

Long-Term Pricing Analysis (LTPA) Working Party

CAS SPRING MEETING

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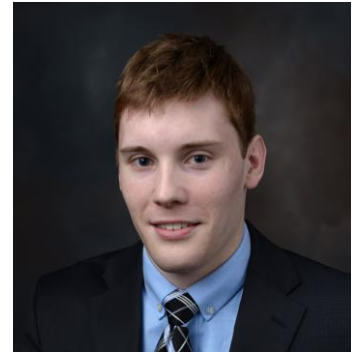
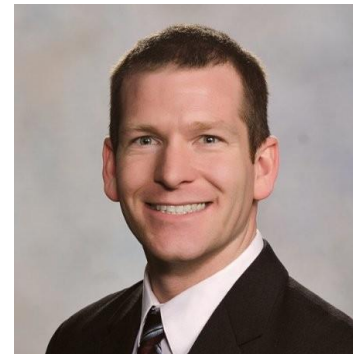
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- We are talking directly about pricing methodologies and considerations, so please consider anti-trust before engaging in dialogue concerning your specific company.
- All data presented is fictitious and is in no way an endorsement for certain rates nor premiums in any real-world line of business.

Working Party Members



Our Mission

To research ratemaking and pricing consideration that encompass a longer view than a single policy period in the future

Feldblum Asset Share – Cliff Notes

“A financially strong carrier does not focus on reported results or cash flows from the current year. Rather, it examines the whether the stream of future profits, from both the original policy year and from renewal years, justifies underwriting the contract.”

-pg 3, Asset Share Pricing for Property-Casualty Insurers, Sholom Feldblum

- The only real question should be, “Is it profitable to write this policy”
- Paper emphasized entering new markets/products

Single Period Ratemaking View

$$\textit{Premium} = \textit{Losses} + \textit{Expense} + \textit{Profit}$$

“The role of a pricing actuary is to estimate each of these components for the period during which the proposed rates will be in effect.”

-excerpt from Basic Ratemaking, Werner / Modlin

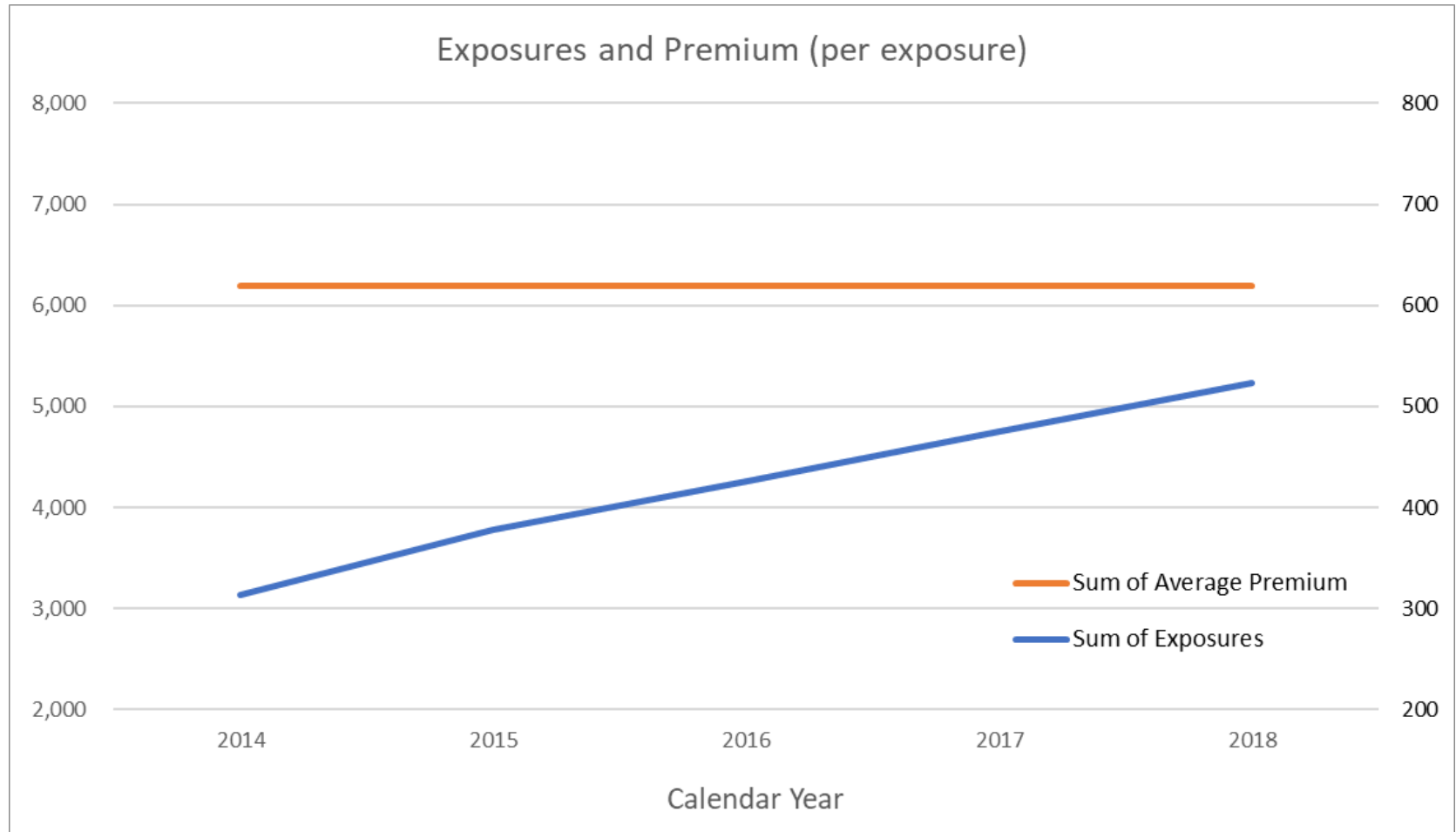
Single Period Ratemaking View

Let's price some new business!

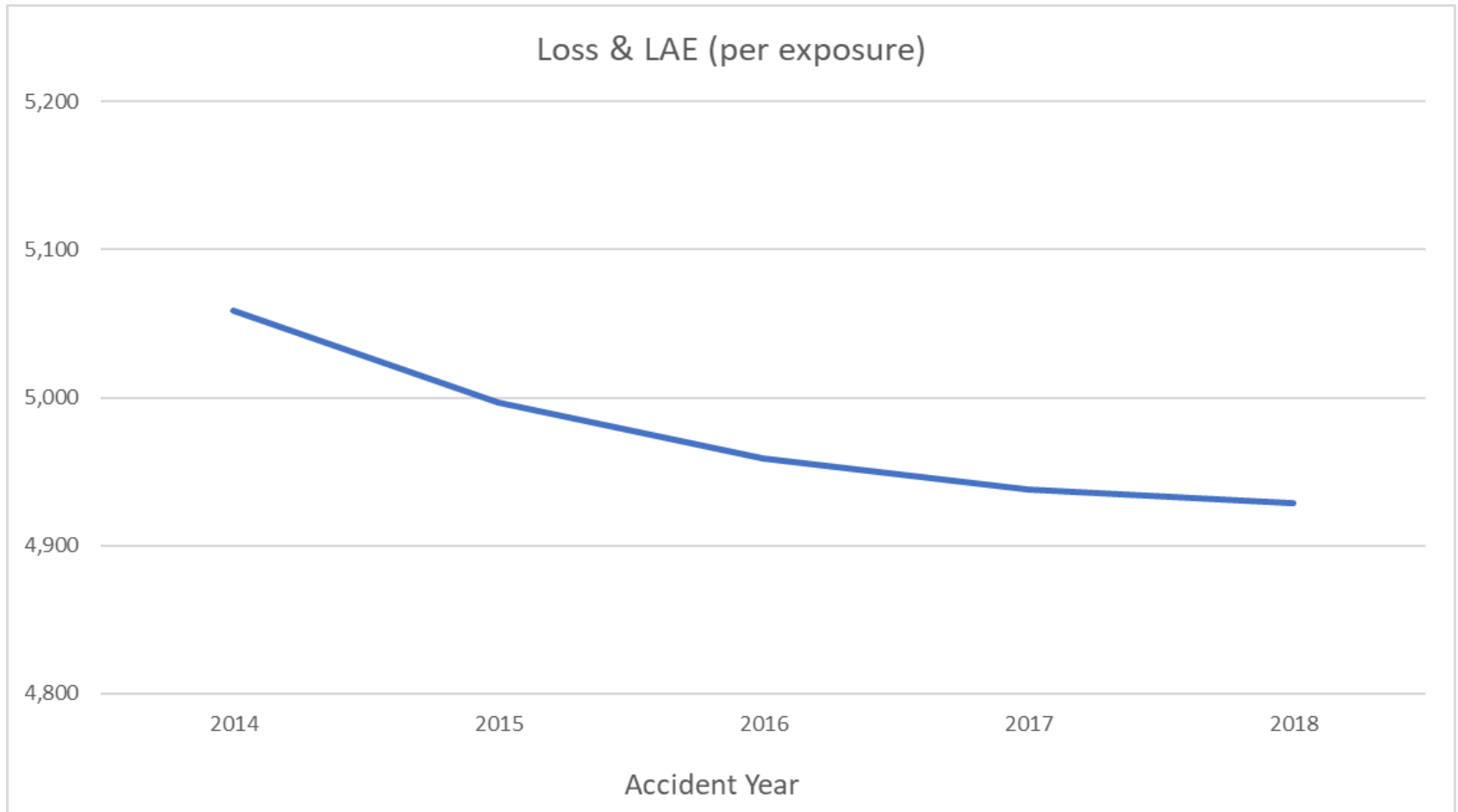
Product specs are as follows:

- We began writing the product in 2011
- Interest rates are 0% (and we omit discounting columns)
- Profit targets are 5% of premium
- All policies are 1/1 - 12/31
- We re-underwrite every 5 years
- Goal is to determine rates for new policyholders in the upcoming year

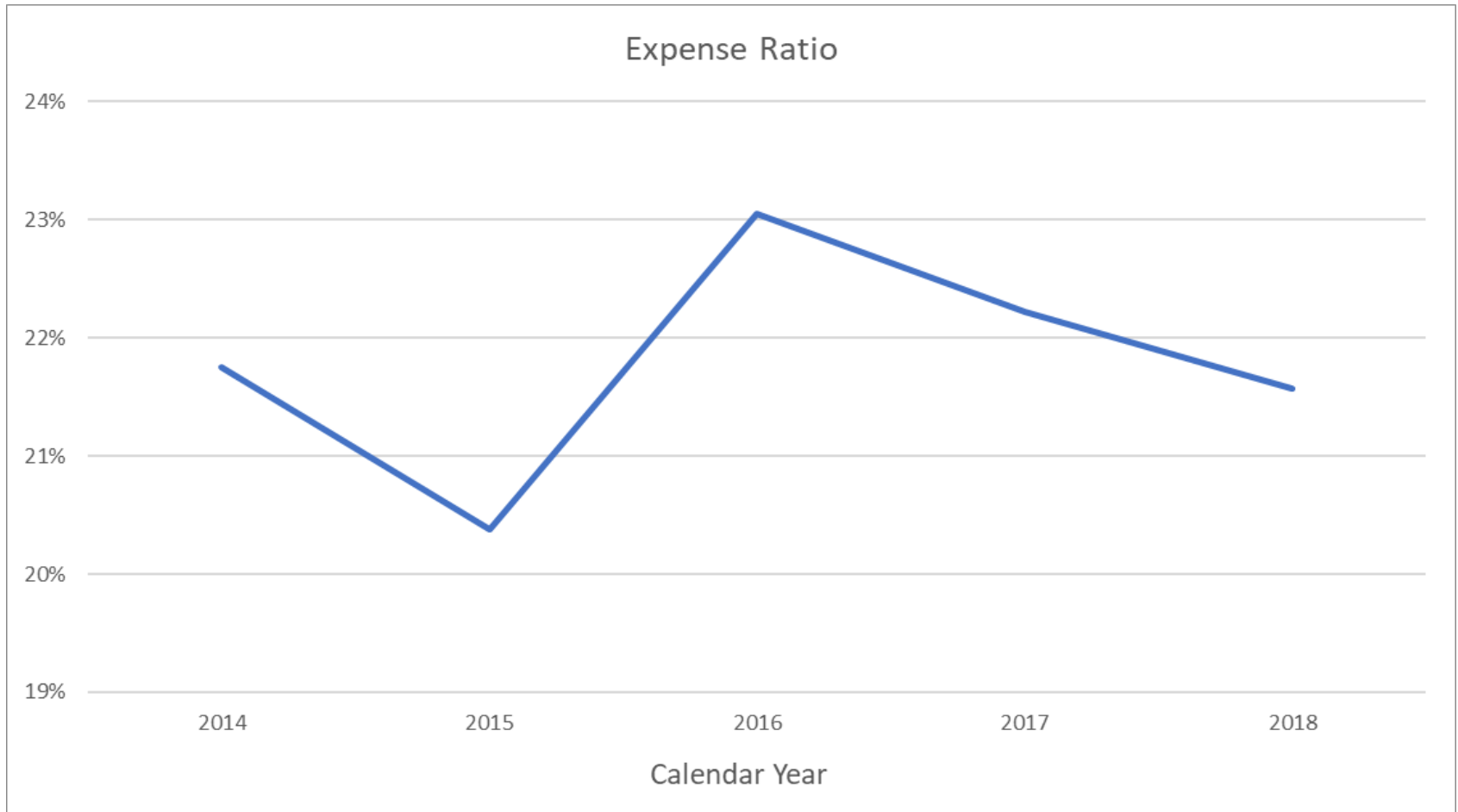
Single Period – Trend Selection



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Single Period – Trend Selection

Historical data years 2014 through 2018						
<u>CY / AY</u>	<u>Premium</u>	<u>Exposure</u>	<u>Avg Prem</u>	<u>Ultimate Loss & LAE</u>	<u>Loss & LAE Cost</u>	<u>Expense Ratio</u>
2014	1,944,211	314	6,193	1,588,034	5,058	21.8%
2015	2,342,439	378	6,193	1,890,050	4,997	20.4%
2016	2,641,110	426	6,193	2,114,860	4,959	23.1%
2017	2,939,782	475	6,193	2,343,978	4,938	22.2%
2018	3,238,453	523	6,193	2,577,466	4,929	21.6%
5 yr trend			0.0%		-0.6%	0.7%
3 yr trend			0.0%		-0.3%	-3.3%
Selected			0.0%		-0.5%	-1.3%

Single Period – Indication

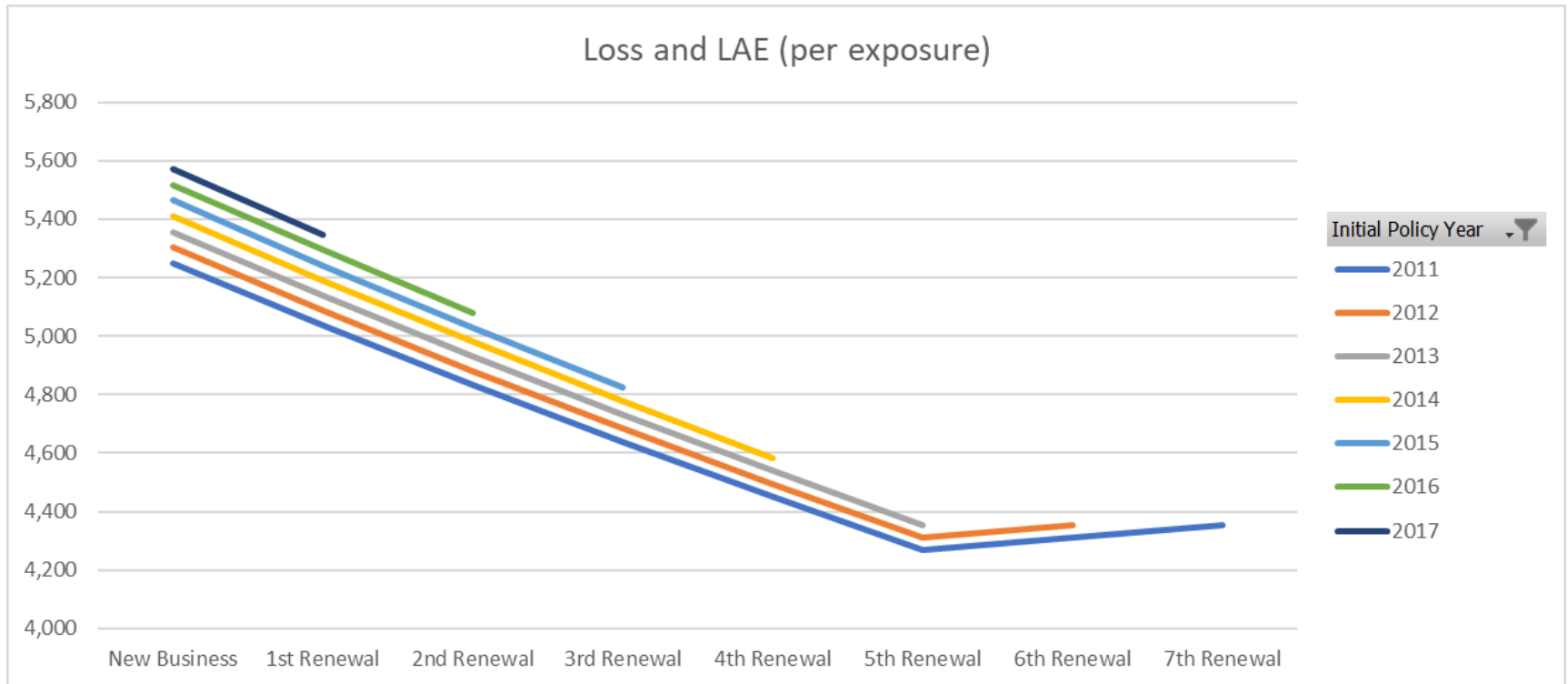
Premium Trend	0.0%		
Loss Trend	-0.5%		
Expense Trend	-1.3%		
	Trended	Trended	Trended
AY	Premium	Loss & LAE	Loss & LAE Ratio
2014	1,944,211	1,610,612	82.8%
2015	2,342,439	1,907,922	81.5%
2016	2,641,110	2,124,836	80.5%
2017	2,939,782	2,343,978	79.7%
2018	3,238,453	2,565,366	79.2%
Total	13,105,995	10,552,714	80.5%
	Assumed Expense Ratio		21.3%
	Permissible Loss Ratio		73.7%
		Indication	9.2%

Multi-Period Ratemaking View

$$Premium_t = Losses_t + Expenses_t + Profit_t$$

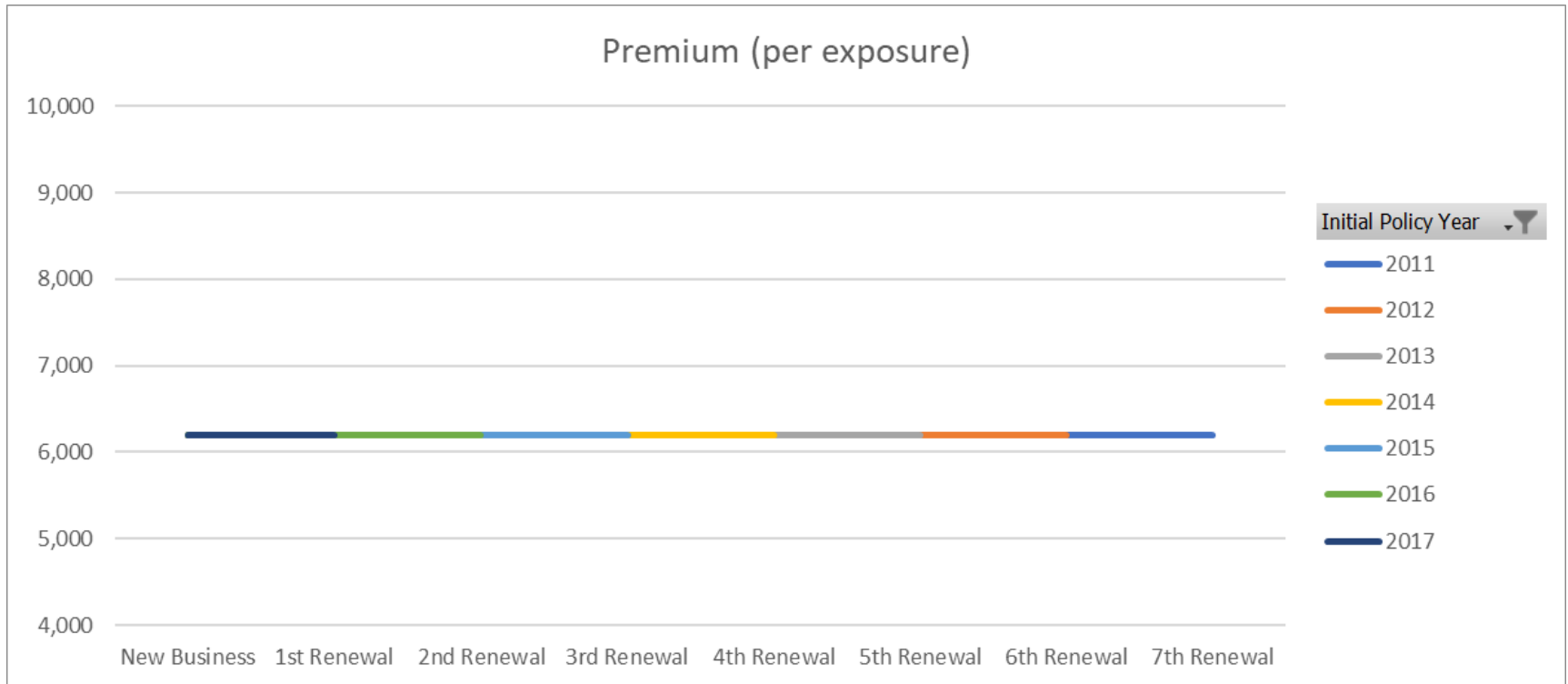
- Differing loss costs and expenses between new and renewal business
- Differing persistency rates among insureds and their sensitivity to rate changes
- The interplay between these two phenomenon

Multi-Period – Extended Trends



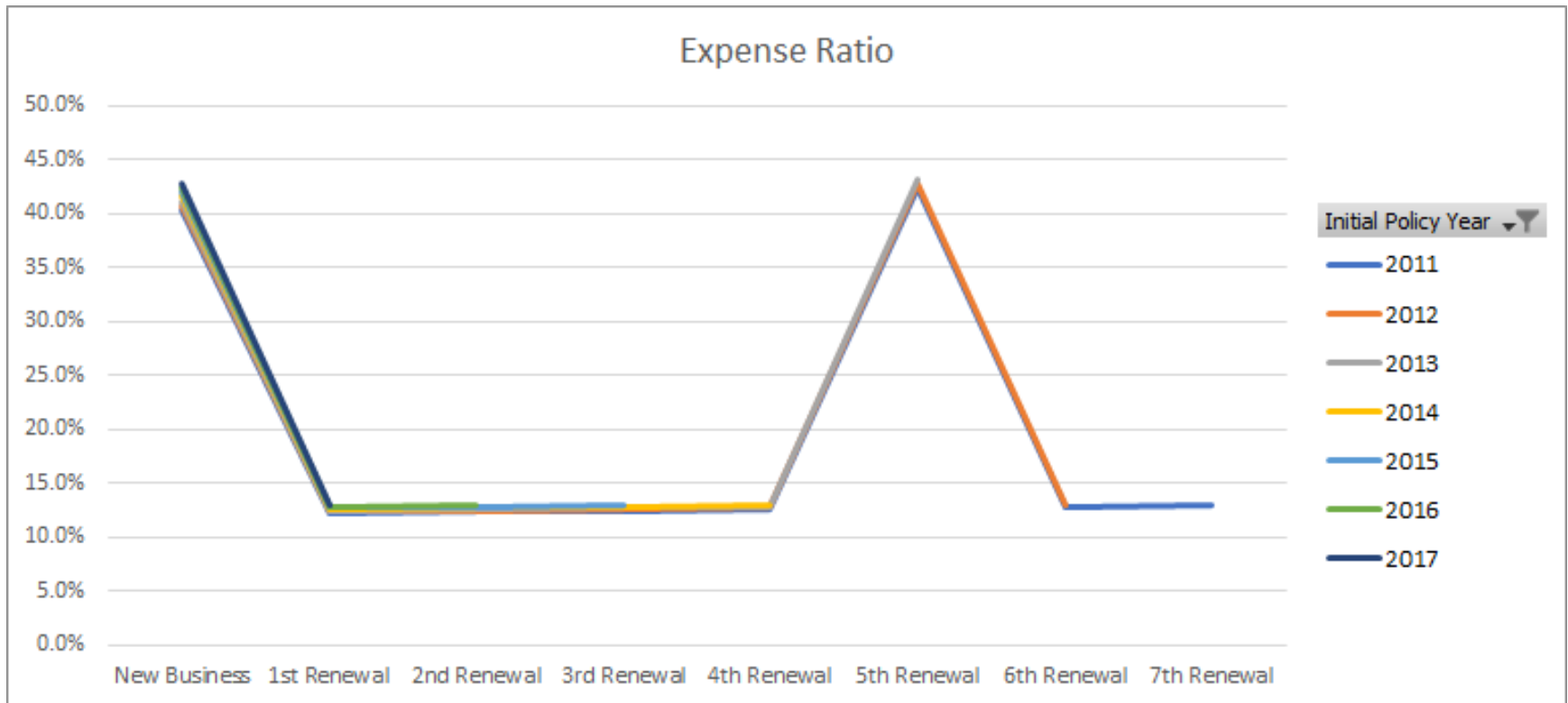
- One way you can account for our subscript is to aggregate by cohort instead of solely by AY

Multi-Period – Extended Trends



- Here we reconfirm the premium is static

Multi-Period – Extended Trends



- Re-underwriting causes the uptick in expenses

Multi-Period – Extended Trends

Loss Per Exposure									
		Cohort (Initial Policy Year)							
Renewal	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	
1	5,250	5,303	5,356	5,409	5,463	5,518	5,573	5,629	
2	5,037	5,088	5,139	5,190	5,242	5,294	5,347		
3	4,833	4,882	4,931	4,980	5,030	5,080			
4	4,638	4,684	4,731	4,778	4,826				
5	4,450	4,494	4,539	4,585					
6	4,270	4,312	4,355						
7	4,312	4,355							
8	4,355								
9									
10									

- Derive trends across both time dimensions, cohort and AY
- Loss Cost x cohort trend x AY trend

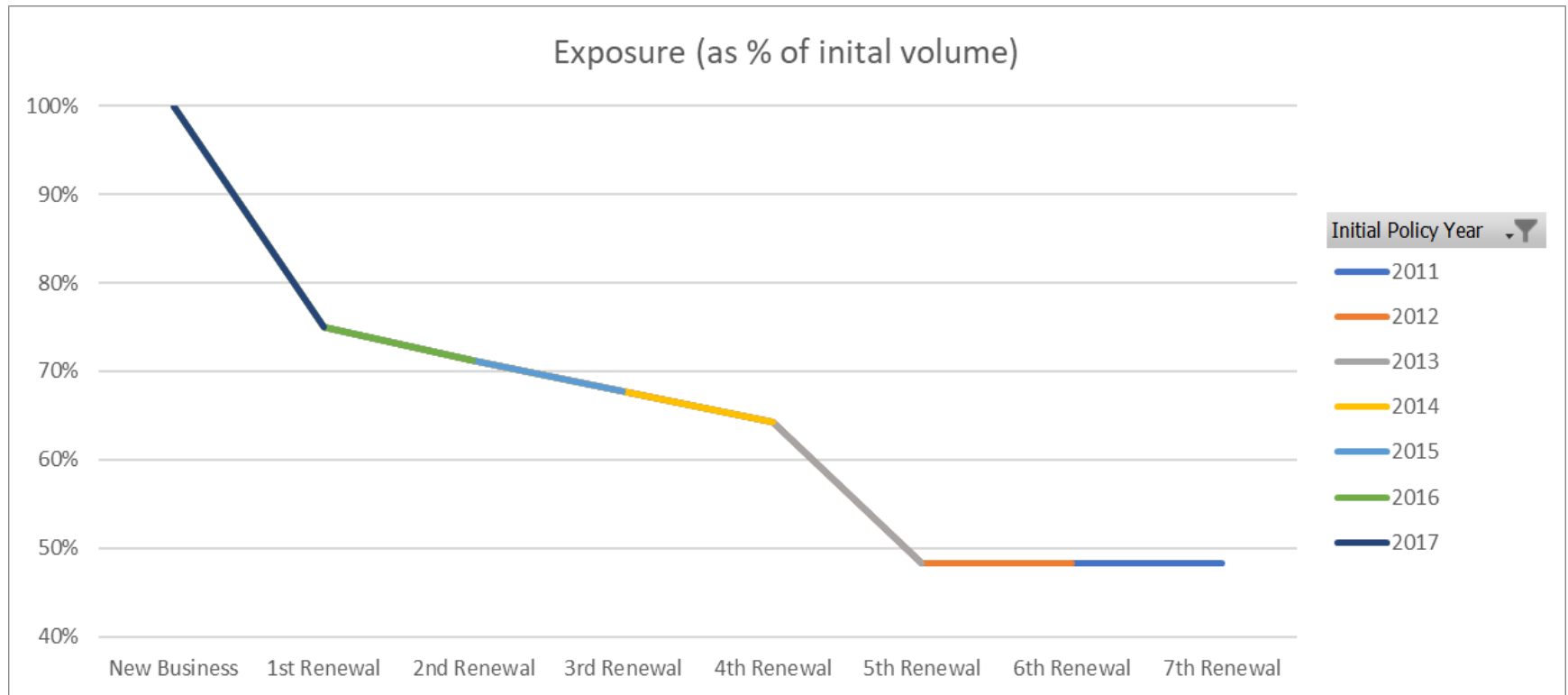
Multi-Period – Extended Trends

Loss Per Exposure										
Cohort (Initial Policy Year)										
Renewal	2011	2012	2013	2014	2015	2016	2017	2018	AY Trend	Projected LC
1	5,250	5,303	5,356	5,409	5,463	5,518	5,573	5,629	1.0%	5,685
2	5,037	5,088	5,139	5,190	5,242	5,294	5,347	5,401	1.0%	5,455
3	4,833	4,882	4,931	4,980	5,030	5,080	5,131	5,182	1.0%	5,234
4	4,638	4,684	4,731	4,778	4,826	4,874	4,923	4,972	1.0%	5,022
5	4,450	4,494	4,539	4,585	4,630	4,677	4,724	4,771	1.0%	4,818
6	4,270	4,312	4,355	4,399	4,443	4,487	4,532	4,578	1.0%	4,623
7	4,312	4,355	4,399	4,443	4,487	4,532	4,578	4,623	1.0%	4,670
8	4,355	4,399	4,443	4,487	4,532	4,578	4,623	4,670		4,670
9	4,355	4,399	4,443	4,487	4,532	4,578	4,623	4,670		4,670
10	4,355	4,399	4,443	4,487	4,532	4,578	4,623	4,670		4,670
Cohort Trend	-3.5%	-4.1%	-4.1%	-4.1%	-4.0%	-4.0%				

Multi-Period – Indication

<u>Projected Policy (per exposure)</u>					
Renewal	Premium	Loss & LAE	Expense Ratio	Loss & LAE Ratio	
1	6,193	5,685	43.7%	91.8%	
2	6,193	5,455	13.2%	88.1%	
3	6,193	5,234	13.4%	84.5%	
4	6,193	5,022	13.5%	81.1%	
5	6,193	4,818	13.6%	77.8%	
6	6,193	4,623	45.9%	74.7%	
7	6,193	4,670	13.9%	75.4%	
8	6,193	4,670	13.9%	75.4%	
9	6,193	4,670	14.1%	75.4%	
10	6,193	4,670	14.2%	75.4%	
Total	61,930	49,516	20.0%	80.0%	
		<u>One Year Out</u>	<u>Multi-Period</u>		
	Assumed Expense Ratio	21.3%	20.0%		
	Permissible Loss Ratio	73.7%	75.0%		
	Indication	9.2%	6.5%		

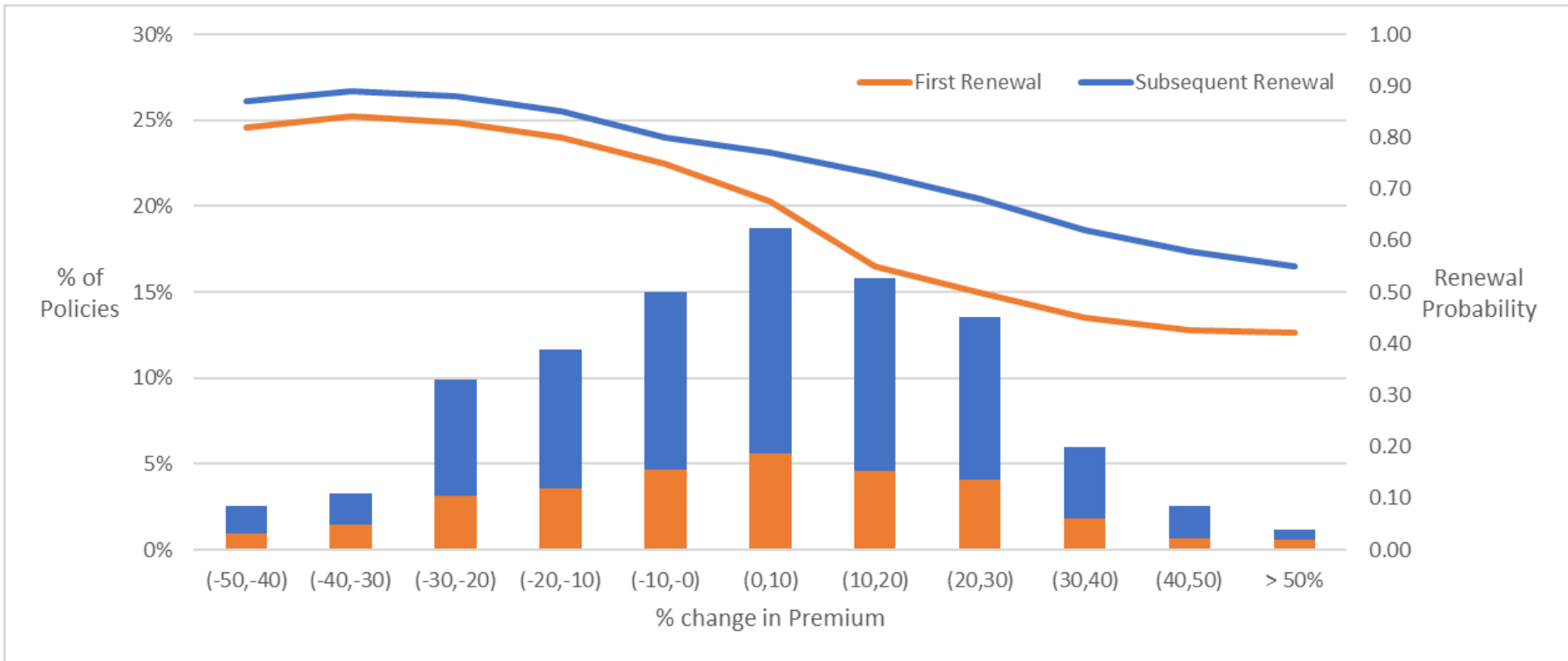
Multi-Period – What about cancels?



Multi-Period – What about cancels?

<u>Projected Policy (per exposure) with Cancellation</u>						
Renewal	Premium	Loss & LAE	Expense Ratio	Loss & LAE Ratio	<u>Persistence</u>	
1	6,193	5,685	43.7%	91.8%	100.0%	
2	6,193	5,455	13.2%	88.1%	75.0%	
3	6,193	5,234	13.4%	84.5%	71.3%	
4	6,193	5,022	13.5%	81.1%	67.7%	
5	6,193	4,818	13.6%	77.8%	64.3%	
6	6,193	4,623	45.9%	74.7%	48.2%	
7	6,193	4,670	13.9%	75.4%	48.2%	
8	6,193	4,670	13.9%	75.4%	48.2%	
9	6,193	4,670	14.1%	75.4%	48.2%	
10	6,193	4,670	14.2%	75.4%	48.2%	
Total	38,358	31,241	21.0%	81.4%		
		<u>One Year Out</u>	<u>Multi-Period</u>	<u>MP w/ Lapse Rate</u>		
	Assumed Expense Ratio	21.3%	20.0%	21.0%		
	Permissible Loss Ratio	73.7%	75.0%	74.0%		
	Indication	9.2%	6.5%	10.1%		

Cancelation Rates are not static



Multi-Period – Existing Business

Projected Cumulative Results								
	Cohort							
	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>
Project Premium	3,835,796	3,835,796	3,835,796	3,835,796	3,835,796	3,835,796	3,835,796	3,835,796
Loss & LAE	2,891,249	2,920,162	2,949,363	2,978,857	3,008,646	3,038,732	3,069,119	3,099,811
Expense Ratio	19.5%	19.7%	19.9%	20.0%	20.2%	20.5%	20.7%	20.9%
Loss & LAE Ratio	75.4%	76.1%	76.9%	77.7%	78.4%	79.2%	80.0%	80.8%
Permissible Loss Ratio	75.5%	75.3%	75.1%	75.0%	74.8%	74.5%	74.3%	74.1%
Indication	-0.2%	1.0%	2.3%	3.6%	4.9%	6.3%	7.6%	9.0%

- This is one “intuitive” thing that is tempting to do
- Not so simple
- What do we do about the prior results that were planned?

Considerations

Does this align with current ASOP's?

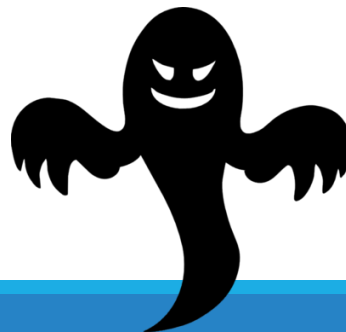
- Can the PV of losses and premiums balance over multiple periods, or does ASOP compel balance at each period
- Interest you charge a different rate based on insured likelihood of persisting

Is this worth it?

- Is there too much parameter risk with extended horizon
- Is this material

Is this actuarial science or product management?

Is this 'Price Optimization'?



Current Road Map

- Understand what LTPA is common in the industry
- Elaborate LTPA methods, incorporating modern statistical/data driven techniques
- Putting the two together to put into context potential upside of LTPA

