

Technical Assessment - Data Scientist - 010030

Task I - Resource Allocation Proposal

Data Cleaning

The data cleaning process was fairly straightforward, as the data provided did not require excessive processing before becoming useable. The two excel sheets were directly imported and joined using the Pandas Python library. As the column names were overly descriptive, a Python dictionary was created to map the original column names to shorter or abbreviated versions. For example, "Gross claims incurred (£m)" became "GCI", and "Excess of assets over liabilities (£m) [= equity]" became simply "Equity". This would help to greatly enhance code readability further down the notebook. This column cleaning task was nested within a MultiIndex function, which also removed the "YE" and converted the year to an integer in the lower header.

The next cleaning step concerned the first column. Rather than having a repetitive and bulky object column containing strings "Firm 1, Firm 2" etc., the column was replaced with just the firm number. This would enable faster indexing when searching for a specific firm's details.

Two rows were found to have missing data across all the columns, so these were removed to avoid skewing the statistical properties of the data. The other 0 values in the dataset were set to NaN for the same reason, as it was concluded that it was not realistic for any of the columns to have a legitimate data point of 0.

Once this was all done, the data was considered ready to be used.

Resource Allocation

Making informed decisions around prioritisation ensure that resources go where they are needed most. This often means the largest departments and the departments currently in flux. In this section, various metrics will be proposed to identify which firms stand out from the rest and should therefore receive more supervisory attention.

Largest Firms

When it comes to gauging the size of an insurance company, two metrics often quoted are the net written premium (NWP) and total assets value. The 5 largest firms by NWP are shown in Fig. 1.

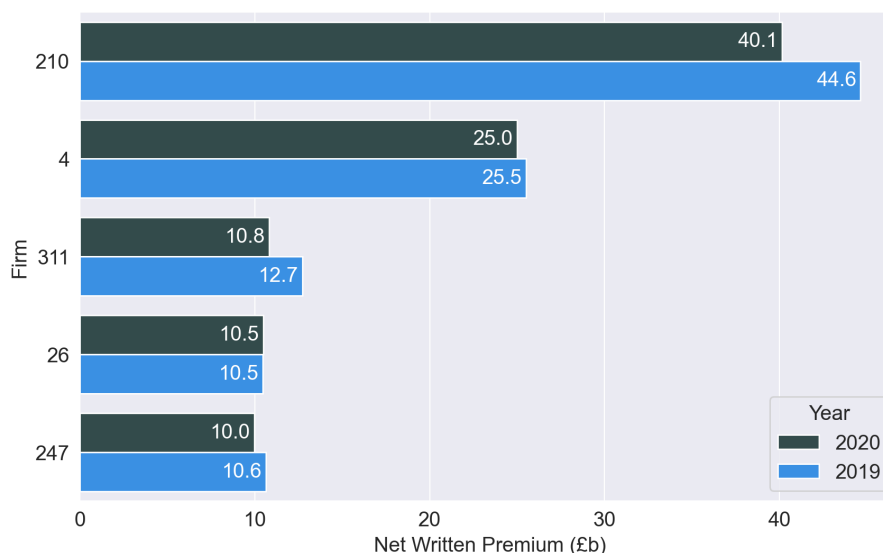


Figure 1: Largest Firms by Net Written Premium in 2020

As evidenced by the figure, Firm 210 is the largest firm by NWP, and has been since 2017. However, despite the considerable profits made by these firms, all 5 of the firms on display have seen a contraction in NWP relative to 2019. This reduction of 6.5% on average is in line with the wider industry trend, where the average NWP went down by 7.9% (from £1.22b to £1.12b) between 2019 and 2020.

Another possible way of ranking insurance firms is by total assets. The 5 largest firms by assets are shown in Fig. 2.

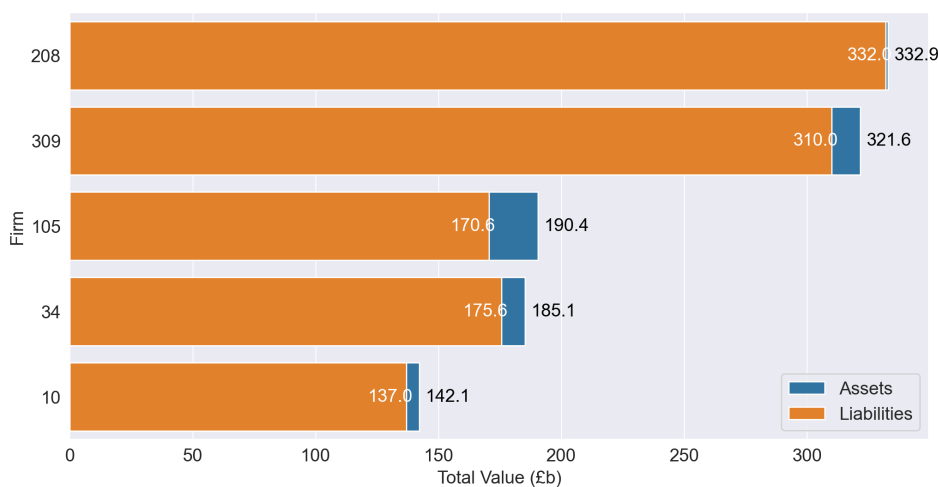


Figure 2: Largest Firms by Total Assets in 2020

Firm 210 is once again the largest firm by this metric. They have held this top spot since 2016, with a surprisingly similar margin over firm 311 for most of those years. However, their current ratio is relatively low, sitting at 1.003.

Most Volatile Firms

Firms with a constantly changing business profile that seem at odds with wider industry trends also merit additional attention. An important metric to keep track of in this context is the Gross Claims Incurred (GCI) figure. Sudden and unexpected fluctuations in GCI can negatively affect a firm's financial position.

In Fig. 3, the largest single-year fluctuations in GCI are plotted. Green represents a drop in GCI, which generally has a positive impact on a firm's financial position, whereas red indicates a sudden jump in GCI, which can affect profitability.

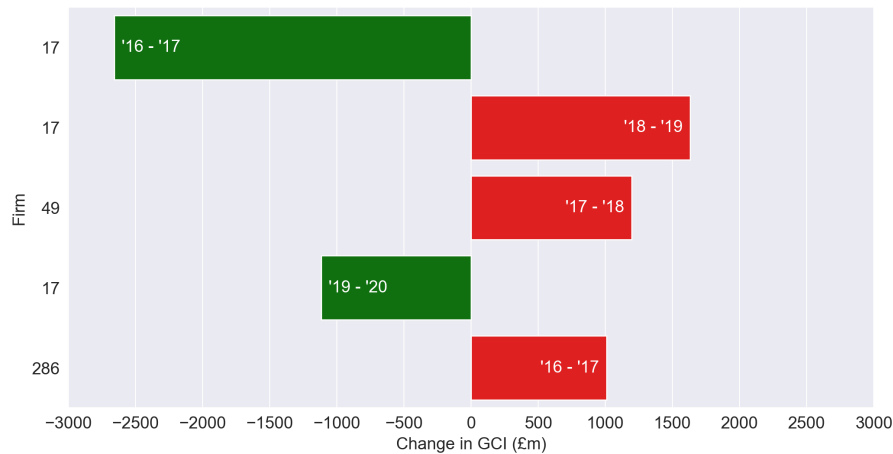


Figure 3: Largest Single-Year Fluctuations in GCI from 2016 to 2020

From 2016 to 2020, Firm 17 experienced 3 out of the 5 largest single-year GCI fluctuations in the industry.

Taking a closer look at this firm reveals some interesting insights. As evidence by Fig. 4, Firm 17's GWP is on downward trend, whereas GCI is volatile and in a broadly upwards direction. This combination proves worrisome for investors, which could prove however GWP data is missing from 2020. This could indicate that the firm has closed. However, if this is not the case, it is clear that Firm 17 would benefit from having additional resources allocated to stabilise this figure and ensure profitability in the long term.

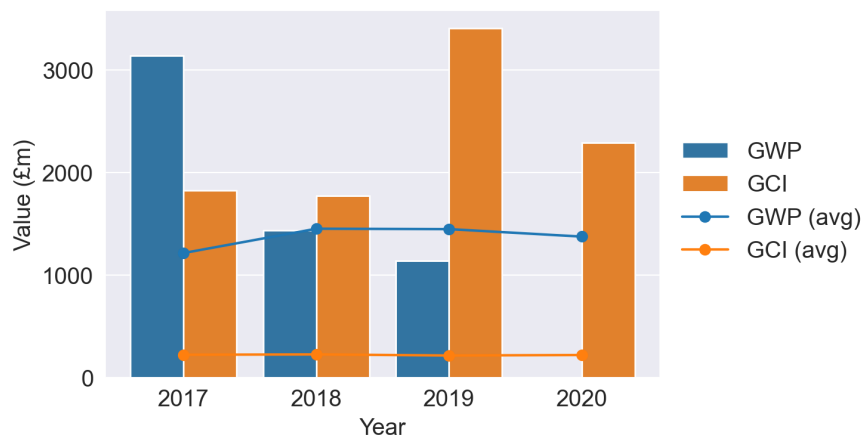


Figure 4: Firm 52 - Variation in Gross Written Premium (GWP) and Gross Costs Incurred (GCI) from 2016 to 2020