

Understanding The Hong Kong SAR D&B Financial Stress Score (FSS) Re-Estimation



OVERVIEW

D&B's Financial Stress Scoring System (also known as the D&B Failure Score System) consists of statistical models built using the latest methodologies to give optimal predictive power to Dun & Bradstreet scores.

The Financial Stress Scoring System uses statistical probabilities to classify public and private companies into three risk classifications of Financial Stress: 1,001-1,890 Financial Stress Score; 1 - 100 Percentile Ranking and 1 - 5 Risk Class segmentation. These classifications predict the likelihood of a business experiencing financial stress within a 12 month period. The Financial Stress Scoring System uses the combined power of the Dun & Bradstreet Data Cloud that includes over 160,000 Hong Kong SAR businesses including Payment, Public Filing, Demographic, and Financial data.

AVAILABILITY OF THE FINANCIAL STRESS SCORE

A Financial Stress Score is available on approximately 160,000 Hong Kong SAR based companies. Financial Stress Scores are not available on business files that fall into the following categories:

- Business records that cannot be located or have an invalid address or telephone number.
- The business is closed.
- The business does not have investigation update within 2 years.
- Businesses with legal structure equal to 'Government Department', 'Statutory Body', 'Representative Company', 'Foreign Company, 'Non-profit Organization'. Businesses with missing data of legal structure
- Businesses in industries and SIC codes that do not lend themselves to scoring through this type of model. These industries and groups are listed in Table-1 below.
- Business Branch Locations inquiries automatically result in a trade-up to a headquarters' location.

2-DIGIT SIC GROUP	SIC GROUP DESCRIPTION
43 and 91 - 97	Government Offices
99	Non Classifiable Establishment

Table 1: Excluded SIC

WHAT THE FINANCIAL STRESS SCORE PREDICTS

The Financial Stress Score was designed to predict the likelihood a business will experience financial stress and cease operations without paying all creditors in full over the next 12 month period.

The scorecards are based upon the observed characteristics of hundreds of thousands of businesses in the Dun & Bradstreet Data Cloud and the relationship these characteristics have to the probability of a business experiencing financial stress over a period of 12 months.

Dun & Bradstreet defines a financially stressed company as one that:

- Ceased operations following assignment or bankruptcy
- Ceased operations with loss to creditors
- Voluntarily withdrew from business operation leaving unpaid obligations
- Is in receivership, reorganization, or has made an arrangement for the benefit of creditors.

Note: 1. Voluntary discontinuance involving no loss to creditors is not defined as financially stressed. 2. Financial Stress scores are not calculated for those businesses designated as "Discontinued at This Location" or "Petition for Wind-up". These records are automatically assigned a score of -1.

As previously mentioned, the Financial Stress model assigns three measurements of risk:

1. A "Financial Stress Score" of 1,001 – 1,890, where a 1,001 represents businesses that have the highest probability of financial stress, and a 1,890 which represents businesses with the lowest probability of financial stress. This score provides a direct relationship between the score and the level of risk. The marginal odds of being good doubles for each 40 point increase. For example, a score of 1,200, on a marginal basis, represents twice the risk of financial stress as a score of 1,240. This score enables a customer to utilize more granular cutoffs to drive their automated decision-making process.
2. A "Percentile" of 1 – 100, where a 1 represents businesses that have the highest probability of financial stress, and a 100 which represents businesses with the lowest probability of financial stress. This Percentile shows you where a company falls among businesses in the Dun & Bradstreet Data Cloud, and is most effectively used by customers to rank order their portfolios from highest to lowest risk of business failure. The Dun & Bradstreet Data Cloud, and is most effectively used by customers to rank order their portfolios from highest to lowest risk of business failure.
3. A "Class" of 1 – 5, which is a segmentation of the scoreable universe into five distinct risk groups where a one (1) represents businesses that have the lowest probability of financial stress, and a five (5) represents businesses with the highest probability of financial stress. This Class enables a customer to quickly segment their new and existing accounts into various risk segments to determine appropriate marketing or credit policies.

Note: Financial Stress scores are not calculated for those businesses designated as "Discontinued at This Location," "Open Bankruptcy" or "Higher Risk¹". These records are automatically assigned a score of -1.

¹These "Higher Risk" businesses include those that display characteristics of higher risk, either intentionally as in an overbuy, or may be higher risk due to other business factors.

Table 2, below, illustrates the distribution of the Financial Stress Class in the Dun & Bradstreet Data Cloud. The associated Financial Stress Score Percentile and Financial Stress Score are also displayed.

Table 2: Distribution of Financial Stress Risk Class in the Dun & Bradstreet Data Cloud

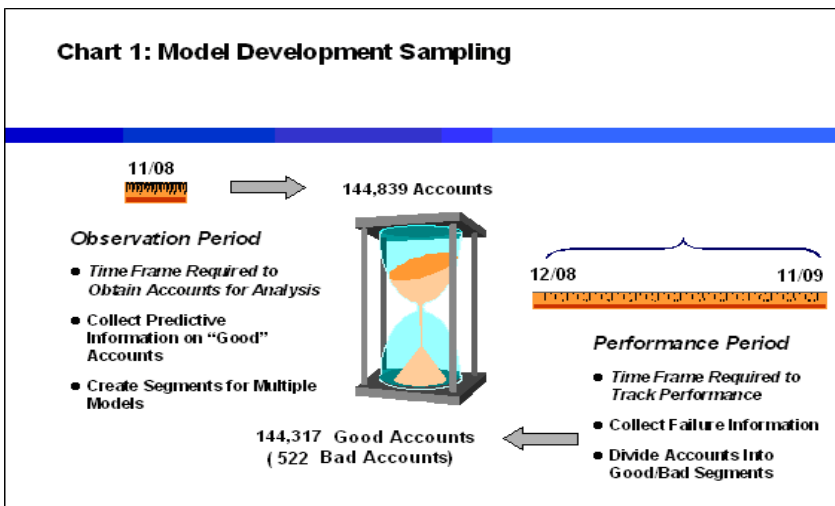
FINANCIAL STRESS RISK CLASS	% OF BUSINESSES WITHIN THIS FINANCIAL STRESS CLASS	FINANCIAL STRESS PERCENTILE	FINANCIAL STRESS SCORE
1	5%	>=96	1488 - 1890
2	33%	63 - 95	1459 - 1487
3	35%	28 - 62	1448 - 1458
4	26%	2 - 27	1427 - 1447
5	1%	1	1001 - 1426

HOW THE FINANCIAL STRESS SCORE IS CALCULATED

The Financial Stress Scoring System was developed using state of the art statistical and modeling techniques to select and weight the data elements that are most predictive of financial stress. The resulting Financial Stress models are mathematical equations that consist of a series of variables and coefficients (weights) that have been calculated for each variable.

The selection of the variables and the calculation of corresponding weights for each model are the result of extensive data analysis. When developing the models, Dun & Bradstreet evaluated a combination of “good” and “bad” performing businesses in the Dun & Bradstreet Data Cloud. Chart 1, below, illustrates the model development sample for the Financial Stress Score.

Chart 1: Model Development Sampling



A total of 144,839 businesses records were used to develop the Financial Stress Score. These consisted of:

- Approximately 144,317 “good,” or non-financially stressed, companies in the Dun & Bradstreet Data Cloud.
- Approximately 522 “bad,” or financially stressed, companies in the Dun & Bradstreet Data Cloud.

Data is collected from two time periods we designate as an observation window and a performance window. The observation window defines the sample used in the model and all identification and characteristic data are collected from this time period. The performance window defines the length of time the accounts are tracked to examine their payment behavior.

Dun & Bradstreet analyzed this information and identified the data elements, which are statistically the most significant factors for predicting financial stress. The Dun & Bradstreet's Data Cloud includes over 160,000 businesses, is uniquely qualified to demonstrate this impact.

Sample data elements used in the model include:

- Payment performance information
- Non-financial information such as
 - demographics (industry, size, corporate structure)
 - public records (suits, liens, or judgments)
- Financial ratios, which include sales, networth etc.

RELATIONSHIP BETWEEN FINANCIAL STRESS SCORE, INCIDENCE OF BUSINESS FAILURES AND DATA CLOUD AVERAGES

The 1,001 - 1,890 Financial Stress Score is created by calculating the estimated probability of a company experiencing financial stress.

The 1 - 100 (Percentile) is created by ranking the firm relative to the average incidence of financial stress within the scoreable universe.

The Risk Class is created using cut off points in the Percentile Ranking.

Table 3 below provides the national failure rates for each Financial Stress Class, as well as a comparison to the average failure rate by Class.

FINANCIAL STRESS CLASS	% OF D&B FILES REPRESENTED	FAILURE RATES WITHIN RANGE	CUMULATIVE % OF BADS CAPTURED
1	5%	0.11%	98.9%
2	33%	0.27%	81.9%
3	35%	0.37%	57.1%
4	26%	0.49%	32.7%
5	1%	0.89%	0.0%

The following Table 4 illustrates the overall incidence of business failures nationally and by industry group.

Table 4: Incidence of Business Failures by Industry (Based on 2009 Failure Statistics)

MAJOR INDUSTRY GROUP	PROJECTED FAILURE RATE
Agriculture, Forestry, Fishing,	0.31%
Mining	0.27%
Construction	0.40%
Manufacturing	0.36%
Transportation, Communications Utilities	0.36%
Wholesale Trade	0.38%
Retail Trade	0.32%
Finance, Insurance, Real Estate	0.37%
Services	0.32%
Public Administration	0.00%

APPENDIX A

FOLLOWING IS A LIST OF SOME OF THE MAJOR DATA ELEMENTS USED IN THE FINANCIAL STRESS SCORING SYSTEM AND THEIR IMPACT TO SCORECARD:

Demographic Information

FACTOR	IMPACT ON MODEL
Industry	Certain industries sectors have shown relatively higher risk E.g. Companies in Construction sector have shown a relatively higher risk than those in other sector.
Company Type (Legal Status)	Public limited Companies are considered less risky. These businesses typically have the ability to utilize additional support if necessary.
Number of Inquires over past 12 months	Companies which are been inquired over the past 12 months are said to be non financially stressed companies, so positive points are assigned to these companies
Employee Size	In general, the larger the number of employees, the greater the stability of the business.
Years in Business	In general, as the company gets older it tends to stabilize in its business hence the lower the risk.

Financial Information

FACTOR	IMPACT ON MODEL
Net worth	Companies who have high net worth are less likely to default hence those companies are assigned with positive points
Sales	As Companies have higher sales, it indicated higher profit earned hence as sales values increase positive points are assigned.

Payment Information

FACTOR	IMPACT ON MODEL
Current Paydex®	Paydex® stands for "payment index," which is based on an analysis of past payment behavior as reported to Dun & Bradstreet. The higher the actual Paydex®, the lower the risk.
Percent of Payments 90 & above past due	The higher the percentage of payments 90 & above days past due, the higher the risk.
Negative Payment Information	Negative payment comments adversely affect the score. They consist of unsatisfactory, bad debt, suit-filed, non-sufficient funds, credit refused, placed for collection or repossession trade experiences.
Maximum High Credit	Companies with higher maximum high credit imply that their business partner run business actively and confidently with it. It is less likely to default.

Court Information

FACTOR	IMPACT ON MODEL
Number of District Court filings	If companies have suits against them in the district court are considered more riskier. As court filing is considered as not to have good business obligation.
Number of High court filings	If companies have suits against them in the high court are considered more riskier as companies have higher chance to default as these companies are sued if they don't repay their loans back.
District court Amount	District court amount, gives information on the value of amount that the companies are sued.

APPENDIX B

D&B HK FINANCIAL STRESS SCORE – DETAILED PROJECTED PERFORMANCE TABLE

Cumulative Failure Risk Score Performance						Failure Risk Score Performance within Range			
CUMULATIVE SCORE RANGE	PERCENTILE RANGE	APPROVAL RATE	FAILURE RATE	% OF FAILED ACCOUNTS IDENTIFIED	FAIL/ NON FAIL RATIO	MARGINAL SCORE RANGE	PERCENTILE RANGE	FAILURE RATE	% OF FAILED ACCOUNTS IDENTIFIED
1488 - 1890	96 - 100	5%	0.11%	98.95%	606	1488 - 1890	96 - 100	0.11%	1.1%
1479 - 1890	91 - 100	9%	0.19%	96.84%	518	1479 - 1487	91 - 95	0.22%	2.1%
1473 - 1890	86 - 100	14%	0.21%	94.44%	468	1473 - 1478	86 - 90	0.25%	2.4%
1468 - 1890	81 - 100	19%	0.23%	91.76%	438	1468 - 1472	81 - 85	0.28%	2.7%
1465 - 1890	76 - 100	24%	0.24%	88.89%	413	1465 - 1467	76 - 80	0.30%	2.9%
1462 - 1890	71 - 100	28%	0.25%	85.92%	397	1462 - 1464	71 - 75	0.31%	3.0%
1459 - 1890	66 - 100	33%	0.26%	82.76%	378	1459 - 1461	66 - 70	0.33%	3.2%
1458 - 1890	61 - 100	38%	0.27%	79.50%	365	1458 - 1458	61 - 65	0.34%	3.3%
1457 - 1890	56 - 100	40%	0.28%	76.25%	361	1457 - 1457	56 - 60	0.34%	3.3%
1455 - 1890	51 - 100	45%	0.29%	72.80%	349	1455 - 1456	51 - 55	0.36%	3.4%
1453 - 1890	46 - 100	53%	0.30%	69.25%	336	1453 - 1454	46 - 50	0.37%	3.5%
1451 - 1890	41 - 100	58%	0.30%	65.61%	329	1451 - 1452	41 - 45	0.38%	3.6%
1450 - 1890	36 - 100	62%	0.31%	61.88%	322	1450 - 1450	36 - 40	0.39%	3.7%
1448 - 1890	31 - 100	66%	0.31%	58.05%	317	1448 - 1449	31 - 35	0.40%	3.8%
1447 - 1890	26 - 100	73%	0.32%	54.12%	308	1447 - 1447	26 - 30	0.41%	3.9%
1446 - 1890	21 - 100	75%	0.33%	50.10%	306	1446 - 1446	21 - 25	0.42%	4.0%
1444 - 1890	16 - 100	84%	0.34%	45.98%	295	1444 - 1445	16 - 20	0.43%	4.1%
1443 - 1890	11 - 100	85%	0.34%	41.76%	295	1443 - 1443	11 - 15	0.44%	4.2%
1440 - 1890	6 - 100	95%	0.35%	37.45%	285	1440 - 1442	6 - 10	0.45%	4.3%
1001 - 1890	1 - 100	100%	0.36%	0.00%	277	1001 - 1439	1 - 5	0.80%	37.5%

This Projected Performance Table is based on a generic model. Performance may vary based on individual customer portfolios.

EXPLANATIONS

CUMULATIVE FAILURE RISK SCORE PERFORMANCE

- **Approval Rate:** To set an approval rate, select the appropriate projected score or percentile cutoff that yields the desired approval rate. Approved businesses are companies scoring between the lowest value in the score range (or percentile) and 1890 (or 100 percentile). For example, a credit policy, which approves 62% of all accounts, requires accepting accounts that score between 1450 - 1890 (or 36 - 100 percentile). Accounts scoring below the cutoff (1001 - 1449) are reviewed, declined, etc.
- **Failure Rate:** The failure rate represents those businesses that score between the lowest value in the score range and 1890. For example, the failure rate for a credit policy which approves all businesses with a score at or above 1450 (or 36-100 percentile) is expected to be 0.31%.
- **% of Failed Accounts Identified:** The percentage of total failed businesses that score between 1001 and the cutoff point for the approval rate. For example, approving businesses with a score at or above 1450 (36 - 100 percentile) is expected to eliminate 61.9% of the bad accounts.
- **Fail-Non Fail Ratio (Odds):** The ratio of “Good” accounts to “Bad” accounts among those businesses that score between the lowest value in the score range and 1890 (or 100 percentile). For example, a credit policy which approves all accounts scoring at or above 1450 (or 36 - 100 percentile) should result in a portfolio with 322 “Good” accounts for every “Bad” account in the portfolio.

FAILURE RISK SCORE PERFORMANCE WITHIN RANGE

- **BAD Rate:** The incidence of failure for those businesses that score within the score range. For example, the failure rate for companies scoring between 1448 and 1449 (31 - 35 percentile) is expected to be 0.40%.
- **% of BADs Identified:** The percentage of total failed businesses within the score range. For example, 3.8% of all failed companies are expected to score between 1448 and 1449 (31 - 35 percentile).

APPENDIX C

D&B HK FINANCIAL STRESS SCORE - PROJECT PERFORMANCE TABLES

Cumulative Financial Stress Score Performance						
RISK CLASS	SCORE RANGE	PERCENTILE RANGE	% OF ACCOUNTS	FAILURE RATE	% OF FAILURES IDENTIFIED	GOOD-BAD RATIO
1	1488 - 1890	91 - 100	5%	0.11%	98.9%	606
2	1459 - 1890	86 - 100	33%	0.26%	85.5%	378
3	1448 - 1890	81 - 100	66%	0.31%	57.1%	317
4	1427 - 1890	76 - 100	99%	0.36%	31.8%	279
5	1001 - 1890	71 - 100	100%	0.36%	0.0%	277

Financial Stress Score Performance Within Range			
SCORE RANGE	PERCENTILE RANGE	FAILURE RATE	% OF FAILED IDENTIFIED
1488 - 1890	96 - 100	0.11%	1.1%
1459 - 1487	63 - 95	0.27%	17.1%
1448 - 1458	28 - 62	0.37%	24.8%
1427 - 1447	2 - 27	0.49%	24.4%
1001 - 1426	1	0.89%	32.7%

EXPLANATIONS

CUMULATIVE FINANCIAL STRESS SCORE PERFORMANCE

- **% of Accounts:** To set an approval rate, select the appropriate percentile range that yields the desired approval rate. For example, to develop a credit policy that approves a projected 66% of all customers requires accepting accounts scoring at or above 1448 (or 28 - 100 percentile). Businesses scoring below the cutoff score (1001 - 1447) are reviewed, declined, etc.
- **Failure Rate:** The failure rate represents those businesses that score between the lowest value in the score range (or percentile) and 1890 (or 100 percentile). For example, the failure rate for a credit policy which approves all businesses with a score at or above 1448 (or 28 - 100 percentile) is expected to be 0.31%.
- **% of Bad Identified:** The percentage of total failed businesses that score between 1001 and the cutoff point for the approval rate. For example, approving businesses with a score above 1448 (or 28 - 100 percentile) is expected to eliminate 57.1% of the bad accounts.
- **Good-Bad Ratio (Odds):** The ratio of “Good” accounts to “Bad” accounts among those businesses that score between the lowest value in the score range and 1890 (or 100 percentile). For example, a credit policy that approves all accounts scoring at or above 1448 (or 28 - 100 percentile) should result in a portfolio with 317 “Good” accounts for every “Bad” account in the portfolio.

FINANCIAL STRESS SCORE PERFORMANCE WITHIN RANGE

- **Failure Rate within Range:** The incidence of failure for those businesses that score within the score range. For example, the failure rate for companies scoring between 1427 and 1447 (or 2 - 27 percentile) is expected to be 0.49%.
- **% of BADs Identified:** The percentage of total failed businesses within the score range. For example, 24.4% of failed companies are expected to score between 1427 and 1447 (or 2 - 27 percentile).



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