



### Introduction

- Most commonly used methods for reserving –
- Paid and incurred loss development methods and
- Paid and incurred Bornhuetter-Ferguson methods
- Loss development methods rely on the selection of development factors
- Based on own data
- Supplemented with industry information
- Bornhuetter Ferguson (B-F) method -
  - Also relies on loss development factor selection; but also
- Selection of A Priori ultimate losses or ultimate loss ratios
- The discussion will involve <u>CONSIDERATIONS</u> for selecting A
   Priori ultimate loss ratios

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### **Loss Development Methods**

- Concerns with development factors
- Variable and Volatile
- Uncertainty in future loss development factors
- Do development factors vary based on where you are in underwriting cycle?
- Loss development methods produce AN indication of ultimate losses
- Uncertainty of estimates often requires use of supplementary methods
- Often greater uncertainty in more recent years
- Bornhuetter Ferguson method -
- Selection of A Priori ultimate losses or ultimate loss ratios

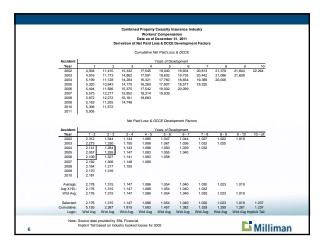
### Traditional Approaches to Selecting A Priori Ultimate Loss Ratios

- Common methods:
- Pricing loss ratio
- Historical loss ratios adjusted for rate change and trend
- Reliability / Predictability of the above two methods
- Are we missing important information?
- Is there a trend / pattern or just normal variability

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### **Illustrative Example**

- For Discussion Purposes Only
   Results by company and line of business would vary
- Alternative assumptions could be made
- Workers Compensation Premium and Losses
- Based on Schedule P
- Aggregate Industry Information



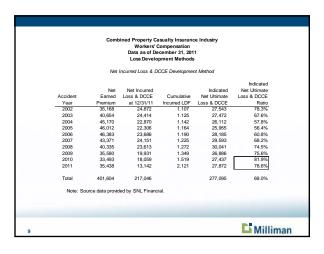


		Deri		Worker Data as of	/ Casualty I rs' Compen: I December I Loss & DCI	ation 31, 2011	,	vrs		
			C	umulative N	at Incurred L	oss & DOCE				
Accident					Years of De					
Year	1	2	3	4	5	6	7	8	9	10
2002	12,346	18,372	20,959	21,933	22,639	23,200	23,735	24,138	24,478	24,872
2003	12,877	18,357	20,430	21,490	22,312	23,093	23,527	24,048	24,414	
2004	12,867	17,561	19,421	20,486	21,309	21,901	22,462	22,870		
2005	13,147	17,274	19,171	20,376	21,079	21,792	22,306			
2006	13,415	18,243	20,744	22,054	23,054	23,686				
2007	13,810	19,243	21,692	23,245	24,151					
2008 2009	13,878 12,454	19,418 17,516	22,065 19.931	23,613						
2009	12,454	17,516	19,931							
2010	13,142	18,059								
Accident			Net Inc	urred Loss a	S DCCE Dev Years of De		actors			
Year	1.2	2 - 3	3 - 4	4.5	1 wars of De	6 · 7	7.8	8-9	9 - 10	10 - ult
2002	1,488	1,141	1.046	1.032	1.025	1.023	1.017	1.014	1.016	10- 41
2003	1.426	1.113	1.052	1.038	1.035	1.019	1.022	1.015		
2004	1.365	1,106	1.055	1.040	1.028	1.026	1.018			
2005	1.314	1,110	1.063	1.034	1.034	1.024				
2006	1.360	1.137	1.063	1.045	1.027					
2007	1.393	1.127	1.072	1.039						
2008	1.399	1.136	1.070							
2009	1.406	1.138								
2010	1.420									
Average:	1.397	1.126	1.060	1.038	1.030	1.023	1.019	1.015	1.016	
Avg X H/L:	1.396	1.127	1.061	1.038	1.030	1.023	1.018			
Wtd Avg:	1.396	1.126	1.060	1.038	1.030	1.023	1.019	1.015	1.016	
Selected:	1.396	1.126	1.060	1.038	1.030	1.023	1.019	1.015	1.016	1.107
Cumulative:	2.121	1.519	1.349	1.272	1.225	1.190	1.164	1.142	1.125	1.107
Logic:	Wtd Avg	Wtd Avg	Wtd Avg	Wtd Avg	Wtd Avg	Wtd Avg	Wtd Avg	Wtd Avg	Wtd Avg II	mplicit Tail
	Source data	provided by	SNL Financi							Milli
	Implicit Tail b									



	Ne	at Paid Loss & DCC	E Development	Method	
Accident	Net Earned	Net Paid	Cumulative	Indicated Net Ultimate	Indicated Net Ultimate Loss & DCCE
Year	Premium	at 12/31/11	Paid LDF	Loss & DCCE	Ratio
2002	35,168	22.264	1.237	27.543	78.3%
2003	40,654	21,609	1 261	27.247	67.0%
2004	45,170	20.009	1.290	25.817	57.2%
2005	46.012	19.320	1.329	25.680	55.8%
2006	46,383	20.099	1.382	27,779	59.9%
2007	43.371	19.939	1.457	29.052	67.0%
2008	40,335	18,663	1.583	29,535	73.2%
2009	35,580	14,748	1.815	26,770	75.2%
2010	33,493	11,572	2.387	27,621	82.5%
2011	35,438	5,505	5.193	28,583	80.7%
Total	401,604	173,728		275,628	68.6%
Note: S	ource data provio	led by SNL Financi	əl		







# **Analysis of Loss Development Methods**

- Indicating increasing loss ratios in recent accident years
- Are results really deteriorating?
- Is something else causing this increase, making the loss development method not as predictive?
- Common next steps

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- Select base period of ultimate losses
- Ultimate losses selected for accident year 2007 and prior based on development methods
- Additional Methods utilized for more recent accident years 2008 and subsequent

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				roperty Casualty In:				
				Workers' Compensa ta as of December 3				
				ry of Indicated Ultin				
Accident	Net Earned	Net Loss & DCCE Paid to	Net Loss & DCCE Incurred	Indications of Net	Ultimate Loss & DCCE	Selected Net Ultimate		Selected Net Ultimate Loss & DCCE
Year	Premium	Paid to Date	to Date	Development	Development	Loss & DCCE	Logic	Ratio
2002	35.168	22.264	24.872	27.543	27.543	27.543	Avg LDFs	78.3%
2003	40,654	21,609	24,414	27,247	27,472	27,359	Avg LDFs	67.3%
2004	45,170	20,009	22,870	25,817	26,112	25,964	Avg LDFs	57.5%
2005	46,012	19,320	22,306	25,680	25,955	25,817	Avg LDFs	56.1%
2006	46,383	20,099	23,696	27,779	28,185	27,982	Avg LDFs	60.3%
2007	43,371	19,939	24,151	29,052	29,593	29,323	Avg LDFs	67.6%
Total	256,757	123,240	142,300	163,119	164,859	163,989		63.9%
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# **Additional Methods**

- Bornhuetter - Ferguson for Accident Years 2008 and subsequent Assumptions

Loss Development Factors -

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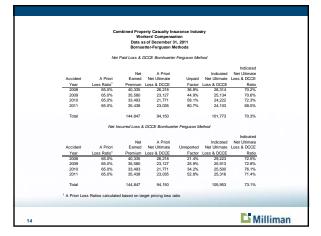
- Same as loss development method
- A Priori Loss Ratios
  - Scenario 1: Pricing loss ratio
- Scenario 2: Adjust historical loss ratios for rate change and trend
   Scenario 3: Adjusted loss ratios reflecting more recent years

# Scenario 1: Pricing Loss Ratio

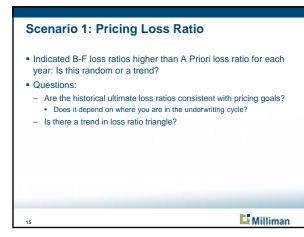
Assumptions:

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- The company targets a 65% Loss and DCCE ratio
- The company believes rate changes and trend will result in overall 65% loss ratio
- $\mbox{-}$  Select 65% ultimate loss for more recent accident years for the BF method



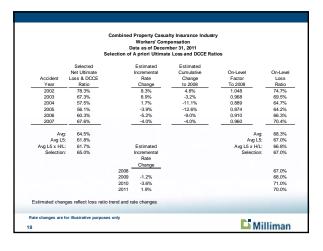




Net Paid Lo		Detie Tei								
Net Paid Lo	12 12 15	24 Ratio	angie 36	48	60	72	84	96	108	120
2002	14.0%	32.4%	43.6%	49.9%	54 1%	56.7%	59.2%	60.8%	62.1%	63.3%
2002	12.1%	27.5%	36.6%	43.3%	45.8%	48.5%	50.3%	51.9%	53.2%	03.376
2004	11.5%	24.6%	31.6%	36.1%	39.3%	41.3%	42.9%	44.3%	00.270	
2005	11.6%	23.8%	30.8%	35.3%	38.3%	40.4%	42.0%	44.070		
2006	11.8%	25.0%	33.1%	37.8%	41 0%	43.3%	42.070			
2007	12.8%	28.2%	36.8%	42.2%	46.0%					
2008	14.1%	30.4%	40.1%	46.3%						
2009	14.5%	31.5%	41.5%							
2010	15.8%	34.6%								
2011	15.5%									
Net Incurre										
	12	24	36	48	60	72	84	96	108	120
2002	35.1%	52.2%	59.6%	62.4%	64.4%	66.0%	67.5%	68.6%	69.6%	70.7%
2003	31.7%	45.2%	50.3%	52.9%	54.9%	56.8%	57.9%	59.2%	60.1%	
2004	28.5%	38.9%	43.0%	45.4%	47.2%	48.5%	49.7%	50.6%		
2005	28.6%	37.5%	41.7%	44.3%	45.8%	47.4%	48.5%			
2006	28.9%	39.3%	44.7%	47.5%	49.7%	51.1%				
2007	31.8% 34.4%	44.4% 48.1%	50.0% 54.7%	53.6% 58.5%	55.7%					
				58.5%						
2009 2010	35.0% 38.0%	49.2% 53.9%	56.0%							
2010	38.0%	53.9%								
2011	37.1%									



# Scenario 2: Adjusted Historical Loss Ratio Assumptions Historical Loss Ratios are predictive of future Requires adjustment for: Rate Changes Trend





	c	Wo Data a	erty Casualty In rkers' Compensa is of December 3 letter-Ferguson I	ition 1, 2011	atry		
	Ne	t Paid Loss &	DCCE Bornhuette	r Ferguson Me	thod		
Accide Year		Net Earned Premium	A Priori Net Ultimate Loss & DCCE	Unpaid	Indicated Net Ultimate Loss & DCCE	Indicated Net Ultimate Loss & DCCE Ratio	
2008	67.0% 68.0%	40,335 35,580 33,493	27,025 24,195 23,780	36.8% 44.9% 58.1%	28,611 25,614 25,389	70.9% 72.0% 75.8%	
2011	70.0%	35,438	24,807	80.7%	25,534	72.1%	
	Net	Incurred Loss &	& DCCE Bornhuet	ter Ferguson N	lethod	Indicated	
			Net Ultimate	Unreported		Loss & DCCE	
Accide	nt A Priori	Famed					
Accide		Premium			Loss & DCCE	Ratio	
	Loss Ratio <sup>2</sup>				Loss & DCCE 29,396	Ratio 72.9%	
Year 2008 2009	Loss Ratio <sup>2</sup> 67.0% 68.0%	Premium 40,335 35,580	Loss & DCCE 27,025 24,195	Factor 21.4% 25.9%	29,396 26,190	72.9% 73.6%	
Year 2008 2009 2010	Loss Ratio <sup>2</sup> 67.0% 68.0% 71.0%	Premium 40,335 35,580 33,493	Loss & DCCE 27,025 24,195 23,780	Factor 21.4% 25.9% 34.2%	29,396 26,190 26,187	72.9% 73.6% 78.2%	
Year 2008 2009	Loss Ratio <sup>2</sup> 67.0% 68.0% 71.0%	Premium 40,335 35,580	Loss & DCCE 27,025 24,195	Factor 21.4% 25.9%	29,396 26,190	72.9% 73.6%	
Year 2008 2009 2010	Loss Ratio <sup>2</sup> 67.0% 68.0% 71.0% 70.0%	Premium 40,335 35,580 33,493	Loss & DCCE 27,025 24,195 23,780	Factor 21.4% 25.9% 34.2%	29,396 26,190 26,187	72.9% 73.6% 78.2%	
Yea 2006 2006 2010 2011 2011	Loss Ratio <sup>2</sup> 67.0% 68.0% 71.0% 70.0%	Premium 40,335 35,580 33,493 35,438 144,847	Loss & DCCE 27,025 24,195 23,780 24,807 99,806	Factor 21.4% 25.9% 34.2% 52.8%	29,396 26,190 26,187 26,252 108,025	72.9% 73.6% 78.2% 74.1%	



### Scenario 2: Adjusted Historical Loss Ratio

- BF loss ratios higher than A Priori loss ratio for each year
- Is this random or a trend?
- Questions regarding rate change and trend assumptions:
- How accurate are the rate changes?
- How accurate are the trend assumptions?
- Do the trend and rate changes reflect:
  - Changes in retentions / deductibles, limits, terms and conditions
  - Changes in exposure, mix of business, mix of states, new and renewal business
  - Changes in the economy
- Answers vary by :
- Company and line of business in a company
- Stability of patterns
- Underwriting cycle
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Scenario 2: Adjusted Historical Loss Ratio

Questions regarding loss development assumptions:

- Is this something we haven't reflected?
- Changes to data that would change development
   Increased number of small dollar claims due to a poor economy will temper development factors
  - Change in case reserve practices
  - However, paid losses show a similar pattern
  - Company change in payment pattern
  - Due to claims settlement initiatives?Due to changes in the mix of business?
  - Are these changes noticeable in development factors?
  - Known prior to the analysis or explanation of results?

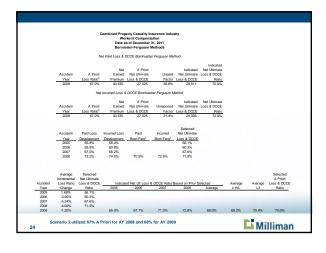
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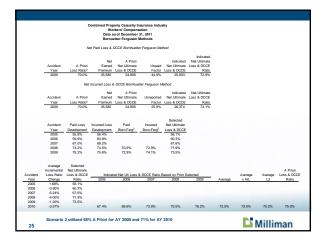
### Scenario 3: Adjusted Loss Ratio Reflecting More Recent Years

- Historical Loss Ratios adjusting for:
  - Rate changes
  - Trend
  - More recent accident year selections
- Iterative Approach
  - Select A Priori loss ratio for one year
  - Perform B-F calculation
  - Select the accident year ultimate losses
  - Select A Priori loss ratio for next year based on all prior years' selections
  - Perform B-F calculation

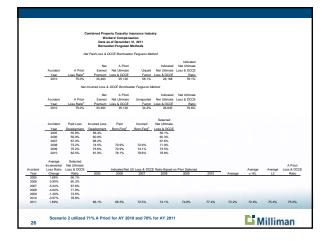
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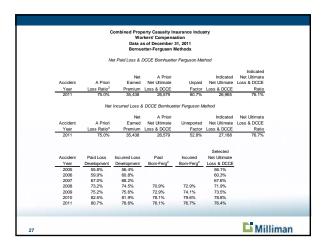








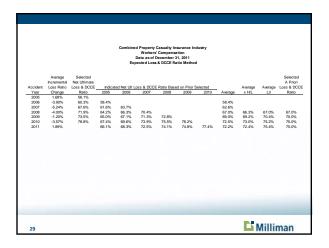




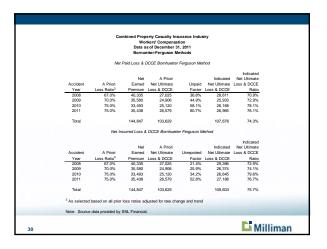








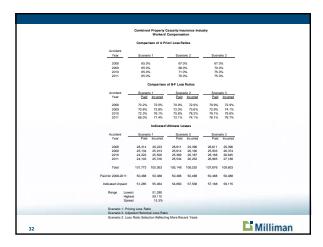














### Summary

- Presentation provides <u>considerations</u> when selecting an A Priori
- No single method is appropriate for all situations
- Selection of A Priori depends on
  - -Company Specific Information/Situation - Line of Business
  - Length of Tail

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- Effect of Economic Environment
- Differentiating Between
- a trend in loss ratios
  variability of results

### **Other Considerations**

- The opposite situation would have indicated *improving* loss ratios
- Are loss ratios really improving or has there been a change to the reporting or payment patterns?
  - Case reserve weakening
  - Lack of large claims initially reported / reservesDelay in reporting or paying losses
    - Delay in reporting or paying losse
       Change in claims system
    - Change in Claims syst
       Change in TPA
    - Change in underlying accounts

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