

Intermediate Track 1: Forensics of the Commercial Auto Cycle...And Where to Now

CARe Seminar, June 6-7, 2016

Boston, Massachusetts

Kevin Hilferty, Guy Carpenter (Moderator)

Mike Mahoney, Senior Actuary, Liberty Mutual Reinsurance

John Buchanan, Principal – Excess and Reinsurance, Verisk / ISO



Antitrust Notice

- The Casualty Actuarial Society is committed to adhering strictly to the letter and spirit of the antitrust laws. Seminars conducted under the auspices of the CAS are designed solely to provide a forum for the expression of various points of view on topics described in the programs or agendas for such meetings.
- Under no circumstances shall CAS seminars be used as a means for competing companies or firms to reach any understanding – expressed or implied – that restricts competition or in any way impairs the ability of members to exercise independent business judgment regarding matters affecting competition.
- It is the responsibility of all seminar participants to be aware of antitrust regulations, to prevent any written or verbal discussions that appear to violate these laws, and to adhere in every respect to the CAS antitrust compliance policy.



IT1: Forensics of the Commercial Auto Cycle...And Where to Now

Description

This session will tackle the anatomy of the Commercial Auto results over the last underwriting cycle, including analyzing the components underlying the loss ratio rises and reserve strengthening in the last few years. A look back, ex-ante, review of what we knew and how we might have known it earlier. The session will include both a quantitative and qualitative review of what happened, lessons learned, and what might happen in the current market.

Moderator :

Kevin Hilferty, Guy Carpenter

Presenter:

Mike Mahoney, Senior Actuary, Liberty Mutual Reinsurance

John W. Buchanan, Principal, Excess & Reinsurance, Verisk / ISO



3

CARe IT1: Forensics of Commercial Auto

Agenda

- **Introduction**
 - Kevin Hilferty 5 minutes
- **Historical Commercial Auto Results**
 - Mike Mahoney 30 minutes
- **Analyzing More Recent Results and Role of Benchmarking in the Underwriting Cycle**
 - John Buchanan 35 minutes
- **Q&A** 5 minutes

To the extent there is time, will pause for questions after each of the Three main sections. Otherwise, will have questions at the end.



4

Section 1

Introduction

Kevin Hilferty

Section 2

Historical Commercial Auto Results

Mike Mahoney

US P&C Primary Industry Commercial Auto/ Truck Liability/ Medical

- Losses grew less than 3% per year over last 20 years.
- Premium remained static from 1987 to 1999 as losses grew more than 50%
- Commissions appear remarkably stable.
- 2006 was still very profitable. Premium and loss static since 2003.

Accident Year	Gross Earned Premium	Commission Ratio	Estimated Ultimate Loss	Estimated Ultimate LR	Discounted Loss & Comm Ratio
1984	6.46		8.41	130%	109%
1985	8.66		9.65	111%	91%
1986	13.11		9.88	75%	69%
1987	14.99		10.80	72%	71%
1988	14.76		11.41	77%	74%
1989	15.04		12.18	81%	76%
1990	15.02		11.83	79%	74%
1991	14.75	12.2%	10.80	73%	70%
1992	14.87	11.4%	10.95	74%	72%
1993	15.23	11.3%	11.78	77%	77%
1994	15.75	11.3%	13.15	83%	85%
1995	15.12	12.1%	12.54	83%	81%
1996	15.27	12.2%	13.22	87%	84%
1997	15.34	12.7%	14.05	92%	90%
1998	15.13	13.0%	14.58	96%	94%
1999	15.54	12.7%	16.44	106%	104%
2000	17.00	12.5%	17.09	101%	98%
2001	18.54	12.9%	16.75	90%	88%
2002	21.83	12.6%	16.30	75%	79%
2003	23.96	12.3%	15.99	67%	73%
2004	24.59	12.7%	15.88	65%	73%
2005	25.14	12.3%	16.47	66%	73%
2006	24.85		16.96	68%	73%
Total	380.94		307.12	81%	
Annual Growth 1987-2006 (Exp. Fit)	3.0%		2.7%		
1987-2006	2.7%		2.4%		

US P&C Primary Industry Commercial Auto/ Truck Liability/ Medical

- Restated Loss Ratio is remarkably stable.
- Only a small residual cyclical effect.

Conclusion:

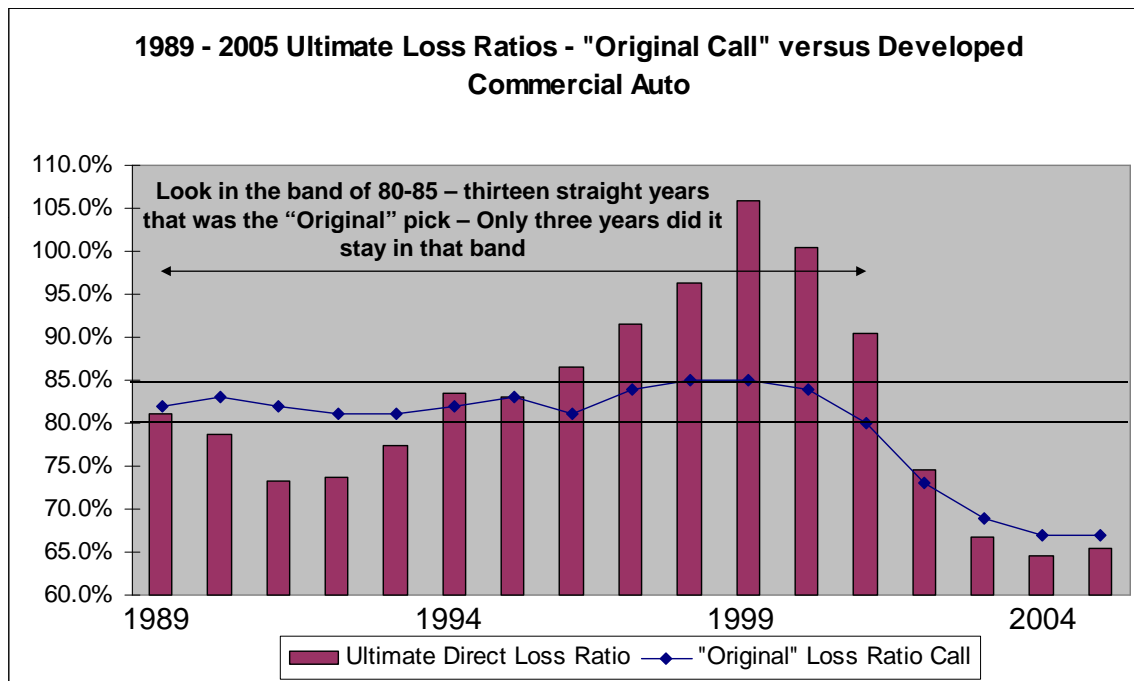
Soft market u/w losses were driven by inadequate premium rather than extraordinary growth in losses.

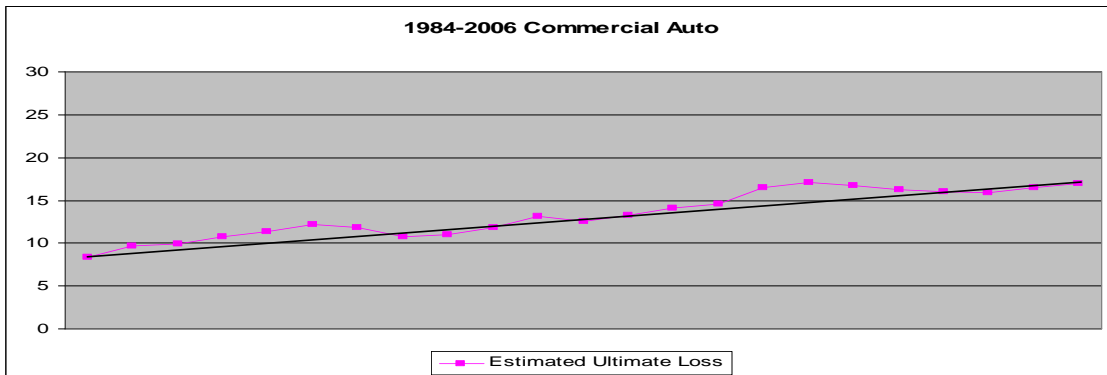
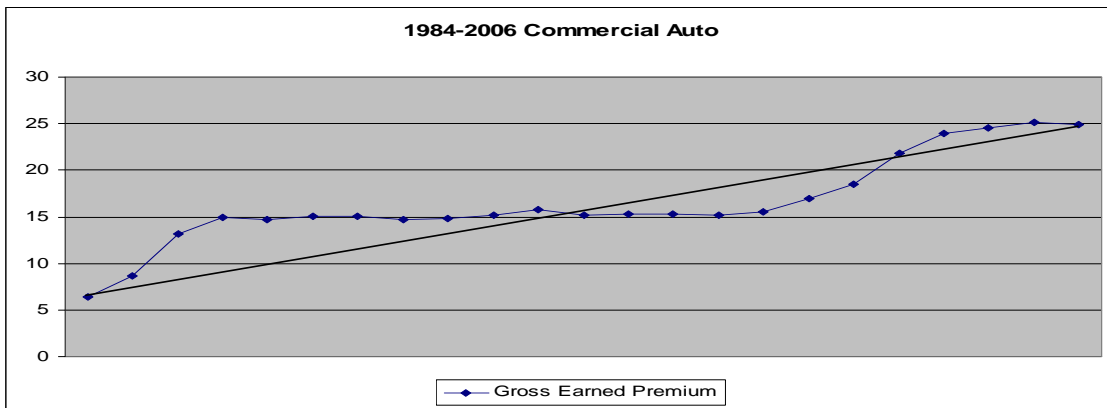
Accident Year	Gross Earned Premium	Estimated Ultimate Loss	Estimated Ultimate LR	Smoothed Premium	Restated Loss Ratio
1984	6.46	8.41	130%		
1985	8.66	9.65	111%		
1986	13.11	9.88	75%		
1987	14.99	10.80	72%	14.99	72%
1988	14.76	11.41	77%	15.43	74%
1989	15.04	12.18	81%	15.89	77%
1990	15.02	11.83	79%	16.35	72%
1991	14.75	10.80	73%	16.84	64%
1992	14.87	10.95	74%	17.34	63%
1993	15.23	11.78	77%	17.85	66%
1994	15.75	13.15	83%	18.37	72%
1995	15.12	12.54	83%	18.92	66%
1996	15.27	13.22	87%	19.48	68%
1997	15.34	14.05	92%	20.05	70%
1998	15.13	14.58	96%	20.64	71%
1999	15.54	16.44	106%	21.25	77%
2000	17.00	17.09	101%	21.88	78%
2001	18.54	16.75	90%	22.53	74%
2002	21.83	16.30	75%	23.20	70%
2003	23.96	15.99	67%	23.88	67%
2004	24.59	15.88	65%	24.59	65%
2005	25.14	16.47	66%	25.31	65%
2006	24.85	16.96	68%	26.06	65%
Total	380.94	307.12	81%		
Annual Growth				3.0%	

US P&C Primary Industry Commercial Auto/ Truck Liability/ Medical

1. It is astounding that from 1989 to 2001 original 12 month LR was always between 80 and 85 while the ultimate LR varied between 73 and 106.
2. 1991 had a 12 mo LR of 82 and 1999 had a 12 mo LR of 85!!!!

Accident Year	Gross Earned Premium	Estimated Ultimate Loss	Estimated Ultimate LR	Original 12 Mo Ultimate LR
1984	6.46	8.41	130%	
1985	8.66	9.65	111%	
1986	13.11	9.88	75%	
1987	14.99	10.80	72%	
1988	14.76	11.41	77%	
1989	15.04	12.18	81%	82%
1990	15.02	11.83	79%	83%
1991	14.75	10.80	73%	82%
1992	14.87	10.95	74%	81%
1993	15.23	11.78	77%	81%
1994	15.75	13.15	83%	82%
1995	15.12	12.54	83%	83%
1996	15.27	13.22	87%	81%
1997	15.34	14.05	92%	84%
1998	15.13	14.58	96%	85%
1999	15.54	16.44	106%	85%
2000	17.00	17.09	101%	84%
2001	18.54	16.75	90%	80%
2002	21.83	16.30	75%	73%
2003	23.96	15.99	67%	69%
2004	24.59	15.88	65%	67%
2005	25.14	16.47	66%	67%
2006	24.85	16.96	68%	
Total	380.94	307.12	81%	





Source – AM Best's Aggregate and Averages, Annual Statements, CARE 2008 presentation by Isaac Mashitz

Ultimate Losses Compared to GDP US Gross Domestic Product CA/GL/WC/PL

Swiss Re
iii

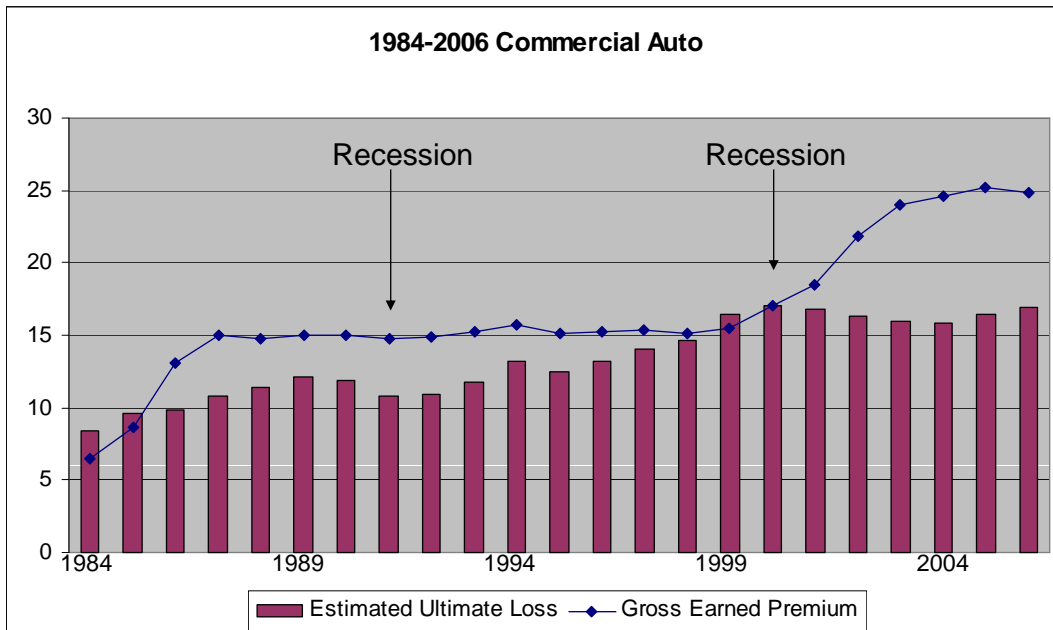
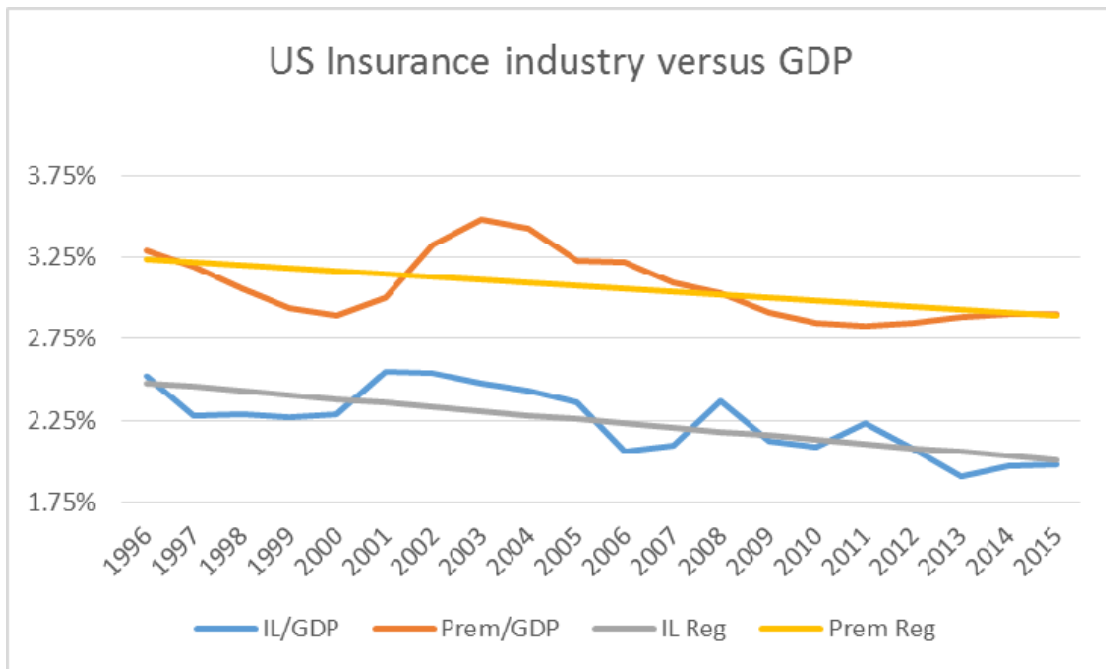
1. Insured loss as a % of GDP grew by about 25% in soft market and returned to normal levels as market hardened.

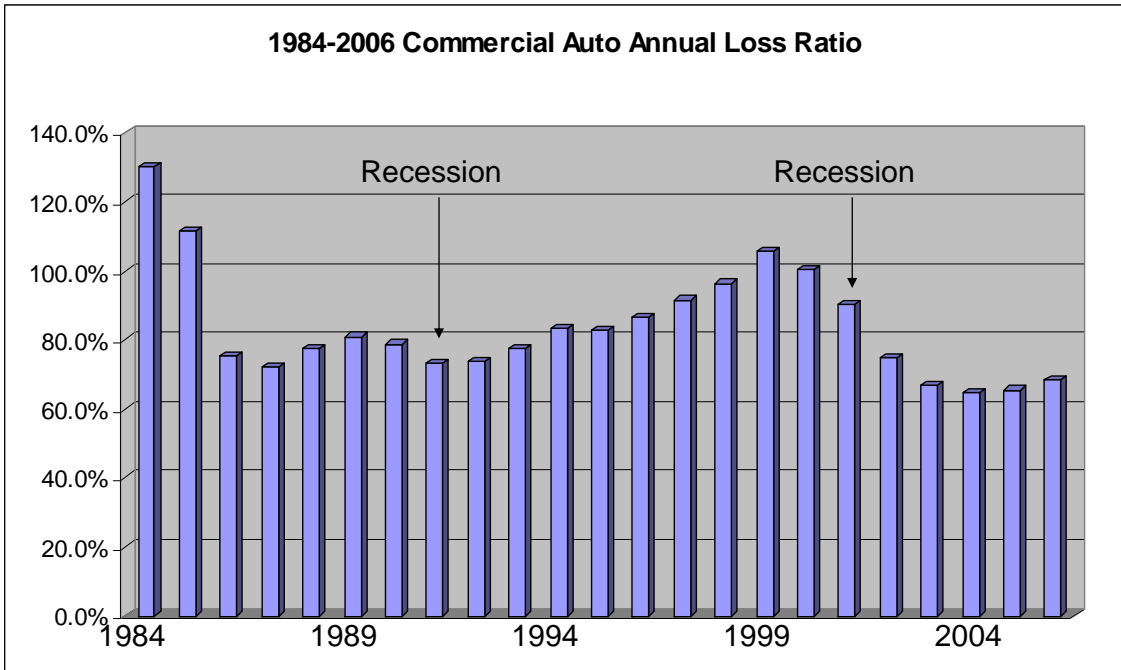
2. I believe this explains residual cyclical effect after premium smoothing in earlier exhibits.

Accident Year	Ultimate Losses Primary Industry	GDP	Ultimate losses As a % of GDP
1995	55.36	7,398	0.75%
1996	58.06	7,817	0.74%
1997	64.14	8,304	0.77%
1998	74.93	8,747	0.86%
1999	84.36	9,268	0.91%
2000	90.46	9,817	0.92%
2001	93.58	10,128	0.92%
2002	89.23	10,470	0.85%
2003	85.21	10,971	0.78%
2004	85.34	11,734	0.73%
2005	92.28	12,455	0.74%
2006	101.16	13,246	0.76%
Average			
1995 - 2006			0.81%
Annual Growth	5.6%	5.4%	
Exponential Fit	4.9%	5.2%	

Amounts in USD Billions

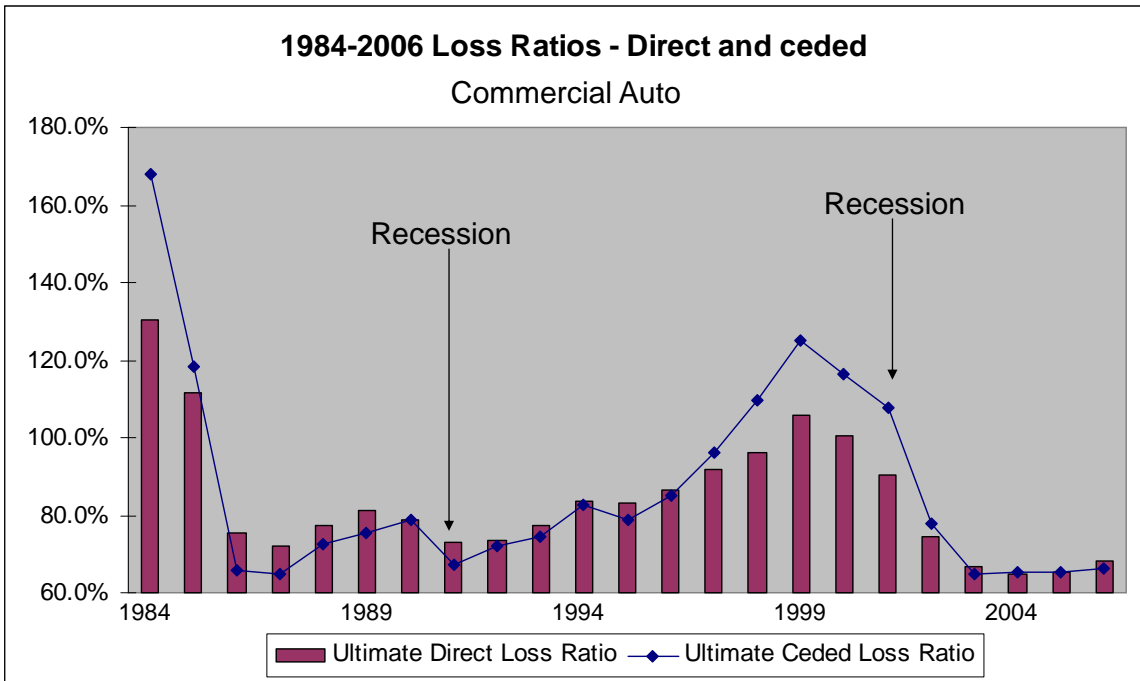
Industry versus GDP update





Conclusion - Two recessions did not seem to impact the business noticeably

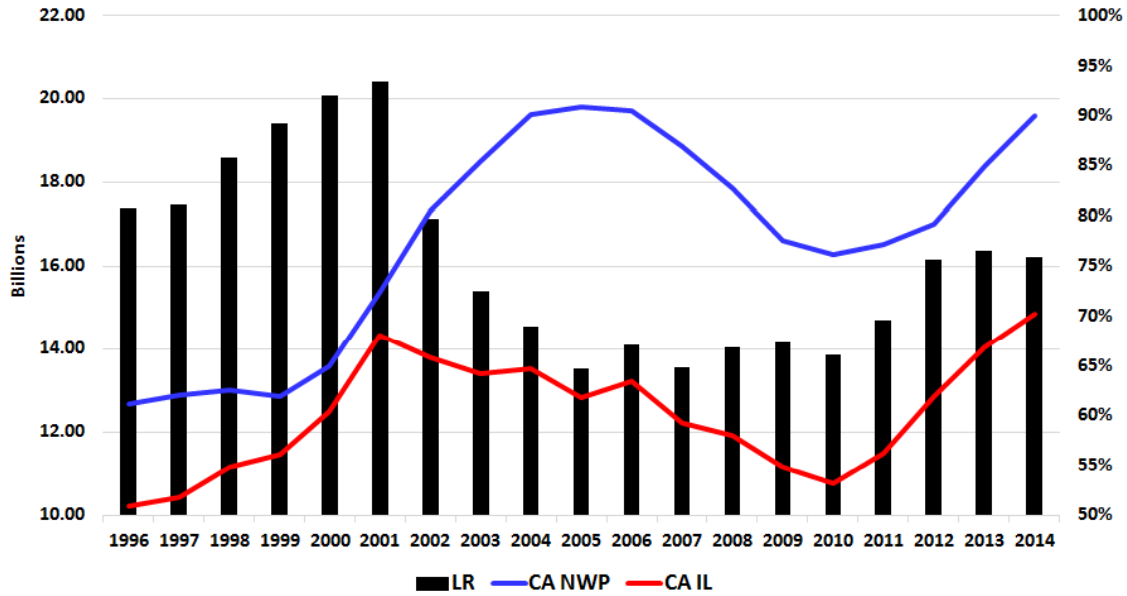
Source - AM Bests Aggregate and Averages, Annual Statements, CARE 2008 presentation by Isaac Mashitz



Same looking patterns, so recession seems like not the story.
Note - Reinsurance results are 52% more volatile than primary

Source - AM Bests Aggregate and Averages, Annual Statements, CARE 2008 presentation by Isaac Mashitz

Commercial Auto CY figures



Source : SNL

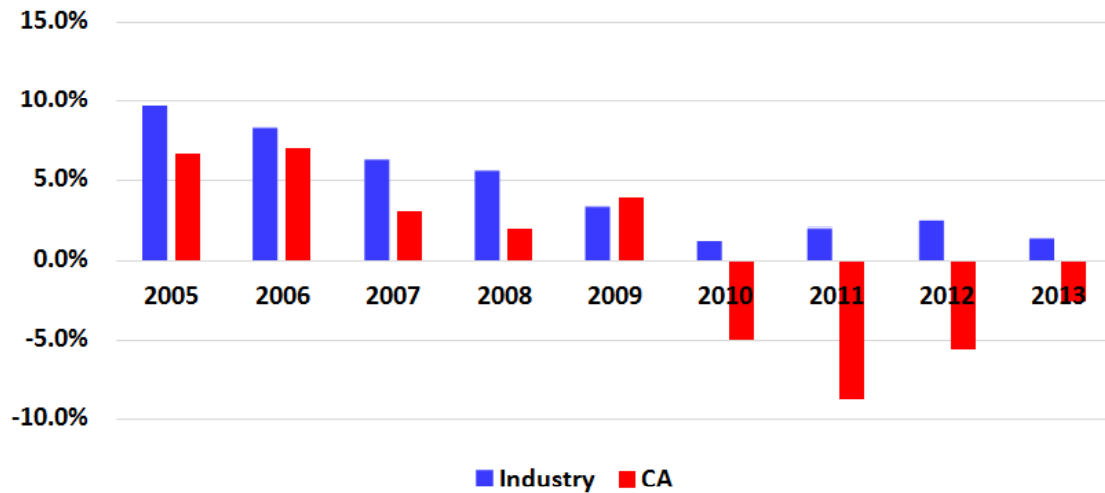
US Reinsurance Industry Reserve Development All Lines - Net - \$ Billions

1. Historically for reinsurers, adverse development only occurred during soft market accident years.
2. Historically for reinsurers, hard market years develop favorably.
3. For reinsurers, the years 1989-1996 are remarkably stable

Accident Year	Original Reserves	Developed Reserves	Adv/ (Fav) Dev	Percent Develop	after
1984	3.6	6.0	2.4	67%	10 years
1985	4.2	5.6	1.4	33%	10 years
1986	6.2	5.5	(0.7)	-11%	10 years
1987	6.7	5.1	(1.6)	-24%	10 years
1988	6.0	4.9	(1.1)	-18%	10 years
1989	6.1	5.8	(0.3)	-5%	9 years
1990	6.4	6.1	(0.3)	-5%	10 years
1991	7.2	6.8	(0.4)	-6%	10 years
1992	7.7	7.7	-	0%	10 years
1993	8.3	7.8	(0.5)	-6%	9 years
1994	8.9	8.5	(0.4)	-4%	10 years
1995	9.6	9.0	(0.6)	-6%	10 years
1996	10.1	10.6	0.5	5%	10 years
1997	10.1	11.5	1.3	13%	10 years
1998	10.0	14.2	4.3	43%	9 years
1999	12.2	18.5	6.3	52%	8 years
2000	13.0	19.8	6.8	52%	7 years
2001	17.2	20.3	3.1	18%	6 years
2002	13.7	14.3	0.6	4%	5 years
2003	14.8	13.0	(1.8)	-12%	4 years
2004	15.4	14.3	(1.2)	-8%	3 years
2005	18.0	17.9	(0.1)	-1%	2 years
2006	12.8	12.8	-	0%	1 year
1984-85	7.8	11.6	3.8	49%	
1986-88	18.9	15.5	(3.4)	-18%	
1989-96	64.3	62.3	(2.0)	-3%	
1997-2001	62.5	84.3	21.9	35%	
2002-2006	74.8	72.3	(2.5)	-3%	
Soft Market	70.3	95.9	25.7	37%	84-85 & 97-01
Hard Market	93.7	87.8	(5.9)	-6%	86-88 & 02-06
Stable Market	64.3	62.3	(2.0)	-3%	89-96

Source: Bests Aggregates and Averages

Total Industry versus CA Loss Development



	2005	2006	2007	2008	2009	2010	2011	2012	2013
Industry	(26,733,981)	(21,516,288)	(17,508,323)	(17,774,953)	(9,720,584)	(3,525,180)	(6,289,559)	(7,444,176)	(4,086,401)
CA	(773,251)	(826,447)	(362,028)	(229,881)	(416,488)	520,624	943,582	616,023	304,849
	2.9%	3.8%	2.1%	1.3%	4.3%	-14.8%	-15.0%	-8.3%	-7.5%

Source : SNL

Page 19

CARE: Intermediate Track 1 Forensics of the Commercial Auto Cycle...And Where to Now

Boston, Massachusetts
June 6, 2016



SERVE | ADD VALUE | INNOVATE

John Buchanan, FCAS, MAAA
Principal, Excess and Reinsurance

IT 1: Forensics of the Commercial Auto Cycle Agenda

- **Benchmarking Analysis Framework**
 - Benchmarking components
 - Where are we in the underwriting cycle?
 - Assessing confidence
- **Commercial Auto Experience Through 12/31/2015**
 - Raw experience and on-level
 - Using rate changes and power units (TTT)
 - Ground-up and excess indications
 - Frequency, severity, layer increased limits factors
- **Qualitative vs. Quantitative**
 - Historical issues and reconciling to graphs
 - Future and Emerging Issues
- **Where to Now?**
 - Impact Telematics, improved class plans, exposure bases

Benchmark Assessment Matrix A Suggested Framework

- All information received can be slotted (“pigeonholed”) for further analysis
- Set up an initial matrix of lines of business and types of analyses of interest to a primary company or reinsurer
 - US some 30 LOBs and 20 types of analyses
 - Trends, LDFs, ILFs, rate changes ..., cycle analysis
 - Similar for Global
- Visual framework to systematically:
 - Survey and slot internal and external info into each cell
 - Assess confidence of each item in each cell
 - Establish priorities for pricing projects – direct and proxy
- Ultimately chief actuaries and upper management use all information to assess market cycles for each LOB
- Framework for slotting actuarial presentations, including today’s



Benchmarking Components

Primary and Excess

- Trends
- Loss Development Factors
- Rate Changes
- Ground Up Loss Costs
- Excess Loss Factors
- Allocated Loss Adjustment Expenses
- Loss Ratios
- Emerging Issues
- Line of Business Correlations



Where are we in the Underwriting Cycle?

Benchmark Assessment Matrix

Estimating Confidences - Illustrative

	1		2		3		4		5		6		7	
	Trends													
	Ground Up				Excess				Loss Dev't Factors					
	Severity	Freq	Exposure	Severity	Freq	Ground Up	Excess	Ground Up	Excess	Ground Up	Excess	Ground Up	Excess	
Property	●	○	●	○	○	●	○	●	○	●	○	●	○	
Casualty	●	○	○	○	○	○	○	●	○	●	○	●	○	
Specialty	●	○	○	○	○	○	○	○	○	○	○	○	○	

	8		9		10		11		12		13		14		15	
	Rate Changes				Ground-Up		Excess				State/		Layer		Emergence	
	Primary		Reinsurance		Loss Costs		Loss Factors		ALAE		Hazard/ Subline		Experience/ Exposure		Testing	
Property	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○	○
Casualty	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○	○
Specialty	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

	16		17		18		19		20		21		22		23	
	External Forces		Loss Ratios				Aggregate				Industry		LOB		Where	
			Primary		Reinsurers		Volatility		Distribution		Macro Application		Redund/Def/ Correlations		in the Cycle?	
Property	○	○	●	●	●	●	○	○	○	○	●	●	●	●	●	●
Casualty	○	○	●	●	●	●	○	○	○	○	○	○	○	○	○	○
Specialty	○	○	●	●	●	●	○	○	○	○	○	○	○	○	○	○

Confidence:	Good	●	Medium	○	Some	○	Minimal	○
-------------	------	---	--------	---	------	---	---------	---

Source: Adapted from IT2 Intermediate / Advanced - CRe May 2014 (JBuchanan)

Case Study

Commercial Auto



Insurance Services Office, Inc. All rights reserved. Confidential and Proprietary



SERVE | ADD VALUE | INNOVATE

Industry Observations: Illustrative

Commercial Auto Reserve Analysis: "It's Deja Vu Again..."
Another Year Of Adverse Development Driven By More
Recent AY & Lower Initial Loss Picks. Reserves Continue to
Appear Modestly Deficient

- **Adverse prior year reserve development** for the 3rd consecutive year
- Only major commercial line to add to prior year reserves
- Only line that continues to see **rate increases** in the low to mid-single-digit rate
- Industry **direct written premium was up 9% in 2014** driven by continued rate increases and exposure growth
- All of the **2010-2013 years have developed adversely**, with AY'11 the worst so far.

Source: Compiled by ISO from Dowling & Partners Securities, LLC IBNR Reports (1H2015) – Used with Permission

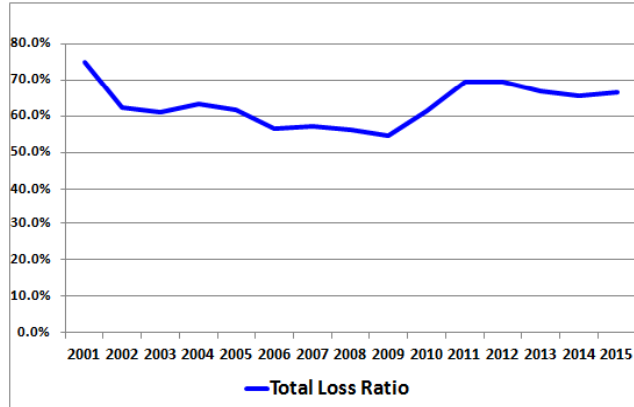


Commercial Auto – TTT- Countrywide Average Ground-up Loss Ratios @12/31/2015 Before Rate Level Changes

Illustrative

Analysis Method: Premium (no rate change)
Apriori Trend = 0.03
INCURRED

AY	Ultimate INDEMNITY & ALAE	Total Loss Ratio	YTY Change	Ultimate Premium
2001	2,683,675,861	74.8%		3,588,742,631
2002	2,421,386,973	62.3%	-16.71%	3,888,880,055
2003	2,452,868,136	61.1%	-1.93%	4,014,464,636
2004	2,531,795,163	63.4%	3.76%	3,992,503,146
2005	2,587,402,721	61.7%	-2.68%	4,191,394,636
2006	2,577,834,225	56.4%	-8.59%	4,572,993,699
2007	2,597,030,409	57.1%	1.24%	4,546,807,464
2008	2,340,171,099	56.3%	-1.40%	4,171,400,000
2009	2,129,040,163	54.4%	-3.37%	3,911,917,967
2010	2,324,556,274	61.4%	12.87%	3,784,931,314
2011	2,616,186,513	69.5%	13.19%	3,764,687,780
2012	2,675,907,159	69.5%	0.00%	3,848,116,211
2013	2,823,855,622	66.7%	-4.03%	4,233,212,067
2014	2,955,641,408	65.6%	-1.65%	4,507,618,886
2015	3,169,521,802	66.4%	1.22%	4,771,845,144
Total/Average	38,894,874,328	62.9%	-0.58%	61,789,515,699
Trend 7 year			2.46%	
Trend - all year			0.27%	



Source: ISO SOLM 2016 v1 - losses developed to ultimate using 5-year VVA; 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)

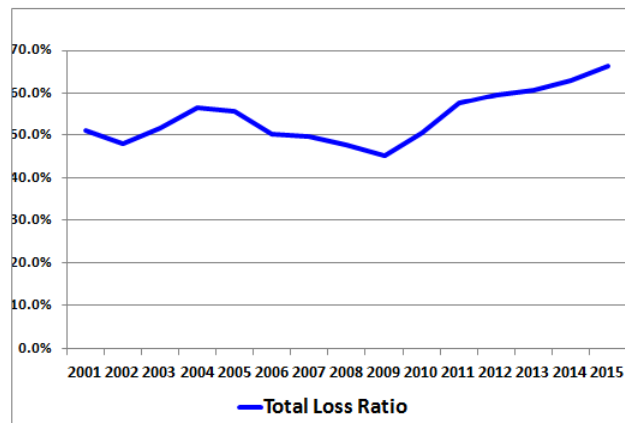


Commercial Auto - TTT - Countrywide Average Ground-up Loss Ratios @12/31/2015 After Rate Level Changes (on-level 2015)

Illustrative

Analysis Method: Premium (MW rate change)
Apriori Trend = 0.03
INCURRED

AY	Ultimate INDEMNITY & ALAE	Total Loss Ratio	YTY Change	Ultimate Prem
2001	2,683,675,861	51.0%		5,259,313,191
2002	2,421,386,973	47.9%	-6.08%	5,058,540,638
2003	2,452,868,136	51.8%	8.14%	4,738,768,792
2004	2,531,795,163	56.6%	9.27%	4,473,817,476
2005	2,587,402,721	55.6%	-1.77%	4,651,561,274
2006	2,577,834,225	50.4%	-9.35%	5,115,704,280
2007	2,597,030,409	49.8%	-1.19%	5,214,341,935
2008	2,340,171,099	47.6%	-4.42%	4,934,409,650
2009	2,129,040,163	45.3%	-4.83%	4,695,638,350
2010	2,324,556,274	50.7%	11.92%	4,586,874,534
2011	2,616,186,513	57.5%	13.41%	4,551,143,714
2012	2,675,907,159	59.7%	3.83%	4,478,943,135
2013	2,823,855,622	60.8%	1.84%	4,642,446,939
2014	2,955,641,408	63.0%	3.62%	4,692,777,431
2015	3,169,521,802	66.4%	5.40%	4,771,845,144
Total/Average	38,894,874,328	54.1%	2.13%	71,866,126,484
Trend 7 year			5.85%	
Trend - all year			1.62%	



Source: ISO SOLM 2016 v1 - losses developed to ultimate using 5-year VVA; 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 assuming 6 mo. policies)



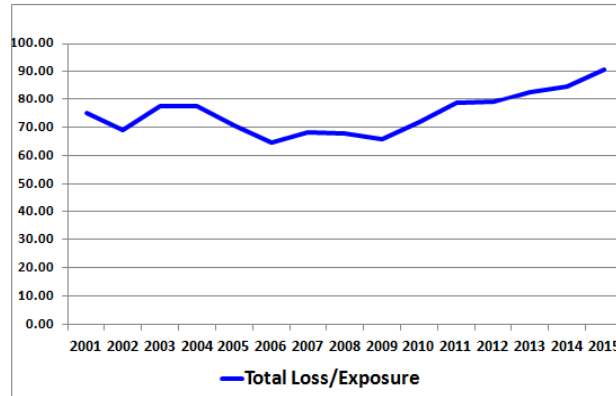
Commercial Auto - TTT- Countrywide

Average Ground-up Loss Costs @12/2015 Per Exposure Unit (Power Units)

Illustrative

Analysis Method: Exposure (no adjustments)
 Apriori Trend = 0.03
 INCURRED

AY	Ultimate INDEMNITY & ALAE	Total Loss/Exposure	YTY Change	AY Exposure (Power Units)
2001	2,683,675,861	75.01		35,779,015
2002	2,421,386,973	68.91	-8.12%	35,136,166
2003	2,452,868,136	77.47	12.42%	31,662,327
2004	2,531,795,163	77.60	0.17%	32,625,743
2005	2,587,402,721	70.79	-8.77%	36,548,902
2006	2,577,834,225	64.72	-8.57%	39,828,308
2007	2,597,030,409	68.10	5.22%	38,135,006
2008	2,348,171,899	67.80	-0.44%	34,634,539
2009	2,129,040,163	65.78	-2.98%	32,367,036
2010	2,324,556,274	71.85	9.23%	32,352,978
2011	2,616,186,513	78.62	9.42%	33,278,007
2012	2,675,907,159	79.19	0.74%	33,789,107
2013	2,823,855,622	82.73	4.47%	34,132,666
2014	2,955,641,408	84.79	2.49%	34,858,375
2015	3,169,521,802	90.79	7.07%	34,911,651
Total/Average	38,894,874,328	74.79	1.59%	520,039,826
Trend 7 year			4.82%	
Trend - all year			1.24%	



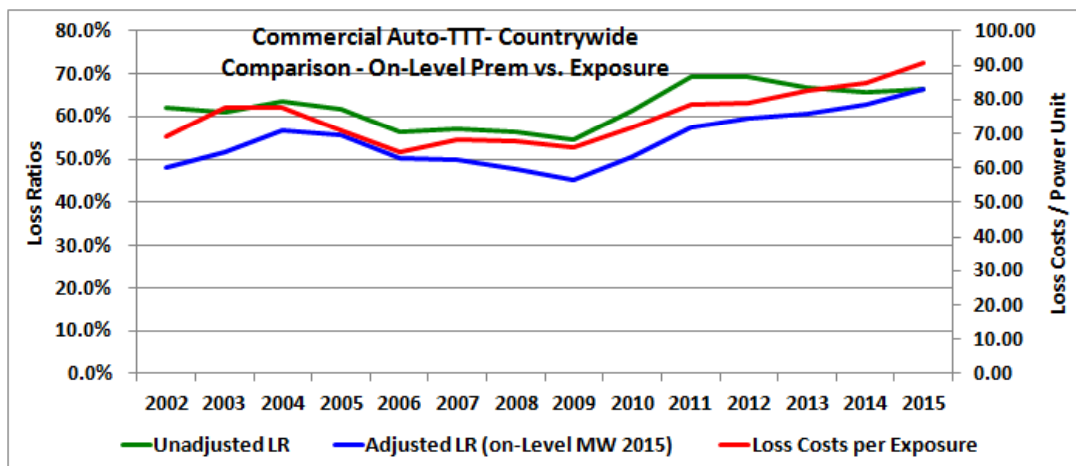
Source: ISO SOLM 2016 v1 - losses developed to ultimate using 5-year VWA; premiums developed to ultimate using Earned Premium triangle
 ISO MarketWatch for Rate changes - Auto Commercial Liability - through 12/31/2015 (adjusted policy year to accident year using 6mo policy term assumption)



Commercial Auto - TTT- Countrywide

Comparison On-Level Loss Ratios and Per Exposure Loss Costs

Illustrative



Source: ISO SOLM 2016 v1 - losses developed to ultimate using 5-year VWA; 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)

NB: additional variables such as truck employment, truck tonnage, new heavy truck sales, and other economic indicators should be explored to help analyze residual trend indications (see Dave Clark - IT2 and C28); other Emerging Issues variables described in slides 48-54 should also be reviewed.

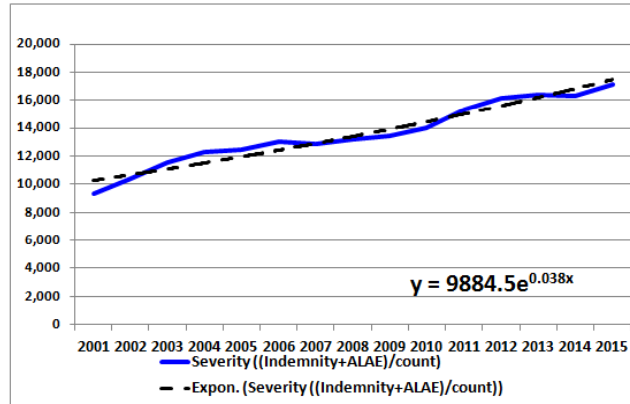


Commercial Auto – TTT - Countrywide Average Ground-up Average Severity @ 12/2015

Illustrative

Analysis Method: Premium (MW rate change)
Apriori Trend = 0
INCURRED

AY	Severity (Indemnity+ ALAE)/count	Severity (Indemnity+ ALAE)/count	YTY Change	Ultimate Prem
2001	9,324	9,324		5,259,313,191
2002	10,378	10,378	11.30%	5,056,540,638
2003	11,554	11,554	11.33%	4,738,766,792
2004	12,300	12,300	6.46%	4,473,817,476
2005	12,427	12,427	1.03%	4,651,561,274
2006	13,009	13,009	4.68%	5,115,704,280
2007	12,836	12,836	-1.33%	5,214,341,935
2008	13,158	13,158	2.51%	4,934,409,650
2009	13,414	13,414	1.95%	4,695,638,350
2010	14,036	14,036	4.64%	4,586,874,534
2011	15,320	15,320	9.15%	4,551,143,714
2012	16,134	16,134	5.31%	4,478,943,135
2013	16,396	16,396	1.62%	4,642,446,939
2014	16,318	16,318	-0.48%	4,692,777,431
2015	17,135	17,135	5.01%	4,771,845,144
Total/Average	203,739		4.51%	71,866,126,484
Trend 7 year				3.94%
Trend - all year				3.80%



Source: ISO SOLM 2016 v1 - losses developed to ultimate using 5-year VWA; 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)

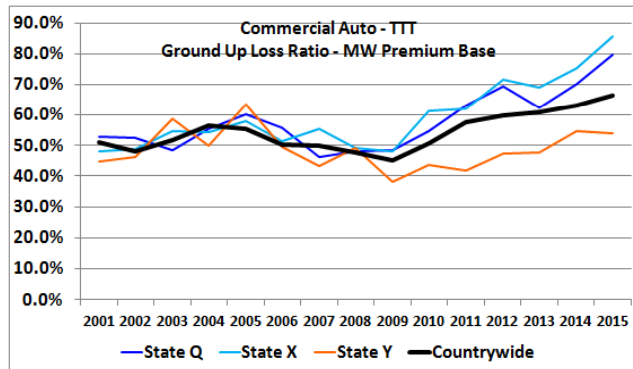


Commercial Auto - TTT – State Differences Average Ground-up Loss Ratio @12/2015 Including Split Between Frequency and Severities

Illustrative

Ground Up Loss Ratio - MW Premium Base

	Countrywide	State Q	State X	State Y
2001	51.0%	52.8%	48.0%	44.9%
2002	47.9%	52.4%	48.7%	46.4%
2003	51.8%	48.4%	54.7%	58.6%
2004	56.6%	55.3%	54.3%	49.9%
2005	55.6%	60.3%	58.0%	63.6%
2006	50.4%	55.8%	51.4%	49.6%
2007	49.8%	46.3%	55.4%	43.3%
2008	47.6%	48.0%	49.2%	49.0%
2009	45.3%	48.6%	48.2%	38.2%
2010	50.7%	54.6%	61.3%	43.5%
2011	57.5%	63.1%	62.1%	41.8%
2012	59.7%	69.4%	71.7%	47.5%
2013	60.8%	62.6%	69.0%	47.6%
2014	63.0%	70.3%	75.4%	54.6%
2015	66.4%	79.6%	85.7%	53.8%
7 Year Trend	5.85%	7.06%	8.02%	5.76%
7 year Trend - Freq	1.90%	3.48%	3.43%	4.11%
7 year Trend - Sev	3.94%	3.58%	4.58%	1.58%
% of 7-year trend due to sev	66.2%	49.0%	55.4%	27.5%
% of 7-year trend due to freq	33.8%	51.0%	44.6%	72.5%



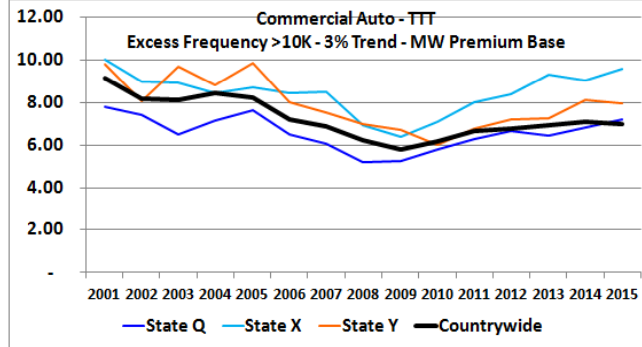


Commercial Auto - TTT – State Differences Excess Frequency >10k @12/2015

Using On-Level Premium and Assuming 3% Severity Trend

Illustrative

Excess Frequency >10K - 3% Trend - MW Premium Base				
	Countrywide	State Q	State X	State Y
2001	9.13	7.78	9.98	9.79
2002	8.18	7.41	9.01	8.08
2003	8.10	6.50	8.92	9.70
2004	8.47	7.17	8.46	8.82
2005	8.24	7.66	8.73	9.82
2006	7.22	6.49	8.42	8.04
2007	6.91	6.05	8.49	7.52
2008	6.23	5.21	6.92	7.01
2009	5.78	5.25	6.38	6.74
2010	6.20	5.80	7.10	6.03
2011	6.67	6.29	7.99	6.79
2012	6.77	6.68	8.42	7.22
2013	6.92	6.45	9.30	7.24
2014	7.09	6.83	9.05	8.11
2015	7.01	7.22	9.55	7.98
7 Year Trend	3.15%	4.67%	6.60%	4.17%
Total Occurrences	723,394	48,635	25,544	11,015
Excess vs GU trend	1.25%	1.19%	3.17%	0.06%

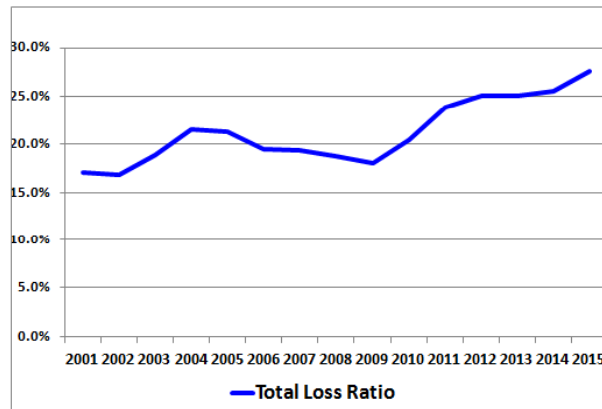


Commercial Auto – TTT – Countrywide Excess Layer Losses to compare to ILF's @ 12/2015

Illustrative

Analysis Method: Premium (MW rate change)
Apriori Trend = 0.03
INCURRED

AY	Ultimate INDEMNITY & ALAE	Total Loss Ratio	YTY Change	Ultimate Prem
2001	900,472,751	17.1%		5,259,313,191
2002	850,017,180	16.8%	-1.75%	5,058,540,638
2003	895,208,665	18.9%	12.50%	4,738,768,792
2004	967,012,506	21.6%	14.29%	4,473,817,476
2005	991,762,034	21.3%	-1.39%	4,651,561,274
2006	996,606,811	19.5%	-8.45%	5,115,704,280
2007	1,010,286,630	19.4%	-0.51%	5,214,341,935
2008	928,512,806	18.8%	-3.09%	4,934,408,650
2009	842,913,152	16.0%	-4.20%	4,695,030,350
2010	936,502,478	20.4%	13.33%	4,586,874,534
2011	1,081,656,974	23.8%	16.67%	4,551,143,714
2012	1,118,274,300	25.0%	5.04%	4,478,943,135
2013	1,166,903,259	25.1%	0.40%	4,642,446,939
2014	1,195,408,670	25.5%	1.59%	4,692,777,431
2015	1,316,964,903	27.6%	8.24%	4,771,845,144
Total/Average	15,198,503,119	21.1%	3.76%	71,866,126,484
Trend 7 year			6.36%	
Trend - all year			2.93%	



Source: ISO SOLM 2016 v1 - losses developed to ultimate using 5-year VWA; 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 assuming 6 mo. policies)



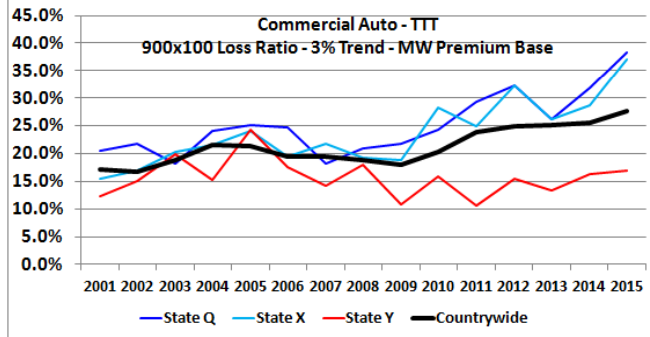
Commercial Auto - TTT - State Differences

Excess Partial Loss Ratios 900x100k @12/2015

Using On-Level Premium and Assuming 3% Severity Trend

Illustrative

900x100 Loss Ratio - 3% Trend - MW Premium Base				
	Countrywide	State Q	State X	State Y
2001	17.1%	20.6%	15.4%	12.3%
2002	16.8%	21.7%	16.9%	15.1%
2003	18.9%	18.2%	20.4%	19.8%
2004	21.6%	24.1%	21.5%	15.2%
2005	21.3%	25.1%	24.0%	24.3%
2006	19.5%	24.7%	19.4%	17.5%
2007	19.4%	18.2%	21.7%	14.3%
2008	18.8%	20.9%	19.2%	18.1%
2009	18.0%	21.8%	18.9%	10.9%
2010	20.4%	24.3%	20.3%	16.0%
2011	23.8%	29.3%	24.9%	10.6%
2012	25.0%	32.2%	32.2%	15.4%
2013	25.1%	26.2%	26.1%	13.3%
2014	25.5%	31.9%	28.6%	16.4%
2015	27.6%	38.3%	37.1%	16.9%
7 Year Trend	6.36%	7.58%	7.47%	5.69%
Excess vs GU trend	0.52%	0.52%	-0.55%	-0.07%



Commercial Auto - Lengthening Loss Development

View at 2010: Ex-ante 5 years - excess layer 900x100k

Illustrative

State	Countrywide							
Major Class	CA							
Data Threshold Min	100,001							
Data Threshold Max	1,000,000							
Paid/Incurred	INCURRED				INCURRED			
Loss Type	INDEMNITY							
Trend	3.0%							
Line of Business	CA				Combined			
Market	Countrywide							
State	Countrywide							
	12	24	36	48	60	72	84	96
AY 1997	352,883,222	617,774,125	756,950,801	842,517,130	912,791,715	938,273,843	949,819,380	950,724,785
AY 1998	361,574,320	610,038,081	733,181,509	917,409,907	969,817,214	984,022,031	988,320,401	989,207,712
AY 1999	375,819,924	643,345,945	871,990,360	999,072,041	1,047,350,457	1,071,732,446	1,080,432,924	1,083,276,328
AY 2000	364,230,364	668,607,352	888,136,006	1,019,035,751	1,069,796,753	1,078,685,399	1,078,134,771	1,080,449,826
AY 2001	362,874,309	646,234,901	855,175,814	998,697,134	1,028,546,796	1,032,712,610	1,035,065,838	1,036,330,034
AY 2002	359,155,078	647,590,063	836,254,069	927,380,059	958,498,124	975,097,181	980,217,784	981,263,268
AY 2003	373,693,137	673,313,888	850,101,251	951,649,708	989,067,394	1,005,607,530	1,007,869,678	1,008,014,437
AY 2004	428,699,656	744,516,910	924,343,635	1,011,987,427	1,058,416,374	1,075,494,990	1,074,042,654	1,076,876,061
AY 2005	444,161,637	771,183,404	949,105,547	1,056,701,234	1,097,265,890	1,112,068,839	1,116,372,434	1,120,755,518
AY 2006	437,386,107	766,785,312	963,240,859	1,066,637,325	1,112,815,458	1,129,449,952	1,129,332,037	1,131,489,486
AY 2007	462,185,649	801,737,481	991,509,745	1,088,630,104	1,118,557,727	1,139,793,153	1,146,546,479	1,146,896,069
AY 2008	425,290,636	722,271,219	888,533,303	978,115,334	1,013,557,136	1,027,136,175	1,034,021,517	1,035,845,596
AY 2009	334,768,535	624,898,496	776,084,454	883,104,169	927,787,928	948,485,344	949,819,735	949,819,735
AY 2010	372,699,495	672,626,985	895,740,409	969,387,048	1,035,435,968	1,051,546,587		
AY 2011	421,407,667	763,041,966	990,398,802	1,125,676,152	1,194,878,815			
AY 2012	423,223,216	796,628,773	1,042,048,655	1,168,866,896				
AY 2013	448,843,946	849,643,294	1,079,354,243					
AY 2014	475,727,327	837,690,338						
AY 2015	500,463,960							
7 Year Totals - 2014, 2015:	18,120,331,965	19,430,015,200						
			15,321,892,201	20.0%				
	24/12	36/24	48/36	60/48	72/60	84/72	96/84	108/96
AY 1997	1.751	1.225	1.113	1.083	1.028	1.012	1.001	1.002
AY 1998	1.689	1.282	1.171	1.057	1.015	1.004	1.001	1.001
AY 1999	1.712	1.355	1.146	1.048	1.023	1.008	1.003	1.000
AY 2000	1.836	1.328	1.147	1.050	1.008	1.000	1.002	0.999
AY 2001	1.781	1.323	1.168	1.030	1.004	1.002	1.001	0.998
AY 2002	1.803	1.291	1.109	1.034	1.017	1.005	1.001	0.999
AY 2003	1.802	1.263	1.119	1.038	1.017	1.002	0.998	1.001
AY 2004	1.737	1.242	1.095	1.046	1.016	0.999	1.003	1.000
AY 2005	1.736	1.231	1.113	1.038	1.013	1.006	1.002	1.001
AY 2006	1.753	1.256	1.107	1.043	1.014	1.001	1.002	1.002
AY 2007	1.735	1.237	1.098	1.027	1.019	1.006	1.000	1.003
AY 2008	1.698	1.230	1.101	1.036	1.013	1.007	1.002	
AY 2009	1.867	1.242	1.138	1.061	1.022	1.001		
AY 2010	1.805	1.287	1.120	1.065	1.016			
AY 2011	1.858	1.265	1.137	1.061				
AY 2012	1.882	1.308	1.122					
AY 2013	1.893	1.270						
AY 2014	1.761							
			6 year ATA/ATU Factor			6 Ex Ante		

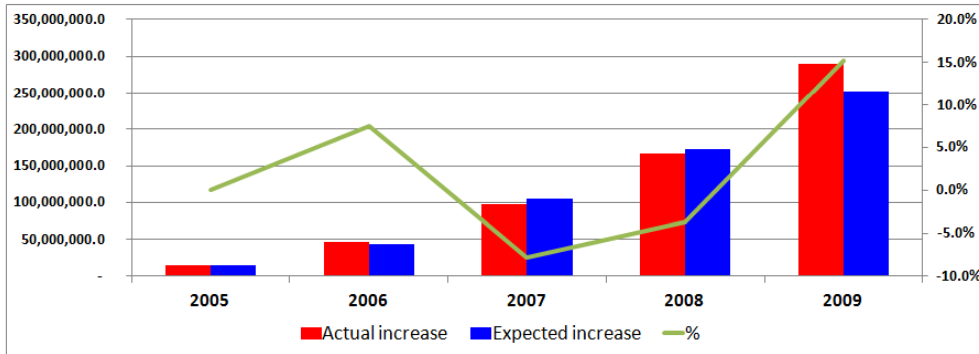


Commercial Auto – ERLI Warning

View at 2010: Ex-ante 5 years – excess layer 900x100k

Illustrative

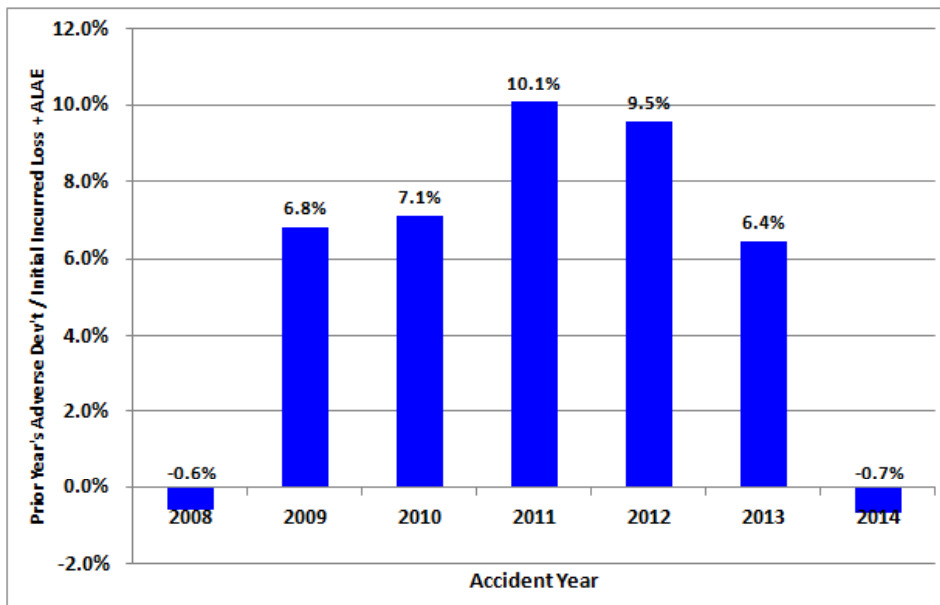
AY	Actual n-6	Actual n-5	5-Yr ATA	Expected n-5	AY	Actual increase	Expected increase	Actual - Expected	%
2005	1,097,265,890	1,112,068,639	1.0135	1,112,059,126	2005	14,802,749.0	14,793,235.6	9,513.4	0.1%
2006	1,066,637,325	1,112,815,458	1.0403	1,109,570,434	2006	46,178,133.0	42,933,109.1	3,245,023.9	7.6%
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- TTT – ERLI Warning

Adverse Development from Initial Estimate - Total

Illustrative

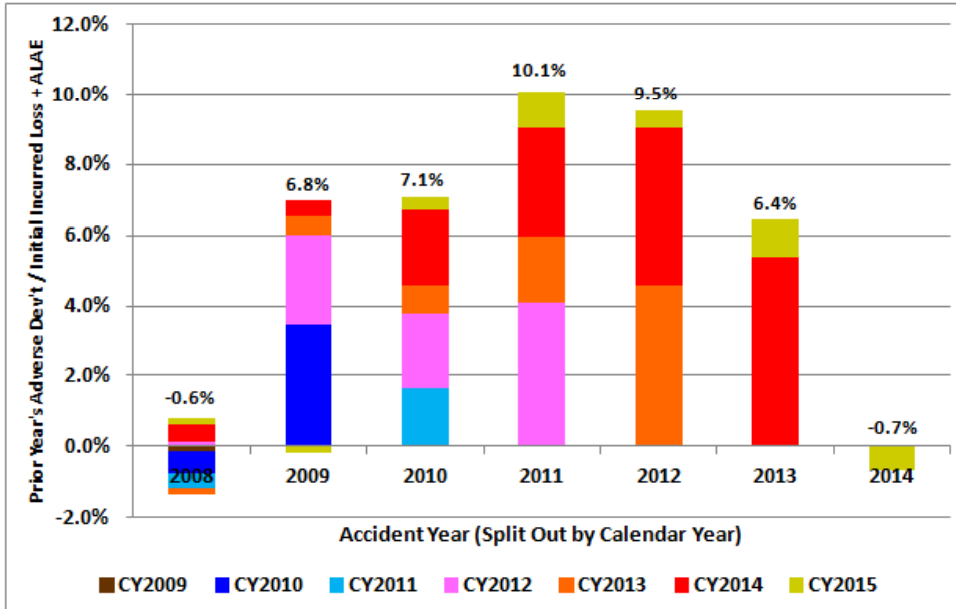


Source: ISO SOLM 2016 v1 - losses developed to ultimate using 5-year VWA (refresh each year); premiums developed to ultimate using Earned Premium triangle
 ISO MarketWatch for Rate changes - Auto Commercial Liability - through 12/31/2015 (adjusted policy year to accident year using 6 mo policy term assumption)



Commercial Auto- TTT – ERLI Warning Adverse Development from Initial Estimate – Total by Calendar Year

Illustrative

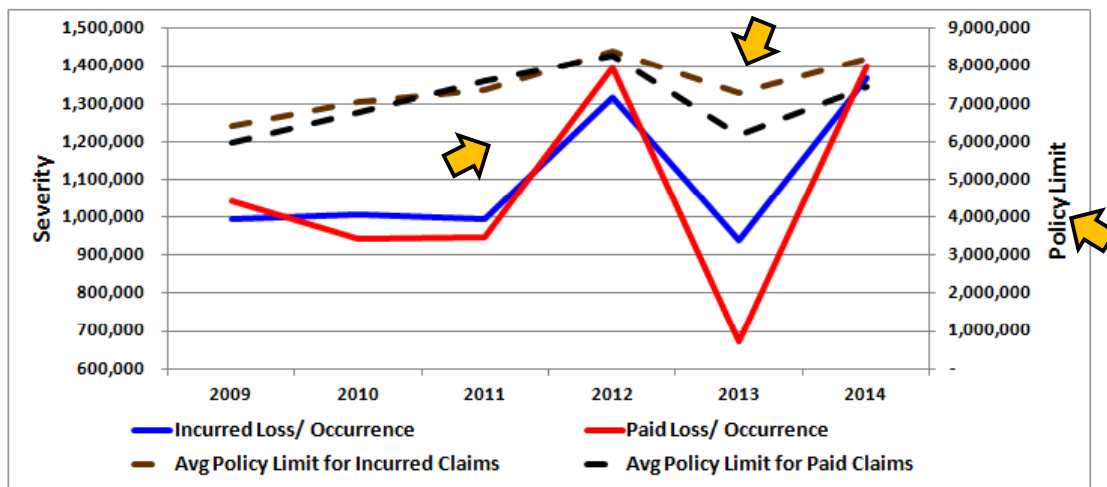


Source: ISO SOLM 2016 v1 - losses developed to ultimate using 5-year VWA (refresh each year); premiums developed to ultimate using Earned Premium triangle
 ISO MarketWatch for Rate changes - Auto Commercial Liability - through 12/31/2015 (adjusted policy year to accident year using 6 mo policy term assumption)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



Umbrella and Excess: Commercial Auto Component Average Severities and Policy Limits

Illustrative

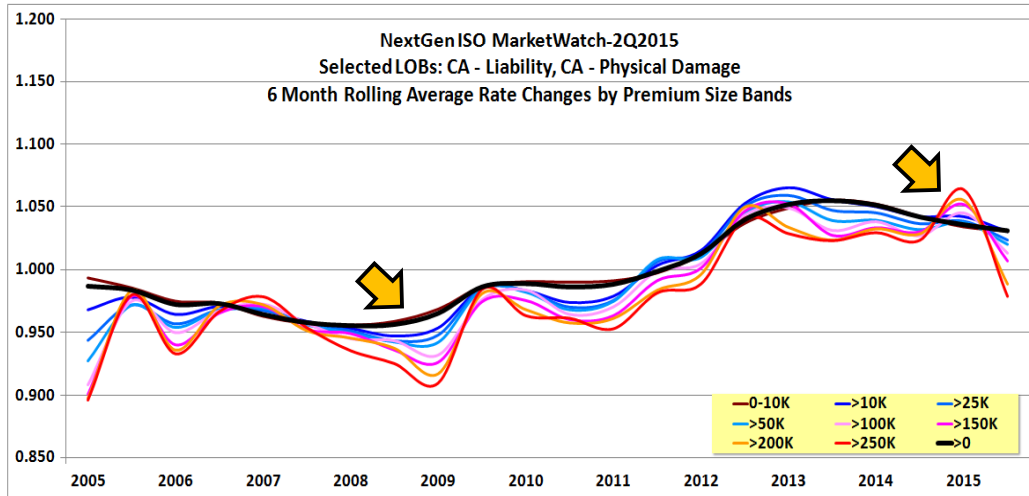


Source: ISO SOLM-UXS
 Losses unadjusted for rate changes



Rate Changes Through 6/30/2015 Liability & Physical Damage

Illustrative



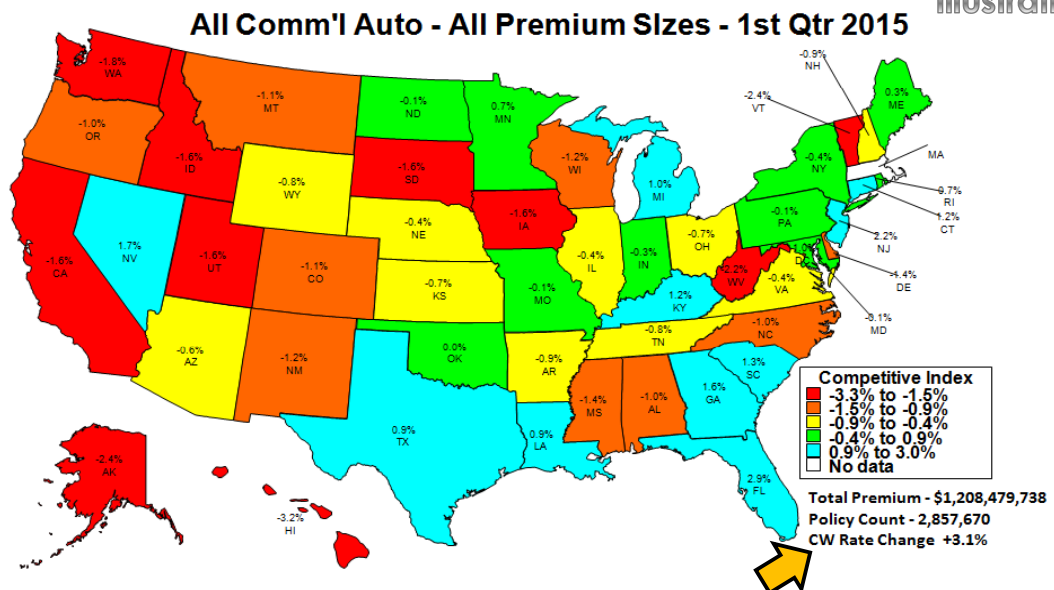
Total # of policies	Total Premium (previous)			
	All	>10K	>100k	>200k
107,165,059	44,856,211,848	10,451,606,813	2,757,728,316	1,572,252,422

Source: ISO MarketWatch - released 9/15/2015



Rate Changes: State Competitive Indexes

Illustrative



Note: Competitive Index is the average rate change in that state vs. the overall countrywide average
Negative means more competitive (softer market) and positive means less competitive (harder market).

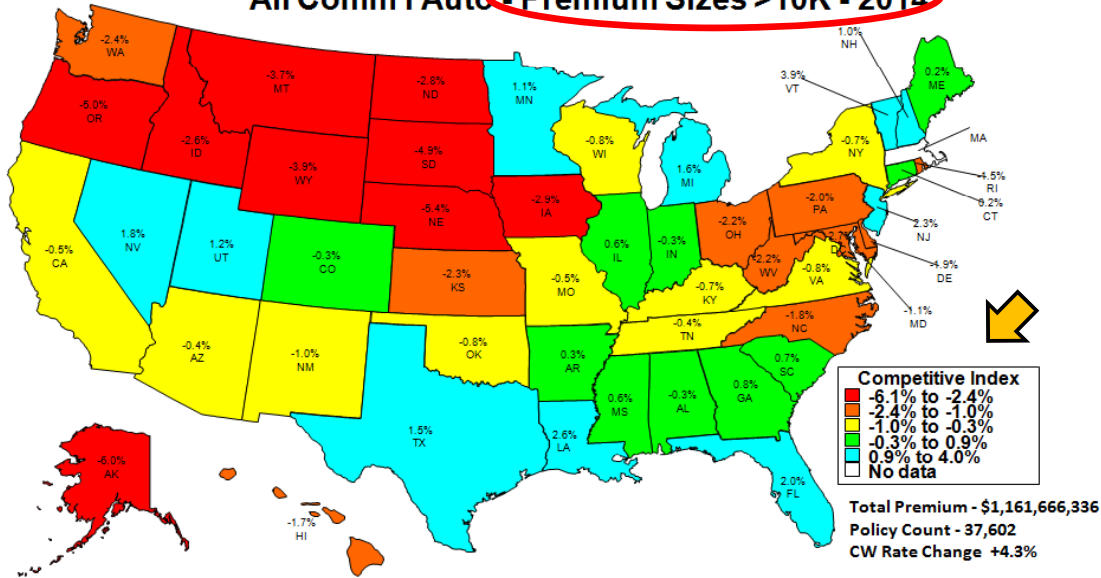
Source: ISO MarketWatch - released 9/15/2015



Rate Changes: State Competitive Indexes

Illustrative

All Comm'l Auto - Premium Sizes >10K - 2014

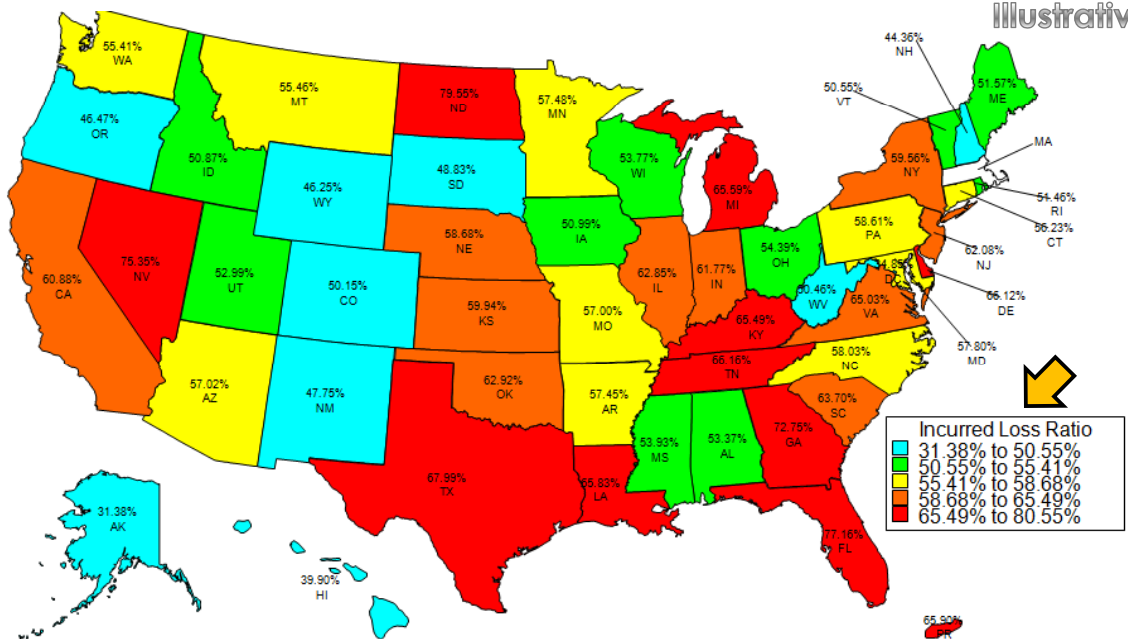


Note: Competitive Index is the average rate change in that state vs. the overall countrywide average
Negative means more competitive (softer market) and *positive* means less competitive (harder market).
 Source: ISO MarketWatch - released 9/15/2015



Commercial Auto Liability - Incurred Loss Ratios

Illustrative

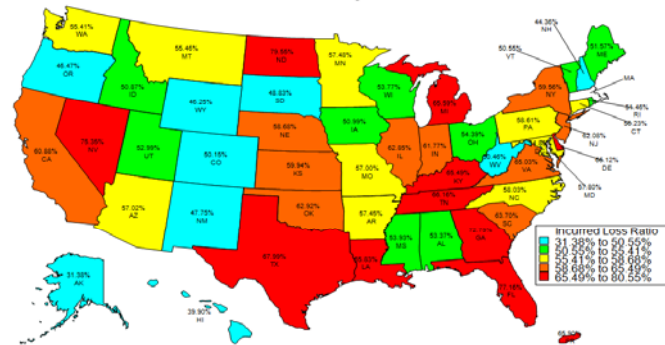


Source: ISO Data Cube - Experience Profiler (2009-2013)

Comparison of 2009-2013 Loss Ratios to 2014 Rate Changes

Commercial Auto Liability - Incurred Loss Ratios

Illustrative



NextGen MarketWatch - Competitive Ranking
All Comm'l Auto - All Premium Sizes - 2014



Rate Change Observations



- **Rate change deterioration**
 - Overall rates were down by 1-5% per year from 2005 to 2011 (2007 to 2009 down by 3-5%)
 - Taking premium size into consideration the rates related to the **larger premium sizes are down by 3% to 9% per year** from 2005 to 2012.
 - These larger rate reductions may impact E&S, reinsurers and primary companies insuring larger auto fleets
- **Large differentials by state and premium size**
- **Adverse loss ratio experience by state tends to give rise to subsequent rate activity**

Commercial Auto Conclusions

- **Long-term pricing reductions** in the early to mid 2000s were partially **offset by significant frequency reductions** in that period
- **Pricing continued to drop** in the later 2000s, **but frequencies leveled off** presenting pent up pressure on results
- **Loss ratios increased from 2009 to 2012 by over 25%** - from mid 50%'s to close to 70%: long-term severities increased, development factors lengthened, frequencies started to rise, excess layer %'s increased, rates were still dropping
- After **prices started to rise in 2012**, loss ratios leveled off are now trending back up again towards the mid 60%'s
- It appears **trends may not have been spotted by many carriers**, as we have seen late emerging losses and significant subsequent years reserve strengthening
- **Significant state and commercial auto type differences**

Emerging Issues Qualitative vs. Quantitative Analysis

Confidential - Not for Distribution without permission



Qualitative and Quantitative Analysis – Overview and Steps Reconciling and Projecting Expected Impacts on Trend Indications

Overview: Apply knowledge from internal and external sources

- Assess qualitative impacts affecting individual lines of business
- Evaluate impacts on combinations of lines under an ERM framework; historical and emerging

1. Start with a survey list of potential historical issues or topics

- e.g. impact of seat belt laws for Personal Auto or MPL under various time frames

2. Assess whether each item would have a positive or negative impact

- e.g. expected to reduce (positive) or increase (negative) the frequency trend, no impact or unknown

3. Attempt to quantify impact of each item

- Low, medium, high, or unknown

4. Reconcile various impact items, direction and magnitude, on historical frequency trend indications

- Eyeball axiom – do the two visuals line up across the time periods included?
- Perhaps more rigorous trend analysis confidence level tests can be applied

5. Do the same for:

- Across line impacts under ERM (e.g. economy, climate change, etc.)
- Severity impacts and other items in Benchmark Assessment Matrix
- Future emerging issues

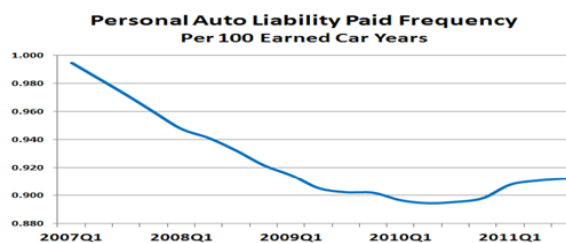
Source: CArE Seminar (CS1)- JBuchanan – 6/2013



Frequency Trend Assessment Matrix Impact Illustration #1 – Personal Auto Cycle Components

ISSUE/TOPIC		Personal Auto - Total				
		2H1990s	1H2000s	2H2000s	2010-13	FUTURE
Historical Perspective	Seat Belt Laws	M				✓
	Seat Belt Usage		L	L		✓
	Airbags Laws/Technology	L	M	M	L	
	Automobile Design	L	L	L		
	Roadway Design	L	L	L		
	Electronic Stability Control		L	H	L	
	Vehicle Type (Unequal Size)		L	L	L	
	Bumper Height		✓	✓	✓	
	Graduated Licensing (Teenagers)		M	L		
	Performance (more HP)		L	L	L	
	Distracted Driving (use of Cell Phones, etc.)		L	M	M	
	Economy (good mean more driving, vice-versa)	✓	L	M	L	
	Miles Driven (Price of Gasoline)			L	L	
	Climate (severe weather change?)			✓	✓	✓
	Tort Reform	✓	✓	✓	✓	
	Building Code Regulation/Construction					

Impact Color Keys:	
Positive (Lower Frequency)	Green
Negative (Higher Frequency)	Red
Expected No Impact	Yellow
Blank = N/A	
✓ = Some impact expected (TBD)	
Impact Levels:	
H = High	
M = Medium	
L = Low	



Source: CArE Seminar (CS1)- JBuchanan – 6/2013



Frequency Trend Assessment Matrix - Illustrative Impact Illustration #1 – Personal and Commercial Auto Cycle Components

ISSUE/TOPIC	Personal Auto - Total					Commercial Auto - TTT				
	2H 1990s	1H 2000s	2H 2000s	2010-15	FUTURE	2H 1990s	1H 2000s	2H 2000s	2010-15	FUTURE
Seat Belt Laws	M				✓	✓	✓	✓	✓	
Seat Belt Usage		L	L		✓					
Airbags Laws/Technology	L	M	M	L		✓	✓	✓	✓	
Automobile Design	L	L	L			✓	✓	✓	✓	
Auto Performance (more HP)		L	L	L						
Roadway Design	L	L	L			✓	✓	✓	✓	
Electronic Stability Control		L	H	L		✓	✓	✓	✓	
Vehicle Type (Unequal Size)		L	L	L						
Bumper Height		✓	✓	✓						
Graduated Licensing (Teenagers)		M	L							
Distracted Driving (use of Cell Phones, etc.)		L	M	M						
Miles Driven (Price of Gasoline)			L	L		✓	✓	✓	✓	
Economy (good means more driving, vice-versa)	✓	L	M	L		✓	✓	✓	✓	
Crash/testing Avoidance Systems (autobrake, forward collision warning, adaptive headlights, lane departure warning, AEB)										
Small overlap frontal										
Google driverless car										
Improved Risk Management Programs						✓	✓	✓	✓	
Mandatory Training						✓	✓	✓	✓	
Telematics / improved class plans / exposure bases									✓	
Tort Reform	✓	✓	✓	✓						
Propensity to sue										
Social changes / Political Ideology										
Deductible Increases										

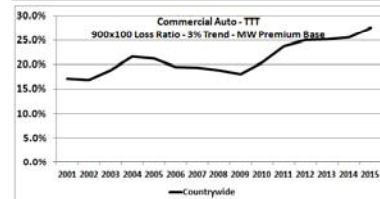
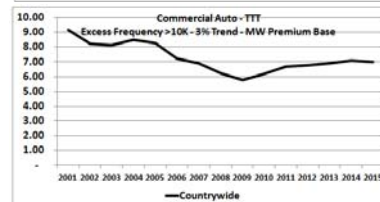
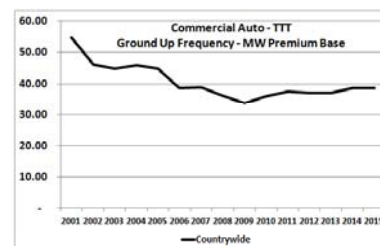


Frequency/Severity Trend Assessment Matrix – Illustrative Impact Illustration #1 – Commercial Auto Cycle Components (In Progress)

ISSUE/TOPIC	Commercial Auto - TTT				
	2H 1990s	1H 2000s	2H 2000s	2010-15	FUTURE
Seat Belt Laws	✓	✓	✓	✓	
Seat Belt Usage					
Airbags Laws/Technology	✓	✓	✓	✓	
Automobile / Truck Design	✓	✓	✓	✓	
Auto Performance (more HP)					
Roadway Design	✓	✓	✓	✓	
Electronic Stability Control	✓	✓	✓	✓	
Vehicle Type (Unequal Size)					
Bumper Height					
Graduated Licensing (teenagers)					
Distracted Driving (use of Cell Phones, etc.)					
Miles Driven (Price of Gasoline)	✓	✓	✓	✓	
Economy (good means more driving, vice-versa)	✓	✓	✓	✓	
Crash/testing Avoidance Systems (autobrake, forward collision warning, adaptive headlights, lane departure warning, AEB)					
Small overlap frontal					
Google driverless car					
TNC (Uber, Lyft, etc.)					
Changing demographics (younger as boomers retire)					
Budget Constraints					
Regulatory changes (minimum age, mandatory rest)					
Improved Risk Management Programs	✓	✓	✓	✓	
Mandatory Training	✓	✓	✓	✓	
Telematics / improved class plans / exposure bases				✓	
Tort Reform					
Propensity to sue					
Social changes / Political Ideology					
Deductible Increases					
Limit Increases					

Impact Color Keys:	
Positive (Lower Frequency)	
Negative (Higher Frequency)	
No Impact/Unknown	
Blank = N/A	
✓ = Some impact expected (TBD)	

Impact Levels:	
H = High	
M = Medium	
L = Low	



Source: ISO SOLM 2016 v1

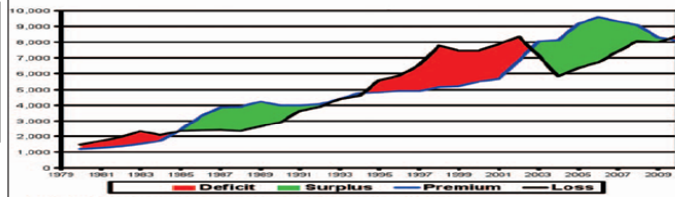


Frequency Trend Assessment Matrix

Impact Illustration #2 – MPL Cycle Components

ISSUE/TOPIC	PROFESSIONAL LINES - MPL														
	MPL - Total					MPL - Doc					MPL - Hosp				
	2H 1990s	1H 2000s	2H 2000s	2010-13	Future	2H 1990s	1H 2000s	2H 2000s	2010-13	Future	2H 1990s	1H 2000s	2H 2000s	2010-13	Future
Historical Perspective	Advancements in Risk Management / Patient Safety														
	- Advances in anesthesiology, ER triage, symptom check lists, etc.														
	- Apology Movement / I'm Sorry Legislation														
	- EMR / Computerized Phys Order Entry														
	Defensive Medicine														
	Economic Considerations														
	Legal Environment Changes														
	- Cost effectiveness to bring suit														
	Social / Ideology shifts (more/less conservative)														
	- Attorney general / Judge appointments														
	- Heightened media coverage														
	Tort Reform enactment/erosion														
	Supply / Demand shifts														
	- Delivery System Shift (provider Phys/Hosp consolidation)														
	- Patient demographic shift (age, diabetes, obesity, etc.)														
- Patient demand increase (new insureds)															
- Physician supply shortage															

Impact Color Keys:
Positive (Lower Frequency)
Negative (Higher Frequency)
No Impact/Unknown
Blank = N/A
✓ = Some impact expected (TBD)



Emerging Issues - Illustration

Assessing Impact by Line of Business Framework

Emerging Issues	STANDARD CASUALTY							PROFESSIONAL LINES							PROPERTY				OTHER								
	PA - Total	CAU - Total	CAU - Short	CAU - LHT	CAU - PPT	GL - Total	GL - ParamOps	GL - Prod	MPL - Total	MPL - Doc	MPL - Hosp	FLOTM - Total	FLOTM - E&O	FLOTM - D&O	FLOTM - LRI	FLOTM - All Other	HO - Total	CP - Fire	CP - Wind	WC	WC Cat	Crop	Aviation	Marine	A&H		
Alternative Energy																											
Artificial Intelligence																											
Autonomous Vehicles																											
Class Action Lawsuits																											
Climate Change																											
Cyber Security																											
Defective/Counterfeit Products																											
Demographic Changes																											
Distracted Drivers																											
Distracted Driving Laws																											
Driver/Vehicle Issues																											
Drywall																											
Effects of the Economic Downturn																											
E-Waste																											
Food-Related Issues																											
Genetically Modified Organisms																											
Green Buildings																											
Government Regulation																											
Government Debt Levels																											
Hazardous Chemicals/Products																											
Hydraulic Fracturing (Fracking)		✓	✓	✓					M	H	L							✓	✓								
Litigation Financing																											
Medical/Recreational Marijuana																											
Nanotechnology																											
Reputational Risk																											
Social Media Liability																											
Solar Weather																											
Supply Chain Vulnerability																											
Water Quality/Scarcity																											

Impact Color Keys:
Positive (Lower Frequency)
Negative (Higher Frequency)
No Impact/Unknown
Blank = N/A
✓ = Some impact expected (TBD)

Yellow = perhaps cover at CARe Bermuda session

Impact Levels:
H = High
M = Medium
L = Low

Source: CARe Seminar (CS1)– JBuchanan – 6/2013

Speaker Bios

