Consumer Advocate RfI CA-FA-02: *On page 10 of "Trend Analysis" section of the filing it says the trend models reflect "seasonality where deemed appropriate." The Oliver Wyman (OW) report concludes that seasonality should be reflected in the BI trend, but FA concludes that it should not. What would the FA BI loss cost trend be if its BI model reflected seasonality in the model? What would the R^2 values be?*

FA Response to RfI CA-FA-02:

As requested, we included a seasonality parameter. For ease of review and comparison, we show both our original model followed by the model with the seasonality parameter included. Our procedure separately trends frequency and severity and we show both separately on the following two pages.

As one would expect, adding the additional parameter for both frequency and severity increases the R^2 value (albeit marginally). In both cases, the adjusted R^2 is also increased (again, only marginally).

In general, we do not include a parameter where the p-value is greater than 0.05, which is the case for seasonality for both frequency and severity.

Including seasonality for frequency has no impact on the annualized trend level for the period considered "past" and continuing into the future (both "past" and future frequency trends are -2.3% with and without seasonality).

Including seasonality for severity increases the annualized trend level by 0.2 percentage points for the period considered "past" and continuing into the future (the "past" and future frequency trends are 6.9% with, increasing to 7.1% without seasonality).

21 *Bodily Injury Frequency Model – Original Selection (excludes seasonality)*

REGRESSION STATISTICS

Multiple R	R2	Adjusted R2	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	k
0.8029	**0.6446**	**0.5220**	0.1415	40	-	11

Runs-Test Result: 0.1644 RESIDUALS RUNS RANDOM

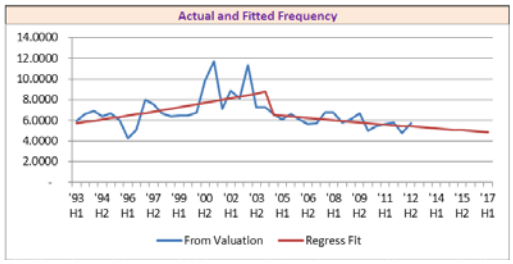
	Coefficients	S.E.	t-Stat	p-value	C.I. Lower	99% Upper	Selected Coeff.	
	1	2						
Intercept	(74.616)	17.7857	(4.195)	0.0002	(123.640)	(25.592)	(74.616)	11
Season	-	-	-	1.0000	-	-	-	10
All Years	0.0383	0.0089	4.3055	0.0002	0.0138	0.0628	0.0383	9
Scalar 1	123.1113	33.2990	3.6971	0.0009	31.3263	214.8963	123.1113	8
Trend 1	(0.062)	0.0166	(3.709)	0.0009	(0.107)	(0.016)	(0.062)	7
Scalar 2	-	-	-	1.0000	-	-	-	6
Trend 2	-	-	-	1.0000	-	-	-	5
Scalar 3	-	-	-	1.0000	-	-	-	4
Trend 3	-	-	-	1.0000	-	-	-	3
Scalar 4	-	-	-	1.0000	-	-	-	2
Trend 4	-	-	-	1.0000	-	-	-	1

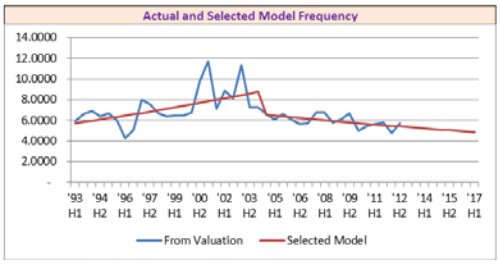
Trends are Annual

ANOVA

	df	SS	MS	F	Significance F
Regression	10	1.0536	0.1054	5.2593	0.0002
Residual	29	0.5810	0.0200		
Total	39	1.6345			

	Fitted Annual	Previous Selected	Selected Annual		
		selected = fitted			
past	(2.3%)	(3.10%)	(2.3%)	'12H2	=> last period in "past"
future	(2.3%)	(3.10%)	(2.3%)		





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23 *Bodily Injury Frequency Model – Original Selection Adjusted to include Seasonality*

REGRESSION STATISTICS

Multiple R	R2	Adjusted R2	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	k
0.8029	**0.6447**	**0.5222**	0.1415	40	-	11

Runs-Test Result: 0.1644 RESIDUALS RUNS RANDOM

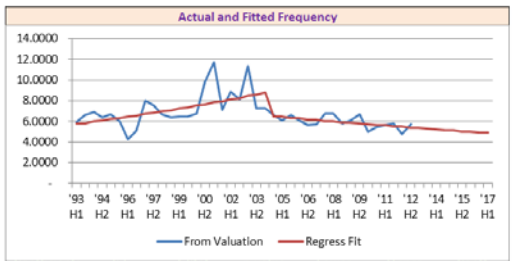
	Coefficients	S.E.	t-Stat	p-value	C.I. Lower	99% Upper	Selected Coeff.	
	1	2						
Intercept	(74.602)	17.7827	(4.195)	0.0002	(123.618)	(25.586)	(74.602)	11
Season	(0.010)	0.0448	(0.214)	0.8323	(0.133)	0.1139	(0.010)	10
All Years	0.0383	0.0089	4.3063	0.0002	0.0138	0.0628	0.0383	9
Scalar 1	123.1118	33.2933	3.6978	0.0009	31.3426	214.8809	123.1118	8
Trend 1	(0.062)	0.0166	(3.709)	0.0009	(0.107)	(0.016)	(0.062)	7
Scalar 2	-	-	-	1.0000	-	-	-	6
Trend 2	-	-	-	1.0000	-	-	-	5
Scalar 3	-	-	-	1.0000	-	-	-	4
Trend 3	-	-	-	1.0000	-	-	-	3
Scalar 4	-	-	-	1.0000	-	-	-	2
Trend 4	-	-	-	1.0000	-	-	-	1

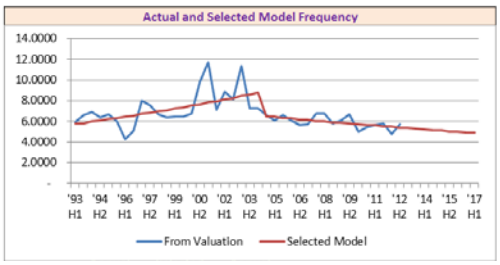
Trends are Annual

ANOVA

	df	SS	MS	F	Significance F
Regression	10	1.0538	0.1054	5.2621	0.0002
Residual	29	0.5808	0.0200		
Total	39	1.6345			

	Fitted Annual	Previous Selected	Selected Annual		
		selected = fitted			
past	(2.3%)	(3.10%)	(2.3%)	'12H2	=> last period in "past"
future	(2.3%)	(3.10%)	(2.3%)		





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Bodily Injury Severity Model – Original Selection (excludes seasonality)

REGRESSION STATISTICS

Multiple R	R2	Adjusted R2	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	k
0.7218	**0.5210**	**0.3499**	0.2206	39	1	11

Runs-Test Result: 0.4932 RESIDUALS RUNS RANDOM

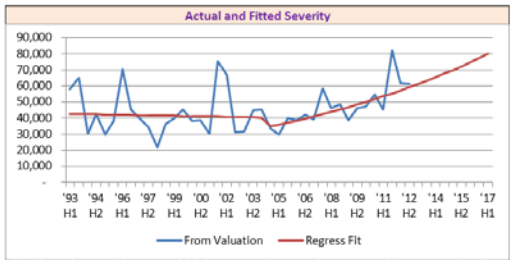
	Coefficients	S.E.	t-Stat	p-value	C.I. Lower	99% Upper	Selected Coeff.	
	1	2						
Intercept	20.4262	27.7261	0.7367	0.4674	(56.188)	97.0406	20.4262	11
Season	-	-	-	1.0000	-	-	-	10
All Years	(0.005)	0.0139	(0.353)	0.7265	(0.043)	0.0334	(0.005)	9
Scalar 1	(143.556)	53.7909	(2.669)	0.0125	(292.194)	5.0823	(143.556)	8
Trend 1	0.0715	0.0268	2.6676	0.0126	(0.003)	0.1456	0.0715	7
Scalar 2	-	-	-	1.0000	-	-	-	6
Trend 2	-	-	-	1.0000	-	-	-	5
Scalar 3	-	-	-	1.0000	-	-	-	4
Trend 3	-	-	-	1.0000	-	-	-	3
Scalar 4	-	-	-	1.0000	-	-	-	2
Trend 4	-	-	-	1.0000	-	-	-	1

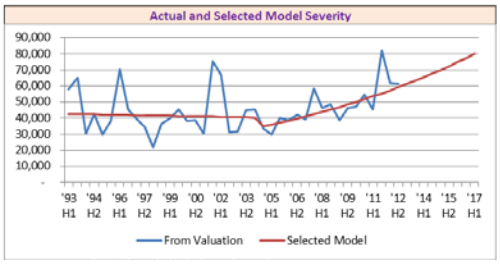
Trends are Annual

ANOVA

	df	SS	MS	F	Significance F
Regression	10	1.4824	0.1482	3.0449	0.0098
Residual	28	1.3631	0.0487		
Total	38	2.8455			

	Fitted Annual	Previous Selected	Selected Annual		
		selected = fitted			
past	6.9%	5.7%	6.9%	'12H2	=> last period in "past"
future	6.9%	5.7%	6.9%		





Bodily Injury Severity Model – Adjusted to include Seasonality

REGRESSION STATISTICS

Multiple R	R2	Adjusted R2	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	k
0.7237	**0.5238**	**0.3537**	0.2200	39	1	11

Runs-Test Result: 2.1372 RESIDUALS RUNS NOT RANDOM

	Coefficients	S.E.	t-Stat	p-value	C.I. Lower	99% Upper	Selected Coeff.	
	1	2						
Intercept	20.2584	27.6434	0.7328	0.4697	(56.128)	96.6443	20.2584	11
Season	0.1135	0.0706	1.6087	0.1189	(0.081)	0.3086	0.1135	10
All Years	(0.005)	0.0138	(0.354)	0.7258	(0.043)	0.0333	(0.005)	9
Scalar 1	(147.259)	53.6794	(2.743)	0.0105	(295.589)	1.0712	(147.259)	8
Trend 1	0.0734	0.0268	2.7420	0.0105	(0.001)	0.1473	0.0734	7
Scalar 2	-	-	-	1.0000	-	-	-	6
Trend 2	-	-	-	1.0000	-	-	-	5
Scalar 3	-	-	-	1.0000	-	-	-	4
Trend 3	-	-	-	1.0000	-	-	-	3
Scalar 4	-	-	-	1.0000	-	-	-	2
Trend 4	-	-	-	1.0000	-	-	-	1

Trends are Annual

ANOVA

	df	SS	MS	F	Significance F
Regression	10	1.4905	0.1491	3.0800	0.0091
Residual	28	1.3550	0.0484		
Total	38	2.8455			

	Fitted Annual	Previous Selected	Selected Annual		
		selected = fitted			
past	7.1%	5.7%	7.1%	'12H2	=> last period in "past"
future	7.1%	5.7%	7.1%