

Solvency and Financial Report of Insurance Firms for the Bank of England

(Analysed by: Syarmine Shah)

Background:

This report is part of technical assignment for Analyst - Systems, Change and Banking Data team (PRA Strategy, Risk & Operations) (009533) role at the Bank of England.

This report contains the results of data analysis assignment of insurance firms across the United Kingdom under the Bank of England and Prudential Regulation Authority (PRA).

In total, there are 325 firms in the dataset with 8 business profile metrics and 9 underwriting metrics, ranging from 2016 and 2020 period. The following are the metrics in the dataset:

General	Underwriting
Gross_claims_incurred_(£m)	NWP_(£m)
Gross_BEL_(inc.TPs_as_whole_pre-TMTP) (£m)	SCR_(£m)
Net_BEL_(inc.TPs_as_a_whole_pre-TMTP) (£m)	EoF_for_SCR_(£m)
Pure_net_claims_ratio	SCR_coverage_ratio
Net_expense_ratio	GWP_(£m)
Net_combined_ratio	Total_assets_(£m)
Pure_gross_claims_ratio	Total_liabilities_(£m)
Gross_expense_ratio	Excess_of_assets_over_liabilities_(£m)_[=_equity]
Gross_combined_ratio	

I would like Bank of England for this opportunity be a part of this assessment and analysing firm-level insurance dataset. The report covers the requirements for technical assessment assigned by the Bank of England.

This report sets out my findings on firm's profile and provides thematic observations that support improvements in supervisory resource allocation management. PRA Supervision teams will use individual firm responses to inform their supervisory strategy, which may result in follow-up discussions and actions.

1. Firms Analysis

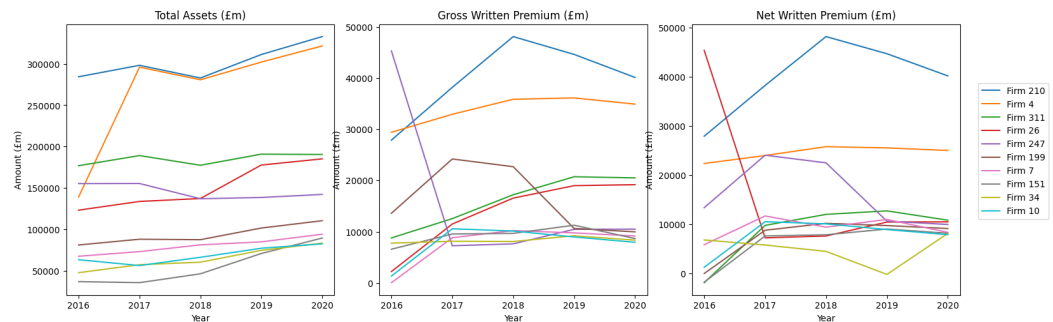
To analyse the firm size, the following metrics are selected

- Total Assets(TA)
- Gross Written Premium (GWP)
- Net Written Premium (NWP)

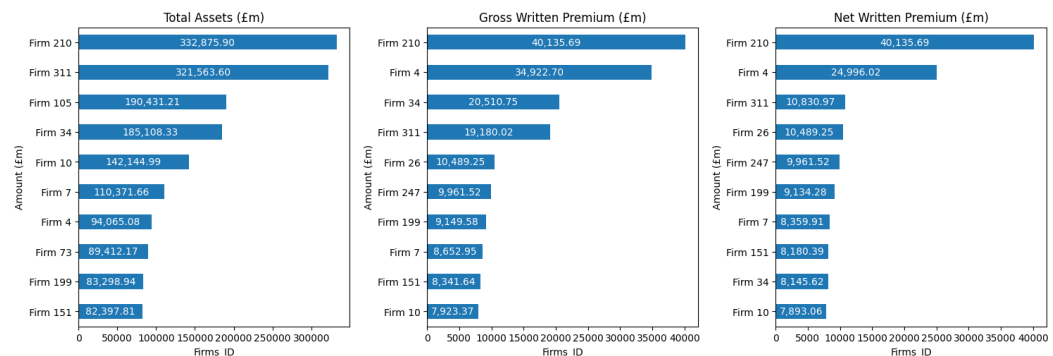
From 2016 to 2020 period, the following table summarise the sum of each of the metrics

Year	TA(£b)	GWP(£b)	NWP(£m)
2016	2,302.48	273.69	207.22
2017	2,355.99 ↑ (2.23%)	295.67 (↑ 8.03%)	259.87(↑ 25.41%)
2018	2,252.26 ▼ (-4.40%)	340.19(↑ 15.06%)	274.31(↑ 5.56%)
2019	2,473.09 ↑ (9.80%)	316.05(▼ -7.10%)	254.27(▼ -7.31%)
2020	2,458.37 ▼ (-0.59%)	269.89(▼ -14.61%)	213.96(▼ -15.85%)

- From 2016 to 2020, the following is a trend line across 5 years period by TA, GWP and NWP.



- In 2020, at firm level, the following shows the top 10 firms based on TA, GWP, and NWP.



- The firms dataset are further analysed using concentration and distributions measures (CDMs) as recommended by [International Monetary Fund 2019: Financial Soundness Indicator Compilation Guide](#)

Assets (%)						Gross Written Premiums (%)						Net Written Premiums (%)					
Firms_ID	2016(%)	2017(%)	2018(%)	2019(%)	2020(%)	Firms_ID	2016(%)	2017(%)	2018(%)	2019(%)	2020(%)	Firms_ID	2016(%)	2017(%)	2018(%)	2019(%)	2020(%)
Firm 210	12.35	12.66	12.56	12.58	13.54	Firm 210	10.19	12.92	14.14	14.12	14.87	Firm 210	13.46	14.70	17.54	17.56	18.76
Firm 311	6.04	12.56	12.46	12.22	13.08	Firm 4	10.75	11.14	10.54	11.43	12.94	Firm 4	10.78	9.22	9.39	10.03	11.68
Firm 105	7.68	8.03	7.87	7.72	7.75	Firm 34	3.21	4.24	5.06	6.56	7.60	Firm 311	-0.90	3.76	4.38	5.00	5.06
Firm 34	5.35	5.67	6.09	7.18	7.53	Firm 311	0.81	3.89	4.87	6.01	7.11	Firm 26	21.87	2.79	2.78	4.11	4.90
Firm 10	6.74	6.59	6.08	5.60	5.78	Firm 26	16.56	2.45	2.24	3.31	3.89	Firm 247	6.46	9.25	8.19	4.18	4.66
Firm 7	3.52	3.74	3.88	4.10	4.49	Firm 247	4.97	8.19	6.67	3.36	3.69	Firm 199	0.00	3.38	3.72	3.83	4.27
Firm 4	2.93	3.10	3.60	3.43	3.83	Firm 199	0.01	2.98	3.00	3.09	3.39	Firm 7	2.83	4.50	3.43	4.32	3.91
Firm 73	1.60	1.51	2.05	2.86	3.64	Firm 7	2.40	3.23	2.84	3.56	3.21	Firm 151	-0.84	2.93	2.87	3.55	3.82
Firm 199	2.07	2.43	2.68	3.01	3.39	Firm 151	2.83	2.75	2.37	2.91	3.09	Firm 34	3.29	2.22	1.64	-0.07	3.81
Firm 151	2.75	2.39	2.94	3.12	3.35	Firm 10	0.48	3.57	2.98	2.84	2.94	Firm 10	0.61	4.05	3.68	3.51	3.69

Key Insights

- **Total Asset:** In 2020, the total assets across all firms amounted to over £2,458.37 billion, marking a slight decrease of 0.59% from the previous year. Among the 325 firms analyzed, Firm 210 stood out with the largest assets, amounting to over £332.88 billion, which constituted a significant market share of 13.54%. Firm 311 was a close second, holding 13.08% of the market share. Other notable firms included Firm 105, Firm 34, and Firm 10, which respectively held market shares of 7.75%, 7.53%, and 5.78%.
- 2. **Gross Written Premium (GWP):** In 2020, the Gross Written Premium (GWP) across all firms totalled over £269.89 billion, marking a decrease of 14.61% from the previous year. Firm 210 led the market with the highest GWP, with over £40,135.69 billion and capturing a substantial market share of 14.87%. Firm 4 followed closely with a 12.94% share, reflecting a growth of 1.51% from 2019. These two firms, Firm 210 and Firm 4, dominated the market. Trailing behind them were Firm 34 and Firm 311, which held market shares of 7.60% and 7.11% respectively.
- 3. **Net Written Premium (NWP):** Firm 210 and Firm 4 also significantly influenced the market in terms of Net Written Premium (NWP), with respective shares of £40,135.69 (18.76%) and £24,996.02 (11.68%). Firm 311 held a notable position in the market with a share of 5.06%. while all other firms in the market held less than 5% of the NWP.
- 4. The following shows the NWP/GWP ratio across 10 insurance firms.

NWP / GWP Ratio

	2016	2017	2018	2019	2020
Firms_ID					
Firm_21	nan	nan	nan	nan	inf
Firm_303	-0.77	-26.24	1.08	6.22	6.82
Firm_152	0.78	0.46	0.68	0.50	2.63
Firm_76	0.87	1.26	1.26	1.24	1.35
Firm_61	0.74	1.06	0.99	-2.67	1.12
Firm_28	0.97	1.02	1.41	1.00	1.00
Firm_226	1.00	1.00	1.00	1.00	1.00
Firm_265	1.00	1.00	1.00	1.00	1.00
Firm_26	1.00	1.00	1.00	1.00	1.00
Firm_25	1.00	1.00	1.00	1.00	1.00

2. Business Trends

The following shows top 10 firm year-on-year across 2016 to 2020.

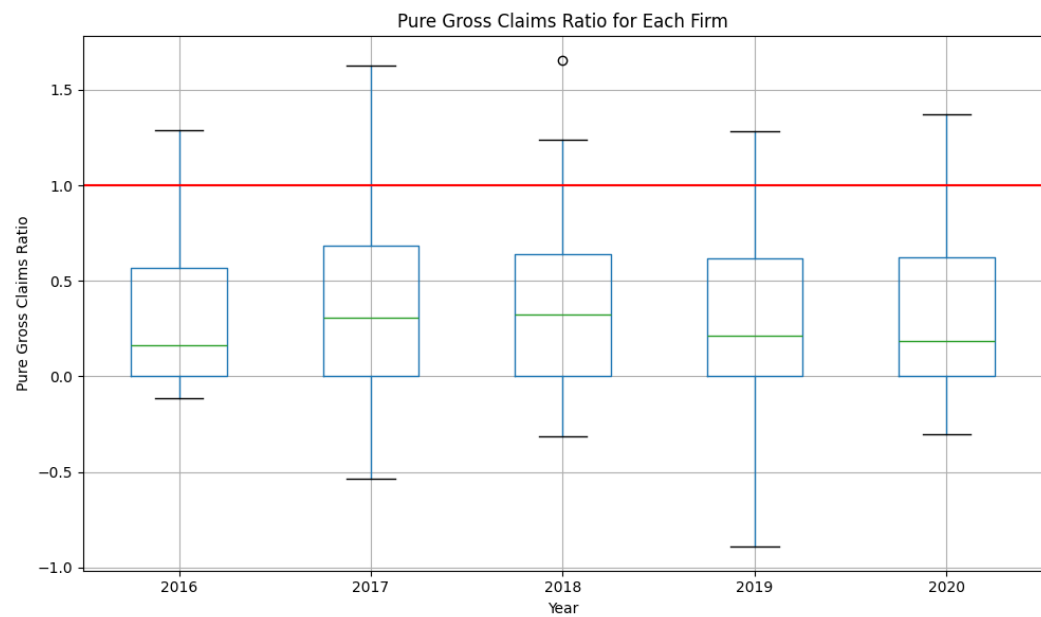
2.1 Gross claims incurred

		2016	2017	2018	2019	2020
Firms_ID						
Firm_210	nan	36.97	25.97	-7.23	-10.09	
Firm_4	nan	7.25	7.50	-0.96	-2.03	
Firm_311	nan	-625.04	22.82	5.91	-14.85	
Firm_26	nan	-84.02	5.21	37.20	0.37	
Firm_247	nan	79.64	-6.47	-52.73	-6.24	
Firm_199	nan	129,759.97	15.97	-4.44	-6.21	
Firm_7	nan	99.63	-19.45	16.57	-23.83	
Firm_151	nan	-535.56	3.16	14.76	-9.39	
Firm_34	nan	-15.21	-22.19	-104.04	-4,585.17	
Firm_10	nan	725.48	-4.08	-11.56	-11.53	

2.2 Pure Gross Claims Ratio

- Across 5 year period, there are notable variation of the pure gross claim ratio across the 325 firms, with 285 firms are within 0% to 62%, excluding outlier (see next section). Generally there pure gross claim ratio is below 100% across the 5 years,

except year 2020, where the top 10 firms are above 100% ratio.



- In 2020, Firm 144, Firm 29 and Firm 91 has pure gross claim ratio of over 130% with values of 137%, 134% and 130%, with increase in YoY of 75.8%, 401,486%, and 65.41% each respectively. Image below on the left hand side is the pure gross claim ratio values, and on the right side is the YoY over the previous year.

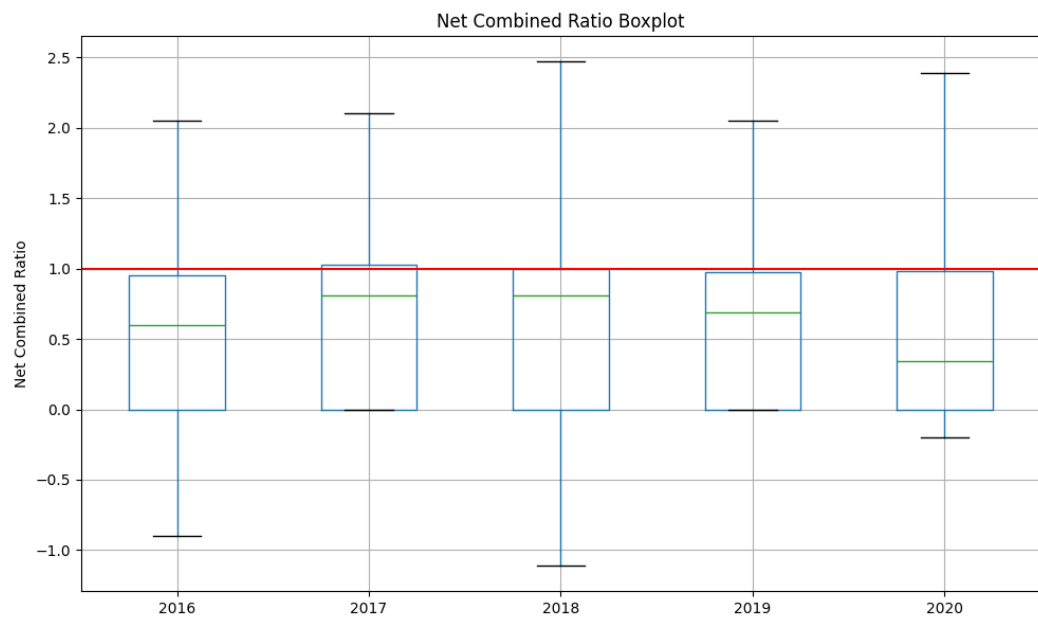
	2016	2017	2018	2019	2020
Firms_ID					
Firm_144	0.66	1.04	0.63	0.78	1.37
Firm_29	0.71	1.63	0.81	0.00	1.34
Firm_91	0.00	0.65	0.94	0.78	1.30
Firm_319	0.35	1.21	0.25	0.04	1.13
Firm_194	0.53	0.64	0.34	0.60	1.09
Firm_206	0.31	0.85	0.71	0.46	1.09
Firm_239	1.29	0.64	0.68	0.58	1.06
Firm_52	0.53	0.85	0.74	0.62	1.05
Firm_160	0.60	0.72	0.60	0.70	1.04
Firm_294	0.78	0.53	0.72	1.28	1.04

	2016	2017	2018	2019	2020
Firms_ID					
Firm_144	0.66	1.04	0.63	0.78	1.37
Firm_29	0.71	1.63	0.81	0.00	1.34
Firm_91	0.00	0.65	0.94	0.78	1.30
Firm_319	0.35	1.21	0.25	0.04	1.13
Firm_194	0.53	0.64	0.34	0.60	1.09
Firm_206	0.31	0.85	0.71	0.46	1.09
Firm_239	1.29	0.64	0.68	0.58	1.06
Firm_52	0.53	0.85	0.74	0.62	1.05
Firm_160	0.60	0.72	0.60	0.70	1.04
Firm_294	0.78	0.53	0.72	1.28	1.04

2.3 Net Combined Ratio

- Across 5 year period, there are notable variation of the net combined ratio across the 325 firms, with 285 firms are within 0% to 97.9% in year 2020, excluding outlier (see next section). Generally there net combined ratio are below 100% across the 5

years, except year 2020, where the top 10 firms are above 100% ratio.



- In 2020, Firm 97, Firm 21 and Firm 29, have a net combined ratio of 239%, 230% and 215% with a variation in YoY increment of 139%, 238% and 183% each respectively. Image below is the net combined ratio values.

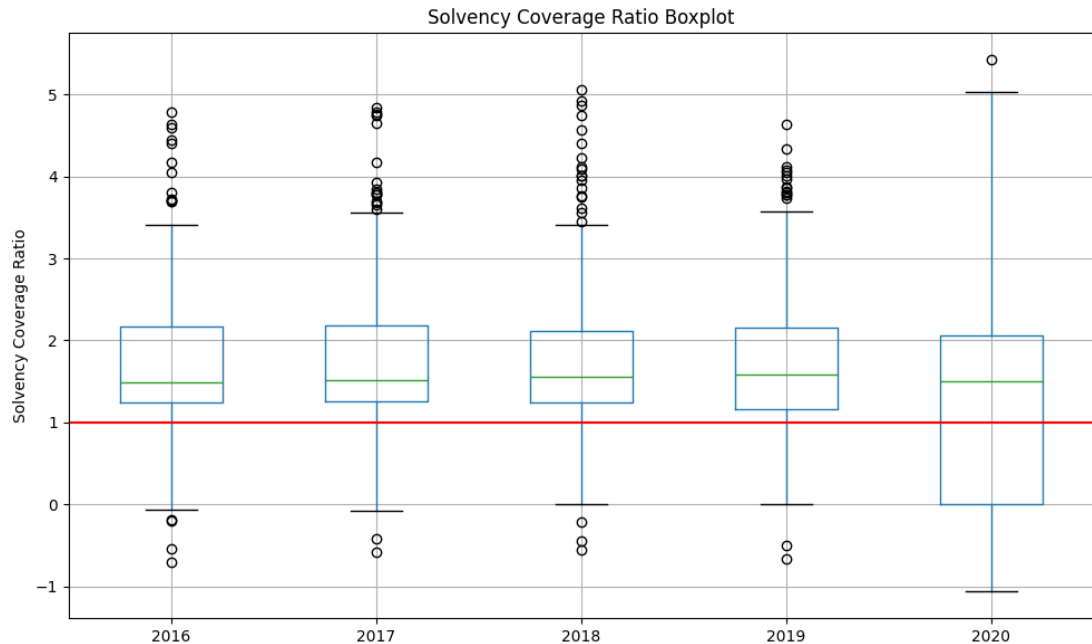
	2016	2017	2018	2019	2020
Firms_ID					
Firm_97	0.99	1.06	1.01	1.00	2.39
Firm_21	2.01	1.07	0.85	0.68	2.30
Firm_29	0.10	1.52	1.33	0.76	2.15
Firm_214	0.00	0.93	0.93	0.97	1.98
Firm_316	1.57	1.36	2.47	1.63	1.75
Firm_239	2.05	0.99	1.13	1.11	1.74
Firm_137	0.82	1.31	1.59	1.13	1.53
Firm_144	1.03	1.45	1.05	1.14	1.51
Firm_300	0.92	1.00	1.05	1.32	1.45
Firm_160	0.93	1.05	0.94	1.06	1.45

- The following is the YoY of the net combined ratio as mentioned.

	2016	2017	2018	2019	2020
Firms_ID					
Firm_97	nan	6.53	-4.79	-0.68	138.98
Firm_21	nan	-46.75	-20.91	-19.63	238.17
Firm_29	nan	1,376.04	-12.44	-43.07	183.62
Firm_214	nan	inf	-0.39	4.36	104.56
Firm_316	nan	-13.44	81.39	-33.89	7.27
Firm_239	nan	-51.55	13.96	-1.82	56.39
Firm_137	nan	59.40	21.07	-28.90	35.28
Firm_144	nan	40.65	-28.01	8.92	32.51
Firm_300	nan	7.88	5.80	24.87	10.59
Firm_160	nan	13.13	-10.74	13.61	36.62

2.4 Solvency Coverage Ratio

- Across 5 year period, most of the firms are above 100% from 2016 to 2019 ranging from 159% to 167%. In 2020, there is notable spread of the solvency coverage ratio with 25% of the firms are in the range of 0% from the requirement, compared to 55% to 69% in 2016 to 2019. Outliers are discussed in the next section.



- In 2020, Firm 20, Firm 62 and Firm 13, have a solvency coverage ratio of 543%, 503% and 459% with a variation in YoY increment of 42%, 49% and 16% each respectively. Image below is the solvency coverage ratios sorted by Year 2020.

	2016	2017	2018	2019	2020
Firms_ID					
Firm_20	2.32	4.84	5.06	3.82	5.43
Firm_62	0.00	2.19	4.10	3.36	5.03
Firm_13	3.26	3.56	3.77	3.96	4.59
Firm_196	2.48	3.93	4.01	4.02	4.08
Firm_147	2.22	3.51	2.57	4.08	4.05
Firm_75	2.84	2.79	3.12	4.05	3.68
Firm_250	4.05	3.70	3.76	3.04	3.67
Firm_180	2.24	4.17	3.96	3.47	3.64
Firm_138	3.30	3.49	2.75	0.00	3.53
Firm_136	2.96	1.70	1.76	1.89	3.52

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- The following is the YoY of the solvency coverage ratio as mentioned.

	2016	2017	2018	2019	2020
Firms_ID					
Firm_20	nan	108.16	4.57	-24.61	42.22
Firm_62	nan	inf	86.87	-17.94	49.74
Firm_13	nan	9.00	5.96	5.22	15.83
Firm_196	nan	58.60	1.91	0.19	1.53
Firm_147	nan	57.83	-26.79	58.87	-0.84
Firm_75	nan	-1.94	11.92	29.91	-9.10
Firm_250	nan	-8.63	1.63	-19.07	20.64
Firm_180	nan	86.10	-5.08	-12.40	4.89
Firm_138	nan	5.57	-21.13	-100.00	inf
Firm_136	nan	-42.68	3.90	7.37	85.68

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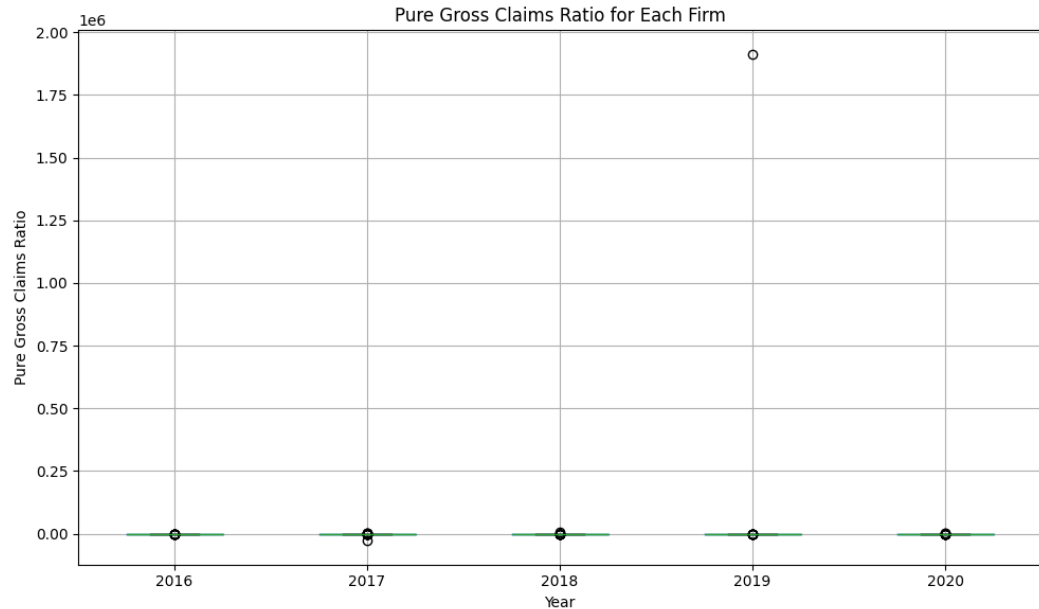
3. Outliers

The following methods are taken to identify outliers within this dataset

- The use of concentration and distribution measures
- Identification using boxplot

3.1 Pure Gross Claim Ratio

- The following boxplot are generated when the code is run for the first time. The boxplot can't be visualised as there is an extreme value in year 2019.

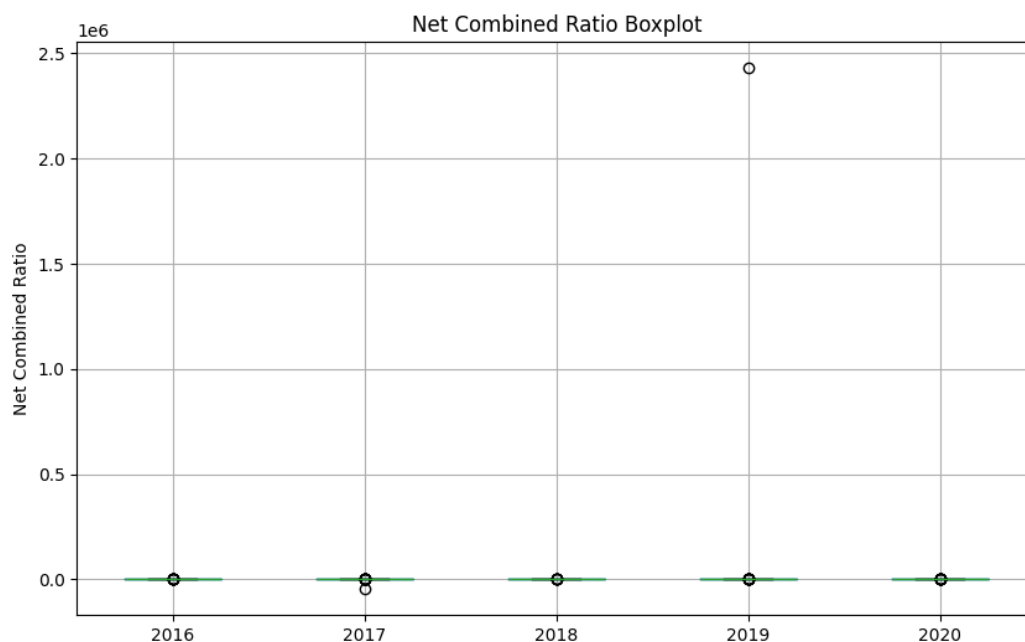


- Using the describe method, there is notable extreme outliers within the dataset. The outliers is from the datapoint in 2019, where the maximum value of pure gross claim ratio is at 1,911,108 from Firm 188. There are 40 firms that are excluded and identified as outliers.

	2016	2017	2018	2019	2020
Firms_ID					
Firm_188	0.00	0.00	0.00	1,911,107.55	0.00
Firm_72	116.15	899.70	113.70	245.58	301.33
Firm_284	0.00	0.00	0.00	183.25	423.54
Firm_190	-0.15	-0.01	0.01	3.10	0.00
Firm_129	0.31	0.92	1.01	1.82	-0.12
Firm_275	0.28	1.26	0.29	1.69	0.07
Firm_99	0.00	-25,876.27	111.68	1.42	1,132.42
Firm_49	-2.51	-2.13	1.24	1.33	-0.06
Firm_294	0.78	0.53	0.72	1.28	1.04
Firm_224	0.69	2.00	1.54	1.20	0.00

3.2 Net Combined Ratio

- The following boxplot are generated when the code is run.



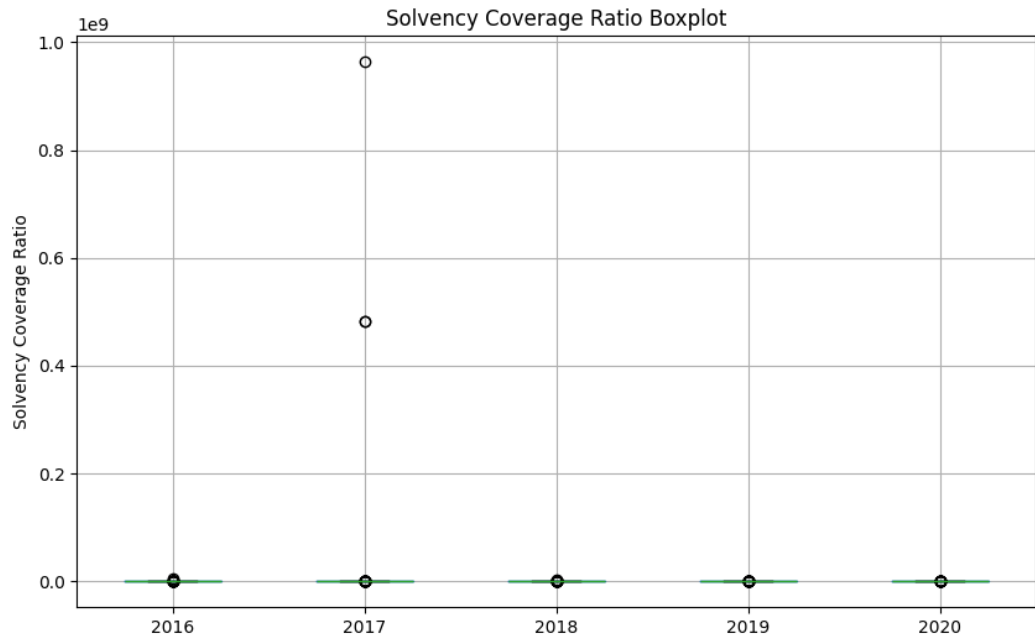
- Using describe method, there is extreme data value in the dataset in year 2019, with a net combined ratio of 2,430,023. The firm identified is Firm 188.

	2016	2017	2018	2019	2020
Firms_ID					
Firm_188	0.00	0.00	0.00	2,430,022.84	0.00
Firm_284	0.00	0.00	0.00	435.58	906.31
Firm_72	67.33	-20.54	144.00	48.63	49.51
Firm_39	0.00	0.00	0.00	33.18	5.77
Firm_88	0.00	3.35	13.94	6.72	4.06
Firm_71	0.00	0.00	0.00	5.19	1.44
Firm_190	-0.49	-0.57	0.35	3.54	0.23
Firm_224	1.25	1.85	1.40	3.07	0.00
Firm_4	1.08	1.71	2.12	2.59	-3.41
Firm_318	0.28	-0.11	2.13	2.47	1.57

- Additionally, when it is sort by 2020, Firm 228, Firm 166 and Firm 284 have a net combined ratio of over 9000, with values of 10,760%, 9,891%, and 9,063% with increase in YoY of 75.8%, 401,486%, and 65.41% each respectively. Image below on the left hand side is the pure gross claim ratio values, and on the right side is the YoY over the previous year

3.3 Solvency Coverage Ratio

- The following boxplot are generated when the code is run showing extreme outliers in year 2017.



- Using describe method, there is extreme data value in the dataset in year 2017, with a solvency coverage ratio 963,584,000.00. Upon sorting by year 2017, the firm identified is Firm 216. The solvency coverage ratio are followed closely by Firm 1, Firm 131, and Firm 127 with 481,792,000%, 481,792,000% and 182,412% each respectively.

	2016	2017	2018	2019	2020
count	3.250000e+02	3.250000e+02	3.250000e+02	325.000000	325.000000
mean	1.286947e+04	5.930313e+06	1.246741e+04	533.017116	514.215109
std	2.319518e+05	6.529400e+07	2.141325e+05	9539.236980	9229.786796
min	-1.974450e+00	-1.973652e+00	-5.515428e-01	-0.669013	-1.066521
25%	1.276845e+00	1.302423e+00	1.268210e+00	1.177754	0.000000
50%	1.662747e+00	1.755881e+00	1.693416e+00	1.710544	1.565516
75%	2.780175e+00	3.203697e+00	2.795907e+00	2.691263	2.367988
max	4.181573e+06	9.635840e+08	3.856018e+06	171974.690816	166394.575872

	2016	2017	2018	2019	2020
Firms_ID					
Firm_216	1.49	963,584,000.00	0.00	0.00	0.00
Firm_1	1.98	481,792,000.00	0.00	0.00	0.00
Firm_131	1.75	481,792,000.00	0.00	0.00	0.00
Firm_127	0.00	182,412.23	194,753.82	171,974.69	166,394.58
Firm_291	146.89	128.53	150.81	261.57	0.00
Firm_319	57.84	67.23	27.86	39.24	0.00
Firm_16	12.25	41.83	26.13	0.00	0.00
Firm_125	2.92	39.83	4.33	14.87	3.65
Firm_103	26.18	34.88	37.91	37.56	6.35
Firm_177	0.00	23.29	31.01	53.35	23.44

- The data for Firm 127 the following years from 2018 to 2020 shows a close average ranging from 166,394% to 194,753%.