

The perfect storm: What is the impact of Covid-19 on the Scottish hospitality industry?

August 2020



Executive summary

One of the most significant victims of Covid-19 is the tourism and hospitality sector badly affected by travel restrictions and lockdown. There are concerns that many companies in this sector will not be able to recover. This report provides insights into expected default rates in the next twelve months for the Scottish tourism and hospitality.

The analysis utilises Wiserfunding expertise in risk modelling and applies its models to a sample of the Scottish tourism and hospitality companies to estimate probability of default (PD) at the company level under three scenarios: baseline, mild downturn and severe downturn.

The main findings of our research are:

- The sample (and the Scottish tourism and hospitality sector) is dominated by **small and relatively young firms**. The latest financial statements from 2019 show a relatively healthy risk profile with a good profitability (ROA above 5% in 63% of the sample) and a generally low level of debt (debt to equity ratio lower than 1 in 70% of the sample).
- However, **given the deterioration in the economy and the impact of the lockdown on this sector, the average PD of these firms has more than doubled from Dec 2019 to June 2020 and reaches 15%** even in the baseline scenario.
- After stressing the financial inputs and macroeconomic variables to reflect the expectations of the next months, **we forecast the average level of default varying between 28% (mild stress) and 43% (severe stress)**.
- Firms of all sizes are seriously affected. Yet contrary to our expectations, **medium and large companies seem to be more sensitive to the shock caused by Covid-19** as compared to small businesses. In particular, for large companies the proportion in the highest PD band (over 30%) increases from 4.55% under the baseline scenario to 27.27% in mild downturn and to 68.18% under severe stress. For small companies that are riskier in normal circumstances, the PD levels also increase but with the magnitude which is less pronounced (the corresponding increase is from 14.33% to 31.49% and 60.16%). This can be attributed to the adaptability of smaller companies that enjoy leaner structure and lower amount of tangible assets and fixed costs. As such, they can adjust faster to the challenging conditions.
- As for the company age, **younger businesses are more vulnerable compared to the more established ones**. The response to the Covid-19 shock is also determined by business fundamentals. **More profitable companies are less likely to experience default, and the same applies to the companies with moderate levels of debt**. The highest risk levels are exhibited by young companies with no profit and high levels of debt.



The analysis in this report has not addressed explicitly the effect of the government support, this will be the subject of further research. However, given the high expected default rates, it confirms that the current government efforts to support the sector (e.g. VAT discount) are going in the right direction. However, we would recommend the support programs to be tailored on the company size to maximise their impact. Business fundamentals should be taken into account too. Firms that show the highest level of adaptability should be rewarded and offered additional support to overcome the crisis, in order to increase the chances of success in the deployment of public funds. Finally, the withdrawal of the current borrowing schemes should be carefully planned in order not to create additional shocks to the companies with high leverage.

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Model Data Inputs and Scenarios

A sample of 5000 Scottish companies was selected from tourism and hospitality industry sectors (SIC2007 codes = 55, 56, 79). This sample is used to generate outcomes under three scenarios:

1. Baseline scenario
2. Mild downturn
3. Severe downturn

The models estimate the Probability of Default (PD) using financial ratios (*see Table 1*), non-financial variables and macroeconomic indicators. More information about risk modelling is given in the next section.

Baseline scenario uses the values from the latest available year of financial statements submitted to the Companies House (2018-2019) and corresponding macroeconomic inputs. To model the two downturn scenarios, the values for the financial ratios should be 'stressed', i.e. adjusted to reflect the negative effect of the pandemic.

Table 1 / Proposed stress factors for downturn scenarios

	Stress table			Numeric Examples £		
	Variables	Stress Factors		Baseline (average of 5000 companies in the sample)	Mild	Severe
		Mild	Severe			
Financials	Total Shareholder Equity	-60%	-80%	£801,695	£320,678	£160,339
	Total Assets	-30%	-65%	£2,308,293	£1,615,805	£807,903
	Turnover	-50%	-91%	£967,911	£483,956	£87,112
	Short Term Debt	+50%	+80%	£554,102	£831,153	£997,384
	Long Term Debt	+40%	+50%	£810,429	£1,134,601	£1,215,644
	Cash	-40%	-89%	£137,131	£82,279	£15,084
	Working Capital	-35%	-68%	£9,158	£5,953	£2,931
	Tangible Assets	-20%	-60%	£1,535,132	£1,228,106	£614,053
	Intangible Assets	-10%	-25%	£24,758	£22,282	£18,569
	EBITDA	-70%	-96%	£290,087	£87,026	£11,603
	Retained Earnings	-90%	-99%	£680,718	£68,072	£6,807
	Interest Expense	+130%	+260%	£26,863	£61,785	£96,707
Macro	GDP	-6%	-13%			
	Unemployment	-7%	-12%			

Notes: The % reflects the change from the baseline scenario, e.g. if the baseline Total Shareholder Equity is £100, then in mild scenario it drops by 60% or becomes £40, and in severe scenario it drops by 80% or becomes £20. For Financial Ratios definitions, see [Table 2 in Appendix](#).

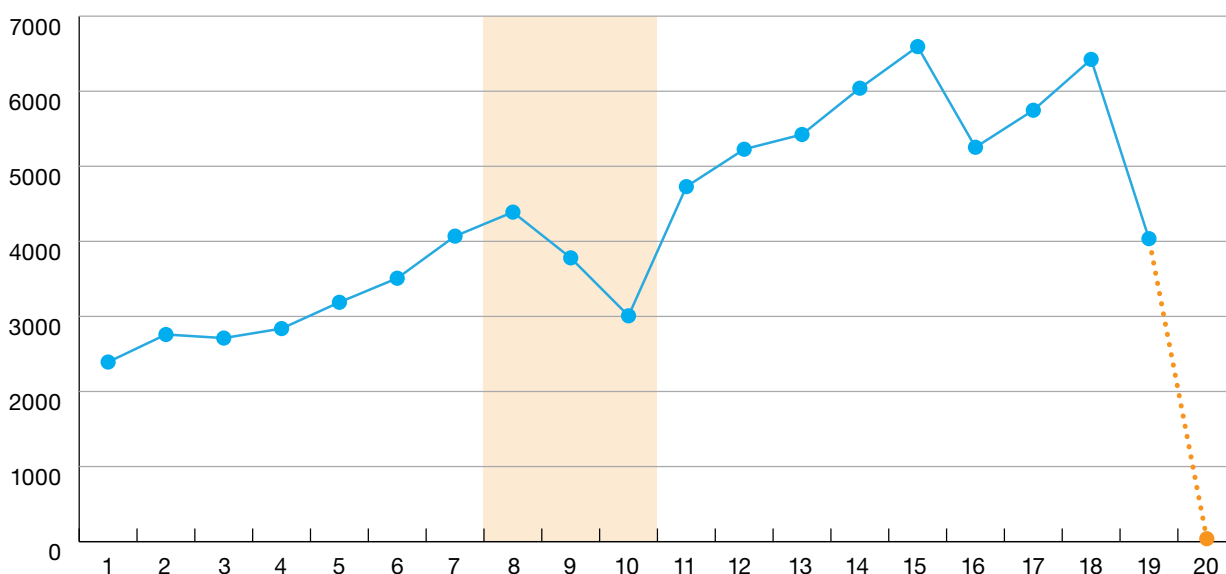
Model Data Inputs and Scenarios

As for the **mild downturn scenario**, we have examined the last 20 years of financial accounts for Scottish tourism and hospitality sectors. The worst changes were observed during the Global Financial Crisis (GFC) Period (2007-2008), and post-GFC recessions followed by the European debt crisis (2009-2011). The tourism industry also suffered the effects of swine flu in 2009-2010. We took the observed percentage change of each financial

variable between the peak and through points in the 2008 crisis as the initial estimates of mild downturn for our current event.

We then made further conservative adjustments following the feedback from the tourist industry experts, and these are the values in *Table 1*.

Figure 1 / Historic data for Turnover: 2001-2020, values are in THSD £



* Further graphs of other financial indicators in 2001-2020 can be found in the [Appendix](#).

For the severe downturn scenario, we initially used an additional 50% adjustment as compared to the 2008 crisis, as it is commonly acknowledged that the current COVID-19 event would bring about a more prolonged and severe impact on the economy and tourism industry. We applied this adjustment to balance sheet financials. As for Profit & Loss (P&L) variables, we took the recent values from the Scottish government estimates of GDP (<https://www.gov.scot/collections/economy-statistics/#gdpmonthlyestimates>).

The estimated drop for Accommodation & Food industry in April 2020 is 85%, and this was used as the severe stress factor for P&L inputs: Turnover, Cash, EBITDA, Retained earnings.

Similar to the mild downturn scenario, these initial estimates were adjusted following the expert advice, and the final estimates are given in *Table 1*.

Results

Risk Metrics Results Definitions

Our results are presented as SME Z-Score, Bond Rating Equivalent (BRE) and Probability of Default (PD). The SME Z-Score is a risk metric derived from Wiserfunding's proprietary risk models (which are explained in the last section). The score goes between 0 and 1000 where the higher the score, the better the risk profiles of the companies. Risk zones are provided to help interpreting the number. These are presented in *Figure 2*:

Figure 2 / SME Z-score Risk Zone Mapping

0 – 100	101 – 250	251 – 450	451 – 700	701 – 1000
Distress	High Risk	Medium Risk	Low Risk	Lowest Risk

Bond Rating Equivalent (BRE) is the transformation of Z-Score in line with the metrics used by credit rating agencies. It represents the credit worthiness of the company with the following risk grades (from the best to the worst): AAA, AA, A, BBB, BB, B, CCC, CC. For more detailed definition, please refer to [Appendix Table 3](#).

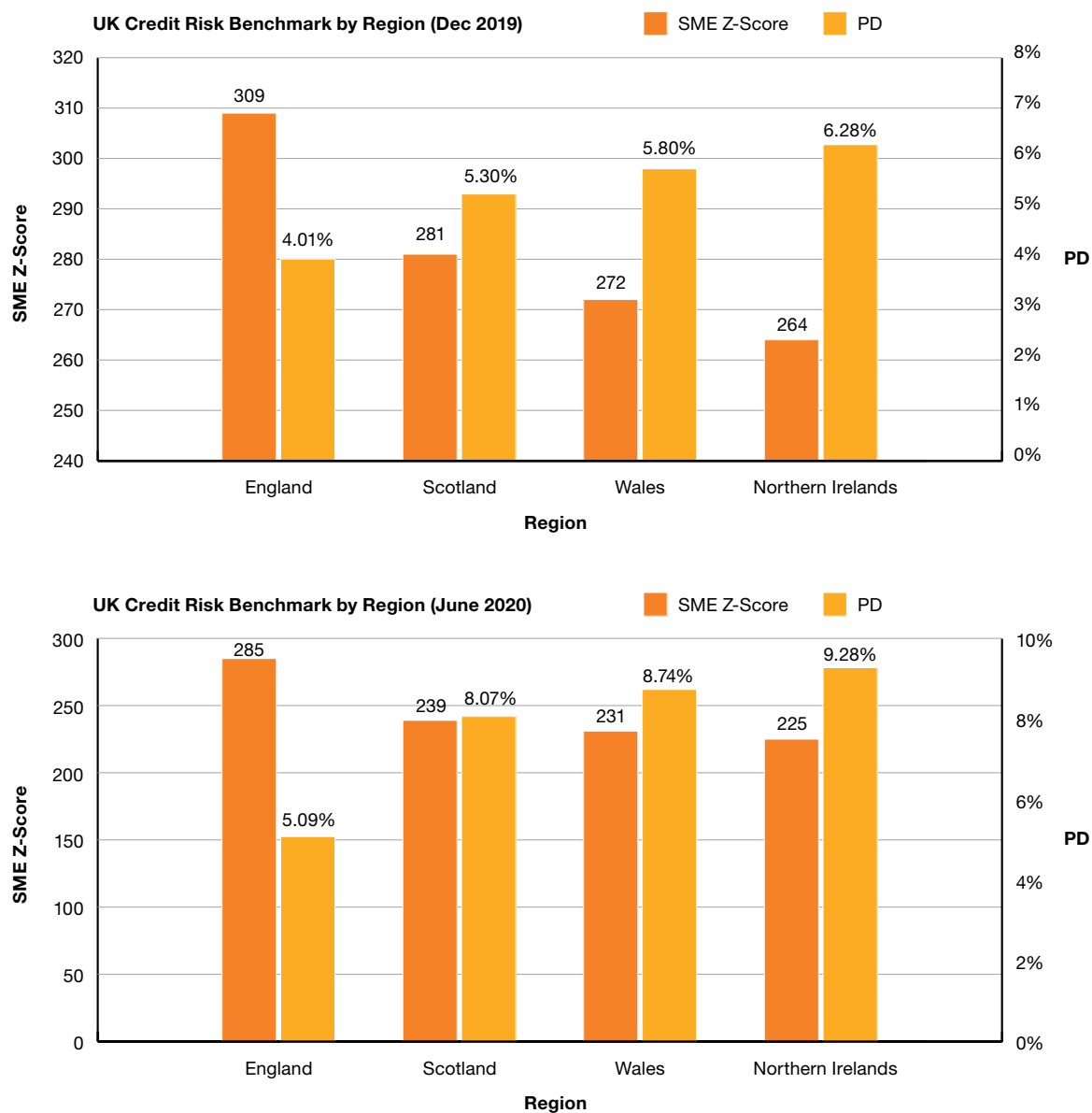
One of the most popular risk measures that is also obtained from Z-Score is Probability of Default (PD). It is a financial term describing the likelihood of default over a particular time horizon. It provides an estimate of the likelihood that a borrower will be unable to meet its debt obligations. It ranges between 0 and 1 with higher values corresponding to the higher risk of default. We use this measure in reporting the results in Executive Summary and Conclusions, whilst the results in this section present all three measures for completeness.

Credit Risk Benchmarks by Region and Sector

To better understand the relative impact of this pandemic on the financial health of Scottish hospitality industry, we compare the change of credit risk from December 2019 to June 2020 across the UK regions and industries, respectively, as shown in *Figures 3-4*.

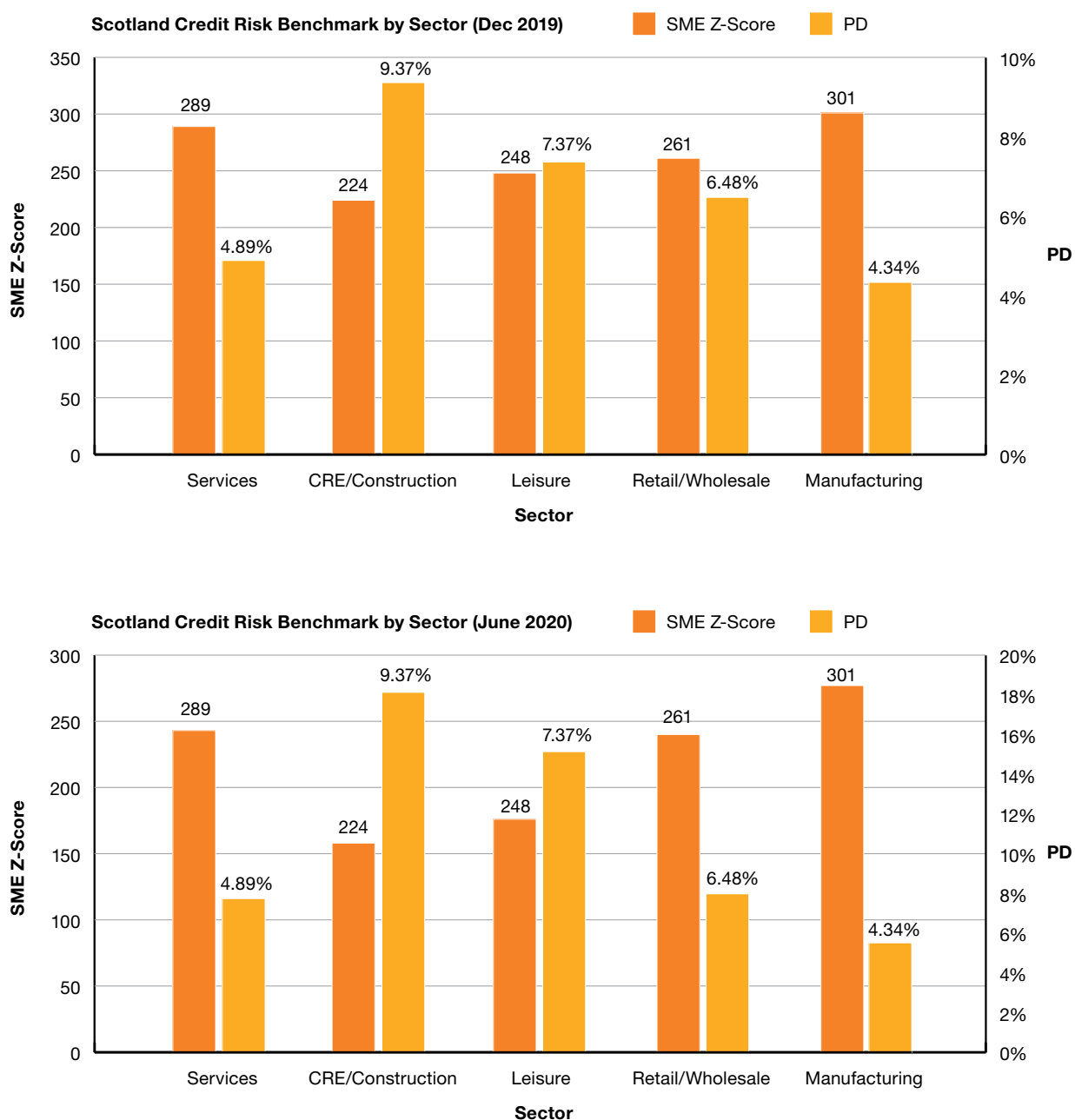
The following graphs (*Figure 3*) provide the comparison of credit risk ratings for different UK regions. The overall estimated Probability of Default (PD) for Scottish economy is going up from 5.30% in December 2019 to 8.07% in June 2020.

Figure 3 / UK Credit Risk Benchmark by Region 2019-2020



The following graphs (*Figure 4*) provide the comparison of credit risk rating for different industries in Scotland. The overall estimated Probability of Default (PD) for Scottish 'Leisure' sector almost doubled from 7.37% in December 2019 to 15.15% in June 2020, given the deterioration in the economy and the impact of the lockdown on this sector.

Figure 4 / Scotland Credit Risk Benchmark by Sector 2019-2020



Overall Sample Results Distribution Comparisons across 3 Scenarios

Figure 5 shows the SME Z-Score distributions under the three scenarios, where the average scores are 263, 165, 93 under baseline, mild stress and severe stress scenarios, respectively. To bring these estimates into perspective, they can be compared to results reported in Figures 3-4, that show the risk distributions for different UK regions and for different sectors in Scotland.

Figure 5 / SME Z-Score Distributions under three scenarios (%)

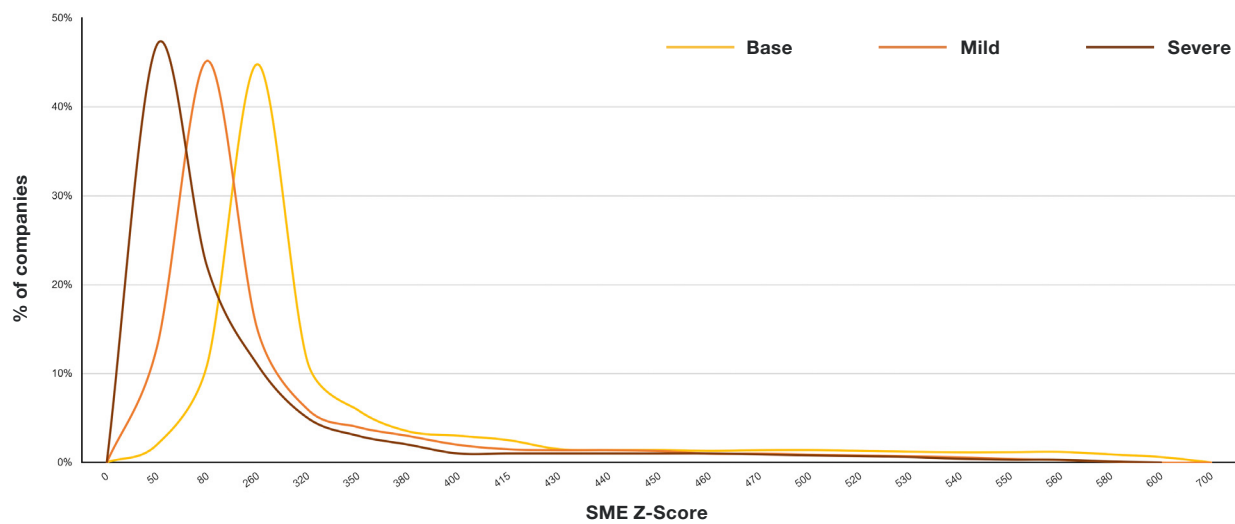
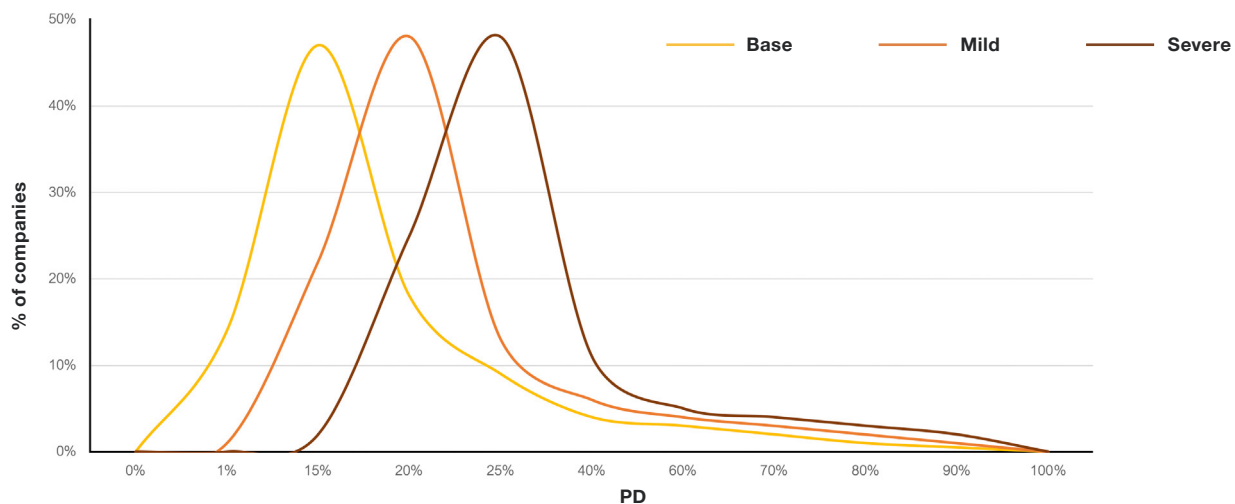


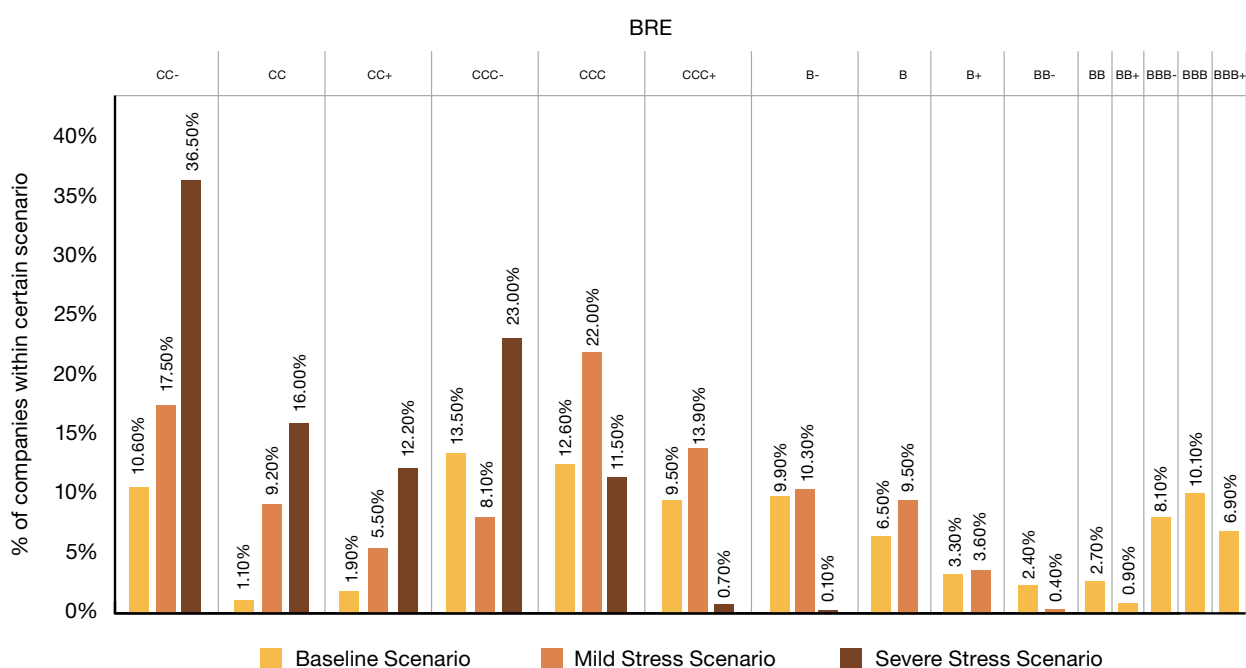
Figure 6 indicates the changes of the companies' PD and distribution in the assumed downturn conditions. In baseline condition, most companies in the hospitality industry show an average 15% PD, increasing to 25% and 43% after applying mild and severe stresses.

Figure 6 / Probability of Default Distributions under three scenarios



The below graph illustrates the impact on companies' Bond Rating Equivalents (BRE) under the stress scenarios. As shown in *Figure 7*, it indicates the rating deterioration from the baseline scenario to the assumed downturn conditions. In the baseline condition, companies' BRE is fairly well diversified varying from investment grades to non-investment grades. With a greater magnitude of economic stress applied, the sample's BRE worsen compared to the baseline with a concentration in the lowest rating grades in the severe stress scenario.

Figure 7 / Bond Rating Equivalents (BRE) Distributions under three scenarios



Sample Distribution Comparisons by Company Size

Figure 8 – Figure 13 illustrate the results distribution by company size under the three scenarios. To begin with, we categorized companies into three groups: “Small”, “Medium”, and “Large”, by the level of total assets. “Small” presents the companies with total assets less than £2million, while the ones with total assets between £2 million and £15 million are regarded as “Medium”. Those with greater than £15 million of total assets are regarded as “Large”. Figure 8 illustrates company size distribution within the sample. Small company, medium-size and large company account for 88.6%, 9.2%, and 2.2% of the entire sample, respectively.

SME Z-Score Distribution by Company Size under different scenarios are shown in Figure 9 – Figure 11. SME Z-Score, which higher value correspond to lower risk, could provide us the overview on the sink of the creditability of tourism companies. In the baseline situation as shown in Figure 9, the small and medium companies are seemed to be more agile to respond the current situation, with more proportion located well above the investment score, compared to the large companies. However, larger companies have less proportion that rated down below 100, which is the score range indicates the high possibility of default of the rated companies, compared to small companies. All companies have higher presence among the medium rating level between 150 and 300.

Figure 8 / Company Size Overview

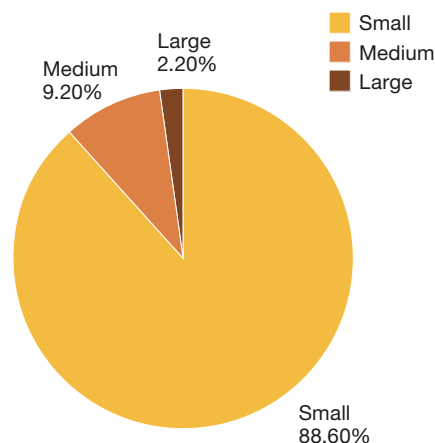


Figure 9 / SME Z-Score Distribution by Company Size – Baseline

Baseline Scenario: SME Z-score Distribution			
	Small	Medium	Large
0-50	12%	1%	5%
50-100	2%	1%	0%
100-150	8%	7%	9%
150-200	16%	18%	23%
200-250	15%	26%	41%
250-300	11%	9%	14%
300-350	10%	7%	5%
350-400	6%	7%	0%
400-450	6%	12%	5%
450-500	6%	5%	0%
500-550	5%	5%	0%
550-600	3%	2%	0%
Total	100%	100%	100%

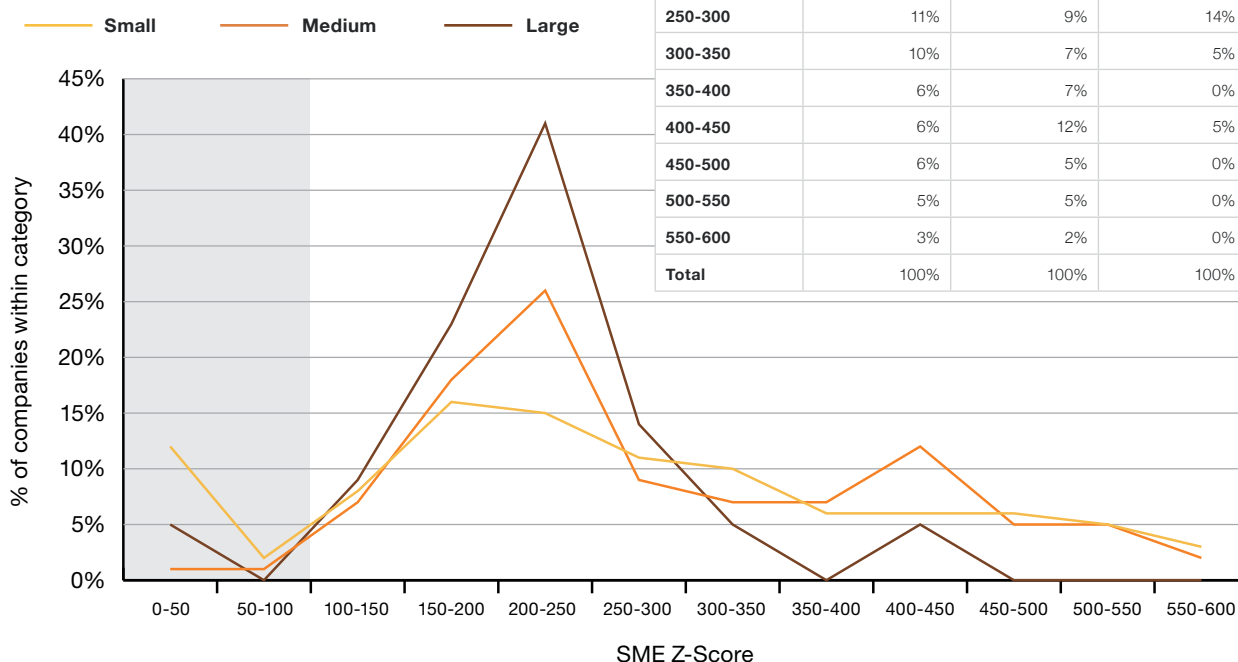
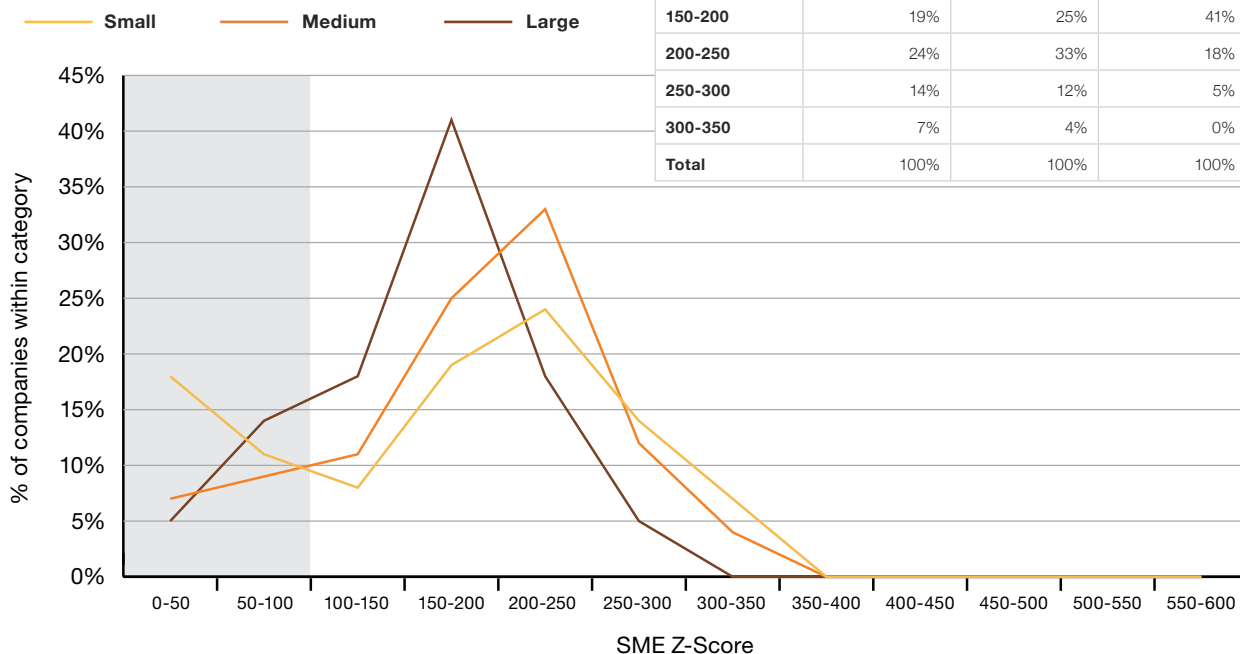
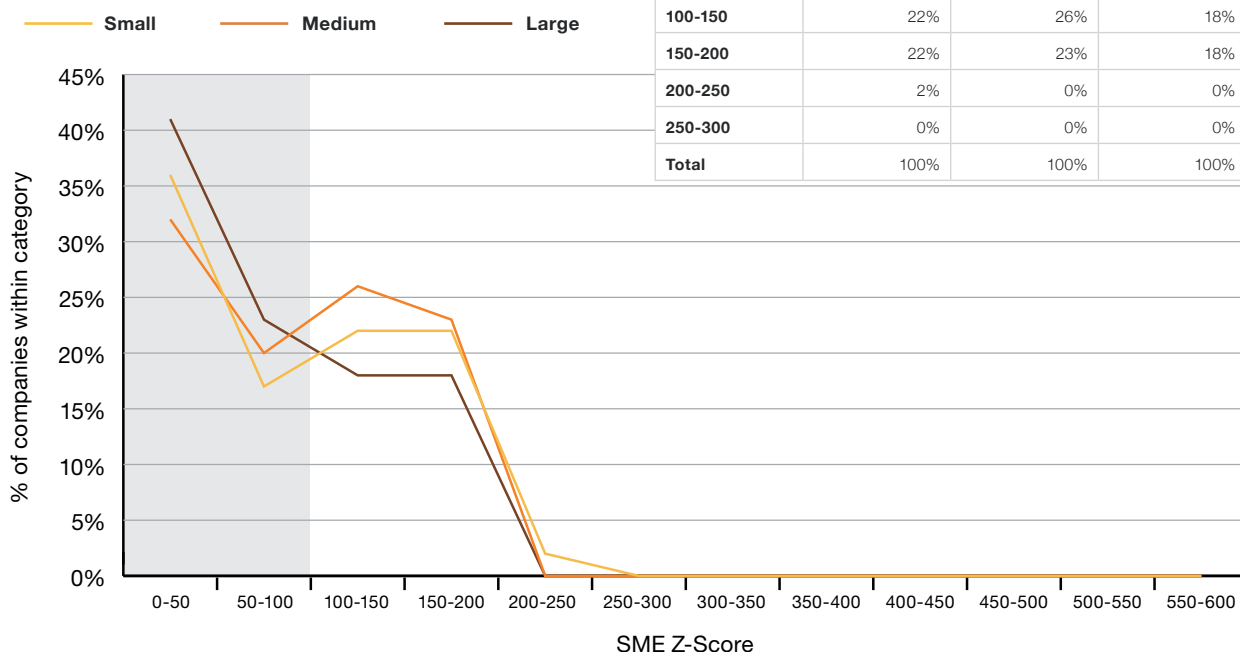


Figure 10 / SME Z-Score Distribution by Company Size – Mild Stress

Under the mild stress, the companies move into higher risk areas, and large companies show the most pronounced shift, as noted before. However, there is also a relatively high spike in the highest risk band from small companies.

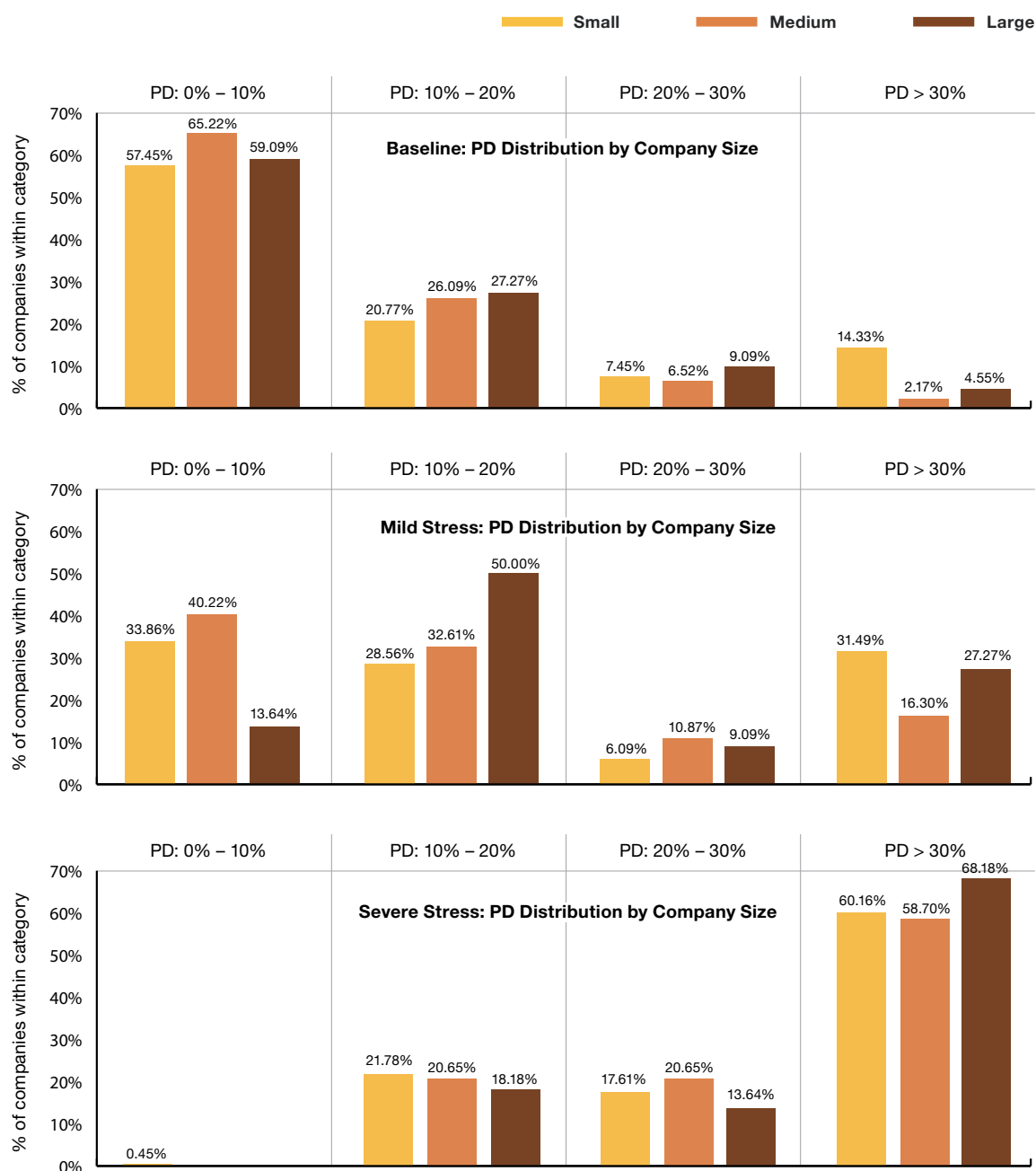
**Figure 11 / SME Z-Score Distribution by Company Size – Severe Stress**

Under severe scenario, the companies of all sizes move even further into the highest risk area, with larger companies appear to be hit hardest, and smaller companies' ratings also dramatically plunge.



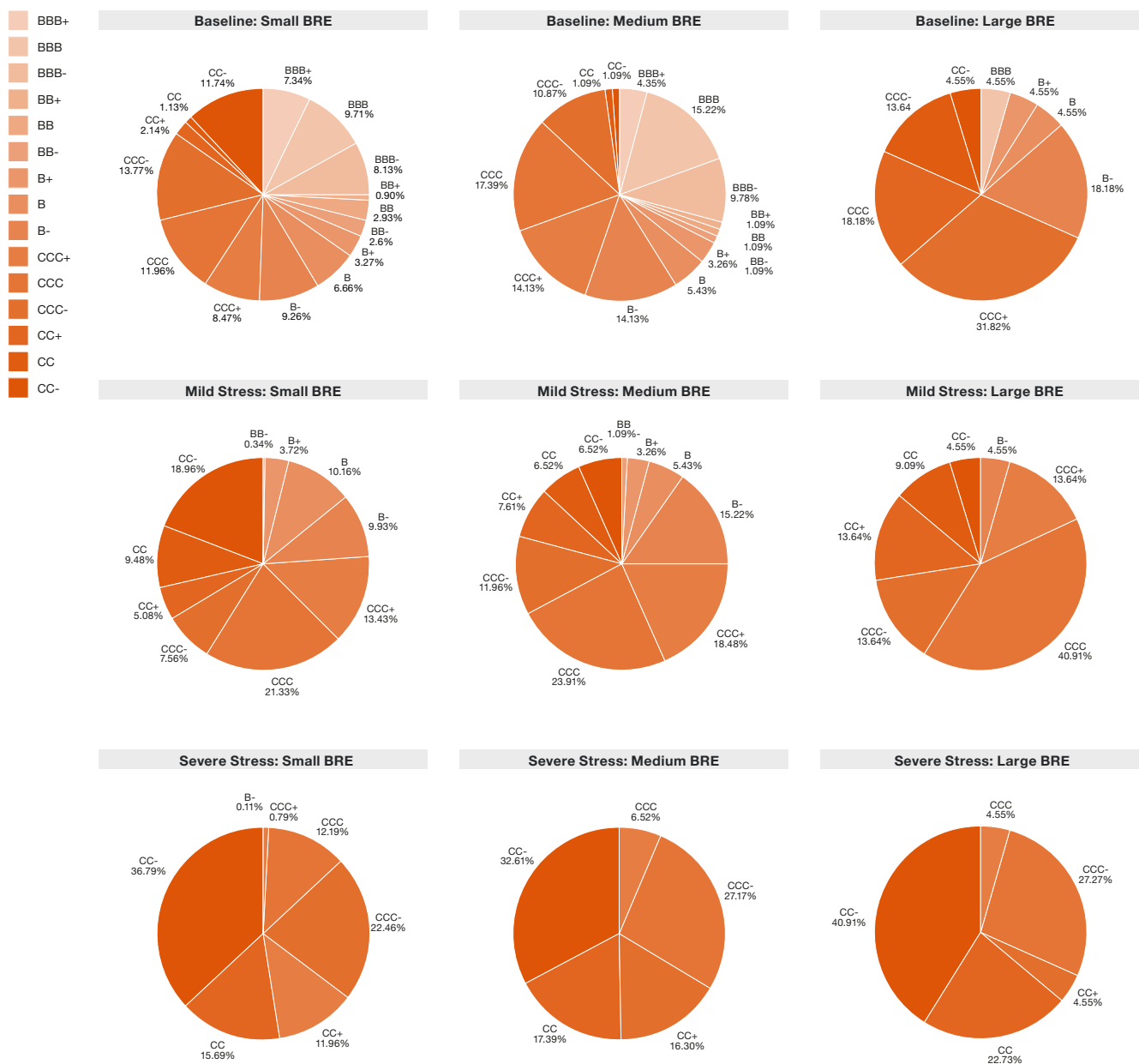
Looking at the companies' PD distributions under stressed scenarios, large companies seem to be more sensitive to the shock caused by Covid-19. As shown in *Figure 12*, under baseline scenario, companies of all sizes are predominantly in the low risk segment, with PD under 10%. In mild-stress scenario, the companies shift into higher risk segments. Large companies show the most pronounced shift into 10% -20% risk segment, whilst small and medium companies are more resilient and are spread across the risk levels. Under severe stress all companies migrate to the highest risk segment with the PD above 30%, with large companies demonstrating the highest presence in this band (68.18%). No companies remain in the lowest risk segment.

Figure 12 / Probability of Default Distribution by Company Size



BRE distribution shows similar patterns in *Figure 13*:

Figure 13 / BRE Distribution by Company Size



Sample Distribution Comparisons by Age of Company

Company's age distribution in the sample is shown in *Figure 14*, where we divided the companies into 4 main age groups: young – companies who are less than or equal to 10 years old (" ≤ 10 "), middle-aged1 - those are between 11-20 years old (" $[11,20]$ "), middle-aged2 – the group of companies between 21 to 30 years old (" $[21,30]$ "), and mature – those that have been active over 30 years (" > 30 ").

In terms of the company age, the young companies dominate the overall sample, with nearly half of the sample being in this group, they are followed by companies with ages falling into $[11,20]$, and $[21,30]$ age brackets, with 32.10%, and 10.50% respectively. Companies with more than 30 years of business history have the smallest presence in the entire sample (7.90%).

Figure 14 / Company Age Overview

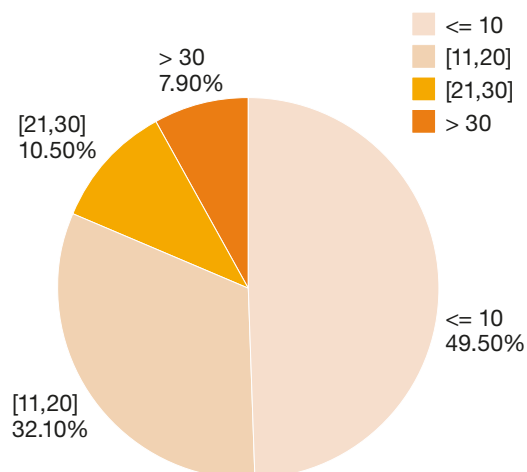
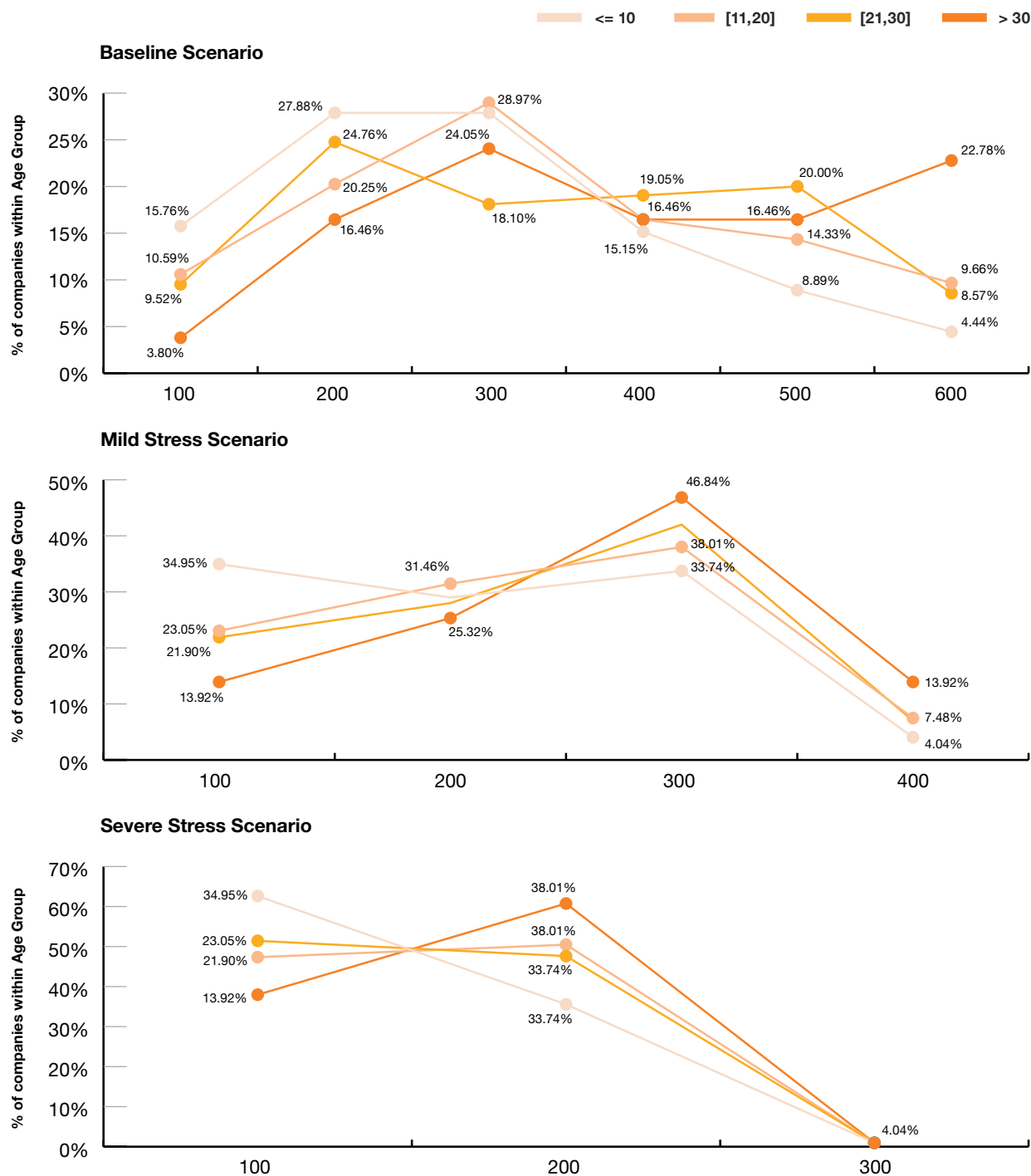


Figure 15 – Figure 17 demonstrate the distribution of the results by company age for the baseline and stressed scenarios. In the baseline scenario, the pattern of SME Z-Score distribution by the company age group is not well pronounced, shown in the following graph. The younger companies show slightly higher risks. However, the pattern becomes clear in a stressed scenario. Mature companies, which have been in their business more than 30 years, tend to be more resilient compared to younger companies, with less volatile SME Z-score among the three scenarios and lowest presence in the high-risk area on the left side. On the contrary, the young companies that have less than 10 years of operation experience are generally riskier with greater volatility in its score migration, and greatest presence in the high-risk zone (SME Z-score < 100). As for middle-aged companies with 11-30 years of age, their creditworthiness is between young companies and mature companies. PD and BRE distribution by age group in *Figure 16* and *Figure 17* show similar patterns with mature companies having the greatest portion of investment-grade equivalent rating in the baseline case and the lowest proportion in the high PD band (PD $> 30\%$).



Figure 15 / SME Z-Score Distribution by Company Age under 3 Scenarios



Notes: In SME Z-Score graphs in this analysis, x-axis represents score band. For example, 100 at x-axis means SME Z-score ranging from 0 to 100; 200 represents SME Z-score between 101 and 200. The y-axis represents the proportion of company within respective age group falling in the corresponding SME Z-score range. For instance, under baseline scenario, 3.8% on the dark orange line represents only 3.8% of “old companies” (greater than 30 years) assigned with “≤100 SME Z-score”.

Figure 16 / PD Distribution by Company Age

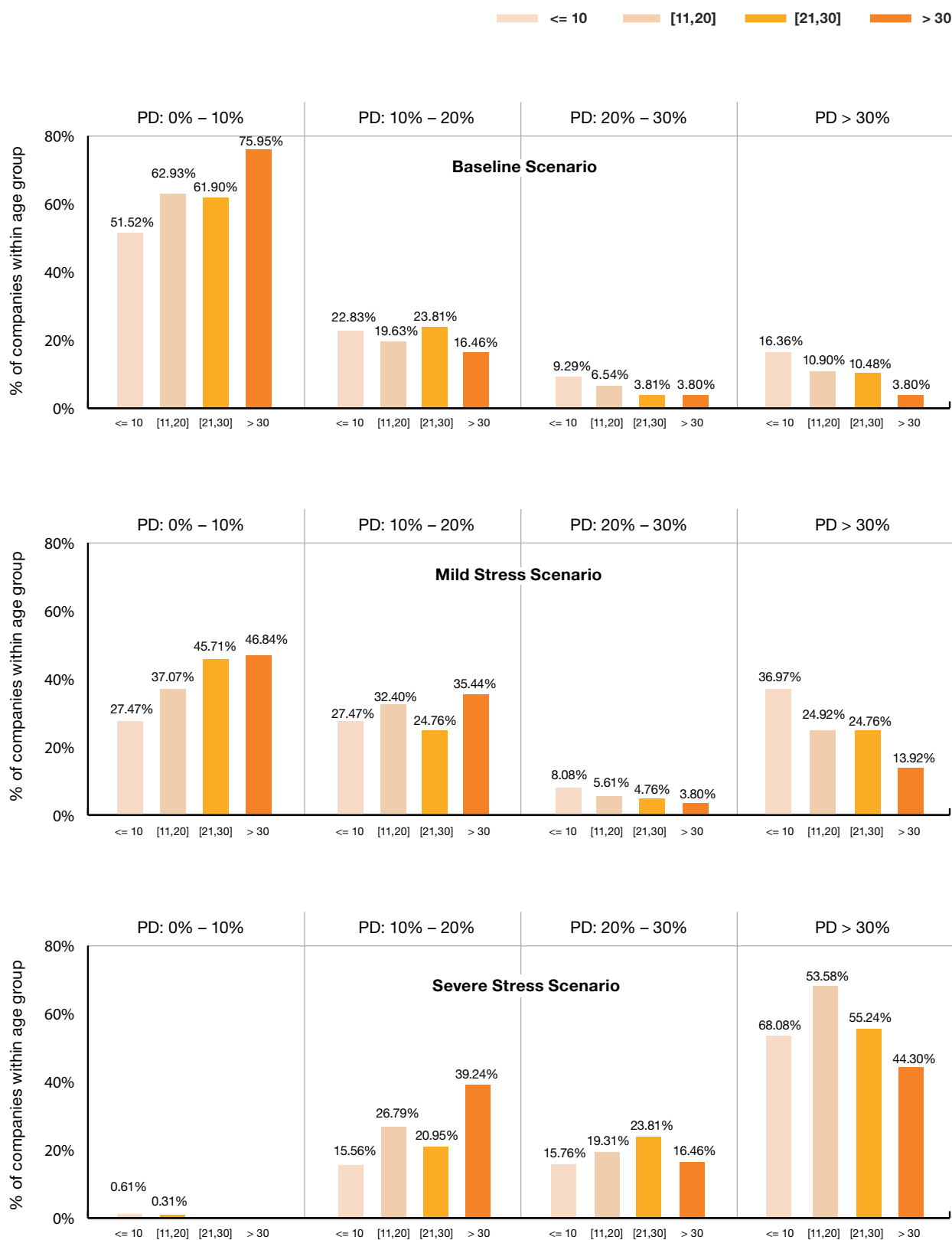
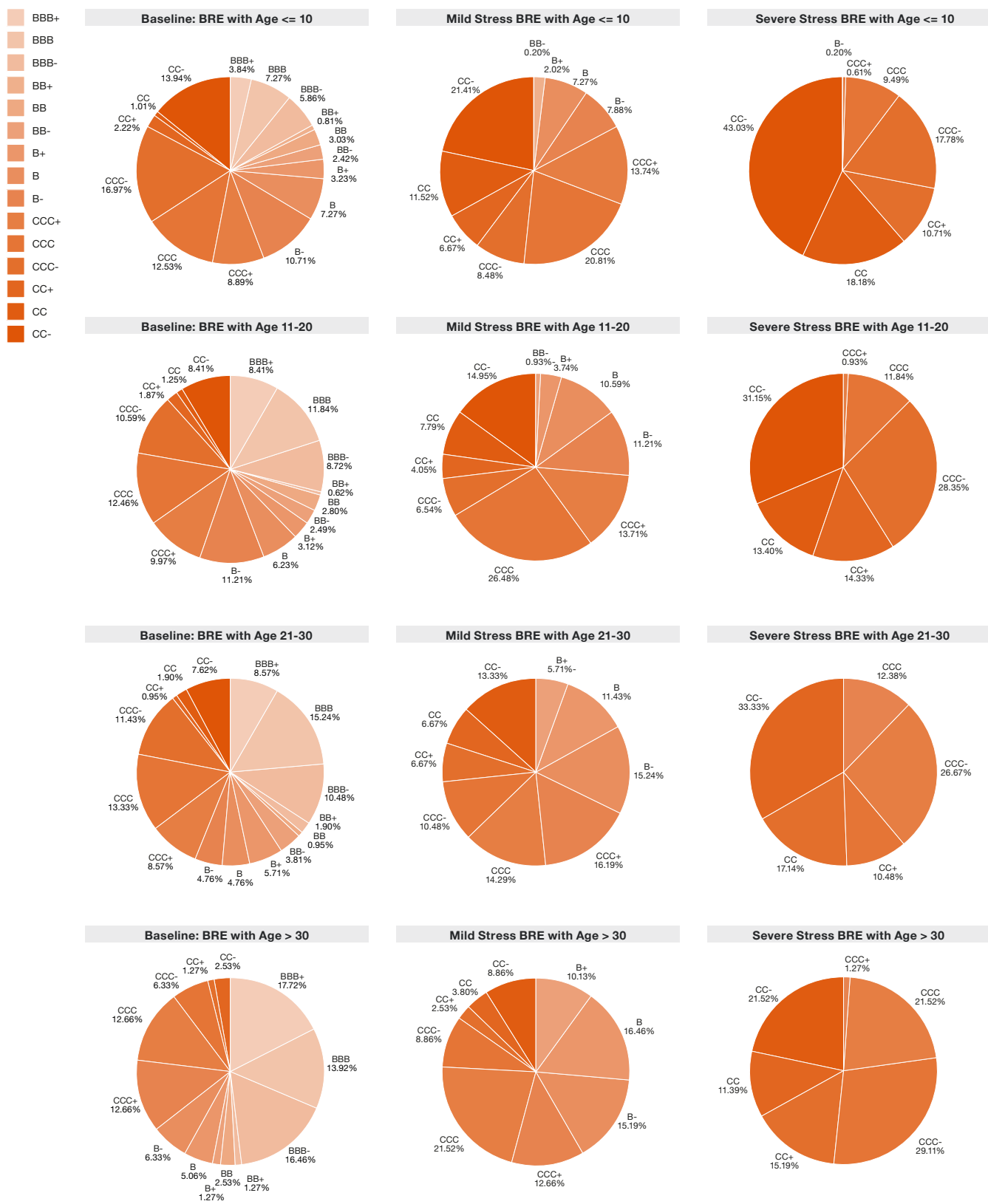


Figure 17 / BRE Distribution by Company Age



Sample Distribution Comparisons by Company's Profitability

Profitability is one the major factor determining company's creditworthiness. In this analysis, we use Return on Assets (ROA), that is, Net Income divided by Total Assets, as the profitability proxy. And the ROA ratios are categorized into 3 groups: (1) low profitability group, having ROA < 0%, (2) medium profitability group, with ROA between 0 and 5%, (3) high profitability group, with more than 5% ROA. *Figure 18* provides an overview of company profitability level under the baseline scenario. The low profitability group, medium profitability and high profitability group accounts for 23.8%, 12.9%, and 63.3% of the entire sample, respectively.

Figure 18 / Company Profitability Overview

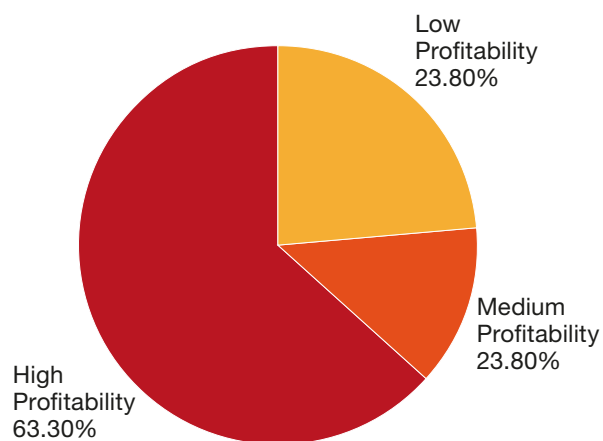
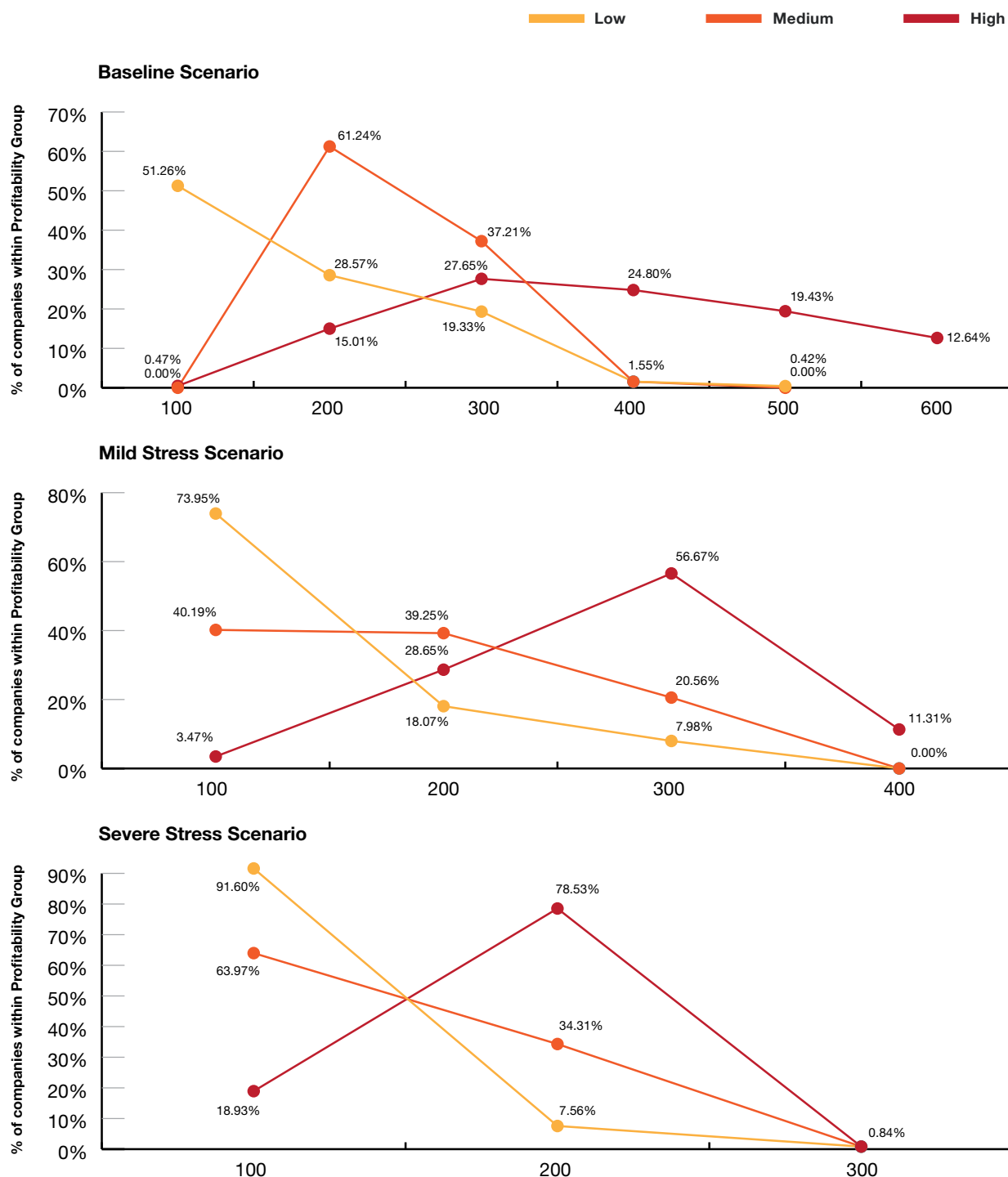


Figure 19 (overleaf) shows SME Z-Score Distribution by Profitability (ROA) under 3 Scenarios. Even under the baseline scenario, over half of low profitable companies have less than 100 SME Z-score assigned, which signals the riskier credit profile. For the rest of two groups, the proportion of having less than 100 SME Z-score is around zero, and the high profitability group is likely to achieve higher score. As situation get worse, all ROA groups' credit score suffers and slide to lower score levels, having greater portion of falling into score band that is less than 100. In the mild-stress situation, none of them obtains score greater than 400, and the maximum score further drops to 300 in the severe stress scenario. Regardless of scenarios, high profitability group generally has better score than other groups.

Figure 19 / SME Z-Score Distribution by Profitability (ROA) under 3 Scenarios

Notes: In SME Z-Score graphs in this analysis, x-axis represents score band. For example, 100 at x-axis means SME Z-score ranging from 0 to 100; 200 represents SME Z-score between 101 and 200. The y-axis represents the proportion of company within respective profitability group falling in the corresponding SME Z-score range.

Looking at PD bands (Figure 20) with different levels of profitability clusters, we can see that the higher profitability is associated with lower default risk. The low profit cluster is more likely to default in baseline case and becomes even more vulnerable in the stressed situations. The findings are consistent with BRE distribution by profitability (Figure 21): under the baseline scenario, companies more capable of generating higher return have better rating assigned (around 75% of profitable group achieving BRE rating of B- and above), while companies in the low profitability group have generally poor rating with 75% within the group assigned CCC and worse ratings. The divergences of BRE among 3 profitability clusters also exist in mild-stress and severe-stress scenarios. The rating deterioration in the higher profitability group is less severe than lower profit group.

Figure 20 / PD Distribution by Profitability Level

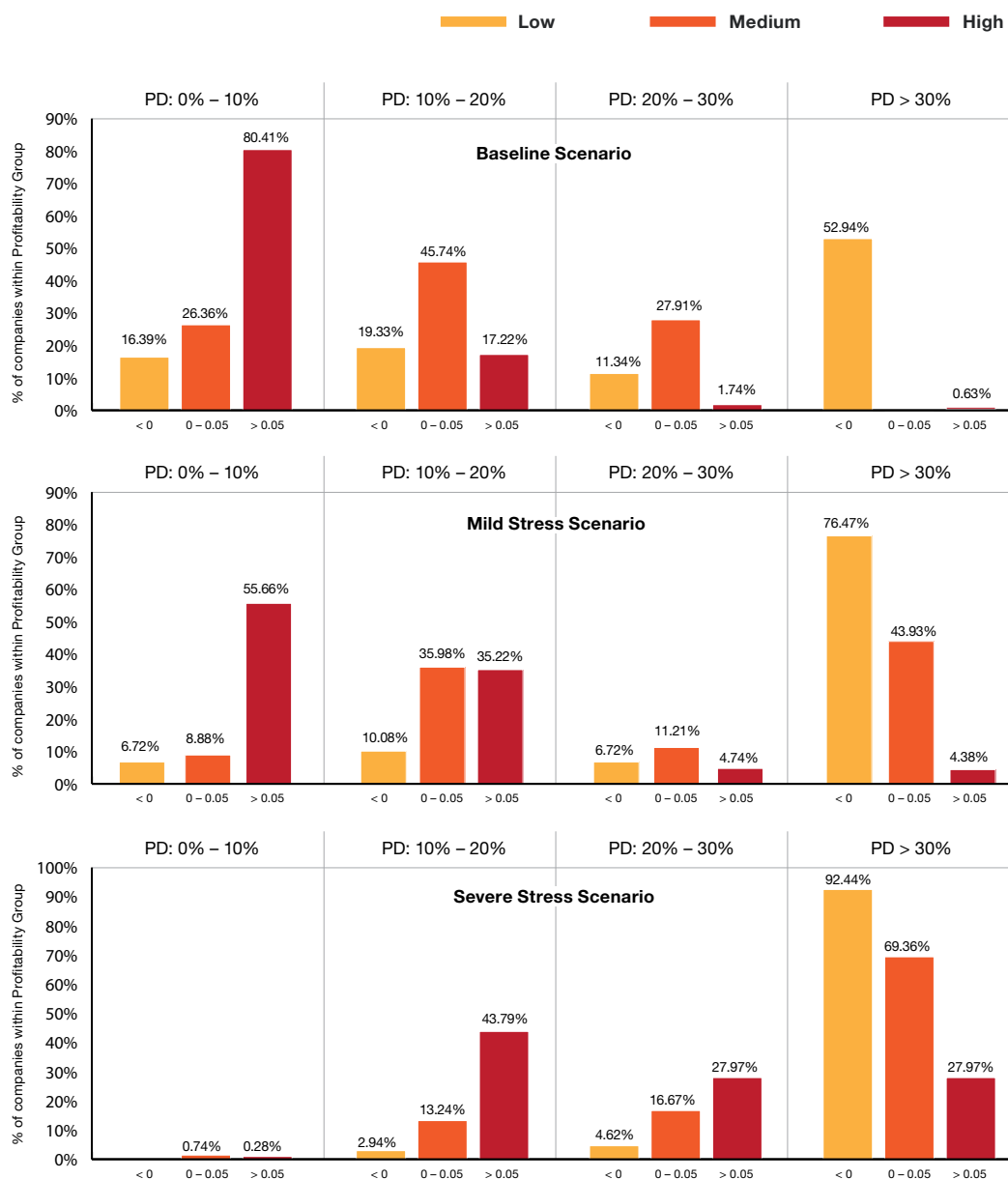
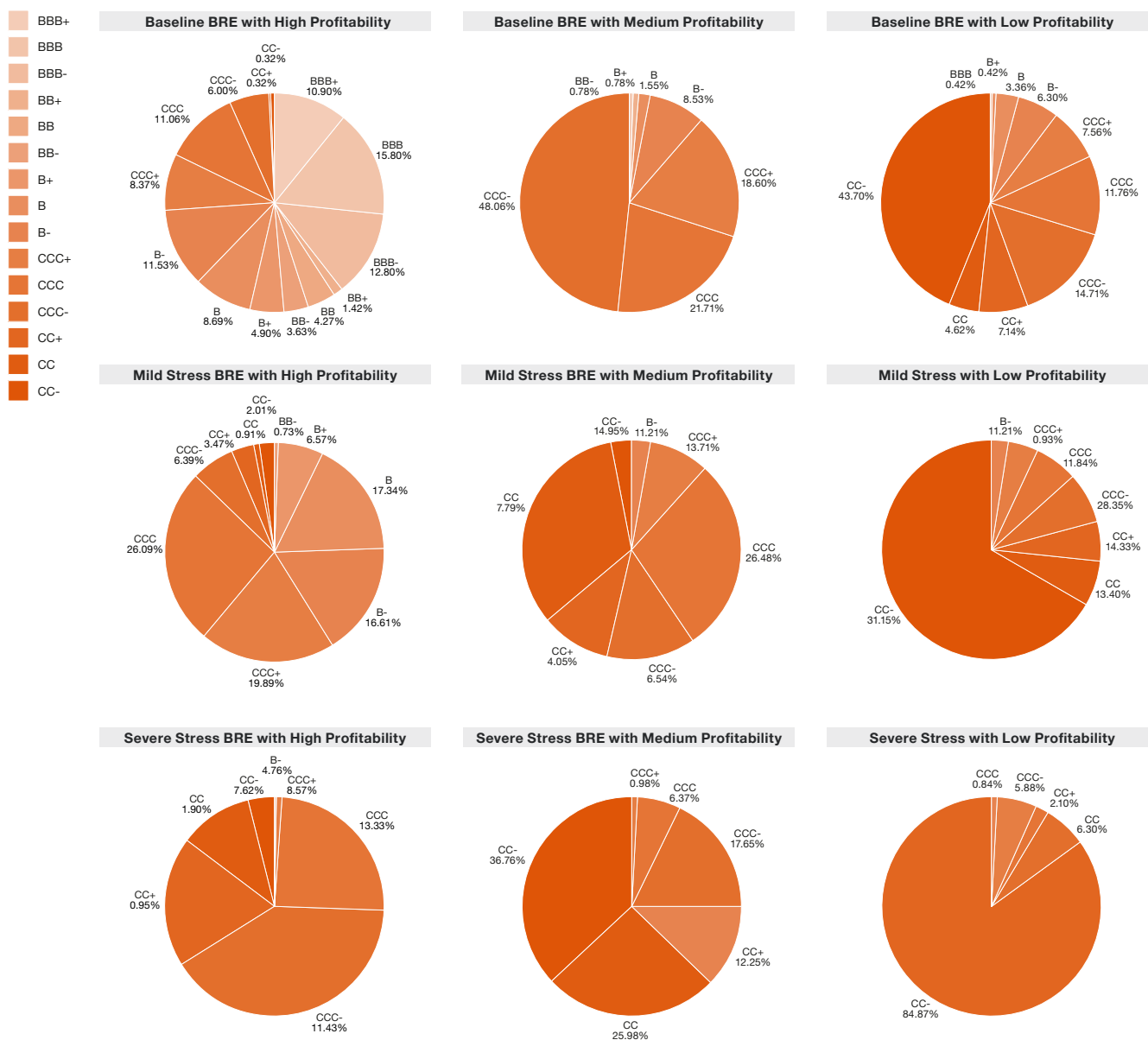


Figure 21 / BRE Distribution by Profitability Level



Sample Distribution Comparisons *by Company's Leverage*

Leverage level is an important factor in predicting the resilience of companies to economic shocks. We categorized leverage ratios (Total Debt divided by Shareholder Equity) into 3 clusters: (1) low leverage group, with leverage ratio less than 1; (2) medium leverage group, with their leverage ratio higher than 1; (3) high leverage group with negative leverage ratio, which results from negative total shareholder's equity in that sample. It means that liabilities exceed assets which could happen when company has accumulated losses over several periods, and company chooses to borrow money to cover accumulated losses. *Figure 22* provides an overview of company's leverage level under the baseline scenario. Low leverage group, Medium leverage and High leverage group accounts for 69.4%, 18.1%, and 12.5% of the entire sample, respectively.

Figure 22 / Company's Leverage Overview

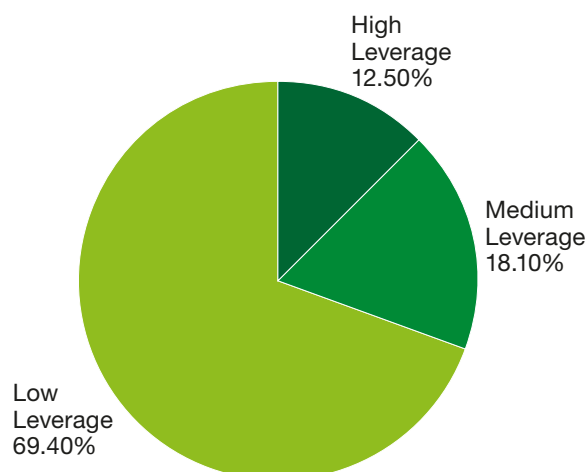
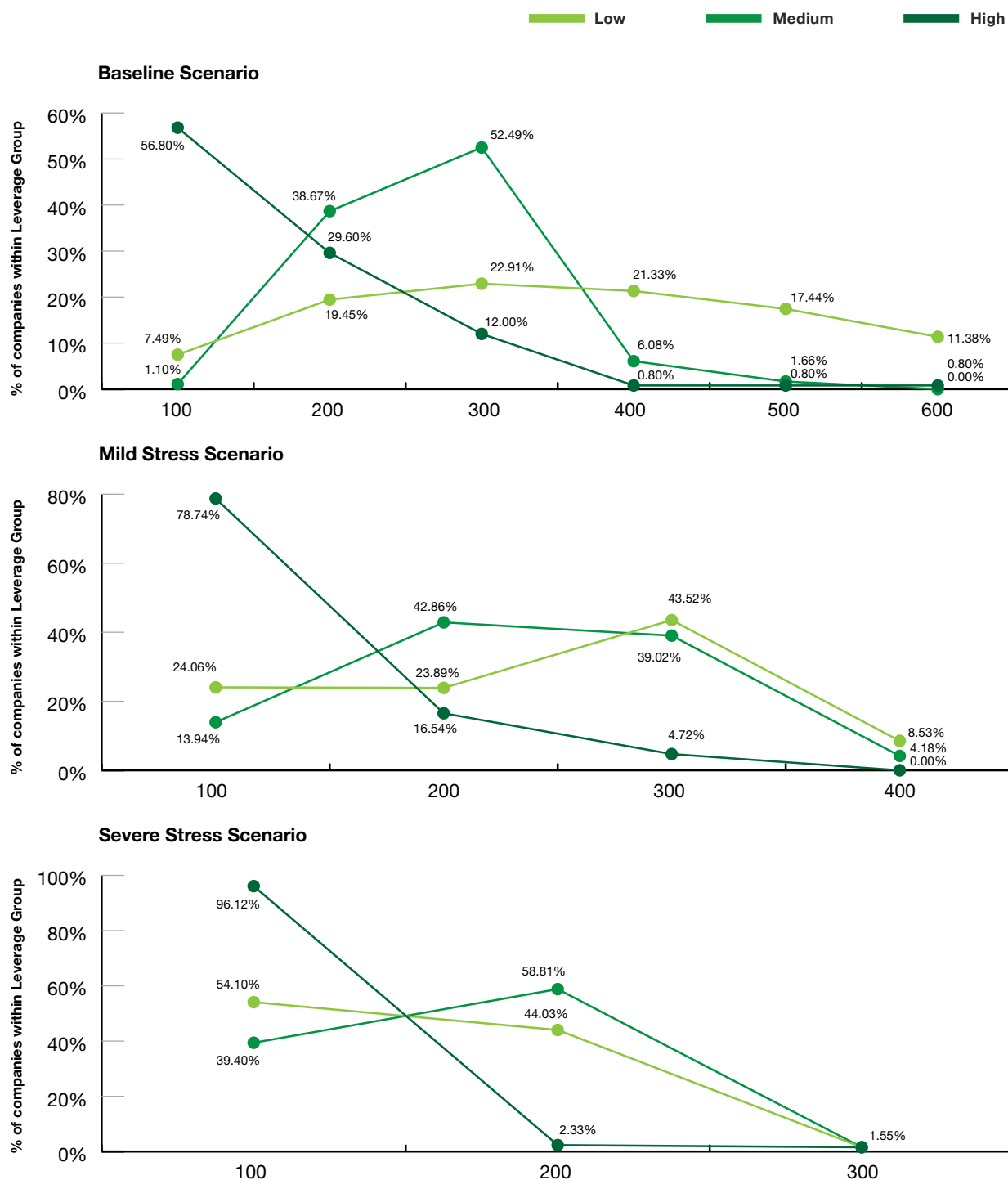


Figure 23 (overleaf) shows SME Z-Score Distribution by Leverage under 3 scenarios. Starting from the baseline scenario, more than half of high leverage companies have less than 100 SME Z-score assigned. For the low- and medium leverage groups, the proportion of having less than 100 SME Z-score is relatively low. These suggest that the higher leverage level is associated with greater default risk.

Comparing low leverage group and medium leverage one, the latter has generally lower portion of company that fall into distress zone (SME Z-score from 0 to 100, see risk zone mapping in *Figure 2*) in all 3 scenarios. Low leverage group achieve average higher score in the baseline scenario by having over 50% of companies assessed as medium- and low- risk entities, while medium leverage group turns to slightly better position in severe stress scenario, having higher SME Z-score on average.



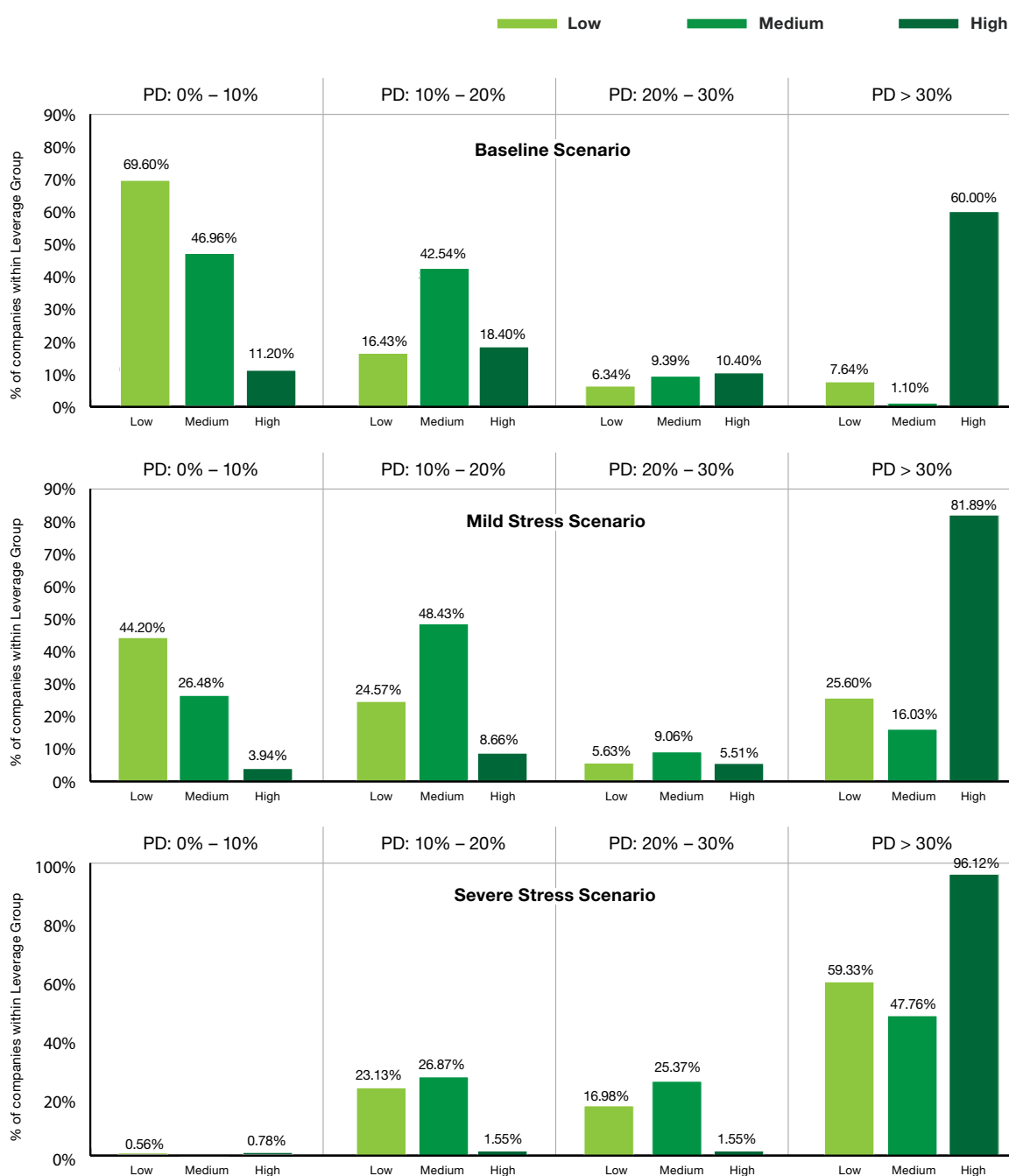
Figure 23 / SME Z-Score Distribution by Leverage under 3 Scenarios



Notes: In SME Z-Score graphs in this analysis, x-axis represents score band. For example, 100 at x-axis means SME Z-score ranging from 0 to 100; 200 represents SME Z-score between 101 and 200. The y-axis represents the proportion of company within respective leverage group falling in the corresponding SME Z-score range.

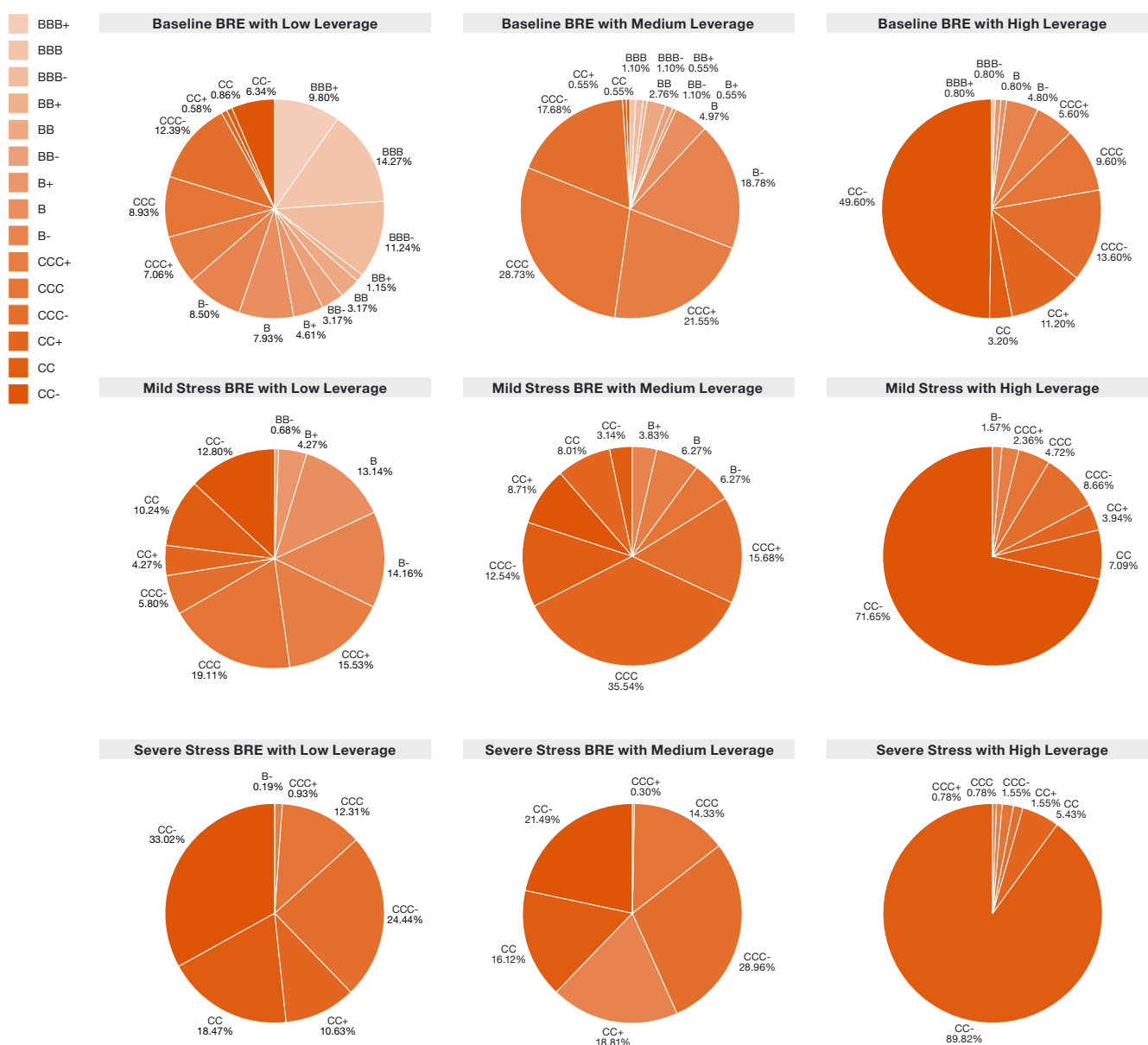
Negative leverage ratio usually signals potential financial distress. According to PD distribution by different leverage levels (see Figure 24), over 60% of high leverage companies are more likely to suffer financial distress (PD >30% – high risk band) and thereby default, compared to other two leverage groups. This portion surges above 80%, and even 95%, in mild and severe downturn respectively. On the contrary, the majority of less leveraged companies have lower PD and stay in the “low risk zone” under the baseline scenario. Medium leverage company group is roughly spread around the “low-and-medium risk zone” according to their PD distribution.

Figure 24 / PD Distribution by Leverage Level



These insights are also supported by BRE distributions segmented by the leverage level (*Figure 25*). Under the baseline scenario, companies bearing less debt are assigned to better rating (around 60% of them achieving B- and above rating), while high leveraged companies have worse ratings with only around 30% of them obtaining B- and above rating. The portion of having B- and above rating drops to 5% in the medium leverage group. As more severe stress factors applied, the sample's overall BRE turns worse regardless of leverage level, and the rating of high leverage company deteriorates the most.

Figure 25 / BRE Distribution by Leverage Level





The speed of the economic recovery

Economic crises have often been defined as black swans, rare and unpredictable events. In the case of the current economic crisis, its unpredictability is somewhat questionable considering that most of the developed world had been enjoying one of the longest benign periods in the recent financial history. However, the trigger of this crisis was definitely unexpected. A global pandemic is a fairly rare event in history and the last time that something similar was experienced, the world was far less connected than it is today.

Our way of living gave the virus a great help to spread quickly throughout the world. Governments responded slowly and in a fragmented way. Lockdown measures were introduced and lifted at different speed creating public confusion. These measures significantly altered the habits of the vast majority of the population affecting every aspect of our life.

At the beginning of the pandemic, few understood how long it would be before life returned to normal, and many analysts talked of V-shaped recoveries. Many analysts now believe that, barring major improvements in COVID treatment (which would make the disease less dangerous), only a vaccine can allow economic activity to return to the pre-pandemic baseline. Even once the economy starts to reopen, measures will likely be put in place that curtail economic activity to some degree – travel will be less common, businesses will have to space workers and customers further apart, restaurants will be serving fewer customers at a time, and sporting events, concerts, and other activities involving large crowds probably will remain off limits for a long time. And even if the rules allow, many people may be reluctant to return to life as it was before the pandemic.

Often, we hear reference to the new normal. As for any big change, most people respond with denial and tend to believe that this “new normal” will only be temporary. Unfortunately, there is no certainty with regards to the length of this new normal stage and waiting for an end can generate wrong behaviours. People and business will need to accept this new status quo and adapt. This is the only way to ensure a faster recovery.

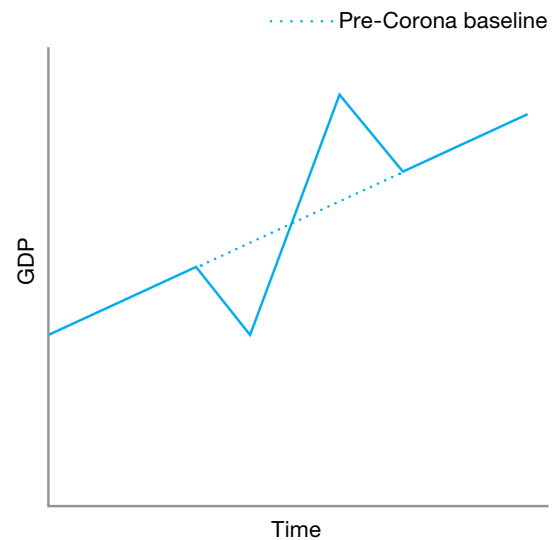
Individuals can adapt faster than businesses. Many people learnt how to cook or cut their hair, even enjoyed exercising outside rather than going to gym. Many businesses managed to respond quickly. Even during lockdown, some businesses modified their business model to adapt to the new context. These businesses not only managed to survive the lockdown, but some increased their revenues.

The speed of the recovery will depend strongly on these behaviours. The faster businesses will adapt, the shorter will be the downturn. SMEs will have an advantage compared to larger, more complex organizations. Small businesses have a leaner structure, lower fixed costs and faster decision times. These elements will play a major role in the next months and hopefully provide SMEs with a competitive advantage.

Most optimistic: The Z

The economy suffers a downturn during the pandemic, but then bounces back up above the level it would have been in a pre-pandemic baseline, as pent-up demand creates a temporary boom. In this scenario, a good part of the GDP foregone during lockdowns – the shopping we didn't do, the restaurant meals we didn't enjoy, trips we didn't take – was simply delayed, and is made up once the risk from the pandemic passes.

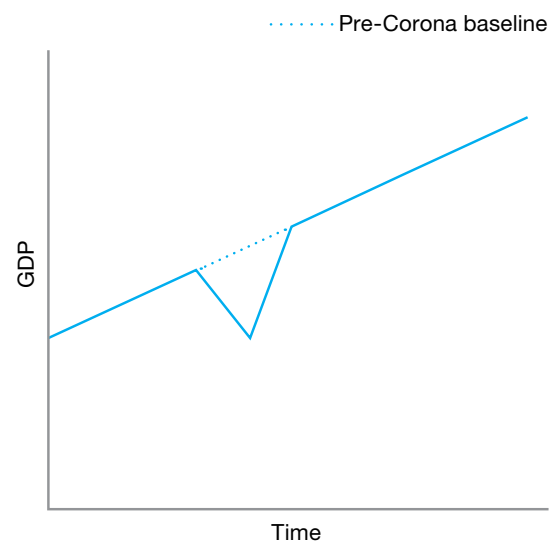
Figure 26 / Z-Shaped Recovery



Still very optimistic: The V

The economy permanently loses the production that would have occurred absent the pandemic, but very quickly returns to its pre-pandemic baseline once social distancing is lifted. Trips not taken, restaurant meals not purchased, and concerts not attended are forgone, rather than delayed, but once life returns to normal, everything is just as it would have been before.

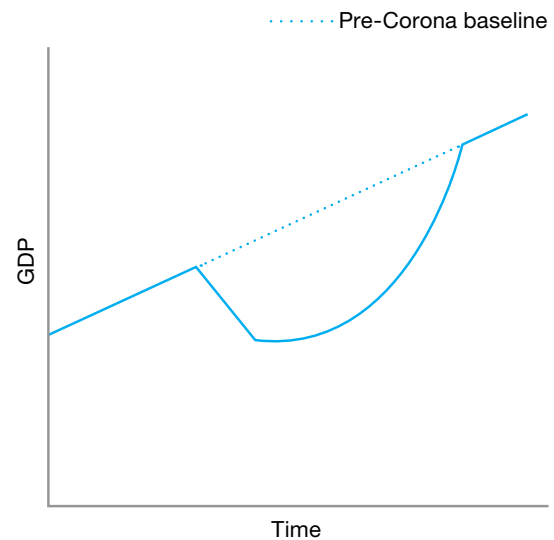
Figure 27 / V-Shaped Recovery



Somewhat pessimistic, and probably more likely: The U

The effects of the pandemic on economic activity last well beyond the end of the social distancing, and GDP recovers slowly. Even after the health risks recede, the economy still doesn't quickly go back to where it would have been, though it does get there eventually. This basic story has many possible shapes. In the U-shape, the level of GDP stays low for a while (perhaps because social distancing norms last a long time), but then recovers back to baseline slowly.

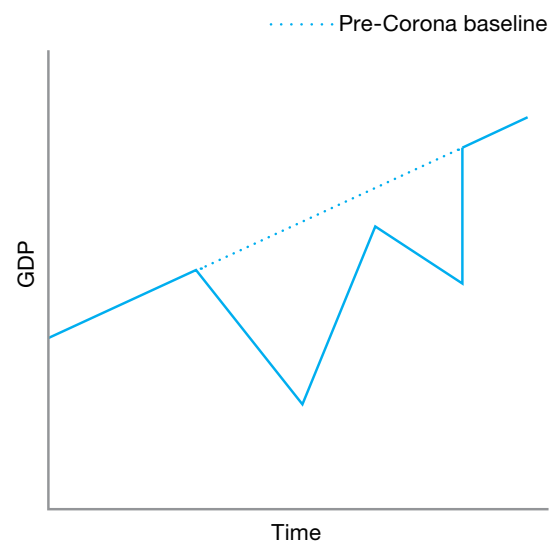
Figure 28 / U-Shaped Recovery



Another possible estimation: The W

If the response to the pandemic is a first round of openings that is followed by a surge in COVID-19 cases and another round of closures in the fall, the recovery could be W-shaped. But then the question will be, what does the recovery from the second (or third, if we do that multiple times) downturn look like?

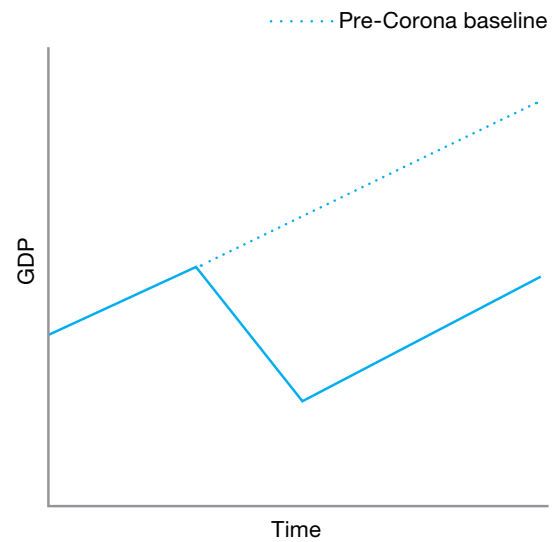
Figure 29 / W-Shaped Recovery



Most pessimistic: The L

The pandemic has a permanent effect on GDP. Lost investment during the crisis, a rethinking of global value chains, a permanent change to fiscal policy, and a slowdown in productivity growth all have the potential to cause the trajectory of GDP to be lower than it otherwise would. This is basically what the recovery from the Great Recession looked like.

Figure 30 / L-Shaped Recovery



Conclusions

The report provided forecasts of expected default rates in the next twelve months for the Scottish tourism and hospitality sector.

The analysis used the risk models developed by Wisersfunding to assess the chances of default/financial distress with financial ratios and macroeconomic variables as inputs. The models were applied to a sample of the Scottish tourism and hospitality companies to estimate probability of default (PD) at the company level under three scenarios: baseline, mild downturn and severe downturn.

The sample of 5000 companies was characterised by predominantly small firms (87% of sample had total assets less than £2m), relatively young (82% of the firms in the sample was less than 20 years old). The latest financial statements from 2019 showed a relatively healthy risk profile with a good profitability (ROA above 5% in 63% of the sample) and a generally low level of debt (debt to equity ratio lower than 1 in 70% of the sample). The baseline scenario used 2019 financial ratios and the most recent macroeconomic variables. Given the deterioration in the economy and the impact of the lockdown on this sector, the average PD of these firms increased to 15% even in the baseline scenario, almost the double of the one observed in other sectors in the UK.

For the mild stress scenario, we examined the last 20 year of financial statements for the Scottish tourism and hospitality sectors. The worst distress was observed during the Global Financial Crisis (GFC) Period (2007 – 2008), and post-GFC recessions followed by the European debt crisis (2009-2011). The tourism industry also suffered the effects of swine flu in 2009-2010. We took the observed percentage change of each financial variable between the peak and through points in the 2008 crisis as the initial estimates of mild downturn for our current event.

For the severe downturn scenario, for balance sheet financials we used an additional 50% adjustment as compared to the 2008 crisis. As for Profit & Loss (P&L) variables, we took the recent values from the Scottish government estimates of GDP, that showed the estimated drop for Accommodation & Food industry in April 2020 of 85%.

For both stress scenarios we then made further conservative adjustments following the feedback from the tourist industry experts.

With stressed financial inputs and macroeconomic variables, forecasts for the average level of default varied between 28% (mild stress) and 43% (severe stress).

Contrary to our expectations, medium and large companies appeared to be more sensitive to the shock caused by Covid-19. In particular, for large companies the proportion in the highest PD band (over 30%) increased from 4.55% under baseline scenario to 27.27% in mild downturn and to 68.18% under severe stress. For small companies that are riskier in normal circumstances, the PD levels also increased but with the less pronounced magnitude. This can be attributed to the adaptability of smaller companies that enjoy leaner structure and lower amount of tangible assets and fixed costs. As such, they can adjust faster to the challenging conditions.

As for the company age, younger businesses appeared to be more vulnerable compared to the more established ones. The response to the Covid-19 shock varied also according to business fundamentals. More profitable companies were less likely to experience default, and the same applied to the companies with moderate levels of debt. The highest risk levels were exhibited by young companies with no profit and high levels of debt.

The analysis in this report did not address explicitly the effect of the government support, this will be the subject of further research. However, the high expected default rates confirm that the current government efforts (e.g. VAT discount) to support the sector are going in the right direction. Nevertheless, we would recommend support programs to be tailored to the company size to maximise their impact. Business fundamentals should be taken into account too. Firms that show the highest level of adaptability should be rewarded and offered additional support to overcome the crisis, in order to increase the chances of success in the deployment of public funds. Finally, the withdrawal of the current borrowing schemes should be carefully planned in order not to create additional shocks to the companies with high leverage.

Overview of risk modelling methodology

The results presented above are based on Wisefunding proprietary risk models, and this section provides a brief overview of them in the context of the history of credit risk modelling for businesses. Wisefunding is a fintech start-up offering innovative solutions for risk assessment. It provides consultancy services to business lenders, including the alternative/non-bank ones. The core of its methodology is based on the famous Z-score model, pioneered by Wisefunding co-founder - Prof Altman (New York University) and one of the most popular models in finance.

The original Z-score model was proposed by Altman (1968) and relied on ratios from financial statements to predict business failures. It used a multiple discriminant analysis technique (MDA) to a matched sample containing 66 manufacturing firms (33 failed and 33 non-failed). From the 22 potentially relevant financial ratios, five were selected into the final Z-score model as achieving the best prediction of bankruptcy: Working Capital/Total Assets, Retained Earnings/Total Assets, EBIT/Total Assets, Market Value Equity/BV of Total Debt and Sales/Total Assets.

The name was inspired by statistical Z-measures and also because it is the last letter in the English alphabet. The financial ratios were used as inputs into multiple linear discriminant analysis to estimate the bankrupt/non-bankrupt group and the resulting discriminant Z-score was compared to cut-offs between "Safe," "Grey" and "Distress" zones. If the firm had a Z-Score below 1.8 (Distressed Zone), it was classified as "bankrupt" and did, in fact, go bankrupt within one year. Firms with a Z-score above 2.99 keep trading, at least until the end of the study period in 1966. For bankrupt and non-bankrupt groups, the accuracy was 100%, whilst there were 3 errors in classification for firms in "Grey" zone.

The Z-score model remained simple, transparent and consistently accurate for many years, and this is a possible reason for its popularity in academic and practitioner research in finance and accounting. This model opened the door to many alternative models and frameworks to predict bankruptcy or defaults. The success of the original model inspired more research into default risk assessment in many scientific disciplines. In addition to finance and accounting scholars, it attracted statisticians and mathematicians, to experiment with better and more efficient methods and techniques, especially with the arrival of more data. More on the history of the Z-score can be found in Altman (2018).

For many years thereafter, MDA was the most popular statistical technique used in bankruptcy and default prediction studies (to mention a few – Altman et al 1977; Blum 1974; Edmister 1972; Micha 1984; Lussier 1995; Taffler 1982; Taffler and Tisshaw 1977). However, the problem which was often pointed out is that the two assumptions of MDA do not hold in most prediction problems, i.e. 1) the independent variables should be multivariate normally distributed (and often they are not); 2) the variance-covariance matrices should be equal for the failing and the non-failing groups. This topic was extensively discussed by Barnes (1982), Karels and Prakash (1987) and McLeay and Omar (2000).

Besides, MDA models are less intuitive as compared to regression when it comes to interpretation. In regression analysis the coefficients can be interpreted as the slopes and therefore, indicate the relative importance of the different independent variables. This is not the case with MDA. Logistic regression does not have these limitations and was first applied to the bankruptcy prediction by Ohlson (1980). Ohlson analysed a sample of 105 bankrupt firms and 2,058 non-bankrupt firms from the COMPUSTAT database between 1970-1976. Probit →

Overview of risk modelling methodology

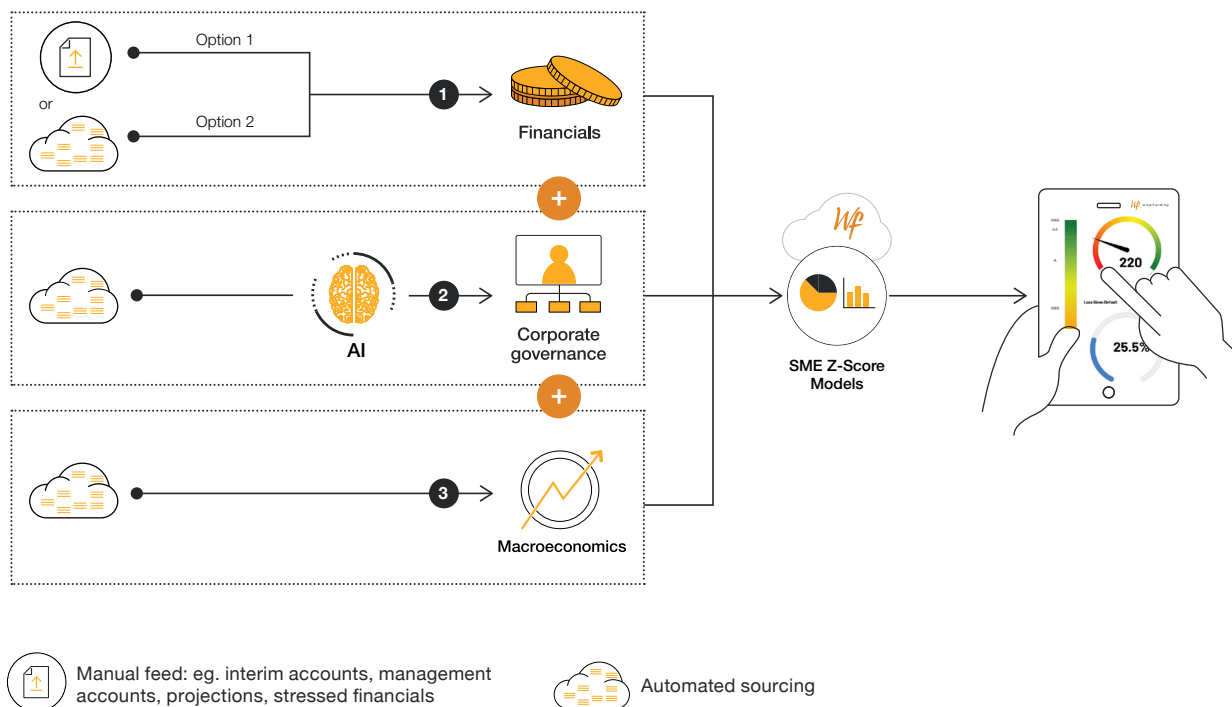
→ analysis is another popular way to predict bankruptcy (pioneered by Zmijewski 1984) but logistic regression is more widely used in this field.

The popularity of logistic regression is based on the fact that it fits well the demands of the default/bankruptcy prediction problem, where the dependant variable is binary (default/non-default). The output from logistic regression is a score between zero and one which provides an estimate for the probability of default (PD). The estimated coefficients provide the information on the statistical effect of each of the independent variables on the estimated PD. Most of the academic literature in default/ bankruptcy prediction used logistic regression (to name several - Becchetti and Sierra 2002; Gentry *et al* 1985; Lin *et al* 2012; Mossman *et al* 1998; Orton *et al* 2015; Platt and Platt 1990; Zavgren 1983), and it is also used in this study.

In 2016 a fintech start up (Wiserfunding Limited) was founded that focuses on developing credit risk models for SMEs. It used the Z-Score as the starting point, leveraging on its strengths (i.e. simplicity, transparency and consistency), but building a modern version that would be specific to the SME market. This is how the SME Z-Score was born.

The SME Z-Score models are segmented by country and industry to maximize their prediction power, but their structure is always the same with 3 modules: a typical financial module using SME specific financial ratios; a corporate governance and qualitative module, which includes important information about the company structure, ownership and managerial skills; and last, a macroeconomic module, that allows to put all the information specific to the company in the economic context in which it operates. There are models for all countries in Europe and the development of models for North America and Asia is in progress.

Figure 31 / SME Z-score components



Source: Wiserfunding, Ltd.

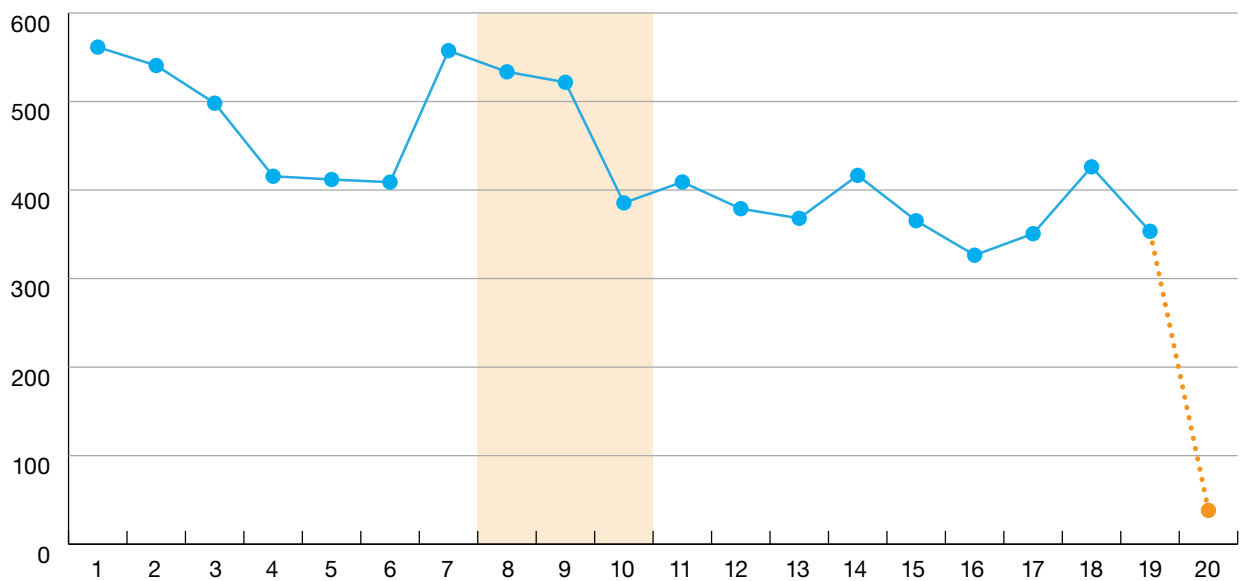
Appendix

Financial Ratios	Definition
Total Shareholder Equity	The shareholders' funds in a company's balance sheet is the excess of the assets over the liabilities. Alternatively, you could view it as the shareholders' investment in the company – the share capital plus all the retained profits of the company. Total Shareholder Equity is the sum of all items under shareholder funds including Share capital, Share premiums and retained earnings (Net earnings available for reinvestment in the firm).
Total Assets	Total Assets is the sum of all current and non-current assets owned by the firm based on the purchase price.
Turnover	Total earnings of the business from its daily operations from sale of goods and services to customers also to known as Revenue/Sales.
Short Term Debt	Short-term debt, also called current liabilities, is a firm's financial obligations that are expected to be paid off within a year.
Long Term Debt	Long Term Debt (non-current liabilities) is the sum of all financial debt owed for a period exceeding 12 months from date of reporting (bank loan, debenture and mortgage loans).
Cash	'Cash' stands for 'cash and cash equivalents' and refers to the item on the balance sheet that reports the value of a company's assets that are in cash or can be converted into cash immediately. Cash equivalents include bank accounts and marketable securities, which are debt securities with maturities of less than 90 days.
Working Capital	Capital of the business used in the daily operations calculated as the difference between the current assets and the current liabilities. Finance provided to support the short-term assets of the business (stocks and debtors) to the extent that these are not financed by short-term creditors.
Tangible Assets	A tangible asset is an asset that has a finite monetary value and usually a physical form. Tangible assets can typically be transacted for some monetary value though the liquidity of different markets will vary.
Intangible Assets	An intangible asset is an asset that is not physical in nature. Goodwill, brand recognition and intellectual property, such as patents, trademarks, and copyrights, are all intangible assets.
EBITDA	EBITDA, or earnings before interest, taxes, depreciation, and amortization, is a measure of a company's overall financial performance and is used as an alternative to simple earnings or net income in some circumstances.
Retained Earnings	Retained earnings is the amount of net income left over for the business after it has paid out dividends to its shareholders. It is the accumulated net income subsequent to any withdrawals as dividends at the reported date under the shareholder funds section of the balance sheet.
Interest Expenses	The interest expenses is the annual accrued amount of interest that the company paid (or sometimes will have to pay) to its creditors.

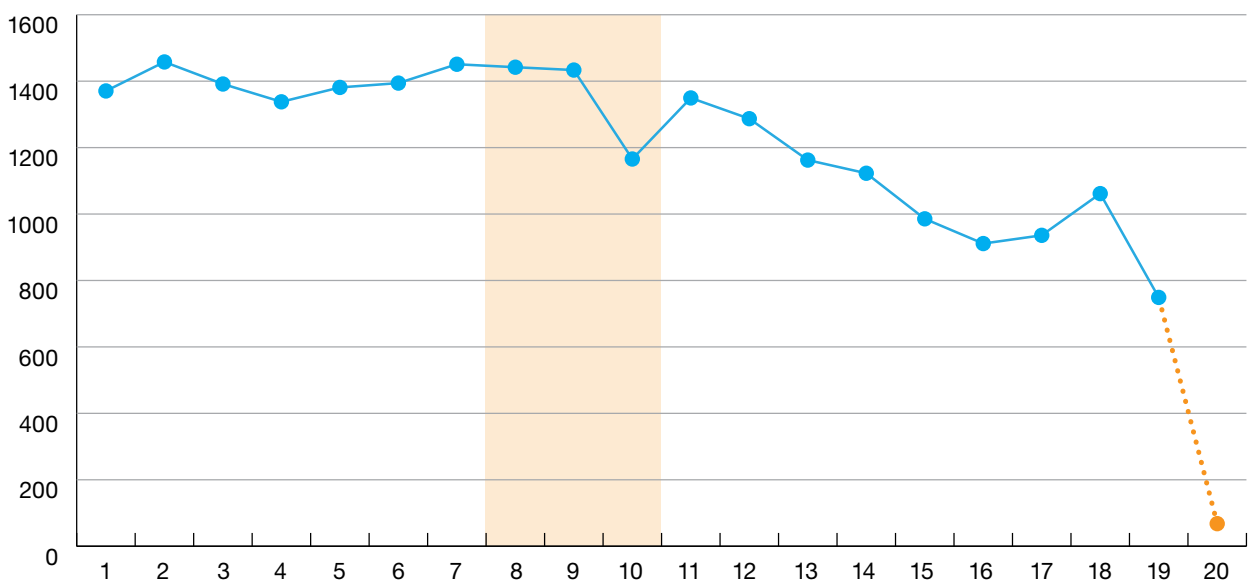
Category	Definition
AAA	An obligor rated 'AAA' has extremely strong capacity to meet its financial commitments. 'AAA' is the highest issuer credit rating assigned.
AA	An obligor rated 'AA' has very strong capacity to meet its financial commitments. It differs from the highest-rated obligors only to a small degree.
A	An obligor rated 'A' has strong capacity to meet its financial commitments but is somewhat more susceptible to the adverse effects of changes in circumstances and economic conditions than obligors in higher-rated categories.
BBB	An obligor rated 'BBB' has adequate capacity to meet its financial commitments. However, adverse economic conditions or changing circumstances are more likely to weaken the obligor's capacity to meet its financial commitments.
BB	An obligor rated 'BB' is less vulnerable in the near term than other lower-rated obligors. However, it faces major ongoing uncertainties and exposure to adverse business, financial, or economic conditions that could lead to the obligor's inadequate capacity to meet its financial commitments.
B	An obligor rated 'B' is vulnerable, but the obligor currently has the capacity to meet its financial commitments. Adverse business, financial, or economic conditions will likely impair the obligor's capacity or willingness to meet its financial commitments.
CCC	An obligor rated 'CCC' is currently vulnerable and is dependent upon favourable business, financial, and economic conditions to meet its financial commitments.
CC	An obligor rated 'CC' is currently highly vulnerable. The 'CC' rating is used when a default has not yet occurred, but we expect default to be a virtual certainty, regardless of the anticipated time to default.

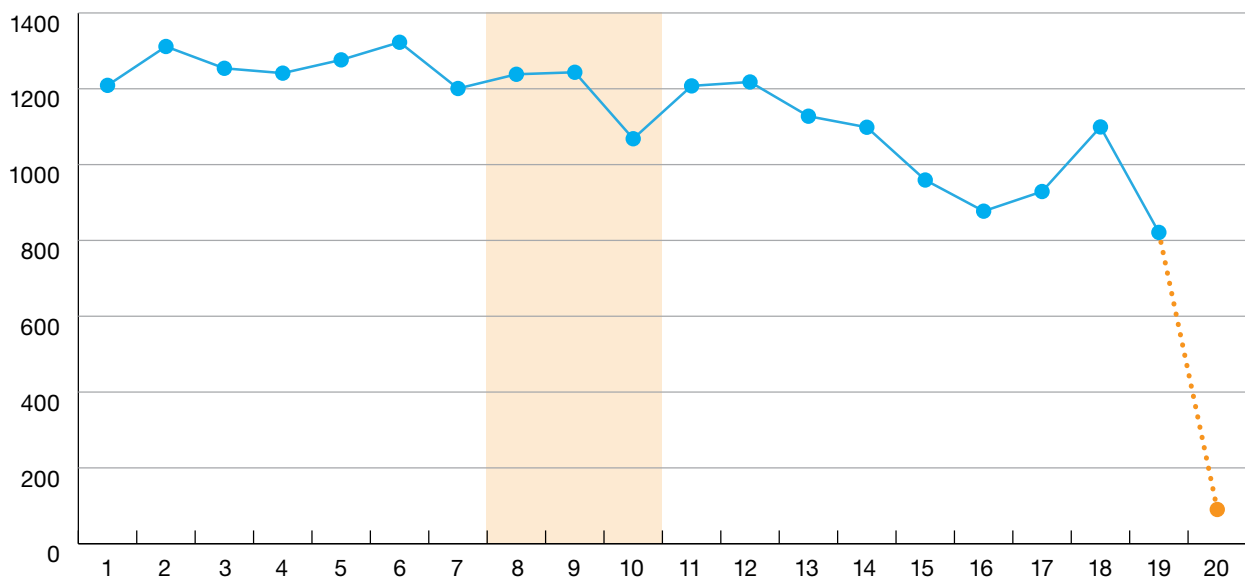
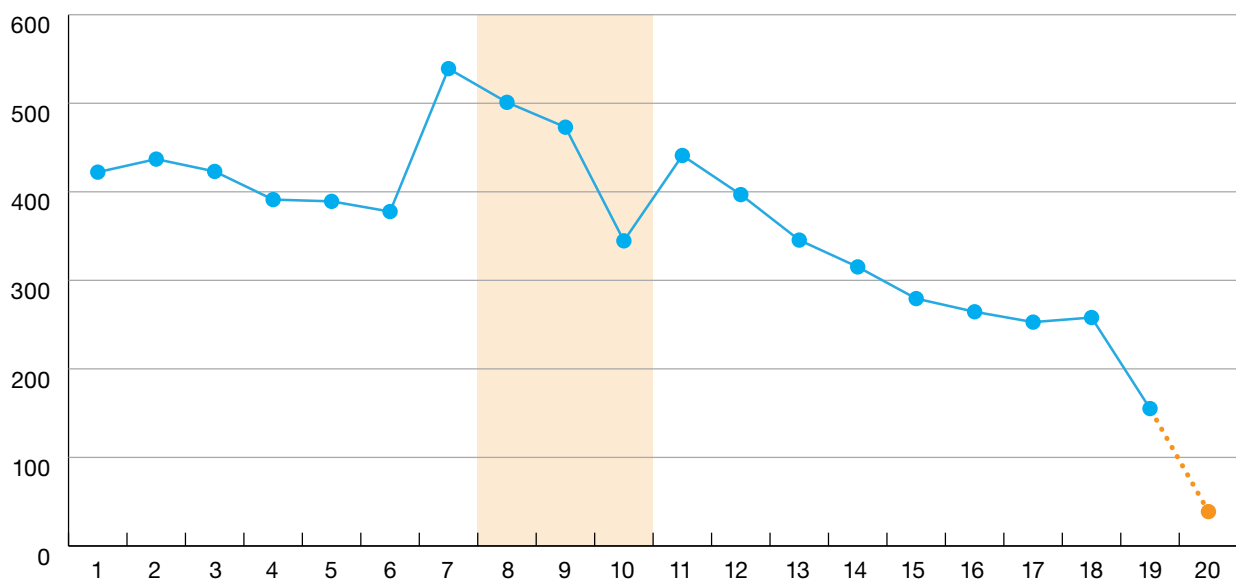
***Ratings from 'AA' to 'CC' may be modified by the addition of a plus (+) or minus (-) sign to show relative standing within the rating categories.**

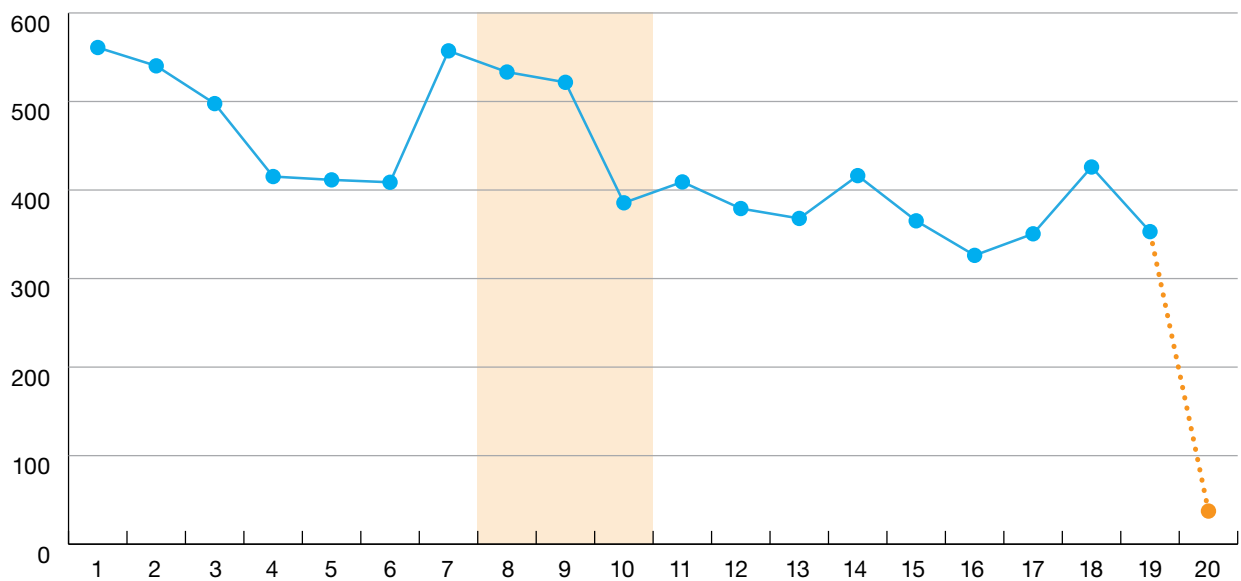
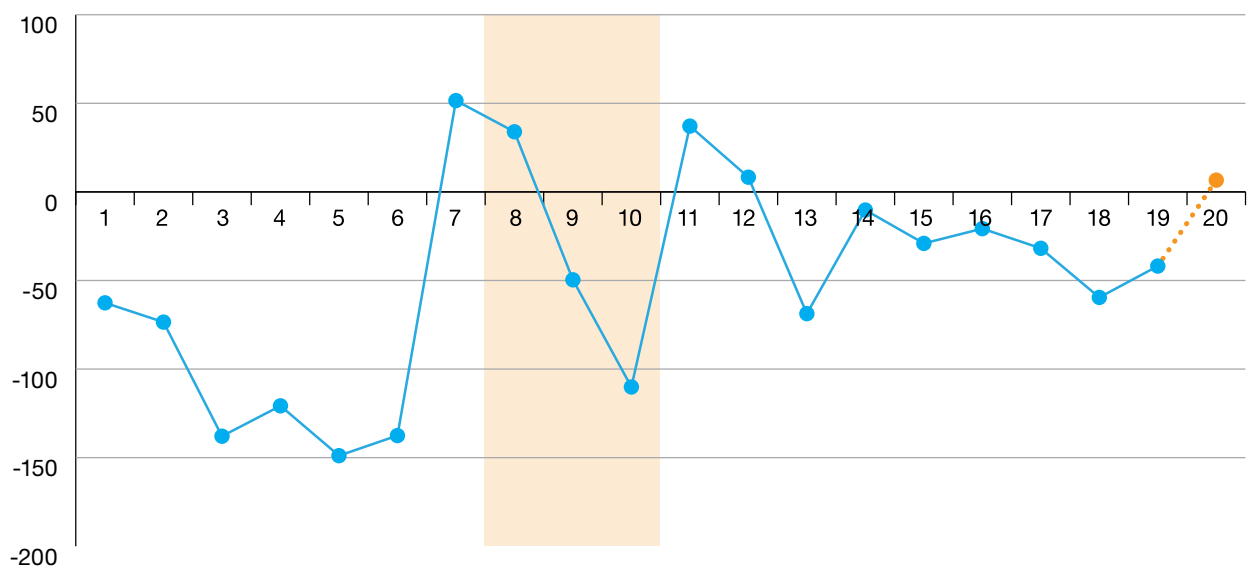
Shareholder Funds

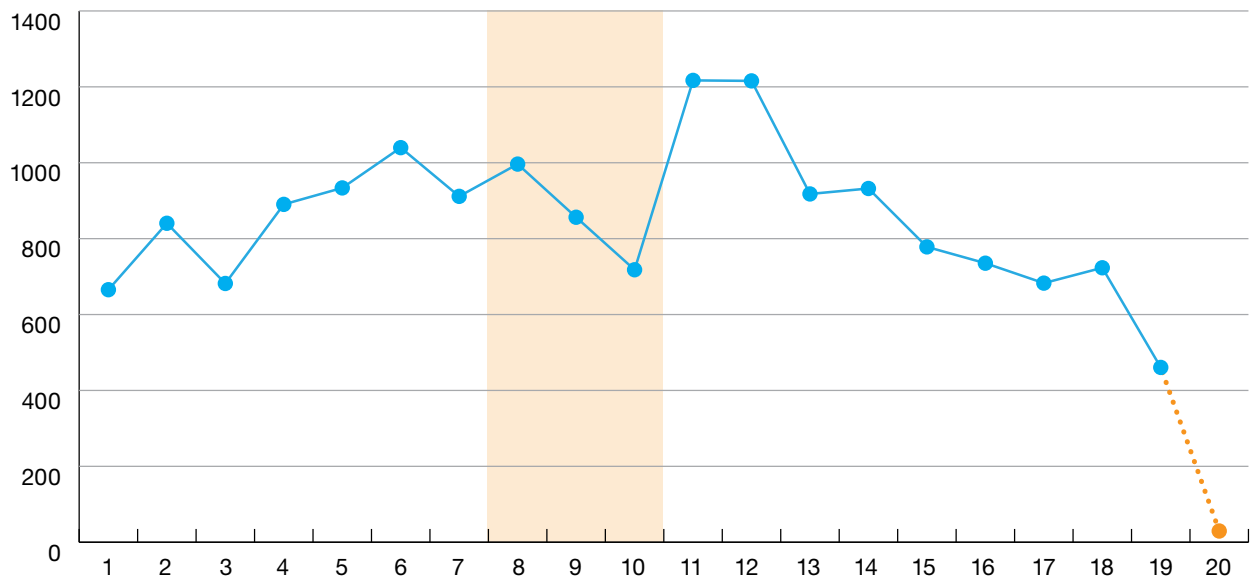
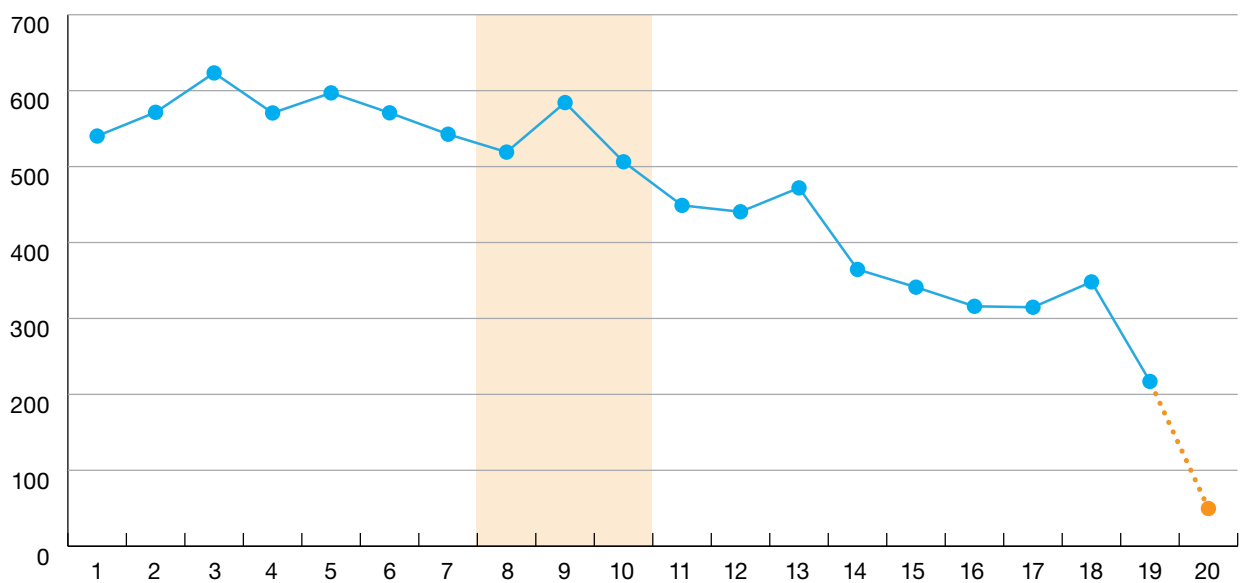


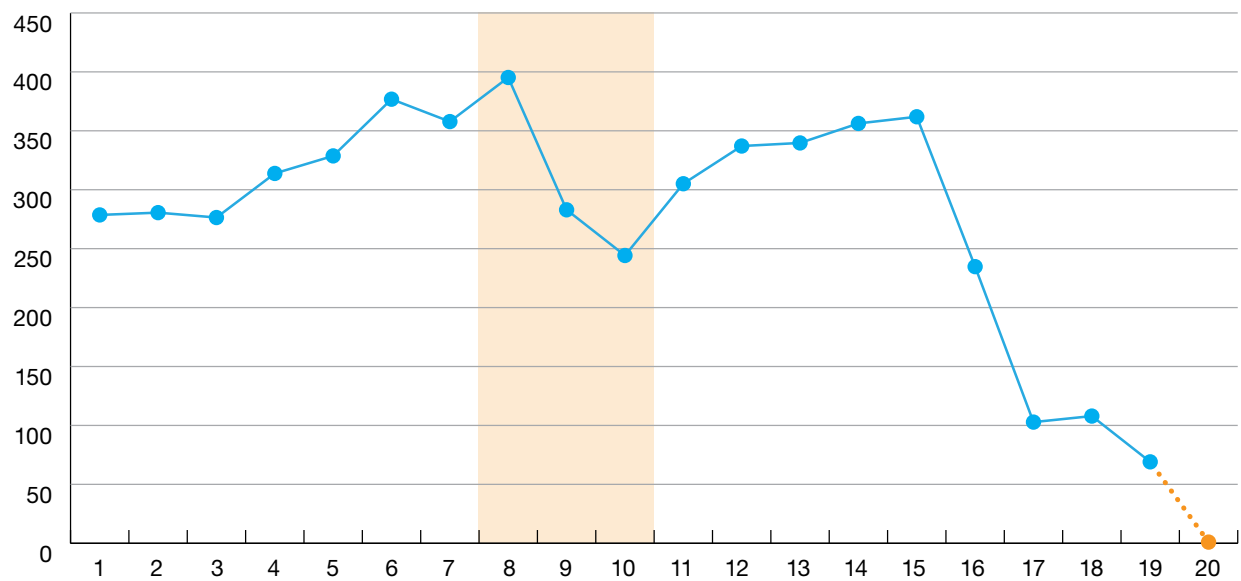
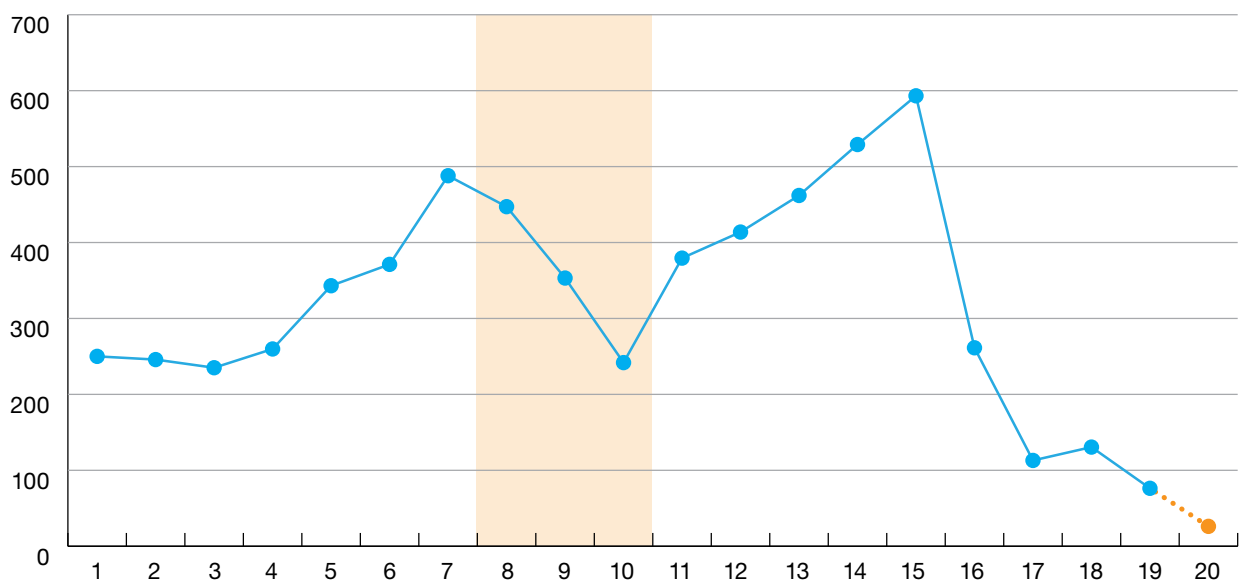
Total Assets

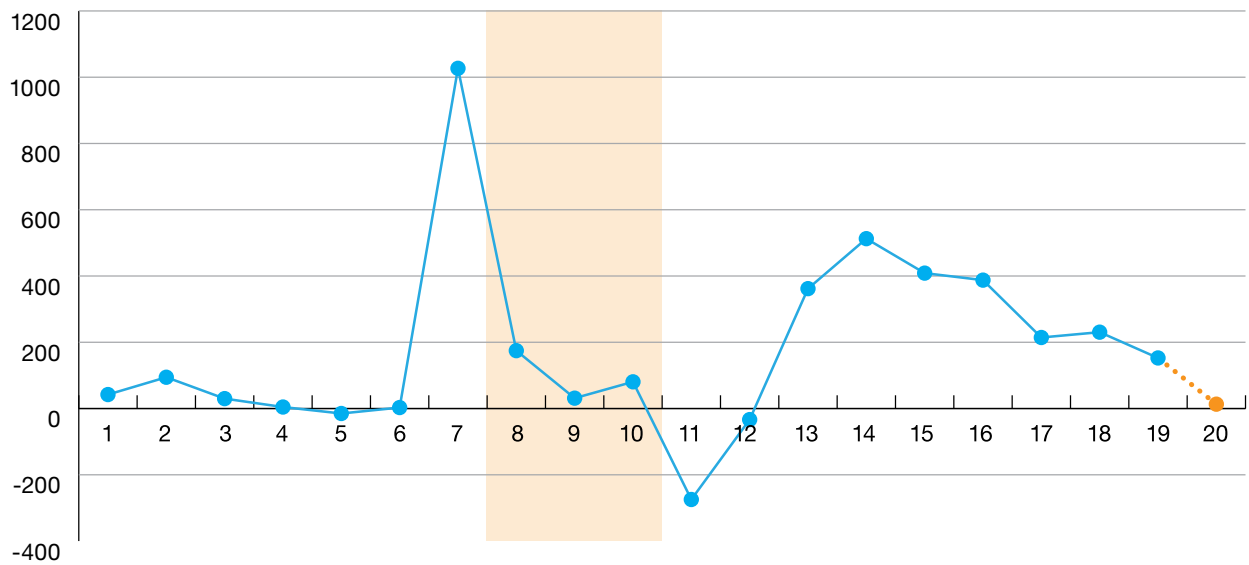
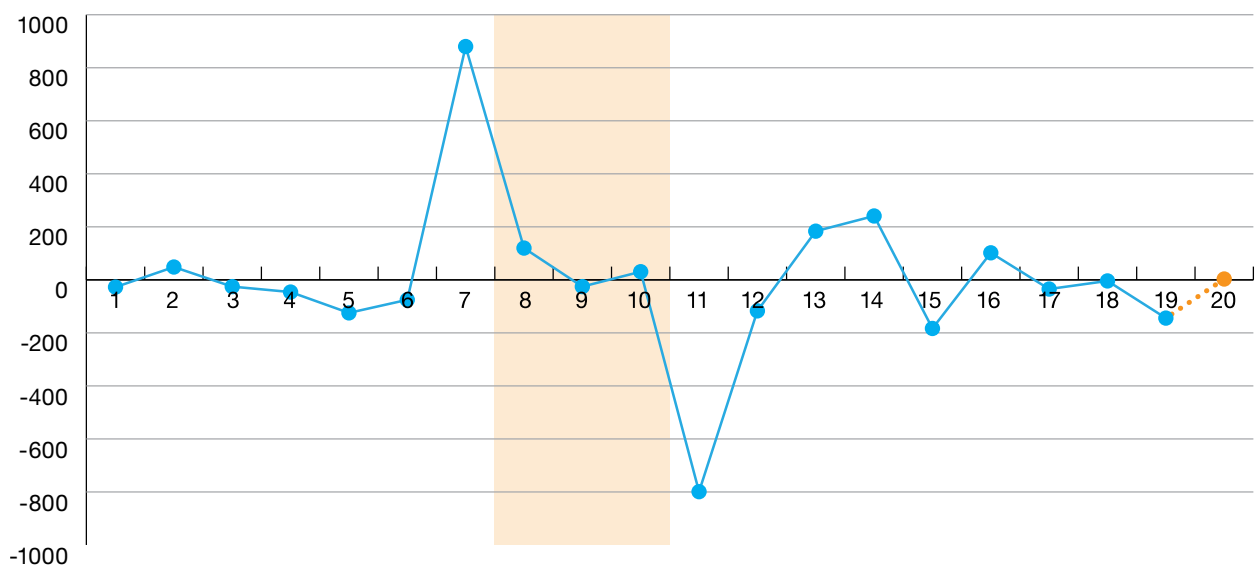


Fixed Assets**Current Assets**

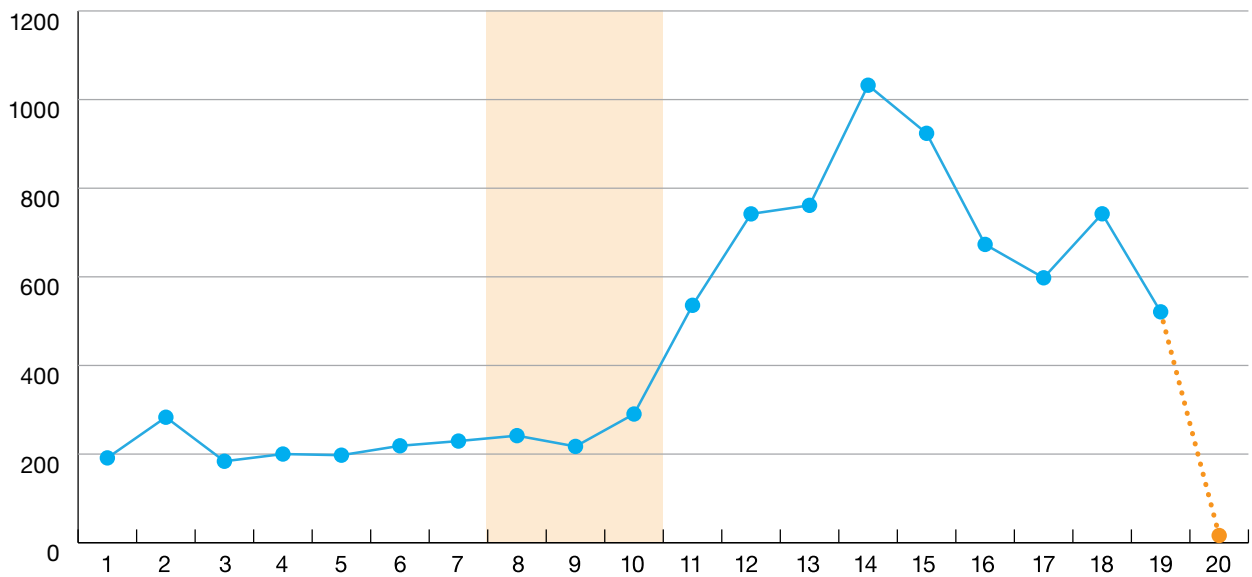
Net Assets**Net current assets**

Long term liabilities**Current liability**

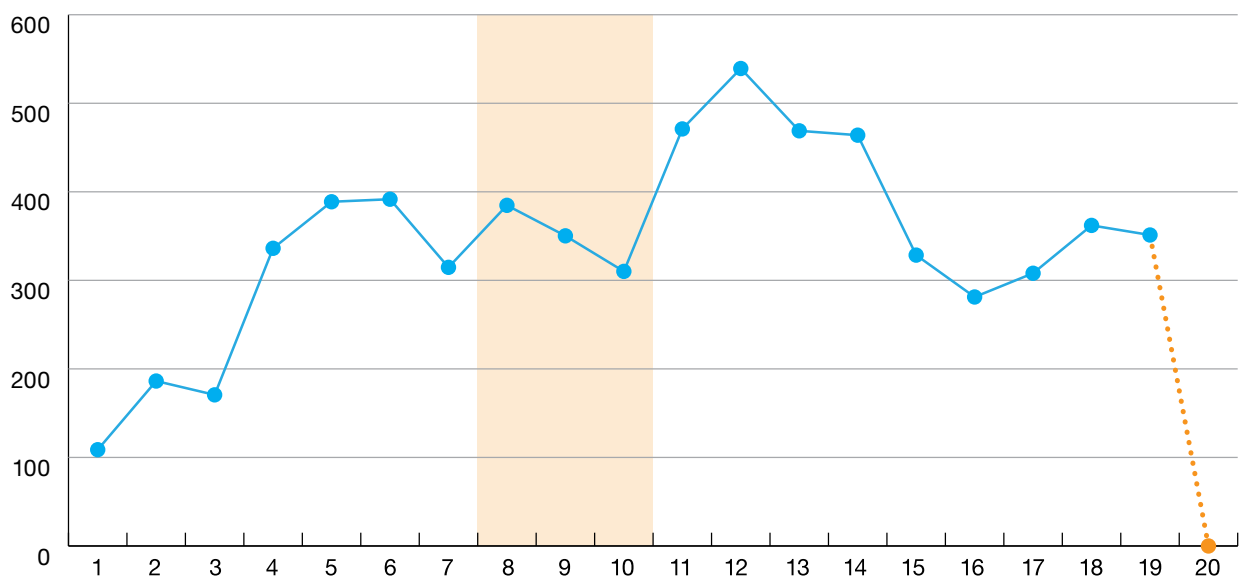
Trade debt**Trade credit**

Profit (Loss) after Tax**Retained profit (loss)**

EBITDA



Interest paid



Cash in (out) flow from operational activity

