

Arius[®]

Actual versus Expected Analysis



IT TAKES VISION

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1. Arius Actual vs. Expected Analysis

Actual vs. Expected (AvE) diagnostics in Arius provide an easy approach for highlighting the impact of loss emergence, and for assessing the effectiveness of various actuarial assumptions. These tools assist in answering the questions:

- How did losses emerge as compared to expectations?
- Do selected LDFs follow patterns in the data?
- How did my methods perform relative to each other?
- What is driving change to my ultimate loss estimates?

Arius offers two different Actual vs. Expected approaches to help your analysis, the direct and the indirect.

THE DIRECT APPROACH

The Arius Direct approach to AvE calculates the expected amount based on the prior development factors from a particular method and compares to actual current results, examining the assumptions of the particular method and how that method performed. There is a Direct Actual vs. Expected analysis corresponding to every standard development method within Arius. These methods can be found in the respective development method collections in the Collection Library. If you have customized your development method collections you may need to add these AvE tables to your collections from the Object Library; the system will not add these to your customized collections. (See the section Working with Objects and Collections.)

THE INDIRECT APPROACH

The Indirect approach calculates the expected amounts using the prior indicated reserves, examining how the selected ultimate performed over the period. The indirect approach is available for select methods from two perspectives:

- Prior selections are used to calculate expected amounts, or
- Prior implied patterns of development are selected to calculate expected amounts.

NOTE: To use implied patterns of development, you must make selections in the exhibit Ratio of Cumulative Paid Loss to Ultimate Loss as part of your normal development period workflow before appending a new diagonal. (The Ratio of Cumulative Paid Loss to Ultimate Loss exhibit is used in the case of the Paid Loss Development method. You will use the similarly named corresponding exhibit for your chosen development method).

Both the direct and indirect approaches can be used when comparing full periods or partial periods where interpolation is turned on. Actual vs. Expected analysis can be particularly useful for early analysis mid-period when projecting end-of-period results, and for a quick roll forward at period-end when actual data becomes available and assumptions can be quickly verified. (See the section The Direct Approach for instructions on how to save SDFs from your mid-period analysis.)

Arius provides reports to calculate the \$ and % change from expected, comparisons of Actual vs Expected results based on method, and customizable graphing capabilities for each report.

2. The Direct approach

The direct approach to Actual vs. Expected is more diagnostic in nature, focusing on testing the assumptions of each development method. This exhibit focuses on your last two diagonals of data, and comparing each method's analysis and selections from the prior diagonal with the actual results reflected in the current diagonal.

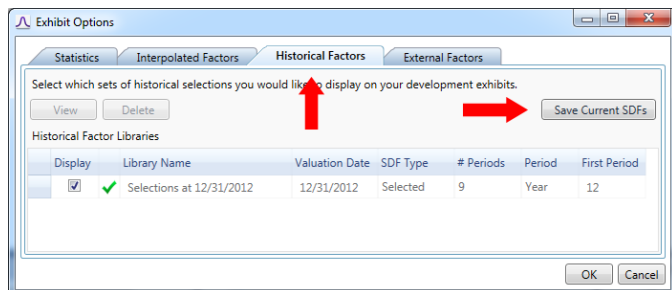
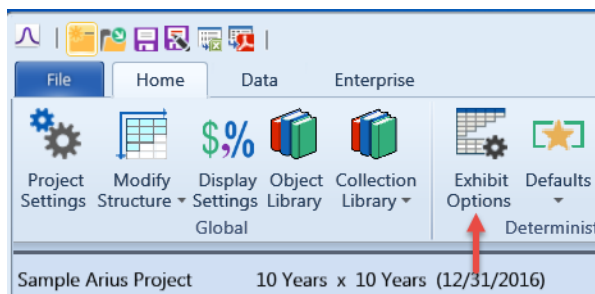
Using Paid Loss as an example, the direct approach to AvE calculates expected paid loss for the current period by taking the last period's cumulative Paid Loss and applying an expected incremental development factor based on your prior period's selected Paid Loss Development factors. Expected Paid Loss is then compared to actual Paid Loss from the current period data, diagnostically answering the question:

- How did my prior period selected Paid Loss development factors perform in predicting my current period Paid Loss?

For each development method this difference in AvE is stated as a percentage of Prior Ultimate Loss, providing a consistent benchmark across all of the different development methods.

Your current selected factors are captured—i.e., become prior selections—when a new diagonal is appended to this project and these factors are stored by Arius as prior period values. The Direct AvE methods and reports will populate when you have completed at least one prior period analysis, appended the next period's diagonal, and entered current period data in the new diagonal.

Note: For a mid-period analysis you must manually save your Selected Development Factors as prior through Exhibit Options (found on the Home ribbon). This is necessary because you will not add a new diagonal between mid-period and end-period analyses.



This is an example of the Direct Approach.

PP AutoLiab > Methods > Actual vs Expected Using Prior Paid Loss Development

Actual vs Expected Using Prior Paid Loss Development

Accident Year	Prior Ultimate Loss (1)	Prior Cumulative Paid Loss (2)	Prior Age (3)	Prior Cumulative Development Factor (4)	Current Age (5)	Prior Cumulative Development Factor at Current Age (6)	Expected Incremental Development Factor (4)/(6) (7)	Expected Cumulative Paid Loss (2) x (7) (8)	Actual Cumulative Paid Loss (9)	Actual Less Expected (9) - (8) (10)	Actual Less Expected as Percentage of Prior Ultimate Loss (10)/(1) (11)
2004	\$ 21,326	\$ 21,284	108	1.0029	120	1.0015	1.0014	\$ 21,314	\$ 21,289	(\$ 25)	-0.12 %
2005	14,383	14,327	96	1.0050	108	1.0029	1.0021	14,357	14,357	0	0.00 %
2006	13,250	12,811	84	1.0067	96	1.0050	1.0016	12,832	13,205	373	2.82 %
2007	8,775	8,471	72	1.0213	84	1.0067	1.0145	8,594	8,657	63	0.72 %
2008	8,297	7,754	60	1.0595	72	1.0213	1.0374	8,044	8,088	44	0.53 %
2009	7,054	6,236	48	1.1306	60	1.0595	1.0671	6,654	6,648	(6)	-0.09 %
2010	7,730	6,046	36	1.2895	48	1.1306	1.1405	6,896	6,870	(26)	-0.33 %
2011	11,221	7,222	24	1.5699	36	1.2895	1.2175	8,793	8,823	30	0.27 %
2012	15,951	5,517	12	2.6609	24	1.5699	1.6950	9,351	10,115	764	4.79 %
2013					12	2.6609					
Total	\$ 107,986	\$ 89,668						\$ 96,836	\$ 98,052	\$ 1,216	1.13 %

100 %

Although technically not a method, the 40+ Arius Actual vs. Expected objects are found under the Methods node in the Object Library.

- By classifying the Actual vs. Expected objects as methods, we can leverage the ability of Arius to designate one method column as the ultimate column and thereby this column can be referenced in formulas in other methods and reports.
- For example in the method object above, column 8 Expected Cumulative Paid Loss, has been designated as the ultimate column of this method and is available to be referenced in formulas of other comparative and summary reports.
- Actual vs. Expected Reports, such as the comparison of results for several methods, are found under the Report node in the Object Library.

3. The Indirect Approach

In the indirect approach, expected values are calculated as a function of prior indicated reserves thereby testing the development methods relatively, as opposed to the direct approach which focuses on testing a specific development method's selections and assumptions independent of other development methods. The indirect approach is offered based on two different strategies. One strategy relies on prior *selected* development factors whereas the other strategy relies on prior *implied* development factors.

The indirect approach to AvE analysis answers two questions:

- How did my Selected Ultimates perform relative to Paid Loss and Incurred Loss emergence?
- How did each development method perform relative to all other development methods?

AvE RELYING ON PRIOR SELECTED DEVELOPMENT FACTORS

(See the section above on The Direct Approach for details about how prior period numbers and factors are defined and captured.)

Accident Year	Prior Ultimate Loss (1)	Prior Cumulative Paid Loss (2)	Prior Indicated Case and IBNR Loss Reserve (1) - (2) (3)	Prior Age (4)	Prior Ratio of Cumulative Paid Loss to Ultimate Loss (5)	Current Age (6)	Prior Ratio of Cumulative Paid Loss to Ultimate Loss at Current Age (7)	Expected Incremental Percentage [(7)-(5))/(1)-(5)] (8)	Expected Cumulative Paid Loss (3)*(8)+(2) (9)	Actual Cumulative Paid Loss (10)	Actual Less Expected (10) - (9) (11)	Actual Less Expected as Percentage of Prior Ultimate Loss (11)/(1) (12)
2004	\$ 21,326	\$ 21,284	\$ 42	108	0.9971	120	0.9985	49.08 %	\$ 21,304	\$ 21,289	(\$ 15)	-0.07 %
2005	14,383	14,327	56	96	0.9950	108	0.9971	42.01 %	14,350	14,357	7	0.05 %
2006	13,250	12,811	439	84	0.9934	96	0.9950	24.44 %	12,918	13,205	287	2.16 %
2007	8,775	8,471	304	72	0.9792	84	0.9934	68.15 %	8,678	8,657	(21)	-0.24 %
2008	8,297	7,754	543	60	0.9438	72	0.9792	62.88 %	8,095	8,088	(7)	-0.09 %
2009	7,054	6,236	818	48	0.8845	60	0.9438	51.36 %	6,656	6,648	(8)	-0.12 %
2010	7,730	6,046	1,684	36	0.7755	48	0.8845	48.56 %	6,864	6,870	6	0.08 %
2011	11,221	7,222	3,999	24	0.6370	36	0.7755	38.16 %	8,748	8,823	75	0.67 %
2012	15,951	5,517	10,434	12	0.3758	24	0.6370	41.84 %	9,883	10,115	232	1.45 %
2013						12	0.3758					
Total	\$ 107,986	\$ 89,668	\$ 18,318						\$ 97,498	\$ 98,052	\$ 554	0.51 %

Using Paid Loss as an example, this analysis uses the prior period selected Paid Loss Development factors to estimate the current period's cumulative Paid Loss, where calculation of expected current Paid Loss is a function of the prior period *selected* ultimate outstanding loss. This answers the additional question:

- How did my prior period selected development factors perform relative to all other development method selected development factors in the prior period?

(NOTE: Using Paid Loss as an example, if 100% weight had been given to the Paid Loss Development method in selecting the prior Ultimate Loss estimate then the results from this analysis will be identical to the Direct analysis of expected Paid Loss emergence.)

The Expected Cumulative Loss column (9) can be referenced in the formula editor.

AVe RELYING ON PRIOR IMPLIED DEVELOPMENT FACTORS

PP AutoLab > Methods > Actual vs Expected Using Prior Implied Paid Loss Development and Prior Indicated Reserves

Actual vs Expected Using Prior Implied Paid Loss Development and Prior Indicated Reserves

Accident Year	Prior Ultimate Loss (1)	Prior Cumulative Paid Loss (2)	Prior Indicated Case and IBNR Loss Reserve (1) - (2) (3)	Prior Age (4)	Prior Ratio of Cumulative Paid Loss to Ultimate Loss (5)	Current Age (6)	Prior Ratio of Cumulative Paid Loss to Ultimate Loss at Current Age (7)	Expected Incremental Percentage [(7)-(5)]/[1-(5)] (8)	Expected Cumulative Paid Loss (3)+(8)*(2) (9)	Actual Cumulative Paid Loss (10)	Actual Less Expected (10) - (9) (11)	Actual Less Expected as Percentage of Prior Ultimate Loss (11)/(1) (12)
2004	\$ 21,326	\$ 21,284	\$ 42	108	0.9973	120	0.9982	32.23 %	\$ 21,297	\$ 21,289	(\$ 8)	-0.04 %
2005	14,383	14,327	56	96	0.9947	108	0.9973	50.04 %	14,355	14,357	2	0.02 %
2006	13,250	12,811	439	84	0.9847	96	0.9947	65.35 %	13,098	13,205	107	0.81 %
2007	8,775	8,471	304	72	0.9705	84	0.9847	48.17 %	8,617	8,657	40	0.45 %
2008	8,297	7,754	543	60	0.9341	72	0.9705	55.18 %	8,054	8,088	34	0.42 %
2009	7,054	6,236	818	48	0.8758	60	0.9341	46.91 %	6,620	6,648	28	0.40 %
2010	7,730	6,046	1,684	36	0.7727	48	0.8758	45.36 %	6,810	6,870	60	0.78 %
2011	11,221	7,222	3,999	24	0.6292	36	0.7727	38.71 %	8,770	8,823	53	0.47 %
2012	15,951	5,517	10,434	12	0.3603	24	0.6292	42.03 %	9,903	10,115	212	1.33 %
2013						12	0.3603					
Total	\$ 107,986	\$ 89,668	\$ 18,318						\$ 97,524	\$ 98,052	\$ 528	0.49 %

100 %

This analysis is identical to the indirect approach to AVe which relies on prior selected development factors with the exception of columns 5 and 7 (Prior and Current Ratio of Paid Loss to Ultimate Loss).

The *implied* ratios referenced in columns 5 and 7 of the indirect approach are based on historical selections from the exhibit shown below which calculates ratios of cumulative paid loss to ultimate loss.

PP AutoLab > Exhibits > Cumulative Paid Loss to Ultimate Loss

Ratio of Cumulative Paid Loss to Ultimate Loss

Accident Year	12	24	36	48	60	72	84	96	108	120
2004	0.3519	0.5912	0.7380	0.8637	0.9324	0.9717	0.9921	0.9932	0.9953	0.9956
2005	0.3671	0.6401	0.7686	0.8808	0.9382	0.9815	0.9893	0.9915	0.9936	
2006	0.3293	0.5920	0.7131	0.8497	0.9273	0.9500	0.9608	0.9903		
2007	0.3259	0.6276	0.7893	0.9010	0.9205	0.9597	0.9807			
2008	0.3083	0.6486	0.7666	0.8609	0.9290	0.9690				
2009	0.3792	0.6045	0.7574	0.8787	0.9368					
2010	0.3943	0.6344	0.7775	0.8835						
2011	0.3495	0.6398	0.7816							
2012	0.3445	0.6316								
2013	0.3376									
Average	0.3488	0.6233	0.7615	0.8741	0.9307	0.9664	0.9807	0.9917	0.9945	0.9956
7 Year Average	0.3485	0.6255	0.7649	0.8741	0.9307	0.9664	0.9807	0.9917	0.9945	0.9956
5 Year Average	0.3610	0.6318	0.7745	0.8748	0.9304	0.9664	0.9807	0.9917	0.9945	0.9956
3 Year Average	0.3439	0.6353	0.7722	0.8744	0.9288	0.9596	0.9769	0.9917	0.9945	0.9956
1 Year Average	0.3376	0.6316	0.7816	0.8835	0.9368	0.9690	0.9807	0.9903	0.9936	0.9956
Selections at 12/31/2012	0.3603	0.6292	0.7727	0.8758	0.9341	0.9705	0.9847	0.9947	0.9973	0.9982
Default	0.3439	0.6353	0.7722	0.8758	0.9368	0.9690	0.9807	0.9903	0.9936	0.9956
Manual Selected	0.3500									
Selected	0.3500	0.6353	0.7722	0.8758	0.9368	0.9690	0.9807	0.9903	0.9936	0.9956

100 %

This variation of the indirect approach using implied development factors can be more helpful where historical prior period selections may not be reliable when viewed individually.

IMPORTANT NOTE: To use the indirect approach to AvE using Implied Development Factors, selections must be made using the above Ratio of Cumulative Paid Loss to Ultimate Loss exhibit (...in the case of the Paid Loss Development method. You will make selections from the corresponding exhibit for your chosen development method).

- **These selections must be made for the current period before appending the next period diagonal** to establish prior selections for this exhibit for future analysis. This should be included as a standard step in your analysis each development period.

To determine which exhibit is the source of a ratio column, click in the ratio column and choose **Source Data** from your window's ribbon. The screenshot below illustrates the location of the source of the column labeled Ratio of Cumulative Paid Loss to Ultimate Loss in the Object Library.

The screenshot displays the PP AutoLiab software interface. The main window shows the 'Object Library' with a list of exhibits. Exhibit 65, 'Cumulative Paid Loss to Ultimate Loss', is selected. A secondary window titled 'PP AutoLiab > Exhibits > Cumulative Paid Loss to Ultimate Loss' is open, showing a table of ratios for various accident years. A red circle highlights the 'Source Data' button in the top ribbon of this window. A third window, 'Source Data', is open, showing a list of tables with checkboxes. The 'Ultimate Loss' table (ID 25) and the 'Paid Loss' table (ID 16) are both checked.

Accident Year	12	24	36	48	60	72	84	96	108	120
2004	0.3519	0.5912	0.7380	0.8637	0.9324	0.9717	0.9921	0.9932	0.9953	0.99
2005	0.3671	0.6401	0.7686	0.8808	0.9382	0.9815	0.9893	0.9915	0.9936	
2006	0.3293	0.5920	0.7131	0.8497	0.9273	0.9717	0.9921	0.9932	0.9953	0.99
2007	0.3259	0.6276	0.7893	0.9010	0.9205	0.9717	0.9921	0.9932	0.9953	0.99
2008	0.3083	0.6486	0.7666	0.8609	0.9290	0.9717	0.9921	0.9932	0.9953	0.99
2009	0.3792	0.6045	0.7574	0.8787	0.9368	0.9717	0.9921	0.9932	0.9953	0.99
2010	0.3943	0.6344	0.7775	0.8835						
2011	0.3495	0.6398	0.7816							
2012	0.3445	0.6316								
2013	0.3376									

Table ID	Table Name
<input checked="" type="checkbox"/>	25 Ultimate Loss
<input checked="" type="checkbox"/>	16 Paid Loss

4. Reports

AvE using Selected Paid Loss Development

Prior Indicated Case and IBNR Loss Reserves are calculated as a function of Historical Ultimate Loss less Paid Loss (adjusted proportionally for partial periods). Ratios are derived from the current period Paid Loss Development Exhibit with column 5 relying on interpolated ratios for partial periods. Calculations are shown below to determine expected incremental paid loss and the difference in the actual incremental paid loss, with the final column reflecting percentage change from expected.

Accident Year	Prior Indicated Case and IBNR Loss Reserves (1)	From Development Age (2)	Ratio of Cumulative Paid Loss to Ultimate Loss (3)	To Development Age (4)	Ratio of Cumulative Paid Loss to Ultimate Loss (5)	Expected Incremental Percentage [(5)-(3)]/[1-(3)] (6)	Expected Incremental Paid Loss (1 x (6)) (7)	Actual Incremental Paid Loss (8)	Actual Paid Loss Less Expected Paid Loss (9)	Percentage Change from Expected (9) / (7) (10)
2004	\$ 42	108	0.9918	120	0.9939	25.42 %	\$ 11	\$ 5	(\$ 6)	-52.89 %
2005	56	96	0.9897	108	0.9918	20.35 %	11	30	19	165.08 %
2006	439	84	0.9806	96	0.9897	47.21 %	207	394	187	90.07 %
2007	304	72	0.9685	84	0.9806	38.41 %	117	186	69	59.52 %
2008	543	60	0.9359	72	0.9685	50.77 %	276	334	58	21.18 %
2009	818	48	0.8880	60	0.9359	42.75 %	350	412	62	17.78 %
2010	1,684	36	0.7799	48	0.8880	49.14 %	828	824	(4)	-0.46 %
2011	3,999	24	0.6335	36	0.7799	39.93 %	1,597	1,601	4	0.25 %
2012	10,434	12	0.3564	24	0.6335	43.06 %	4,493	4,598	105	2.34 %
2013				12	0.3564			5,544		
Total	\$ 18,318						\$ 7,889	\$ 13,928	\$ 495	6.28 %

Comparison of AvE Loss Using Prior Implied Loss Development and Prior Indicated Reserves

This report compares paid and incurred results of AvE Using Prior Implied Development and Prior Indicated Reserves, resulting in a final column Change in Ultimate Loss.

Accident Year	Expected Cumulative Paid Loss (1)	Actual Cumulative Paid Loss (2)	Expected Cumulative Incurred Loss (3)	Actual Cumulative Incurred Loss (4)	Prior Ultimate Loss (5)	Current Ultimate Loss (6)	Actual Less Expected Paid Loss (2) - (1) (7)	Actual Less Expected Incurred Loss (4) - (3) (8)	Change in Ultimate Loss (6) - (5) (9)
2004	\$ 21,297	\$ 21,289	\$ 21,318	\$ 21,308	\$ 21,326	\$ 21,384	(\$ 8)	(\$ 10)	\$ 58
2005	14,355	14,357	14,374	14,372	14,383	14,449	2	(2)	67
2006	13,098	13,205	13,162	13,236	13,250	13,334	107	74	84
2007	8,617	8,657	8,670	8,711	8,775	8,827	40	41	52
2008	8,054	8,088	8,128	8,156	8,297	8,347	34	28	50
2009	6,620	6,648	6,708	6,738	7,054	7,096	28	30	42
2010	6,810	6,870	7,014	7,100	7,730	7,776	60	86	46
2011	8,770	8,823	9,059	9,089	11,221	11,289	53	30	68
2012	9,903	10,115	10,369	10,512	15,951	16,014	212	143	63
2013									
Total	\$ 97,524	\$ 98,052	\$ 98,802	\$ 99,222	\$ 107,986	\$ 108,516	\$ 528	\$ 420	\$ 530

Comparison of AvE Loss Using Prior Selected Loss Development and Prior Indicated Reserves

This report compares paid and incurred results of AvE Using Prior *Selected* Development and Prior Indicated Reserves, resulting in a final column Change in Ultimate Loss.

PP AutoLiab > Reports > Comparison of Actual vs Expected Loss Using Prior Selected Loss Development and Prior Indica...

Comparison of Actual vs Expected Loss Using Prior Selected Loss Development and Prior Indicated Reserves

Accident Year	Expected Cumulative Paid Loss	Actual Cumulative Paid Loss	Expected Cumulative Incurred Loss	Actual Cumulative Incurred Loss	Prior Ultimate Loss	Current Ultimate Loss	Actual Less Expected Paid Loss (2) - (1)	Actual Less Expected Incurred Loss (4) - (3)	Change in Ultimate Loss (6) - (5)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2004	\$ 21,304	\$ 21,289	\$ 21,320	\$ 21,308	\$ 21,326	\$ 21,384	(\$ 15)	(\$ 12)	\$ 58
2005	14,350	14,357	14,376	14,372	14,383	14,449	7	(4)	67
2006	12,918	13,205	13,072	13,236	13,250	13,334	287	164	84
2007	8,678	8,657	8,659	8,711	8,775	8,827	(21)	52	52
2008	8,095	8,088	8,119	8,156	8,297	8,347	(7)	37	50
2009	6,656	6,648	6,714	6,738	7,054	7,096	(8)	24	42
2010	6,864	6,870	7,018	7,100	7,730	7,776	6	82	46
2011	8,748	8,823	8,971	9,089	11,221	11,289	75	118	68
2012	9,883	10,115	10,227	10,512	15,951	16,014	232	285	63
2013									
Total	\$ 97,498	\$ 98,052	\$ 98,477	\$ 99,222	\$ 107,986	\$ 108,516	\$ 554	\$ 745	\$ 530

100 %

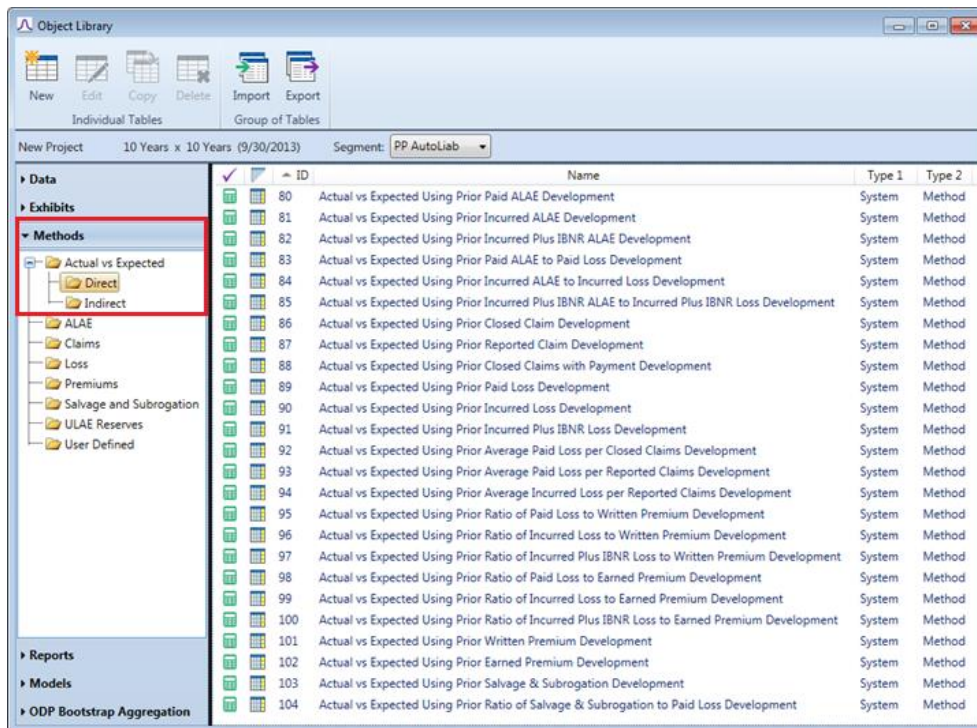
5. Where to Find Actual vs. Expected Objects and Collections

The 40+ Actual vs. Expected objects are found under the Methods node in the Object Library. By classifying the Actual vs. Expected objects as methods, we can leverage the ability of Arius to designate one method column as the ultimate column and thereby this column can be referenced in formulas in other methods and reports.

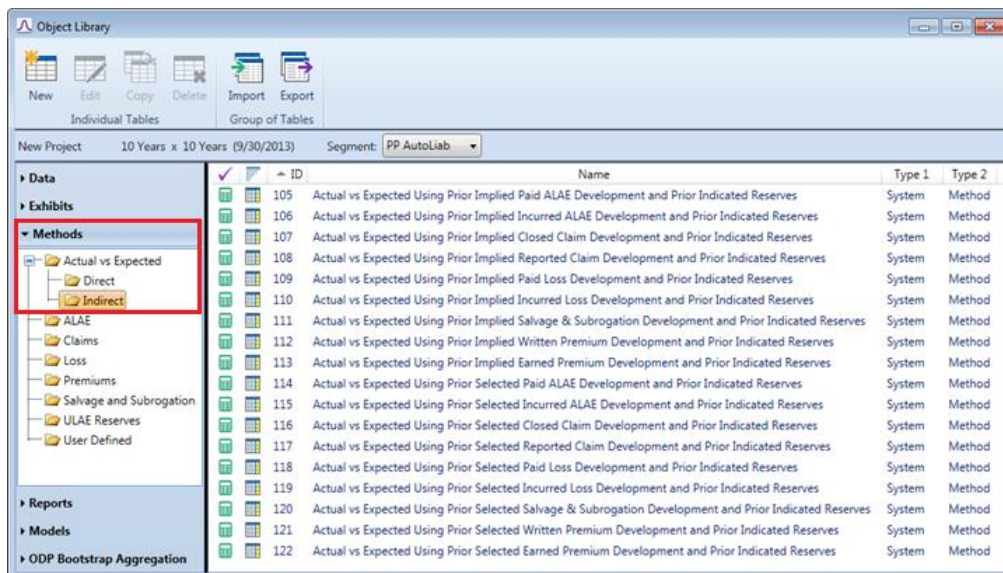
The Arius standard collections have been expanded to include the Direct Actual vs. Expected objects relevant to each development method. If you are currently using standard collections in your project you will automatically see these objects in your collections. In some cases the Actual vs. Expected objects are displayed in your collection panes in graph form. To access the underlying analysis merely click the **Source Data** icon in the ribbon of the Actual vs. Expected graph. If you have customized your collections you will not see the new objects in the collections in your Navigation Pane but will need to add them to your collections from the Object Library.

In addition, under the Navigation Pane's Data Diagnostics node, there are ten Actual vs. Expected collections to enhance your diagnostic analysis. Collections also display samples of some of the many graphing permutations available to provide a visual representation of your analysis. A settings icon accompanying each graph provides for quick customization. (See the section Working with Graphs.)

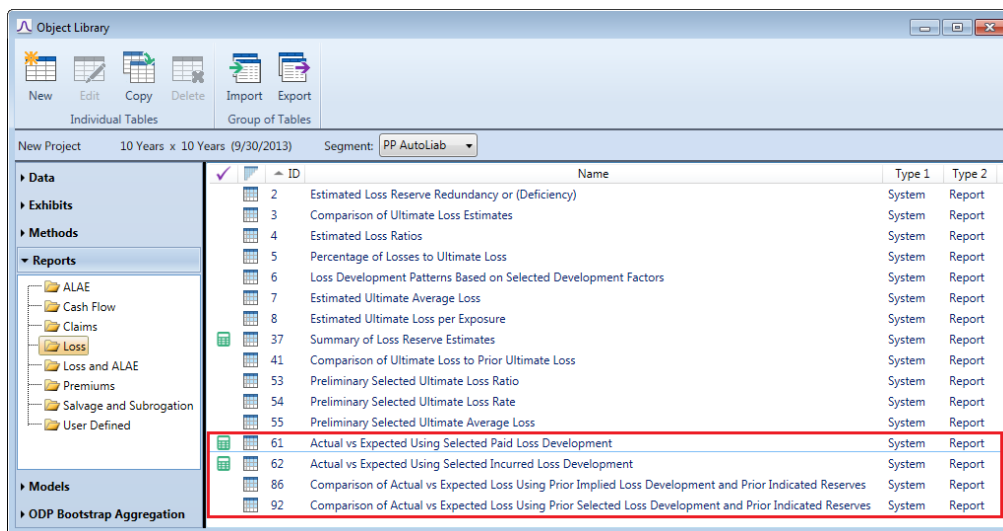
Direct Actual vs. Expected objects in the Methods node of the Object Library:



Indirect Actual vs. Expected objects in the Methods node of the Object Library:

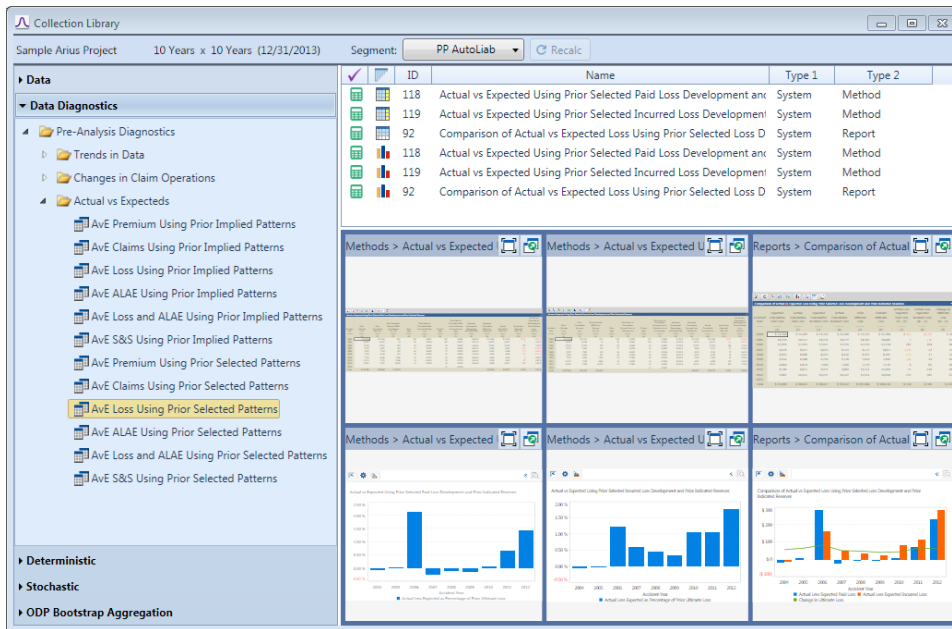


Actual vs. Expected Objects found in the Object Library for Loss Reports:

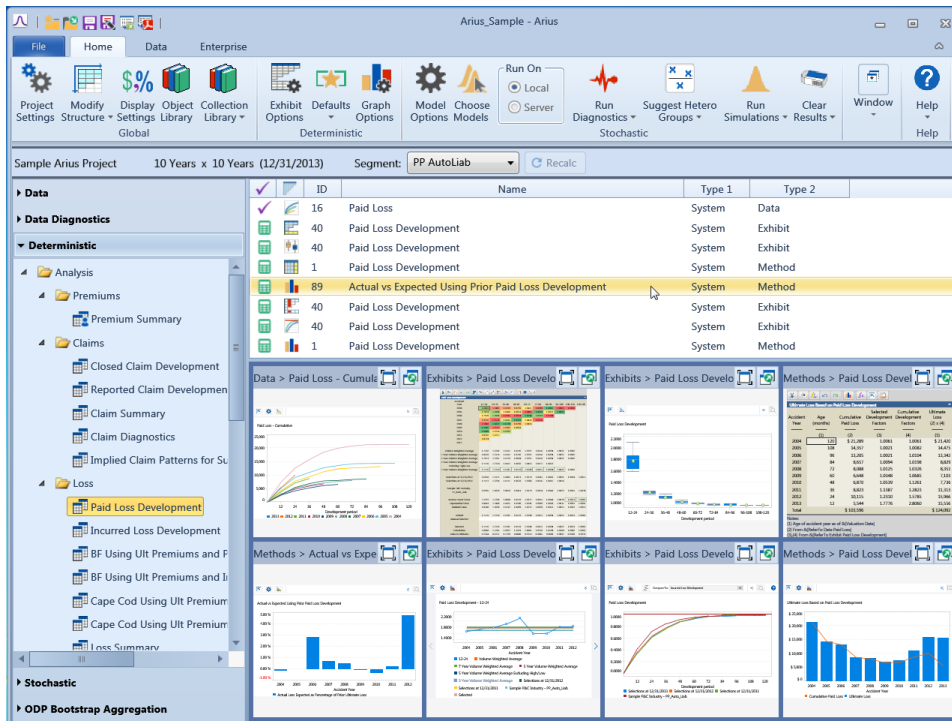


Similar Actual vs. Expected report objects are found under each analysis type (loss, ALAE, claims, etc.).

AvE Collections found in the Collection Library:



Additions to the Loss Development Collection including corresponding AvE objects:

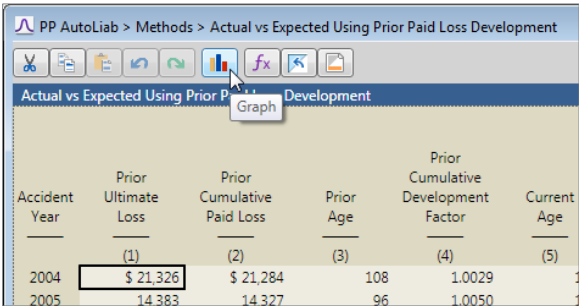


Similar Actual vs. Expected collections are found under each development method type.

6. Graphing the Actual vs. Expected Results

Customizable graphs are available for each Actual vs Expected method. A few samples are shown below. To modify the graphs choose Graph settings from the graph's ribbon.

1. Click on Graph from the Method ribbon.

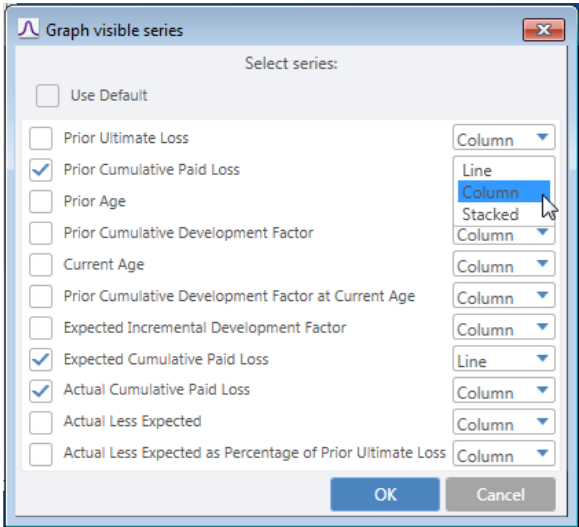
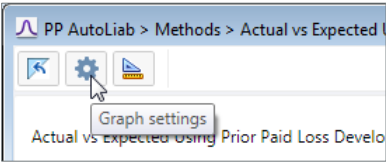


PP AutoLiab > Methods > Actual vs Expected Using Prior Paid Loss Development

Actual vs Expected Using Prior Paid Loss Development

Accident Year	Prior Ultimate Loss	Prior Cumulative Paid Loss	Prior Age	Prior Cumulative Development Factor	Current Age
	(1)	(2)	(3)	(4)	(5)
2004	\$ 21,326	\$ 21,284	108	1.0029	
2005	14,383	14,327	96	1.0050	

2. Click on Graph settings from the graph ribbon, then select the data you would like to display and if you would like the data displayed as a line, a column or stacked. Click **OK**.



Graph visible series

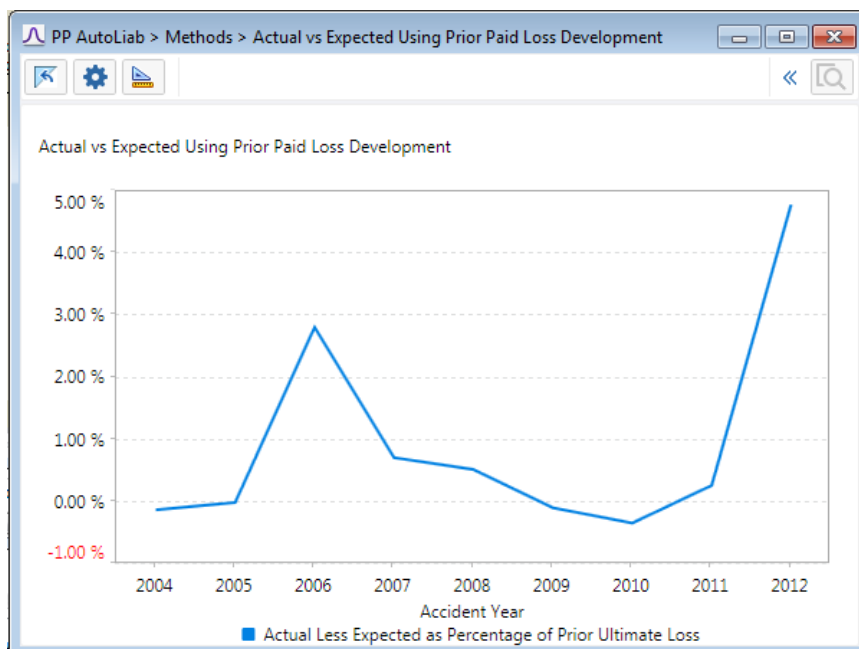
Select series:

☐ Use Default

<input type="checkbox"/> Prior Ultimate Loss	Column
<input checked="" type="checkbox"/> Prior Cumulative Paid Loss	Line
<input type="checkbox"/> Prior Age	Column
<input type="checkbox"/> Prior Cumulative Development Factor	Column
<input type="checkbox"/> Current Age	Column
<input type="checkbox"/> Prior Cumulative Development Factor at Current Age	Column
<input type="checkbox"/> Expected Incremental Development Factor	Column
<input checked="" type="checkbox"/> Expected Cumulative Paid Loss	Line
<input checked="" type="checkbox"/> Actual Cumulative Paid Loss	Column
<input type="checkbox"/> Actual Less Expected	Column
<input type="checkbox"/> Actual Less Expected as Percentage of Prior Ultimate Loss	Column

OK Cancel

- Graph Results: Below are two samples of possible customized graphs for the Direct Paid Loss Development AvE method.



7. Using Actual vs. Expected at Year-End

Before you begin

If you plan to use the Direct approach and/or Indirect approach using selected patterns, you will not need to select anything other than the standard development patterns and ultimates you selected as part of your most recent analysis in Arius.

If you plan to use the Indirect approach using implied patterns, you will also need to select ratio to ultimate patterns before you prepare your most recent Arius analysis file for the new period.

Populate the AvE tables

Below we have provided the steps to populate the AvE tables for Paid Loss, in two different scenarios.

- Scenario 1 assumes an analysis at 12/31/2015 with a 12-24-36 structure is being updated at 12/31/2016 with a 12-24-36 structure.
- Scenario 2 assumes an analysis at 9/30/2016 with a 9-21-33 structure is being rolled forward to 12/31/2016 with a 9-21-33 structure.

Similar steps will be necessary for each data element (e.g., Incurred Loss, Open Claims, etc.) for which you want to populate Actual vs. Expected tables.

Scenario 1: 12/31/2015 to 12/31/2016 with 12-24-36 structure

- Original file at 12/31/2015 with 12-24-36 development periods
- Roll forward to 12/31/2016 with 12-24-36 development periods

In the 2015 file

1. Select 12-24-36 Paid Loss Development factors.
2. Select Ultimate Loss.
3. If using Indirect AvE using implied pattern, select 12-24-36 Cumulative Paid Loss to Ultimate Loss factors (Exhibit 65 under EXHIBITS | LOSSES | OTHER RATIOS).
4. Save this file.

Create and update 2016 file

5. In MODIFY STRUCTURE | APPEND NEW EVALUATION, uncheck the **Clear All Assumptions** box.
6. Save this file with a new name.
7. Select 12-24-36 Paid Loss Development factors.
8. If using Indirect AvE using implied pattern, select 12-24-36 Cumulative Paid Loss to Ultimate Loss factors (Exhibit 65 under EXHIBITS | LOSSES | OTHER RATIOS).

Scenario 2: 9/30/2016 to 12/31/2016 with 9-21-33 structure

- Original file at 9/30/2016 with 9-21-33 development periods
- Roll forward to 12/31/2016 with 9-21-33 development periods (last diagonal is a partial period and interpolation is activated)

In the 9/30 file

1. Select 9-21-33 Paid Loss Development factors.
2. Select Ultimate Loss
3. If using Indirect Actual vs. Expected using implied pattern, select 9-21-33 Cumulative Paid Loss to Ultimate Loss factors (Exhibit 65 under Exhibits | Losses | Other Ratios).
4. Save this file.

Create and update 12/31 file

5. In MODIFY STRUCTURE | APPEND NEW EVALUATION, uncheck the **Continue Adding Exposure Periods** and **Clear All Assumptions** boxes.
6. Load new data into the latest diagonal.
7. Select 12-24-36 (interpolated) Paid Loss Development factors.
8. If using Indirect Actual vs. Expected using implied patterns, select 12-24-36 (interpolated) Cumulative Paid Loss to Ultimate Loss factors (Exhibit 65 under EXHIBITS | LOSSES | OTHER RATIOS).