Causes of Recent Adverse Development

Commitment Beyond Numbers

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Kevin C. Ahlgrim, Ph.D., ASA, MAAA
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About the Presenters

• Fellow of the Casualty Actuarial Society
• Graduate of Illinois State University
• 21 years of experience, primarily in commercial lines
• Reserving studies for:
  • Insurance companies (SAO and financial exams)
  • Captive insurance companies
  • Self-insured entities
• Extensive experience reviewing industry financial statement data and associated trends
• Experience in workers’ compensation, liability lines, medical professional liability and commercial automobile

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Senior Consulting Actuary  
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About the Presenters

- Associate of the Casualty Actuarial Society
- Associate in Risk Management (ARM)
- B.A. Mathematics – Carthage College
- 17 years of experience, primarily in commercial lines
- Reserving studies for:
  - Insurance companies (SAO and financial exams)
  - Captive insurance companies
  - Self-insured entities
  - Public entities
- Funding recommendations for emerging coverages
- Experience reviewing industry financial statement data and associated trends
- Risk margin modeling

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About the Presenters

- Associate of the Society of Actuaries (ASA)
- Member of the American Academy of Actuaries (MAAA)
- Ph.D., Finance, University of Illinois
- M.S., Finance, University of Illinois
- B.S., Actuarial Science, University of Illinois
- Research interests include risk management of insurers, subrogation, fixed income modeling and actuarial science
- Teaches enterprise risk management and analysis of statutory financial statements courses
- Illinois State was one of only four universities to be recognized as “Top Performers” in the February 2018 issue of A.M. Best’s insurance news magazine, Best’s Review

Kevin C. Ahlgrim
Associate Professor
Illinois State University
Presentation Outline

• Current Snapshot of 1-Year Development
• Historical Figures
• Risk of Material Adverse Deviation (RMAD) Background
• RMAD Research
• Conclusions
Reserve Developments and the Role of Actuarial Practice

- Early 2000’s - Many insolvencies and large reserve developments
- Early 2000’s - Language in Statements of Actuarial Opinion (SAOs) starting to require specific information about the RMAD
- Sarbanes - Oxley Act (2002)
- Nov. 2003 Standard & Poor’s article
- Ensuing soft market after 2003 - not as much attention
Questions Resulting from Scrutiny of Industry Development

• Are reserve developments a cause, symptom, or lagging indicator of the industry’s problems?

• Is the actuarial profession (and SAOs) properly serving the industry?

• What is the actuary’s role?
Industry 1 Year Development (Millions) vs. Underwriting Gain / (Loss)
Observations on Reserve Development

• Reserve development generally has an inverse relationship with underwriting gain and net income

• If and when the industry’s reserve development is adverse, we would expect underwriting and income results to be negative

• Graphs show a slight lag
## Schedule P from a High Altitude!

<table>
<thead>
<tr>
<th>Accident Year</th>
<th>Initial Incurred</th>
<th>Mature Evaluation</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>181,747,406</td>
<td>171,951,630</td>
<td>(9,795,776)</td>
</tr>
<tr>
<td>1996</td>
<td>191,083,453</td>
<td>184,414,055</td>
<td>(6,669,398)</td>
</tr>
<tr>
<td>1997</td>
<td>185,364,188</td>
<td>183,482,815</td>
<td>(1,881,373)</td>
</tr>
<tr>
<td>1999</td>
<td>199,247,464</td>
<td>217,263,186</td>
<td>18,015,722</td>
</tr>
<tr>
<td>2000</td>
<td>211,741,982</td>
<td>234,586,739</td>
<td>22,844,757</td>
</tr>
<tr>
<td>2001</td>
<td>239,347,139</td>
<td>251,545,485</td>
<td>12,198,346</td>
</tr>
<tr>
<td>2002</td>
<td>238,233,905</td>
<td>240,755,339</td>
<td>2,521,434</td>
</tr>
<tr>
<td>2003</td>
<td>253,319,492</td>
<td>235,946,990</td>
<td>(17,372,502)</td>
</tr>
<tr>
<td>2004</td>
<td>270,095,742</td>
<td>241,416,909</td>
<td>(28,678,833)</td>
</tr>
<tr>
<td>2005</td>
<td>286,300,878</td>
<td>260,140,336</td>
<td>(26,160,542)</td>
</tr>
<tr>
<td>2006</td>
<td>267,270,993</td>
<td>244,892,379</td>
<td>(22,378,614)</td>
</tr>
<tr>
<td>2007</td>
<td>286,426,111</td>
<td>267,757,520</td>
<td>(18,668,591)</td>
</tr>
<tr>
<td>2008</td>
<td>324,615,169</td>
<td>306,332,168</td>
<td>(18,283,001)</td>
</tr>
<tr>
<td>2009</td>
<td>293,611,854</td>
<td>280,971,565</td>
<td>(12,640,289)</td>
</tr>
<tr>
<td>2010</td>
<td>292,645,587</td>
<td>285,705,278</td>
<td>(6,939,309)</td>
</tr>
<tr>
<td>2011</td>
<td>326,249,045</td>
<td>316,603,538</td>
<td>(9,645,507)</td>
</tr>
<tr>
<td>2012</td>
<td>314,545,732</td>
<td>304,407,922</td>
<td>(10,137,810)</td>
</tr>
<tr>
<td>2013</td>
<td>301,200,748</td>
<td>294,133,934</td>
<td>(7,066,814)</td>
</tr>
<tr>
<td>2014</td>
<td>314,890,927</td>
<td>310,053,726</td>
<td>(4,837,201)</td>
</tr>
<tr>
<td>2015</td>
<td>325,788,435</td>
<td>324,423,282</td>
<td>(1,365,153)</td>
</tr>
<tr>
<td>2016</td>
<td>348,606,470</td>
<td>346,833,951</td>
<td>(1,772,519)</td>
</tr>
<tr>
<td>Totals</td>
<td>5,846,740,063</td>
<td>5,705,807,443</td>
<td>(140,932,620)</td>
</tr>
</tbody>
</table>

- Initial incurred is an initial value of held incurred loss, including IBNR, values as of 12/31/xx (12 months old)
- Mature valuation is from a Schedule P several years more mature (limited to 10 years of maturity)
Adverse industry development coincides with high loss ratios in underwriting cycle.

2002 and 2003 is where the number of companies showing reserve development > 0 or < 0 are closest.
Schedule P from a High Altitude! – Commercial Auto

• Initial incurred is an initial value of held incurred loss, including IBNR, values as of 12/31/xx (12 months old)

• Mature valuation is from a Schedule P several years more mature (limited to 10 years of maturity)
Commercial Auto by Accident Year
Change in Initial vs. Mature Incurred Loss Development (000s)
History – Top 30 Development Study

- Began annual look at the Top 30 fourteen years ago
- Data collected and display/appearance have evolved over time
- Extensive use of SAOs in data collection
- SAO Exhibits A & B facilitate meaningful data collection
2017 Industry Reserve Development

• Development of net ultimate loss and defense & cost containment expenses (DCC) in accident years 2016 and prior in calendar year 2017 (Schedule P Part 2)

• Overall industry development is favorable, with about $8.9B reserves released

• Analyze 30 groups or unaffiliated singles with most one-year adverse reserve development in calendar year 2017

• Excluded Financial Guaranty/Mortgage Guaranty (FG/MG) from Top 30
One-Year Development

Change Influenced by a Single Group

*Top 30: +$4.8 B

Industry Total: -$8.9 B

*Includes Financial Guaranty/Mortgage Guaranty

Top 30

Industry

$ Billions

$Billions


*Includes Financial Guaranty/Mortgage Guaranty

Top 30 Industry

2008

2009

2010

2011

2012

2013

2014

2015

2016

2017

Pinnacle Actuarial Resources, Inc.
Analysis of Company Developments

• About $4.8B of adverse development over the past year for Top 30 groups – less than the almost $15.0B in 2008
  • 2008: almost $10.0B is attributable to one company exposed to financial guarantee insurance and credit default swaps
  • 2010: $5.0B is attributable to one company exposed to excess casualty
  • Steadily decreasing from CY 2010 to CY 2013
  • 2017: decrease from CY 2016 after increasing trend from CY 2014 to CY 2016

• Surplus decreased from 2016 to 2017 for top 30 companies by 8.30%
  • Industry surplus growth is 7.07%
## 2017 Top 30 Largest Reserve Developments of P&C Groups - Excluding Financial Guaranty/Mortgage Guaranty (in 000s)

<table>
<thead>
<tr>
<th>Group #</th>
<th>Source of Adverse Development</th>
<th>One-Year Development</th>
<th>Two-year Development</th>
<th>2017</th>
<th>2016</th>
<th>2015</th>
<th>One-Year Dev. As % of 2015 Surplus</th>
<th>Two-Year Dev. As % of 2015 Surplus</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Exposure to environmental claims; Changes in book of business</td>
<td>880,316</td>
<td>946,172</td>
<td>17,366,672</td>
<td>20,200,265</td>
<td>19,313,310</td>
<td>4%</td>
<td>5%</td>
</tr>
<tr>
<td>2</td>
<td>Mass torts; Risks from runoff business; Adverse court decision</td>
<td>285,390</td>
<td>298,010</td>
<td>2,092,318</td>
<td>2,075,632</td>
<td>1,839,813</td>
<td>14%</td>
<td>16%</td>
</tr>
<tr>
<td>3</td>
<td>Exposure to mass torts, environmental &amp; asbestos claims</td>
<td>236,788</td>
<td>361,846</td>
<td>1,875,290</td>
<td>1,922,462</td>
<td>1,847,566</td>
<td>12%</td>
<td>20%</td>
</tr>
<tr>
<td>4</td>
<td>New claims system; NV law imposing strict liability</td>
<td>159,573</td>
<td>554,330</td>
<td>11,459,082</td>
<td>14,290,024</td>
<td>15,239,855</td>
<td>1%</td>
<td>4%</td>
</tr>
<tr>
<td>5</td>
<td>Uncertainty in long tailed lines; Impact of catastrophic losses</td>
<td>137,629</td>
<td>581,953</td>
<td>14,741,155</td>
<td>15,537,518</td>
<td>15,095,022</td>
<td>1%</td>
<td>4%</td>
</tr>
<tr>
<td>6</td>
<td>Impact of court decision; Lead Paint Claims; MI PIP claims</td>
<td>127,620</td>
<td>286,922</td>
<td>92,194</td>
<td>46,913</td>
<td>65,287</td>
<td>272%</td>
<td>439%</td>
</tr>
<tr>
<td>7</td>
<td>Growing long tailed excess lines; Redefined reinsurance treaty</td>
<td>117,301</td>
<td>127,733</td>
<td>536,276</td>
<td>454,491</td>
<td>420,574</td>
<td>25%</td>
<td>30%</td>
</tr>
<tr>
<td>8</td>
<td>Uncertainty in new lines; Impact of future economic downturn</td>
<td>110,514</td>
<td>20,221</td>
<td>75,000</td>
<td>25,000</td>
<td>25,000</td>
<td>434%</td>
<td>81%</td>
</tr>
<tr>
<td>9</td>
<td>Rapid growth in some areas; Impact of adverse weather</td>
<td>107,384</td>
<td>180,578</td>
<td>76,804</td>
<td>63,499</td>
<td>50,296</td>
<td>169%</td>
<td>359%</td>
</tr>
<tr>
<td>10</td>
<td>Inflation risk; Adverse court decisions; Auto reserves uncertainty</td>
<td>88,159</td>
<td>357,792</td>
<td>2,077,091</td>
<td>2,173,431</td>
<td>2,192,751</td>
<td>4%</td>
<td>16%</td>
</tr>
<tr>
<td>11</td>
<td>Exposure to asbestos, environmental, construction defect claims</td>
<td>73,099</td>
<td>101,035</td>
<td>75,317</td>
<td>113,944</td>
<td>118,462</td>
<td>64%</td>
<td>85%</td>
</tr>
<tr>
<td>12</td>
<td>Instability in reserves &amp; settlement rate; New line uncertainty</td>
<td>71,122</td>
<td>158,085</td>
<td>1,594,772</td>
<td>1,446,846</td>
<td>1,456,958</td>
<td>5%</td>
<td>11%</td>
</tr>
<tr>
<td>13</td>
<td>Change in mix of business; Low frequency, high severity nature</td>
<td>66,329</td>
<td>57,962</td>
<td>1,063,755</td>
<td>1,078,955</td>
<td>1,118,845</td>
<td>6%</td>
<td>5%</td>
</tr>
<tr>
<td>14</td>
<td>None</td>
<td>64,165</td>
<td>89,352</td>
<td>219,823</td>
<td>297,648</td>
<td>314,070</td>
<td>22%</td>
<td>28%</td>
</tr>
<tr>
<td>15</td>
<td>None</td>
<td>62,122</td>
<td>-133,775</td>
<td>6,331,365</td>
<td>8,666,974</td>
<td>6,503,090</td>
<td>1%</td>
<td>-2%</td>
</tr>
<tr>
<td>16</td>
<td>Exposure to coal occupational disease claims; Nature of WC</td>
<td>61,360</td>
<td>59,449</td>
<td>982,512</td>
<td>937,947</td>
<td>875,180</td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td>17</td>
<td>Changes in subrogation philosophies &amp; claims handling</td>
<td>58,280</td>
<td>28,072</td>
<td>442,375</td>
<td>516,017</td>
<td>562,197</td>
<td>5%</td>
<td>9%</td>
</tr>
<tr>
<td>18</td>
<td>Regulatory challenges; Volatility in lines with high limits</td>
<td>53,334</td>
<td>63,476</td>
<td>433,946</td>
<td>355,366</td>
<td>379,231</td>
<td>6%</td>
<td>5%</td>
</tr>
<tr>
<td>19</td>
<td>Short operating history; Rapid growth; Long haul trucking</td>
<td>43,360</td>
<td>113,956</td>
<td>1,079,338</td>
<td>1,087,598</td>
<td>1,060,251</td>
<td>4%</td>
<td>11%</td>
</tr>
<tr>
<td>20</td>
<td>None</td>
<td>41,448</td>
<td>83,320</td>
<td>301,661</td>
<td>291,103</td>
<td>294,338</td>
<td>14%</td>
<td>28%</td>
</tr>
<tr>
<td>21</td>
<td>None</td>
<td>38,836</td>
<td>60,876</td>
<td>52,057</td>
<td>48,654</td>
<td>57,571</td>
<td>80%</td>
<td>106%</td>
</tr>
<tr>
<td>22</td>
<td>None</td>
<td>37,848</td>
<td>37,154</td>
<td>233,320</td>
<td>248,413</td>
<td>247,184</td>
<td>15%</td>
<td>15%</td>
</tr>
<tr>
<td>23</td>
<td>None</td>
<td>35,929</td>
<td>30,169</td>
<td>13,354</td>
<td>13,336</td>
<td>10,827</td>
<td>269%</td>
<td>279%</td>
</tr>
<tr>
<td>24</td>
<td>None</td>
<td>31,721</td>
<td>26,966</td>
<td>206,746</td>
<td>180,655</td>
<td>196,722</td>
<td>17%</td>
<td>14%</td>
</tr>
<tr>
<td>25</td>
<td>None</td>
<td>27,357</td>
<td>9,238</td>
<td>324,319</td>
<td>331,033</td>
<td>271,764</td>
<td>8%</td>
<td>3%</td>
</tr>
<tr>
<td>26</td>
<td>None</td>
<td>27,141</td>
<td>11,157</td>
<td>62,433</td>
<td>60,689</td>
<td>50,600</td>
<td>45%</td>
<td>22%</td>
</tr>
<tr>
<td>27</td>
<td>None</td>
<td>26,430</td>
<td>40,520</td>
<td>315,265</td>
<td>287,926</td>
<td>302,059</td>
<td>9%</td>
<td>13%</td>
</tr>
<tr>
<td>28</td>
<td>None</td>
<td>23,911</td>
<td>43,337</td>
<td>183,203</td>
<td>219,295</td>
<td>230,835</td>
<td>11%</td>
<td>19%</td>
</tr>
<tr>
<td>Subtotal (Top 30)</td>
<td>3,301,508</td>
<td>4,838,871</td>
<td>56,412,589</td>
<td>72,426,531</td>
<td>71,343,073</td>
<td>1%</td>
<td>11%</td>
<td></td>
</tr>
<tr>
<td>Total industry</td>
<td>-8,864,793</td>
<td>-11,848,321</td>
<td>787,070,323</td>
<td>735,117,277</td>
<td>705,777,989</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>AMB Group</th>
<th>Surplus</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Growth in Surplus (Top 30):** -8.30% 1.52%

**Growth in Surplus (Industry):** 7.07% 4.16%
What line of business do you think experienced the largest amount of adverse development in CY_17 for the Top 30?

A. Commercial Automobile Liability (CAL)
B. Workers’ Compensation (WC)
C. Other Liability Occurrence (OL – Occ)
D. Medical Professional Liability Claims Made (MPL – CM)
E. Private Passenger Automobile Liability (PPAL)
CY_2017 – 1-Year Reserve Development - Top 30
### 1-Year Reserve Development by Accident Year by Coverage for Current Top 30 – Excluding FG/MG

<table>
<thead>
<tr>
<th>Acc Yr</th>
<th>CAL</th>
<th>CMP</th>
<th>OL-OCC</th>
<th>OL-CM</th>
<th>Spec Prop*</th>
<th>PPAL</th>
<th>Subtotal</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior</td>
<td>7,428</td>
<td>-34,002</td>
<td>467,380</td>
<td>86,794</td>
<td>42,328</td>
<td>663</td>
<td>570,591</td>
<td>864,902</td>
</tr>
<tr>
<td>2008</td>
<td>54</td>
<td>-19,673</td>
<td>23,501</td>
<td>823</td>
<td>-1,425</td>
<td>2,764</td>
<td>7,469</td>
<td>-26,222</td>
</tr>
<tr>
<td>2009</td>
<td>2,730</td>
<td>-9,938</td>
<td>8,601</td>
<td>8,187</td>
<td>-3,441</td>
<td>11,025</td>
<td>54,218</td>
<td>67,552</td>
</tr>
<tr>
<td>2010</td>
<td>-264</td>
<td>-6,158</td>
<td>46,264</td>
<td>3,351</td>
<td>-11,025</td>
<td>17,231</td>
<td>107,299</td>
<td>170,315</td>
</tr>
<tr>
<td>2011</td>
<td>6,098</td>
<td>-12,833</td>
<td>75,056</td>
<td>21,747</td>
<td>107,299</td>
<td>170,315</td>
<td>170,315</td>
<td>340,630</td>
</tr>
<tr>
<td>2012</td>
<td>44,440</td>
<td>2,169</td>
<td>81,903</td>
<td>66,646</td>
<td>-31,621</td>
<td>185,849</td>
<td>185,849</td>
<td>371,698</td>
</tr>
<tr>
<td>2013</td>
<td>133,186</td>
<td>67,003</td>
<td>114,965</td>
<td>11,869</td>
<td>1,801</td>
<td>354,702</td>
<td>354,702</td>
<td>709,404</td>
</tr>
<tr>
<td>2014</td>
<td>235,816</td>
<td>84,122</td>
<td>150,097</td>
<td>40,635</td>
<td>11,920</td>
<td>592,204</td>
<td>592,204</td>
<td>1,184,408</td>
</tr>
<tr>
<td>2015</td>
<td>268,900</td>
<td>109,258</td>
<td>162,926</td>
<td>33,356</td>
<td>64,653</td>
<td>546,319</td>
<td>546,319</td>
<td>1,092,628</td>
</tr>
<tr>
<td>2016</td>
<td>288,043</td>
<td>4,062</td>
<td>150,792</td>
<td>67,921</td>
<td>30,118</td>
<td>553,861</td>
<td>553,861</td>
<td>1,107,722</td>
</tr>
</tbody>
</table>

**Totals**

- CAL: 986,431
- CMP: 184,010
- OL-OCC: 1,281,485
- OL-CM: 341,329
- Spec Prop*: 133,195
- PPAL: 107,129
- Subtotal: 3,033,579
- Total: 3,306,041

**% of All Lines**

- CAL: 29.8%
- CMP: 5.6%
- OL-OCC: 38.8%
- OL-CM: 10.3%
- Spec Prop*: 4.0%
- PPAL: 3.2%
- Total: 91.8%

*Short Tail Line of Business, Prior includes CY development on AY 2015 & Prior
(values in thousands)
# 1-Year Reserve Development by Accident Year by Coverage for Total US P/C Industry

<table>
<thead>
<tr>
<th>Acc Yr</th>
<th>CAL</th>
<th>CMP</th>
<th>OL-Occ</th>
<th>OL-CM</th>
<th>FG/MG*</th>
<th>PPAL</th>
<th>HO/FO</th>
<th>Subtotal</th>
<th>Total</th>
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<tbody>
<tr>
<td>Prior</td>
<td>-54,022</td>
<td>406,082</td>
<td>958,176</td>
<td>-18,141</td>
<td>955,103</td>
<td>65,907</td>
<td>118,834</td>
<td>2,431,939</td>
<td>-105,782</td>
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<tr>
<td>2009</td>
<td>-2,068</td>
<td>-39,646</td>
<td>-206,854</td>
<td>17,416</td>
<td></td>
<td>-21,149</td>
<td>-9,015</td>
<td>-261,316</td>
<td>-766,843</td>
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<td>2010</td>
<td>-20,293</td>
<td>-39,266</td>
<td>-164,147</td>
<td>11,390</td>
<td></td>
<td>-40,719</td>
<td>-5,602</td>
<td>-258,637</td>
<td>-933,423</td>
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<td>2014</td>
<td>351,089</td>
<td>-72,549</td>
<td>-218,788</td>
<td>-217,066</td>
<td></td>
<td>174</td>
<td>-163,059</td>
<td>-320,199</td>
<td>-1,090,263</td>
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<tr>
<td>2015</td>
<td>596,416</td>
<td>72,388</td>
<td>-150,700</td>
<td>-81,879</td>
<td></td>
<td>536,147</td>
<td>-312,442</td>
<td>659,930</td>
<td>-669,436</td>
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<tr>
<td>2016</td>
<td>634,630</td>
<td>-226,627</td>
<td>61,754</td>
<td>604,961</td>
<td>-61,197</td>
<td>816,851</td>
<td>454,052</td>
<td>2,284,424</td>
<td>-1,772,531</td>
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</tbody>
</table>

Totals 1,632,406 | -129,943| 126,876| 107,841| 893,906| 1,163,206| -41,826| 3,752,466| -8,864,789

*Short Tail Line of Business, Prior includes CY development on AY 2015 & Prior
(values in thousands)
Observations Related to Commercial Auto Liability

CAL Industry 1 Yr Dev (Millions) vs. Net AY Loss & LAE Ratio

Increase in held ultimate loss ratio precedes reserve deterioration
Commercial Automobile - AM Best

Combined Ratio Trend

- Commercial Auto Liability
- P/C Industry
- Commercial Lines
Frequency Trends

Total Crashes by Vehicle Type
Federal Motor Carrier Safety Administration

Lg Trucks
Buses

Large Trucks (in thousands)
Buses (in thousands)

Observations Related to Auto Liability

- CY 2017 had 246 writers of CAL with over $1 Million of DWP
  - Of these, 147 writers (60%) experienced adverse development in CY 2017

- CY 2017 had 245 writers of PPAL with over $1 Million of DWP
  - Of these, 125 writers (51%) experienced adverse development in CY 2017
Observations Related to PPAL

PPAL Industry 1 Yr Dev (Millions) vs. Net AY Loss & LAE Ratio

PPAL 1 Yr Dev

PPAL Net AY Loss & LAE Ratio
RMAD - Background

- Reserve development of the Top 30 and the industry highlights the need to understand reserve risk
  - What is the potential for “material” changes in reserve estimates?
- Statement on “Risk of Material Adverse Deviation” – RMAD
- Choice of Materiality “Threshold”
  - Determined by judgment of Appointed Actuary
    - Percent of Surplus
    - Percent of Reserves
    - Dollar amount relative to Company Action Level Risk-Based Capital
RMAD Location and Requirements

• Statement of Actuarial Opinion (SAO)
  – Exhibit B: Disclosures
  – Relevant Comments Paragraphs
    • Risk of Material Adverse Deviation
      – Identify materiality standard and basis
      – Explanatory paragraph to describe major risk factors
        » 2013: “If such risk exists” include
        » 2014: include regardless of yes/no disclosure
        » 2015, 2016 & 2017: no significant changes
        » Do not include:
          • General, broad statements about risks and uncertainties due to economic changes, judicial decisions, regulatory actions, political or social forces
          • Exhaustive list of all potential sources of risks and uncertainties
      – Explicitly state whether or not the actuary reasonably believes there are significant risks and uncertainties that could result in material adverse deviation

Source: 2013 - 2017 Practice Notes on P&C SAOs by American Academy of Actuaries COPLFR
<table>
<thead>
<tr>
<th>Group #</th>
<th>Source of Adverse Development - 2017</th>
<th>One-Year Development</th>
<th>Two-year Development</th>
<th>% of Surplus</th>
<th>$ Amnt. (000's)</th>
<th>Yes or No</th>
<th>Actuary: Employee or Consultant?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Exposure to environmental claims; Changes in book of business</td>
<td>440,185</td>
<td>473,162</td>
<td>10% of Reserves</td>
<td>1,723,400</td>
<td>No</td>
<td>Employee</td>
</tr>
<tr>
<td>2</td>
<td>Mass torts; Risks from runoff business; Adverse court decision</td>
<td>156,842</td>
<td>162,092</td>
<td>20%</td>
<td>115,424</td>
<td>No</td>
<td>Consultant</td>
</tr>
<tr>
<td>3</td>
<td>Exposure to mass torts, environmental &amp; asbestos claims</td>
<td>235,509</td>
<td>359,832</td>
<td>10% of Reserves</td>
<td>593,397</td>
<td>No</td>
<td>Employee</td>
</tr>
<tr>
<td>4</td>
<td>New claims system; NY law imposing strict liability</td>
<td>245,952</td>
<td>389,836</td>
<td>10% of Reserves</td>
<td>1,191,712</td>
<td>No</td>
<td>Consultant</td>
</tr>
<tr>
<td>5</td>
<td>Uncertainty in long tailed lines; Impact of catastrophic losses</td>
<td>61,306</td>
<td>272,248</td>
<td>5% of Reserves</td>
<td>Yes</td>
<td>Consultant</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Impact of court decision; Lead Paint Claims; MI PIP claims</td>
<td>59,515</td>
<td>359,832</td>
<td>15%</td>
<td>48,026</td>
<td>Yes</td>
<td>Employee</td>
</tr>
<tr>
<td>7</td>
<td>Growing long tailed excess lines; Redefined reinsurance treaty</td>
<td>62,672</td>
<td>36,145</td>
<td>20%</td>
<td>28,758</td>
<td>No</td>
<td>Consultant</td>
</tr>
<tr>
<td>8</td>
<td>Uncertainty in new lines; Impact of future economic downturn</td>
<td>108,514</td>
<td>20,221</td>
<td>15%</td>
<td>167,000</td>
<td>No</td>
<td>Employee</td>
</tr>
<tr>
<td>9</td>
<td>New business through acquisition; Larger geographic footprint</td>
<td>107,384</td>
<td>180,578</td>
<td>15%</td>
<td>167,000</td>
<td>No</td>
<td>Employee</td>
</tr>
<tr>
<td>10</td>
<td>New reserves system; Growth in taxi program; Runoff exposure</td>
<td>31,684</td>
<td>42,777</td>
<td>5%</td>
<td>2,524</td>
<td>Yes</td>
<td>Consultant</td>
</tr>
<tr>
<td>11</td>
<td>None</td>
<td>101,566</td>
<td>381,672</td>
<td>15%</td>
<td>325,224</td>
<td>No</td>
<td>Employee</td>
</tr>
<tr>
<td>12</td>
<td>Rapid growth in some areas; Impact of adverse weather</td>
<td>127,620</td>
<td>286,922</td>
<td>10% of Reserves</td>
<td>1,191,712</td>
<td>No</td>
<td>Consultant</td>
</tr>
<tr>
<td>13</td>
<td>Inflation risk; Adverse court decisions; Auto reserves uncertainty</td>
<td>37,292</td>
<td>17,953</td>
<td>10%</td>
<td>33,000</td>
<td>No</td>
<td>Employee</td>
</tr>
<tr>
<td>14</td>
<td>Exposure to asbestos, environmental, construction defect claims</td>
<td>62,037</td>
<td>-151,620</td>
<td>15%</td>
<td>167,000</td>
<td>No</td>
<td>Employee</td>
</tr>
<tr>
<td>15</td>
<td>Instability in reserves &amp; settlement rate; New line uncertainty</td>
<td>62,037</td>
<td>-151,620</td>
<td>15%</td>
<td>167,000</td>
<td>No</td>
<td>Employee</td>
</tr>
<tr>
<td>16</td>
<td>Change in mix of business; Low frequency, high severity nature</td>
<td>62,037</td>
<td>-151,620</td>
<td>15%</td>
<td>167,000</td>
<td>No</td>
<td>Employee</td>
</tr>
<tr>
<td>17</td>
<td>None</td>
<td>30,822</td>
<td>65,271</td>
<td>20%</td>
<td>126,305</td>
<td>No</td>
<td>Consultant</td>
</tr>
<tr>
<td>18</td>
<td>New business through acquisition; Larger geographic footprint</td>
<td>39,141</td>
<td>54,505</td>
<td>10% of Reserves</td>
<td>167,000</td>
<td>No</td>
<td>Employee</td>
</tr>
<tr>
<td>19</td>
<td>Regulatory challenges; Volatility in lines with high limits</td>
<td>30,822</td>
<td>65,271</td>
<td>20%</td>
<td>126,305</td>
<td>No</td>
<td>Consultant</td>
</tr>
<tr>
<td>20</td>
<td>Short operating history; Rapid growth; Long haul trucking</td>
<td>38,836</td>
<td>60,876</td>
<td>20%</td>
<td>126,305</td>
<td>No</td>
<td>Consultant</td>
</tr>
<tr>
<td>21</td>
<td>New business through acquisition; Larger geographic footprint</td>
<td>30,822</td>
<td>65,271</td>
<td>20%</td>
<td>126,305</td>
<td>No</td>
<td>Consultant</td>
</tr>
<tr>
<td>22</td>
<td>Regulatory challenges; Volatility in lines with high limits</td>
<td>30,822</td>
<td>65,271</td>
<td>20%</td>
<td>126,305</td>
<td>No</td>
<td>Consultant</td>
</tr>
<tr>
<td>23</td>
<td>Short operating history; Rapid growth; Long haul trucking</td>
<td>38,836</td>
<td>60,876</td>
<td>20%</td>
<td>126,305</td>
<td>No</td>
<td>Consultant</td>
</tr>
<tr>
<td>24</td>
<td>New business through acquisition; Larger geographic footprint</td>
<td>30,822</td>
<td>65,271</td>
<td>20%</td>
<td>126,305</td>
<td>No</td>
<td>Consultant</td>
</tr>
<tr>
<td>25</td>
<td>Regulatory challenges; Volatility in lines with high limits</td>
<td>30,822</td>
<td>65,271</td>
<td>20%</td>
<td>126,305</td>
<td>No</td>
<td>Consultant</td>
</tr>
<tr>
<td>26</td>
<td>Exposure to coal occupational disease claims; Nature of WC</td>
<td>30,822</td>
<td>65,271</td>
<td>20%</td>
<td>126,305</td>
<td>No</td>
<td>Consultant</td>
</tr>
<tr>
<td>27</td>
<td>Changes in subrogation philosophies &amp; claims handling</td>
<td>30,822</td>
<td>65,271</td>
<td>20%</td>
<td>126,305</td>
<td>No</td>
<td>Consultant</td>
</tr>
<tr>
<td>28</td>
<td>Case reserve adequacy; Claim closure rate; New market growth</td>
<td>30,822</td>
<td>65,271</td>
<td>20%</td>
<td>126,305</td>
<td>No</td>
<td>Consultant</td>
</tr>
<tr>
<td>29</td>
<td>Catastrophic weather events</td>
<td>30,822</td>
<td>65,271</td>
<td>20%</td>
<td>126,305</td>
<td>No</td>
<td>Consultant</td>
</tr>
<tr>
<td>30</td>
<td>Asbestos/Environmental claims; WC settlement patterns</td>
<td>30,822</td>
<td>65,271</td>
<td>20%</td>
<td>126,305</td>
<td>No</td>
<td>Consultant</td>
</tr>
</tbody>
</table>

Subtotal (Top 30)  2,419,872  3,318,445  8 Yes; 11 Employee; 14 Consultant

Total Industry  -8,864,793  -11,848,321
When choosing the RMAD threshold as stated in the SAO, who selects the threshold?

A. Appointed Actuary
B. Management
C. Finance/Accounting Department
D. Discussions between Appointed Actuary and management
Several companies list multiple options for the RMAD before specifying why they chose a particular measure

- Selecting the lowest and highest threshold were both observed as well as selections within their range of options

Focus on selecting a particular measure in relation to risk-based capital adequacy levels

- Some actuaries listed options for their RMAD threshold and chose the minimum so long as it was less than the reduction that would lead to Company Action Level RBC

Several companies included purpose and intended use

- Narrative included for the purpose of solvency monitoring or regulatory review/oversight
- Referenced ASOP No. 36
Specific RMAD Paragraph Disclosures – Yes/No RMAD

• “The difference in the Company’s carried reserves and the higher end of my range of reasonable unpaid claim estimates is less than my materiality standard.”

• “The carried reserves plus the materially standard is also within the range of reasonable estimates.”

• “There is a risk of material adverse deviation from the carried gross reserves... there is not a risk of material adverse deviation from the carried net reserves.”

• “The probability of adverse development of this magnitude is greater than remote.”

• “Uncertainty of variability in the reserves...”

• “Stable book of business, strong capital position, low leverage ratio, and demonstration of historically adequate reserves...”
Specific RMAD Paragraph - Risk Factors

• “Rapid growth in... long-haul trucking... is highly leveraged, and does not have a stable history of experience.”

• “…uncertainty in auto reserving indications resulting from changes in claim-handling practices in recent years, including the implementation of a new claims handling system…”

• “Risks to the Company include the low-frequency and high-severity nature of some of its exposures; changes in the mix of business…”
Specific RMAD Paragraph - Risk Factors

- “Rate-level adequacy... Case-incurred variability”

- “Significant changes in subrogation philosophies and claims handling, including increases in claim settlement rates and increases in the strength of case reserves.”

- “The major factors contributing to this risk are exposure to asbestos and environmental liabilities, and to a lesser extent, exposure to other mass torts.”
# Major Risk Factors – Disclosures

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<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Claims Department Changes (handling, settlement or reserving)</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>4</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Long tail Coverage / Line of Business</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>13</td>
<td>2</td>
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<tr>
<td>Uncertainty</td>
<td>1</td>
<td>2</td>
<td>7</td>
<td>5</td>
<td>1</td>
<td>6</td>
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<tr>
<td>Other Mass Tort exposure</td>
<td>-</td>
<td>2</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Asbestos exposure</td>
<td>-</td>
<td>3</td>
<td>6</td>
<td>5</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Asbestos &amp; Environmental (A&amp;E)</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>-</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>New Line of Business (lack of historical experience)</td>
<td>-</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Rapid growth</td>
<td>1</td>
<td>4</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Change in Economy</td>
<td>1</td>
<td>1</td>
<td>6</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Construction defect exposure</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>1</td>
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<tr>
<td>Inflation</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Workers Compensation Insurance</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Lack of historical experience</td>
<td>-</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Court/judicial decision recent or pending</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Environmental exposure</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Asbestos/A&amp;E/Environmental Combination</td>
<td>6</td>
<td>7</td>
<td>10</td>
<td>5</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Total Risk Factors Listed</td>
<td>41</td>
<td>53</td>
<td>70</td>
<td>57</td>
<td>67</td>
<td>50</td>
</tr>
</tbody>
</table>

*Top 30 Groups with highest 1 year adverse development - Sch P, Part 2
RMAD Disclosures Research

- Research question: How are actuaries actually reporting on RMADs?
- Methodology: Review SAOs
- Focus on “objective” information (Exhibit B)
Methodology

• Reviewed SAOs for Affiliated and Unaffiliated companies with 2016 Net Earned Premium from Income Statement > $20 million

• Around 1,100 companies meet this criteria, out of roughly 3,000 companies in 2016

• ISU graduate student of actuarial science input 2016 RMAD information from SAO
Captured SAO Data

- Exhibit B RMAD disclosures
  - #5: Materiality standard in $US
  - #6: Are there significant risks that could result in material adverse deviation? Yes/No/NA
- Relevant Comments paragraph – Description of basis for materiality threshold
- 2017 follow-up
  - Actual reserve development
  - Threshold breach?
  - Schedule P Part 2
- Additional information on Appointed Actuary
  - Name
  - Appointment date
  - Consultant/Employee
  - Firm/Geography
Who is the Appointed Actuary? (1,020 SAOs)

- Consultant: 62.2%
- Employee: 37.8%
Choosing the Materiality Basis

• What is considered “material” for an insurer?
• Examples include
  – Percent of Surplus
  – Percent of Reserves
  – Dollar amount relative to Company Action Level Risk-Based Capital
  – Dollar amount relative to next lower Risk-Based Capital (RBC) level, if already at Company Action Level
  – Dollar amount to insolvency (minimum capital requirement)
2016 SAO Review: Materiality Threshold Basis

- % of reserves: 27.6%
- % of surplus: 67.5%
- RBC: 3.5%
- Other: 1.4%
Materiality Threshold: % of Surplus (688 insurers)

- 7.4% of Surplus
- 50.9% of Surplus
- 8.1% of Surplus
- 26.3% of Surplus
- 2.3% of Surplus
- 4.9% of Surplus
Materiality Threshold: % of Reserves (282 insurers)
Which of the following is the MOST relevant for choosing the materiality threshold?

A. Line(s) of business specialization
B. Financial strength
C. Risk tolerance of organization
D. Historical volatility of earnings
E. Use of Reinsurance

Polling Question #3
Choosing a Threshold

• How does an actuary choose materiality threshold?
• Do insurer-specific factors affect the selection of a materiality threshold?

• Example: Is there a difference in the materiality of adverse loss development? Assume all other factors are equal

  Reserves = $50 million
  PHS = $100 million
  A. Personal auto focus
  B. Medical malpractice focus
Choosing a Threshold – Regression (2015 data)

Dependent variable = Materiality standard = % of PHS

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient (Std Err)</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>4.1207 (2.4201)</td>
<td>*</td>
</tr>
<tr>
<td>LogAssets</td>
<td>0.5550 (0.1738)</td>
<td>***</td>
</tr>
<tr>
<td>OrgForm (Stock = 1)</td>
<td>1.5813 (0.5285)</td>
<td>***</td>
</tr>
<tr>
<td>Consult = 1</td>
<td>2.4136 (0.4893)</td>
<td>***</td>
</tr>
<tr>
<td>%LongTail</td>
<td>0.0172 (0.0063)</td>
<td>***</td>
</tr>
<tr>
<td>IRIS2</td>
<td>-0.0050 (0.0030)</td>
<td>*</td>
</tr>
<tr>
<td>%Stock</td>
<td>-0.0380 (0.0169)</td>
<td>**</td>
</tr>
</tbody>
</table>
Long-tailed liability lines are more uncertain over long periods of time

Source: SNL Financial
Threshold Choice and Line of Business

On average, companies specializing in long-tailed lines appear to choose higher thresholds.

“Long-tailed lines” include MedMal, Other Liab, and Work Comp.
Consultants vs. Employees – Threshold Choice

On average, consultants appear to choose higher thresholds.
Is there a risk of material adverse deviation?

- **Yes**: 29.9%
- **No**: 70.1%
Modeled Breaches: % of Surplus

![Chart showing the percentage of surplus for different threshold levels, with a note indicating that the choice of threshold affects the likelihood of breach.]

- Actual: 5% of PHS, 11.5% of PHS, 6.3% of PHS, 4.4% of PHS, 3.4% of PHS, 2.6% of PHS.
Breaches by Threshold - % of Surplus (663 SAOs)

<table>
<thead>
<tr>
<th>Percent of Companies that Breached</th>
<th>14%</th>
<th>7%</th>
<th>4%</th>
<th>6%</th>
<th>0%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total breach</td>
<td>51</td>
<td>7</td>
<td>2</td>
<td>56</td>
<td>16</td>
</tr>
<tr>
<td>5% of Surplus</td>
<td>350</td>
<td>24</td>
<td>2</td>
<td>11</td>
<td>16</td>
</tr>
<tr>
<td>10% of Surplus</td>
<td>181</td>
<td>2</td>
<td>2</td>
<td>11</td>
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</tr>
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<td>15% of Surplus</td>
<td>181</td>
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<td>181</td>
<td>2</td>
<td>2</td>
<td>11</td>
<td>16</td>
</tr>
</tbody>
</table>

Total Breach

5% of Surplus

10% of Surplus

15% of Surplus

20% of Surplus

25% of Surplus

Total

Breach
RMAD Response and Line of Business

Across all thresholds, companies specializing in long-tailed lines are more likely to have affirmative RMADs.

5% of Surplus: 28.6%
10% of Surplus: 20.2%
15% of Surplus: 5.7%
20% of Surplus: 16.8%
25% of Surplus: 0.0%

<25% LT: 50.0%
>75% LT: 100.0%
Long-Tailed Lines Focus Affects RMAD Response

“Long-tailed lines” include MedMal, Other Liab, and Work Comp

All companies = 29.9%
RMAD Disclosures by Organizational Form

<table>
<thead>
<tr>
<th>Company Type</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mutual</td>
<td>9.9%</td>
<td>90.1%</td>
</tr>
<tr>
<td>Stock</td>
<td>34.5%</td>
<td>65.5%</td>
</tr>
</tbody>
</table>

Stock insurer more likely to indicate RMAD
Consultants vs. Employees – Affirmative RMAD

Consultant

Yes
26.5%

No
73.5%

Employee

Yes
35.5%

No
64.5%
Is an affirmative RMAD viewed negatively by the Board of Directors?

A. Yes
B. No
C. Neutral
D. Not if adequately justified

Polling Question #4
## Were Breaches Predicted?

<table>
<thead>
<tr>
<th>RMAD Disclosure?</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breach</td>
<td>39</td>
<td>30</td>
<td>69</td>
</tr>
<tr>
<td>No Breach</td>
<td>266</td>
<td>685</td>
<td>951</td>
</tr>
</tbody>
</table>

1,020 Companies

30 insurers said “No RMAD” but still breached their threshold (Almost double the 2015 result)
Is an RMAD Disclosure Needed?

• Some companies have large surplus and very limited long tailed exposure
• Some companies have explicit limits on their liability
• Certain lines of business rarely, if ever, experience material adverse reserve deviation
  – Low value property or other fast-settling lines
Guidance on Materiality

• American Academy of Actuaries (COPLFR) SAO Practice Note on Property and Casualty Loss Reserves

• American Academy of Actuaries Discussion Paper prepared by the Task Force on Materiality

• Actuarial literature, for example:
  – Materiality and ASOP No. 36: Considerations for the Practicing Actuary – CAS Committee on Valuation, Finance and Investments
Questions
Join Us for the Next APEX Webinar

Thursday, August 16
2:00 p.m. ET
Registration is Open

Disruptive Innovation and Risk
Final Notes

• We’d like your feedback and suggestions
  • Please complete our survey

• For copies of this APEX presentation
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Thank You for Your Time and Attention

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