

2022 BAS Annual Case Competition

Team 33:

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Agenda

- Introduction
- Observations from Data
- Catastrophe Reserving and Challenges
- Reserving Methods
- Comparison of Ultimate Losses
- LOB's Standardization Recommendations

Introduction

How will we be managing this review
and what do we aim to accomplish?

Procedure

Our Bruin Mutual team will be using various methods to conduct a reserving review of:

- Personal Auto Physical Damage
- Personal Auto Liability
- Homeowner's Property

We will compare the characteristics and Ultimate Losses of all methods for each LOB.

Intentions

- Display resulting Ultimate Losses using reserving methods based on claims data dating from January 1st 2011 to December 31st 2020
- Provide reserving methods recommendations for each LOB
- Standardize efficient processes to generate accurate future reserving reviews

Observations from Data

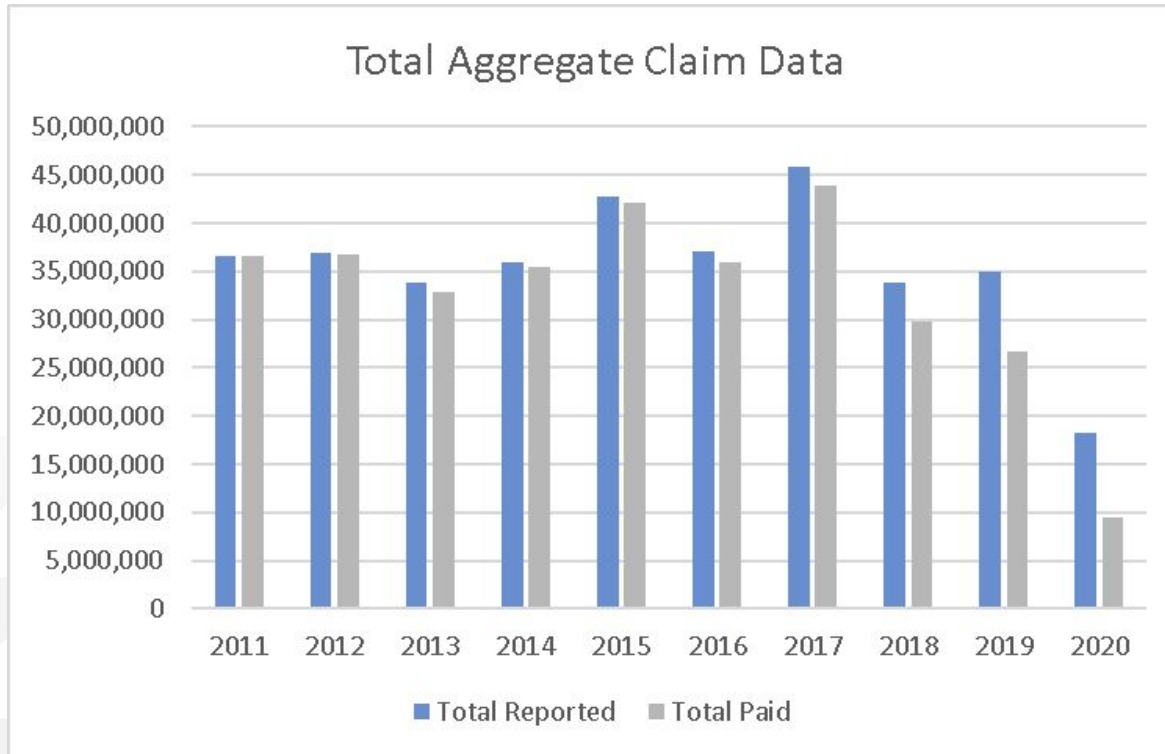
Were there any errors or noticeable trends in the claims data?

Review of Data

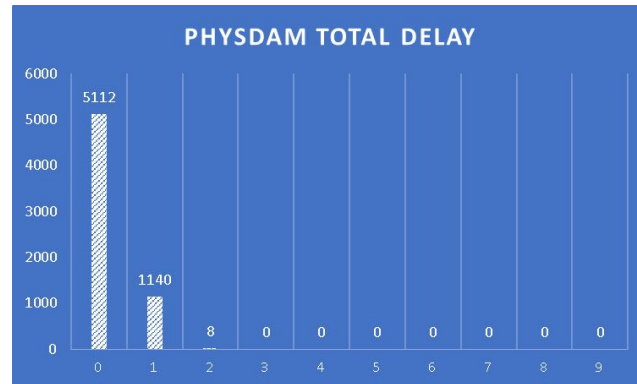
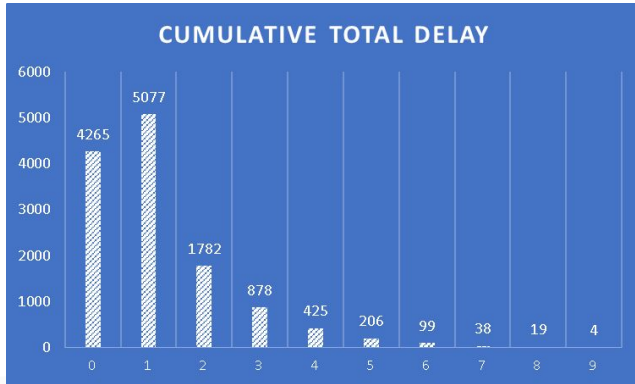
Errors

- After a thorough inspection of the claims data we concluded all provided data was accurate.

Review of Data



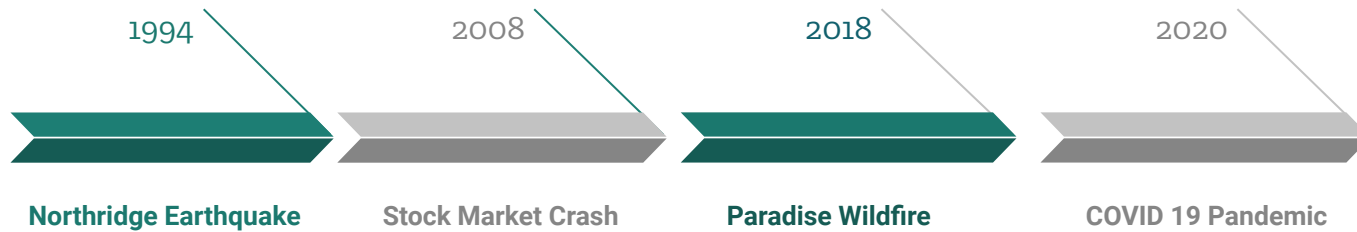
Review of Data



Catastrophe Reserving & Challenges

Are CAT's included in the reserving process, and what challenges do they present?

CAT Reserving



- CAT's are unpredictable so their reserving is done through separate processes.
- CAT's disrupt natural patterns created for commonplace reserve calculations.

Challenges

01

Government Regulations

- Limitations on catastrophe reserves

02

Predicting Occurrences

- Catastrophes are unsystematic

03

Predicting Severity

- Disaster models can only be so accurate

Reserving Methods

Which methods are used to create accurate predictions and what are their characteristics?

Chain Ladder Method

Advantages

- Demands a large volume of claims
- Good for stable patterns of loss development

Disadvantages

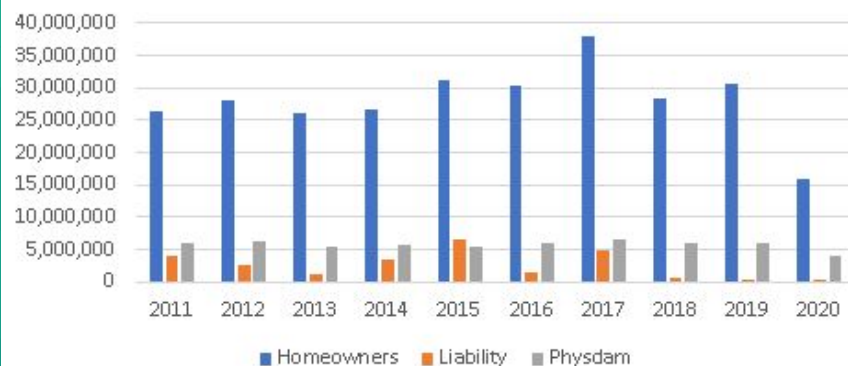
- Only accurate when previous patterns are predicted to reoccur

Paid Chain Ladder Method Ultimate Loss

Projected Ultimate Claims - Paid Chain Ladder Method

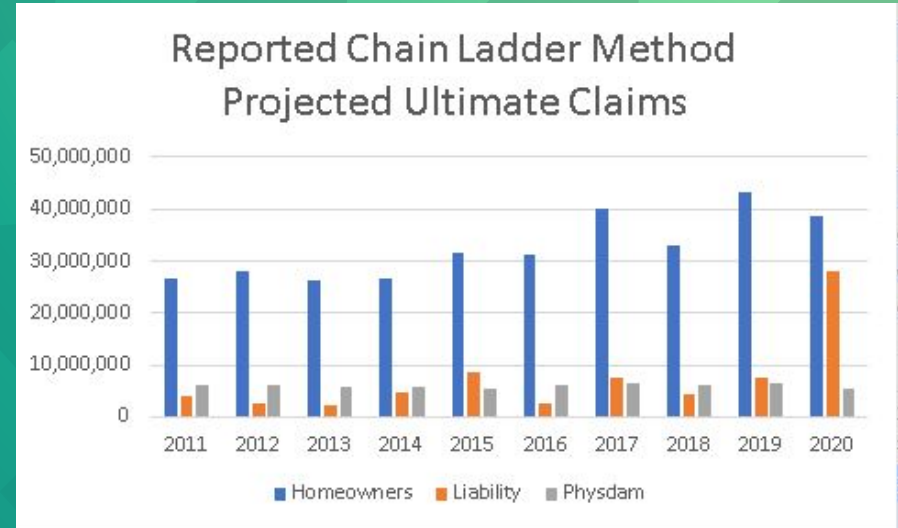
Year	Homeowners	Liability	Physdam	Total
2011	26,458,387	4,071,317	6,093,005	36,622,709
2012	28,051,044	2,511,329	6,167,102	36,729,477
2013	26,055,677	1,243,949	5,594,092	32,896,912
2014	26,551,453	3,387,386	5,727,696	35,655,578
2015	31,231,036	6,451,281	5,547,188	43,005,662
2016	30,380,228	1,438,489	6,000,913	37,890,638
2017	38,080,280	4,784,465	6,501,640	48,965,900
2018	28,311,992	598,889	5,944,766	35,744,081
2019	30,716,881	358,305	6,108,874	38,077,624
2020	15,886,093	150,013	3,923,843	21,273,386

Paid Chain Ladder Method Projected Ultimate Claims



Reported Chain Ladder Method Ultimate Loss

Projected Ultimate Claims - Reported Chain Ladder Method				
Year	Homeowners	Liability	Physdam	Total
2011	26,458,387	4,072,127	6,093,005	36,623,519
2012	28,084,819	2,610,883	6,167,102	36,863,102
2013	26,222,057	2,070,586	5,594,092	33,893,425
2014	26,762,423	4,601,952	5,727,696	36,540,354
2015	31,751,512	8,436,187	5,547,188	44,266,990
2016	31,190,449	2,572,198	6,000,913	39,759,772
2017	40,109,371	7,453,102	6,501,640	52,249,043
2018	32,834,421	4,235,115	5,944,766	41,901,424
2019	43,341,580	7,555,309	6,300,267	52,790,925
2020	38,788,164	28,036,949	5,241,321	45,509,749



Expected Method

Advantages

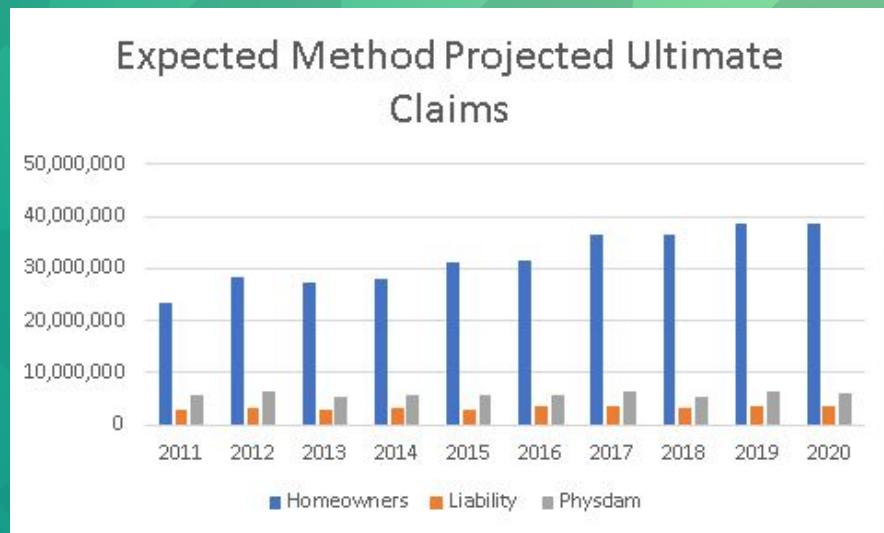
- Great for using with little to no past data
- Remains stable over time

Disadvantages

- Requires minimum level of loss reserves
- Unreactive when actual claims vary from expectation

Expected Method Ultimate Loss

Projected Ultimate Claims - Expected Method				
Year	Homeowners	Liability	Physdam	Total
2011	23,407,679	2,941,478	5,559,058	29,607,379
2012	28,504,004	3,055,499	6,512,390	35,026,689
2013	27,385,448	2,812,826	5,468,799	32,740,602
2014	28,052,239	3,061,425	5,686,379	33,885,878
2015	31,248,432	2,867,311	5,558,657	36,216,404
2016	31,488,890	3,454,123	5,613,919	37,353,740
2017	36,611,881	3,531,702	6,482,908	42,663,388
2018	36,376,782	3,180,322	5,403,343	40,938,283
2019	38,611,206	3,527,174	6,560,540	44,441,963
2020	38,482,802	3,715,168	6,052,244	44,144,697



Bornhuetter-Ferguson Method

Advantages

- Useful for limited and or unstable data
- Exceptional handling for uneven patterns of loss development

Disadvantages

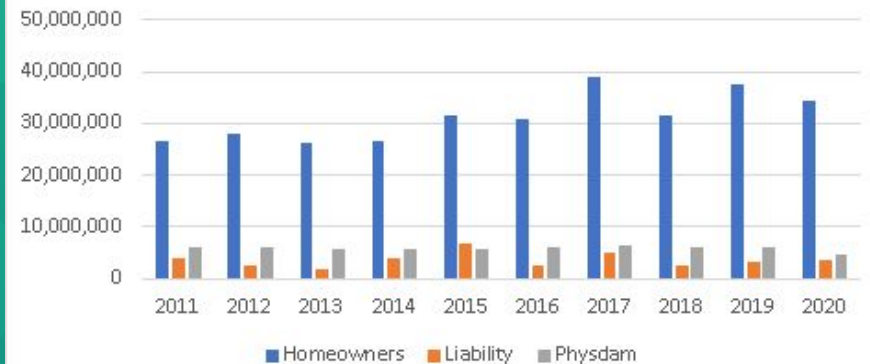
- Ineffective for short tailed lines of insurance

Bornhuetter-Ferguson Method Ultimate Loss

Projected Ultimate Claims - Bornhuetter-Ferguson Method

Year	Homeowners	Liability	Physdam	Total
2011	26,458,387	4,071,722	6,093,005	36,623,114
2012	28,067,932	2,561,151	6,167,102	36,796,269
2013	26,140,036	1,668,503	5,594,092	33,393,626
2014	26,667,960	3,835,041	5,727,696	36,069,424
2015	31,485,017	6,595,436	5,547,188	43,424,849
2016	30,824,450	2,347,920	6,000,913	38,727,951
2017	38,801,642	5,078,182	6,501,640	49,697,523
2018	31,594,064	2,484,165	5,944,629	39,162,189
2019	37,486,443	3,133,028	6,207,968	44,977,003
2020	34,226,150	3,664,588	4,754,129	39,286,270

Bornhuetter-Ferguson Method
Projected Ultimate Claims



Cape Cod Method

Advantages

- Prevents distortion by unexpected fluctuation at the start of the year
- Expected claims ratio is estimated from previous data

Disadvantages

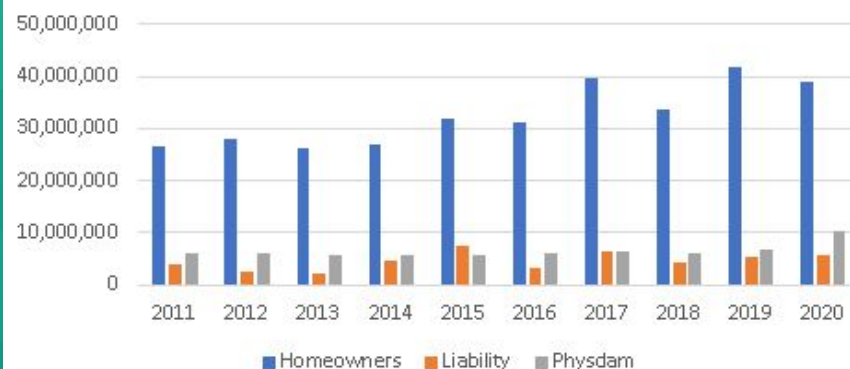
- Requires high volume of credible reported claims to yield an accurate expected claims estimate
- Assumes constant loss exposure without taking variation into account

Cape Cod Ultimate Loss

Projected Ultimate Claims - Cape Cod Method

Year	Homeowners	Liability	Physdam	Total
2011	26,458,387	4,072,127	6,093,005	36,623,519
2012	28,084,819	2,611,231	6,167,102	36,862,287
2013	26,224,002	2,114,923	5,594,092	33,833,018
2014	26,777,968	4,551,719	5,727,696	36,138,105
2015	31,749,803	7,298,722	5,547,188	43,543,472
2016	31,234,997	3,362,577	6,000,913	39,167,377
2017	39,748,745	6,349,292	6,501,640	50,592,265
2018	33,589,627	4,443,317	5,954,576	41,294,823
2019	41,831,577	5,370,603	6,702,208	49,503,219
2020	38,940,711	5,561,282	10,406,516	44,858,399

Cape Cod Method Projected Ultimate Claims



Comparison of Ultimate Losses

What was each methods Ultimate Loss and
what does it indicate?

Claim Data at 12/31/2020

Year	Homeowners Reported	Homeowners Paid	Liability Reported	Liability Paid	Physdam Reported	Physdam Paid	Total Reported	Total Paid
2011	26,458,387	26,458,387	4,072,127	4,071,317	6,093,005	6,093,005	36,623,519	36,622,709
2012	28,084,819	28,051,044	2,610,361	2,511,326	6,167,102	6,167,102	36,862,282	36,729,472
2013	26,189,063	26,038,548	2,023,050	1,239,643	5,594,092	5,594,092	33,806,206	32,872,283
2014	26,515,037	26,372,410	3,663,928	3,332,843	5,727,696	5,727,696	35,906,661	35,432,949
2015	30,937,721	30,548,642	6,233,706	6,014,412	5,547,188	5,547,188	42,718,615	42,110,243
2016	29,308,203	28,730,253	1,704,134	1,161,928	6,000,913	6,000,913	37,013,251	35,893,095
2017	35,265,582	33,827,393	4,065,531	3,643,103	6,501,640	6,501,640	45,832,753	43,972,136
2018	26,712,332	23,463,090	1,189,843	391,766	5,943,257	5,943,257	33,845,432	29,798,113
2019	27,726,338	20,527,498	1,049,594	152,406	6,240,131	6,050,565	35,016,063	26,730,469
2020	13,290,664	6,058,640	339,735	16,658	4,609,457	3,471,556	18,239,857	9,546,854

Homeowners Ultimate Loss Comparison

Year	Paid CL		Reported		Expected		Cape Cod				Best Method	
	Method	Paid CL	CL Method	Reported	Method	Expected	BF Method	Method	Cape Cod	Method		
	Reported	Method	Reported	CL Method	Reported	Method	Reported	BF Method	Reported	Method		
	Data	Paid Data	Data	Paid Data	Data	Paid Data	Data	Paid Data	Data	Paid Data		
	Difference	Difference	Difference	Difference	Difference	Difference	Difference	Difference	Difference	Difference		
2011	0	0	0	0	-3,050,708	-3,050,708	0	0	0	0	0	Any method but Expected
2012	-33,774	0	0	33,774	419,186	452,960	-16,887	16,887	0	33,774	33,774	Paid CL
2013	-133,387	17,128	32,994	183,509	1,196,385	1,346,900	-49,028	101,488	34,939	185,454	185,454	Paid CL
2014	36,416	179,043	247,386	390,014	1,537,201	1,679,829	152,923	295,550	262,931	405,558	405,558	Paid CL
2015	293,315	682,394	813,791	1,202,870	310,711	699,789	547,296	936,375	812,082	1,201,161	1,201,161	Paid CL
2016	1,072,024	1,649,974	1,882,246	2,460,196	2,180,687	2,758,637	1,516,246	2,094,196	1,926,794	2,504,744	2,504,744	Paid CL
2017	2,814,697	4,252,887	4,843,789	6,281,978	1,346,299	2,784,488	3,536,060	4,974,249	4,483,163	5,921,352	5,921,352	Expected
2018	1,599,660	4,848,902	6,122,089	9,371,331	9,664,451	12,913,692	4,881,732	8,130,974	6,877,295	10,126,537	10,126,537	Paid CL
2019	2,990,543	10,189,383	15,615,243	22,814,082	10,884,868	18,083,708	9,760,106	16,958,946	14,105,240	21,304,079	21,304,079	Paid CL
2020	2,595,428	9,827,453	25,497,499	32,729,524	25,192,138	32,424,162	20,935,486	28,167,510	25,650,047	32,882,071	32,882,071	Paid CL

Liability Ultimate Loss Comparison

Year	Paid CL		Reported		Expected		BF Method		Cape Cod		Best Method
	Method	Paid CL	CL Method	Reported	Method	Expected	Reported	BF Method	Method	Cape Cod	
	Reported	Method	Reported	CL Method	Reported	Method	Reported	BF Method	Reported	Method	
	Data	Paid Data	Data	Paid Data	Data	Paid Data	Data	Paid Data	Data	Paid Data	
	Difference	Difference	Difference	Difference	Difference	Difference	Difference	Difference	Difference	Difference	
2011	-810	0	0	810	-1,130,649	-1,129,839	-405	405	0	810	Paid CL
2012	-99,032	3	522	99,558	445,138	544,173	-49,210	49,825	870	99,905	Paid CL
2013	-779,101	4,306	47,536	830,943	789,775	1,573,183	-354,548	428,859	91,872	875,279	Paid CL
2014	-276,542	54,543	938,024	1,269,109	-602,503	-271,418	171,113	502,198	887,791	1,218,876	Paid CL
2015	217,575	436,868	2,202,482	2,421,775	-3,366,395	-3,147,102	361,730	581,023	1,065,016	1,284,309	Paid CL
2016	-265,645	276,561	868,064	1,410,270	1,749,988	2,292,194	643,786	1,185,991	1,658,443	2,200,648	Paid CL
2017	718,934	1,141,362	3,387,571	3,809,999	-533,829	-111,401	1,012,652	1,435,079	2,283,762	2,706,189	Expected
2018	-590,953	207,123	3,045,272	3,843,349	1,990,479	2,788,556	1,294,322	2,092,399	3,253,474	4,051,551	Paid CL
2019	-691,289	205,899	6,505,714	7,402,903	2,477,580	3,374,768	2,083,433	2,980,622	4,321,008	5,218,197	Paid CL
2020	-189,722	133,356	27,697,214	28,020,292	3,375,433	3,698,510	3,324,853	3,647,931	5,221,547	5,544,625	Paid CL

Physdam Ultimate Loss Comparison

Year	Paid CL		Reported		Expected		BF Method		Cape Cod		Best Method
	Method	Paid CL	CL Method	Reported	Method	Expected	Reported	BF Method	Method	Cape Cod	
	Reported	Method	Reported	CL Method	Reported	Method	Reported	BF Method	Reported	Method	
	Data	Paid Data	Data	Paid Data	Data	Paid Data	Data	Paid Data	Data	Paid Data	
	Difference	Difference	Difference	Difference	Difference	Difference	Difference	Difference	Difference	Difference	
2011	0	0	0	0	-533,947	-533,947	0	0	0	0	0 Any method but Expected
2012	0	0	0	0	345,288	345,288	0	0	0	0	0 Any method but Expected
2013	0	0	0	0	-125,293	-125,293	0	0	0	0	0 Any method but Expected
2014	0	0	0	0	-41,318	-41,318	0	0	0	0	0 Any method but Expected
2015	0	0	0	0	11,469	11,469	0	0	0	0	0 Any method but Expected
2016	0	0	0	0	-386,994	-386,994	0	0	0	0	0 Any method but Expected
2017	0	0	0	0	-18,732	-18,732	0	0	0	0	0 Any method but Expected
2018	1,509	1,509	1,509	1,509	-539,915	-539,915	1,371	1,371	11,319	11,319	BF Method (by ~100 over Paid CL)
2019	-131,257	58,309	60,136	249,702	320,409	509,975	-32,163	157,403	462,077	651,643	Paid CL
2020	-685,614	452,287	631,864	1,769,765	1,442,786	2,580,687	144,671	1,282,572	5,797,058	6,934,959	Paid CL

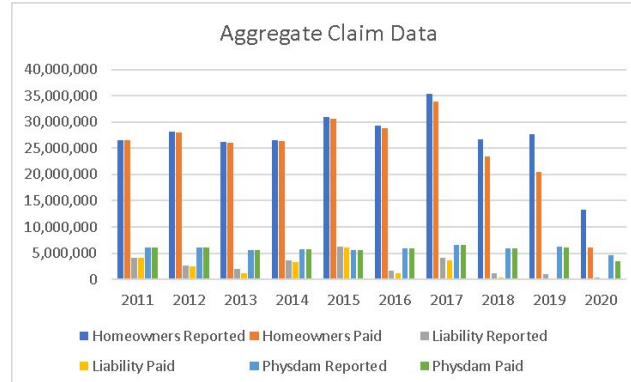
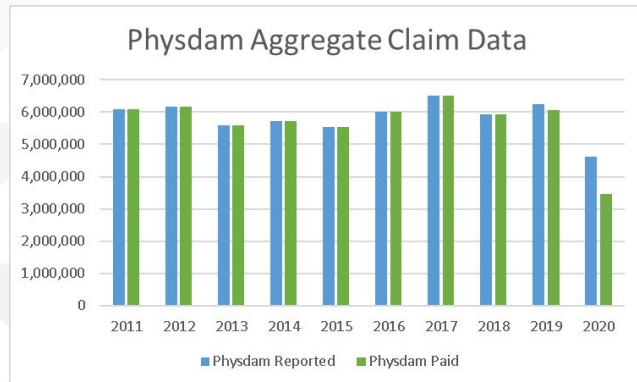
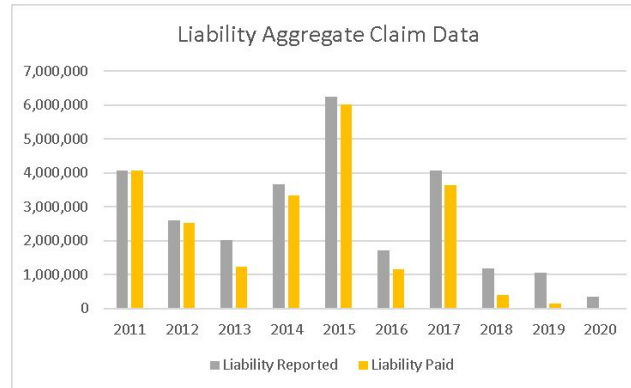
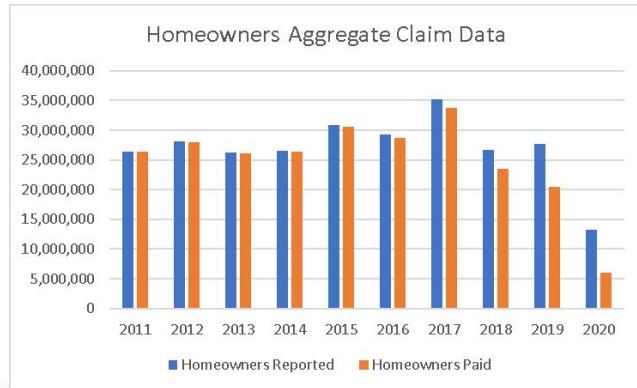
Total Ultimate Loss Comparison

Year	Paid CL		Reported		Expected		Cape Cod				Best Method
	Method	Paid CL	CL Method	Reported	Method	Expected	BF Method	Method	Cape Cod		
	Reported	Method	Reported	CL Method	Reported	Method	Reported	BF Method	Reported	Method	
	Data	Paid Data	Data	Paid Data	Data	Paid Data	Data	Paid Data	Data	Paid Data	
	Difference	Difference	Difference	Difference	Difference	Difference	Difference	Difference	Difference	Difference	
2011	-810	0	0	810	-7,016,139	-7,015,330	-405	405	0	810	Paid CL
2012	-132,805	5	820	133,630	-1,835,593	-1,702,783	-66,013	66,797	5	132,815	Paid CL
2013	-909,294	24,629	87,219	1,021,141	-1,065,604	-131,681	-412,579	521,343	26,813	960,735	Paid CL
2014	-251,083	222,629	633,693	1,107,405	-2,020,784	-1,547,071	162,763	636,475	231,444	705,156	Paid CL
2015	287,047	895,419	1,548,375	2,156,747	-6,502,211	-5,893,839	706,235	1,314,607	824,858	1,433,230	Paid CL
2016	877,387	1,997,543	2,746,522	3,866,678	340,490	1,460,645	1,714,700	2,834,856	2,154,126	3,274,282	Expected Method
2017	3,133,148	4,993,765	6,416,290	8,276,907	-3,169,365	-1,308,748	3,864,770	5,725,387	4,759,512	6,620,129	Expected Method
2018	1,898,649	5,945,967	8,055,992	12,103,310	7,092,851	11,140,170	5,316,757	9,364,075	7,449,391	11,496,709	Paid CL
2019	3,061,561	11,347,155	17,774,862	26,060,456	9,425,900	17,711,494	9,960,940	18,246,534	14,487,156	22,772,750	Paid CL
2020	3,033,529	11,726,532	27,269,892	35,962,895	25,904,841	34,597,843	21,046,413	29,739,416	26,618,542	35,311,545	Paid CL

LOB Standardization Recommendation

Suggested Method

Aggregate Claim Data



Personal Auto Physical Damage

Paid Chain Ladder Method

Reasoning

- Least difference between claim amount and projected ultimates
- Most consistent LOB



Thank You!