CARe Seminar on Reinsurance
CAS Online Event – June 1-2, 2020

Wheels: Commercial Auto, Another Dip in the Road

Concurrent Session 1, Monday, June 1, 1:30- 2:45 p.m.

- **John Buchanan,** FCAS, MAAA, Managing Principal, Verisk/ISO
- **Terry Knull**, FCAS, MAAA, CPCU, Actuary/Underwriting Manager, Swiss Re

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Commercial Auto – Update to CAS Webinar – May 21, 2020

Illustrative

This CARe presentation provides an update and summary of the materials that were presented at this recent CAS Webinar. These webinars are part of the "Wheels" series that have been presented at various CAS events over the last four years, tracking the ups and downs of this line.

The CAS webinar, along with the prior sessions, go into much more detail than can be covered in this session. In particular, the interested reader is encouraged to go to these prior recorded sessions to delve into more background on the loss and rating components of the commercial auto underwriting cycle, the effect of the emergence lag on results, pressures on increased limits, and a detailed investigation into social inflation.

ISO

Wheels – Commercial Auto is Getting Personal

CAS Webinar, May 21, 2020

Marni Wasserman, ACAS, MAAA, Actuarial Associate, Verisk/ISO
Jennifer Stevens, Head of Regional Casualty Treaty Underwriting, Swiss Re

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Concurrent Session 1 - Wheels: Commercial Auto, Another Dip in the Road

- This session provides a **year-end 2019 holistic update** to the Commercial Auto industry experience and trends, most recently presented at the **May CAS On-line Webinar** ("as part of the 4-year Wheels series"). In addition to reviewing items such as lengthening LDFs and large loss pressures on ILFs, a comparison between commercial and personal auto trends will be presented.

- A company **actuary/underwriting managers perspective** will be given on the state of the market, including the expected impact of various **societal and jury impacts**. Impacts on the portfolio and potential underwriting responses, as well as discussion of the significant issues and **pausing impacts from Covid-19**, will be given.

- To also help frame potential scenarios, this session will Include a **historical look** to prior shock events including the **Great Recession** on premium level dips, troughs and recovery shapes, and a **framework** for measuring similar impacts under various **Covid-19 emerging scenarios**. A **conceptual actuarial triangle approach** to estimating various Covid components will also be given.

CS 1 Agenda - Wheels: Commercial Auto, Another Dip in the Road

- **Introduction and commercial auto update – John 20 mins**
  - Overall industry results through 12/31/2019 – ups and downs over the last decade
  - Review trends, LDFs, loss ratios, segments, ground-up vs excess, competitive underwriting cycle, rate changes, emergence lags, ILF pressures
  - Review of personal auto vs. commercial auto trends and results
- **An actuary/underwriting managers perspective – Terry 20 mins**
  - State of the market for commercial and personal auto
  - Future auto trends, including societal factors, jury impact, etc…
  - Impact on portfolio loss ratios & reserving
- **COVID – John/Terry 25 mins (15/5/5Q)**
  - Great Recession – dips, troughs, recoveries, shapes
  - Relevance to Covid – market sizing, shelter / pause / emergence issues
  - Actuarial triangle principles applied to Covid emergence analysis
  - Company perspective
- **Q&A 10 mins**

Commercial Auto

Views from 2010 - 2019

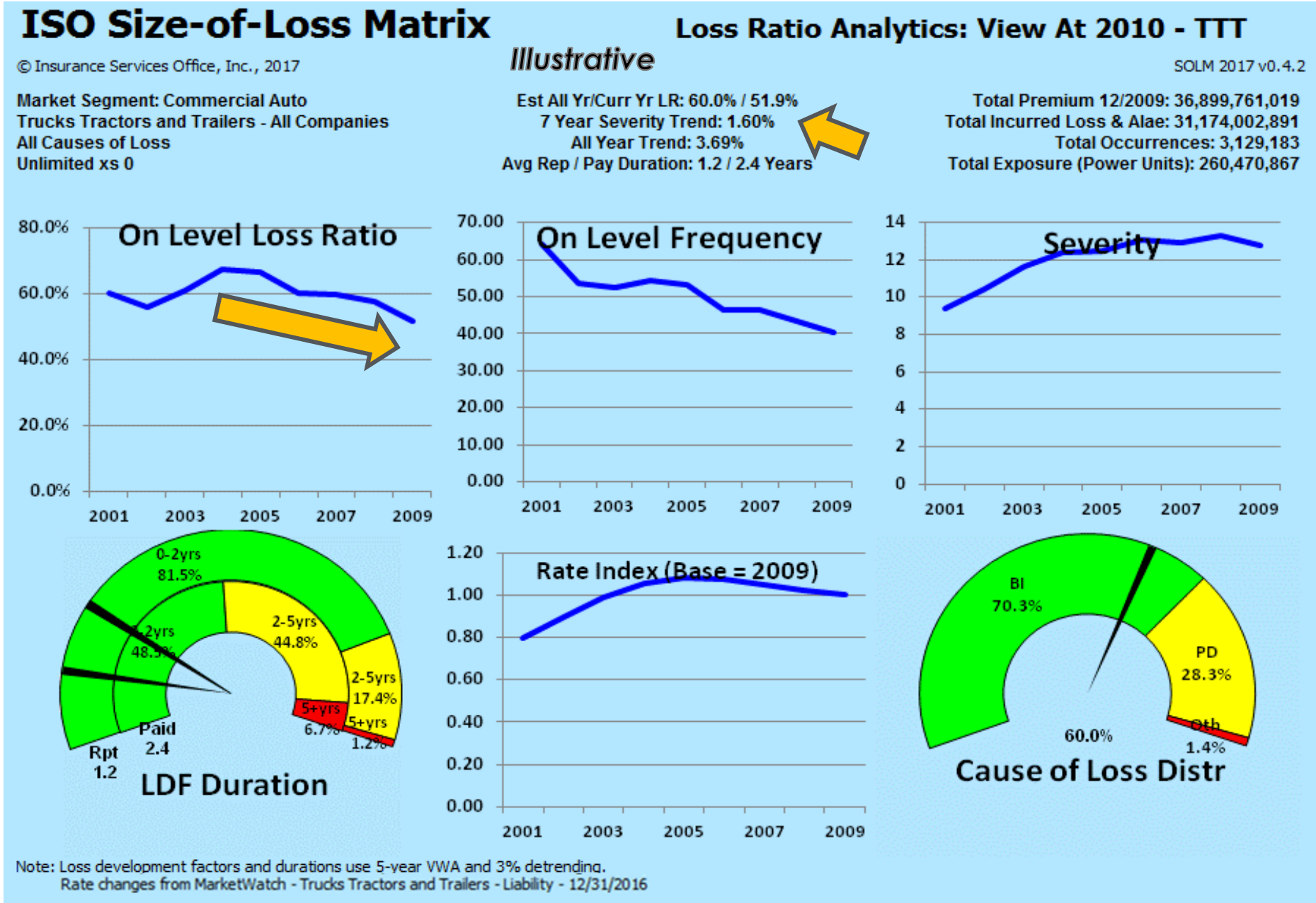
ISO

Commercial Auto – View at 2010

Holistic view at 2010:

- On level Loss ratios going down since 2004
- Frequencies steadily reducing from early 2000s
- Severities overall recently flat, and 1.6% for the last 7 years
- Relatively quick LDF duration
  - avg GU reported loss = 1.2 yrs
  - avg paid = 2.4 yrs
- Moderate reductions in rates since 2005
- Mostly BI claims – but their trends ok as well
- This interconnected on-level line graphs show what various IELRs would be at current rate levels (useful for residual trend analysis)

- Overall, the 2010 on-level loss ratio compared to long term is 8 pts better (60.0% long-term vs. 51.9% current)

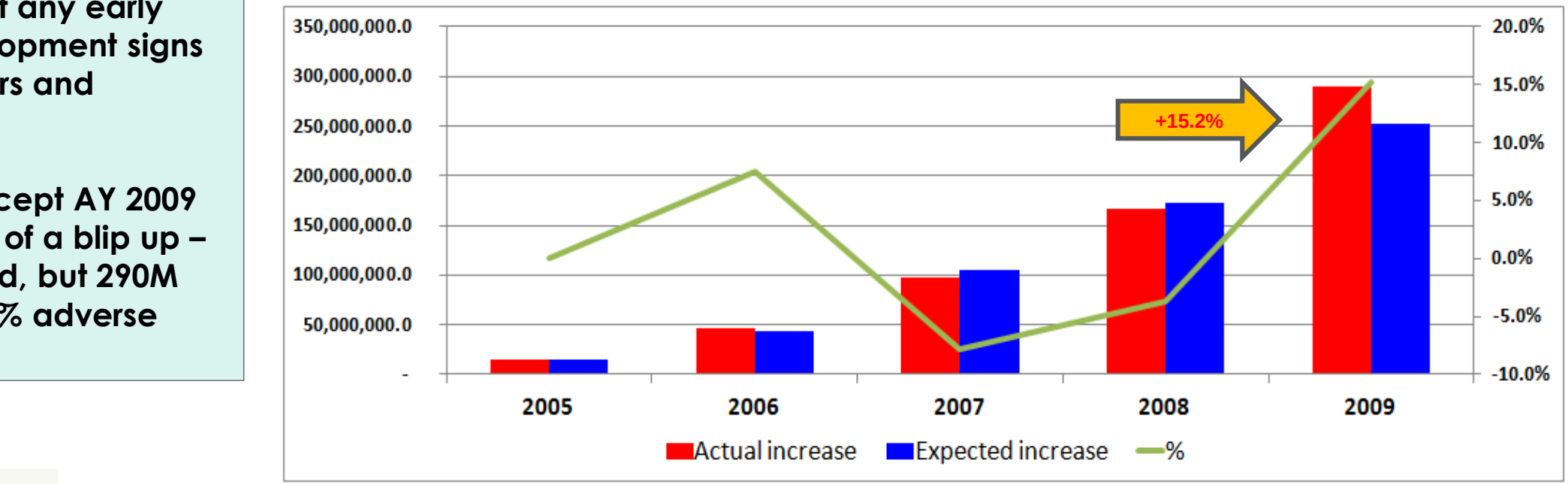


TTT Actual vs. Expected (ERLI Warning) – Excess Layer 900x100k

Illustrative

Check to see if any early warning development signs in various layers and components.

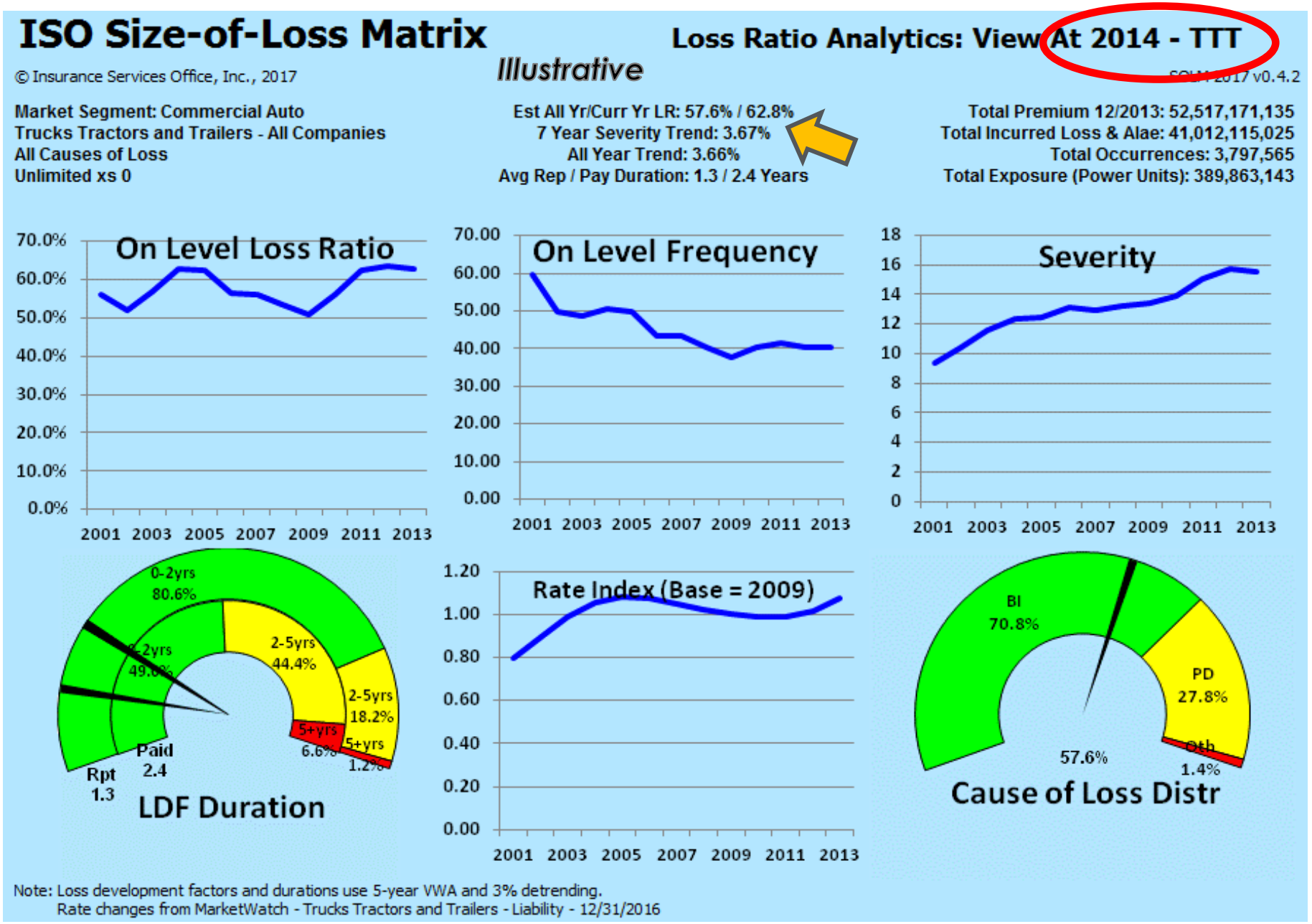
Overall ok, except AY 2009 indicates a bit of a blip up – 252M expected, but 290M actual, or 15.2% adverse development.



AY	Actual n-6	Actual n-5	5-Yr ATA	Expected n-5	AY	Actual increase	Expected increase	Actual - Expected	%
2005	1,097,265,890	1,112,068,639	1.0135	1,112,059,126	2005	14,802,749.0	14,793,235.6	9,513.4	0.1%
2006	1,066,637,325	1,112,815,458	1.0403	1,109,570,434	2006	46,178,133.0	42,933,109.1	3,245,023.9	7.6%
2007	991,509,745	1,088,630,104	1.1063	1,096,882,077	2007	97,120,359.0	105,372,332.4	(8,251,973.4)	-7.8%
2008	722,271,219	888,533,303	1.2391	894,986,382	2008	166,262,084.0	172,715,163.5	(6,453,079.5)	-3.7%
2009	334,768,535	624,898,496	1.7525	586,678,587	2009	290,129,961.0	251,910,051.5	38,219,909.5	15.2%
2010		372,698,496			2010				
Sum x2010	12,419,753,463	13,029,933,029		13,010,201,530	Sum x2015	610,179,566	590,448,067	19,731,499	3.3%
1996-1999	3,028,045,461	3,027,332,760		3,027,933,529	2001-2004	(712,701)	(111,932)	(600,769)	-536.7%
2000-2004	5,179,255,288	5,175,654,269		5,182,091,395	2005-2009	(3,601,019)	2,836,107	(6,437,126)	-227.0%
2005-2009	4,212,452,714	4,826,946,000		4,800,176,606	2010-2014	614,493,286	587,723,892	26,769,394	4.6%

Commercial Auto – View at 2014

Due to frequencies and severities both ticking up since 2009, and rate levels not reacting until 2013, overall 2013 TTT IELR went from 51.9% to 62.8%

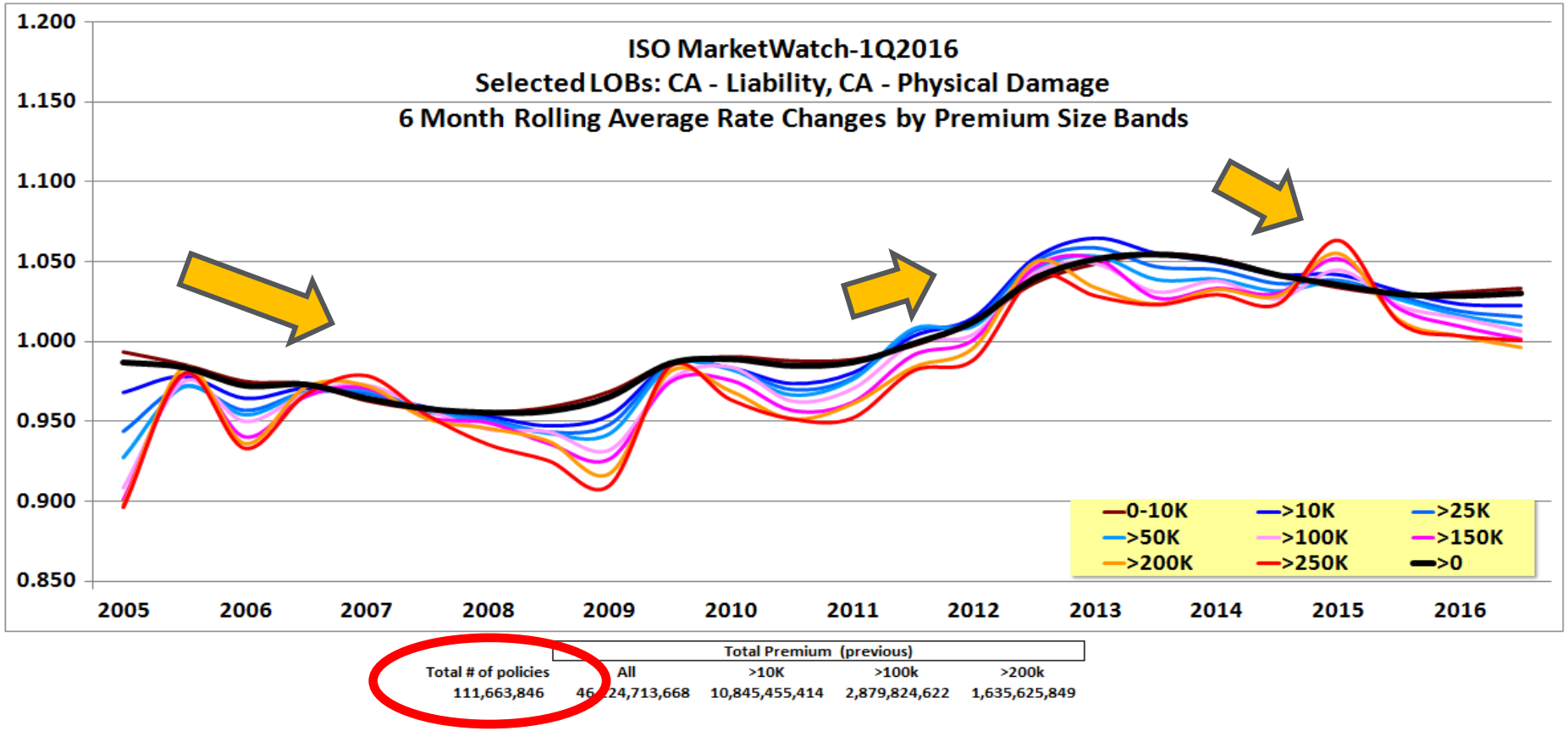


Incremental Rate Changes Through 3/31/2016 - Liability & Physical Damage

Rates reducing from 2005 to 2011, and importantly didn't go positive until 2012 even though loss trends changed direction 3 years earlier.

Larger policies, in general have larger rate reductions, and back to flat early 2016.

Illustrative



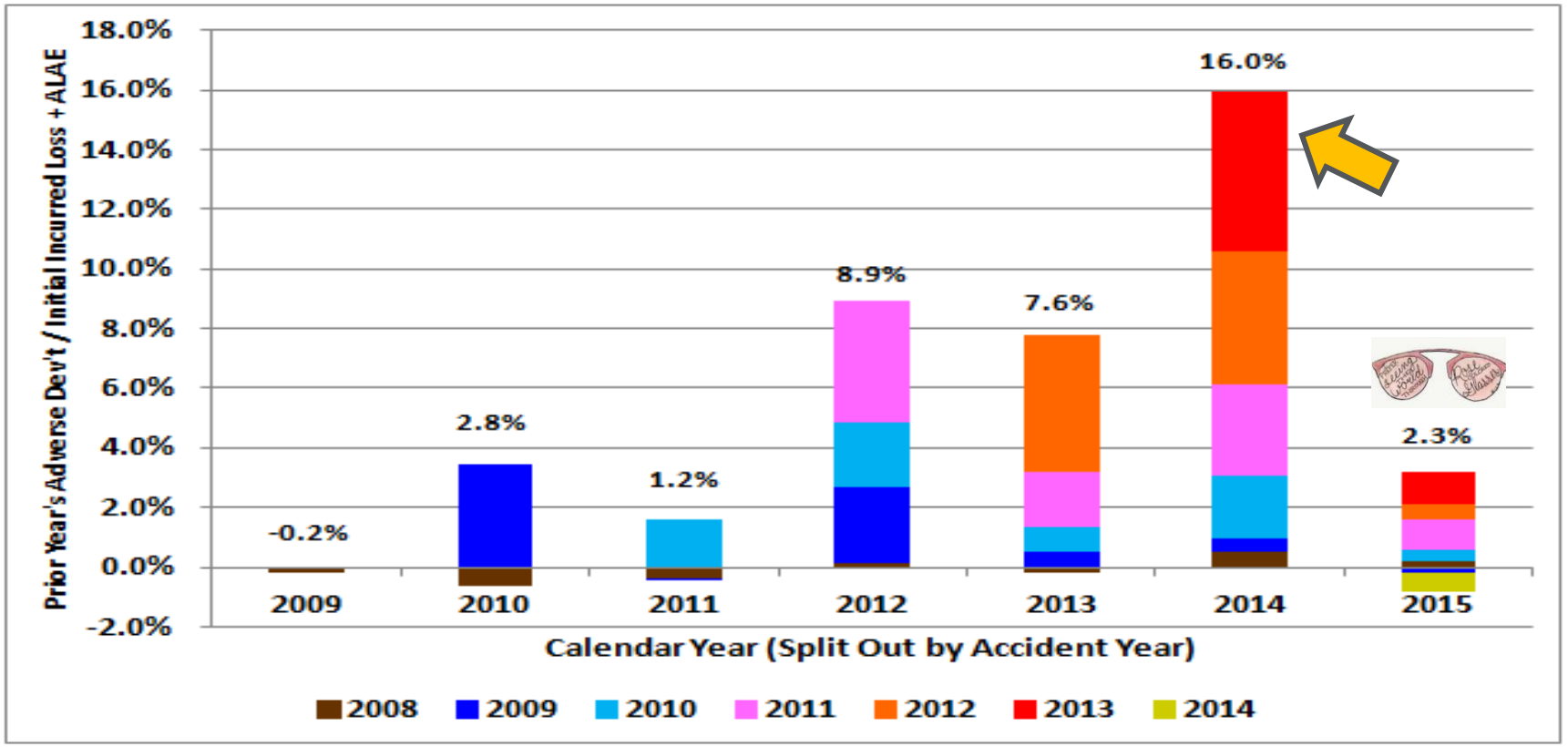
Source: ISO MarketWatch – released 6/15/2016; further details in Commercial Actuarial Panel – December 2016

Illustrative

Commercial Auto – TTT - ERLI Warning through 2015 – Calendar Year

Each calendar year since 2010 had adverse development due to lengthening loss development factors. Calendar year 2014 being by far the most adverse, with all accident years contributing.

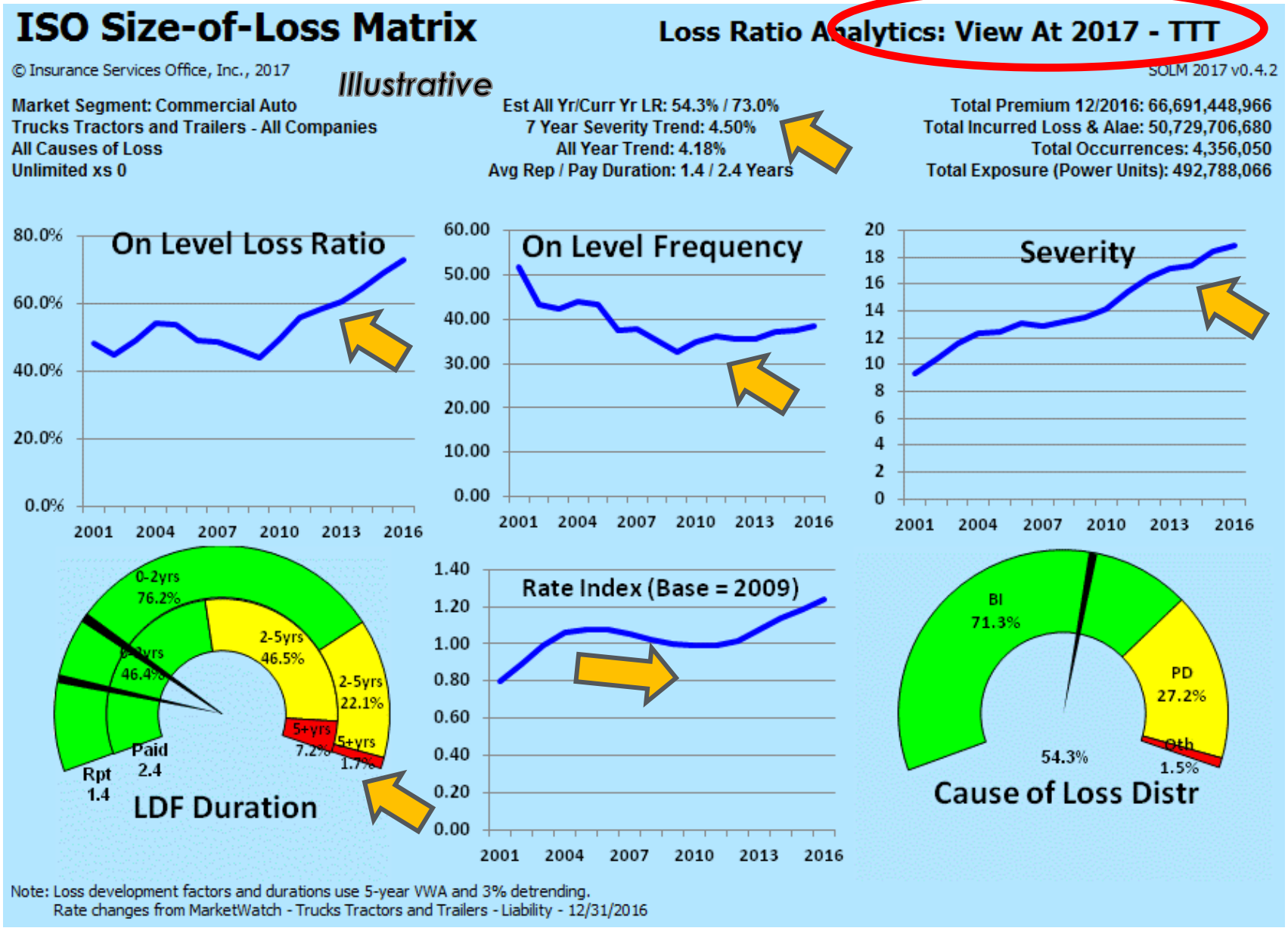
First look at 2015 appears to be not as adverse as prior years.



Source: ISO SOLM 2016 v1 - losses developed to ultimate using 5-year VWA (refresh each year); premiums developed to ultimate using Earned Premium triangle
ISO MarketWatch for Rate changes - Auto Commercial Liability - through 12/31/2015 (adjusted policy year to accident year using 6 mo policy term assumption)
CY adverse development for AYs 2009-2014: approximately 40% in CY2014 (about 20% each in CY2013 and CY2012)

Commercial Auto – View at 2017

The IELR for 2016 has moved to 73.0%, up from 51.9% at 2009. Rebounded frequency, heightened severity trends, lengthening development factors, coupled with rates that were still going down through 2012 account for the over 20 point increase.



Source: SOLM 2017v1 pre-release

Commercial Auto

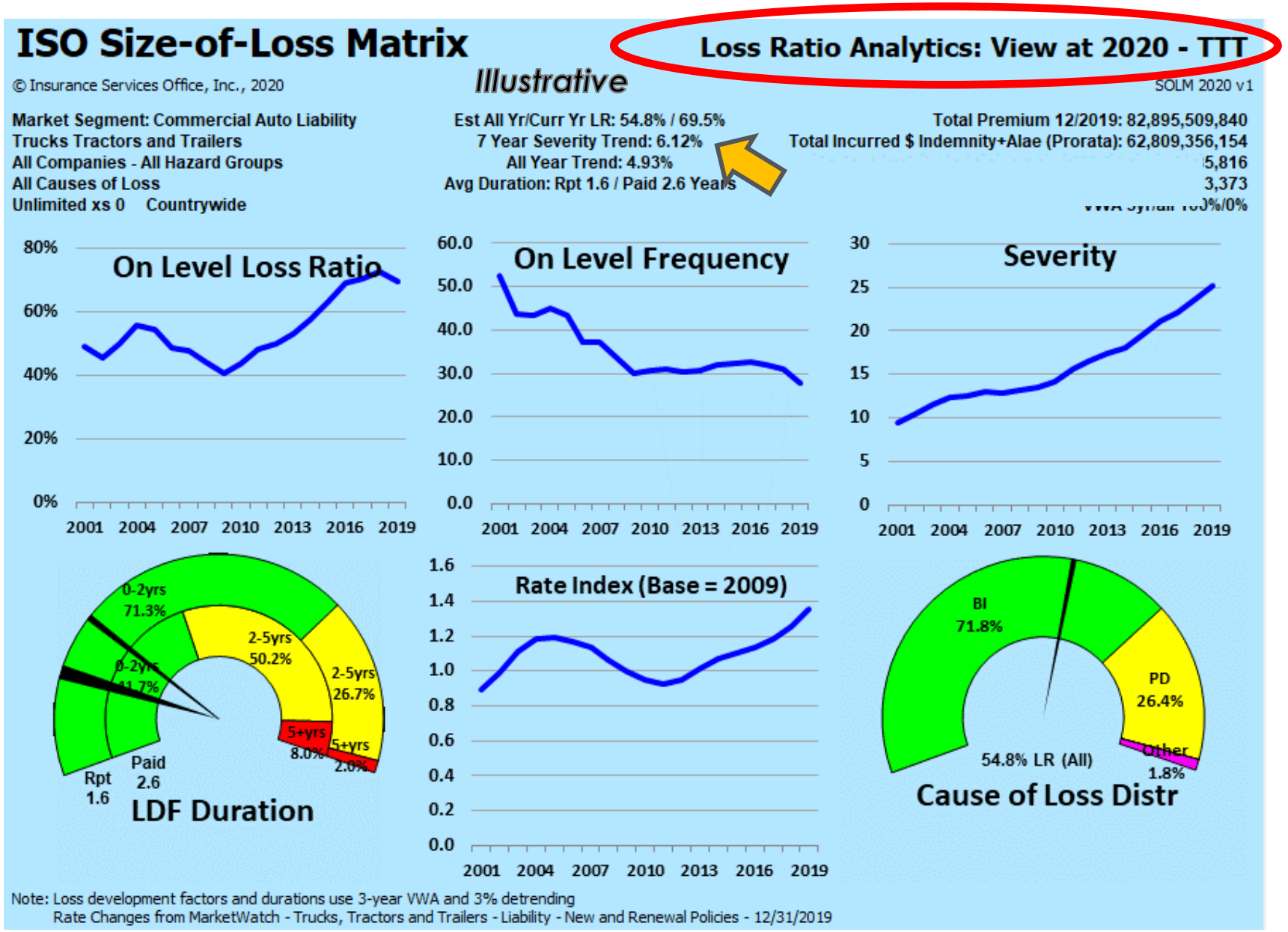
View at 2020

Commercial Auto – View at 2020

There has been a steady decline in on-level results since 2009, with some initial apparent improvement in 2019. The decline was due to significantly higher average severity trends (1.6% 7-year trend 2009 to now 6.1%), reversal of steep frequency reductions, and significantly lengthening LDF tail.

For 2019, the steady improvement in rates, now in the 6-8% range, appears to somewhat reverse the higher loss levels.

Note that the above statistics don't reflect a potential under-reporting of losses that may have occurred during 1st qtr 2020 processing. This may cause future additional tail lengthening in 2020, among other various Covid pause issues.



Source: SOLM 2020v1 pre-release (using expanded MarketWatch method 3-new and renewal including impacts from ILFs)

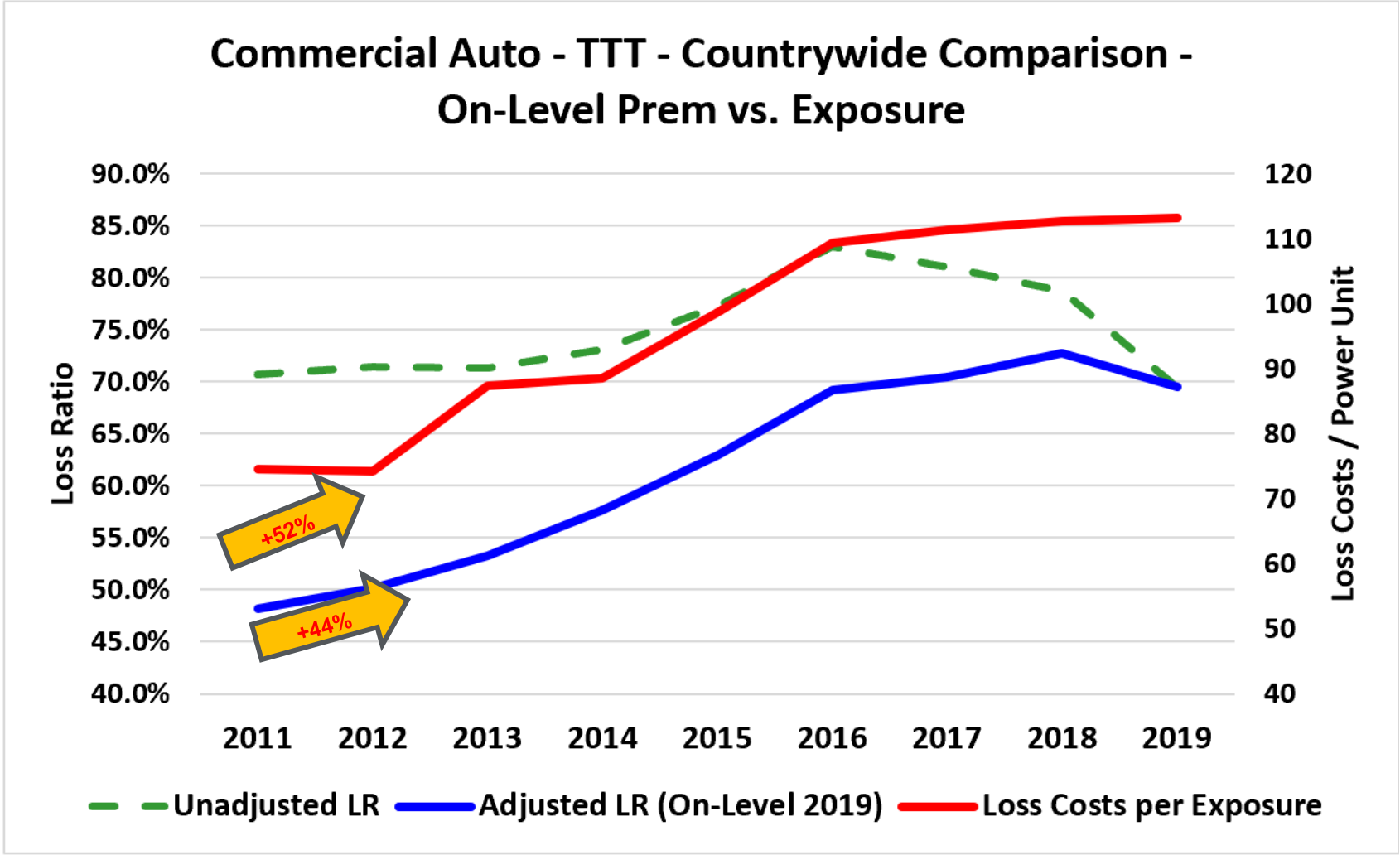
Commercial Auto – View at 2020

Comparison of Results using On-level premium vs. Power Units - TTT

Overall increase in cost up by 52% per power unit, and up by 44% per on-level premium.

Leveling off of results since 2016 under both methods. The apparent modest improvement shown in 2019 may be due to some potential under reporting of losses processed in early 2020.

Illustrative

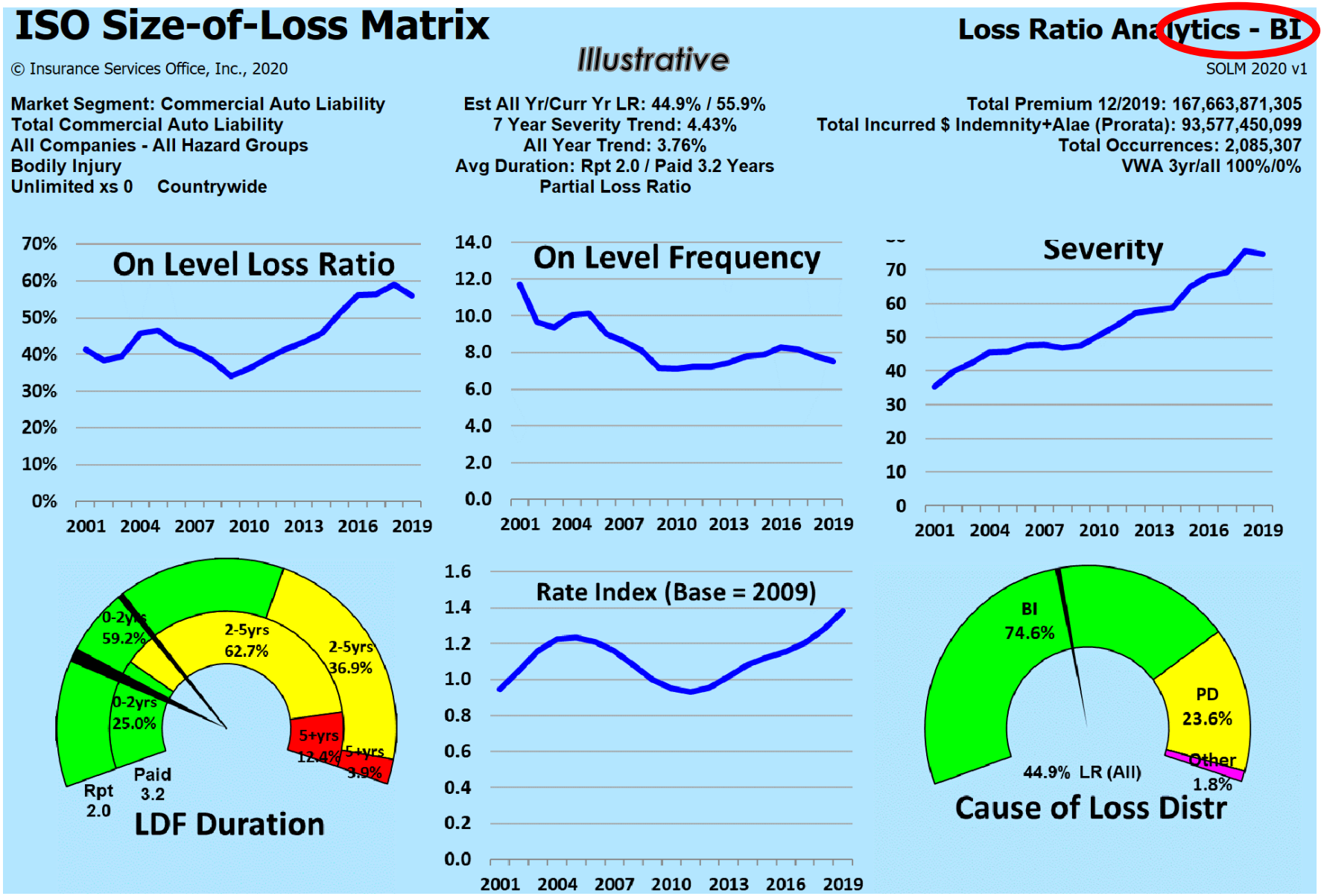


Source: SOLM 2020v1 pre-release; losses developed using 3-yr VWA; uses ISO MarketWatch 12/31/2019 rate changes – CA-TTT Liability; power units in months

Commercial Auto – View at 2020

Bodily injury is a somewhat larger portion of total (74.6% vs. 70.3% in 2009), and longer average reported loss and payment duration.

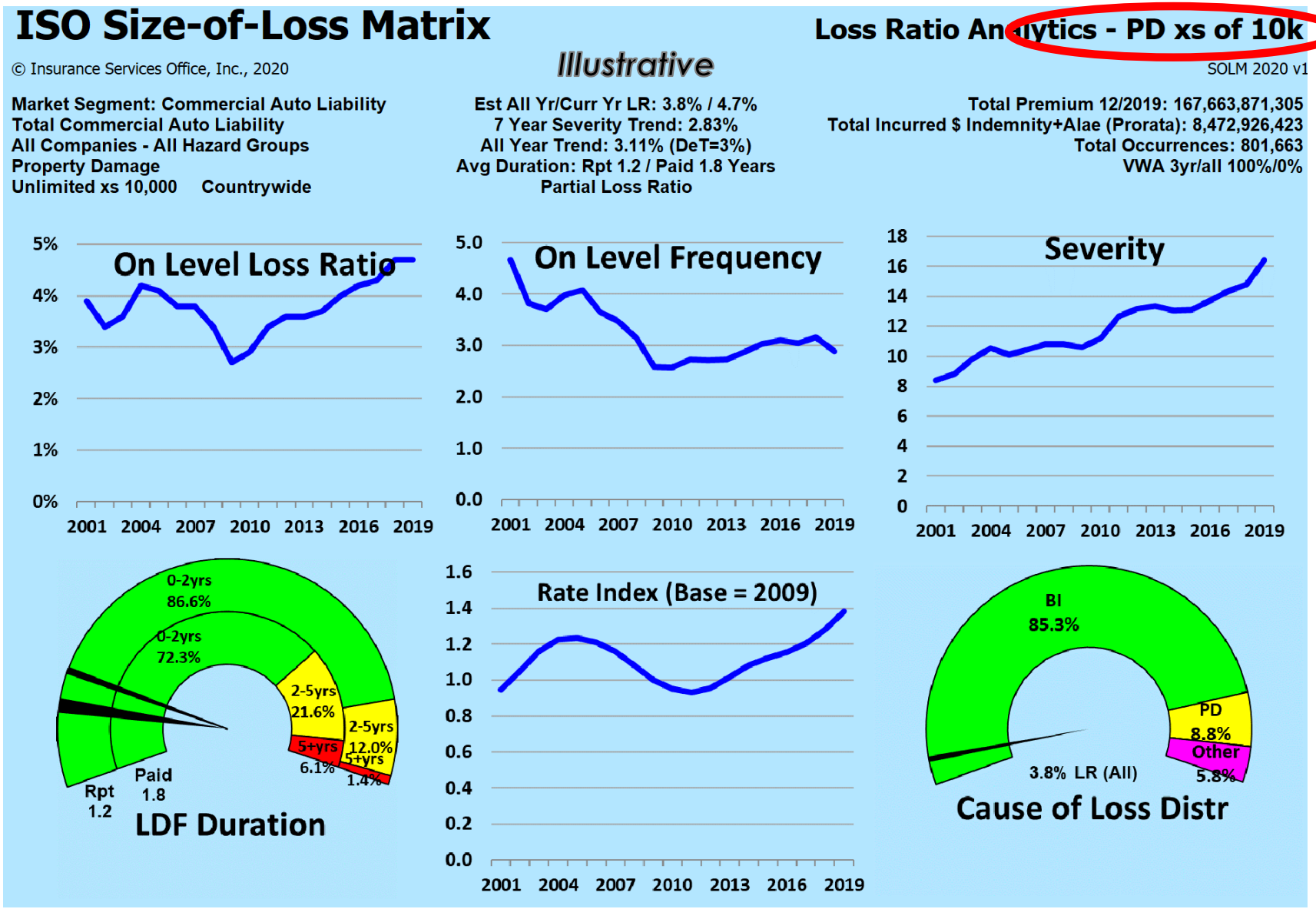
BI shows somewhat higher frequency trends but somewhat lower severity trends than total.



Source: SOLM 2019v1 pre-release using on-level premium as base

Commercial Auto – View at 2020

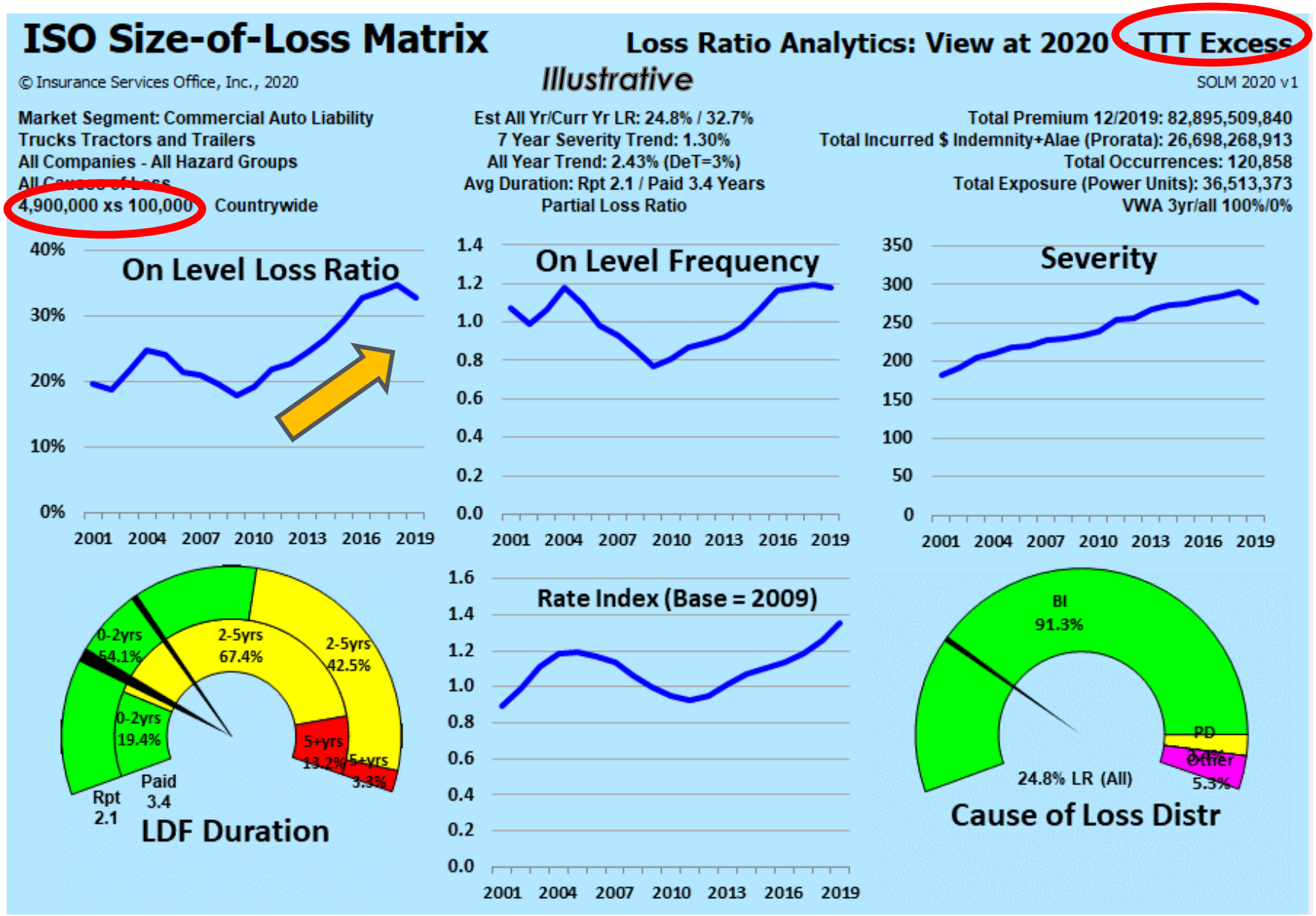
PD excess of 10k shows mostly increasing frequency trends beyond 3% and somewhat higher overall average severity trends, rising from 10k in 2008 to 16k in 2019 (60% increase)



Source: SOLM 2019v1 pre-release using on-level premium as base

Commercial Auto – View at 2020

Continued significant pressure on increased limits factors for layer 4.9M xs of 100k, going from low 20% in 2009 to around 35% currently, driven by higher frequency and steady severity trend.

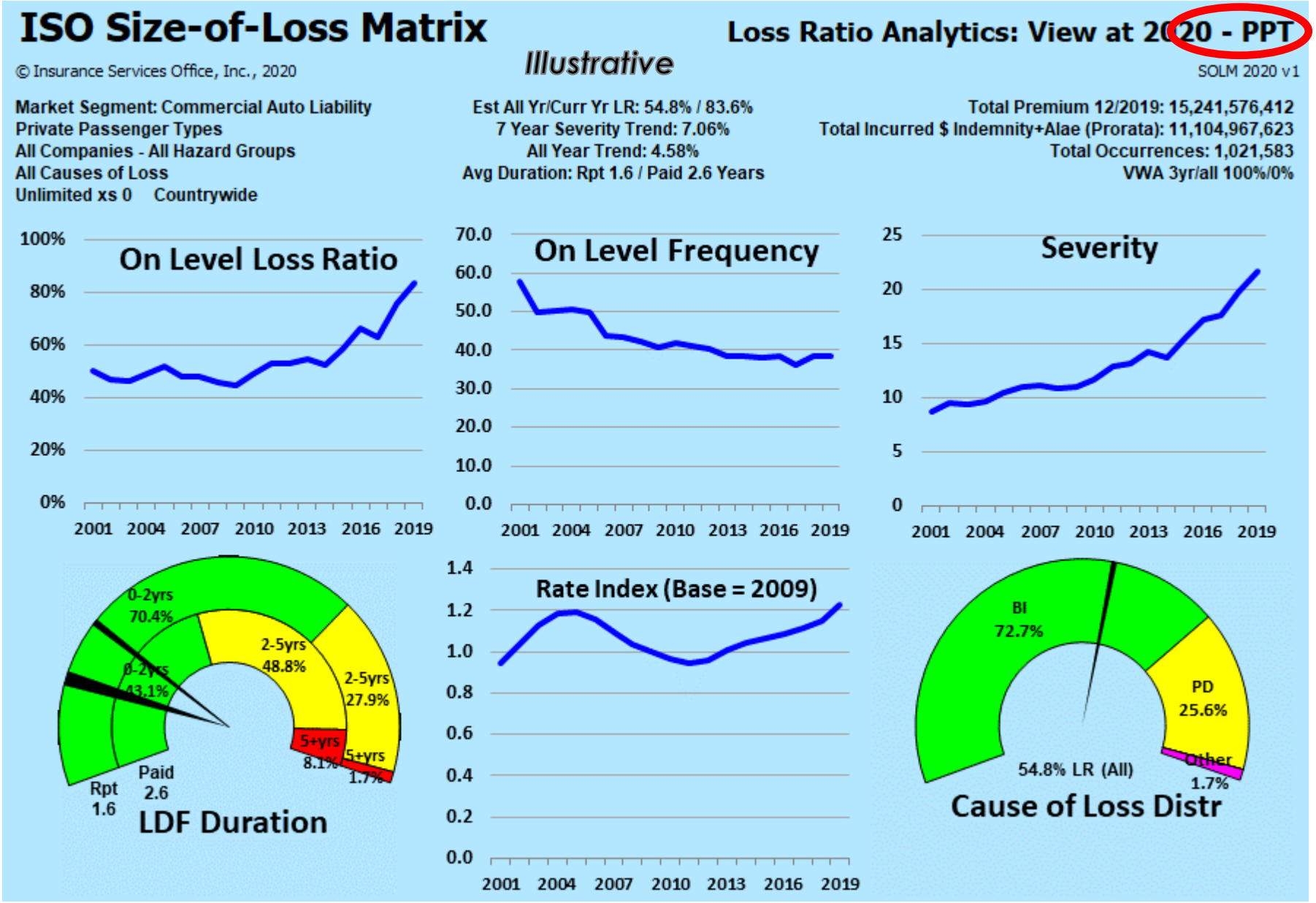


Source: SOLM 2019v1 pre-release using on-level premium as base

Commercial Auto – View at 2020 - PPT

Private Passenger Types, which accounts for about 10% of the 8 Cau markets we analyze, continues significant adverse loss ratio trend since 2009. The current loss ratio is 83.6%, vs. long-term on-level average of 54.8%.

Higher overall recent severity trends (7-year 7.1%), coupled with rate changes that aren't nearly as high as most of the other Cau lines, accounts for the deterioration.



Source: SOLM 2019v1 pre-release using on-level premium as base

Commercial Auto – View at 2020 – All CAu

Continuing Reported Lengthening Loss Development – 4.9M xs 100k

Illustrative

ISO SIZE OF LOSS MATRIX

While excess LDF factors have continued to get longer over the last decade, the deterioration has accelerated in the last 4 calendar years 2016 to 2019.

All views at 2020 use 3-year averages – if use more recent or trend LDFs, indications would be higher.

Incurred $ Indemnity+Alae (Prorata) Triangle — Total Commercial Auto Liability

Threshold Min	Threshold Max		12	24	36	48	60	72	84	96	108
52,190	2,609,462	AY 1997	459,121,202	810,706,347	982,622,136	1,096,662,033	1,185,388,443	1,222,714,015	1,236,979,387	1,240,895,032	1,243,359,348
53,755	2,687,746	AY 1998	470,376,384	797,235,139	1,005,015,187	1,172,020,498	1,236,693,801	1,257,813,051	1,268,179,614	1,270,262,411	1,271,558,941
55,368	2,768,378	AY 1999	482,525,291	830,811,450	1,116,063,265	1,279,925,210	1,342,649,564	1,374,608,673	1,388,605,346	1,392,140,359	1,392,453,319
57,029	2,851,430	AY 2000	473,001,413	849,479,950	1,128,595,269	1,297,606,598	1,371,946,590	1,385,234,582	1,385,477,094	1,391,435,329	1,389,935,436
58,740	2,936,973	AY 2001	912,964,178	1,731,583,746	2,299,798,702	2,662,995,834	2,787,396,984	2,823,162,435	2,859,582,623	2,869,722,678	2,869,793,315
60,502	3,025,082	AY 2002	861,313,373	1,649,128,318	2,185,980,875	2,450,873,303	2,577,486,443	2,653,460,094	2,678,103,820	2,681,606,877	2,684,149,188
62,317	3,115,834	AY 2003	869,901,549	1,619,851,489	2,085,337,396	2,431,312,139	2,572,574,571	2,615,744,536	2,627,459,999	2,623,439,112	2,636,359,014
64,187	3,209,309	AY 2004	986,175,263	1,812,631,600	2,301,776,950	2,635,054,127	2,775,830,011	2,832,458,360	2,847,109,564	2,861,795,195	2,868,403,900
66,112	3,305,589	AY 2005	979,646,975	1,829,368,225	2,368,411,351	2,719,106,383	2,857,401,931	2,895,978,065	2,931,037,695	2,938,329,298	2,936,629,414
68,096	3,404,756	AY 2006	1,008,809,762	1,888,793,229	2,427,596,708	2,741,938,813	2,873,140,729	2,925,958,497	2,949,932,155	2,961,557,718	2,968,981,914
70,138	3,506,899	AY 2007	998,209,424	1,857,353,185	2,413,693,715	2,713,786,956	2,832,390,291	2,898,679,484	2,915,703,747	2,929,865,190	2,940,859,341
72,243	3,612,106	AY 2008	880,018,811	1,606,291,829	2,071,822,518	2,283,305,510	2,405,541,763	2,451,715,330	2,478,317,514	2,485,652,492	2,495,034,669
74,410	3,720,469	AY 2009	714,675,711	1,372,908,145	1,718,554,920	2,004,773,593	2,125,154,303	2,185,379,182	2,193,564,724	2,205,485,600	2,210,867,371
76,642	3,832,083	AY 2010	702,551,820	1,356,194,197	1,816,716,534	2,088,823,949	2,275,821,897	2,324,124,098	2,356,488,827	2,373,773,029	2,381,240,508
78,941	3,947,046	AY 2011	751,407,849	1,473,437,967	1,944,227,210	2,308,545,982	2,483,833,458	2,570,360,541	2,599,659,486	2,613,047,279	2,619,671,848
81,310	4,065,457	AY 2012	785,921,534	1,560,787,469	2,167,947,364	2,525,647,258	2,744,781,662	2,811,993,951	2,850,409,856	2,851,981,295	
83,749	4,187,421	AY 2013	759,940,838	1,575,239,154	2,169,190,100	2,640,164,491	2,871,349,311	2,955,321,968	2,998,577,537		
86,261	4,313,043	AY 2014	862,437,115	1,621,451,175	2,299,915,262	2,802,147,829	3,071,176,514	3,168,917,871			
88,849	4,442,435	AY 2015	910,865,311	1,882,357,791	2,694,453,953	3,326,556,116	3,619,468,031				
91,515	4,575,708	AY 2016	992,521,253	2,044,514,150	2,959,471,866	3,602,912,197					
94,260	4,712,979	AY 2017	983,831,328	2,057,799,370	2,956,947,949						
97,088	4,854,368	AY 2018	978,631,336	2,134,533,566							
100,001	5,000,000	AY 2019	941,241,497								
CY tots-2014,2015,2016,2017,2018,2019:			39,066,517,320	41,934,860,409	45,413,695,915	49,123,129,321	53,154,400,221	57,246,901,005			

	24/12	36/24	48/36	60/48	72/60	84/72	96/84	108/96	120/108
AY 1997	1.766	1.212	1.116	1.081	1.031	1.012	1.003	1.002	1.001
AY 1998	1.695	1.261	1.166	1.055	1.017	1.008	1.002	1.001	1.001
AY 1999	1.722	1.343	1.147	1.049	1.024	1.010	1.003	1.000	0.999
AY 2000	1.796	1.329	1.150	1.057	1.010	1.000	1.004	0.999	1.000
AY 2001	1.897	1.328	1.158	1.047	1.013	1.013	1.004	1.000	1.001
AY 2002	1.915	1.326	1.121	1.052	1.029	1.009	1.001	1.001	1.003
AY 2003	1.862	1.287	1.166	1.058	1.017	1.004	0.998	1.005	1.002
AY 2004	1.838	1.270	1.145	1.053	1.020	1.005	1.005	1.002	1.000
AY 2005	1.867	1.295	1.148	1.051	1.014	1.012	1.002	0.999	1.001
AY 2006	1.872	1.285	1.129	1.048	1.018	1.008	1.004	1.003	1.000
AY 2007	1.861	1.300	1.124	1.044	1.023	1.006	1.005	1.004	1.000
AY 2008	1.825	1.290	1.102	1.054	1.019	1.011	1.003	1.004	1.002
AY 2009	1.921	1.252	1.167	1.060	1.028	1.004	1.005	1.002	1.001
AY 2010	1.930	1.340	1.150	1.090	1.021	1.014	1.007	1.003	1.001
AY 2011	1.961	1.320	1.187	1.076	1.035	1.011	1.005	1.003	
AY 2012	1.986	1.389	1.165	1.087	1.024	1.014	1.001		
AY 2013	2.073	1.377	1.217	1.088	1.029	1.015			
AY 2014	1.880	1.418	1.218	1.096	1.032				
AY 2015	2.067	1.431	1.235	1.088					
AY [illegible]	2.060	1.448	1.217						
	2.092	1.437							
	2.181								

4-Year

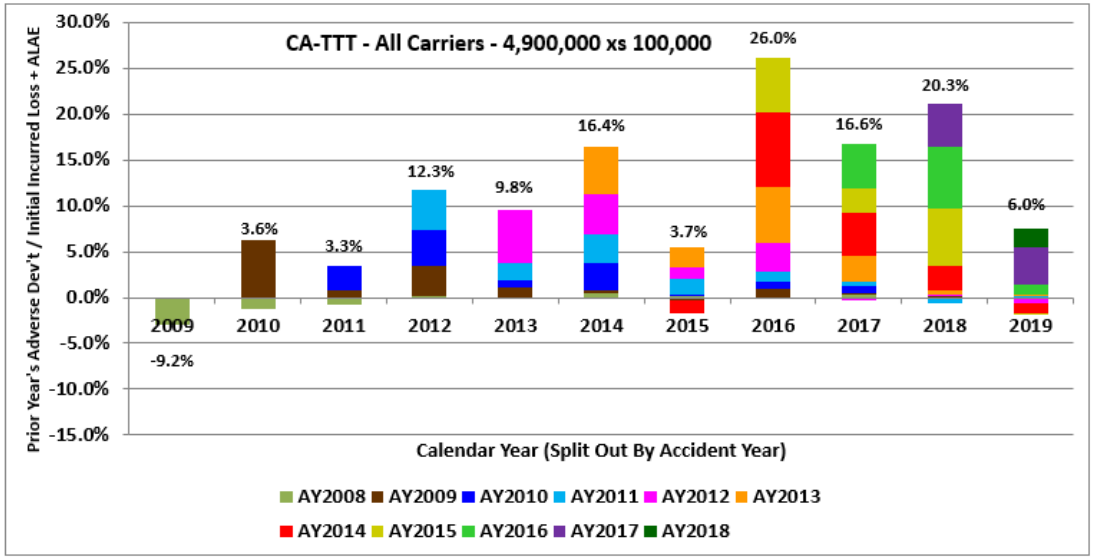
Commercial Auto – View at 2020

TTT – Reserve Run-off Test @12/31/2019 – 4.9M xs 100k

Illustrative

Comparing to initial selected excess losses at 12 months using a mechanical 7-year average, produces deterioration over 10% for accident years 2009 to 2016.

All subsequent years continue the same pattern of deterioration.



ISO SOLM 2020 v1 - Development Triangle and Analysis
Ex-ante Reserving Analysis Runoff Tests (through 12/31/2019)

ISO SIZE OF LOSS MACR

Market Analysis: CA-TTT - All Carriers
Assumptions: Incurred $ Indemnity+Alae (Prorata); 4,900,000 xs 100,000; 7 yr VWA (100% wt); 3.0% detrended threshold

Select Metric here:

% Adverse (Favorable) Development	Ultimate Est. INCURRED @12 mos	Adverse (Fav) Devt	AY	CY2019 1	CY2018 2	CY2017 3	CY2016 4	CY2015 5	CY2014 6	CY2013 7	CY2012 8	CY2011 9	CY2010 10	CY2009 11	CY2008 12	CY2007 13	CY2006 14	CY2005 15
5.7%	897,902,649	50,740,598	2000	(12,930)	(149,758)	(14,243)	(37,007)	(261,486)	425,081	733,592	(512,896)	818,798	(1,110,327)	(2,139,611)	(2,344,311)	4,181,288	(9,234,565)	(14,676,518)
1.6%	1,010,768,029	16,375,429	2001	787,419	(5,344)	(2,957)	(428,489)	807,970	(213,803)	623,967	(1,001,009)	(817,958)	(102,505)	(3,066,717)	(907,864)	(1,584,648)	(16,274,319)	(27,122,001)
-5.6%	1,071,433,069	(60,448,675)	2002	1,146,292	38,190	(78,068)	207,792	481,517	885,639	1,093,401	411,217	(1,580,076)	(315,301)	(2,110,163)	(2,471,368)	6,326,387	(26,864,870)	(39,421,521)
-5.5%	1,159,649,320	(63,719,021)	2003	7,567	(93,610)	173,138	(156,304)	(923,686)	(621,565)	(872,661)	604,636	3,712,828	(5,013,395)	(4,041,767)	(3,539,561)	(12,460,534)	(6,311,222)	(34,072,725)
-7.1%	1,284,575,460	(91,473,173)	2004	497,267	321,963	759,334	162,091	(105,645)	(2,126,179)	(570,204)	884,918	1,341,638	(3,893,278)	(1,657,873)	(3,340,037)	(37,904,958)	(38,294,783)	(7,547,426)
-6.6%	1,286,702,227	(84,283,460)	2005	739,633	(341,665)	6,814	(750,450)	395,695	1,158,628	(77,579)	956,896	5,082,412	1,949,461	(5,330,134)	(19,922,005)	(48,131,203)	(20,019,965)	
-5.0%	1,251,809,595	(62,032,543)	2006	7,797	(753,901)	218,520	239,219	(1,999,062)	2,061,251	(487,251)	600,397	(2,488,640)	6,081,552	(32,750,289)	(23,247,505)	(9,514,632)		
-4.3%	1,262,720,573	(54,204,881)	2007	355,794	(1,237,617)	202,947	1,471,755	2,039,102	(1,820,731)	2,868,812	4,264,750	1,846,213	(15,739,003)	(24,621,962)	(23,774,881)			
-4.5%	1,147,287,274	(51,108,491)	2008	816,118	(1,763,331)	2,964,483	(1,515,357)	1,160,284	5,035,009	(1,656,175)	1,382,019	(9,367,983)	(13,927,997)	(34,235,562)				
12.9%	832,718,476	107,224,480	2009	(959,446)	1,856,248	2,252,855	7,329,472	(2,465,369)	2,803,857	9,340,997	27,988,561	6,628,998	52,448,309					
12.2%	910,799,779	111,055,180	2010	(592,141)	(348,424)	7,229,646	7,490,679	2,612,416	26,807,488	7,128,177	35,964,636	24,762,703						
12.3%	1,030,242,376	126,705,244	2011	1,626,765	(4,444,210)	4,962,160	11,363,461	16,524,671	33,331,743	18,441,090	44,899,562							
14.2%	1,034,165,518	146,546,304	2012	(4,277,153)	1,686,291	(2,452,915)	32,188,727	12,692,051	45,382,241	61,327,062								
16.7%	1,113,782,286	185,866,945	2013	1,151,207	4,598,386	30,177,928	68,596,690	24,495,023	56,847,711									
12.9%	1,272,261,912	163,839,064	2014	(13,595,076)	33,840,346	59,537,789	102,242,930	(18,186,925)										
14.8%	1,338,654,998	198,733,711	2015	(2,384,344)	84,613,671	36,432,421	80,071,963											
12.5%	1,553,070,539	194,700,116	2016	16,240,200	103,114,471	75,345,446												
8.7%	1,616,676,652	141,304,681	2017	66,183,158	75,121,524													
2.0%	1,803,489,008	36,264,450	2018	36,264,450														

	Minimum	Maximum		
	-3.7%	-1.3%	17	Favorable development
	-1.3%	-0.1%	39	Somewhat favorable
	-0.1%	0.1%	63	Within +-0.1% of original estimate
	0.1%	2.7%	50	Somewhat adverse
	2.7%	8.0%	21	Adverse development
			190	# of AY x CY cells tested

Actual vs Expected Development: AY x CY

Sources: Using pre-release SOLM 2019 v2 – mechanical selections of VWA (100% 7-year)

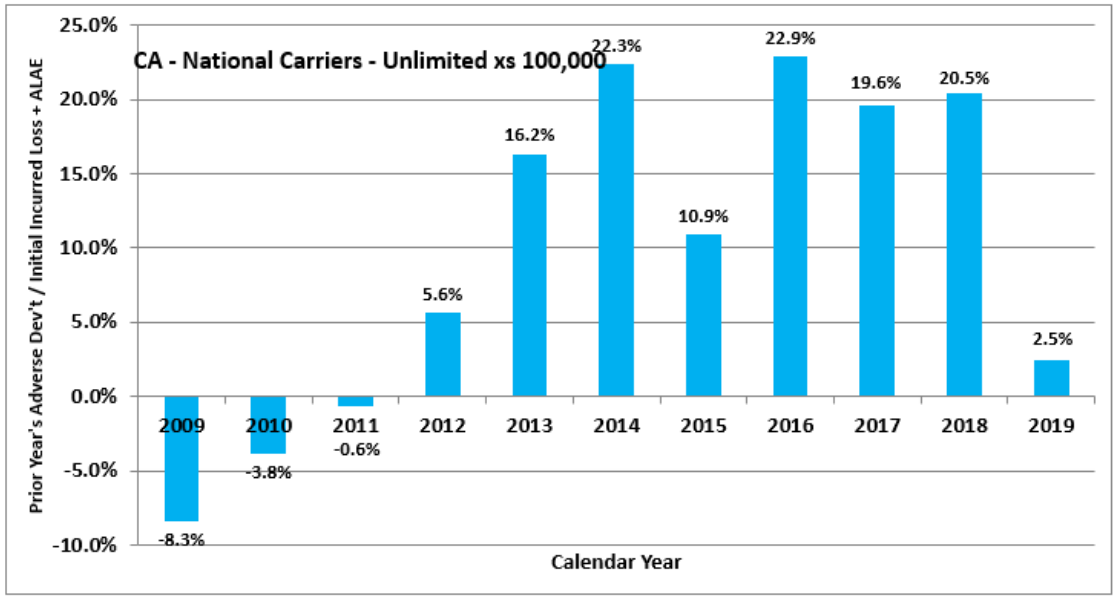
Commercial Auto – View at 2020

All CAu National Carriers – Reserve Run-off Test @12/31/2019 – # xs 100k

Illustrative

Comparing to initial selected excess loss frequencies at 12 months using a mechanical 7-year average, produces deterioration over 10% for accident years 2011 to 2016.

All years from 2012 have large loss deterioration.



ISO SOLM 2020 v1 - Development Triangle and Analysis
Ex-ante Reserving Analysis Runoff Tests (through 12/31/2019)

ISO SIZE OF LOSS MATRIX

Market Analysis: CA - National Carriers
Assumptions: Incurred # Occurrence Indemnity; Unlimited xs 100,000; 7 yr VWA (100% wt); 3.0% detrended threshold

Select Metric here:

% Adverse (Favorable) Development	Ultimate Est. INCURRED @12 mos	Adverse (Fav) Devt	AY	1 CY2019	2 CY2018	3 CY2017	4 CY2016	5 CY2015	6 CY2014	7 CY2013	8 CY2012	9 CY2011	10 CY2010	11 CY2009	12 CY2008	13 CY2007	14 CY2006	15 CY2005
-2.3%	1,654	(38)	2000	-	-	(0)	(1)	-	0	-	1	(2)	4	2	(7)	(3)	(14)	(57)
4.2%	3,368	141	2001	1	(1)	(0)	-	(0)	1	(3)	(0)	(4)	2	(1)	(15)	(38)	(1)	(215)
1.0%	3,555	36	2002	1	1	(1)	2	(3)	1	(0)	(1)	6	(3)	(12)	(5)	45	(53)	(129)
-4.9%	3,741	(183)	2003	0	0	0	0	(2)	2	(0)	3	6	3	(26)	4	22	(207)	36
-5.0%	3,952	(197)	2004	0	0	1	(3)	(2)	1	(6)	12	(2)	(0)	(8)	(55)	(41)	(172)	77
-8.8%	3,917	(345)	2005	1	0	(0)	3	(3)	(2)	(4)	8	9	4	(8)	(160)	(65)	(129)	
-8.9%	3,700	(329)	2006	2	(0)	(1)	3	(1)	(1)	(3)	7	(8)	(15)	(83)	(103)	(124)		
-2.9%	3,434	(100)	2007	(0)	2	(1)	2	5	7	(2)	10	15	(52)	(111)	26			
-5.0%	2,853	(142)	2008	1	(1)	(1)	1	(0)	18	(10)	1	(21)	(85)	(44)				
1.0%	2,316	24	2009	(0)	(2)	9	(6)	11	9	5	34	(52)	16					
9.5%	2,137	203	2010	(1)	3	(4)	33	(1)	77	73	(17)	40						
19.9%	1,991	396	2011	2	1	8	19	34	81	173	77							
16.8%	2,033	341	2012	1	(3)	12	31	51	151	98								
16.4%	2,157	354	2013	(7)	37	23	82	92	128									
13.4%	2,239	300	2014	(12)	43	57	161	51										
16.8%	2,485	417	2015	(30)	85	164	199											
13.7%	2,624	361	2016	(6)	148	219												
6.5%	2,865	185	2017	(36)	221													
5.8%	3,152	181	2018	181														

Minimum	Maximum	Actual vs Expected Development: AY x CY	
-6.4%	-2.2%	13	Favorable development
-2.2%	-0.1%	35	Somewhat favorable
-0.1%	0.1%	76	Within +-0.1% of original estimate
0.1%	3.0%	46	Somewhat adverse
3.0%	8.7%	19	Adverse development
		189	# of AY x CY cells tested

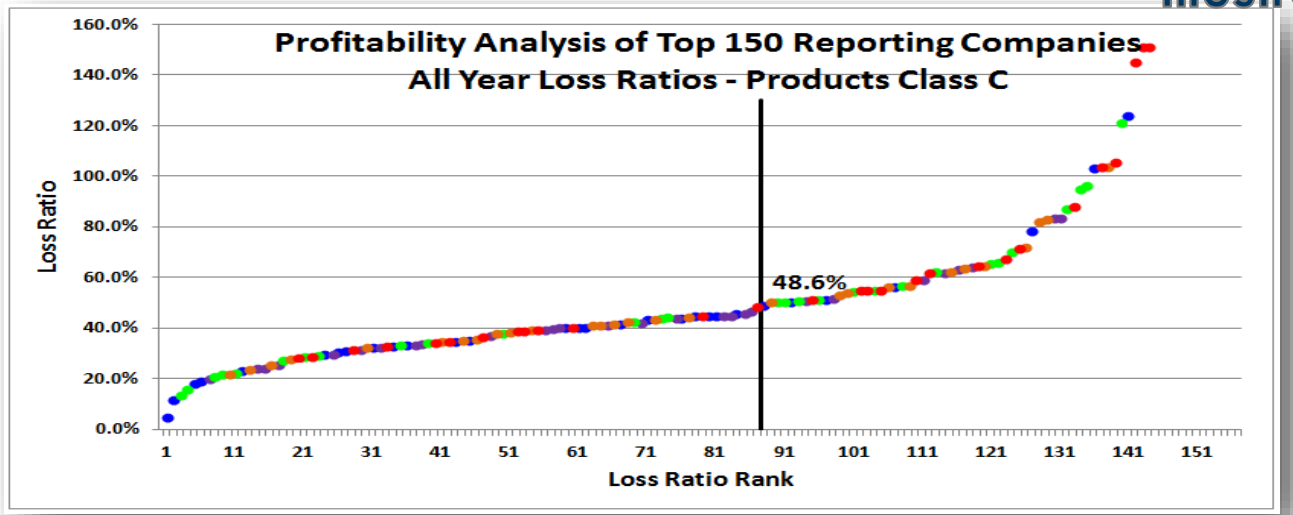
Sources: Using pre-release SOLM 2019 v2 – mechanical selections of VWA (100% 7-year)

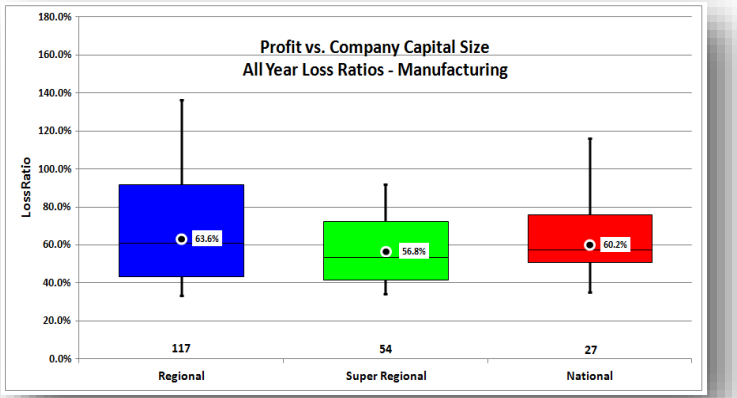
Underwriting Cycle Analysis – Initial Investigation

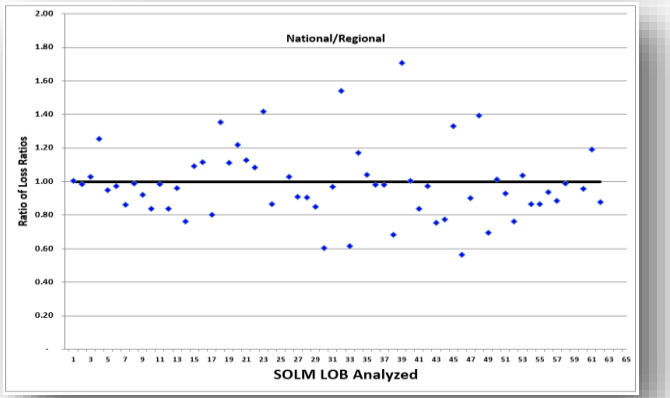
Illustrative

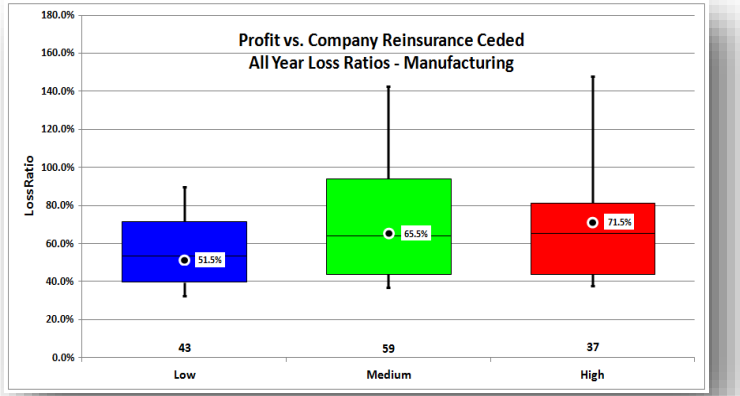
Research done over the last few years was centered around investigating why company results were so dramatically different from each other. Like the LDF patterns, we found companies had strikingly different results.

We investigated things like how correlated are capital size and reinsurance ceded to results. We did find there was some impact of each, but not overwhelming.







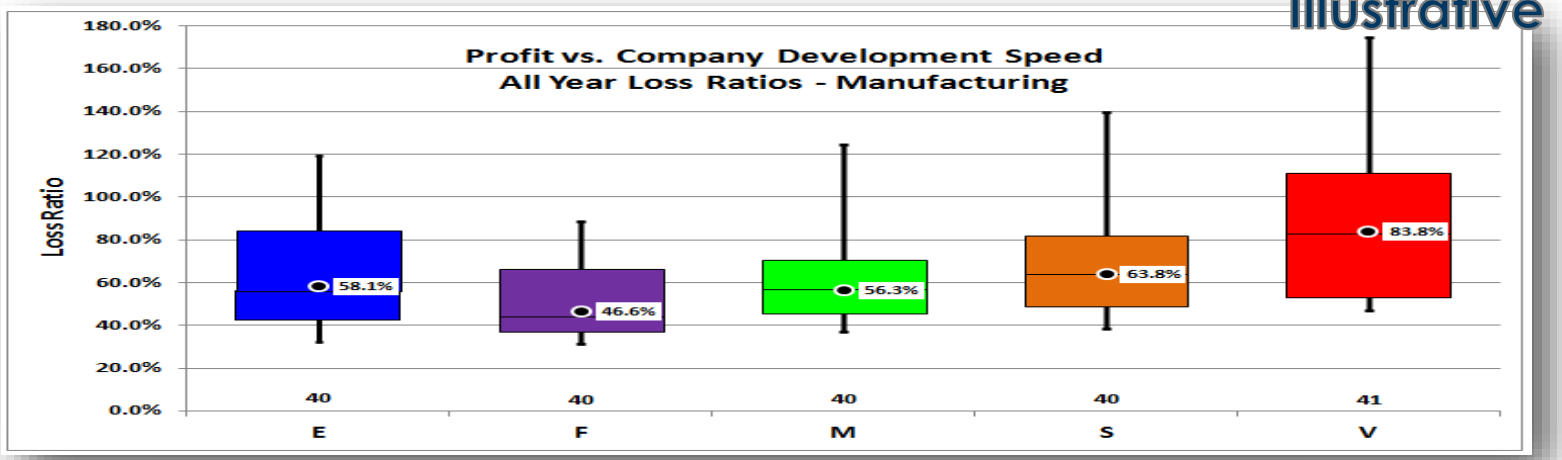


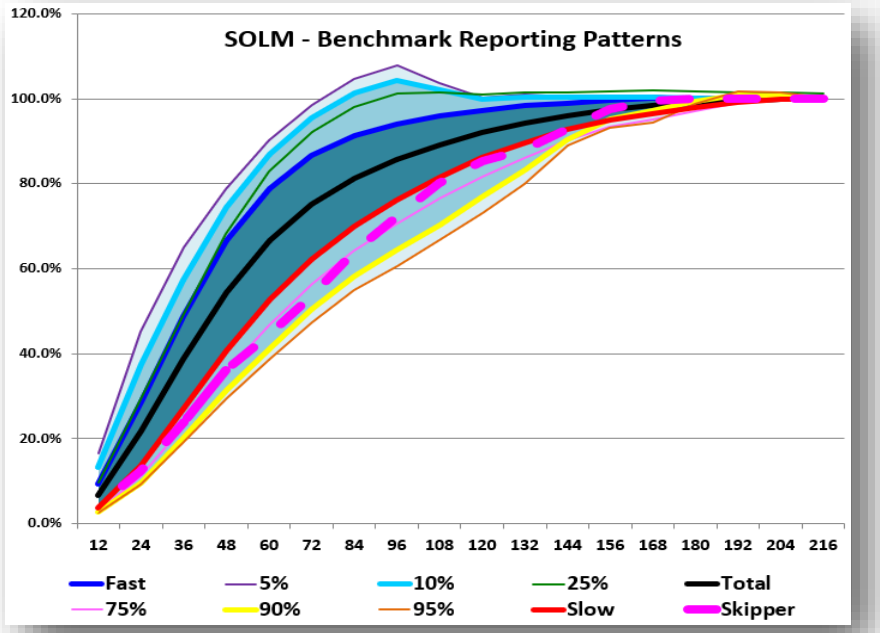
Note: Total loss ratios (2001-2016) use 20 year loss triangles and all-year LDFs; each individual company uses credibility weighted all-year industry factors, split between Fast and Slow for apriori

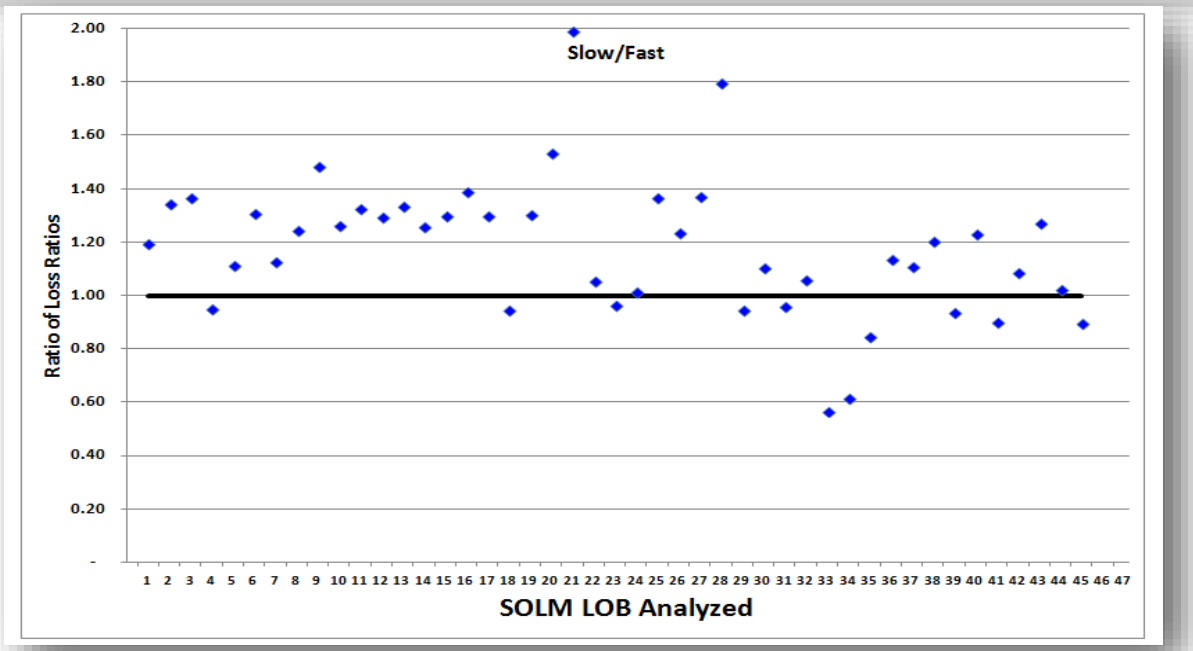
Source: Verisk Monday Webinar – 10/1/2018 – John Buchanan, Marni Wasserman (recorded)

Underwriting Cycle Analysis – Further Investigation Profit / LDF Speed

However when investigating LDF Speed and Profitability, we found a significant correlation. Companies that don't recognize the are longer than industry LDFs, very strongly have much worse ultimate loss ratios. Almost every one of the 44 markets we analyzed (besides short-tail property lines) experienced this important connection.





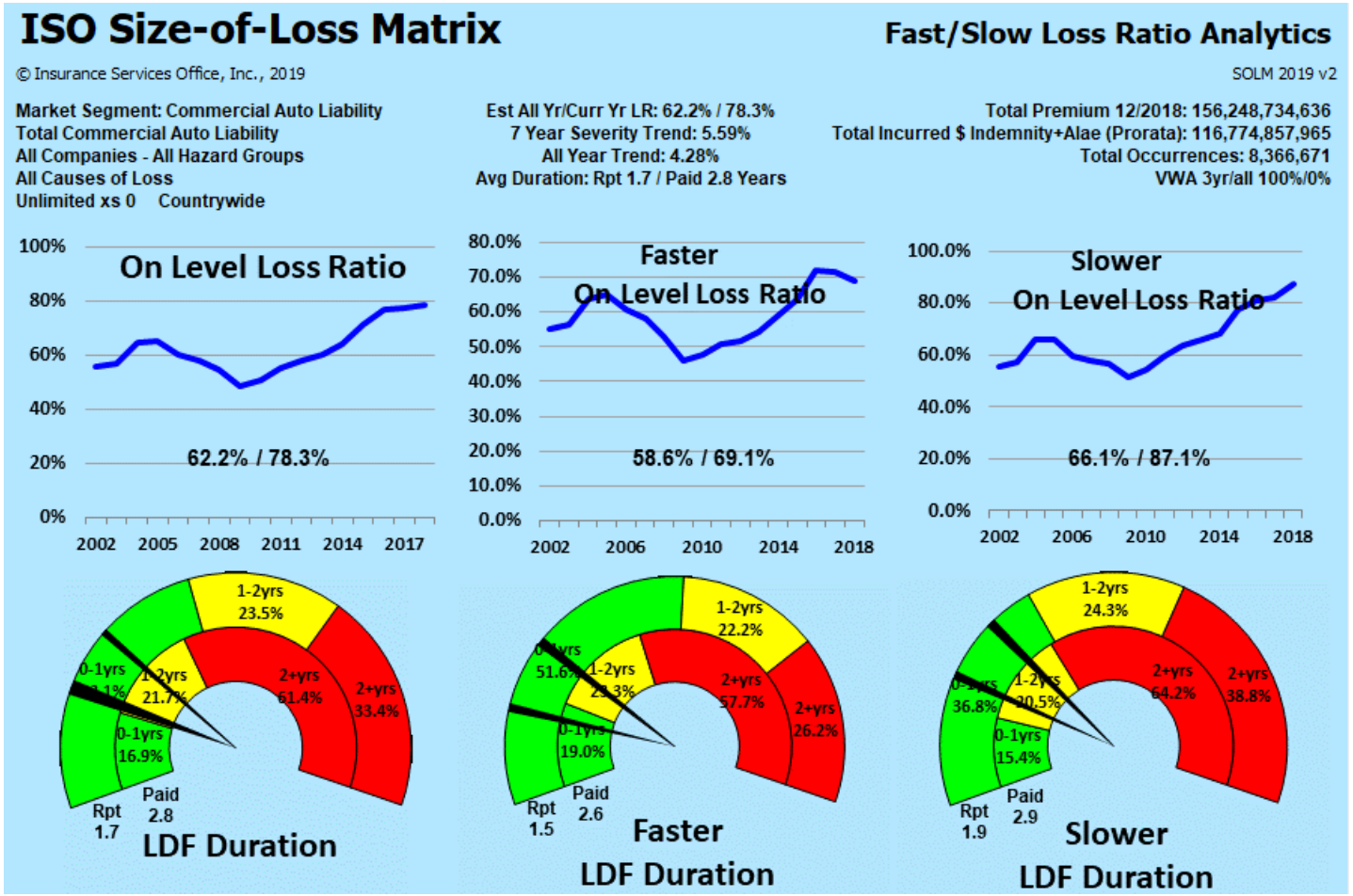


Note: See Verisk Monday Webinar on link between LDF Speed and Profitability (9/11/2017 – J. Buchanan and M. Wasserman)

Competitive Underwriting Cycle - Further Investigation Profit / LDF Speed

We are investigating "why" profit is often strongly correlated to loss development speed. We have a few competitive marketplace hypotheses:

- The first is that **faster reporting companies** may get an **earlier more accurate reading** of results, and be able to reprice their business more quickly when circumstances change
- The second is that **slower companies**, especially those that **don't know they are slow,** may have a **downward bias** in establishing lower loss development **parameters** for their models
- Especially in a highly competitive environment, **slower LDF companies** may for example **assume** that losses are **fully reported by 8 years** rather than the full length of the pattern at 20+ years
- These companies may ultimately have higher loss ratios when the losses do indeed emerge against **lower charged premiums**
- There may also be an additional pricing component for longer tailed companies to factor in additional investment income. But this may be mitigated by lower interest rates and payment patterns that don't vary as much as the reporting patterns



Commercial Auto – State Group X

Expected Loss 900x100 based on AS Circular ILF

Illustrative

Policy Limit ($,000)	State Group Basic Limit Loss Weight	Limited Average Severity	Indicated Increased Limit Factor
100	**0.0148**	**18,529**	**1.00**
250	0.0010	28,100	1.52
300	**0.0153**	**30,374**	**1.64**
400	0.0003	34,152	1.84
500	0.0294	37,169	2.01
750	0.0011	42,582	2.30
1,000	**0.8664**	**46,214**	**2.49**
1,500	0.0001	50,983	2.75
2,000	0.0590	54,160	2.92
2,500	0.0000	56,517	3.05
3,000	0.0022	58,372	3.15
5,000	**0.0104**	**63,237**	**3.41**
7,500	0.0000	66,793	3.60
10,000	0.0000	69,157	3.73

Policy Limit	300k	1M	5M
100	1,000	1,000	1,000
250	1,517	1,517	1,517
300	1,639	1,639	1,639
400	1,843	1,843	1,843
500	2,006	2,006	2,006
750	2,298	2,298	2,298
1000	2,494	2,494	2,494
1500	2,752	2,752	2,752
2000	2,923	2,923	2,923
2500	3,050	3,050	3,050
3000	3,150	3,150	3,150
5000	3,413	3,413	3,413
7500	3,605	3,605	3,605
10000	3,732	3,732	3,732
900x100 Expected Loss %	39.0%	59.9%	43.8%
Loss Weight	7.5%	85.0%	7.5%

Weighted Expected Loss %
57.1%

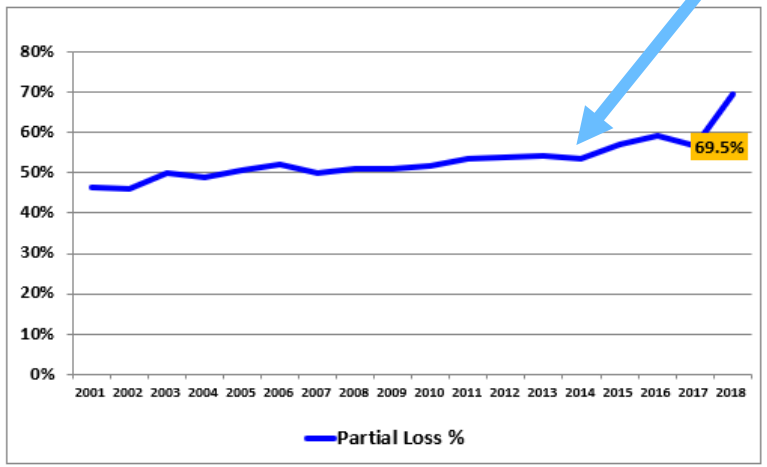
Note: Weights provided in the circular can be used to combine expected loss percentages from state groups and classes.

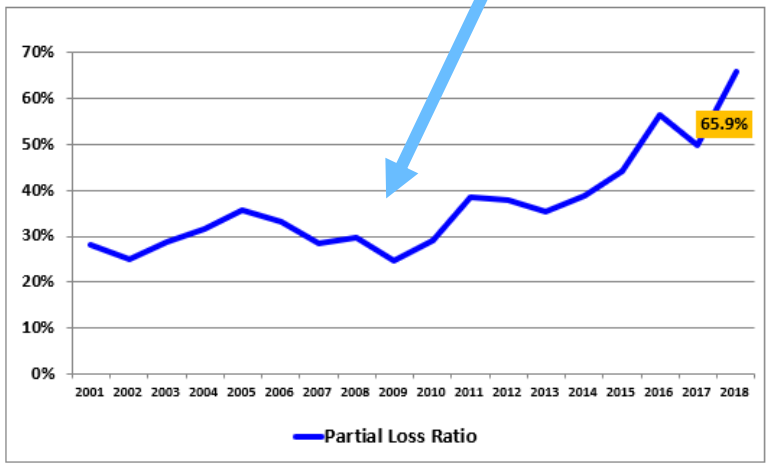
Commercial Auto – State Group X

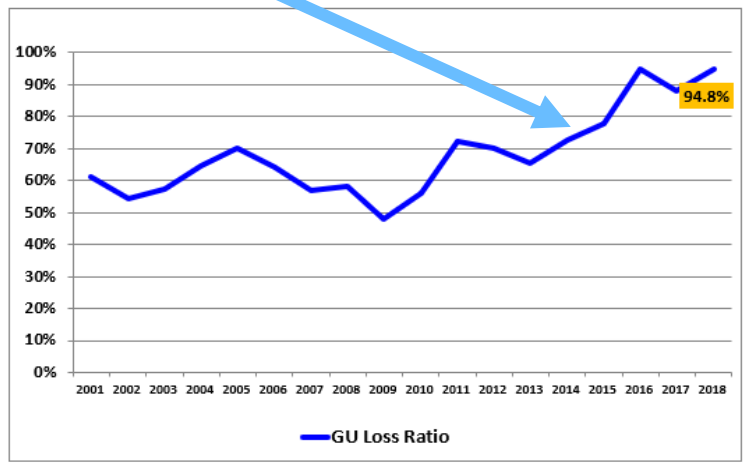
900 x 100 – Partial Loss Ratio (3% detrended)

Illustrative

AY	Ultimate $ Indemnity	Partial Loss %	YTY Change	Ultimate Prem	Ultimate Ground-Up $ Indemnity	Partial Loss Ratio	GU Loss Ratio
2001	54,066,864	46.3%		191,059,192	116,686,784	28.3%	61.1%
2002	45,225,137	45.9%	-11.66%	180,793,117	98,552,188	25.0%	54.5%
2003	50,944,082	50.0%	14.80%	177,408,839	101,956,361	28.7%	57.5%
2004	53,816,571	49.0%	10.80%	169,451,394	109,826,867	31.8%	64.8%
2005	61,515,440	50.8%	12.26%	172,332,265	121,097,403	35.7%	70.3%
2006	62,046,318	51.9%	-7.00%	186,688,815	119,556,003	33.2%	64.0%
2007	56,211,517	50.0%	-14.16%	197,579,830	112,369,319	28.5%	56.9%
2008	58,378,117	51.1%	4.56%	196,128,588	114,311,987	29.8%	58.3%
2009	48,242,594	51.0%	-17.45%	196,359,288	94,609,471	24.6%	48.2%
2010	58,029,818	51.8%	17.89%	200,404,513	112,019,813	29.0%	55.9%
2011	77,515,141	53.4%	33.10%	201,014,022	145,206,125	38.6%	72.2%
2012	79,780,656	53.9%	-2.07%	210,893,915	148,086,826	37.8%	70.2%
2013	84,573,196	54.2%	-6.08%	238,248,803	156,156,005	35.5%	65.5%
2014	94,174,505	53.3%	9.30%	242,577,817	176,581,13	38.8%	72.8%
2015	113,736,42	56.9%	14.18%	256,866,545	199,772,4 2	44.3%	77.8%
2016	145,974 1	59.4%	27.09%	259,204,703	245,943 95	56.3%	94.9%
2017	119,488 257	56.8%	-11.19%	238,984,685	210,33 036	50.0%	88.0%
2018	152,0 8,223	69.5%	31.80%	230,626,271	218,6 ,743	65.9%	94.8%
Total/Average	1,415 747,670	54.4%	9.27%	3,746,622,604	2,601,6 4,954	37.8%	69.4%
	Tr nd 7 year	58.3%	7.93%			47.08%	80.81%
	T end – all year		4.20%				





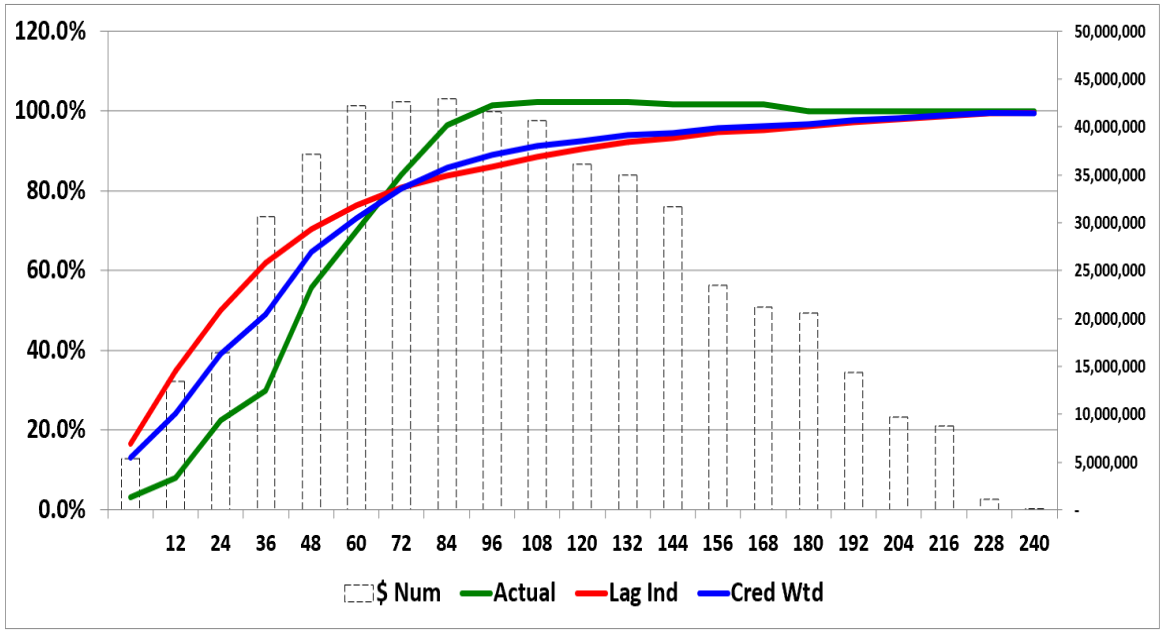


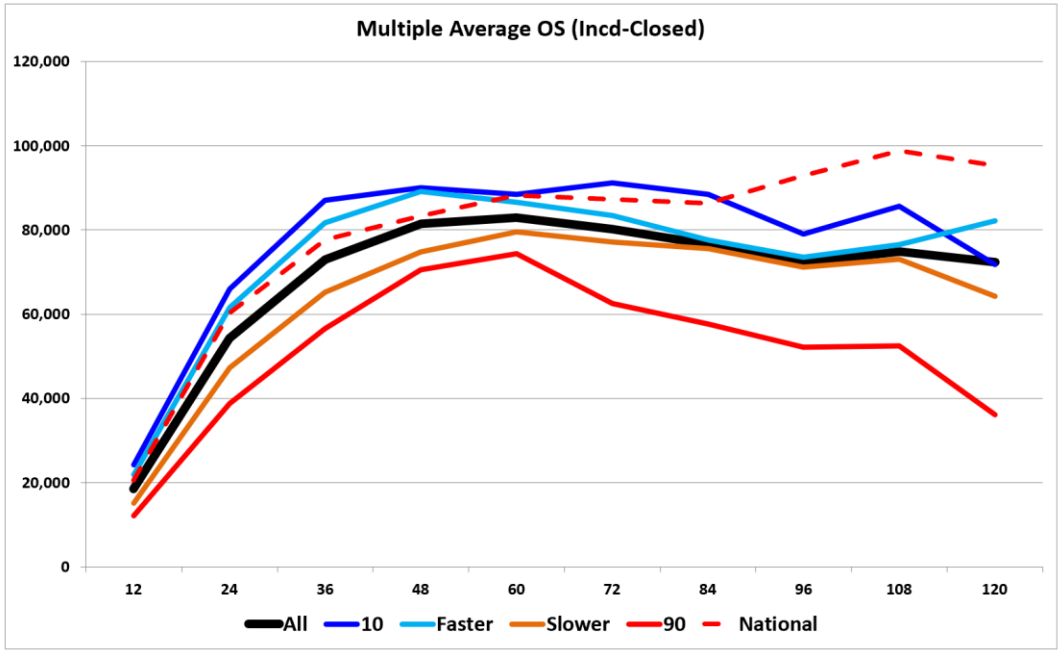
Note: premiums are on-leveled to 12/31/2018 using ISO MWDB Method 2 (new and renewal) indications
additional adjustments for historical changes in deductibles, limits and other exposure adjustments would be required for a full comparison to AS Circular ILF results

Adjusting Case Reserving and Settlement Patterns under Covid - Framework

Review of Reported and Paid, $ and # Settlement Patterns by Company Speed; Introduce 3/6 mo.lags

		12	24	36	48	60	72	84	96	108	120
Medium $	% Reptd - 7-Yr	18.7%	35.6%	52.5%	65.8%	74.0%	79.7%	83.6%	86.6%	89.5%	91.8%
#	% Reptd - 7-Yr	52.9%	67.5%	76.4%	82.0%	85.6%	88.0%	90.5%	92.8%	93.5%	95.4%
$	% Paid - 7-Yr	3.7%	13.3%	27.1%	43.2%	57.8%	67.9%	74.8%	80.5%	84.4%	88.2%
#	% Paid - 7-Yr	28.3%	53.8%	67.5%	75.6%	80.7%	84.0%	87.0%	89.3%	91.5%	93.9%
Slow $	% Reptd - 7-Yr	12.8%	25.7%	39.5%	50.7%	59.1%	66.5%	71.9%	76.3%	81.1%	84.3%
#	% Reptd - 7-Yr	51.5%	63.7%	74.0%	80.0%	83.9%	86.9%	90.2%	94.6%	92.7%	95.6%
$	% Paid - 7-Yr	2.9%	9.9%	20.7%	34.6%	47.2%	55.6%	64.1%	70.1%	75.5%	80.6%
#	% Paid - 7-Yr	21.9%	44.4%	59.9%	68.9%	74.9%	79.0%	83.0%	86.6%	89.9%	93.9%

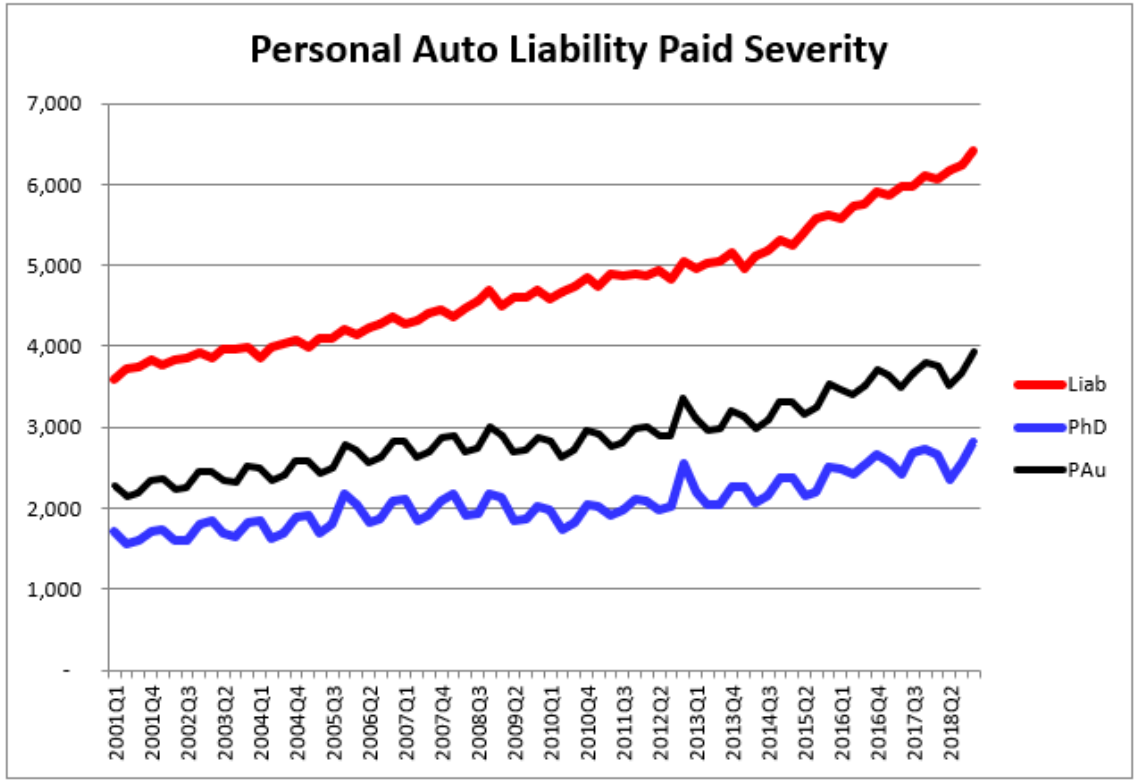


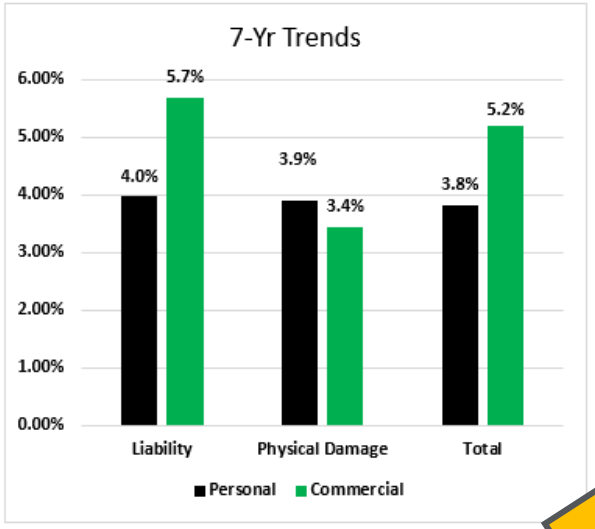


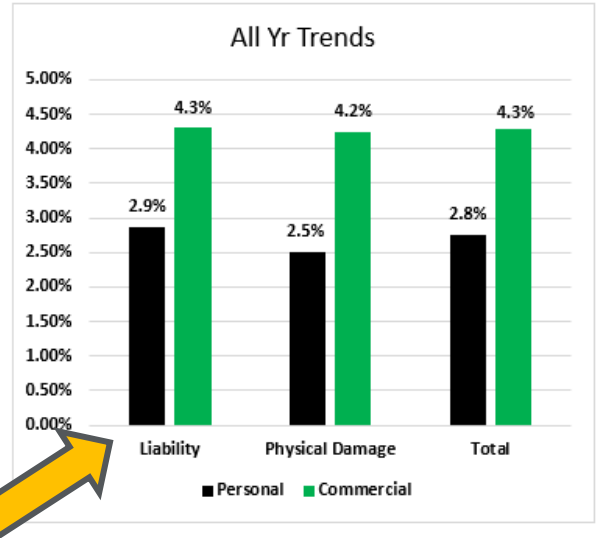
Personal Auto
View at 2019

Personal vs. Commercial Auto – View at 2019

Personal Auto Paid Severity trends tend to be lower than that of Commercial Auto.



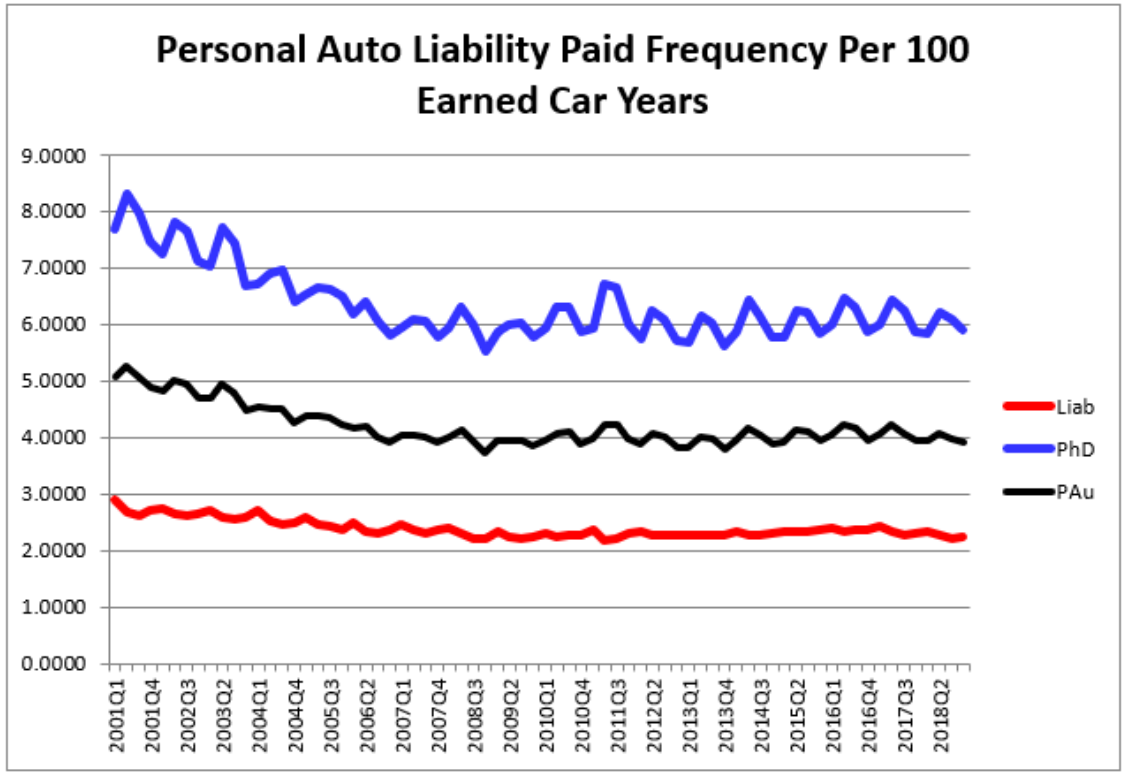


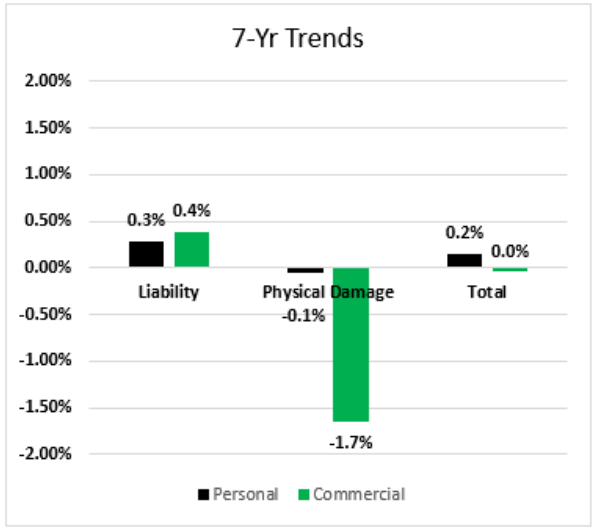


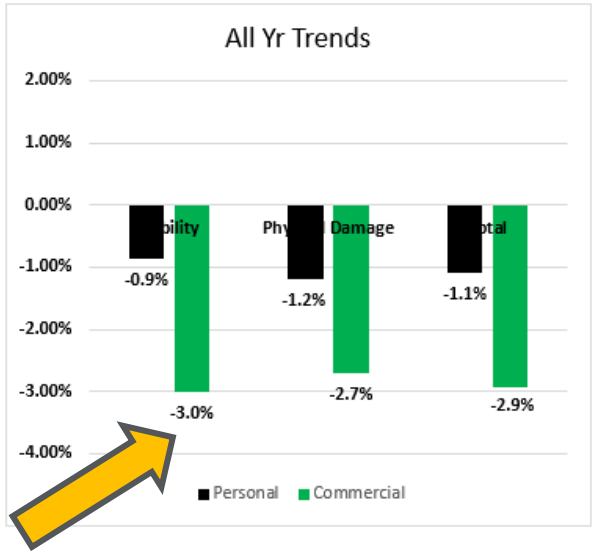
		7 Yr	All Yr
Liability	Personal	3.79%	2.87%
	Commercial	5.69%	4.30%
Physical Damage	Personal	3.91%	2.51%
	Commercial	3.44%	4.24%
Total	Personal	3.83%	2.76%
	Commercial	5.21%	4.29%

Personal vs. Commercial Auto – View at 2019

Personal Auto Paid Frequency trends tend to be higher than that of Commercial Auto, but both sets are relatively flat or negative.



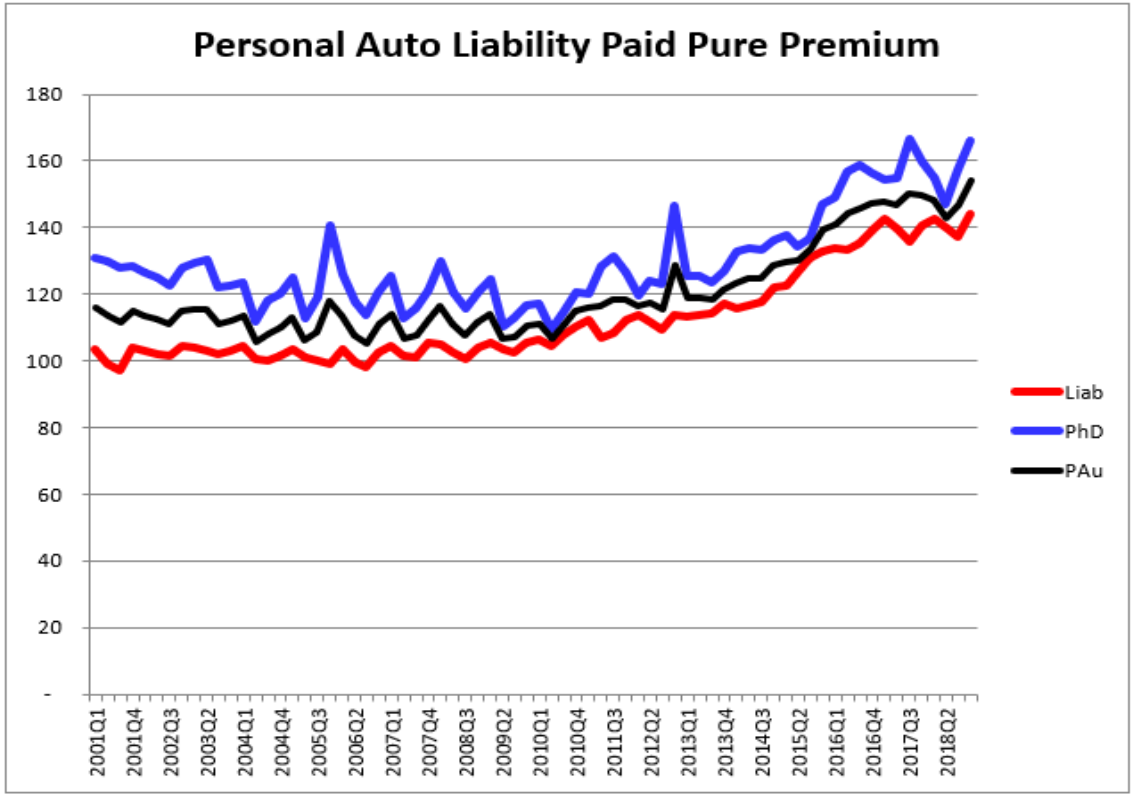


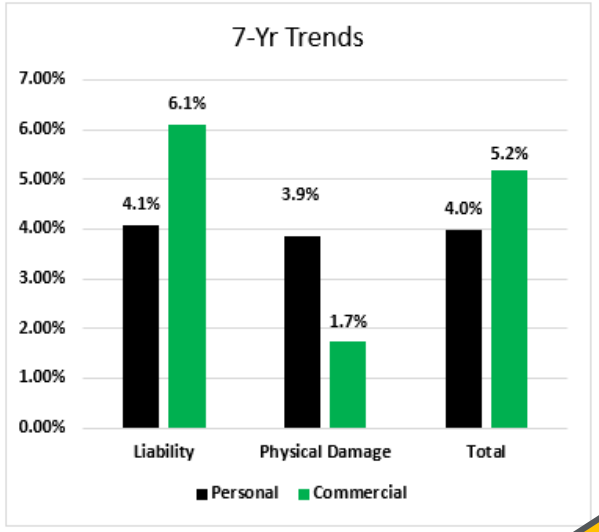


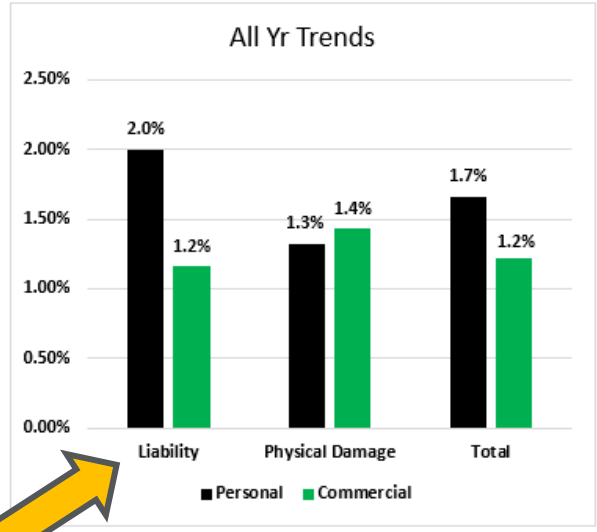
		7 Yr	All Yr
Liability	Personal	0.29%	-0.87%
	Commercial	0.39%	-3.01%
Physical Damage	Personal	-0.06%	-1.20%
	Commercial	-1.65%	-2.70%
Total	Personal	0.15%	-1.10%
	Commercial	-0.04%	-2.94%

Personal vs. Commercial Auto – View at 2019

Personal Auto Pure Premium trends tend to be lower than Commercial Auto in the more recent years, but somewhat higher over all years.







		7 Yr	All Yr
Liability	Personal	4.08%	2.00%
	Commercial	6.10%	1.16%
Physical Damage	Personal	3.85%	1.32%
	Commercial	1.73%	1.43%
Total	Personal	3.98%	1.66%
	Commercial	5.17%	1.22%


Seminar on
Reinsurance
Online Event
June 1-2, 2020

Casualty Actuarial Society Reinsurance Seminar

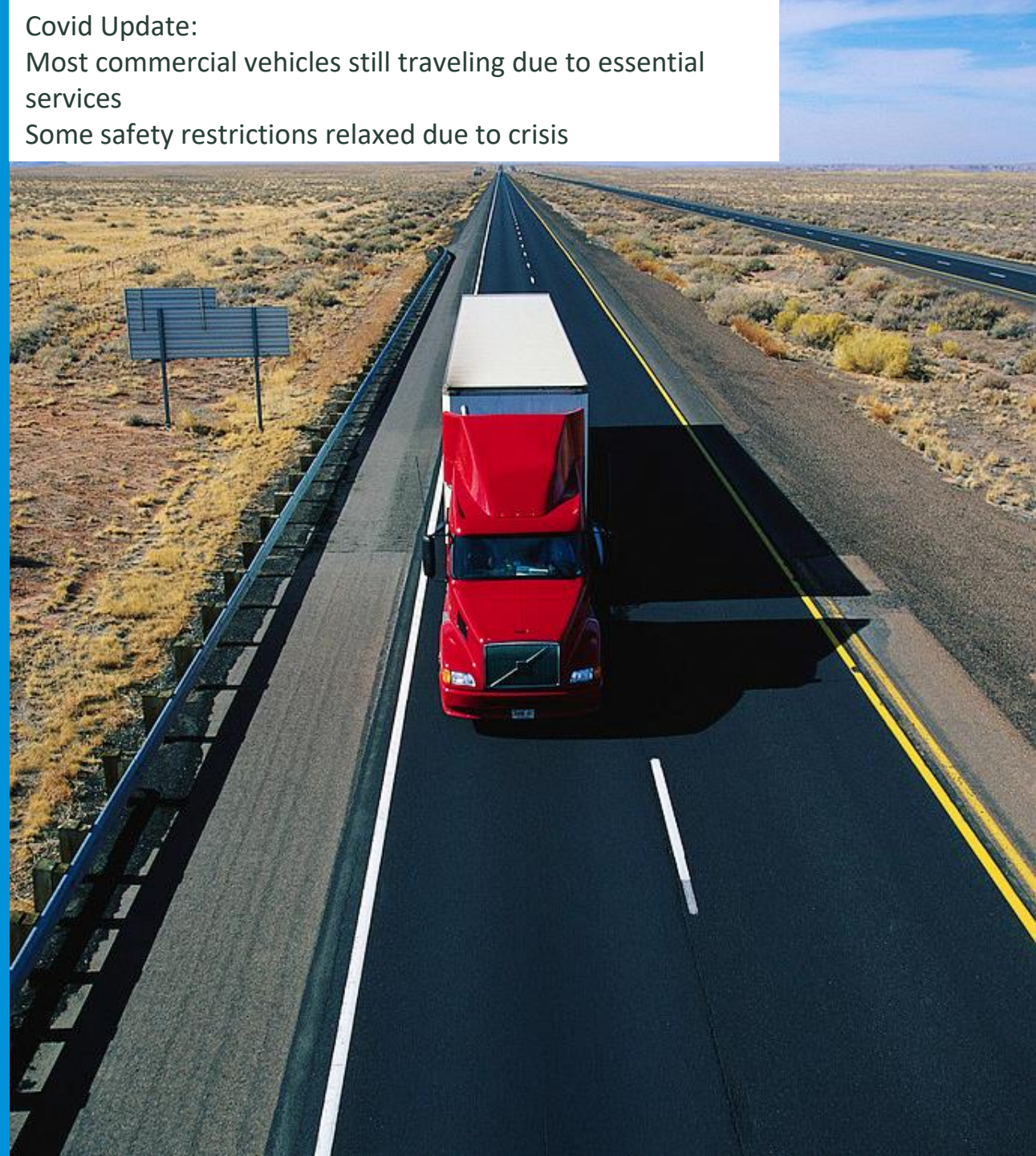
Terry Knull – Team Leader Casualty Treaty Underwriting, Swiss Re North America

State of the Market

General Observations Commercial Auto

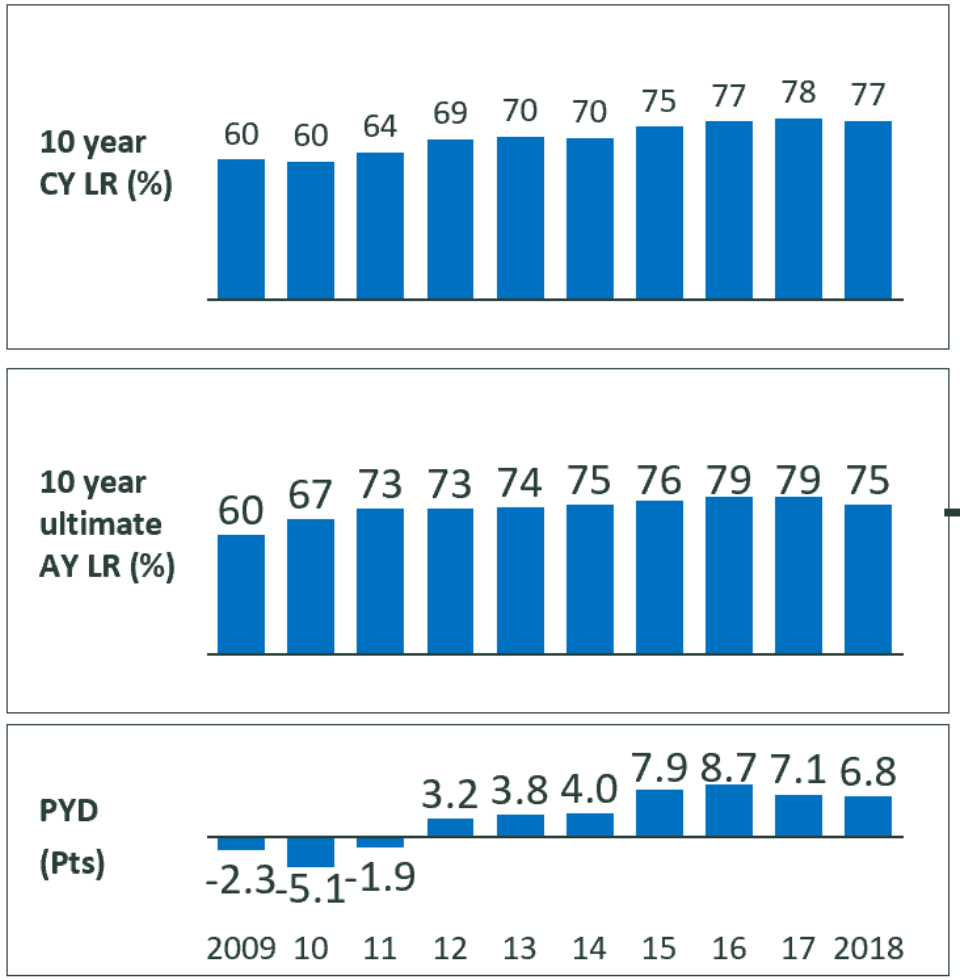
- Elevated loss & comb ratios due to loss trend and adverse development ($1.8B in 2018)
- CAL 2018 Combined ratio @ 108.1%, 8th year in a row above 100%. 2019 is estimated at 107.0%
- Rising rates; high single digits (but not enough)
- Frequency pressure is driven by increased utilization, distracted driving, and driver shortages.
- Plaintiff attorney interest in 8 figure court awards for severe cases, a new litigation revenue stream. This and other forms of social inflation put pressure on severity.
- Technology such as ADAS & cameras will lead to reduction in accidents but take-up is slow
- TNC growth, Uber and Lyft IPOs in 2019

Covid Update:
Most commercial vehicles still traveling due to essential services
Some safety restrictions relaxed due to crisis

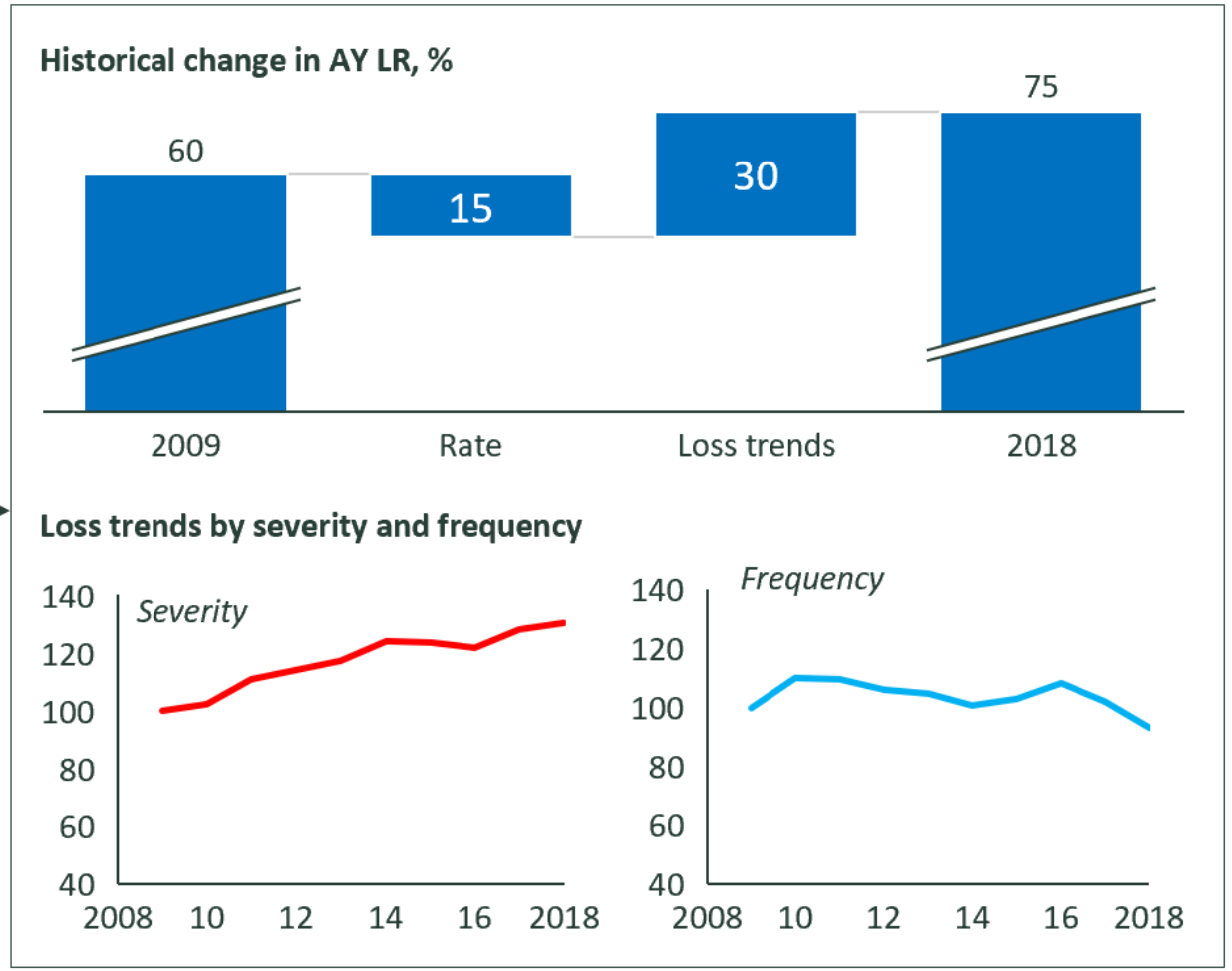


Commercial Auto Market Snapshot

Net Basis



Source: SNL, CIAB, Swiss Re, Conning



General Observations
Personal Auto

- Return to Underwriting profit in 2018 after 10 consecutive years of CR > 100%. CR for 2018 was 97.7%. 2019 is expected to be the same.
- Favorable loss reserve development during CY2018 of over $800 million.
- Price increases slowing due to competition, dominant players (e.g. State Farm) looking to recapture lost market share.
- Vehicle sales slowing leading to lower exposures
- Frequency is improving due to safety features and flattening of miles driven. Severity remains a concern
- Non-standard market showing improvement, but hazard profile remains high (10 year average CR @ 105%)
- Product development is influenced by innovation from tech firms, vehicle manufacturers, ridesharing companies, and now ILS specialists

Covid Update:
Drastic reduction in private passenger transportation
Lower frequency
Premium refunds to policyholders

Key Trends for Casualty

Macro drivers	Impact	Comments
Reserve releases		Reserve releases running out; adverse development for GL, Umbrella, Financial Lines, ? Workers Compensation
Rate trends		Motor rates increases plateaued, WC rates decreasing, and Liability rates up/ momentum increasing
Economic activity		The COVID lockdowns have led to an unprecedented drop in activity. Real GDP is projected to contract 6.4% in 2020 with only a partial rebound next year. The unemployment rate has spiked to post-Depression records and is not expected to reach pre-crisis lows over the forecast horizon
Yield curve		Long tail lines extremely sensitive to investment income; yield curve movements impact profitability. Interest rates projected to remain low for even longer amid economic hit and unprecedented monetary policy actions
Health care costs		As health care costs rise, claim costs increase, some PPACA provisions help keep medical inflation relatively low (vs. historical peaks)
Emerging Risks		Marijuana, Autonomous Vehicles, 3D Printing, Pandemic, Climate change, Opioids, etc…
Loss Trends		Increasing severity due to property events, non-correlated, non-systemic large losses, deep pockets, motor impact on umbrella, temporary frequency reduction due to COVID impact on economy

Trends: Current Auto Drivers

	Environmental Factors	Impact	Comments
	**Reduced gas prices**		**Saudi Arabia and Russia driving the gas price down. COVID-19 shelter in place significantly reducing demand and prices. Consumption expect to rebound later this year with 2021 still at reduced levels compared to 2019.**
	**Unemployment**		**The unemployment rate caused by COVID-19 sky rocketed. It was 4.4% in March and expected to be 15+% in April. The hope is that this is short term and will rebound quickly once there is some resolution of COVID-19. Beware of increased frequency to follow.**
	**Trucking industry**		**COVID-19 crisis has granted temporary latitude for drivers to transport increased size and weight limits (this varies by state). Truck companies are out in full force looking for drivers. Driver shortage has been exacerbated by COVID-19, for a variety of reasons**
	**Distracted Driving**		**Distracted driving continues to be a concern. Data is improving but still not fully reliable.**
	**Slow down of new vehicle sales**		**Vehicle sales are down 34% YOY as of March 31.**
	**Rate Changes**		**Personal lines carriers were having competitive pressure on rates before the Coronavirus. Unclear how premium rebates and future rate filings will be impacted. Will the DOI require rate decreases?**
	**Advanced technology**		**Should lead to fewer accidents. Does this offset distracted driving? Increase in repair costs.**

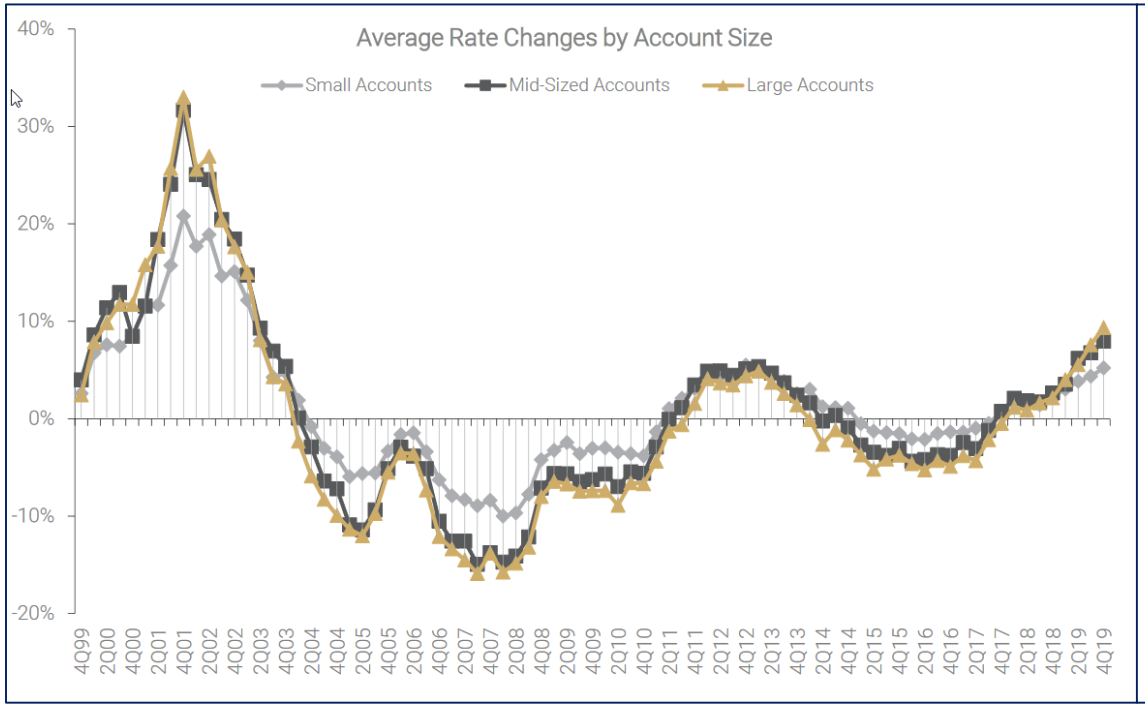
Positive impact on portfolio | Negative impact on portfolio | Neutral impact | Impact uncertain

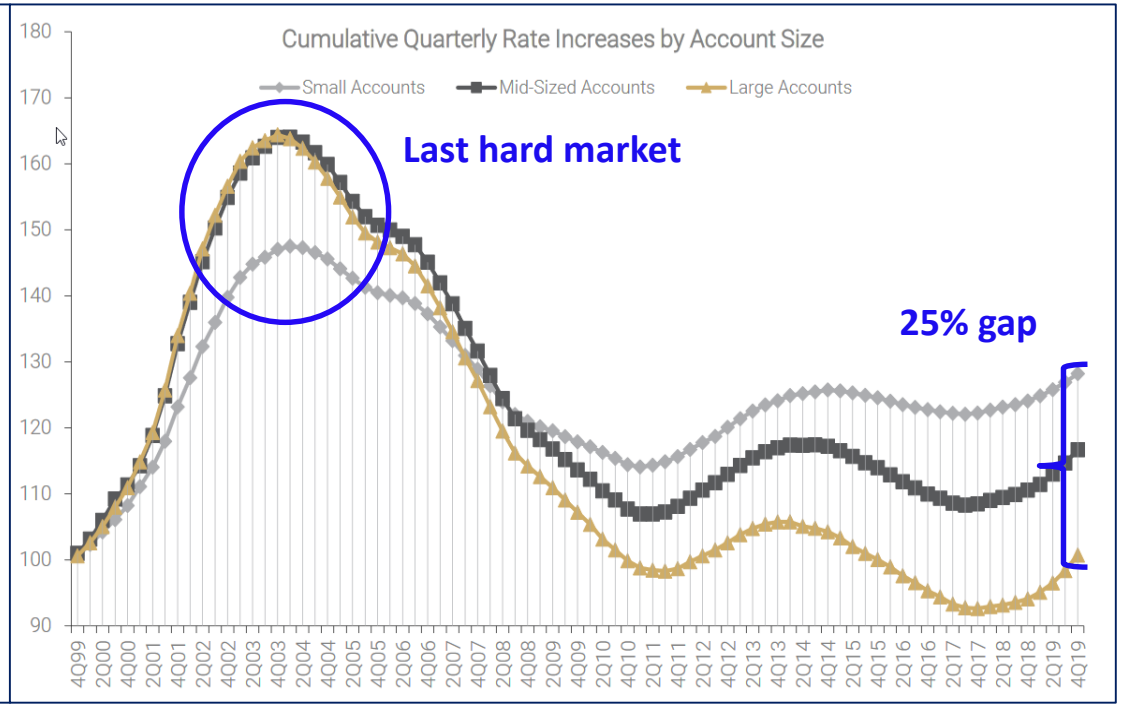
Social Distancing

COVID-19: There are reports that severity is increasing because of more speeding on open roadways.

Although claim counts are down, it may not be for all types of claims

P&C Rate increases for US large and mid-size accounts still below year 2000 level
The most exposed accounts are the least adequately priced





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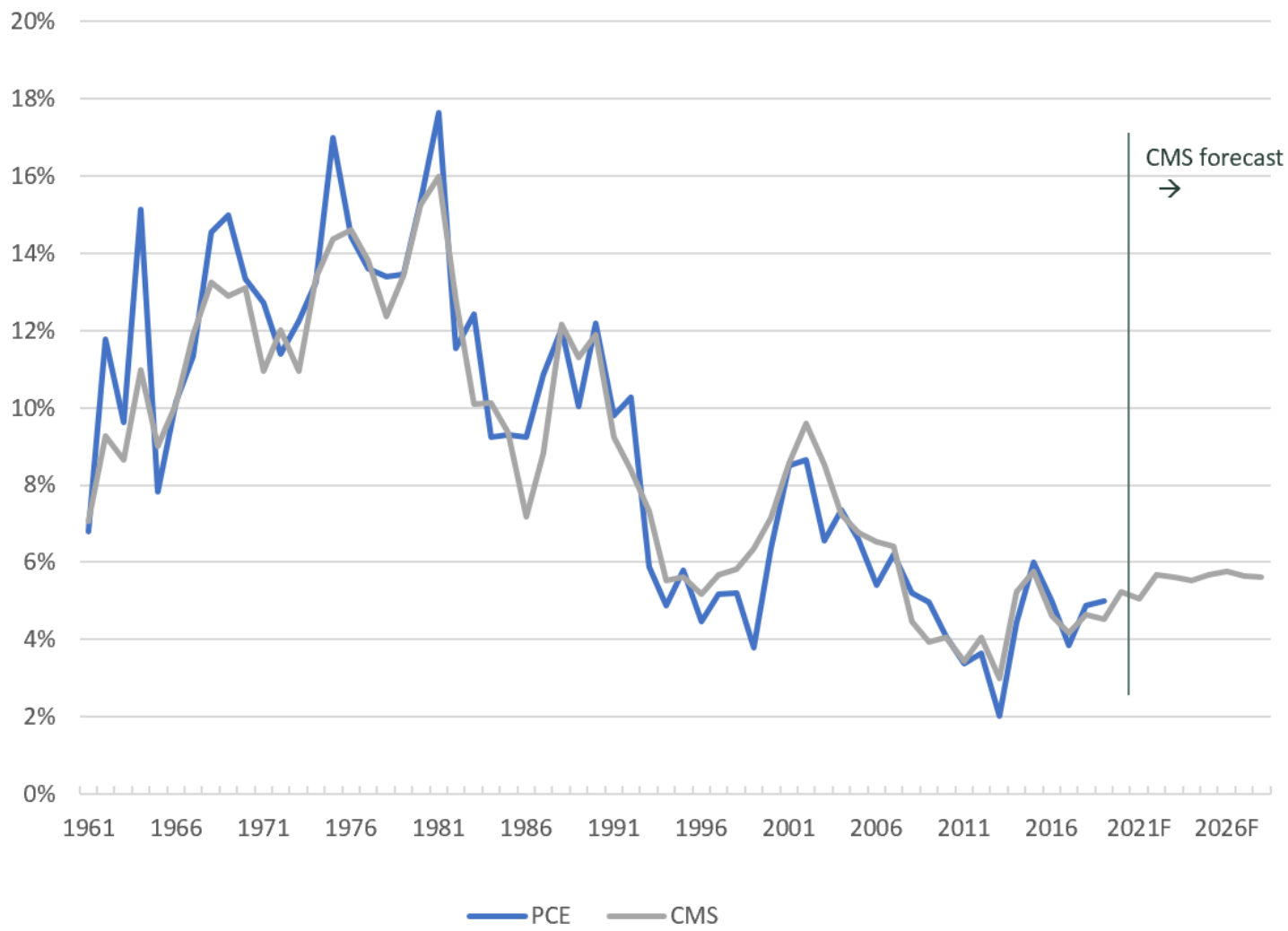
Health spending is a key indicator of Medical Cost Inflation

Medical Inflation drives Bodily Injury loss severity

YoY Growth in Healthcare Spending



Source: Datastream and CMS

Comments & Actions

- PCE = Nominal dollar expenditures (price x quantity) on healthcare as measured by the Personal Consumption Expenditures component of Gross Domestic Product
- CMS = Nominal dollar expenditures on healthcare as measured by the Centers for Medicare and Medicaid Services
- The correlation between the two annual yoy series is 95.3% (1961-2018); on average, historic data shows health expenditure growth for PCE yoy is 0.2% higher than CMS estimates.
- The average CMS projection through 2027 is 5.6%.
- KEY TAKEAWAY
  - After a decade (2001-2011) of declining Health spending levels, yoy growth has increased, partly driven by coverage expansion under ACA after 2014, BUT
  - the projection of 5.6% is lower than the long term average

What is Social Inflation?

- Defined by PLUS as capturing “an increased propensity to sue; rising jury awards and expanding judicial theories beyond the 4 corners of a contract.”
- Rising costs of insurance claims resulting from:
  - Anti-corporate sentiment
  - Growing Wealth and Income gap
  - Increased litigation
  - Broader definitions of liability
  - More plaintiff friendly legal decisions
  - Composition of juries (millennials)
  - Larger compensatory jury awards

Swiss Re's definition of social inflation

The term social inflation generally refers to the increase in compensation costs over and above basic economic trends. These include societal trends such as changing attitudes, expanding concepts of liability, a rising willingness to resolve conflict via the legal system, large defense costs, nuclear verdicts and a generally more plaintiff-friendly environment.

Nay sayers

THE INSURANCE Insider

Reserve deterioration will be 'huge issue' at Q4: Dowling

Bernard Goyder

16/01/2020

Analyst VJ Dowling has predicted that reserve deterioration will be dribbled out by carriers over coming quarters, rather than in a single lump, with negative consequences for insurance valuations.

Speaking at the Insurance Information Institute (III) Joint Industry Forum in New York, Dowling said: "We are going to start seeing a lot more stair-stepping of reserves," following years of optimistic reserving by carriers.

"It's not going to be good for the stocks if that happens," he added.

Reserve calculations are changing as a result of escalating social inflation, with jury awards surging.

Dowling said the increasing number of millennials on juries and the rise of litigation finance were pushing up claims costs. He said social inflation was a "big deal" for insurers in Q2 2019 and will become a "huge issue" during the upcoming Q4 results.

He said social inflation was being used as "an excuse" by companies to "hide from the fact we are going to get reversion to the mean with loss costs".

Since the financial crisis, casualty claims have come in lower than expected, but that trend has now firmly reversed, he explained.

Dowling added that the Sarbanes-Oxley rules make it hard for insurers to pile reserve deterioration into a single quarter, instead causing carriers to portion out reserve strengthening as bad news occurs.

Moreover, because actuaries base models on historical data, those responsible for reserving calculations can be slow to respond to changing circumstances.

Nay sayers

BUSINESS INSURANCE.

Group charges insurance sector with creating fake crisis

Posted On: Mar. 9, 2020 4:08 PM CST

Judy Greenwald

The insurance industry has created a "fake" crisis allegedly generated by high jury awards, although it is enjoying a record surplus, say two consumer organizations, in a report issued Monday.

Insurers have blamed social inflation, the term used to describe rising jury awards and settlements, as one of the principal drivers behind recent increases in insurance prices.

This "overcapitalized industry is already charging many businesses far too much in premiums while threatening even greater increases, all while attempting to create the perception that it is too financially troubled to pay clams," says the report How the Cash-Rich Insurance Industry Fakes Crises and Invents Social Inflation, which was issued by the Washington, D.C.-based Consumer Federation of America and the Center for Justice & Democracy at New York Law School.

CFA

CENTER FOR JUSTICE & DEMOCRACY
CJ&D
at NEW YORK LAW SCHOOL

HOW THE CASH-RICH INSURANCE INDUSTRY FAKES CRISES AND INVENTS SOCIAL INFLATION

By:

J. Robert Hunter, Director of Insurance, Consumer Federation of America

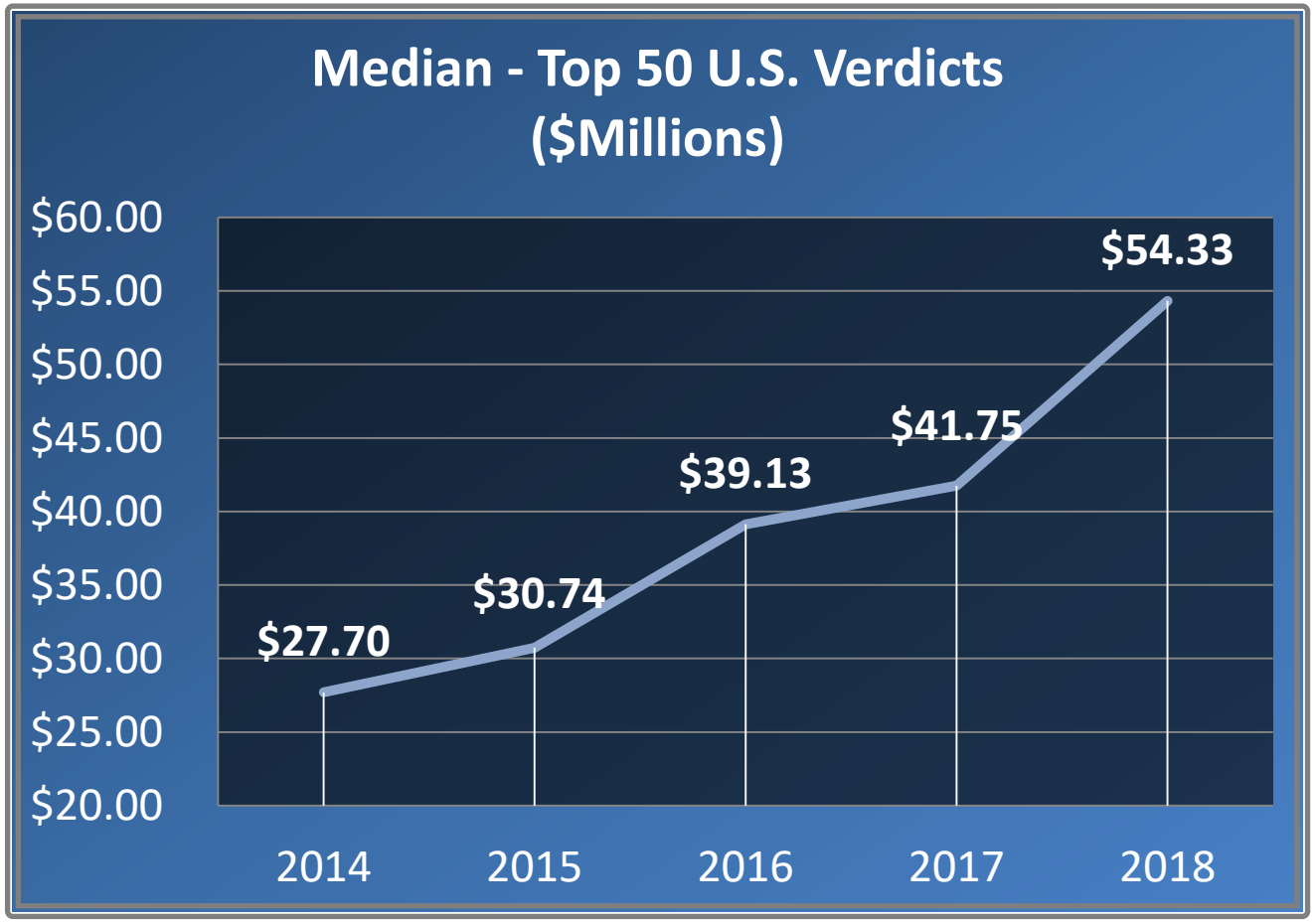
Joanne Doroshow, Executive Director, Center for Justice & Democracy

Douglas Heller, Insurance Expert, Consumer Federation of America

CONSUMER FEDERATION OF AMERICA
CENTER FOR JUSTICE & DEMOCRACY

March 2020

Claims Trend: Top 50 U.S. Verdicts 2014-2018



Data compiled for AIG by Shaub, Ahmuty, Citrin & Spratt

Comments

- Median of the top 50 single plaintiff bodily injury award has almost doubled from 2014 – 2018 due to increasing frequency of severe large losses
- Increase in "pile on litigation", once recalls/investigations are announced, more suits filed by municipalities, investors, consumers, etc.
- Juries desensitized to the value of a dollar and highly publicized mega verdicts are the new normal
- Millennials continue to take leadership roles in jury deliberations (studies indicate median awards from millennial juries are double prior historical awards)
- Juries discount facts on liability apportionment and are sympathetic to severely injured plaintiffs
- Plaintiff's bar very coordinated, share strategies rapidly & efficiently, and spending more on legal advertising and marketing than ever before
- Reptile theory & Kardashian effect continue unabated
- Health Hazard & Medical device verdicts continue to drive the increasing awards
- The anti-corporation movement gained momentum after such scandals as Enron and the financial crisis of 2007-2008, juries take this bias to the courtroom
- Litigation funding has quadrupled between 2013 – 2016 increasing the volume of legal actions

How did we get here?

Kardashian Effect

Celebrities and reality shows expose "normal" people to lavish wealth and upscale lifestyles.

Unrealistic expectations of earnings; unrealistic expectations for lost wages and/or damages.

If celebs/athletes make this much, why can't I?
No such thing as "gross wealth" to public anymore. *Juries are numb to the value of money.*

Reptile Theory

Plaintiff lawyers trigger survival-based thinking in juries to "protect" the individual *and their community*

Courtroom becomes a public forum to protect safety of all – the *public* is at risk

Safety should be primary concern and expectation that (large) companies should protect **every** citizen from harm

Juror views that large corporations are at fault for societal and environmental harms

Nuclear Verdicts

Juries continue to award damages even when the facts of the case prove that the defendant was not at fault

Huge verdicts can occur in rural areas that are economically depressed

Plaintiffs bar (1) focuses on defendants with the deepest pockets and (2) share tactics in order to maximize verdicts

Social Inflation

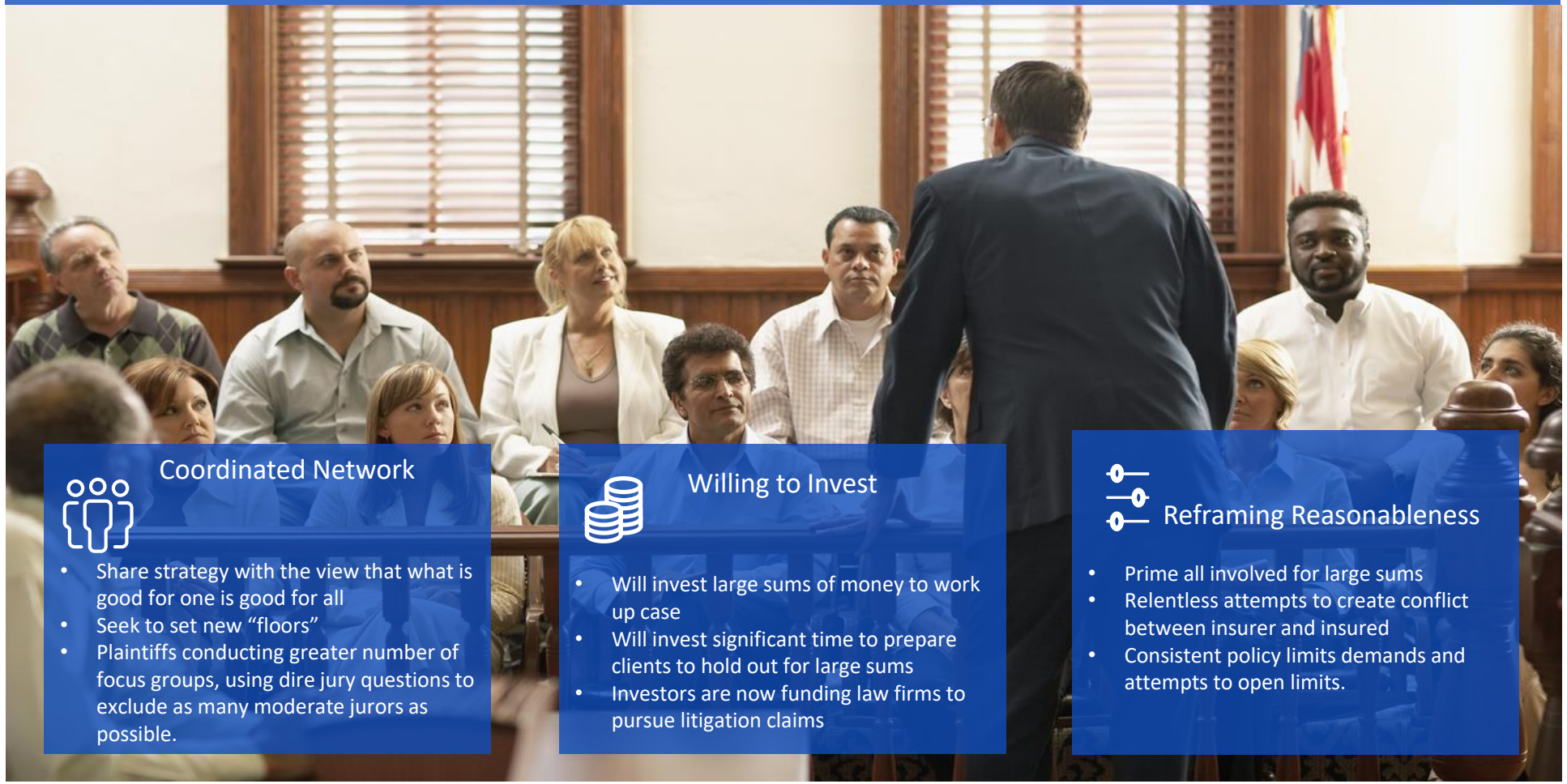
All three combine to allow juries to enact "social justice" with their findings.

We are starting to see verdicts that are legally inexplicable, but are setting case law for the future.

Defense attorneys must disrupt these verdicts by planning for, and disputing the gut instinct of juries.

It is no longer enough to disprove legal liability, defense attorneys must now disprove malicious intent.

Why are nuclear verdicts happening?
The Plaintiff's Bar



Coordinated Network

- Share strategy with the view that what is good for one is good for all
- Seek to set new "floors"
- Plaintiffs conducting greater number of focus groups, using dire jury questions to exclude as many moderate jurors as possible.

Willing to Invest

- Will invest large sums of money to work up case
- Will invest significant time to prepare clients to hold out for large sums
- Investors are now funding law firms to pursue litigation claims

Reframing Reasonableness

- Prime all involved for large sums
- Relentless attempts to create conflict between insurer and insured
- Consistent policy limits demands and attempts to open limits.

What about the role of juries?

45% of jurors admit sympathy affects their attitudes about a lawsuit

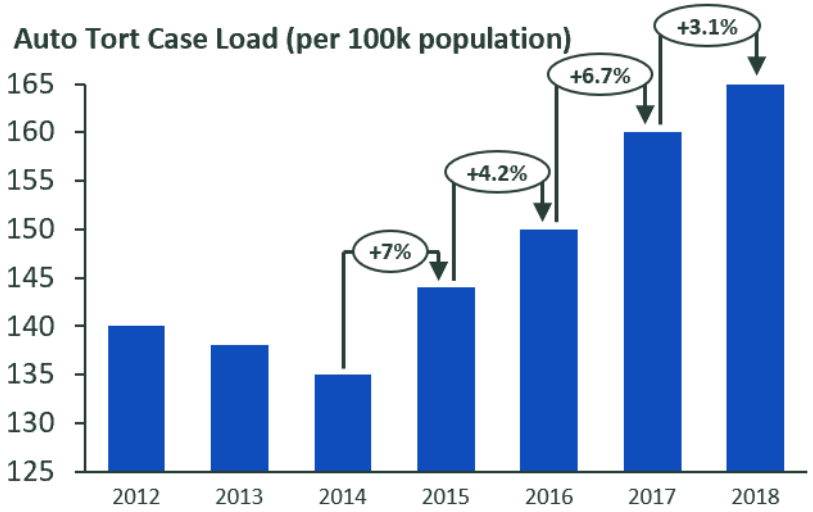
42% of jurors would decide a case based *not on the law* but on what they believe is fair

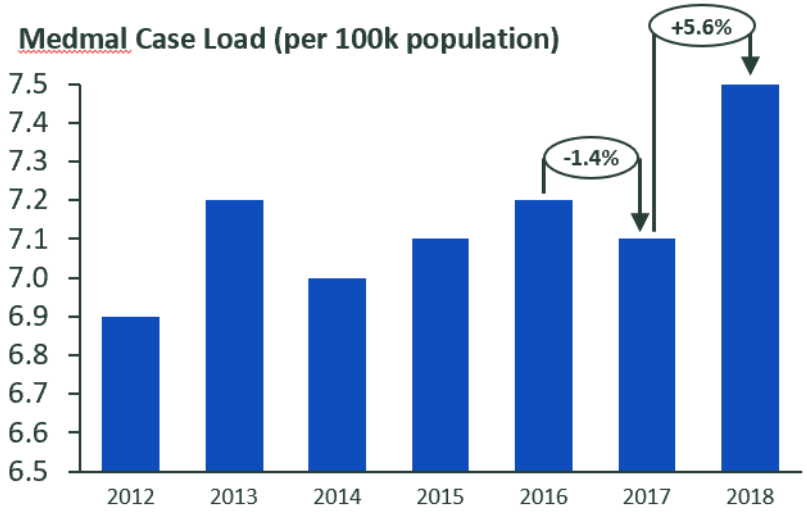
35% of jurors would add lawyer fees to a damages award, *even if instructed not to*

72% would assume a case has merit if it "makes it to a courtroom"

Millennial juries tend to be more socially conscious, sympathetic to injured plaintiffs, and significantly more likely to award damages and hold corporations to a higher standard than past generations.

Auto tort cases in state courts have strongly increased between 2014 and 2018

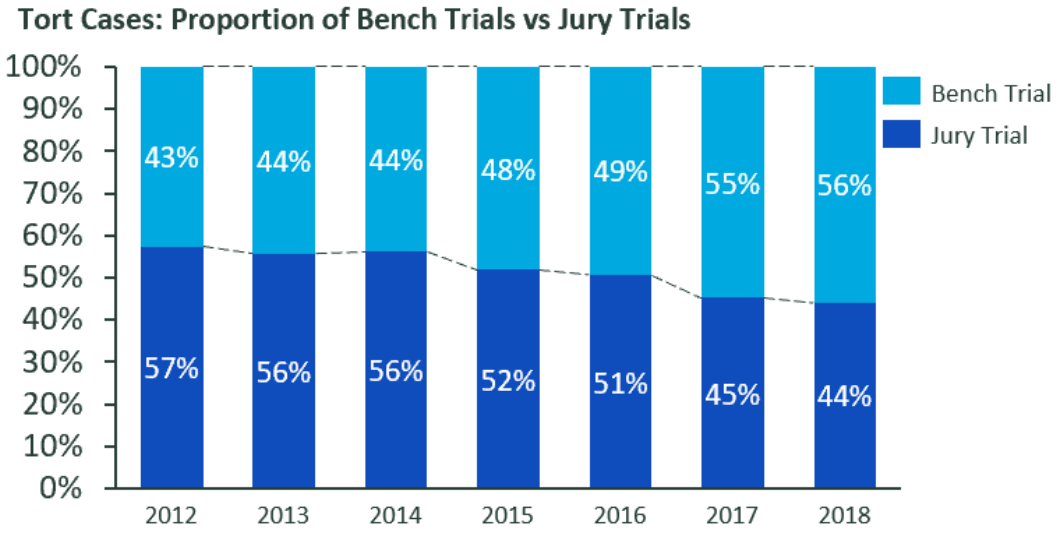


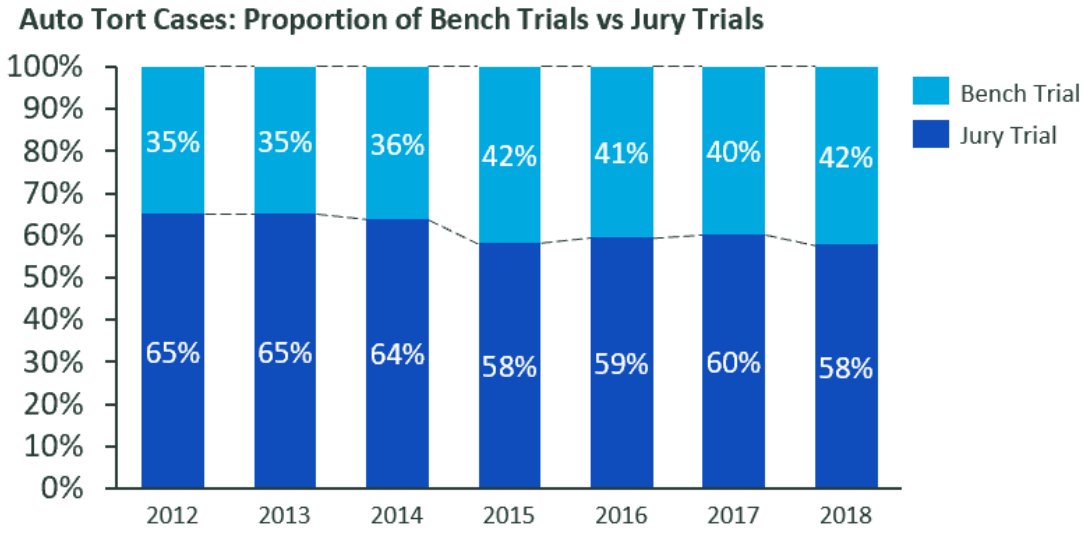


- Auto tort cases filed with US state courts have seen a significant uptick starting in 2014 (22% increase from 2014 to 2018)
- Medmal cases experienced a spike of 5.6% from 2017 to 2018 after having more moderately increased in the preceding years.

Source: Court Statistics Project http://www.courtstatistics.org/
State basis: 14 states with at least 6 years of reporting (2012 missing for some states) - AK/CT/IA/KS/MI/NE/NH/NJ/PA/PR/SC/TX/WA/WI

Shift from jury to bench trials in state courts



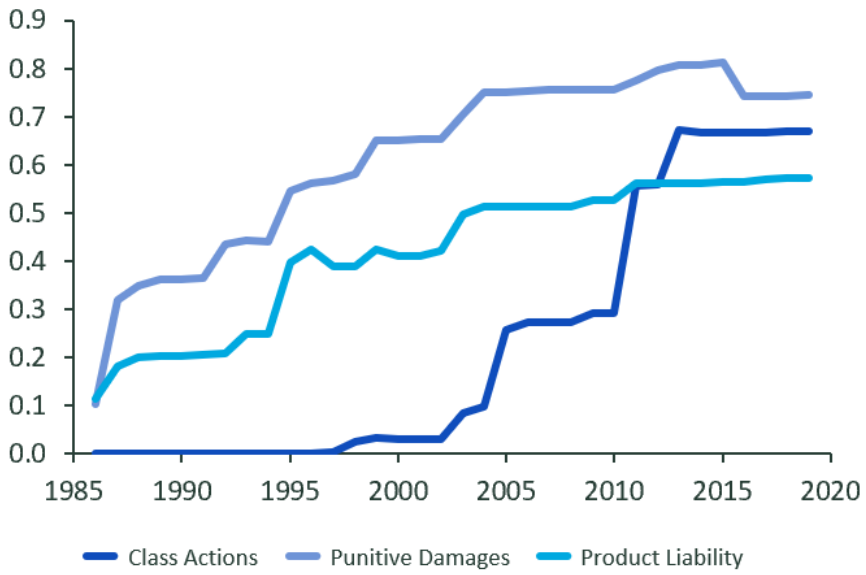


- We observe a shift from Jury trials to Bench trials for tort cases
- The shift is less pronounced for auto tort cases where still more cases end in jury trials than bench trials

Source: Court Statistics Project http://www.courtstatistics.org/
State basis (all tort): 16 states with at least 6 years of reporting (2012 missing for some states) – AK/FL/HI/KS/KY/MI/MN/MO/NV/NJ/NY/OH/SC/TX/WA
State basis (auto tort): 16 states with at least 6 years of reporting (2012 missing for some states) – AK/FL/HI/IA/KS/MI/MN/NE/NV/NJ/NY/PR/SC/TX/WA/WI

Tort reform – little activity in recent years

Proportion of states having enacted ATRA supported reforms



- Hardly any ATRA-supported tort reform has been enacted since 2013 for class actions, punitive damages or product liability.
- To the contrary, several states have struck down punitive damage reforms as unconstitutional (Illinois, Kentucky and Missouri)

Source: American Tort Reform Association (ATRA) - http://www.atra.org/resources/tort-reform-records/
The graph shows the proportion of states that have enacted ATRA supported reforms since 1986. Reforms prior to 1986 are not tracked.

Trends: Key Trends we see for the Future

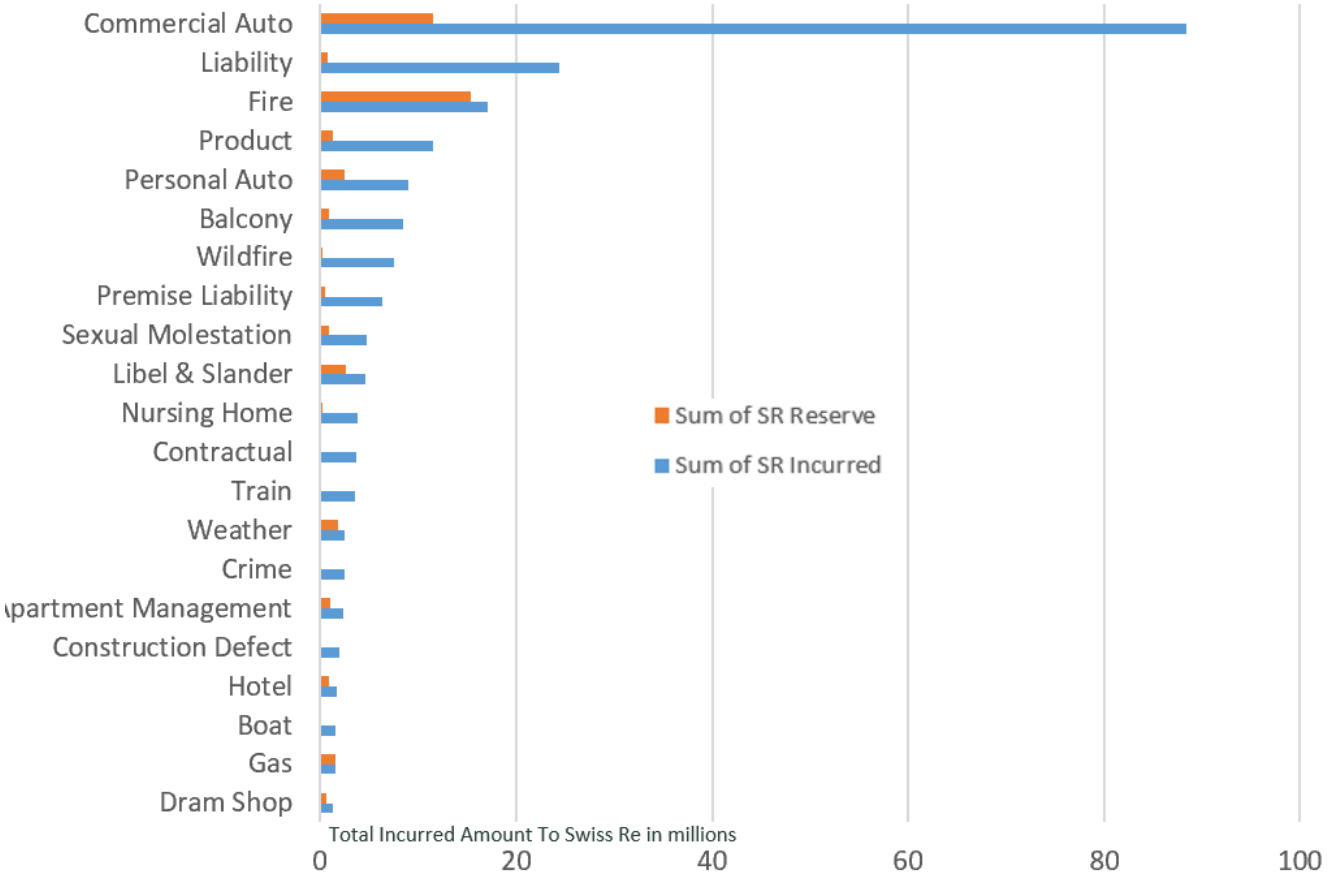
Environmental Factors	Expected Impact	Comments
Plaintiff attorney focus on motor and nuclear verdicts	↓	Plaintiff's bar focus on traditional bodily injury. De-sensitized & anti-corporate juries are driving increase in large losses. Possibility Millennials will make up more of the juries the remainder of the year as older people stay home because of COVID-19.
Distracted Driving	→	Distracted Driving is expected to continue. However, smartphone penetration has little room to increase and vehicle cockpit innovations continue to be prevalent. This puts frequency at an elevated level, but not necessarily increasing anymore.
Telematics adoption & usage based insurance	→	Poised for rapid growth in the U.S. Continued improvement in cost, convenience, and effectiveness.
Safety Innovation & Autonomous Vehicles	↑	Accident avoidance systems common in new vehicles. AEB (automating emergency braking) targeted 100% by 2022. High autonomous vehicles expected in maybe a decade (not full autonomous). Average age of vehicle is increasing, new tech will trickle down to the population, delaying full benefits.
Ride Sharing	?	Real-time algorithms are making this very efficient. Potential for multiple customers to the same destination. Implications are huge for less congestion, fewer drunk drivers, and less pollution.
Soaring repair costs	↓	Safety innovations and increase in autonomous features are driving up cost to replace or repair vehicle.
Medical inflation	↓	Strong increases in the cost of hospital services and prescription drugs. Same problems exist in healthcare with inefficiencies and utilization rather than prevention. As of Q4 2019, healthcare inflation was 5.3% (the average before the 08 collapse was 6%)
Marijuana	↗	DC and 11 states legal for recreational use with more to come. Conflicting studies on whether frequency is increased permanently.

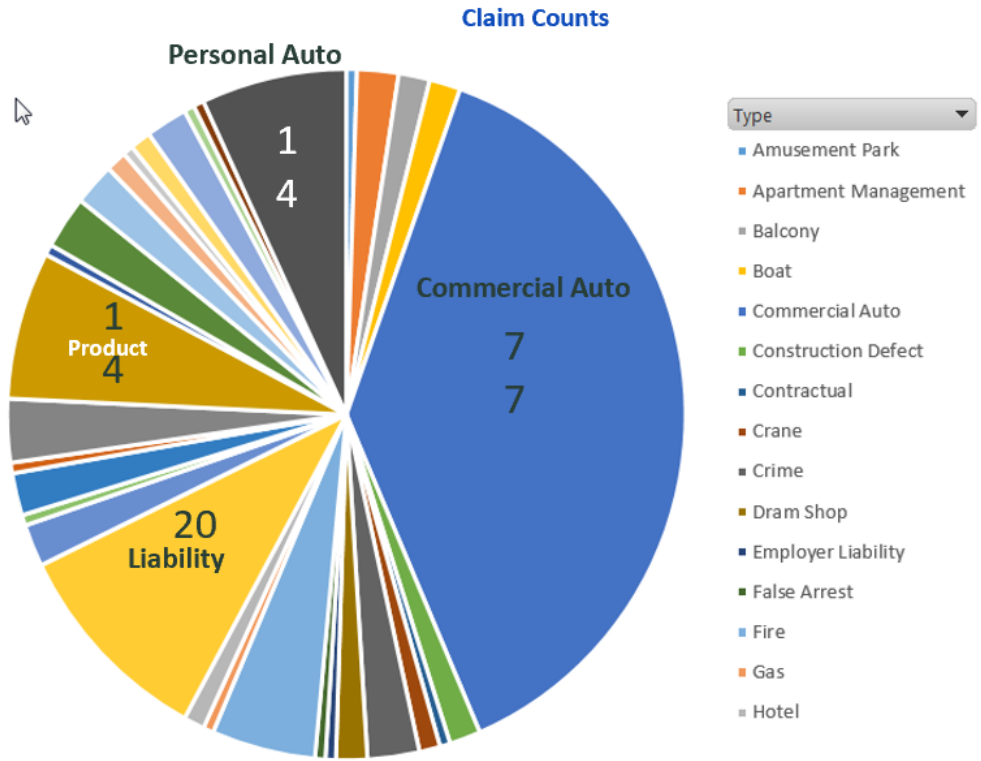
↑ Positive impact on portfolio ↓ Negative impact on portfolio → Neutral impact ? Impact uncertain

COVID-19: Driving behavior may change forever. More acceptance of work from home.
It might speed up the use of telematics and mileage based pricing.

Motor loss impact on Umbrella is Significant

Top 200 Umbrella XOL losses (2010-2017)





40% (count) and 43% (total incurred) of our largest 200 Umbrella XOL losses are from Commercial Auto

Ultimate Loss Ratios – Industry Booked vs Projected

Commercial Auto Liability

09-19 Excl AmTrust		Schedule P Industry Booked Ultimate Loss Ratios - Commercial Auto Liability											Swiss Re Actuarial Projections				
Accident Year	Earned Premium (000s)	As of 12	As of 24	As of 36	As of 48	As of 60	As of 72	As of 84	As of 96	As of 108	As of 120	(Adv)/ Fav from 12 to Current	Reported Loss Ratio	Paid Method	Reported Method	Selected	Carried - Selected
1997	12,188,203	77.8%	78.3%	79.9%	81.8%	83.5%	83.9%	83.9%	83.7%	83.8%	83.7%	-5.9%					
1998	12,093,751	77.0%	78.7%	81.8%	85.2%	86.4%	86.8%	86.5%	86.4%	86.1%	86.1%	-9.1%					
1999	11,992,467	78.5%	83.7%	88.0%	91.3%	92.6%	92.5%	92.8%	92.6%	92.4%	92.4%	-13.9%					
2000	12,870,674	77.3%	80.8%	84.2%	86.6%	88.0%	88.9%	88.6%	88.5%	88.5%	88.4%	-11.1%					
2001	13,900,917	73.3%	73.2%	75.7%	77.6%	78.7%	78.2%	77.9%	77.9%	77.6%	77.5%	-4.2%					
2002	15,724,627	66.6%	64.9%	66.4%	66.9%	66.9%	66.8%	66.4%	66.3%	66.1%	66.0%	0.6%					
2003	17,429,980	63.6%	61.5%	61.1%	61.2%	60.8%	60.5%	60.2%	59.9%	59.8%	59.7%	3.9%					
2004	18,711,968	61.5%	58.6%	58.2%	57.9%	57.3%	57.4%	56.9%	56.8%	56.7%	56.7%	4.9%					
2005	19,121,586	60.8%	59.1%	58.3%	58.2%	57.8%	57.5%	57.1%	57.0%	56.8%	56.7%	4.1%					
2006	19,041,946	61.6%	59.8%	59.2%	58.9%	58.3%	57.8%	57.8%	57.7%	57.5%	57.5%	4.1%					
2007	18,899,073	61.9%	61.1%	60.9%	60.7%	60.1%	60.2%	60.0%	59.9%	59.8%	59.7%	2.2%					
2008	17,884,154	62.4%	61.4%	61.3%	61.0%	61.0%	60.9%	60.9%	60.8%	60.8%	60.7%	1.7%					
2009	16,739,915	62.7%	60.5%	60.4%	60.1%	60.2%	60.0%	59.9%	59.7%	59.7%	59.7%	2.9%					
2010	15,864,610	64.7%	64.9%	65.9%	66.8%	67.5%	67.7%	67.5%	67.3%	67.3%	67.4%	-2.6%	67.1%	67.4%	67.4%	67.4%	**0.0%**
2011	15,941,869	65.6%	68.3%	70.0%	71.0%	72.4%	72.5%	72.4%	72.5%	72.6%		-7.0%	72.1%	72.6%	72.6%	72.6%	**0.0%**
2012	16,339,409	66.2%	68.2%	69.6%	71.7%	72.5%	72.6%	72.6%	72.6%			-6.5%	71.9%	72.6%	72.6%	72.6%	**0.0%**
2013	17,459,867	65.6%	67.2%	70.6%	72.7%	73.5%	73.5%	73.9%				-8.2%	73.0%	73.9%	73.9%	73.9%	**0.0%**
2014	18,552,623	65.3%	68.5%	71.6%	73.2%	74.5%	74.8%					-9.5%	73.5%	75.2%	75.2%	75.2%	**-0.4%**
2015	19,803,697	66.2%	70.0%	72.8%	74.7%	76.0%						-9.8%	74.0%	76.8%	76.9%	76.8%	**-0.8%**
2016	20,443,983	69.3%	72.2%	75.2%	77.9%							-8.6%	73.0%	79.5%	79.6%	79.5%	**-1.6%**
2017	21,430,109	70.7%	72.9%	76.2%								-5.5%	66.6%	79.9%	80.0%	80.0%	**-3.8%**
2018	24,863,191	69.7%	72.8%									-3.2%	54.6%	78.1%	78.4%	78.2%	**-5.4%**
2019	27,680,318	70.9%											37.1%	73.4%	77.2%	75.3%	**-4.4%**

- Since AY 2010, industry booked loss ratios are higher than the initial projection as of 12 months.
- Every AY year from 2010 to 2018 had adverse devt. in CY 2019.
- 2018 Premium level increase is due in part to US tax reform (less intragroup, offshore cessions)
- Premium levels in 2019 are up 11%. Even so, early chain ladder indications point to adverse development.

Loss Ratio for Combined Ratio of 100 = *64.6%*

Δ vs 12	< -5.0%	< -3.8%	< -2.5%	< -1.3%		> 1.3%	> 2.5%	> 3.8%	> 5.0%

Heat Map range (input) +/- : **5%**

2010-2019 Total Ind Reserves	38,367,910
2010-2019 Reserve Red/ (Def)	(3,954,249)
2010-2018 Prior Yr Devt	(2,473,006)

Ultimate Loss Ratios – Industry Booked vs Projected

Personal Auto Liability

		Schedule P Ultimate Loss Ratio Selections - Private Passenger Auto Liability											Actuarial Projections			
Accident Year	Earned Premium (000s)	As of 12	As of 24	As of 36	As of 48	As of 60	As of 72	As of 84	As of 96	As of 108	As of 120	(Adv)/ Fav from 12 to Current	Paid Method	Reported Method	Selected	Carried - Selected
1997	68,239,065	72.9%	70.4%	69.5%	69.1%	68.9%	68.8%	68.8%	68.8%	68.8%	68.8%	4.1%				
1998	68,901,300	71.5%	70.3%	70.1%	69.8%	69.8%	69.8%	69.8%	69.7%	69.8%	69.8%	1.7%				
1999	68,836,544	75.0%	74.9%	74.8%	74.9%	74.8%	74.8%	74.8%	74.9%	74.8%	74.8%	0.2%				
2000	69,147,087	79.0%	79.4%	79.6%	79.7%	79.7%	79.8%	79.8%	79.8%	79.9%	79.9%	-0.9%				
2001	72,567,709	78.4%	78.0%	77.8%	77.9%	78.1%	78.0%	78.0%	78.0%	78.0%	78.0%	0.4%				
2002	79,248,275	76.0%	75.1%	74.7%	74.8%	74.7%	74.6%	74.5%	74.5%	74.5%	74.5%	1.5%				
2003	86,800,351	71.0%	68.7%	67.8%	67.6%	67.4%	67.4%	67.3%	67.2%	67.2%	67.2%	3.9%				
2004	91,906,472	67.8%	65.2%	64.3%	63.9%	63.6%	63.5%	63.5%	63.4%	63.4%	63.4%	4.4%				
2005	94,278,316	67.1%	64.8%	64.1%	63.8%	63.5%	63.4%	63.2%	63.2%	63.2%	63.2%	3.9%				
2006	95,333,340	65.8%	65.0%	64.5%	64.1%	63.7%	63.5%	63.5%	63.4%	63.4%	63.4%	2.4%				
2007	94,735,725	68.8%	68.4%	67.9%	67.5%	67.1%	66.9%	66.9%	66.8%	66.8%	66.8%	2.0%				
2008	93,293,839	69.4%	68.8%	68.1%	67.6%	67.3%	67.2%	67.1%	67.1%	67.1%	67.1%	2.3%				
2009	93,336,052	72.9%	72.0%	71.2%	70.7%	70.4%	70.5%	70.5%	70.4%	70.4%	70.4%	2.5%				
2010	95,292,721	73.5%	72.4%	71.6%	71.5%	71.3%	71.4%	71.3%	71.2%	71.2%	71.2%	2.3%	71.3%	71.3%	71.3%	**-0.1%**
2011	98,157,391	72.1%	70.8%	70.7%	70.7%	70.6%	70.5%	70.5%	70.5%	70.5%		1.6%	70.5%	70.5%	70.5%	**0.0%**
2012	100,636,845	71.5%	70.8%	70.7%	70.6%	70.5%	70.4%	70.4%	70.4%			1.1%	70.4%	70.4%	70.4%	**0.0%**
2013	101,545,356	72.5%	72.3%	72.4%	72.5%	72.3%	72.2%	72.2%				0.2%	72.3%	72.2%	72.3%	**0.0%**
2014	116,823,393	65.8%	66.1%	66.4%	66.4%	66.2%	66.1%					-0.3%	66.2%	66.1%	66.2%	**0.0%**
2015	114,209,842	72.9%	74.5%	75.0%	75.1%	75.1%						-2.2%	75.4%	75.1%	75.2%	**-0.2%**
2016	121,334,359	75.1%	75.7%	76.0%	76.1%							-1.1%	76.6%	76.1%	76.3%	**-0.2%**
2017	130,585,644	72.3%	71.7%	71.8%								0.5%	71.9%	71.4%	71.7%	**0.1%**
2018	141,446,071	69.4%	69.2%									0.3%	68.8%	68.4%	68.6%	**0.6%**
2019	146,164,596	70.4%											68.9%	69.2%	69.1%	**1.3%**

- Since AY 2012, Industry booked loss ratios are not consistently higher than the initial projection as of 12 months.
- Every AY year from 2010 to 2018 exhibits only modest development in CY 2019.
- 2018 Premium level increase is due in part to US tax reform (less intragroup, offshore cessions)
- Premium levels in 2019 are up 3%.

Loss Ratio for Combined Ratio of 100 = 64.6%

Δ vs 12	< -5.0%	< -3.8%	< -2.5%	< -1.3%		> 1.3%	> 2.5%	> 3.8%	> 5.0%

2010-19 Reserve Redundancy/ (Deficiency)

= 2,111,694 1.7%

Ultimate Loss Ratios – Industry Booked vs Projected

Other Liability Occurrence – (Mostly Excludes Professional and D&O)

09-19 Excl AmTrust		Schedule P Industry Booked Ultimate Loss Ratios - Other Liability: Occurrence											Swiss Re Actuarial Projections				
Accident Year	Earned Premium (000s)	As of 12	As of 24	As of 36	As of 48	As of 60	As of 72	As of 84	As of 96	As of 108	As of 120	(Adv)/ Fav from 12 to Current	Reported Loss Ratio	Paid Method	Reported Method	Selected	Carried - Selected
1997	12,399,909	80.9%	81.5%	82.5%	81.1%	82.0%	83.8%	83.3%	84.7%	86.3%	87.5%	-6.6%					
1998	13,182,174	82.3%	83.0%	85.6%	88.5%	91.6%	91.2%	95.3%	97.9%	98.7%	99.0%	-16.7%					
1999	12,278,962	79.1%	81.0%	82.8%	89.0%	91.7%	95.5%	99.9%	101.9%	101.9%	105.4%	-26.2%					
2000	12,308,791	79.2%	79.6%	84.2%	90.2%	96.4%	98.2%	99.0%	100.3%	100.6%	101.0%	-21.8%					
2001	12,969,558	89.4%	91.0%	91.6%	94.7%	98.7%	100.7%	102.1%	101.5%	102.2%	102.8%	-13.4%					
2002	17,331,029	72.1%	71.8%	73.9%	77.0%	78.5%	79.0%	79.1%	79.6%	80.3%	80.8%	-8.7%					
2003	22,093,965	69.3%	66.3%	66.1%	65.2%	63.6%	62.9%	62.9%	63.1%	62.7%	62.3%	7.0%					
2004	25,655,794	68.3%	60.8%	57.9%	55.9%	54.8%	54.6%	53.9%	53.4%	52.9%	52.9%	15.4%					
2005	25,637,314	65.5%	61.5%	59.6%	56.6%	55.9%	54.8%	53.9%	53.5%	53.2%	53.6%	11.9%					
2006	28,381,175	63.9%	61.9%	58.6%	57.1%	56.1%	54.5%	53.9%	52.8%	52.3%	52.2%	11.7%					
2007	28,083,816	66.1%	63.7%	61.9%	61.9%	60.3%	60.0%	58.6%	57.8%	57.5%	57.2%	8.9%					
2008	26,287,610	67.3%	65.6%	65.5%	62.8%	62.5%	61.6%	60.8%	60.0%	59.7%	59.6%	7.6%					
2009	24,817,098	69.1%	68.4%	66.2%	63.9%	63.0%	61.8%	61.0%	61.3%	60.5%	60.4%	8.7%					
2010	23,159,755	68.4%	68.0%	67.9%	66.4%	66.0%	65.3%	65.3%	64.5%	64.4%	64.5%	3.9%	60.6%	64.5%	64.5%	64.5%	**0.0%**
2011	22,944,250	67.0%	67.0%	67.2%	67.0%	66.9%	67.2%	66.6%	66.4%	66.8%		0.2%	62.0%	66.8%	66.8%	66.8%	**0.0%**
2012	24,094,289	64.8%	64.7%	64.1%	64.6%	64.5%	64.9%	64.4%	64.5%			0.3%	58.8%	64.6%	64.5%	64.5%	**0.0%**
2013	25,852,430	62.3%	61.7%	62.4%	63.7%	63.4%	63.4%	63.7%				-1.4%	57.5%	64.7%	64.4%	64.4%	**-0.7%**
2014	28,100,614	61.7%	61.1%	62.8%	62.0%	62.8%	64.2%					-2.5%	55.7%	66.7%	65.1%	65.1%	**-0.9%**
2015	28,946,170	61.6%	63.6%	63.1%	64.2%	66.7%						-5.1%	55.7%	72.3%	70.2%	71.3%	**-4.5%**
2016	29,186,378	63.7%	64.1%	65.0%	66.7%							-3.0%	48.5%	70.2%	69.3%	69.7%	**-3.1%**
2017	29,601,342	63.3%	64.9%	67.0%								-3.7%	40.7%	69.9%	72.5%	71.2%	**-4.2%**
2018	35,764,839	64.4%	65.6%									-1.1%	28.0%	74.1%	70.3%	72.2%	**-6.7%**
2019	38,037,782	66.5%											15.1%	85.0%	75.4%	75.4%	**-8.8%**

- Since AY 2013, Industry booked loss ratios are higher than the initial projection as of 12 months.
- Every AY year from 2010 to 2018 had adverse devt. in CY 2019.
- 2018 Premium level increase is due in part to US tax reform (less intragroup, offshore cessions)
- Premium levels in 2019 are up 6%. Even so early chain ladder indications show adverse development.

Loss Ratio for Combined Ratio of 100 = *62.3%*

Δ vs 12	< -5.0%	< -3.8%	< -2.5%	< -1.3%		> 1.3%	> 2.5%	> 3.8%	> 5.0%

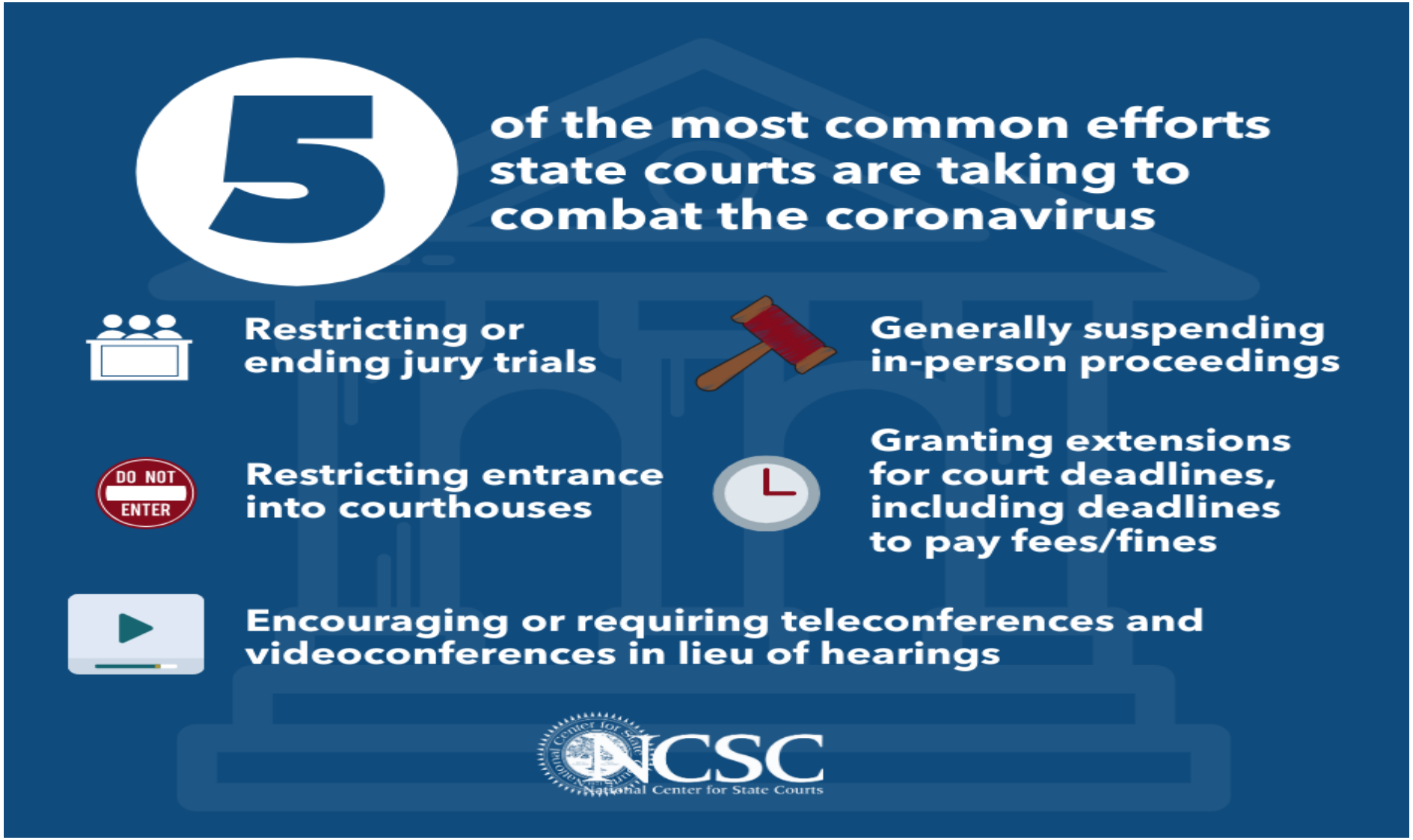
Heat Map range (input) +/- : **5%**

2010-2019 Total Ind Reserves	79,073,926
2010-2019 Reserve Red/ (Def)	(9,632,014)
2010-2018 Prior Yr Devt	(2,821,666)

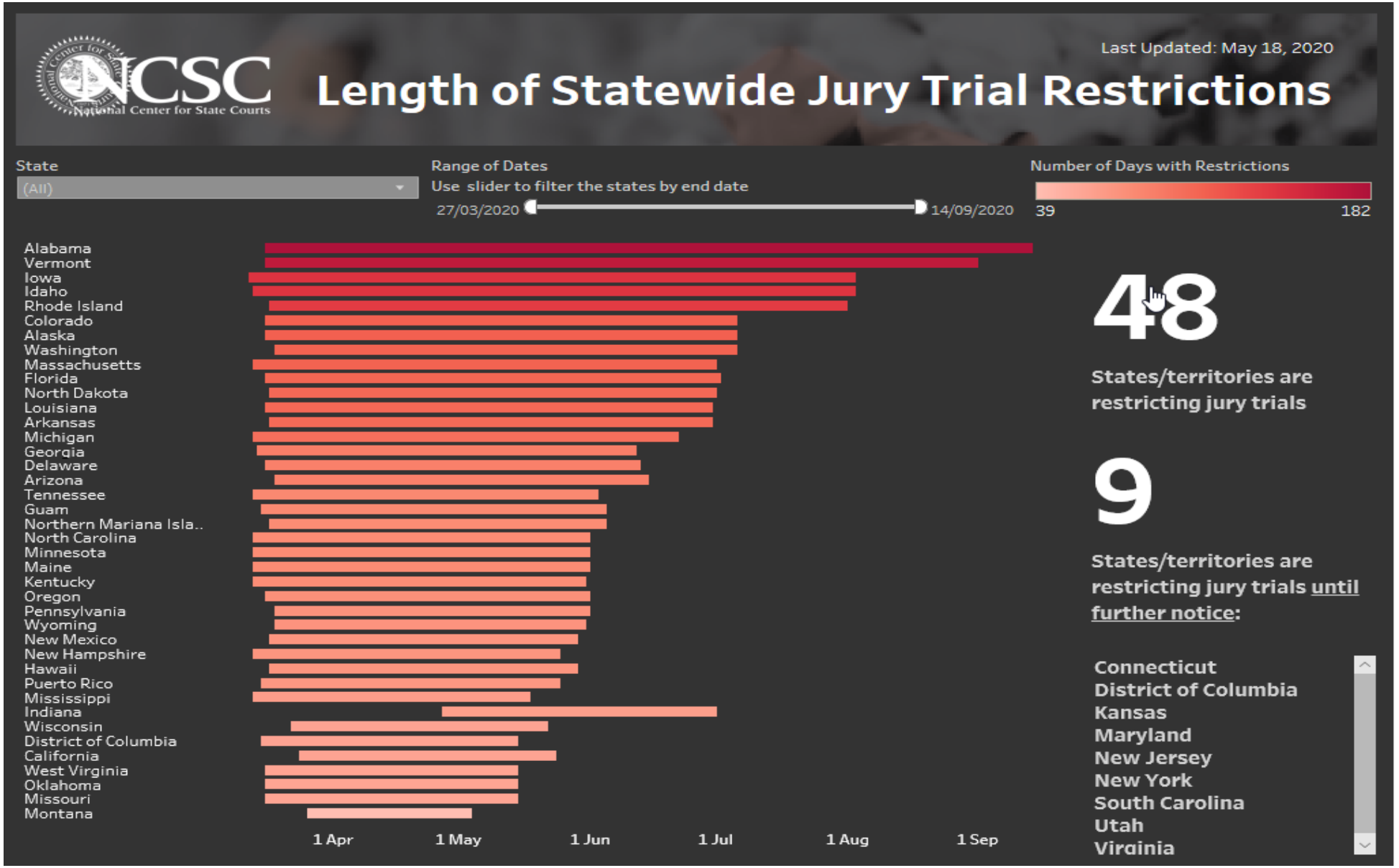
COVID-19: Frustrating or ameliorating social inflation?

- Most experts predict **same or increased** levels of social inflation
- Why?
- Frustration with large corporations not taking ‘adequate’ precautions on behalf of employees
- Blending frustration with government actions with corporations: reducing workforce, employment, ‘little man’ loses
- Frustration and increased sense of fear, lack of control, powerlessness, identification with victim mentality, finding villains

What about the Court System during COVID-19

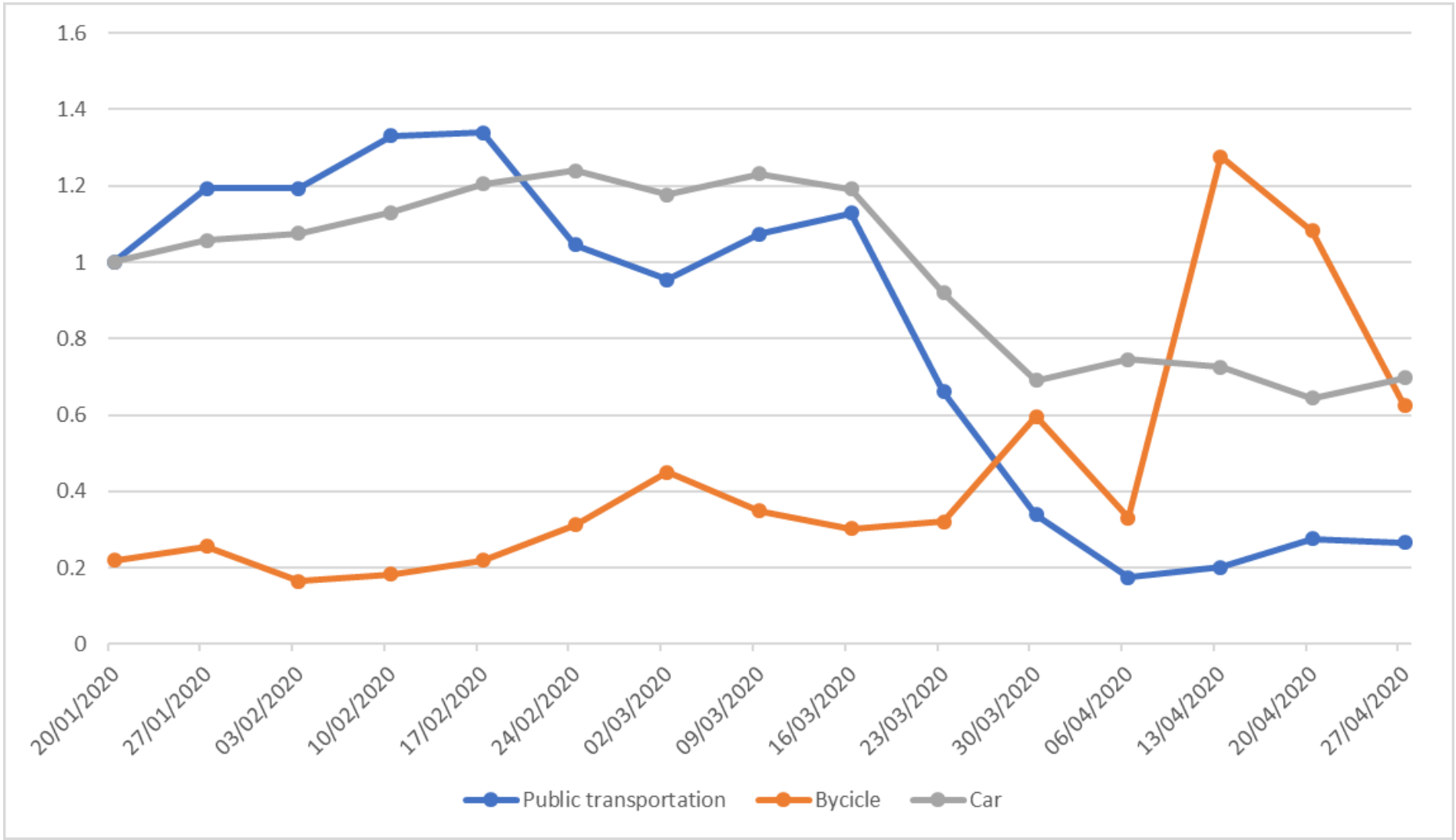


What about the Court System during COVID-19



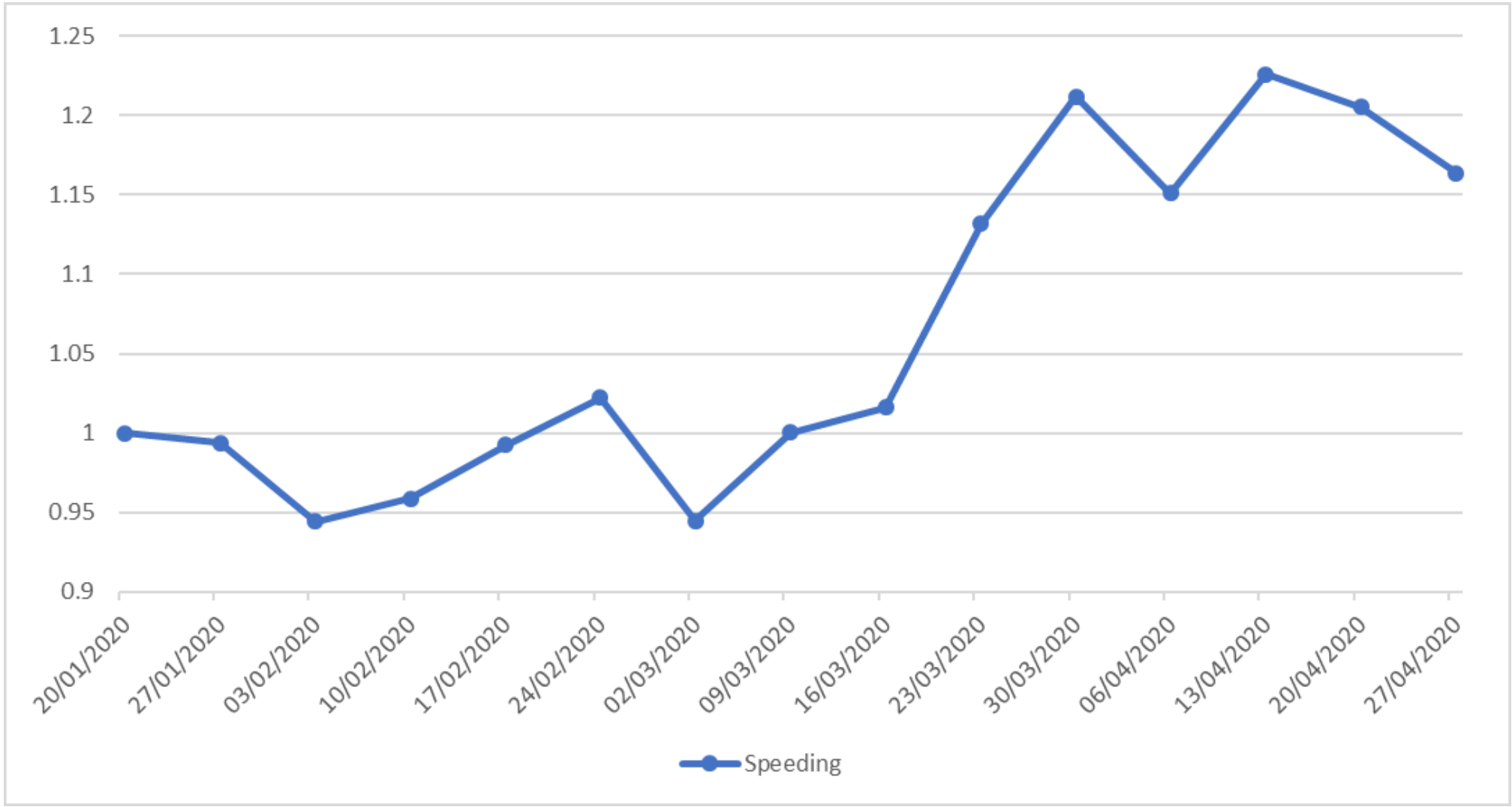
COVID-19 Impact on Modes of Transportation

Swiss Re Data (mostly Europe)



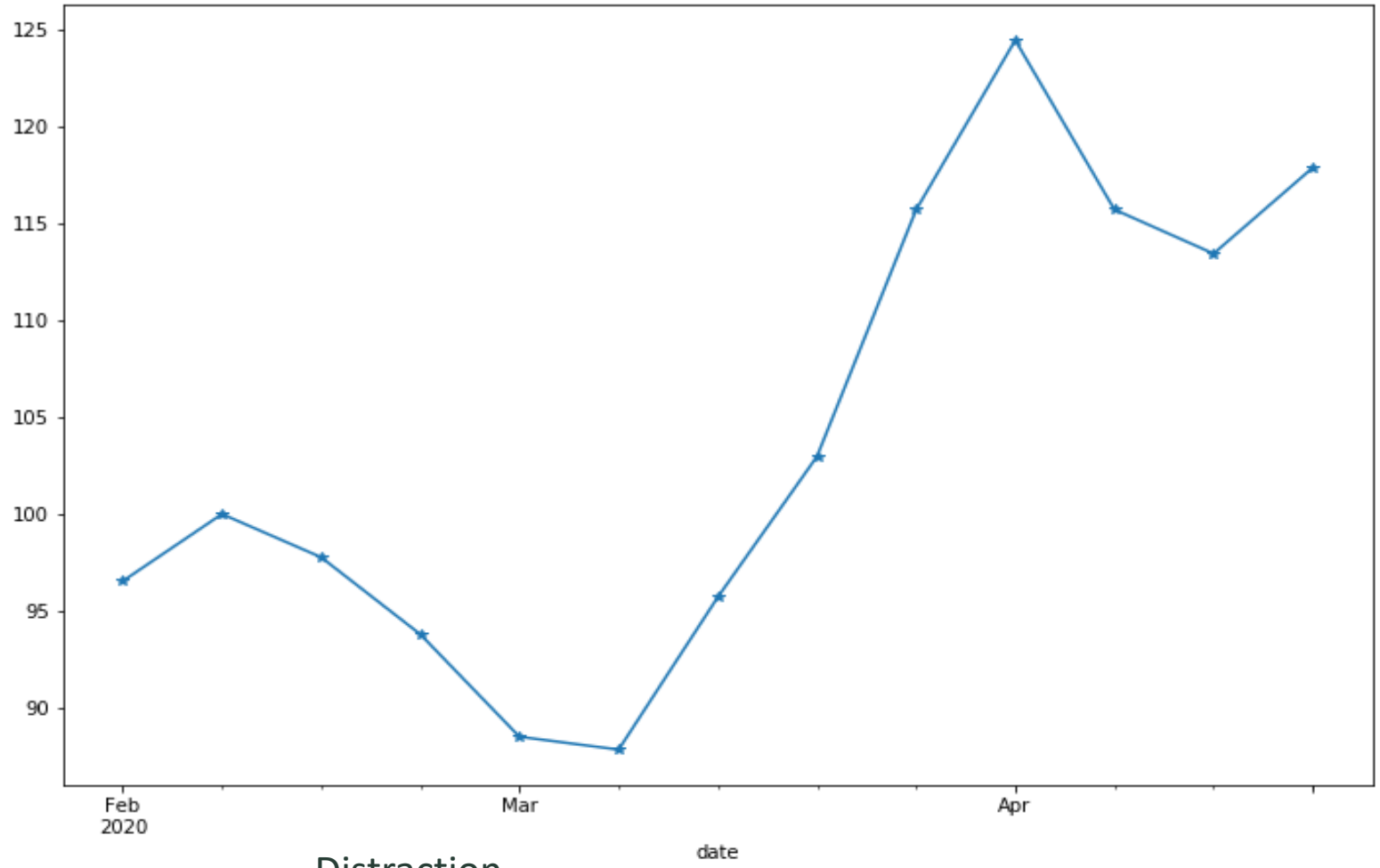
Increase in Speeding during COVID-19

Swiss Re Data (mostly Europe)



Increase of Distracted Driving during COVID-19

Swiss Re data (mostly Europe)



Distraction

COVID-19 Analysis

Great Recession early Indicators

Illustrative

The Yield Curve for 10 Year Treasure Bills began falling at the end of 2006, prior to the official start of the Great Recession in December 2007.

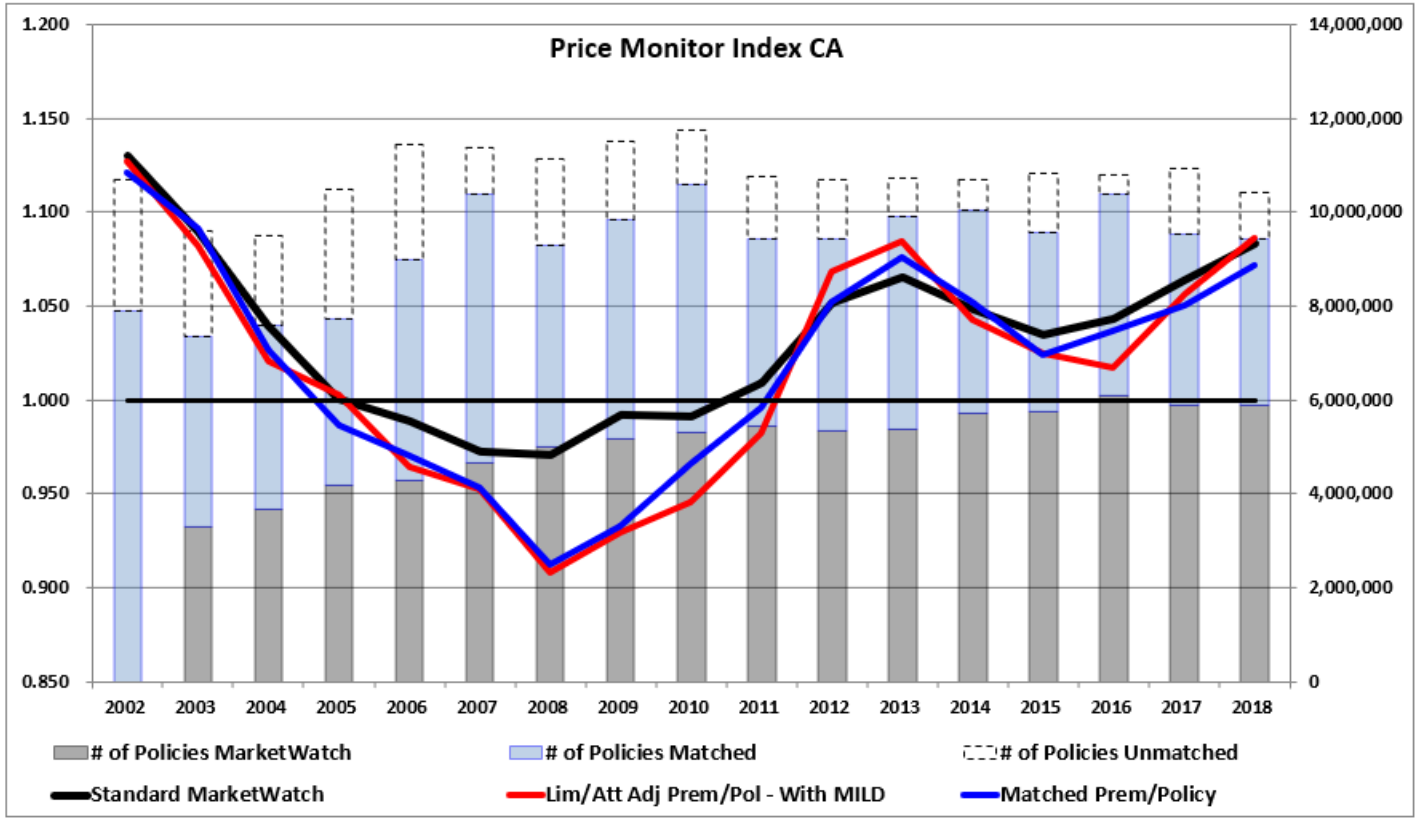
Yield Curve – 10 Year Treasury Bills

Source: https://www.macrotrends.net/2016/10-year-treasury-bond-rate-yield-chart

Consumer Confidence Index

Source: https://data.oecd.org/leadind/consumer-confidence-index-cci.htm

Commercial Auto Liability – Incremental Average Premium Changes



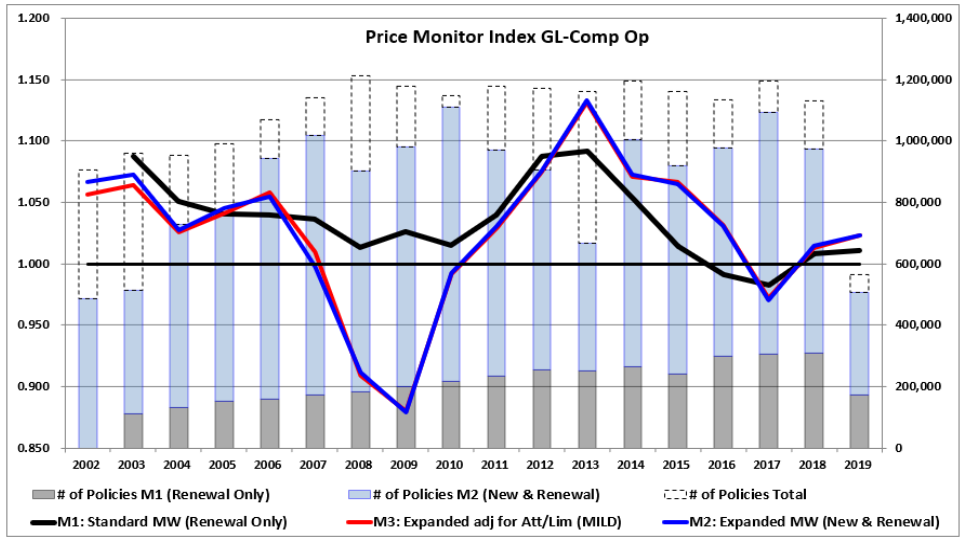
Illustrative

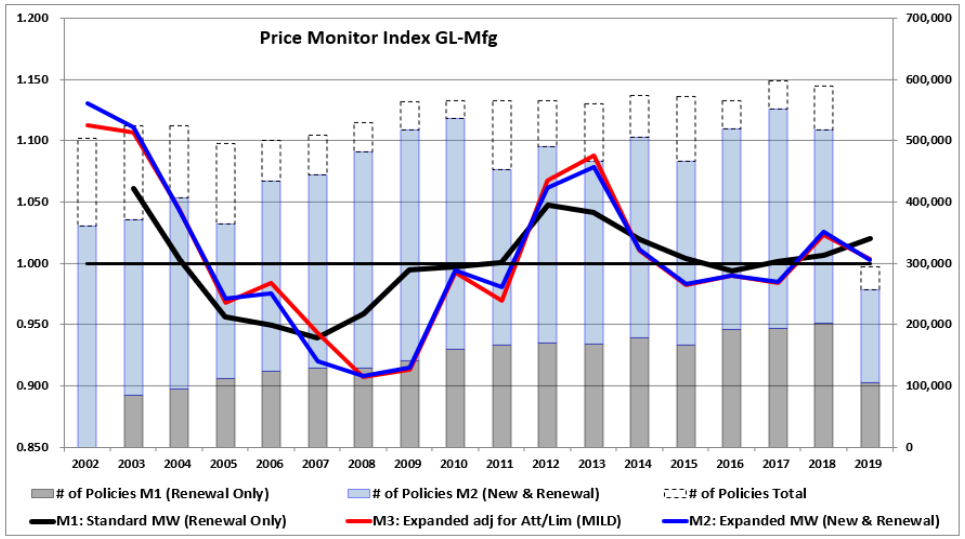
Company Group	Quarter of Date	Rate Change Incremental PY	Current Policy Count	Current Premium	Previous Policy Count	Previous Premium	Previous Premiums (Adjusted)	Average Premium
Total	2008 Q1	-8.5%	2,278,074	1,422,144,703	2,256,943	1,539,105,926	1,553,516,058	624
Total	2008 Q2	-9.2%	2,321,732	1,481,680,471	2,309,684	1,624,074,448	1,632,546,104	638
Total	2008 Q3	-6.5%	2,359,416	1,435,468,282	2,346,270	1,526,731,486	1,535,285,664	608
Total	2008 Q4	-5.8%	2,077,161	1,217,889,146	2,111,258	1,314,207,063	1,292,982,504	586

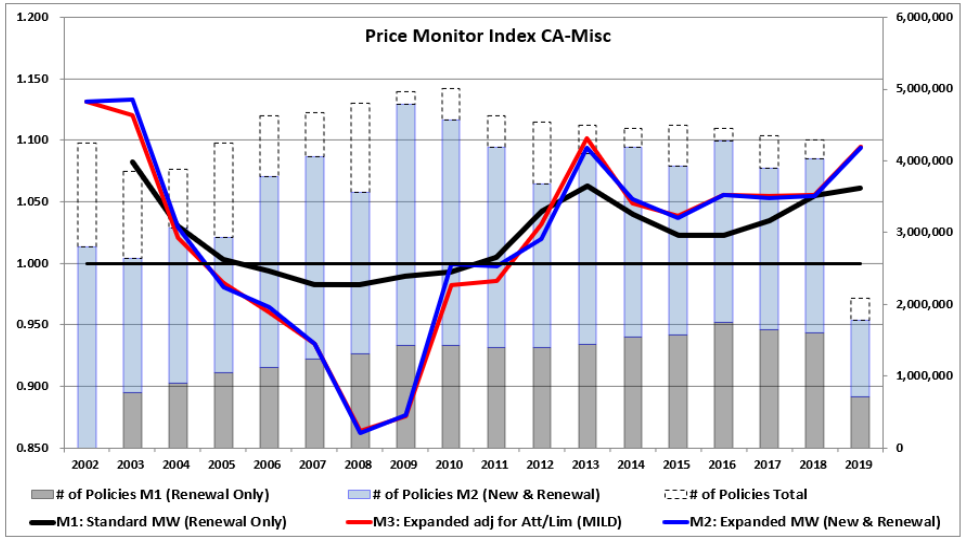
Source: ISO MarketWatch Expanded and Dashboard– released 12/2019

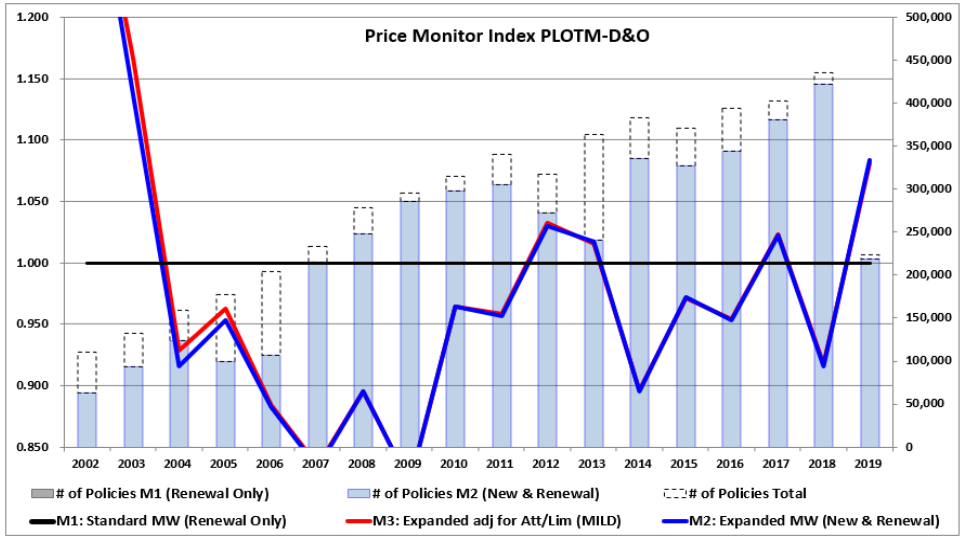
Sample Average Premium Reductions in the Great Recession

Illustrative



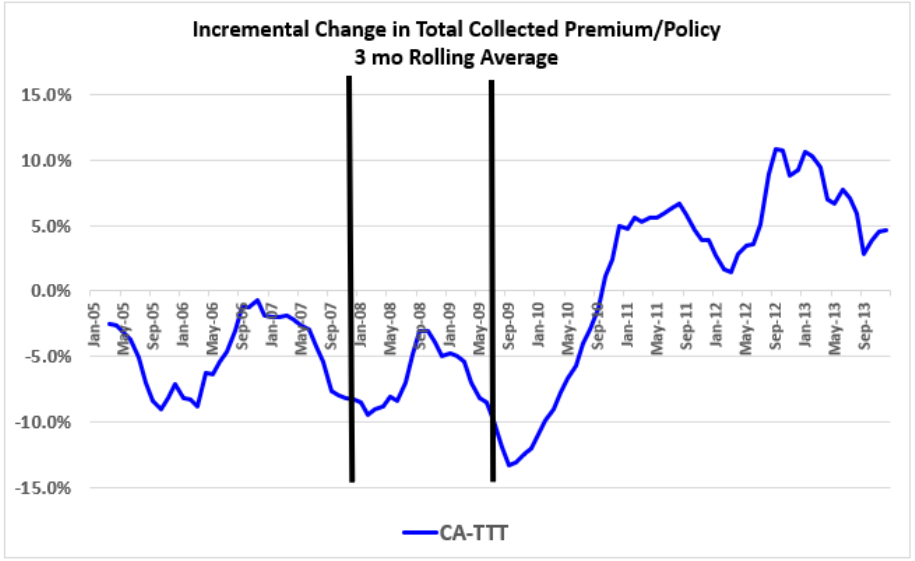


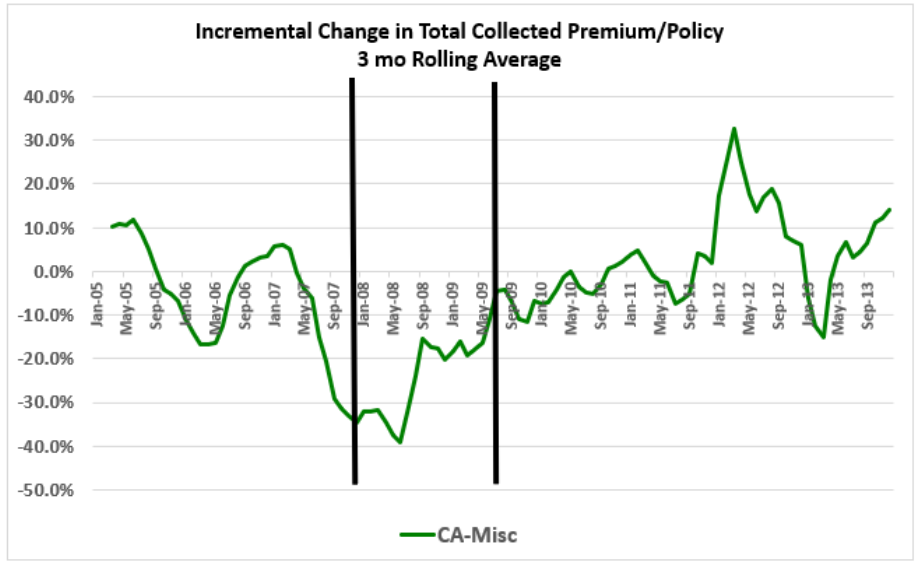




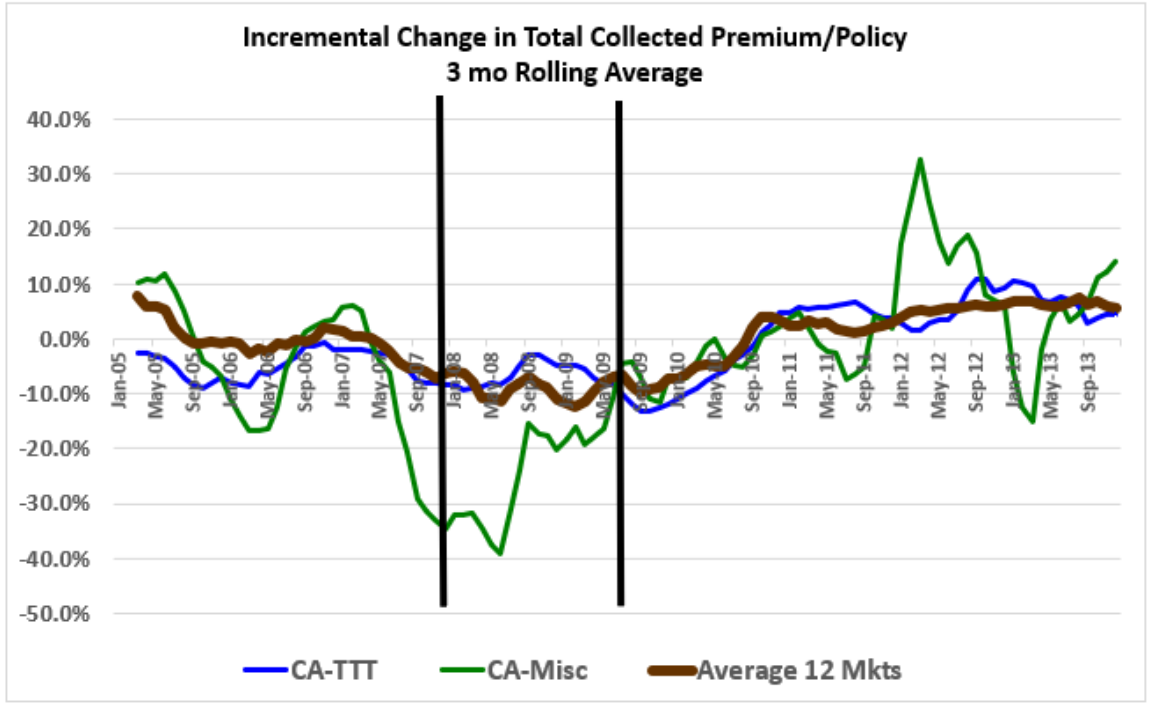
Source: ISO MarketWatch Expanded – released 12/2019

Analyzing Premium Declines – Sample Reductions and Shapes by LOB/Market





Illustrative



Source: ISO MarketWatch Dashboard (removal of floors / ceilings) - Method 2
Parallel lines mark start (12/1/2007) to end (6/1/2009) of the Great Recession

Source: ISO MarketWatch – released 12/2019

Analyzing Premium Declines – Summary by LOB/Market

Illustrative

ISO MarketWatch LOB/Market	Dates: Initial Premium Drop	Trough	GR Start to Trough	Trough to Flat (0%)	Additional to Full Rebound	Drop/Recovery Metrics: Drop to Trough	Total Drop to Flat	Total Premium (B)
GL-Contractors	12/1/2006	3/1/2008	3 Months	27 Months	24 Months	-16.6%	-36.7%	16.8
GL-Completed Ops	2/1/2007	1/1/2009	13 Months	15 Months	16 Months	-18.0%	-25.7%	7.6
GL-Manufacturers	11/1/2006	12/1/2008	12 Months	22 Months	14 Months	-14.5%	-23.1%	5.6
CRR - GL+CAu	4/1/2008	2/1/2009	14 Months	17 Months	10 Months	-10.5%	-13.3%	33.3
D&O	7/1/2006	11/1/2009	23 Months	10 Months	21 Months	-40.4%	-45.6%	15.2
D&O For Profit	4/1/200	11/1/2009	23 Months	10 Months	25 Months	-50.5%	-55.1%	13.2
CAu-TTT	11/1/2006	9/1/2009	21 Months	13 Months	2 Months	-17.5%	-23.0%	37.0
CAu-Misc	4/1/2007	6/1/2008	6 Months	29 Months	11 Months	-34.6%	-48.7%	10.0
BOP	5/1/2006	1/1/2010	25 Months	9 Months	13 Months	-19.7%	-20.1%	36.6
BOP-Indiv Prem Cont	2/1/2007	8/1/2010	31 Months	4 Months	66 Months	-16.4%	-19.4%	6.8
BOP-Liability Payroll	2/1/2006	12/1/2008	12 Months	24 Months	24 Months	-14.5%	-24.7%	2.1
Comm'l Inland Marine	6/1/2007	8/1/2009	20 Months	11 Months	18 Months	-33.8%	-38.3%	42.4
Average Reviewed (12)	4/1/2007	2/1/2009	14 Months	19 Months	13 Months	-15.3%	-25.4%	204.5
LOB Weighted Average	2/8/2007	5/25/2009	17 Months	14 Months	13 Months	-22.5%	-28.2%	
	Cumulative from start GR:		17 Months	32 Months	45 Months			
Dow Jones	10/1/2007	2/1/2009	14 Months	15 Months	32 Months	-49.3%		
Unemployment	3/1/2007	11/1/2009	23 Months	43 Months	43 Months	110.6%		
Housing Prices	1/1/2007	1/1/2009	13 Months	34 Months	13 Months	-20.2%		
	Start	End						
Great Recession Dates	12/1/2007	6/1/2009						

Note: Great Recession defined as the time period from December 2007 to June 2009, starting with the crash of the housing market and ending when the stimulus packages were passed

Leading Indicators of treasury yields, consumer confidence, housing prices, and building permits all indicated that the economy was declining at least a year before the official start of the recession.

Initial premium drop date is when total collected premium per policy started declining

Full rebound to cover loss trend = 3-4%

Dow Jones went from 13,930 to 7,063; Unemployment went from 4.4% to 10.0%; Housing Prices went from $320,100 to $257,000

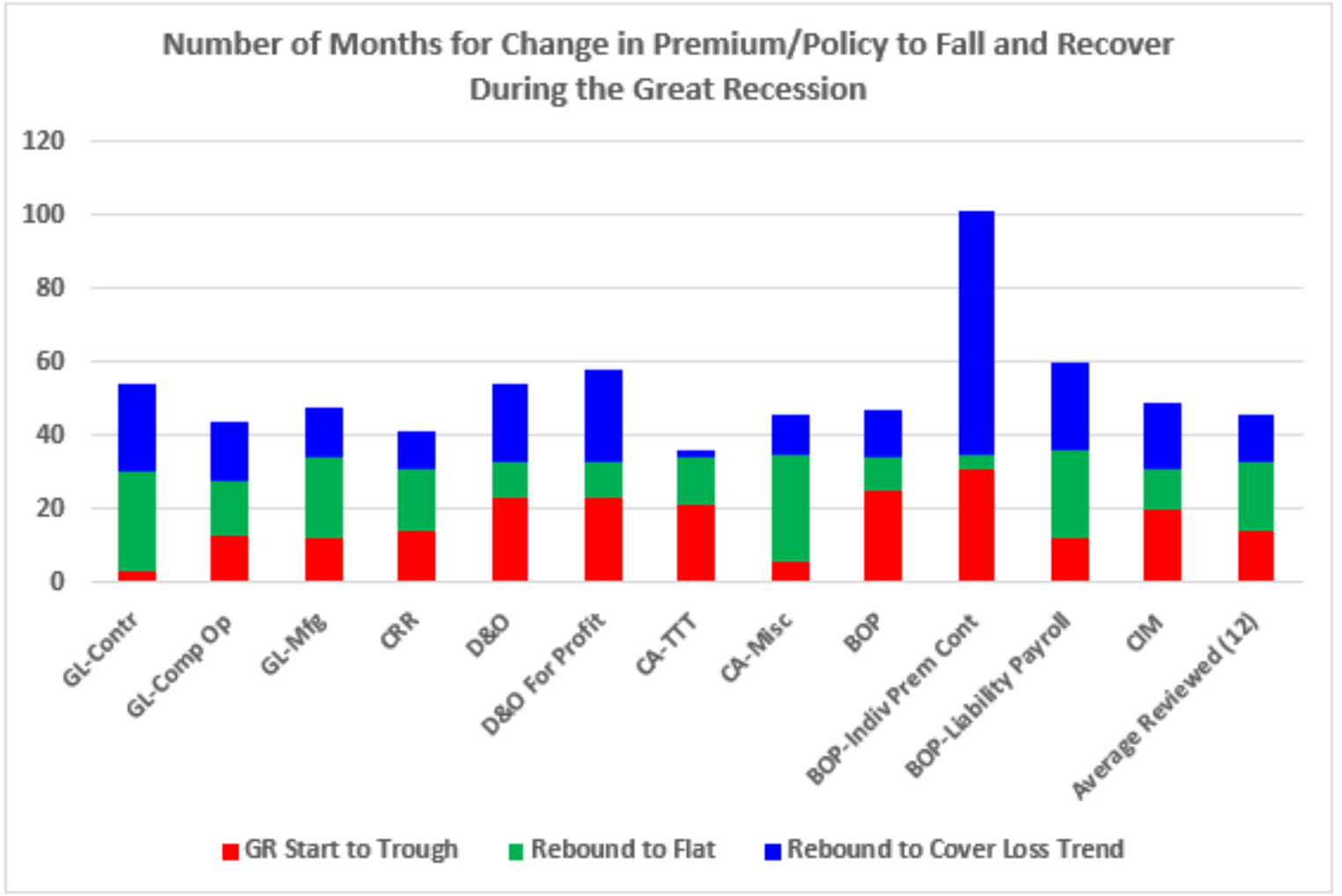
Recovery metrics estimated using monthly impacts from annual rolled up MWDB (area between x-axis and pricing curve)

Total Markets Analyzed above (12 of 72) represents about 25% of the total premium (855.2B) analyzed during that period

Source: ISO MarketWatch

Summary of Lags between initial Premium Drops to Recovery

Illustrative



Source: MarketWatch Dashboard (v1.5 2020-02)

Covid – Market Impact / LDF Speed Up / Slow Down Impact Framework

Illustrative

ISO MarketWatch LOB/Market	Dates: Initial Premium Drop	Dates: Trough	Dates: GR Start to Trough	Dates: Trough to Flat (0%)	Drop/Recovery Metrics: Drop to Trough	Drop/Recovery Metrics: Total Drop to Flat	Total Premium (B)
GL-Contractors	12/1/2006	3/1/2008	3 Months	27 Months	-16.6%	-36.7%	16.8
GL-Completed Ops	2/1/2007	1/1/2009	13 Months	15 Months	-18.0%	-25.7%	7.6
GL-Manufacturers	11/1/2006	12/1/2008	12 Months	22 Months	-14.5%	-23.1%	5.6
CRR - GL+CAu	4/1/2008	2/1/2009	14 Months	17 Months	-10.5%	-13.3%	33.3
D&O	7/1/2006	11/1/2009	23 Months	10 Months	-40.4%	-45.6%	15.2
D&O For Profit	4/1/2006	11/1/2009	23 Months	10 Months	-50.5%	-55.1%	13.2
CAu-TTT	11/1/2006	9/1/2009	21 Months	13 Months	-17.5%	-23.0%	37.0
CAu-Misc	4/1/2007	6/1/2008	6 Months	29 Months	-34.6%	-48.7%	10.0
BOP	5/1/2006	1/1/2010	25 Months	9 Months	-19.7%	-20.1%	36.6
BOP-Indiv Prem Cont	2/1/2007	8/1/2010	31 Months	4 Months	-16.4%	-19.4%	6.8
BOP-Liability Payroll	2/1/2006	12/1/2008	12 Months	24 Months	-14.5%	-24.7%	2.1
Comm'l Inland Marine	6/1/2007	8/1/2009	20 Months	11 Months	-33.8%	-38.3%	42.4
Average Reviewed (12)	4/1/2007	2/1/2009	14 Months	19 Months	-15.3%	-25.4%	204.5
LOB Weighted Average	2/8/2007	5/25/2009	17 Months	14 Months	-22.5%	-28.2%	
	Cumulative from start GR:		17 Months	32 Months			
Dow Jones	10/1/2007	2/1/2009	14 Months	15 Months	-49.3%		
Unemployment	3/1/2007	11/1/2009	23 Months	43 Months	110.6%		
Housing Prices	1/1/2007	1/1/2009	13 Months	34 Months	-20.2%		

	Start	End
Great Recession Dates	12/1/2007	6/1/2009

Covid-19: Dates Medium Scenario: Trough	Covid-19: Dates Medium Scenario: Partial Rebound to Flat	Drop/Recovery Expectations: Drop to Trough	Drop/Recovery Expectations: Total Drop to Flat

Covid 19 Assumption: Medium Scenario (single big wave end 6/30/2020)

Source: ISO MarketWatch – released 12/2019

Covid extension will involve judgments under various viral scenarios as to depth, duration, and shape (V, U, W, WW, L, extended L,…)

Current COVID impacts during stay-at-home: Auto

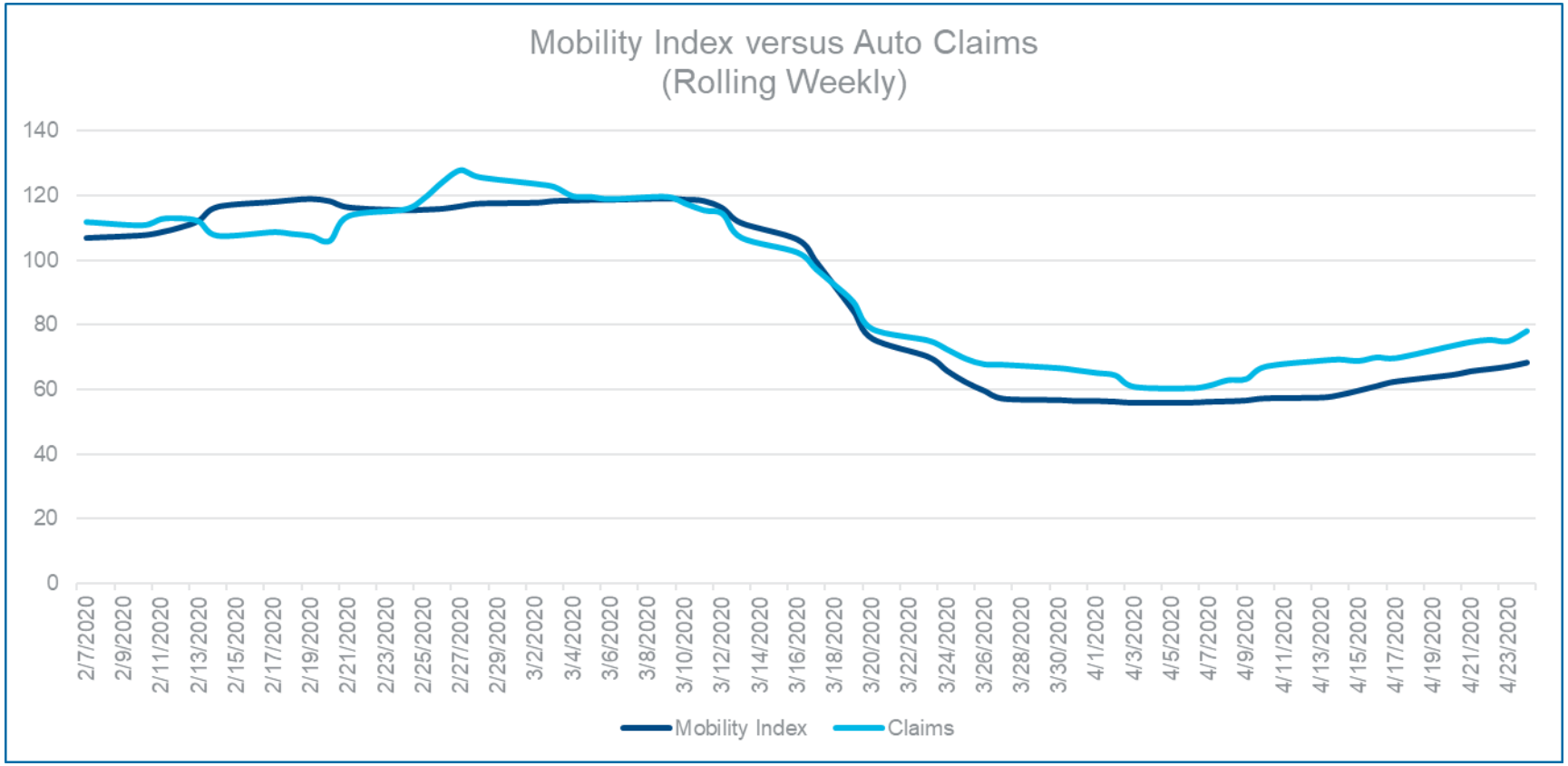
- Highly variable based on location, vehicle type, usage, coverage
- Based on early statistical/claim data

- Personal Auto
  - Frequency impact: -30% to -60%
  - Severity impact: +5% to +35%
  - Pure Premium impact -20% to -50%

- Commercial Auto
  - Frequency impact: -50% to -70%
  - Severity impact: 0% to +20%
  - Pure Premium impact -40% to -70%

Current COVID impacts during stay-at-home: Auto

- Mileage down approximately 45 to 50% (according to mobility data)
- Claim activity highly correlated to driving index



. Source: https://www.apple.com/covid19/mobility

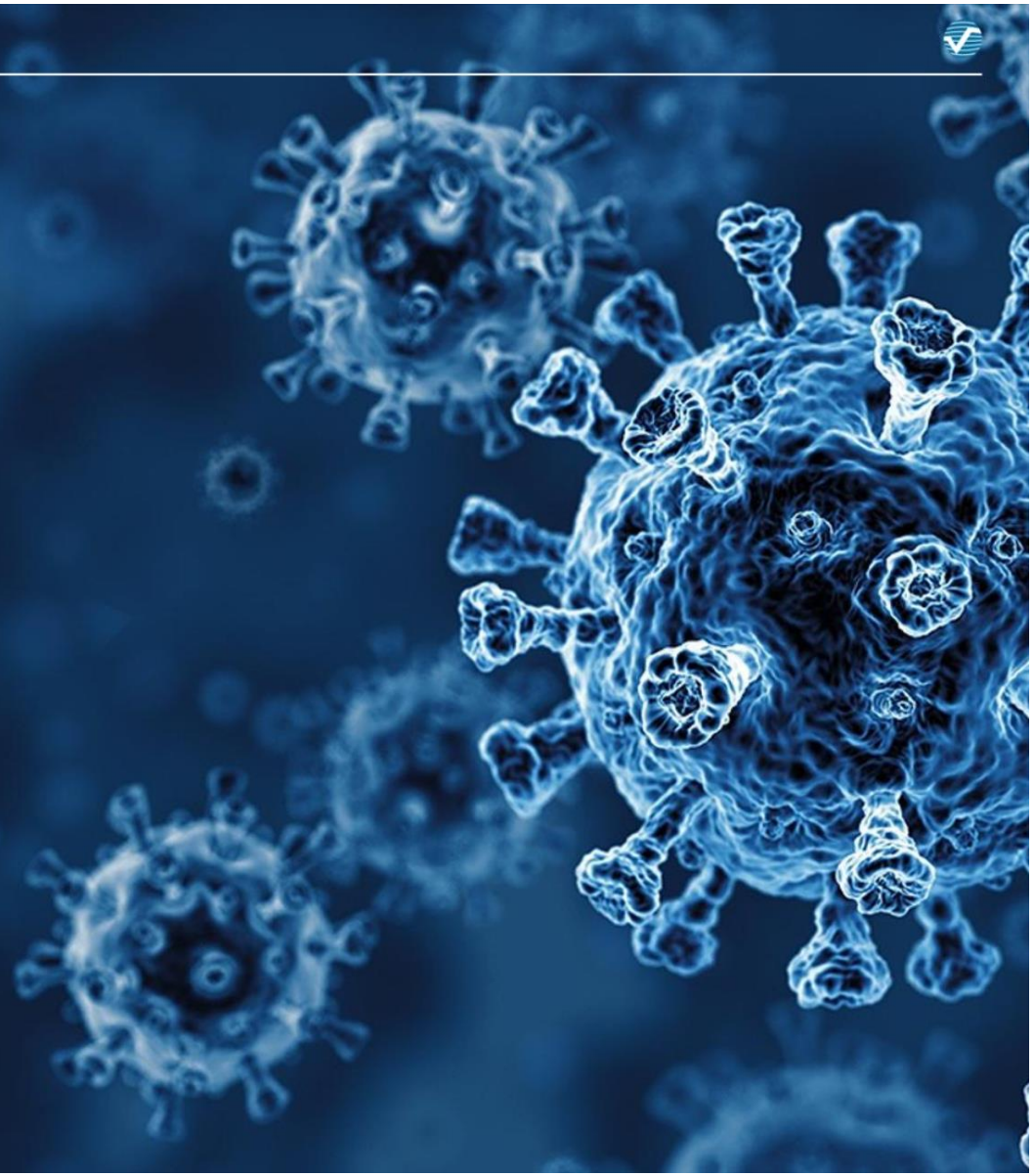
ISO Actuarial Response to COVID-19

Analysis of Short-Term Impacts – Commercial Lines

- Commercial Property (circular LI-CF-2020-048)
- General Liability (circular LI-GL-2020-093)
- Commercial Auto (circular LI-CA-2020-210)

Analysis of Short-Term Impacts – Personal Lines

- Personal Auto (circular LI-PA-2020-115)
- Homeowners
- Dwelling Property
- Personal Inland Marine

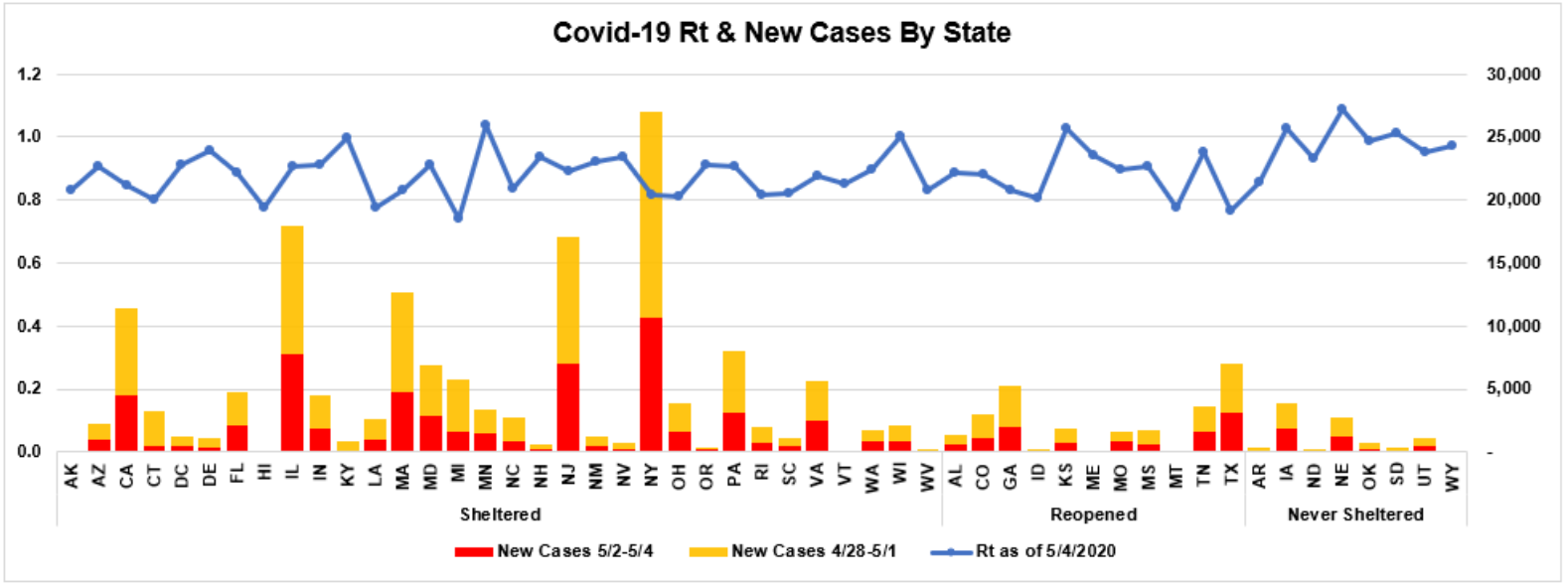


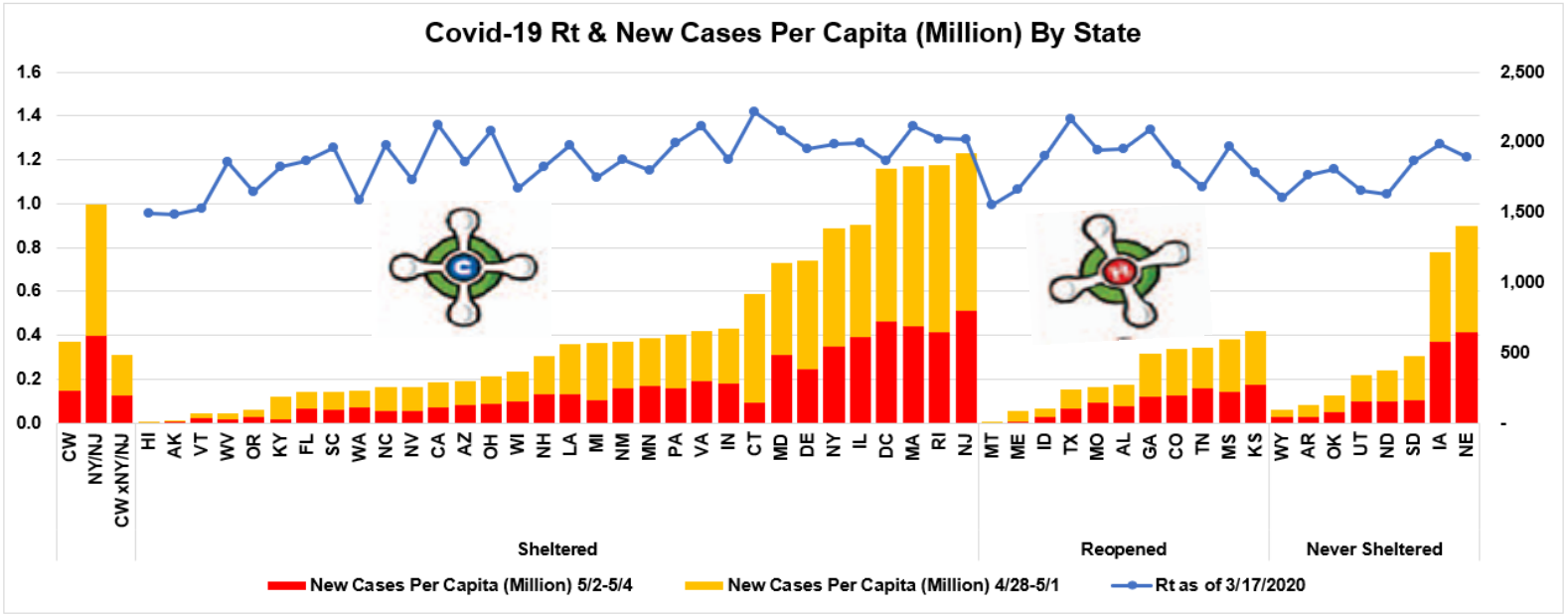
New Covid case reproduction number by state and shelter order – base case (5/4/2020)

Illustrative

These exhibits show the last 7-day and 3-day cases by state and shelter order, as well as Rt, the effective reproduction number. States are split between those who are sheltered, vs. reopened, vs. never sheltered as of 5/4/2020. The top exhibit displays raw new cases, while the bottom adjusts the cases to per million per capita.

Reviewing these periodically will help show the effect of the reopening orders. Other factors such as amount of testing and testing quality would need to be considered.





Source: compiled by ISO using data from https://rt.live/

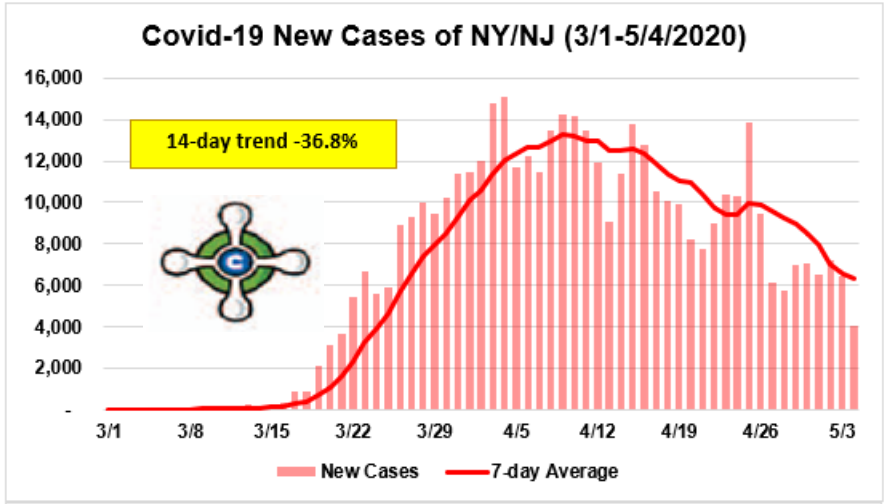
New Covid case and testing counts by shelter order – base week (@5/4/2020)

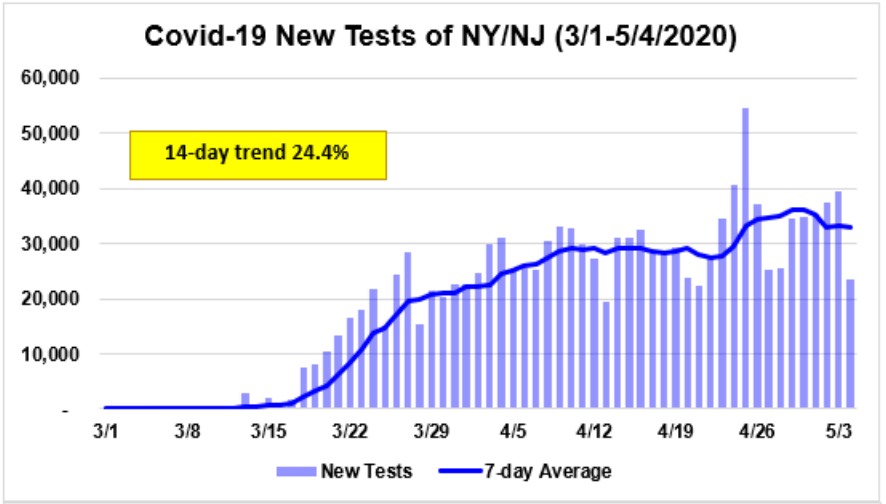
Illustrative

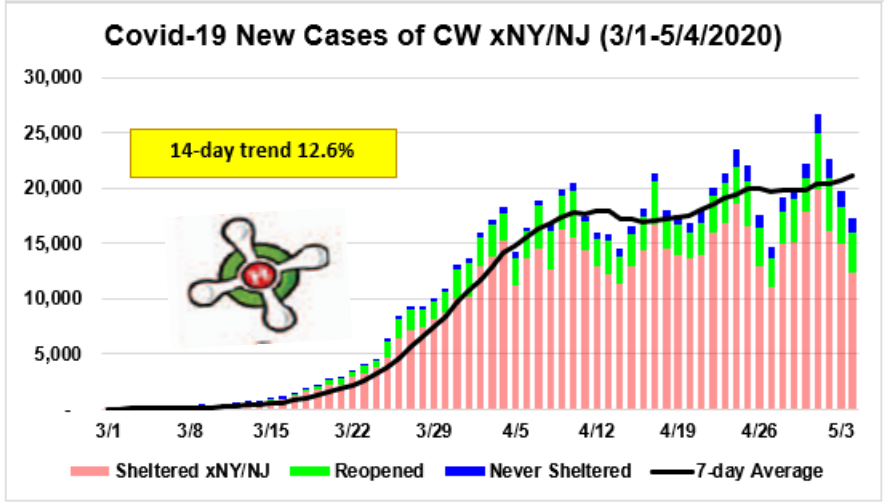
These exhibits show the number of new Covid-19 cases and tests split between NY/NJ and the rest of the country by shelter order as of 5/4/2020. Significant different case trends can be partially explained by different test trends.

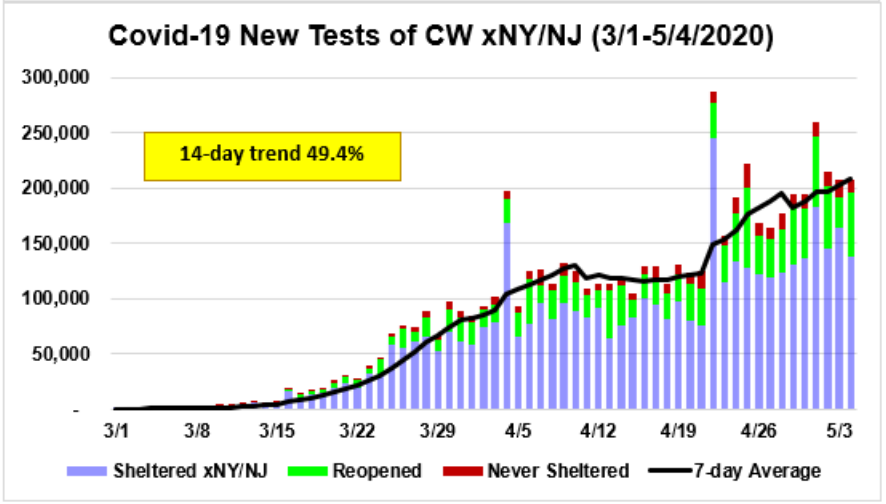
Reviewing these periodically will help show the effect of the reopening orders. Other factors such as testing quality, types of tests, changes in case and test reporting methods by state, would need to be considered.

14-day Trend	4/21-5/4		5/4	
	(Expon) New Cases	New Tests	Total Cases	Total Tests
CW	-4.8%	45.2%	1,171,381	7,268,378
NY/NJ	-36.8%	24.4%	447,222	1,284,530
CW xNY/NJ	12.6%	49.4%	724,159	5,983,848
Sheltered xNY/NJ	6.2%	41.1%	565,718	4,322,311
Reopened	28.3%	88.6%	125,530	1,263,750
Never Sheltered	68.7%	30.6%	32,911	397,787







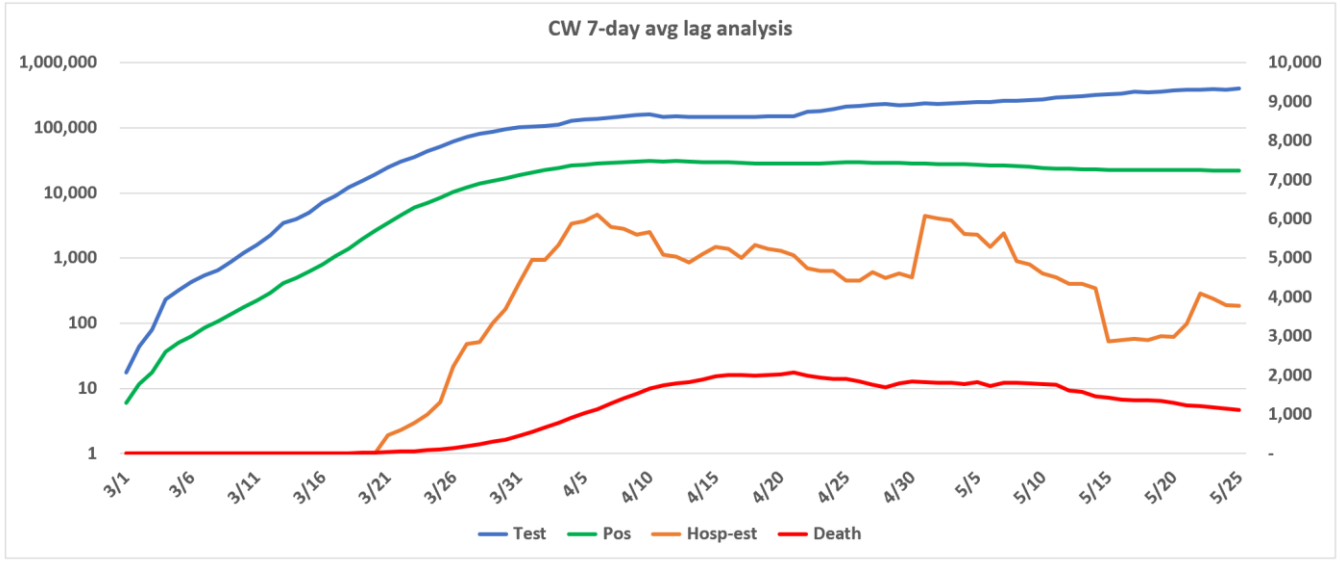


Source: compiled by ISO using data from The COVID Tracking Project (*https://covidtracking.com/api*

Conceptual Framework of Tracking Covid Exposure through to Hospitalizations and Fatalities

Illustrative

These exhibits show how actuarial science can be used to help analyze the various Covid stages. Conceptually, if the right kind of linked data was captured, the process from initial exposure and positive cases through to recovery or death could be tracked. E.g. with robust exposure identification and contact tracing, all those exposed in say the 1st week of April, could be tracked through testing, positive cases, hospitalizations, ICU admissions, intubations and eventual either recovery or death. That process and statistics, which can take weeks or even months, can be used to estimate later cohorts via standard actuarial triangle procedures. Scenario testing, such as shelter policy, can then be tested.



test & pos - left axis (log) hosp & death - right axis

Covid Tracking Project - 50 states (CW cum'l hosp est. from 33 states reporting cum'l at 5/12)

	test	pos	hosp-est	death
	14,604,942	1,654,829	294,000	92,464
conversion %'s:		11.3%	17.8%	31.5%
case - fatality:				5.6%

	A. Exposure	# Tests				All Historical data and selections completely illustrative			
# Exposures	Week end	7	14	21	28	35	42	49	ult
10,100,000	3/31/2020&P	607,117	1,113,048	1,517,793	1,821,352	1,963,013	2,023,724	2,023,724	2,023,724
7,200,000	4/7/2020	433,655	795,035	1,084,138	1,300,966	1,402,152	1,445,517		1,445,517
6,700,000	4/14/2020	432,165	792,303	1,080,413	1,296,495	1,397,334			1,440,550
6,300,000	4/21/2020	449,717	824,480	1,124,291	1,349,150				1,499,055
5,800,000	4/28/2020	520,386	954,042	1,300,966					1,734,621
5,300,000	5/5/2020	683,336	1,252,782						2,277,785
4,800,000	5/12/2020	867,310		Upward trend in tests.					2,891,035
	Maturity	@4/14/2020	@4/21/2020	@4/28/2020	@5/5/2020	@5/12/2020			
	# Tests - CTP	3,124,711	4,180,281	5,795,126	7,543,181	9,636,783	20.0%		13,312,288
		30.0%	55.0%	75.0%	90.0%	97.0%	100.0%	100.0%	10.7 d
	B. Test Dates	# Positive Cases							
# Tests	Week end	7	14	21	28	35	42	49	ult
2,023,724	3/31/2020&P	190,483	226,198	238,103	238,103	238,103	238,103	238,103	238,103
1,445,517	4/7/2020	174,156	206,810	217,695	217,695	217,695	217,695		217,695
1,440,550	4/14/2020	168,713	200,347	210,892	210,892	210,892			210,892
1,499,055	4/21/2020	163,271	193,884	204,089	204,089				204,089
1,734,621	4/28/2020	146,944	174,496	183,680					183,680
2,277,785	5/5/2020	143,220	170,074						179,025
2,891,035	5/12/2020	136,059		Overall reduction due to social distancing working after lag					170,074
	Maturity	@4/14/2020	@4/21/2020	@4/28/2020	@5/5/2020	@5/12/2020			
	# Positive - CTP	602,681	802,658	1,006,023	1,195,491	1,360,591	14.1%		1,403,557
		80.0%	95.0%	100.0%	100.0%	100.0%	100.0%	100.0%	1.8 d
	C. Positive Case ID	# Hospitalizations							
# Positive	Week end	7	14	21	28	35	42	49	ult
238,103	3/31/2020&P	38,355	47,944	55,935	60,729	62,647	63,926	63,926	63,926
217,695	4/7/2020	25,048	31,311	36,529	39,660	40,912	41,747		41,747
210,892	4/14/2020	23,962	29,953	34,945	37,940	39,138			39,937
204,089	4/21/2020	21,423	26,779	31,242	33,920				35,705
183,680	4/28/2020	21,470	26,838	31,311					35,783
179,025	5/5/2020	22,961	28,701						38,268
170,074	5/12/2020	22,178							36,964
	Maturity	@4/14/2020	@4/21/2020	@4/28/2020	@5/5/2020	@5/12/2020			
	# Hosp - CTP	117,419	153,473	185,455	224,638	260,921	19.2%		292,331
		60.0%	75.0%	87.5%	95.0%	98.0%	100.0%	100.0%	5.9 d
	D. Hospital Admittance	# Deaths				All Historical data and selections completely illustrative			
# Hospital	Week end	7	14	21	28	35	42	49	ult
63,926	3/31/2020&P	6,060	10,389	13,852	15,584	16,796	17,315	17,315	17,315
41,747	4/7/2020	4,961	8,504	11,339	12,757	13,749	14,174		14,174
39,937	4/14/2020	4,838	8,294	11,058	12,440	13,408			13,823
35,705	4/21/2020	4,767	8,172	10,897	12,259				13,621
35,783	4/28/2020	3,922	6,723	8,964					11,205
38,268	5/5/2020	3,888	6,666						11,109
36,964	5/12/2020	3,831							10,945
	Maturity	@4/14/2020	@4/21/2020	@4/28/2020	@5/5/2020	@5/12/2020			
	# Deaths - CTP	26,066	40,554	52,482	65,307	76,617	29.4%		92,193
	# Deaths - Est	27,195	39,984	52,705	65,013	76,617			28.0 t
		35.0%	60.0%	80.0%	90.0%	97.0%	100.0%	100.0%	9.7 d
		35.0%	25.0%	20.0%	10.0%	7.0%	3.0%	100.0%	118,196
	Case - Fatality	4.3%	5.1%	5.2%	5.5%	5.6%			
	Actual weekly deaths		14,488	11,928	12,825	11,310	0.781		
	Actual daily deaths		2,070	1,704	1,832	1,616			

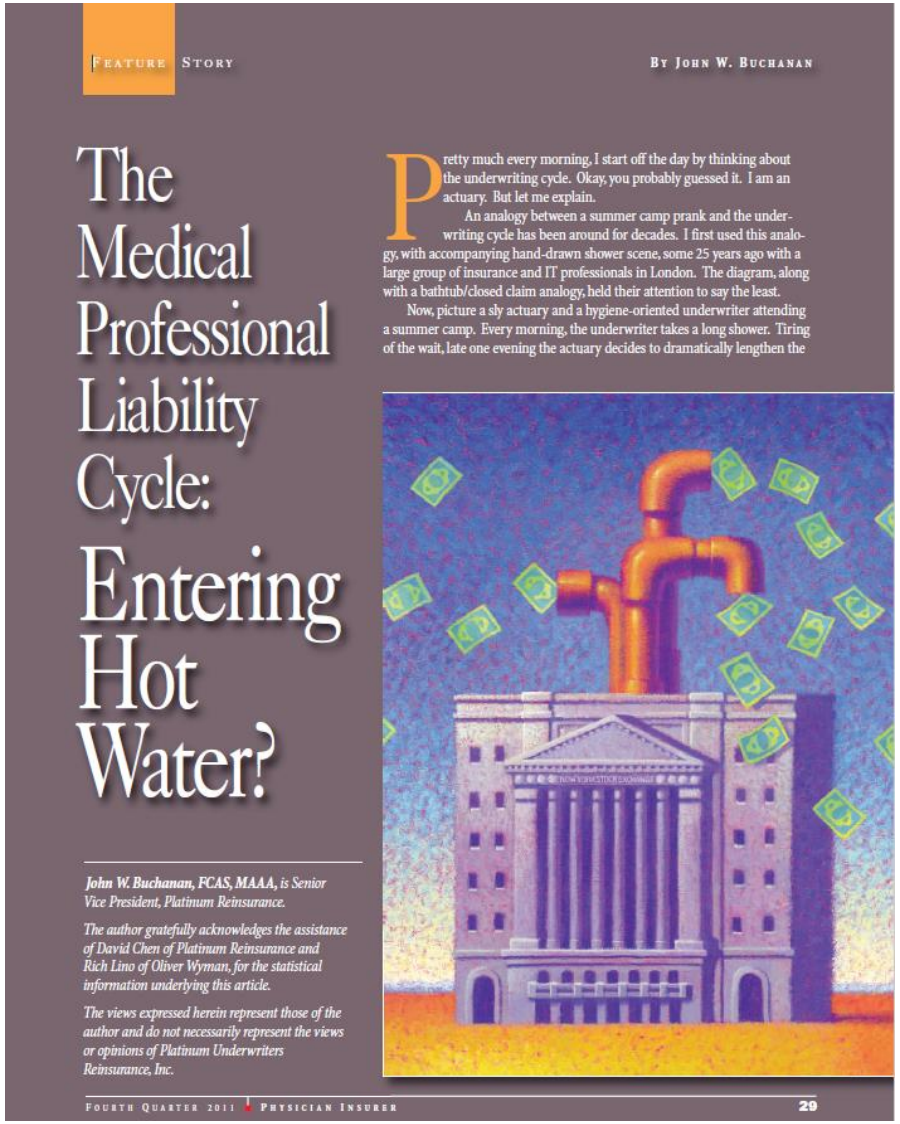
Source: compiled by ISO using data from The COVID Tracking Project (*https://covidtracking.com/api*)

Expected Covid – Emergence Lag Analogy

Illustrative

"Imagine taking a shower when there's a long delay time between turning a knob and the water temperature changing. Getting to the right water temperature will be difficult, because it's hard to control something when there's a long delay in the feedback signal.

One of the problems with reopening under COVID-19 is that, due to the long period of incubation and asymptomatic spread, we only see the impact of our behavior a couple of weeks later. If we just reopen blindly because things seem OK right now, the problem will repeat: invisible community spread followed by the hospital system could be overwhelmed again in a few weeks."



FEATURE STORY

BY JOHN W. BUCHANAN

The Medical Professional Liability Cycle: Entering Hot Water?

Pretty much every morning, I start off the day by thinking about the underwriting cycle. Okay, you probably guessed it. I am an actuary. But let me explain.

An analogy between a summer camp prank and the underwriting cycle has been around for decades. I first used this analogy, with accompanying hand-drawn shower scene, some 25 years ago with a large group of insurance and IT professionals in London. The diagram, along with a bathtub/closed claim analogy, held their attention to say the least.

Now, picture a sly actuary and a hygiene-oriented underwriter attending a summer camp. Every morning, the underwriter takes a long shower. Tiring of the wait, late one evening the actuary decides to dramatically lengthen the

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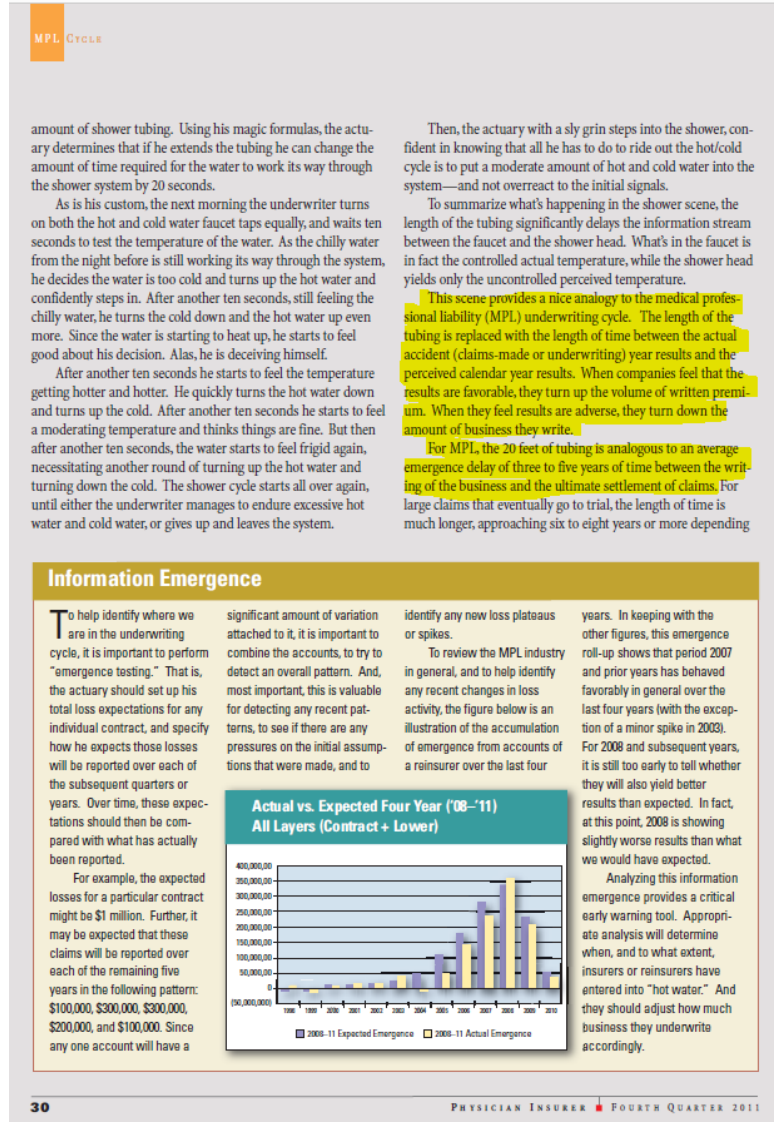
The author gratefully acknowledges the assistance of David Chen of Platinum Reinsurance and Rich Lino of Oliver Wyman, for the statistical information underlying this article.

The views expressed herein represent those of the author and do not necessarily represent the views or opinions of Platinum Underwriters Reinsurance, Inc.



amount of shower tubing. Using his magic formulas, the actuary determines that if he extends the tubing he can change the amount of time required for the water to work its way through the shower system by 20 seconds.

As is his custom, the next morning the underwriter turns on both the hot and cold water faucet taps equally, and waits ten seconds to test the temperature of the water. As the chilly water from the night before is still working its way through the system, he decides the water is too cold and turns up the hot water and confidently steps in. After another ten seconds, still feeling the chilly water, he turns the cold down and the hot water up even more. Since the water is starting to heat up, he starts to feel good about his decision. Alas, he is deceiving himself.

After another ten seconds he starts to feel the temperature getting hotter and hotter. He quickly turns the hot water down and turns up the cold. After another ten seconds he starts to feel a moderating temperature and thinks things are fine. But then after another ten seconds, the water starts to feel frigid again, necessitating another round of turning up the hot water and turning down the cold. The shower cycle starts all over again, until either the underwriter manages to endure excessive hot water and cold water, or gives up and leaves the system.

Then, the actuary with a sly grin steps into the shower, confident in knowing that all he has to do to ride out the hot/cold cycle is to put a moderate amount of hot and cold water into the system—and not overreact to the initial signals.

To summarize what's happening in the shower scene, the length of the tubing significantly delays the information stream between the faucet and the shower head. What's in the faucet is in fact the controlled actual temperature, while the shower head yields only the uncontrolled perceived temperature.

This scene provides a nice analogy to the medical professional liability (MPL) underwriting cycle. The length of the tubing is replaced with the length of time between the actual accident (claims-made or underwriting) year results and the perceived calendar year results. When companies feel that the results are favorable, they turn up the volume of written premium. When they feel results are adverse, they turn down the amount of business they write.

For MPL, the 20 feet of tubing is analogous to an average emergence delay of three to five years of time between the writing of the business and the ultimate settlement of claims. For large claims that eventually go to trial, the length of time is much longer, approaching six to eight years or more depending

Information Emergence

To help identify where we are in the underwriting cycle, it is important to perform "emergence testing." That is, the actuary should set up his total loss expectations for any individual contract, and specify how he expects those losses will be reported over each of the subsequent quarters or years. Over time, these expectations should then be compared with what has actually been reported.

For example, the expected losses for a particular contract might be $1 million. Further, it may be expected that these claims will be reported over each of the remaining five years in the following pattern: $100,000, $300,000, $300,000, $200,000, and $100,000. Since any one account will have a significant amount of variation attached to it, it is important to combine the accounts, to try to detect an overall pattern. And, most important, this is valuable for detecting any recent patterns, to see if there are any pressures on the initial assumptions that were made, and to identify any new loss plateaus or spikes.

To review the MPL industry in general, and to help identify any recent changes in loss activity, the figure below is an illustration of the accumulation of emergence from accounts of a reinsurer over the last four years. In keeping with the other figures, this emergence roll-up shows that period 2007 and prior years has behaved favorably in general over the last four years (with the exception of a minor spike in 2003). For 2008 and subsequent years, it is still too early to tell whether they will also yield better results than expected. In fact, at this point, 2008 is showing slightly worse results than what we would have expected.

Actual vs. Expected Four Year ('08–'11)
All Layers (Contract + Lower)

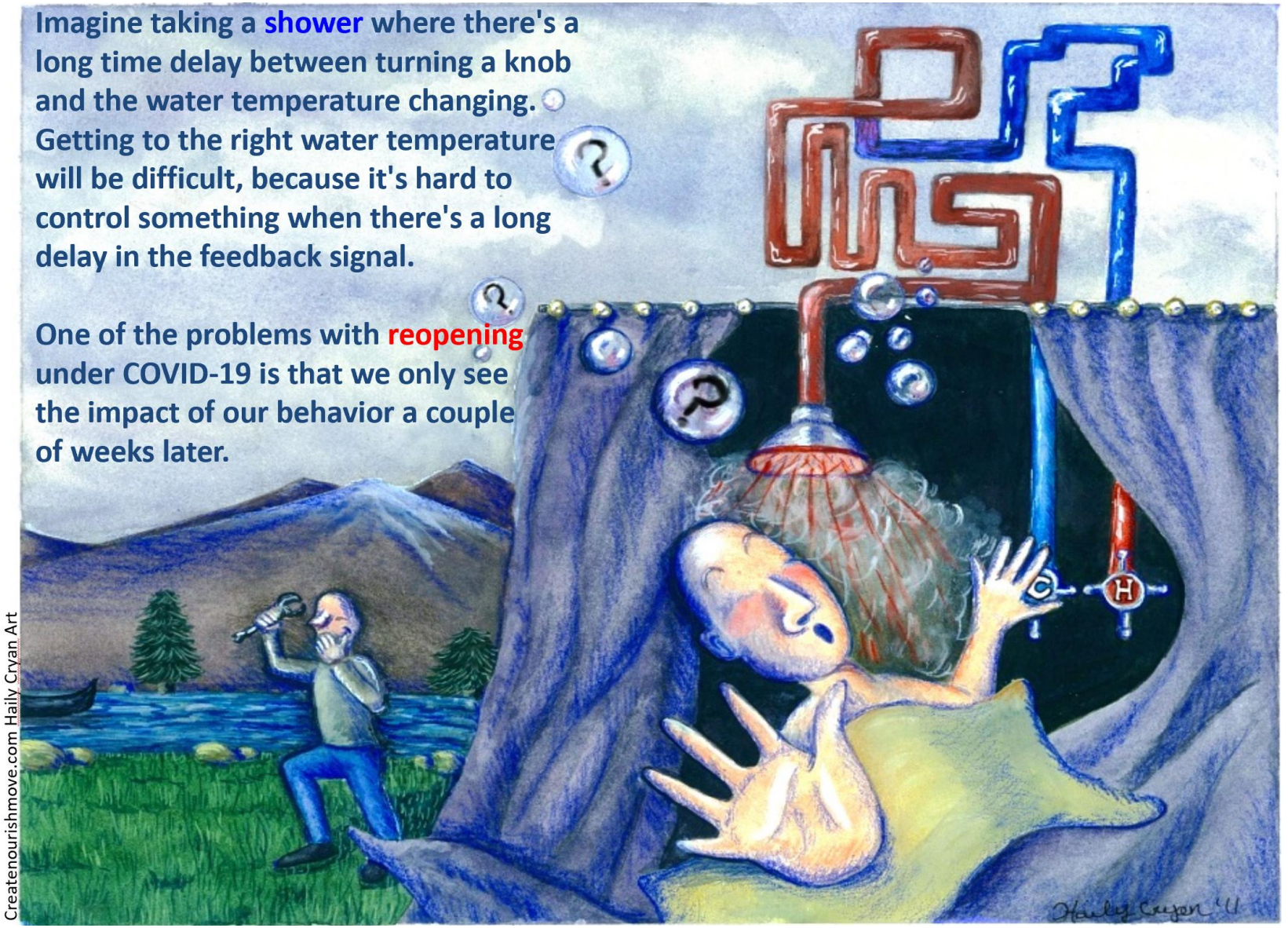
Analyzing this information emergence provides a critical early warning tool. Appropriate analysis will determine when, and to what extent, insurers or reinsurers have entered into "hot water." And they should adjust how much business they underwrite accordingly.

Source: article Physician Insurer – 4th quarter 2011 (J. Buchanan, FCAS); quote Mt. Sinai researcher (D. Sachs, Assistant Professor, Genetics and Genomic Sciences)

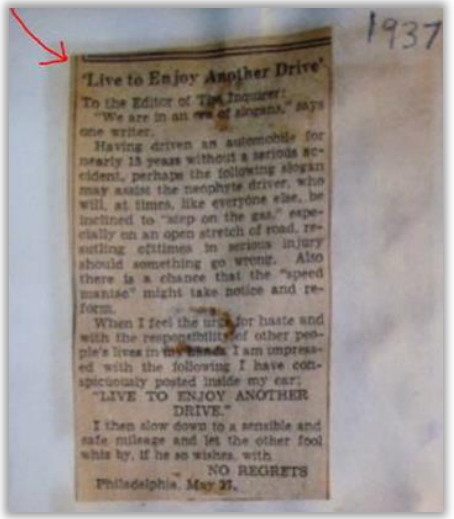
Covid Actuarial Analysis (article under construction)

Information Emergence Lag and Wrong Signaling – Going Viral

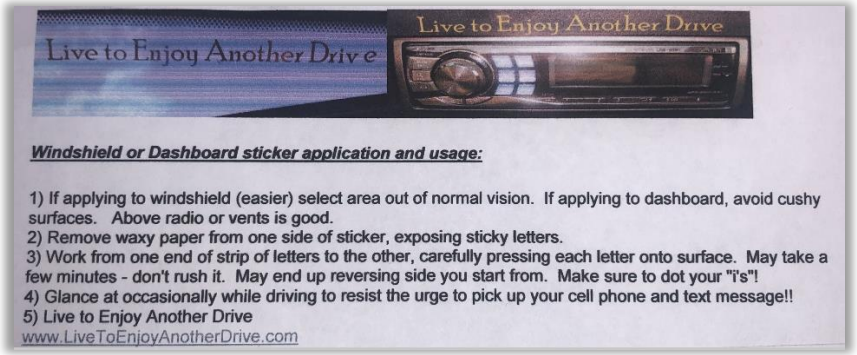
Illustrative



Getting Personal – Grandfathers, Insurance, and Distracted Driving



Distracted Driving sessions now available by Zoom.
For teens, kids, and seniors alike. https://youtu.be/zlPVOsfE0eQ



Windshield or Dashboard sticker application and usage:

1) If applying to windshield (easier) select area out of normal vision. If applying to dashboard, avoid cushy surfaces. Above radio or vents is good.
2) Remove waxy paper from one side of sticker, exposing sticky letters.
3) Work from one end of strip of letters to the other, carefully pressing each letter onto surface. May take a few minutes - don't rush it. May end up reversing side you start from. Make sure to dot your "i's"!
4) Glance at occasionally while driving to resist the urge to pick up your cell phone and text message!!
5) Live to Enjoy Another Drive

www.LiveToEnjoyAnotherDrive.com

EndDD has –

- Created science-based distracted driving presentations, when there were none
- Amassed a network of 500 speakers, the largest in the country
- Given talks to over 375,000 students nationwide, all without cost to schools
- Created a bystander intervention program to teach teens how to effectively speak up when driven distracted by others
- Provided educational materials for free, including safe driving agreements, quizzes and surveys
- Developed video public service announcements. View our most recent PSAs.
- Sponsored teen distracted driving video and meme contests.
- Designed presentations for parents to help them model distraction-free driving for their children

Schedule a presentation for your school, business, place of worship or community organization.

Confirmed Audience To Date: 480,254

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END DISTRACTED DRIVING

John W. Buchanan, FCAS, MAAA

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John Buchanan, FCAS, MAAA, is a principal in charge of ISO's Excess and Reinsurance Division. He has over 30 years of experience as a front-line pricing actuary and consultant in the US, London, and other international reinsurance marketplaces.

In John's career, he has conceptualized, developed and implemented extensive benchmarking and modeling services for various reinsurers, excess carriers, and industry groups. He has pioneered extensive work to extend information gathered in mature benchmarking markets, and applying the information to International markets making use of local and customized knowledge. He was a frontline sign-off actuary for many domestic and international lines of business. While a consultant, he was the main contact for the Reinsurance Association of America and the Reinsurance Research Council of Canada as well as working extensively with the London and European reinsurance market through the Casualty Actuaries in Reinsurance in London. He also formed and chaired the multi-discipline joint IFoA-CAS International Pricing Research Working Party. The resulting paper, *"Analyzing the Disconnect Between the Reinsurance Submission and Global Underwriter's Needs - Property Per Risk*", won the prestigious 2016 IFoA UK Brian Hey and the 2019 CAS US Hachemeister awards.

John's professional accomplishments also include being heavily involved with many international meteorological groups including NOAA, UK-Met, GLOBE, ACRE, and was chairperson of the CAS Climate Change Student Outreach subcommittee. He is on the CARe committee responsible for many of the annual CARe conference educational tracks, and previously at the CAS Ratemaking Seminar. He has been a moderator and panelist at dozens of industry seminars on the topic of domestic and international reinsurance pricing, the underwriting cycle, international benchmarking, etc.

Prior to joining Verisk, John was a Senior Vice President at Platinum Underwriters (previously St. Paul Reinsurance), a Principal at Tillinghast (now Towers Watson), and a Senior Consultant at KPMG, Peat Marwick. He has also competed and won many medals and trophies as an amateur in the Global Salsa Championships, and is determined to write the book "The Mathematician's Guide to Salsa Dancing". He has also written and directed a few sponsored films entitled "*Franklin Climate Change*" and "*Cuba People to People*" with the latter selected to run at various film festivals and described in September 2018 CAS actuarial review article.

Terry A Knull, FCAS, MAAA, CPCU

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Terry Knull, FCAS, MAAA, CPCU is a Team leader in the Actuarial and Underwriting department for Swiss Re North America.

- Terry currently leads a team of 5 underwriters and actuaries covering mostly regional casualty business
- 30 years of experience in the insurance industry with the last 20 years in reinsurance with Swiss Re. Prior to that I worked in the primary insurance arena doing both pricing and reserving work
- My focus the last several years has been on automobile business, both commercial and personal (including non-standard auto)

http://www.verisk.com/iso/excess-reinsurance