2.4% overall change in advisory loss costs to be effective January 1, 2016. The indicated change by industry group is as follows:

Loss Cost Change by Industry Group		
Industry Group	Loss Cost Change	Missouri Exposure Distribution*
Manufacturing	-2.3%	10.9%
Contracting	-4.9%	5.6%
Office & Clerical	-0.9%	59.7%
Goods & Services	-2.5%	18.9%
Miscellaneous	-0.5%	4.9%
TOTAL	-2.4%	100.0%

\* Exposure distribution based on 7/1/12-13 payroll excluding F-classes.

The largest changes in loss costs among the top twenty classifications (based on premium) are:

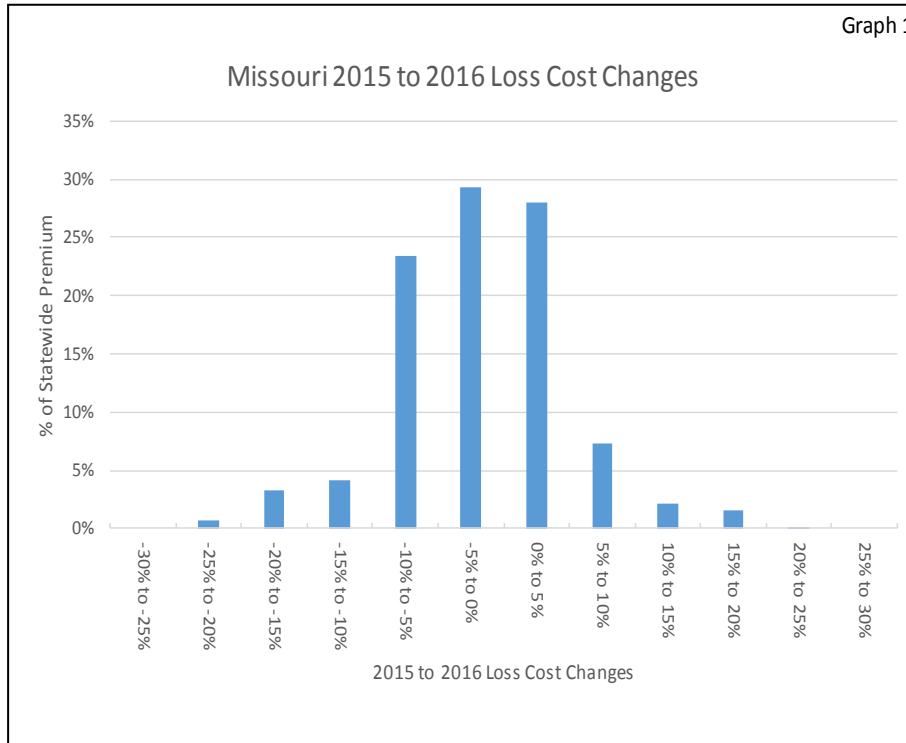
Largest Classes with an Increase in Loss Cost			
Class	Class Description	Size Rank Based on Premium*	Loss Cost Change
7228	Trucking - Local Hauling Only & Drivers	3	+3.4%
8833	Hospital: Professional Employees	9	+1.0%
8868	College: Professional Employees & Clerical	15	+2.6%
7600	Telecommunications Co. - Cable TV or Satellite - All Other Employees & Drivers	17	+2.8%
8835	Home, Public, and Traveling Healthcare - All Employees	20	+5.0%

\* Rank based on 7/1/12-13 payroll x 1/1/2016 proposed loss cost.

Largest Classes with a Decrease in Loss Cost of at least 5%			
Class	Class Description	Size Rank Based on Premium*	2016 Loss Cost Change
5645	Carpentry - Construction of Residential Dwellings Not Exceeding Three Stories in Height	5	-5.4%
8742	Salespersons or Collectors - Outside	6	-5.3%
8391	Automobile Repair Shop & Parts Department Employees, Drivers	10	-5.2%
5183	Plumbing NOC & Drivers	14	-5.7%
5190	Electrical Wiring-Within Buildings & Drivers	18	-17.2%

\* Rank based on 7/1/12-13 payroll x 1/1/2016 proposed loss cost.

As shown in Graph 1, the proposed loss cost changes result in decreases between -10% and -5% for 23.37% of statewide premium<sup>3</sup>, decreases between -5% and 0% for 29.28% of statewide premium, and increases between 0% and 5% for 28.07% of statewide premium. 60.77% of statewide premium will see a decrease, and 3.79% of statewide premium will experience an increase in excess of 10%.



The key factors selected by the NCCI in the determination of the advisory loss costs are shown in the tables below. There are no major changes from the January 1, 2015 filing to the January 1, 2016 filing.

	1/1/15 Filing	1/1/16 Filing	% Change
Premium Development Factor	1.003	1.006	0.3%
Paid LDF - Indemnity	3.665	3.631 *	-0.9%
Incurred LDF - Indemnity	1.288	1.316 *	2.2%
Paid LDF - Medical	1.613	1.619	0.4%
Incurred LDF - Medical	1.101	1.116	1.4%
Indemnity Trend Factor	0.913	0.913	0.0%
Medical Trend Factor	1.015	1.000	-1.5%
Excess Loss Loading	1.013	1.011	-0.2%
Loss Adjustment Expense Factor	1.197	1.194	-0.3%

\* The indemnity LDFs for policy year 2013 were adjusted by the NCCI to reflect the anticipated impact of SB1 which became effective on January 1, 2014 and thus affects loss for the second half of this policy year. The indemnity LDFs above remove the SB1 adjustment to be comparable to the LDFs contained in the January 1, 2015 filing.

<sup>3</sup> Premium equals July 1, 2012-2013 payroll x January 1, 2016 proposed loss cost.



Table 5

## NCCI Factors Applied to Prior Policy Year

	<u>1/1/15 Filing</u>	<u>1/1/16 Filing</u>	<u>% Change</u>
Premium Development Factor	0.999	0.999	0.0%
Paid LDF - Indemnity	2.003	2.024	1.0%
Incurred LDF - Indemnity	1.156	1.177	1.8%
Paid LDF - Medical	1.311	1.325	1.1%
Incurred LDF - Medical	1.054	1.069	1.4%
Indemnity Trend Factor	0.885	0.885	0.0%
Medical Trend Factor	1.020	1.000	-2.0%
Excess Loss Loading	1.013	1.011	-0.2%
Loss Adjustment Expense Factor	1.197	1.194	-0.3%

### III. REVIEW OF THE NCCI FILING

The following presents a synopsis of the key components underlying the overall indicated loss cost level change filed by the NCCI effective January 1, 2016. We have reviewed the NCCI's general methodology as well as the calculations contained in the filing. The NCCI's approach to preparing state filings includes the incorporation of items which are state-specific (such as loss development and trend), as well as items which are based upon countrywide information and included in filings submitted in numerous states (such as adjusting and other expense). A consistent methodology is generally reflected across all states, with judgment applied more by the manner in which elements are selected rather than in the selection of each individual item. We discuss below how the NCCI's judgment comes into play within each of the following elements.

#### A. Loss Development Factors

The NCCI bases its experience indication upon loss and premium for policy years 2012 and 2013 evaluated as of December 31, 2014. Ultimate losses for Missouri are estimated by averaging the results of a paid loss development method and a paid plus case loss development method. With the exception of the January 1, 2014 filing,<sup>4</sup> the NCCI's approach to selecting loss development factors (LDFs) in recent years has been to use an average of the latest two observed paid LDFs when preparing the paid loss projection, and to utilize an average of the latest five paid plus case LDFs when projecting paid plus case loss to ultimate. Thus, the NCCI's judgment comes into play in the selection of the rules which are applied to LDFs at all maturities. We generally prefer to apply judgment in selecting LDFs by reviewing the available historical LDFs at each maturity and making a selection based upon our observations of factors within the given age-to-age period. In our analysis of the NCCI's January 1, 2016 Missouri filing, we reviewed the paid and the paid plus case age-to-age LDFs for each of indemnity loss and medical loss. For each set of factors, we applied our actuarial judgment to select an LDF for each age-to-age period; some selected LDFs were higher than those used by the NCCI, while others were lower. We then replaced the NCCI's rule-based LDFs with our LDF selections to test the impact on the loss cost indication. The indication produced by our selected LDFs, all other elements unchanged, is equal to the indicated loss cost change filed by the NCCI (see Exhibit 4). Thus, while we would have judgmentally selected different LDFs for a number of age-to-age maturities, we do not find that the use of LDFs based upon judgment (rather than the NCCI's LDFs which reflect selected rules) impacts the indicated loss cost change, and conclude that, overall, the selected LDFs used by the NCCI are not unreasonable.

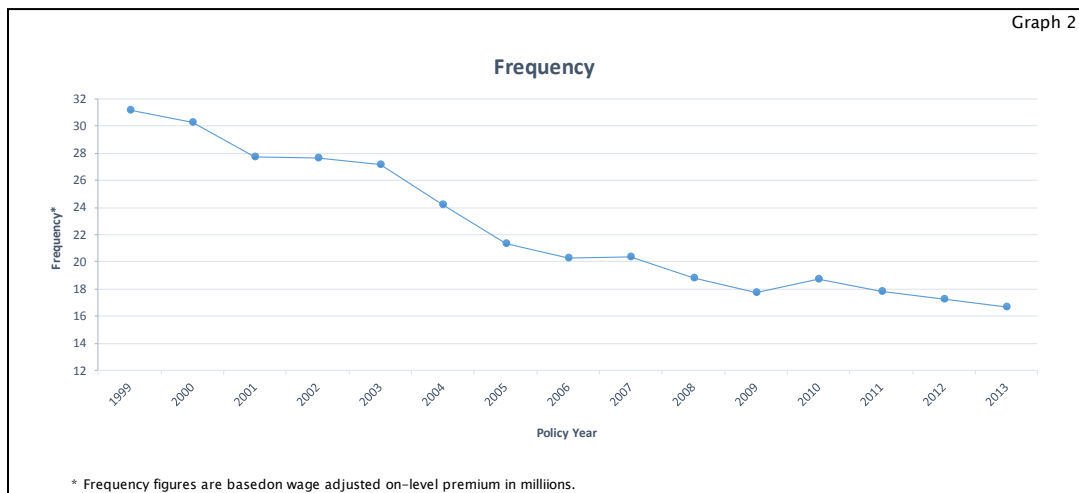
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<sup>4</sup> The NCCI's approach for selecting paid LDFs in the January 1, 2014 filing differs in that it utilizes an average of the latest three observed LDFs.

## B. Trend Analysis

In selecting indemnity and medical loss ratio trends, the NCCI reviewed Missouri-specific frequency, indemnity severity and medical severity information, as well as ultimate indemnity and medical loss ratios, for policy years 1999-2013. The NCCI selects minimum and maximum trend factors for frequency, indemnity severity and medical severity. Using a single frequency within their selected range, the NCCI then calculates implied minimum and maximum indemnity and medical loss ratio trend factors by multiplying the frequency and respective severity components. Finally, they select an annual indemnity loss ratio trend factor and an annual medical loss ratio trend factor within the respective indicated range. We have reviewed each of these components as well as the NCCI's selected loss ratio trends.

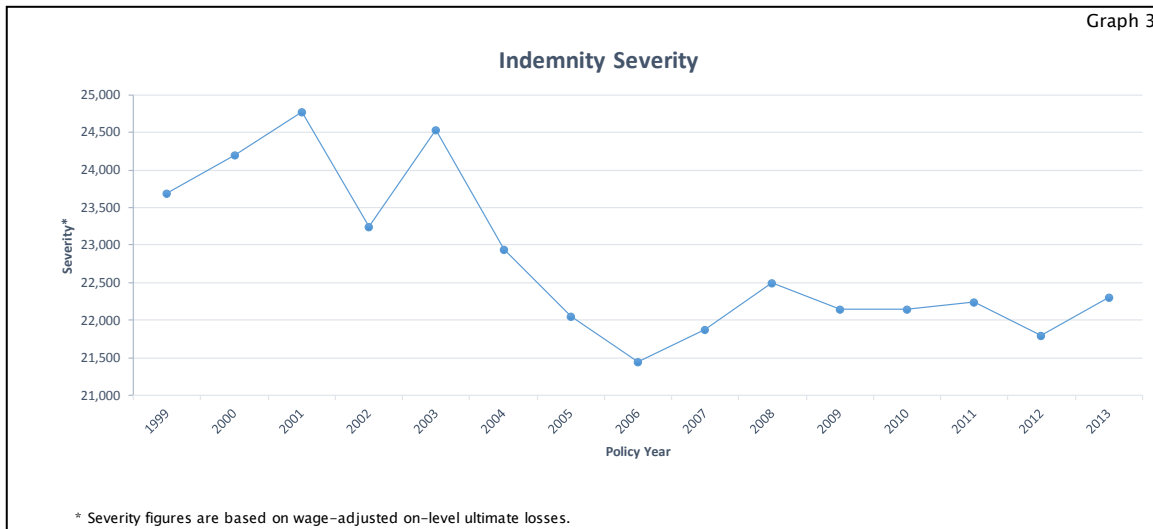
The NCCI reviewed the historical claims frequency for policy years 1999-2013 and selected a minimum frequency trend factor of 0.954<sup>5</sup> and a maximum frequency trend factor of 0.980. The NCCI's selected minimum frequency trend appears to be based upon a longer-term experience period for which a more pronounced average annual decrease is seen. The NCCI's selected maximum frequency trend seems to reflect the shorter-term, more recent experience, which is not declining as rapidly as the older historical years. Graph 2 presents the full experience period reviewed by the NCCI.



The NCCI then utilized a selected frequency trend factor of 0.975 (an annual frequency trend of -2.5%) in calculating the loss ratio trends (as discussed below). In reviewing the data presented by the NCCI, we observe that the frequency for the more recent policy years displays a trend which is less negative than that seen for the older years. After reviewing frequency trends for various combinations of policy years, we concur with the NCCI that an annual frequency trend of -2.5% is appropriate in the determination of the January 1, 2016 loss costs.

<sup>5</sup> A frequency trend factor of 0.954 is equal to an annual frequency trend of -4.6% ( $-0.046 = 0.954 - 1.000$ ).

For indemnity severity, the NCCI calculated the ultimate cost per claim for each of policy years 1999 through 2013 based upon ultimate loss (which equals an average of the ultimate loss produced via the paid development and the paid plus case development projections) divided by projected ultimate claim counts. The NCCI selected a minimum annual indemnity severity trend factor of 0.992 which appears to reflect a long-term average annual indemnity severity trend. The NCCI's selected maximum indemnity severity trend factor is 1.003, which seems to consider experience over a shorter period. Graph 3 presents the 1999-2013 indemnity severities which were considered by the NCCI.

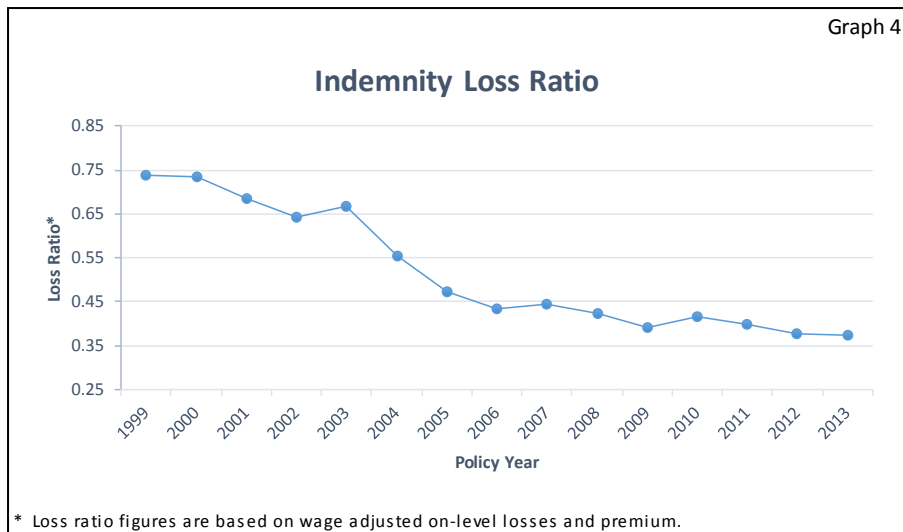


After fitting exponential curves to the severities<sup>6</sup> for various combinations of policy years, we believe the indemnity severity trend factor falls within a range of 0.997-1.003. Combining an average indemnity severity trend factor of 1.000 with a selected 0.975 frequency trend factor yields an indicated annual indemnity loss ratio trend of 0.975.

We now look directly at indemnity loss ratios. As mentioned above, the NCCI derived minimum and maximum loss ratio trend factors by multiplying a selected annual frequency trend factor of 0.975 by the minimum and maximum annual indemnity severity trend factors, respectively. This procedure produced a minimum indemnity loss ratio trend of 0.967 (0.975 x 0.992) and a maximum indemnity loss ratio trend of 0.978 (0.975 X 1.003) in the January 1, 2016 filing. The NCCI selected an annual indemnity loss ratio trend factor of 0.970 for 2016, which is equal to the factor selected in the 2015 filing.

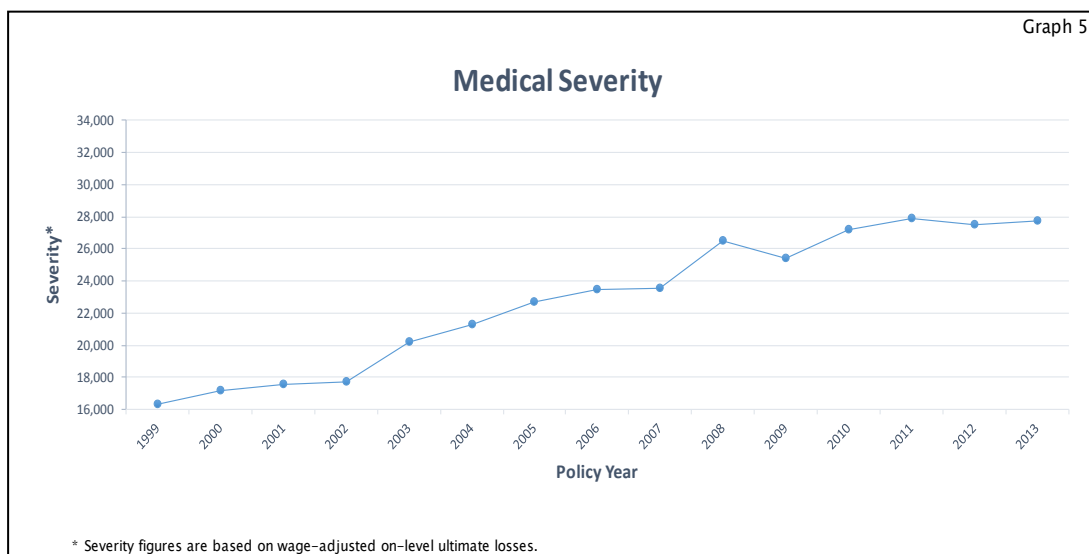
In reviewing the historical indemnity loss ratios for policy years 1999-2013 (refer to Graph 4), we can see that while the loss ratios have continued to decrease over time, such annual decreases have slowed considerably. Over the shorter term, the year to year indemnity loss ratio changes fall within a much narrower range, indicating a smaller average annual decrease.

<sup>6</sup> Actuarial Solutions fit curves to indemnity severities which were calculated based upon ultimate indemnity loss which substitutes our judgment-based LDFs for the rule-based LDFs used by the NCCI.



As noted above, the NCCI selects an annual indemnity loss ratio trend of -3.0%. Based upon a direct review of indemnity loss ratio trends,<sup>7</sup> we believe the 2006-2013 years to be most indicative of the indemnity loss ratio trend for 2016 and would have selected an indemnity loss ratio trend of -2.5% per year. This result is consistent with our findings under the separate analysis of frequency and severity. Therefore, we recommend an annual indemnity loss ratio trend factor of 0.975, which is slightly less negative than the NCCI's selected annual indemnity trend of 0.970 (-2.5% vs -3.0%).

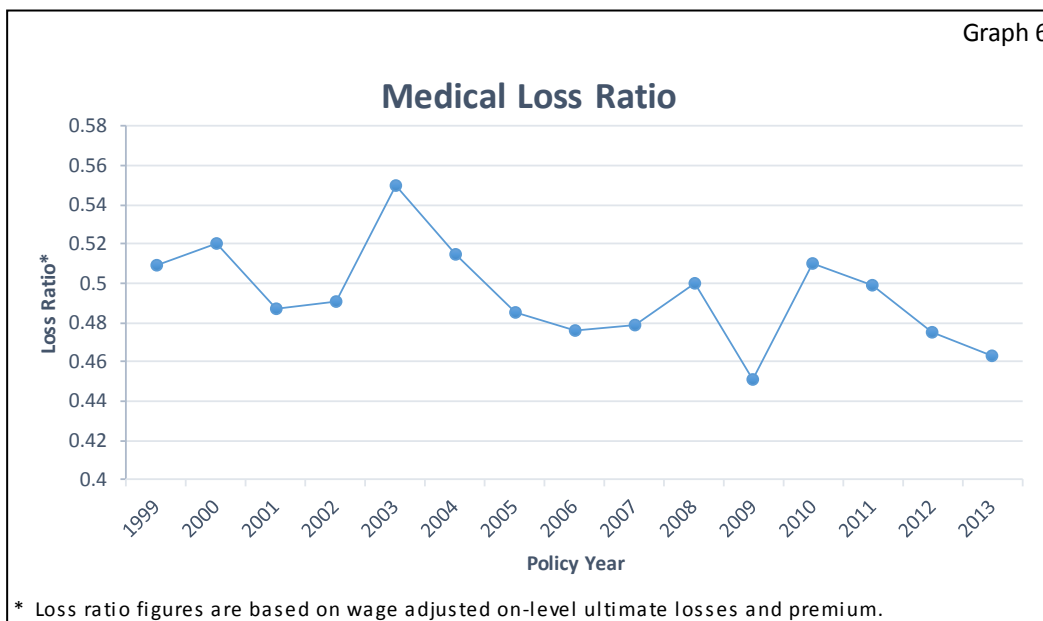
A similar analysis was conducted for medical loss. The NCCI calculates ultimate medical severities based upon ultimate medical loss produced by using an average of the paid and the paid plus case LDF projection methods, divided by ultimate claim counts. The NCCI selected a minimum medical severity trend factor of 1.014 and a maximum medical severity trend factor of 1.043. The minimum trend appears to be based upon the more recent experience, while the maximum trend relies upon long-term medical severities. Graph 5 presents the historical medical severities for policy years 1999 through 2013.



<sup>7</sup> Actuarial Solutions fit curves to indemnity loss ratios which were calculated based upon ultimate indemnity loss which substituted our judgmentally-selected LDFs for the rule-based LDFs selected and utilized by the NCCI.

While the medical severities have continued to increase, in recent years this increase has flattened to temper the annual trend. We have fit various exponential curves to the medical severities<sup>8</sup> and reviewed the resulting medical trend indications. We believe that a medical severity trend factor in the range of 1.010 to 1.035 is reasonable. Combining the medical severity trend with the selected frequency trend of 0.975, discussed above, yields medical loss ratio trends of about 0.985 to 1.009.

With regard to medical loss ratio trends, based upon the selected frequency and severity components, the NCCI calculates a minimum medical loss ratio trend of 0.989 (0.975 x 1.014) and a maximum medical loss ratio trend of 1.017 (0.975 x 1.043). This led the NCCI to select an annual medical loss ratio trend factor of 1.000. Graph 6 presents the medical loss ratios for policy years 1999 through 2013. As can be seen in Graph 6, the historical medical loss ratios are more volatile than is the case for the indemnity loss ratios. For example, the policy year 2009 medical loss ratio is approximately 45%, while the prior two years average 49% and the subsequent two years average about 51%; over all policy years reviewed by the NCCI, the medical loss ratios fluctuate over a range from 45% to 55%.



After reviewing the indicated medical trend results from fitting exponential curves directly to the medical loss ratios<sup>9</sup> as well as a review of the frequency and severity components, we believe a medical loss ratio trend factor in the range of 0.985 to 1.010 would be reasonable. We recommend an annual medical loss ratio trend factor of 0.998; this is slightly lower than the NCCI's selected trend factor of 1.000.

<sup>8</sup> Actuarial Solutions fit curves to medical severities which were calculated based upon ultimate medical loss which substituted our judgment-based LDFs for the rule-based LDFs used by the NCCI.

<sup>9</sup> Actuarial Solutions fit curves to medical loss ratios which were calculated based upon ultimate medical loss which substituted our judgmentally selected LDFs for the rule-based LDFs used by the NCCI.

Replacing the NCCI's filed trend factors with an annual 0.975 indemnity loss ratio trend factor and an annual medical loss ratio trend factor of 0.998 produces an indicated loss cost change of -1.9% (as seen on Exhibit 5). Thus, our review of the trend components produces a slightly less negative indication (-1.9% versus -2.4%) all else equal.

### C. LAE Provision

The Missouri loss costs include a provision for LAE. LAE has two components: Defense and Cost Containment Expense (DCCE) and Adjusting and Other Expense (AOE). DCCE includes items such as legal/defense expenses and medical exam costs. AOE encompasses general claims administration expenses such as salaries for claim adjusters. The NCCI analyzes the DCCE ratio to loss separately from the AOE ratio to loss. For DCCE, the NCCI develops each of countrywide ultimate loss and countrywide ultimate DCCE on an accident year basis; for each accident year, dividing the projected ultimate DCCE dollars by the dollars of projected ultimate loss produces ratios of ultimate DCCE to loss. Similarly, ultimate AOE to loss ratios are determined by dividing projected countrywide ultimate AOE by projected countrywide ultimate loss. Beginning with the 2015 filing, the NCCI selects the countrywide DCCE (and AOE) provision to be equal to the average ultimate DCCE (and AOE) ratio for the three latest accident years; recent prior filings reflected two-year averages.

To determine the LAE provision for a given state's filing, the NCCI considers each of the DCCE and AOE components. For AOE, for which collected data is countrywide in nature, the NCCI selects the countrywide AOE provision; the current countrywide AOE ratio of 7.1% has been selected by the NCCI as the AOE ratio for the January 1, 2016 Missouri filing. For DCCE, the NCCI first selects a countrywide DCCE ratio (currently 13.0%) and then calculates a state relativity.<sup>10</sup> This state relativity is applied to the NCCI's selected countrywide DCCE provision to generate a state-specific DCCE ratio. In Missouri, the relativity is 1.025 for the January 1, 2016 filing and is based upon data collected by the NCCI which excludes MEM experience; the resulting Missouri DCCE provision selected by the NCCI is 13.3% (13.0% x 1.025). Thus, the total indicated LAE provision for Missouri is 20.4%.<sup>11</sup> SB1, which took effect on January 1, 2014, is expected by the NCCI to reduce the LAE ratio by a factor of 0.992 (-0.8%). Application of this adjustment factor produces the LAE provision of 19.4%<sup>12</sup> filed by the NCCI in Missouri.

In reviewing the countrywide LAE information produced by the NCCI, we observed that the NCCI's estimates of the ultimate LAE ratio for a given accident year have fairly consistently decreased over time. For example, as presented in Graph 7, the NCCI's countrywide estimated ultimate LAE ratio for accident year 2009 referenced in the Missouri filing effective January 1, 2011 was 21.3%; the projected countrywide accident year 2009 LAE ratio

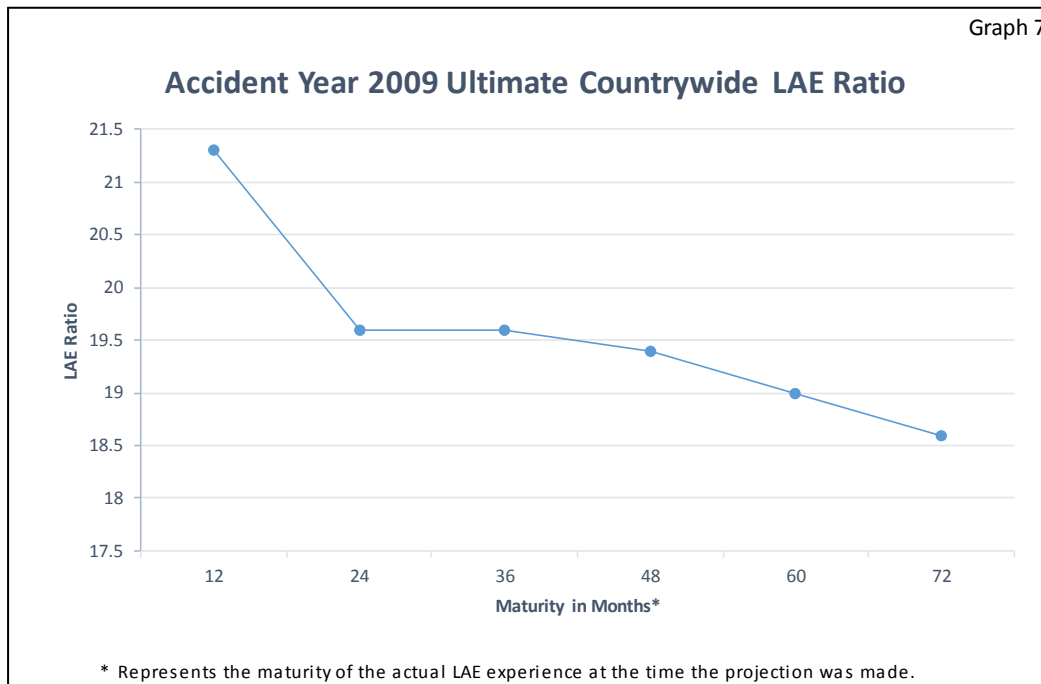
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<sup>10</sup> The DCCE state relativity is based upon a comparison of that state's calendar year DCCE to loss ratio to a countrywide calendar year DCCE ratio. Five calendar years of data are used to determine the state relativity for Missouri.

<sup>11</sup>  $20.4\% = 7.1\% + 13.3\%$ .

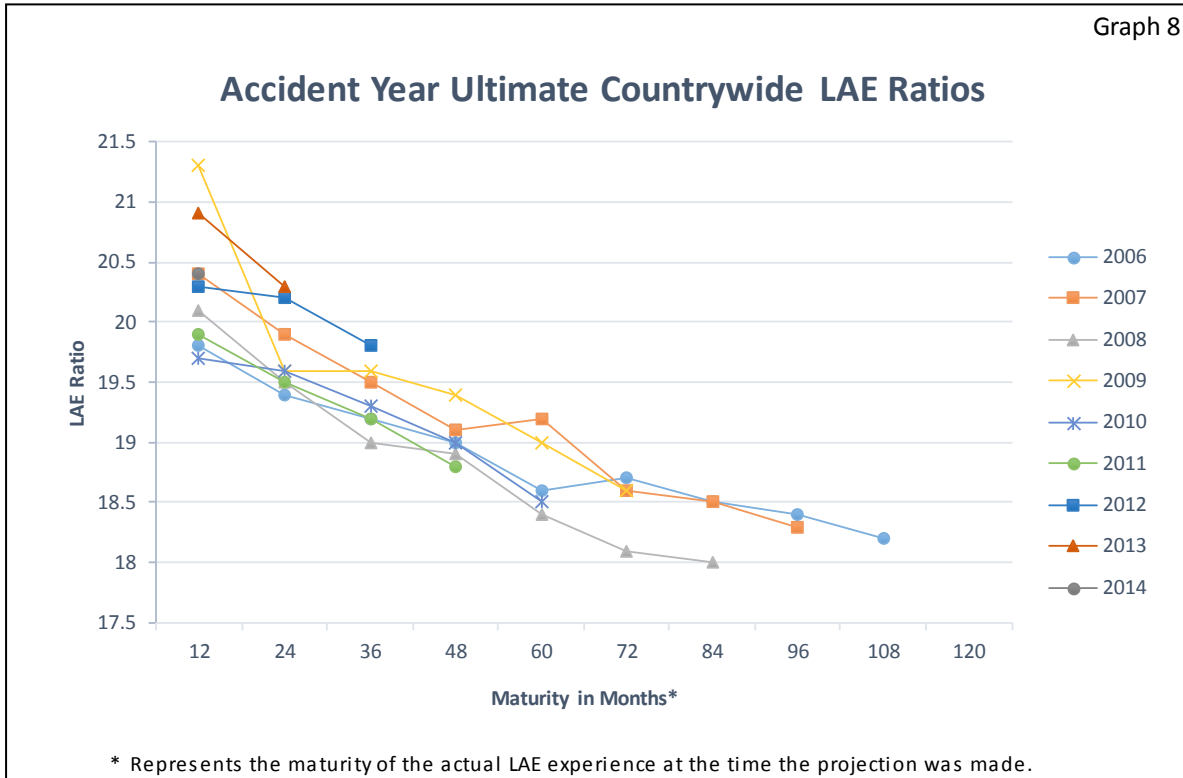
<sup>12</sup>  $19.4\% = (1.0 + 20.4\%) \times 0.992 - 1.0$ .

contained in the Missouri filing effective January 1, 2012 was 19.6%. The projected countrywide accident year 2009 ultimate LAE ratio continued to decrease in each subsequent filing year, and currently is estimated to be 18.6%.



Each filing contains data accumulated through a particular evaluation date; as each subsequent filing is prepared, information stated at a more recent evaluation date is available and incorporated, thus reflecting more mature data. The accident year 2009 ultimate LAE ratio of 21.3% is produced in the 2011 filing by projecting actual LAE experience through December 31, 2009 to an ultimate basis. For the accident year 2009 ultimate LAE ratio determined in the 2012 filing (19.6%), actual LAE experience through December 31, 2010 is projected to ultimate. Thus, with each passing year, the LAE projection for accident year 2009 uses an ever-increasing amount of actual LAE experience, and decreases the time period for which projection to ultimate is required. Graph 7 demonstrates that the process used by the NCCI over-projects the ultimate LAE ratio for accident year 2009, as the ultimate LAE ratio decreases as more actual LAE experience is reflected. Similarly, as seen in Graph 8, the decreasing projection of the ultimate LAE ratio for accident year 2009 is not an isolated occurrence, as other accident years display an analogous pattern.





We raised our concern about the generally decreasing LAE ratios to the NCCI. Their response acknowledged that the ultimate LAE for given accident years decreases over time, but also pointed out that ultimate LAE ratios increase from accident year to accident year; we had noted this during our review of this filing. Although this second observation provides some mitigating effect, the NCCI’s methodology has resulted in proposed countrywide LAE ratios that appear to be too large. The NCCI indicated that two changes have been recently implemented to help address this issue. First, during the prior filing cycle, the NCCI changed its methodology from using an average of the two latest accident years as the selected ultimate DCCE (and AOE) ratio, to reflecting a three-year average ultimate ratio as the selected countrywide DCCE (and AOE) provision. Additionally, the NCCI changed the manner in which it is selecting the 10<sup>th</sup> report-to-ultimate development factors used to generate ultimate DCCE to loss and AOE to loss ratios; namely, rather than using a rule-based average<sup>13</sup> for all age-to-age periods, the NCCI is now applying judgment to select the tail development factor.

We requested historical projections of countrywide DCCE and AOE ratios (to loss) from the NCCI. Table 6 presents the ultimate DCCE ratios for each of accident years 1996 through 2014 as presented in each of the January 1, 2007 through January 1, 2016 filings. Comparable information for AOE is contained in Table 7.

<sup>13</sup> In recent prior filings, the NCCI utilized an average of the latest five observations.

Table 6

Accident Year	Projected Ultimate Countrywide DCCE Ratios									
	Filing Effective ...									
	1/1/07	1/1/08	1/1/09	1/1/10	1/1/11	1/1/12	1/1/13	1/1/14	1/1/15	1/1/16
1996	8.1									
1997	8.9	8.9								
1998	8.9	9.2	9.2							
1999	8.8	9.1	9.1	9.2						
2000	9.2	9.7	9.7	9.6	9.7					
2001	9.4	9.9	10.1	10.0	10.1	10.0				
2002	9.8	10.5	10.6	10.6	10.5	10.4	10.3			
2003	10.0	10.7	10.8	10.7	10.6	10.5	10.4	10.0		
2004	10.0	10.6	10.8	10.7	10.7	10.5	10.3	10.0	9.9	
2005	10.3	11.5	11.1	10.9	10.8	10.5	10.4	10.3	10.2	10.1
2006		11.9	11.3	11.1	10.8	10.6	10.4	10.7	10.6	10.5
2007			12.2	11.8	11.5	11.1	10.9	10.8	10.7	10.6
2008				12.5	11.9	11.6	11.3	11.3	11.1	11.1
2009					13.1	12.0	11.8	11.7	11.5	11.3
2010						12.3	12.1	12.0	11.8	11.5
2011							12.9	12.5	12.3	12.1
2012								12.9	12.9	12.8
2013									13.3	12.9
2014										13.4

Table 7

Accident Year	Projected Ultimate Countrywide AOE Ratios									
	Filing Effective ...									
	1/1/07	1/1/08	1/1/09	1/1/10	1/1/11	1/1/12	1/1/13	1/1/14	1/1/15	1/1/16
1996	7.6									
1997	7.4	7.1								
1998	6.8	6.7	6.7							
1999	6.4	6.3	6.2	6.2						
2000	6.3	6.2	6.1	6.1	6.3					
2001	6.6	6.5	6.4	6.4	6.5	6.3				
2002	6.7	6.6	6.5	6.6	6.7	6.5	6.6			
2003	7.4	7.5	7.4	7.4	7.5	7.3	7.5	7.5		
2004	6.7	7.0	6.9	7.0	7.1	6.9	7.1	7.0	7.1	
2005	7.3	7.8	7.7	7.8	7.9	7.7	7.9	7.5	7.5	7.4
2006		7.9	8.1	8.1	8.1	8.0	8.3	7.8	7.8	7.7
2007			8.2	8.1	8.1	8.0	8.3	7.8	7.8	7.7
2008				7.6	7.5	7.4	7.6	7.1	7.0	6.9
2009					8.1	7.6	7.8	7.7	7.5	7.3
2010						7.4	7.5	7.3	7.2	7.0
2011							7.0	7.0	6.9	6.7
2012								7.4	7.3	7.0
2013									7.6	7.4
2014										7.0

Concentrating first on DCCE, we see in Table 6 that, like LAE in total, while it is true that the projected ultimate DCCE ratios increase from accident year to accident year, it is also true that the ultimate DCCE ratio for a given accident year decreases over time. Considering the DCCE information included in the filing effective on January 1, 2011, we can see, for example, that the accident year 2000 DCCE ratio was 9.7% and the DCCE ratio for each subsequent accident year is greater than or equal to the prior accident year's ratio. We can also consider the changes in DCCE ratio for each given accident year by reviewing Table 6. As was the case for total LAE discussed above, we note the DCCE ratio decreases over time as additional experience is reflected; using accident year 2009 for the purpose of illustration, the projected DCCE ratio is initially equal to 13.1% in the January 1, 2011 filing (containing data evaluated as of December 31, 2009), decreases from filing to filing and is currently projected to be 11.3% in the January 1, 2016 filing.

We have reviewed the historical changes in ultimate DCCE ratios for each accident year as it matures and have utilized this information to project adjusted ultimate countrywide DCCE ratios for individual accident years. We have estimated the future downward development of the DCCE ratios and have also considered the impact of the NCCI's recent methodology change which utilizes a three-year average to produce the selected DCCE ratio. This information, found in Exhibit 1, leads us to believe that a countrywide DCCE ratio in the range of 12.2% to 12.8% would be reasonable. Application of the Missouri DCCE relativity of 1.025 produces a range for the Missouri DCCE of 12.5% to 13.1%.

We have similarly reviewed the NCCI's countrywide AOE ratios (Exhibit 2). The AOE ratios also decrease over time for a given accident year, but do not increase from accident year to accident year to the same degree as the DCCE ratios. After considering the anticipated future decreases in the ultimate AOE ratios and the NCCI's recent adjustment to select an average of the latest three observed ratios, as well as the impact in the current filing of the NCCI's judgmental selection of the 10<sup>th</sup> report to ultimate development factor, we feel that an ultimate countrywide AOE ratio in the 6.4% to 7.0% range would be reasonable for the 2016 filing.

Thus, our range for LAE is 18.9% (12.5% + 6.4%) to 20.1% (13.1% + 7.0%). We have selected 19.5% as the Missouri LAE ratio prior to recognition of the impact of SB1. Reflecting the NCCI's SB1 adjustment factor of 0.992 causes our final LAE ratio to be 18.5%<sup>14</sup>. Substitution of our selected Missouri LAE provision for the LAE ratio included by the NCCI, causes the indicated loss cost change to decrease by an additional 0.7%.

Missouri Employers Mutual experience is not included in the NCCI's calculations. MEM's DCCE ratio is substantially lower than the DCCE ratio for the remainder of the insurance market in Missouri; for a number of years the Department has recommended loss costs which consider this difference in DCCE. Given the inclusion of MEM's DCCE experience in determining the Missouri DCCE ratio, it seems appropriate to consider similar information to reflect the impact of MEM's AOE experience. MEM's AOE ratio is substantially higher than the

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<sup>14</sup>  $(1.0 + 19.5\%) \times 0.992 - 1.0$

AOE ratio for the rest of the insurance industry. MEM’s total LAE experience appears to fairly closely parallel overall industry LAE experience.

We have been requested by the Department to calculate the impact on the indication should MEM experience be considered in the determination of the Missouri LAE provision. As noted above, for each state in which the NCCI submits workers compensation filings, they calculate a relativity of state experience to countrywide experience which is applied to the countrywide DCCE provision to derive a state-specific DCCE ratio. Exhibit 3 presents the Missouri relativity and resulting DCCE ratio produced by the NCCI (Column A), as well as the indicated relativity and DCCE ratio which result from the inclusion of MEM data (Column C). Including MEM’s DCCE experience in the calculation of the Missouri LAE ratio decreases the NCCI selected LAE ratio (after SB1) from 19.4% to 18.6%, resulting in an additional decrease in the loss cost indication of -0.6% due to the LAE factor. Thus, modifying the NCCI indication solely for the impact of MEM on the DCCE ratio would produce a decrease of 3.0% rather than the decrease of 2.4% filed by the NCCI.

In regard to considering MEM’s AOE ratio and its potential impact on the NCCI’s filing, we encounter a difficulty as Missouri-specific AOE ratios are not available. We note from Table 8 that over the eight calendar years 2007 through 2014, MEM’s AOE ratio averages 11.5% of loss (on a paid basis). Based upon countrywide data, over the eight accident years 2007 through 2014, the average ultimate AOE ratio is 7.1%.

Table 8			
AOE Ratios			
Calendar Year	MEM Paid	Accident Year	Countrywide Ultimate*
2007	12.3 %	2007	7.7 %
2008	12.0 %	2008	6.9 %
2009	12.3 %	2009	7.3 %
2010	11.6 %	2010	7.0 %
2011	11.7 %	2011	6.7 %
2012	12.1 %	2012	7.0 %
2013	10.5 %	2013	7.4 %
2014	9.6 %	2014	7.0 %
Average	11.5 %	Average	7.1 %

\* As calculated by and included within the NCCI's 1/1/16 Missouri filing.

Given that the MEM AOE ratio is, on average, about 62%<sup>15</sup> higher than the countrywide AOE ratio, any consideration of MEM’s AOE experience should increase the indication, all else equal. Given that the impact of reflecting MEM’s DCCE experience was a small reduction of 0.6%, we feel that had both the DCCE and AOE

<sup>15</sup> 1.62 = 11.5/7.1

experience of MEM been considered, the NCCI LAE indication would reflect little or no change. Furthermore, we are aware that, in recent years, the market share for MEM has not fluctuated materially; this could be an indication that there is little movement of insureds from MEM to the commercial market and from the commercial market to MEM. An argument can, therefore, be made for not considering either the DCCE or AOE experience of MEM when selecting an LAE provision to include in the advisory loss costs for commercial insurers. Reflecting a 0.0% impact from the consideration of MEM's LAE experience, and ignoring MEM experience in determining the LAE ratio for the advisory filing, produce identical results.

#### **D. Allocation of Loss Costs to Individual Classes**

The NCCI's methodology for distributing the overall indication among the various classes is well documented and well supported. We do not take exception to the methodology used by the NCCI. Loss cost changes for individual classes in this filing range from -28.0% to +20.4%.

We did not review the NCCI's calculation of the effect of changes to the U.S. Longshore and Harbor Workers' Compensation Act.

#### **E. Exclusion of Assigned Risk Experience**

At our request, the NCCI calculated that exclusion of assigned risk data from the experience used in the filing would cause the indicated loss cost change to decrease to -4.4%. Given the current small market share of the Missouri assigned risk market, as well as the fact that risks shift between the voluntary and assigned risk market over time, we feel that it is not inappropriate to base the indicated loss costs upon combined voluntary and assigned risk experience at this time.

#### IV. LIMITATIONS AND DISTRIBUTION

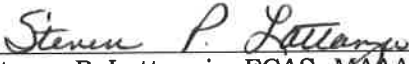
This report has been prepared solely for the use of and reliance by the Missouri Department of Insurance, Financial Institutions and Professional Registration in its review of the NCCI's Missouri advisory loss cost filing effective January 1, 2016. This report should be distributed only in its entirety. It is recommended that any party receiving a copy of this report request its own actuary to review the report to ensure an understanding of all assumptions, data, limitations and conclusions reached by the NCCI in its January 1, 2016 filing and by Actuarial Solutions in the review of the filing.

In our review, we relied solely upon information provided by the Department and by the NCCI. Appendix B of this report presents information supplied by the NCCI in addition to the filing documents. We have not audited this information; the NCCI's calculations have been reviewed for reasonability. If the underlying data or information is inaccurate or incomplete, then our observations and conclusions may likewise be inaccurate or incomplete.

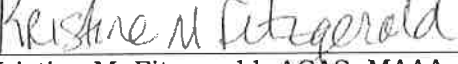
V. SIGNATURE PAGE

This review was prepared by Steve Lattanzio and Kristine Fitzgerald. Mr. Lattanzio is a Fellow of the Casualty Actuarial Society and a Member of the American Academy of Actuaries (MAAA). Ms. Fitzgerald is an Associate of the Casualty Actuarial Society and MAAA. Both individuals meet the Qualification Standards of the American Academy of Actuaries to render property/casualty actuarial opinions.

Date: December 2, 2015

Signature:   
Steven P. Lattanzio, FCAS, MAAA, FCA  
Consulting Actuary

Date: December 2, 2015

Signature:   
Kristine M. Fitzgerald, ACAS, MAAA, FCA  
Consulting Actuary

## VI. GLOSSARY OF TERMS

The following definitions are provided to give context to the terms used within this report and are tailored to the specifics of the filing under review.

### *Accident Year*

A 12-month period of time for which dollars of loss are aggregated based upon those accidents occurring during the given time period. At a given moment in time the amount paid as well as the established reserves are known; the final value of all claims is not known until that time at which all such claims are closed. Loss is analyzed by accident year within some of the NCCI's calculations.

### *Policy Year*

A policy year is comprised of all of the policies written during a particular calendar year; loss and premium is aggregated for all such policies. Since a policy written on January 1 expires December 31 of the same year, but a policy written on December 31 does not expire until the end of the following year, accidents associated with a single policy year occur over the course of two calendar years. Experience from the two most recent complete policy years (2012 and 2013) makes up the bulk of the NCCI's calculation of the indicated loss cost change for this filing.

### *Ultimate Loss*

The estimated amount that will eventually be paid when all claims are closed.

### *Paid Loss*

The dollars of indemnity and medical benefits paid to the injured worker or his/her dependents.

### *Case Reserve*

An estimate made by the claims administrator of the amount which remains to be paid for each particular claim.

### *Incurred Loss*

The sum of paid loss plus case reserves.

### *Loss Development*

The observed change over time in the paid or incurred loss for a particular year.

### *Actuarial Central Estimate*

An estimate that represents an expected value over a range of reasonably possible outcomes, not all conceivable outcomes.